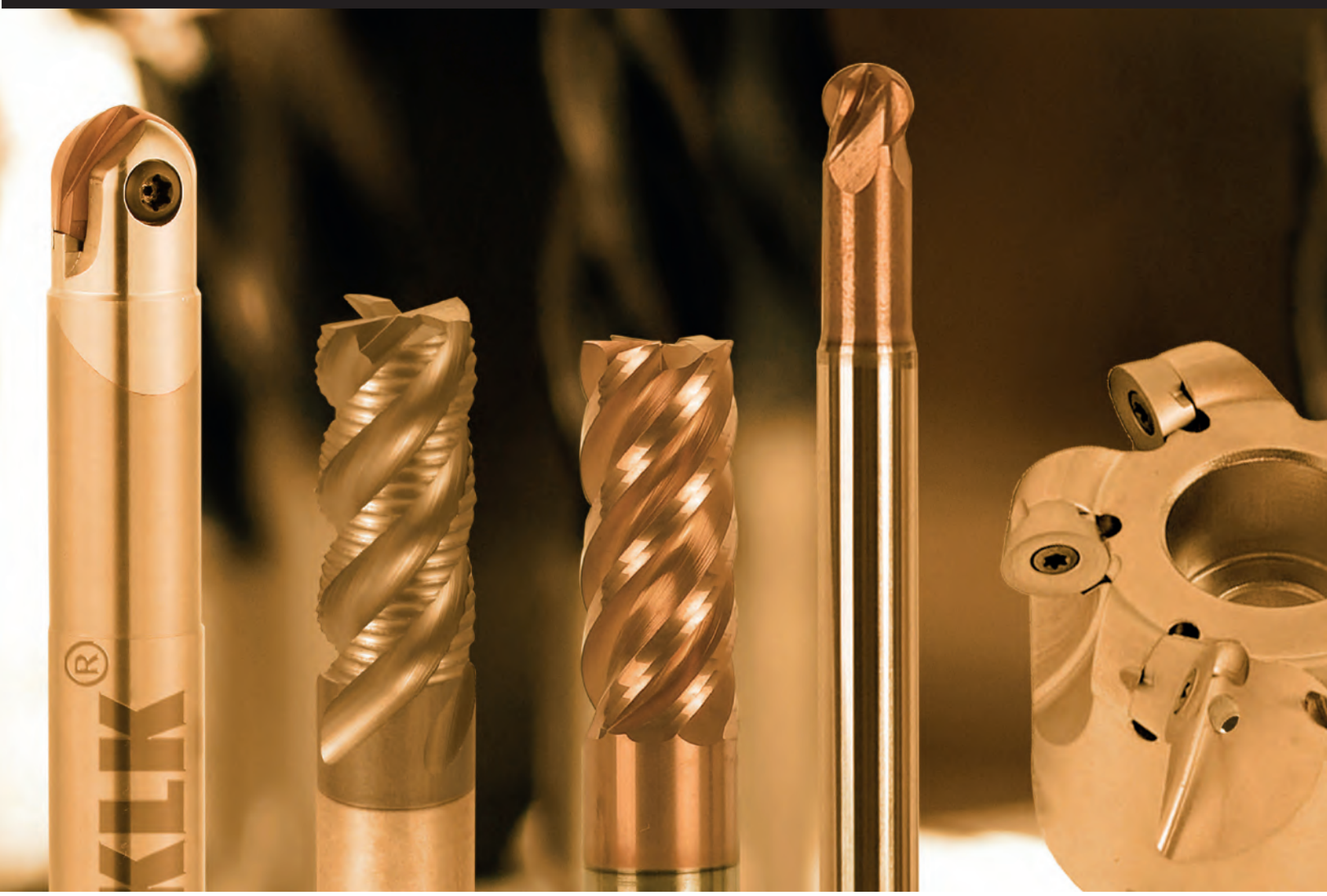
HERRAMIENTAS DE CORTE

CUTTING TOOLS



KLK®
CUTTING TOOLS

ÍNDICE GENERAL

GENERAL INDEX

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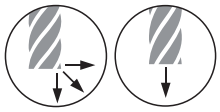
Todos los datos r catálogo podrán ser suscep cambio en la tarifa.

EXPLICACIÓN DE LOS SÍMBOLOS | SYMBOL EXPLANATION

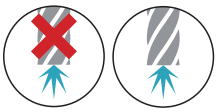
ÁNGULO DE HÉLICE
HELIX ANGLE

DIRECCIONES DE MECANIZADO POSIBLES
MACHINING DIRECTION

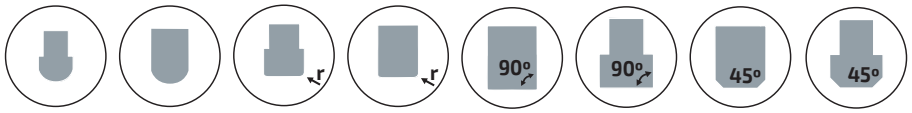


REFRIGERACIÓN EXTERNA
EXTERNAL COOLANT

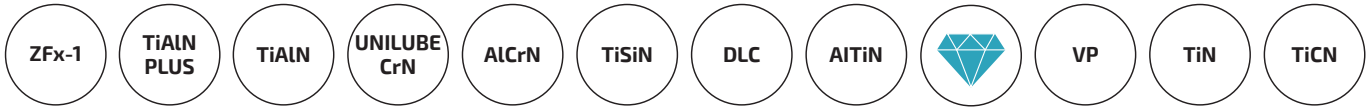
REFRIGERACIÓN INTERNA
INTERNAL COOLANT



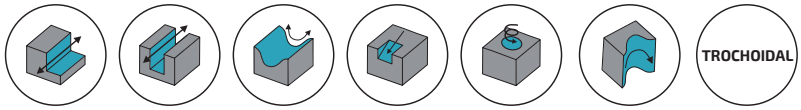
FORMA DE PUNTA
POINT SHAPE



RECUBRIMIENTO
COATING



APLICACIÓN
APPLICATION



SUPERFICIE PULIDA
POLISHED SURFACE

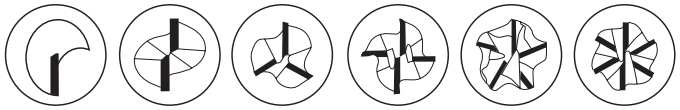
MECANIZADO ALTA CALIDAD
HIGH SPEED CUTTING

MATERIALES DUROS
HARD MATERIALS

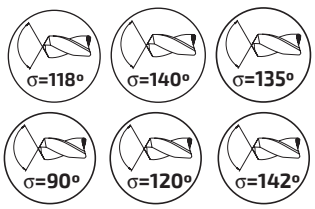
BAJO ESFUERZO DE CORTE
LOWER POWER CUTTING

TOLERANCIA
TOLERANCE

NÚMERO DE DIENTES
No. OF FLUTES



ÁNGULO DE PUNTA
POINT ANGLE



MANGO
SHANK

LONGITUD DE CORTE
DRILL CUTTING LENGTH

3xD · 5xD · 8xD · 10xD · 15xD · 12xD · 20xD · 30xD · 40xD

TIPO DE MACHO
TAP TYPE

Type N · Type VA · Type GG · Type AL · Type H · Type UNI · GH 53 · GH 63

TIPO DE ROSCA
THREAD TYPE

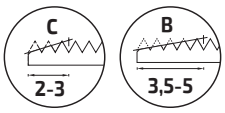
M · MF · G · UNC · UNF

DIMENSIONES SEGÚN NORMA DIN
DIMENSIONS ACCORDING DIN

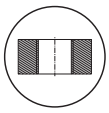
DIN 371 · DIN 374 · DIN 376 · DIN 2174 · DIN 5156

ÁNGULO DE FLANCO
FLANK ANGLE

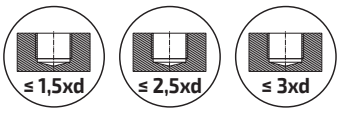
FORMA DE LA PUNTA Y Nº DE HILOS
CHAMFER FORM AND THREADS



AGUJEROS PASANTES
THROUG HOLES



AGUJEROS CIEGOS
BLIND HOLES



RANURAS DE LUBRICACIÓN
LUBRICATION GROOVES

SN

APLICACIÓN UNIVERSAL
UNIVERSAL USE

UNI

ACERO
STEEL

STEEL <65 HRC · STEEL <55 HRC

ACERO INOXIDABLE
STAINLESS STEEL

INOX

FUNDICIÓN
CAST IRON

GGG · GG

MATERIALES NO FÉRRICOS
NON-FERROUS MATERIALS

COPPER · ALU <12% SI · PLASTIC · GOLD · GFK CFK

MATERIALES EXÓTICOS
EXOTIC MATERIALS

NI ALLOYS · TITAN INCONEL

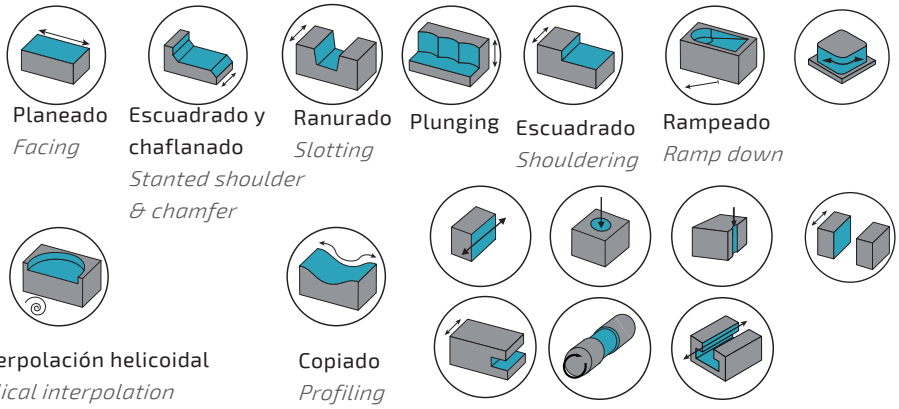
ACERO TEMPLADO
HARDENED STEEL

HG

GRAFITO
GRAPHITE

GRAPHITE

FRESADO
MILLING



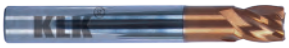
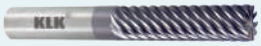
Planeado *Facing* · Escuadrado y chaflanado *Stanted shoulder & chamfer* · Ranurado *Slotting* · Plunging · Escuadrado *Shouldering* · Rampeado *Ramp down*

Interpolación helicoidal *Helical interpolation* · Copiado *Profiling*

FRESAS

END MILLS

MAT. MAT.	REFERENCIA REFERENCE	FOTO PHOTO	Nº DE FILOS No. FLUTES	TIPO DE FRESAS END MILL TYPE	PÁGINA PAGE
ALUMINIO ALUMINUM	F-200		1	**Fresa plana** End mill	10
	F-201		1	**Fresa plana larga** Long end mill	11
	F-282		2	**Fresa plana alta velocidad** High speed end mill	12
	F-301		3	**Fresa plana alta velocidad (0,2µm)** High speed end mill (0,2µm)	13
	F-151		3	**Fresa metal duro tórica hélice variable** Solid carbide variable helix end mill	14
	F-271		3	**Fresa tórica** Corner radius end mill	15
	F-272		3	**Fresa tórica** Corner radius end mill	16
	F-606		3	**Fresa plana de desbaste y semiacabado** Roughing and semi-finishing end mill	17
	F-604		3	**Fresa plana gran desbaste** Super roughing end mill	18
	F-303		3 & 4	**Fresa plana alta velocidad con cuello largo** Long neck high speed end mill	19
	F-481		4	**Fresa con hélice variable** Variable helix end mill	20
	F-482		4	**Fresa con hélice variable** Variable helix end mill	21
	F-283		2	**Fresa tórica** Corner radius end mill	22
	F-281		2	**Fresa tórica** Corner radius end mill	23
	F-284		3	**Fresa tórica alta velocidad (0,2µm)** High speed corner radius end mill (0,2µm)	25
	F-607		3	**Fresa tórica de desbaste y semiacabado** Roughing and semi-finishing corner radius end mill	26
	F-223		2	**Fresa esférica** Ball end mill	27
	F-273		2	**Fresa esférica recubierta** Corner radius end mill with coating	28
	F-274		2	**Fresa esférica recubierta** Corner radius end mill with coating	29
CBN CBN	F-112		2	**Fresa CBN tórica <70 HRC** CBN corner radius end mill <70 HRC	32
	F-110		2	**Fresa CBN esférica <70 HRC** CBN ball end mill <70 HRC	33
COBRE COPPER	F-290		2	**Fresa tórica (0,2µm)** Corner radius end mill (0,2µm)	35
	F-295		3	**Fresa tórica (0,2µm)** Corner radius end mill (0,2µm)	36
	F-285		2	**Fresa esférica (0,2µm)** Ball end mill (0,2µm)	37
ACERO STEEL	F-901		2	**Microfresa plana HSC (0,2µm) <55 HRC** HSC micro end mill (0,2µm) <55 HRC	39
	F-812		2	**Fresa plana HSC/HHC <55 HRC** HSC/HHC end mill <55 HRC	40
	F-913		2	**Fresa plana de cuello largo <55 HRC (0,2µm)** Long neck end mill <55 HRC (0,2µm)	41
	F-202		2	**Fresa plana <55 HRC** End mill <55 HRC	43
	F-214		2	**Fresa plana <70 HRC** End mill <70 HRC	44
	F-204		2	**Fresa plana larga <55 HRC** Long end mill <55 HRC	45
	F-218		2	**Fresa plana extra larga <55 HRC** Extra long end mill <55 HRC	46
	F-302		3	**Fresa plana <55 HRC** End mill <55 HRC	47

MAT. MAT.	REFERENCIA REFERENCE	FOTO PHOTO	Nº DE FILOS No. FLUTES	TIPO DE FRESAS END MILL TYPE	PÁGINA PAGE
ACERO STEEL	F-332		3	**Fresa plana larga <55 HRC** Long end mill <55 HRC	48
	F-402		4	**Fresa plana <55 HRC** End mill <55 HRC	49
	F-401		4	**Fresa larga <70 HRC** Long End mill <70 HRC	50
	F-452		4	**Fresa 35º/38º <60 HRC** End mill 35º/38º <60 HRC	51
	F-414		4	**Fresa plana <70 HRC** End mill <70 HRC	52
	F-404		4	**Fresa plana larga <55 HRC** Long end mill <55 HRC	53
	F-444		4	**Fresa plana extra larga <55 HRC** Extra long end mill <55 HRC	54
	F-418		3 & 4	**Fresa plana de desbaste <55 HRC** Roughing end mill <55 HRC	55
	F-419		4	**Fresa de 30º/32º <60 HRC** End mill 30º/32º <60 HRC	56
	F-502		4 & 6	**Fresa plana para acabado <65 HRC** Finishing end mill <65 HRC	57
	F-504		4 & 6	**Fresa plana larga para acabado <65 HRC** Long finishing end mill <65 HRC	58
	F-509		6	**Fresa plana extra larga para acabado <65 HRC** Extra long finishing end mill <65 HRC	59
	F-367		6	**Fresa para acabado HG <64 HRC** HG finising end mill <64 HRC	60
	F-368		6	**Fresa para acabado HG <64 HRC** HG finising end mill <64 HRC	61
	F-422 F-442		2	**Fresa tórica <65 HRC y serie larga** Corner radius end mill <65 HRC and long series	62
	F-813		2	**Fresa tórica <65 HRC (0,2µm)** Corner radius end mill <65 HRC (0,2µm)	63
	F-216		2	**Fresa tórica con cuello cónico <65 HRC (0,2µm** Taper neck corner radius end mill <65 HRC (0,2µm)	64
	F-217		2	**Fresa tórica con cuello cónico <65 HRC** Taper neck corner radius end mill <65 HRC	65
	F-410		4	**Fresa tórica <50 HRC** Corner radius end mill <50 HRC	66
	F-411		4	**Fresa tórica <60 HRC** Corner radius end mill <60 HRC	68
	F-412		4	**Fresa tórica <65 HRC** Corner radius end mill <65 HRC	69
	F-413		4	**Fresa tórica larga <65 HRC** Corner radius long end mill <65 HRC	70
	F-620		6	**Fresa tórica larga <65 HRC (0,2µm)** Long corner radius end mill <65 HRC (0,2µm)	71
	F-921		2	**Microfresa esférica <55 HRC (0,2µm)** Ball micro end mill <55 HRC (0,2µm)	72
	F-823		2	**Fresa esférica larga <65 HRC (0,2µm)** Long ball end mill <65 HRC (0,2µm)	73
	F-221		2	**Fresa esférica <55 HRC** Ball end mill <55 HRC	76
	F-224		2	**Fresa esférica larga <65 HRC** Long ball end mill <65 HRC	77
	F-222		2	**Fresa esférica para uso general <55HRC** Ball end mill for general use <55HRC	78
	F-225		2	**Fresa esférica larga <65 HRC (0,2µm)** Long ball end mill <65 HRC (0,2µm)	79
	F-234		2	**Fresa esférica extra larga <55 HRC** Extra long ball end mill <55 HRC	80
	F-227		2	**Fresa esférica con cuello cónico <65 HRC** Taper neck ball end mill <65 HRC	81
	F-229		2	**Fresa esférica larga con cuello cónico <65 HRC** Long taper neck ball end mill <65 HRC	82

MAT. MAT.	REFERENCIA REFERENCE	FOTO PHOTO	Nº DE FILOS No. FLUTES	TIPO DE FRESAS END MILL TYPE	PÁGINA PAGE
ACERO STEEL	F-228		2	**Fresa esférica extra larga con cuello cónico <65 HRC** Extra long taper neck ball end mill <65 HRC	83
	F-232		2	**Fresa esférica 3D 230º <65 HRC (0,2µm)** 3D 230º ball end mill <65 HRC (0,2µm)	84
	F-324		3	**Fresa esférica <65 HRC (0,2µm)** Ball end mill <65 HRC (0,2µm)	85
	F-424		4	**Fresa esférica <65 HRC (0,2µm)** Ball end mill <65 HRC (0,2µm)	86
	F-432		4	**Fresa esférica 3D 230º <65 HRC (0,2µm)** 3D 230º ball end mill <65 HRC (0,2µm)	87
	F-212		4	**Fresa TURBO HSC/HHC <65 HRC** HSC/HHC turbo end mill <65 HRC	88
	F-551		4	**Fresa "turbo" <65 HRC** "Turbo" end mill <65 HRC	89
FUND. C.IRON	F-417		3 & 4	**Fresa de desbaste <55 HRC** Roughing end mill <55 HRC	91
INOXIDABLE STAINLESS STEEL	F-1305		3	**Fresa de alto rendimiento <55 HRC** High performance end mill <55 HRC	94
	F-1403		4	**Fresa alto rendimiento <55 HRC** High performance end mill <55 HRC	95
	F-454		4	**Fresa plana <55 HRC** End mill <55 HRC	96
	F-455		4	**Fresa tórica <55 HRC** Corner radius end mill <55 HRC	97
	F-453		4	**Fresa de 38º/41º** 38º/41º end mill	98
	F-420		4	**Fresa de 38º/41º para desbaste** 38º/41º end mill	99
EXÓTICOS EXOTIC MATERIALS	F-388		3	**Fresa plana (0,2µm)** End mill (0,2µm)	101
	F-468		3	**Fresa tórica de hélice variable (0,2µm)** Variable helix end mill (0,2µm)	102
	F-488		4	**Fresa plana** End mill	103
	F-408		4	**Fresa de alto rendimiento con doble ángulo** High performance end mill with double helix angle	104
	F-407		4	**Fresa metal duro** Solid carbide end mill	105
	F-479		4	**Fresa tórica** End mill	106
	F-477		4	**Fresa tórica** Corner radius end mill	107
	F-478		4	**Fresa tórica** Corner radius end mill	108
	F-298		2	**Fresa esférica** Ball end mill	109
	F-498		4	**Fresa esférica (0,2µm)** Ball end mill (0,2µm)	110
	F-591		3	**Fresa cónica con punta esférica <55 HRC** Taper ball end mill <55 HRC	111
GRAFITO GRAPHITE	F-702		2	**Fresa plana con mango largo** Long shank end mill	114
	F-704		4	**Fresa plana con mango largo** Long shank end mill	115
	F-706		6	**Fresa plana con mango largo** Long shank end mill	116
	F-712		2	**Fresa plana recubierta de diamante (0,2µm)** Diamond coated end mill (0,2µm)	117

MAT. MAT.	REFERENCIA REFERENCE	FOTO PHOTO	Nº DE FILOS No. FLUTES	TIPO DE FRESAS END MILL TYPE	PÁGINA PAGE
GRAFITO GRAPHITE	F-716		4	**Fresa plana recubierta de diamante (0,2µm)** Diamond coated end mill (0,2µm)	118
	F-718		2	**Fresa tórica recubierta de diamante (0,2µm)** Diamond coated corner radius end mill (0,2µm)	119
	F-724		4	**Fresa tórica recubierta de diamante (0,2µm)** Diamond coated corner radius end mill (0,2µm)	120
	F-714		4	**Fresa esférica recubierta de diamante (0,2µm)** Diamond coated ball end mill (0,2µm)	121
OTRAS APLICACIONES OTHER APPLICATIONS	F-555		4 & 5	**Fresa de alto rendimiento <65 HRC** High performance end mill <65 HRC	123
	F-552		3	**Fresa con rompevirutas para trocoidal** End mill with chipbreaker for trochoidal	126
	F-595		2	**Fresa cónica (0,2µm) <55 HRC** Taper end mill (0,2µm) <55 HRC	127
	F-590		3	**Fresa cónica con punta esférica <55 HRC** Taper ball end mill <55 HRC	128
	F-460			**Chaflanador 60º <65 HRC** 60º beveling end mill <65 HRC	129
	F-490			**Chaflanador 90º <65 HRC** 90º beveling end mill <65 HRC	130
	F-480			**Fresa para radios cóncavos <65 HRC** End mill for concave radius <65 HRC	131
	F-845			**Fresa para chaflanes exteriores e interiores <65 HRC** End mill for internal and external bevels <65 HRC	132
	F-850			**Sierra circular paso fino <55 HRC** Fine toothing saw blade <55 HRC	133
	F-851			**Sierra circular paso basto <55 HRC** Large toothing saw blade <55 HRC	136

FRESAS/ ALUMINIO

END MILLS/ALLUMINIUM

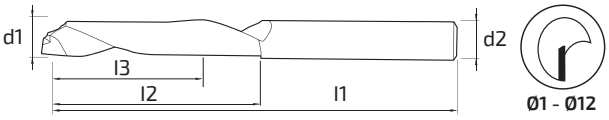
F-200

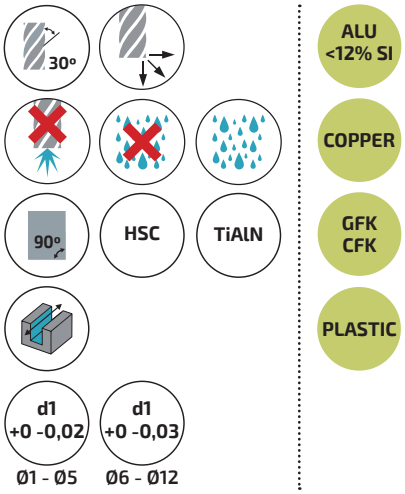
Fresa metal duro 1 labio

1 Fluted solid carbide end mill

Fresa de metal duro de un labio con corte a derechas para fresado de ABS, aluminio, materiales no férricos y materiales no metálicos. Ofrece una buena evacuación de viruta gracias al diseño de la hélice de 30º y tiene gran resistencia al desgaste por su grado WC ul

1 Fluted solid carbide end mill right hand cutting for ABS, aluminum, non-ferrous and non-metallic materials. Excellent chip removing by 30º helix flute design and very good wear resistance by applying ultra fine WC grade.





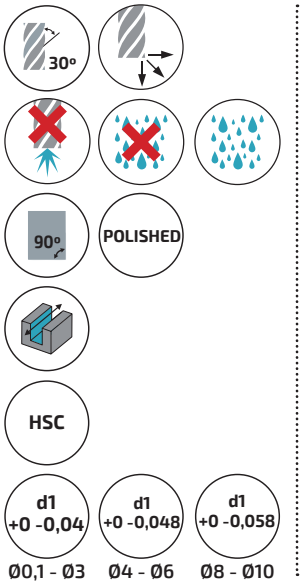
Ref.	d1	d2	l1	l2	l3	z	€
200010200	1,0	6	40	-	5	1	**54,50**
200012200	1,2	3	38	-	5	1	**46,20**
200015200	1,5	3	38	-	5	1	**46,20**
200015210	1,5	6	40	-	5	1	**54,50**
200020200	2,0	6	40	-	5	1	**52,80**
200020210	2,0	6	50	12	5	1	**66,00**
200020220	2,0	4	40	-	7	1	**49,55**
200020230	2,0	3	40	-	8	1	**46,20**
200020240	2,0	3	38	-	10	1	**46,20**
200030200	3,0	3	40	-	5	1	**37,95**
200030210	3,0	3	50	22	5	1	**56,15**
200030220	3,0	6	40	-	5	1	**52,80**
200030230	3,0	6	50	22	5	1	**66,00**
200030240	3,0	6	40	-	8	1	**52,80**
200030250	3,0	3	38	-	10	1	**39,60**
200030260	3,0	4	40	-	10	1	**47,90**
200030270	3,0	6	50	-	10	1	**54,50**
200030280	3,0	6	50	-	12	1	**56,15**
200040200	4,0	4	40	-	6	1	**41,30**
200040210	4,0	6	40	-	6	1	**52,80**
200040220	4,0	4	50	22	8	1	**52,80**
200040230	4,0	6	50	22	8	1	**66,00**

Ref.	d1	d2	l1	l2	l3	z	€
200040240	4	4	40	-	10	1	**44,55**
200040250	4	6	60	-	12	1	**59,40**
200040260	4	4	50	-	14	1	**46,20**
200050200	5	6	40	-	7	1	**52,80**
200050210	5	6	50	22	14	1	**66,00**
200050220	5	6	60	32	14	1	**67,70**
200050230	5	5	60	-	16	1	**52,80**
200060200	6	6	40	-	8	1	**51,15**
200060210	6	6	50	22	14	1	**64,35**
200060220	6	6	60	32	14	1	**66,00**
200060230	6	6	70	42	14	1	**67,70**
200060240	6	6	60	-	16	1	**54,50**
200060250	6	6	60	-	20	1	**54,50**
200060260	6	6	60	-	25	1	**57,75**
200080200	8	8	60	32	14	1	**77,55**
200080210	8	8	75	42	14	1	**87,50**
200080220	8	8	60	-	20	1	**66,00**
200080230	8	8	75	-	25	1	**70,95**
200080240	8	8	75	-	30	1	**72,60**
200100200	10	10	75	-	25	1	**95,75**
200120200	12	12	75	-	25	1	**120,50**

Condiciones de corte | Cutting data pag. 140

Fresa metal duro 1 labio para materiales plásticos

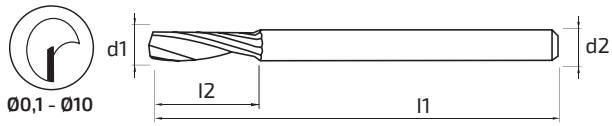
1 Fluted solid carbide end mill for plastic materials



PLASTIC

Fresa de metal duro de un labio con corte a derechas para fresado de materiales plásticos, acrílicos, PP, PE, PA, PS, PC, PET y PPE. Ofrece una buena evacuación de viruta gracias al diseño de la hélice de 30º y tiene gran resistencia al desgaste por su grado WC ul

1 Fluted solid carbide end mill right hand cutting for plastic and acrylic materials, PP, PE, PA, PS, PC, PET and PPE . Excellent chip removing by 30º helix flute design and very good wear resistance by applying ultra fine WC grade.



Ref.	d1	d2	l1	l2	z	€
201001200	0,1	3	30	0,3	1	**74,30**
201002200	0,2	3	30	0,6	1	**56,15**
201003200	0,3	3	30	1,0	1	**47,90**
201004200	0,4	3	30	1,0	1	**47,90**
201005200	0,5	3	30	1,5	1	**44,55**
201006200	0,6	3	30	3,0	1	**44,55**
201008200	0,8	3	30	5,0	1	**44,55**
201010200	1,0	3	30	4,0	1	**44,55**
201015200	1,5	3	30	6,0	1	**44,55**
201020200	2,0	3	30	6,0	1	**44,55**
201020210	2,0	4	50	6,0	1	**54,50**
201020220	2,0	6	50	6,0	1	**61,10**
201020230	2,0	3	30	8,0	1	**44,55**
201020240	2,0	3	38	11,0	1	**54,50**
201030200	3,0	3	30	6,0	1	**44,55**
201030210	3,0	6	50	6,0	1	**66,00**
201030220	3,0	3	38	11,0	1	**54,50**
201030230	3,0	4	50	11,0	1	**66,00**
201030240	3,0	6	50	11,0	1	**72,60**
201030250	3,0	3	50	22,0	1	**59,40**
201030260	3,0	6	60	22,0	1	**75,95**
201040200	4,0	4	50	8,0	1	**57,75**
201040210	4,0	6	50	8,0	1	**67,70**
201040220	4,0	4	50	12,0	1	**57,75**

Ref.	d1	d2	l1	l2	z	€
201040230	4	6	50	12	1	**67,70**
201040240	4	4	50	14	1	**57,75**
201040250	4	6	50	14	1	**67,70**
201040260	4	4	50	22	1	**62,75**
201040270	4	6	50	22	1	**72,60**
201040280	4	4	64	32	1	**66,00**
201050200	5	6	58	12	1	**70,95**
201050210	5	6	50	16	1	**70,95**
201050220	5	6	50	22	1	**70,95**
201060200	6	6	50	12	1	**67,70**
201060210	6	6	50	22	1	**70,95**
201060220	6	6	58	22	1	**74,30**
201060230	6	6	64	32	1	**80,90**
201060240	6	6	75	42	1	**90,75**
201060250	6	6	100	32	1	**89,15**
201080200	8	8	64	22	1	**85,80**
201080210	8	8	64	32	1	**94,10**
201080220	8	8	75	42	1	**108,95**
201080230	8	8	100	42	1	**117,15**
201080240	8	8	100	55	1	**123,75**
201100200	10	10	64	22	1	**127,10**
201100210	10	10	75	32	1	**136,95**
201100220	10	10	100	55	1	**155,15**
201100230	10	10	120	75	1	**174,95**

Condiciones de corte | Cutting data pag. 142

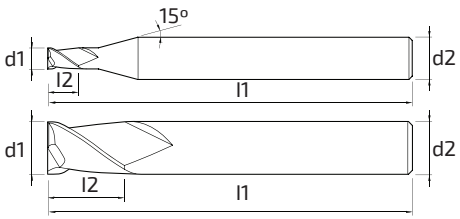
F-282

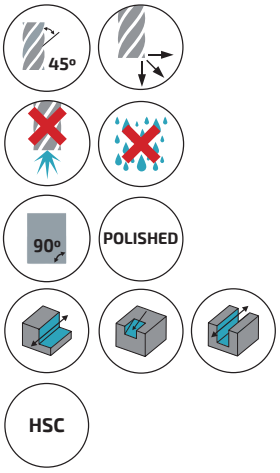
Fresa metal duro de 2 labios para aluminio "alta velocidad"

2 Fluted solid carbide end mill for aluminium high speed cutting

Fresa de metal duro de dos labios y hélice de 45º para aluminio, aleaciones de aluminio, materiales no férricos y materiales no metálicos. El diseño de los con diferentes longitudes cubre un amplio rango de aplicaciones, como desbaste y ranurado. Minimiza la adhesión de viruta gracias a su diseño con doble Ofrece gran rendimiento en el mecanizado de alta velocidad gracias a su grado WC ul (0,2 µm), que además permite alcanzar un exc

2 Fluted solid carbide 45º helix end mill for aluminum, aluminum alloys, non-ferrous and non-metallic materials. Various flute length design for covering wide range application, such as roughing and slotting operations. Minimize built up edge by double edge. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade for excellent surface finish.





ALU <12% SI

COPPER

GFK CFK

PLASTIC

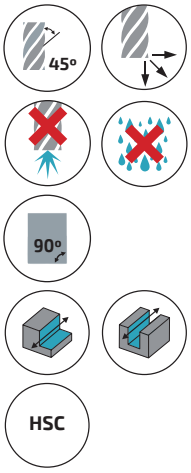
GOLD

Ref.	d1	d2	l1	l2	z	€
282010200	1,0	6	40	3,5	2	**26,80**
282020200	2,0	6	45	7,0	2	**19,25**
282025200	2,5	6	45	8,0	2	**25,00**
282030200	3,0	6	45	10,0	2	**19,25**
282040200	4,0	6	50	12,0	2	**19,25**
282050200	5,0	6	50	15,0	2	**20,00**
282060200	6,0	6	50	15,0	2	**20,00**
282080200	8,0	8	60	20,0	2	**32,15**
282100200	10,0	10	70	25,0	2	**44,35**
282120200	12,0	12	80	35,0	2	**66,40**
282160200	16,0	16	90	40,0	2	**130,20**
282200200	20,0	20	100	45,0	2	**198,55**

Condiciones de corte | Cutting data pag. 140

Fresa metal duro de 3 labios para aluminio “alta velocidad” (0,2µm)

3 Fluted solid carbide end mill for aluminium high speed cutting (0,2µm)



ALU <12% SI
COPPER
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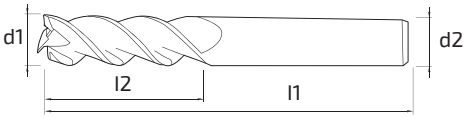
NI ALLOYS
TITAN INCONEL

Fresa de metal duro de tres labios y hélice de 45º para aluminio, aleaciones de aluminio, materiales no férricos y materiales no metálicos. El diseño de los con diferentes longitudes cubre un amplio rango de aplicaciones, está especialmente indicada para contorneado y acabado. Minimiza la adhesión de viruta gracias a su diseño con doble Ofrece gran rendimiento en el mecanizado de alta velocidad gracias a su grado WC ul (0,2 µm), que además permite alcanzar un exc

3 Fluted solid carbide 45º helix end mill for aluminum, aluminum alloy, non-ferrous and non-metallic materials. Various flute length design for covering wide range application, ideal for contouring and finishing operations. Minimize built up edge by double edge. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade for excellent surface finish.

Ø1 - Ø20



Ref.	d1	d2	l1	l2	z	€
301010200	1,0	6	40	3	3	19,40
301015200	1,5	6	40	4	3	22,20
301020200	2,0	6	45	5	3	19,35
301025200	2,5	6	45	8	3	25,00
301030200	3,0	6	50	12	3	21,30
301030210	3,0	6	55	20	3	24,00
301040200	4,0	6	45	11	3	19,40
301040210	4,0	6	55	20	3	24,00
301040220	4,0	6	65	30	3	32,45
301050200	5,0	6	50	13	3	20,70
301050210	5,0	6	55	20	3	22,20
301050220	5,0	6	65	30	3	32,45
301060200	6,0	6	50	15	3	20,70
301060210	6,0	6	60	25	3	25,40
301060220	6,0	6	70	30	3	26,80
301080200	8,0	8	60	20	3	33,75
301080210	8,0	8	65	25	3	39,90

Ref.	d1	d2	l1	l2	z	€
301080220	8,0	8	80	40	3	46,55
301080230	8,0	8	90	50	3	50,50
301100200	10,0	10	70	15	3	46,40
301100210	10,0	10	75	30	3	55,55
301100220	10,0	10	90	40	3	63,85
301100230	10,0	10	100	50	3	68,60
301100240	10,0	10	110	60	3	76,30
301120200	12,0	12	80	35	3	69,75
301120210	12,0	12	100	50	3	79,20
301120220	12,0	12	110	65	3	82,95
301140200	14,0	14	110	45	3	137,40
301160200	16,0	16	85	30	3	134,95
301160210	16,0	16	110	50	3	142,65
301160220	16,0	16	130	80	3	195,45
301200200	20,0	20	130	75	3	229,55
301200210	20,0	20	160	100	3	293,15
301200220	20,0	20	200	130	3	307,10

Condiciones de corte | Cutting data pag. 141

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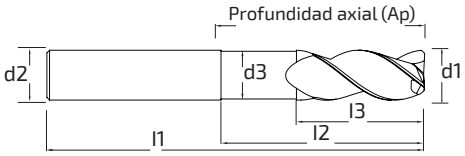
Fresa metal duro tórica de 3 labios para aluminio con hélice variable

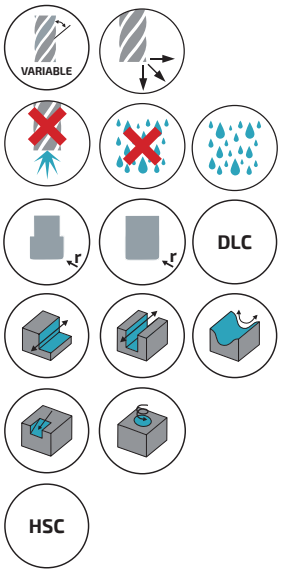
3 Fluted solid carbide variable helix end mill for aluminium

Fresa de metal duro tórica de tres labios con hélice variable, para aluminio. El diseño con ángulo variable garantiza una gran estabilidad de mecanizado y alta velocidad de corte y avance lo que produce una bajada de los tiempos de mecanizado.

3 Fluted variable helix end mill. The variable angle design ensures high machining stability and high speed which provides lower machining times. Specially designed for aluminium machining.



Ø6 - Ø25



ALU <10% SI

COPPER

PLASTIC

GFK CFK

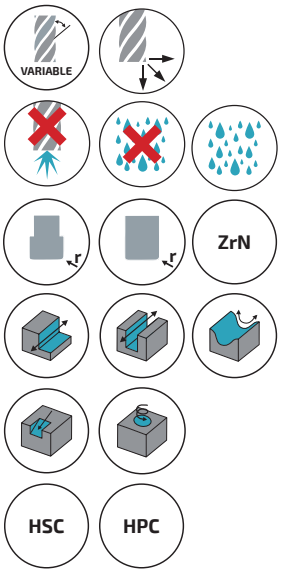
GOLD

Ref.	d1	d2	d3	l1	l2	l3	ap	r	€
151060200	6	6	5,8	54	18	7	18 mm	0,5	**40,80**
151080200	8	8	7,8	63	24	9	24 mm	0,5	**50,90**
151100200	10	10	9,8	72	30	11	30 mm	0,5	**67,00**
151100210	10	10	9,8	72	30	11	30 mm	1, 0	**70,55**
151100220	10	10	9,8	72	30	11	30 mm	1,5	**70,55**
151120200	12	12	11,8	83	36	13	36 mm	0,5	**91,50**
151120210	12	12	11,8	83	36	13	36 mm	1,0	**95,80**
151120220	12	12	11,8	83	36	13	36 mm	1,5	**95,80**
151160200	16	16	15,8	97	48	17	48 mm	1,0	**129,20**
151160210	16	16	15,8	97	48	17	48 mm	2,5	**134,40**
151160220	16	16	15,8	97	48	17	48 mm	4,0	**146,55**
151200200	20	20	19,8	111	60	21	60 mm	2,5	**205,95**
151200210	20	20	19,8	111	60	21	60 mm	4,0	**231,95**
151250200	25	25	19,8	132	79	26	79 mm	2,5	**375,10**
151250210	25	25	24,8	132	79	26	79 mm	4,0	**409,80**

Condiciones de corte | Cutting data pag. 144

Fresa metal duro tórica de 3 labios recubierta para aluminio con hélice variable

3 Fluted solid carbide variable helix end mill for aluminium with coating



ALU

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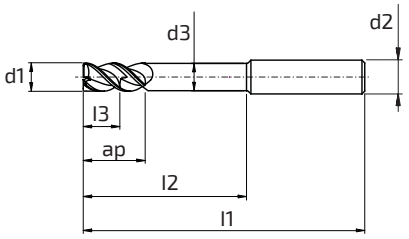
PLASTIC

Fresa de metal duro tórica de tres labios con hélice variable para aluminio, recubierta. Su diseño y recubrimiento garantizan un mecanizado de alta velocidad y un excelente rendimiento.

3 Fluted variable helix end mill with coating. The design and coating guarantee high speed machining and high performance.

Ø3 - Ø20



Ref.	d1	d2	d3	l1	l2	l3	ap	r	z	€
271030200	3	6	2,7	57	12	3,9	8 mm	0,4	3	**58,55**
271030210	3	6	2,7	57	12	3,9	8 mm	0,5	3	**58,55**
271030220	3	6	2,7	57	12	3,9	8 mm	1,0	3	**58,55**
271040200	4	6	3,7	57	18	5,2	11 mm	0,4	3	**58,55**
271040210	4	6	3,7	57	18	5,2	11 mm	0,5	3	**58,55**
271040220	4	6	3,7	57	18	5,2	11 mm	1,0	3	**58,55**
271050200	5	6	4,7	57	18	6,5	13 mm	0,5	3	**58,55**
271050210	5	6	4,7	57	18	6,5	13 mm	1,0	3	**58,55**
271060200	6	6	5,7	57	18	7,8	13 mm	0,5	3	**61,60**
271060210	6	6	5,7	57	18	7,8	13 mm	1,0	3	**61,60**
271060220	6	6	5,7	57	18	7,8	13 mm	1,5	3	**61,60**
271080200	8	8	7,4	63	25	10,4	21 mm	0,5	3	**70,60**
271080210	8	8	7,4	63	25	10,4	21 mm	1,0	3	**70,60**
271080220	8	8	7,4	63	25	10,4	21 mm	1,5	3	**70,60**
271080230	8	8	7,4	63	25	13,0	21 mm	2,0	3	**70,60**
271100200	10	10	9,2	72	30	13,0	22 mm	0,5	3	**121,40**
271100210	10	10	9,2	72	30	13,0	22 mm	1,0	3	**121,40**
271100220	10	10	9,2	72	30	13,0	22 mm	1,5	3	**121,40**
271100230	10	10	9,2	72	30	15,6	22 mm	2,0	3	**121,40**
271120200	12	12	11,0	83	36	15,6	26 mm	0,5	3	**164,35**
271120210	12	12	11,0	83	36	15,6	26 mm	1,0	3	**164,35**
271120220	12	12	11,0	83	36	15,6	26 mm	1,5	3	**164,35**
271120230	12	12	11,0	83	36	15,6	26 mm	2,0	3	**164,35**
271120240	12	12	11,0	83	36	20,8	26 mm	4,0	3	**164,35**
271160200	16	16	15,0	92	42	20,8	36 mm	1,0	3	**306,40**
271160210	16	16	15,0	92	42	20,8	36 mm	2,0	3	**306,40**
271160220	16	16	15,0	92	42	20,8	36 mm	4,0	3	**306,40**
271200200	20	20	19,0	104	52	26,0	41 mm	1,0	3	**441,05**
271200210	20	20	19,0	104	52	26,0	41 mm	2,0	3	**441,05**
271200220	20	20	19,0	104	52	26,0	41 mm	4,0	3	**441,05**

Condiciones de corte | Cutting data pag. 145

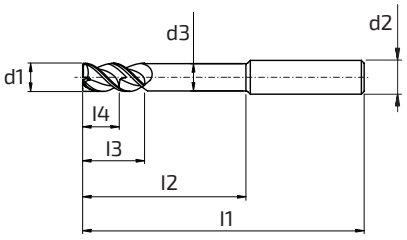
F-272

Fresa metal duro tórica de 3 labios larga recubierta para aluminio con hélice variable

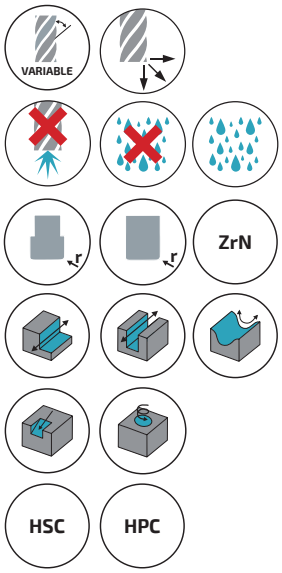
3 Fluted solid carbide long variable helix end mill for aluminium with coating

Fresa de metal duro tórica de tres labios larga con hélice variable para aluminio, recubierta. Su diseño y recubrimiento garantizan un mecanizado de alta velocidad y un excelente rendimiento.

3 Fluted variable helix long end mill with coating. The design and coating guarantee high speed machining and high performance.



Ø3 - Ø20



ALU

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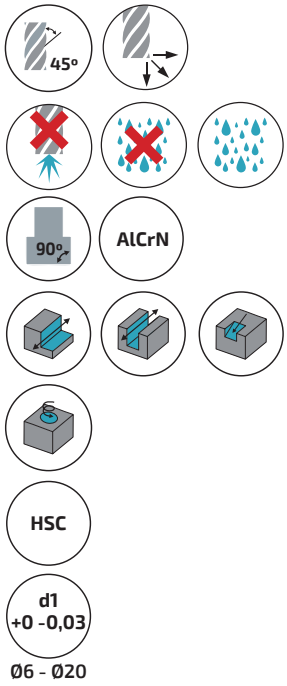
Ref.	d1	d2	d3	l1	l2	l3	l4	r	z	€
272060200	6	6	5,7	80	42	10	7,8	0,5	3	**88,90**
272060210	6	6	5,7	80	42	10	7,8	1,0	3	**88,90**
272060220	6	6	5,7	80	42	10	7,8	1,5	3	**88,90**
272060230	6	6	5,7	80	42	13	-	0,5	3	**88,90**
272060240	6	6	5,7	80	42	13	-	1,0	3	**88,90**
272060250	6	6	5,7	80	42	13	-	1,5	3	**88,90**
272080200	8	8	7,4	100	62	13	10,4	0,5	3	**115,35**
272080210	8	8	7,4	100	62	13	10,4	1,0	3	**115,35**
272080220	8	8	7,4	100	62	13	10,4	1,5	3	**115,35**
272080230	8	8	7,4	100	62	13	10,4	2,0	3	**115,35**
272080240	8	8	7,4	100	62	21	-	0,5	3	**115,35**
272080250	8	8	7,4	100	62	21	-	1,0	3	**115,35**
272080260	8	8	7,4	100	62	21	-	1,5	3	**115,35**
272080270	8	8	7,4	100	62	21	-	2,0	3	**115,35**
272100210	10	10	9,2	100	58	16	13,0	0,5	3	**171,00**
272100220	10	10	9,2	100	58	16	13,0	1,0	3	**171,00**
272100230	10	10	9,2	100	58	16	13,0	1,5	3	**171,00**
272100240	10	10	9,2	100	58	16	13,0	2,0	3	**171,00**
272100250	10	10	9,2	100	58	22	-	0,5	3	**171,00**
272100260	10	10	9,2	100	58	22	-	1,0	3	**171,00**
272100270	10	10	9,2	100	58	22	-	1,5	3	**171,00**
272100280	10	10	9,2	100	58	22	-	2,0	3	**171,00**

Ref.	d1	d2	d3	l1	l2	l3	l4	r	z	€
272120200	12	12	11	120	73	19	15,6	0,5	3	**243,90**
272120210	12	12	11	120	73	19	15,6	1,0	3	**243,90**
272120220	12	12	11	120	73	19	15,6	1,5	3	**243,90**
272120230	12	12	11	120	73	19	15,6	2,0	3	**243,90**
272120240	12	12	11	120	73	19	15,6	4,0	3	**243,90**
272120250	12	12	11	120	73	26	-	0,5	3	**243,90**
272120260	12	12	11	120	73	26	-	1,0	3	**243,90**
272120270	12	12	11	120	73	26	-	1,5	3	**243,90**
272120280	12	12	11	120	73	26	-	2,0	3	**243,90**
272120290	12	12	11	120	73	26	-	4,0	3	**243,90**
272160200	16	16	15	150	100	25	20,8	1,0	3	**517,60**
272160210	16	16	15	150	100	25	20,8	2,0	3	**517,60**
272160220	16	16	15	150	100	25	20,8	4,0	3	**517,60**
272160230	16	16	15	150	100	36	-	1,0	3	**517,60**
272160240	16	16	15	150	100	36	-	2,0	3	**517,60**
272160250	16	16	15	150	100	36	-	4,0	3	**517,60**
272200200	20	20	19	150	98	32	26,0	1,0	3	**665,40**
272200210	20	20	19	150	98	32	26,0	2,0	3	**665,40**
272200220	20	20	19	150	98	32	26,0	4,0	3	**665,40**
272200230	20	20	19	150	98	41	-	1,0	3	**665,40**
272200240	20	20	19	150	98	41	-	2,0	3	**665,40**
272200250	20	20	19	150	98	41	-	4,0	3	**665,40**

Condiciones de corte | Cutting data pag. 145

Fresa metal duro de 3 labios de desbaste y semi acabado para aluminio

3 Fluted solid carbide semi-finishing and roughing end mill for aluminium



ALU <12% SI

COPPER

PLASTIC

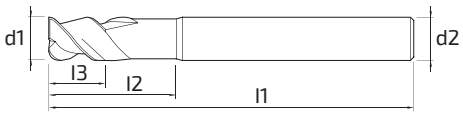
GFK CFK

GOLD

Fresa de metal duro de 3 labios y hélice de 45º recubierta de AlCrN para operaciones de desbaste y semi acabado en aluminio, aleaciones de aluminio, materiales no férricos y materiales no metálicos a alta velocidad. Mejora la resistencia al desgaste y evita el estrés en el en diferentes tipos de mecanizado. Minimiza la adhesión de viruta al gracias al rompevirutas y al canal de evacuación profundo. Su grado TRS ul educe la fractura a altos avances.

3 Fluted solid carbide 45º helix end mill with AlCrN coating for high speed semi finishing and roughing end mill for aluminum, Al alloys, non-ferrous and non-metallic materials. Improves wear resistance as well as avoids edge stress in various applications. Minimizes built up edge by chip breaker and deep pocket design. Reduces fracturing at high feed by high TRS ultra fine WC grade.

Ø6 - Ø20



Ref.	d1	d2	l1	l2	l3	z	€
606060200	6	6	50	15	10	3	40,15
606060210	6	6	70	20	15	3	44,50
606080200	8	8	60	20	15	3	53,85
606080210	8	8	80	25	20	3	66,80
606100200	10	10	70	25	18	3	72,70
606100210	10	10	90	30	23	3	88,55
606120200	12	12	80	30	20	3	92,70
606120210	12	12	100	40	30	3	106,75
606160200	16	16	110	35	25	3	212,75
606160210	16	16	120	50	35	3	237,50
606200200	20	20	110	50	35	3	285,30
606200210	20	20	120	60	45	3	319,55

Condiciones de corte | Cutting data pag. 141

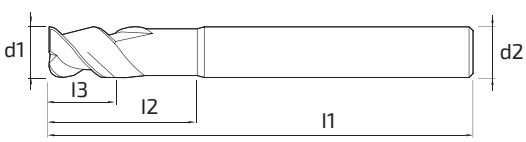
F-604

Fresa metal duro gran desbaste para aluminio

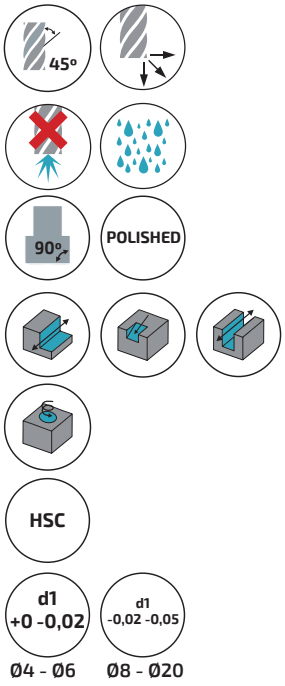
Solid carbide super roughing end mill for aluminium

Fresa de metal duro de tres labios y hélice de 45º para gran desbaste y semiacabado de aluminio, aleaciones de aluminio, materiales no férricos y materiales no metálicos. Minimiza la adhesión de viruta por su diseño con doble y las fracturas a altos avances gracias su grado TRS ul La geometría especial con el WHE de esta herramienta permiten aumentar los avances de forma espectacular, con lo que se consigue reducir los tiempos de mecanizado.

3 Fluted solid carbide 45º helix end mill for roughing and semi finishing of aluminum, aluminum alloy, non-ferrous and non-metallic materials. Minimize built up edge by double edge and minimize fracturing at high feed by high TRS ultra fine WC grade. Geometry promoting high feed per tooth by profile type WHE getting shorter machining times.



Ø4 - Ø20



ALU <12% SI

COPPER

GFK CFK

PLASTIC

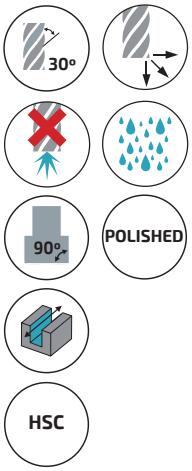
GOLD

Ref.	d1	d2	l1	l2	l3	z	€
604040200	4	6	60	15	10	3	**47,10**
604050200	5	6	60	20	15	3	**47,10**
604060200	6	6	65	21	16	3	**47,10**
604080200	8	8	70	27	21	3	**60,75**
604100200	10	10	75	31	26	3	**76,55**
604120200	12	12	80	38	30	3	**95,15**
604160200	16	16	100	45	36	3	**221,75**
604200200	20	20	110	55	41	3	**283,90**

Condiciones de corte | Cutting data pag. 144

Fresa metal duro de 3 y 4 labios para aluminio “alta velocidad”

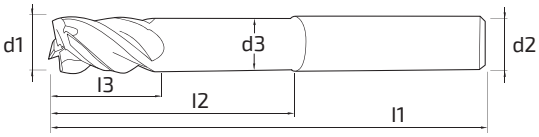
3 and 4 Fluted solid carbide end mill for aluminium high speed cutting



ALU <12% SI
COPPER
GFK CFK
PLASTIC
GOLD
NI ALLOYS
TITAN INCONEL

La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado a alta velocidad de aluminio <12% Si, aleaciones de magnesio y aleaciones de cobre, virutas largas y cortas. Podemos utilizar esta herramienta para operaciones de semi-acabado y acabado.
Los 3-4 labios, la geometría y los 30º de espiral de hélice permiten trabajar con unas muy altas condiciones de corte y obtener un muy

The tool, material and coating are specially designed for high speed cutting HSC of aluminum <12% Si, magnesium alloys, copper alloys, long/short chipping. We may use this tool semi-finishing and finishing.
3-4 fluted, the positive polished geometry and 30º spiral angle allow big feed rates and very good finishing surface.



Ref.	d1	d2	d3	l1	l2	l3	z	€
303060200	6	6	5,7	70	30	12	3	**52,80**
303080200	8	8	7,7	80	35	14	3	**70,80**
303100200	10	10	9,7	90	45	16	3	**99,15**
303120200	12	12	11,5	100	55	18	4	**137,10**
303160200	16	16	15,5	115	65	20	4	**231,70**
303200200	20	20	19,5	125	75	22	4	**304,40**

Condiciones de corte | Cutting data pag. 140

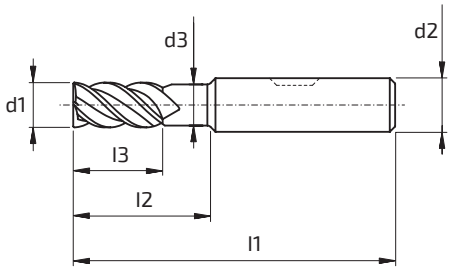
F-481

Fresa de metal duro de 4 labios para aluminio con hélice variable

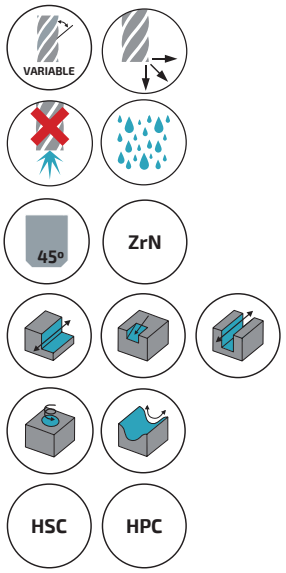
4 Fluted variable helix solid carbide end mill for aluminium

Fresa de metal duro plana de 4 labios recubierta de ZrN. El material y el recubrimiento están especialmente diseñados para el mecanizado de alta velocidad y alto rendimiento de aluminio, cobre y latón.

4 Fluted solid carbide end mill with ZrN coating. The material and coating are specially designed for high speed and high performance cutting of aluminium, copper and brass.



Ø3 - Ø20



ALU

COPPER

PLASTIC

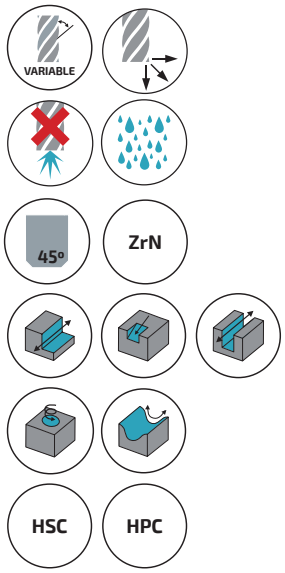
GFK
CFK

Ref.	d1	d2	d3	l1	l2	l3	F	z	€
481030200	3	6	2,7	57	10	6	0,1	4	**58,15**
481040200	4	6	3,7	57	14	8	0,1	4	**58,15**
481050200	5	6	4,7	57	16	10	0,1	4	**58,15**
481060200	6	6	5,5	57	19	12	0,2	4	**58,15**
481080200	8	8	7,4	63	25	16	0,2	4	**66,75**
481100200	10	10	9,2	72	30	20	0,2	4	**114,30**
481120200	12	12	11,0	83	36	24	0,2	4	**155,35**
481160200	16	16	15,0	92	42	32	0,2	4	**289,30**
481200200	20	20	19,0	104	52	40	0,2	4	**416,15**

Condiciones de corte | Cutting data pag. 145

Fresa de metal duro larga de 4 labios para aluminio con hélice variable

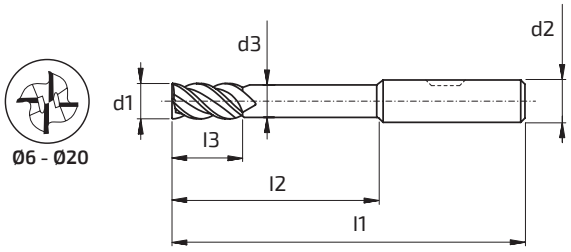
4 Fluted long variable helix solid carbide end mill for aluminium



ALU
COPPER
PLASTIC
GFK
CFK

Fresa de metal duro plana de 4 labios recubierta de ZrN, larga. El material y el recubrimiento están especialmente diseñados para el mecanizado de alta velocidad y alto rendimiento de aluminio, cobre y latón.

4 Fluted long solid carbide end mill with ZrN coating. The material and coating are specially designed for high speed and high performance cutting of aluminium, copper and brass.



Ref.	d1	d2	d3	l1	l2	l3	F	z	€
482040200	4	6	3,7	64	22	16	-	4	**76,25**
482050200	5	6	4,7	64	24	17	-	4	**76,25**
482060200	6	6	5,5	80	42	12	0,2	4	**91,85**
482080200	8	8	7,4	100	62	16	0,2	4	**119,10**
482100200	10	10	9,2	100	58	20	0,2	4	**176,35**
482120200	12	12	11,0	120	73	24	0,2	4	**252,00**
482160200	16	16	15,0	150	100	32	0,2	4	**485,50**
482200200	20	20	19,0	150	98	40	0,2	4	**595,00**

Condiciones de corte | Cutting data pag. 145

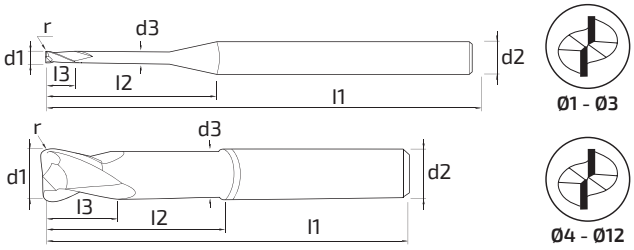
F-283

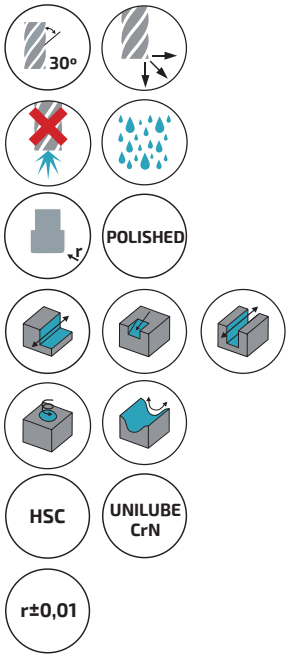
Fresa metal duro gran desbaste para aluminio tórica

2 Fluted solid carbide corner radius end mill for O-ring aluminium

Fresa de metal duro tórica para el mecanizado de aluminio <12% Si, aleaciones de magnesio y aleaciones de cobre tanto de viruta larga como viruta corta. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado a alta velocidad. Los 2 labios, la geometría y los 30º de espiral de hélice permiten grandes avances y gran volumen de extracción de virutas.

Solid carbide corner radius end mill for aluminum <12% Si, magnesium alloys and copper alloys, bath for long and short chips. The tool, material and surface are specially designed for high-speed-cutting HSC. 2 fluted, the positive polished geometry and 30º spiral angle allow big feed rates and high chip removal.





ALU <12% SI

COPPER

GFK CFK

PLASTIC

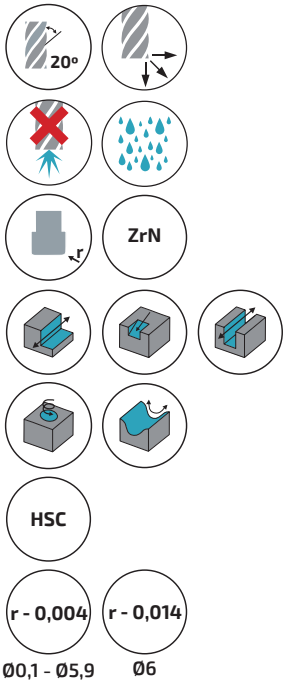
GOLD

Ref.	d1	r	d2	d3	l1	l2	l3	z	€
283010200	1	0,1	4	0,9	60	15	2	2	**54,10**
283020200	2	0,2	4	1,8	60	20	3	2	**54,10**
283030200	3	0,3	4	2,7	60	20	5	2	**54,10**
283040200	4	0,4	4	3,7	60	20	5	2	**51,50**
283050200	5	0,5	5	4,6	60	20	6	2	**53,45**
283060200	6	0,3	6	5,5	65	25	7	2	**53,45**
283060210	6	1,0	6	5,5	65	25	7	2	**53,45**
283080200	8	0,3	8	7,4	70	30	9	2	**70,80**
283080210	8	1,0	8	7,4	70	30	9	2	**70,80**
283100200	10	0,3	10	9,2	85	40	11	2	**90,10**
283100210	10	1,5	10	9,2	85	40	11	2	**90,10**
283120200	12	1,5	12	11,0	93	45	12	2	**137,10**
283120210	12	2,0	12	11,0	93	45	12	2	**137,10**
283120220	12	3,0	12	11,0	93	45	12	2	**137,10**
283160200	16	2,0	16	15,0	130	50	20	2	**228,15**
283160210	16	2,5	16	15,0	130	50	20	2	**228,15**
283160220	16	3,0	16	15,0	130	50	20	2	**228,15**
283160230	16	4,0	16	15,0	130	50	20	2	**228,15**
283200200	20	2,0	20	19,0	150	60	25	3	**308,30**
283200210	20	2,5	20	19,0	150	60	25	4	**308,30**
283200220	20	3,0	20	19,0	150	60	25	2	**308,30**
283200230	20	4,0	20	19,0	150	60	25	2	**308,30**

Condiciones de corte | Cutting data pag. 140

Microfresa metal duro para aluminio tórica

2 Fluted solid carbide corner radius end mill for O-ring aluminium



ALU <12% SI

COPPER

GFK CFK

PLASTIC

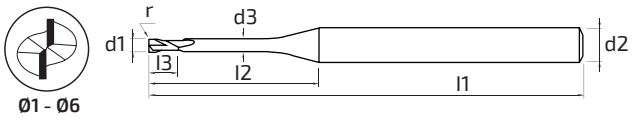
GOLD

NI ALLOYS

TITAN INCONEL

Fresa de metal duro tórica para el mecanizado de aluminio <12% Si, aleaciones de magnesio y aleaciones de cobre tanto de viruta larga como viruta corta. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado a alta velocidad. Con profundidad hasta 15 xD.

Solid carbide corner radius end mill for aluminum <12% Si, magnesium alloys and copper and brass alloys, bath for long and short chips. The tool, material and surface are specially designed for high-speed-cutting HSC.



Ref.	d1	r	d2	d3	l1	l2	l3	z	€
281001200	0,1	0,02	4	0,08	45	0,2	0,1	2	102,35
281001210	0,1	0,02	4	0,08	45	0,3	0,1	2	102,35
281001220	0,1	0,02	4	0,08	45	0,4	0,1	2	102,35
281002200	0,2	0,05	4	0,17	50	0,5	0,15	2	97,35
281002210	0,2	0,05	4	0,17	50	1,0	0,15	2	97,35
281002220	0,2	0,05	4	0,17	50	1,5	0,15	2	97,35
281002230	0,2	0,05	4	0,17	50	2,0	0,15	2	97,35
281003200	0,3	0,05	4	0,27	50	1,0	0,25	2	80,90
281003210	0,3	0,05	4	0,27	50	1,5	0,25	2	80,90
281003220	0,3	0,05	4	0,27	50	2,0	0,25	2	80,90
281003230	0,3	0,05	4	0,27	50	2,5	0,25	2	80,90
281003240	0,3	0,05	4	0,27	50	3,0	0,25	2	80,90
281004200	0,4	0,05	4	0,37	50	2,0	0,3	2	80,90
281004210	0,4	0,05	4	0,37	50	4,0	0,3	2	80,90
281004220	0,4	0,1	4	0,37	50	1,0	0,3	2	80,90
281004230	0,4	0,1	4	0,37	50	1,5	0,3	2	80,90
281004240	0,4	0,1	4	0,37	50	2,0	0,3	2	80,90
281004250	0,4	0,1	4	0,37	50	3,0	0,3	2	80,90
281004260	0,4	0,1	4	0,37	50	4,0	0,3	2	80,90
281005200	0,5	0,05	4	0,47	50	3,0	0,35	2	67,70
281005210	0,5	0,1	4	0,47	50	4,0	0,35	2	67,70
281005220	0,5	0,1	4	0,47	50	5,0	0,35	2	67,70
281005230	0,5	0,1	4	0,47	50	1,0	0,35	2	67,70
281005240	0,5	0,1	4	0,47	50	2,0	0,35	2	67,70
281005250	0,5	0,1	4	0,47	50	3,0	0,35	2	67,70
281005260	0,5	0,1	4	0,47	50	4,0	0,35	2	67,70
281005270	0,5	0,1	4	0,47	50	5,0	0,35	2	67,70
281005280	0,5	0,1	4	0,47	50	6,0	0,35	2	67,70
281006200	0,6	0,1	4	0,57	50	2,0	0,4	2	61,10
281006210	0,6	0,06	4	0,57	50	4,0	0,4	2	61,10

Ref.	d1	r	d2	d3	l1	l2	l3	z	€
281006220	0,6	0,06	4	0,57	50	6	0,4	2	61,10
281006230	0,6	0,06	4	0,57	50	8	0,4	2	61,10
281006240	0,6	0,1	4	0,57	50	2	0,4	2	61,10
281006250	0,6	0,1	4	0,57	50	3	0,4	2	61,10
281006260	0,6	0,1	4	0,57	50	4	0,4	2	61,10
281006270	0,6	0,1	4	0,57	50	5	0,4	2	61,10
281006280	0,6	0,1	4	0,57	50	6	0,4	2	61,10
281006290	0,6	0,1	4	0,57	50	8	0,4	2	61,10
281008200	0,8	0,08	4	0,77	50	4	0,5	2	61,10
281008210	0,8	0,08	4	0,77	50	6	0,5	2	61,10
281008220	0,8	0,08	4	0,77	50	8	0,5	2	61,10
281008230	0,8	0,08	4	0,77	50	10	0,5	2	61,10
281008240	0,8	0,2	4	0,77	50	2	0,5	2	61,10
281008250	0,8	0,2	4	0,77	50	4	0,5	2	61,10
281008260	0,8	0,2	4	0,77	50	5	0,5	2	61,10
281008270	0,8	0,2	4	0,77	50	6	0,5	2	61,10
281008280	0,8	0,2	4	0,77	50	8	0,5	2	61,10
281008290	0,8	0,2	4	0,77	50	10	0,5	2	61,10
281010200	1,0	0,1	4	0,96	50	3	0,8	2	61,10
281010210	1,0	0,1	4	0,96	50	5	0,8	2	61,10
281010220	1,0	0,1	4	0,96	50	7	0,8	2	61,10
281010230	1,0	0,1	4	0,96	50	10	0,8	2	61,10
281010240	1,0	0,1	4	0,96	55	12	0,8	2	61,10
281010250	1,0	0,1	4	0,96	55	15	0,8	2	61,10
281010260	1,0	0,1	4	0,96	60	20	0,8	2	61,10
281010270	1,0	0,2	4	0,96	50	2	0,8	2	61,10
281010280	1,0	0,2	4	0,96	50	3	0,8	2	61,10
281010290	1,0	0,2	4	0,96	50	4	0,8	2	61,10
281010300	1,0	0,2	4	0,96	50	5	0,8	2	61,10
281010310	1,0	0,2	4	0,96	50	6	0,8	2	61,10

F-281

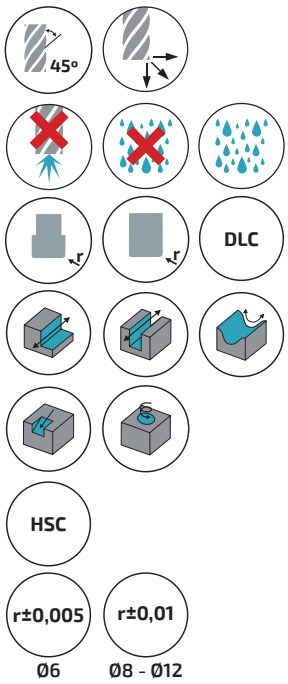
Ref.	d1	r	d2	d3	l1	l2	l3	z	€
281010320	1,0	0,2	4	0,96	50	7	0,80	2	**61,10**
281010330	1,0	0,2	4	0,96	50	8	0,80	2	**61,10**
281010340	1,0	0,2	4	0,96	50	9	0,80	2	**61,10**
281010350	1,0	0,2	4	0,96	50	10	0,80	2	**61,10**
281010360	1,0	0,2	4	0,96	55	12	0,80	2	**61,10**
281010370	1,0	0,2	4	0,96	55	15	0,80	2	**61,10**
281012200	1,2	0,2	4	1,15	50	6	1,00	2	**61,10**
281012210	1,2	0,2	4	1,15	55	12	1,00	2	**61,10**
281015200	1,5	0,15	4	1,44	50	4	1,35	2	**61,10**
281015210	1,5	0,15	4	1,44	50	6	1,35	2	**61,10**
281015220	1,5	0,15	4	1,44	50	8	1,35	2	**61,10**
281015230	1,5	0,15	4	1,44	50	10	1,35	2	**61,10**
281015240	1,5	0,15	4	1,44	55	12	1,35	2	**61,10**
281015250	1,5	0,15	4	1,44	55	16	1,35	2	**61,10**
281015260	1,5	0,15	4	1,44	60	20	1,35	2	**62,75**
281015270	1,5	0,2	4	1,44	50	4	1,35	2	**61,10**
281015280	1,5	0,2	4	1,44	50	6	1,35	2	**61,10**
281015290	1,5	0,2	4	1,44	50	8	1,35	2	**61,10**
281015300	1,5	0,2	4	1,44	50	10	1,35	2	**61,10**
281015310	1,5	0,2	4	1,44	55	12	1,35	2	**61,10**
281015320	1,5	0,2	4	1,44	55	14	1,35	2	**61,10**
281015330	1,5	0,2	4	1,44	55	16	1,35	2	**61,10**
281015340	1,5	0,2	4	1,44	60	18	1,35	2	**62,75**
281015350	1,5	0,2	4	1,44	60	20	1,35	2	**62,75**
281020200	2,0	0,2	4	1,92	50	4	1,70	2	**61,10**
281020210	2,0	0,2	4	1,92	50	6	1,70	2	**61,10**
281020220	2,0	0,2	4	1,92	50	8	1,70	2	**61,10**
281020230	2,0	0,2	4	1,92	50	10	1,70	2	**61,10**
281020240	2,0	0,2	4	1,92	55	12	1,70	2	**61,10**
281020250	2,0	0,2	4	1,92	55	15	1,70	2	**61,10**
281020260	2,0	0,2	4	1,92	60	20	1,70	2	**62,75**
281020270	2,0	0,2	4	1,92	65	25	1,70	2	**62,75**

Ref.	d1	r	d2	d3	l1	l2	l3	z	€
281020280	2	0,2	4	1,92	65	30	1,7	2	**62,75**
281020290	2	0,5	4	1,92	50	4	1,7	2	**61,10**
281020300	2	0,5	4	1,92	50	6	1,7	2	**61,10**
281020310	2	0,5	4	1,92	50	8	1,7	2	**61,10**
281020320	2	0,5	4	1,92	50	10	1,7	2	**61,10**
281020330	2	0,5	4	1,92	55	12	1,7	2	**61,10**
281020340	2	0,5	4	1,92	55	15	1,7	2	**61,10**
281020350	2	0,5	4	1,92	60	20	1,7	2	**62,75**
281030200	3	0,3	4	2,90	65	10	3,0	2	**64,35**
281030210	3	0,3	4	2,90	65	15	3,0	2	**64,35**
281030220	3	0,3	4	2,90	65	20	3,0	2	**64,35**
281030230	3	0,3	4	2,90	75	25	3,0	2	**72,60**
281030240	3	0,3	4	2,90	75	30	3,0	2	**72,60**
281030250	3	0,5	4	2,90	65	15	3,0	2	**64,35**
281030260	3	0,5	4	2,90	65	20	3,0	2	**64,35**
281040200	4	0,3	6	3,90	65	10	4,0	2	**67,70**
281040210	4	0,3	6	3,90	65	15	4,0	2	**67,70**
281040220	4	0,3	6	3,90	65	20	4,0	2	**67,70**
281040230	4	0,3	6	3,90	75	25	4,0	2	**69,35**
281040240	4	0,3	6	3,90	75	30	4,0	2	**69,35**
281040250	4	0,5	6	3,90	65	20	4,0	2	**67,70**
281040260	4	0,5	6	3,90	75	30	4,0	2	**69,35**
281050200	5	0,3	6	4,90	65	20	5,0	2	**67,70**
281050210	5	0,3	6	4,90	75	30	5,0	2	**69,35**
281050220	5	0,3	6	4,90	90	40	5,0	2	**74,30**
281060200	6	0,3	6	5,90	65	20	6,0	2	**67,70**
281060210	6	0,3	6	5,90	75	30	6,0	2	**69,35**
281060220	6	0,3	6	5,90	90	40	6,0	2	**74,30**
281060230	6	0,3	6	5,90	90	50	6,0	2	**74,30**
281060240	6	0,5	6	5,90	65	20	6,0	2	**67,70**
281060250	6	0,5	6	5,90	75	30	6,0	2	**69,35**
281060260	6	1,0	6	5,90	65	25	6,0	2	**69,35**

Condiciones de corte | Cutting data pag. 142 - 143

Fresa metal duro tórica de 3 labios para aluminio de alta velocidad (0,2µm)

3 Fluted solid carbide corner radius end mill for aluminum high speed cutting (0,2µm)



ALU <12% SI

COPPER

PLASTIC

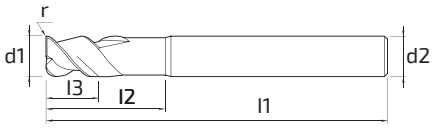
GFK CFK

GOLD

Fresa de metal duro tórica de 3 labios y hélice de 45º recubierta de DLC para aluminio, aleaciones de aluminio, materiales no férricos y materiales no metálicos. Su hélice de tres cortos y a 45º hace posible mecanizar a altas velocidades de corte y avance. Minimiza la adhesión de viruta gracias a su diseño con doble Ofrece gran rendimiento en el mecanizado de alta velocidad gracias a su grado WC ul (0,2 µm), que además permite alcanzar un excelente acabado

3 Fluted solid carbide 45º helix end mill with DLC coating for aluminum, Al alloys, non-ferrous and non-metallic materials. High speed, feed applicable by 3 flute 45º helix and short flute design. Minimize built up edge by double edge. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade for excellent surface finish.

Ø6 - Ø20



Ref.	d1	r	d2	l1	l2	l3	z	€
284060200	6	0,5	6	50	-	15	3	45,65
284060210	6	0,5	6	70	20	7	3	50,40
284060220	6	1,0	6	50	-	15	3	45,65
284060230	6	1,0	6	70	20	7	3	50,40
284080200	8	0,5	8	60	-	20	3	64,10
284080210	8	0,5	8	80	25	9	3	71,90
284080220	8	1,0	8	60	-	20	3	64,10
284080230	8	1,0	8	80	25	9	3	71,90
284080240	8	2,0	8	60	-	20	3	64,10
284080250	8	2,0	8	80	25	9	3	71,90
284100200	10	1,0	10	70	-	25	3	82,55
284100210	10	1,0	10	100	30	11	3	96,40
284100220	10	15,0	10	70	-	25	3	82,55
284100230	10	15,0	10	100	30	11	3	96,40
284100240	10	2,0	10	70	-	25	3	82,55
284100250	10	2,0	10	100	30	11	3	96,40
284120200	12	1,0	12	75	-	30	3	98,30
284120210	12	1,0	12	110	36	13	3	122,15
284120220	12	1,5	12	110	36	13	3	122,15
284120230	12	2,0	12	75	-	30	3	98,30

Ref.	d1	r	d2	l1	l2	l3	z	€
284120240	12	2,0	12	110	36	13	3	122,15
284120250	12	2,5	12	110	36	13	3	122,15
284120260	12	3,0	12	75	-	30	3	98,30
284120270	12	3,0	12	110	36	13	3	122,15
284120280	12	4,0	12	75	-	30	3	98,30
284120290	12	4,0	12	110	36	13	3	122,15
284160200	16	1,0	16	90	-	35	3	191,50
284160210	16	1,0	16	130	50	17	3	236,35
284160220	16	2,0	16	90	-	35	3	191,50
284160230	16	2,0	16	130	50	17	3	236,35
284160240	16	2,5	16	130	50	17	3	236,35
284160250	16	3,0	16	90	-	35	3	191,50
284160260	16	3,0	16	130	50	17	3	236,35
284160270	16	4,0	16	90	-	35	3	191,50
284160280	16	4,0	16	130	50	17	3	236,35
284200200	20	2,0	20	150	60	21	3	409,25
284200210	20	2,5	20	150	60	21	3	409,25
284200220	20	3,0	20	150	60	21	3	409,25
284200230	20	4,0	20	150	60	21	3	409,25

Condiciones de corte | Cutting data pag. 144

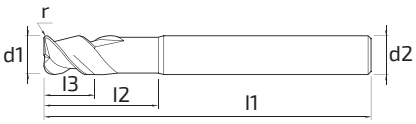
F-607

Fresa metal duro tórica de 3 labios de desbaste y semiacabado para alumino

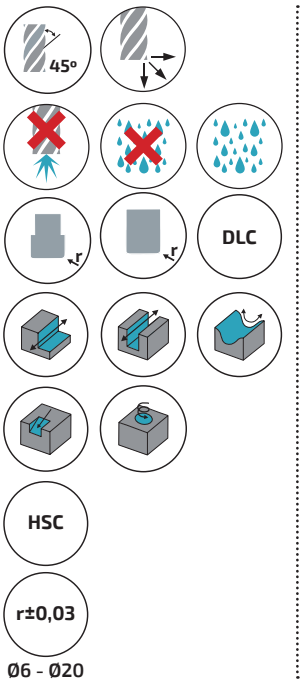
3 Fluted solid carbide semi-finishing and rouching corner radius end mill for aluminium

Fresa de metal duro tórica de 3 labios y hélice de 45º recubierta de AlCrN para operaciones de desbaste y semi acabado en aluminio, aleaciones de aluminio, materiales no férricos y materiales no metálicos a alta velocidad. Mejora la resistencia al desgaste y evita el estrés en el en diferentes tipos de mecanizado. Minimiza la adhesión de viruta al gracias al rompevirutas y al canal de evacuación profundo. Su grado TRS ul educe la fractura a altos avances.

3 Fluted solid carbide corner radius 45º helix end mill with AlCrN coating for high speed semi finishing and roughing end mill for aluminum, Al alloys, non-ferrous and non-metallic materials. Improves wear resistance as well as avoids edge stress in various applications. Minimizes built up edge by chip breaker and deep pocket design. Reduces fracturing at high feed by high TRS ultra fine WC grade.



Ø6 - Ø20



ALU <12% SI

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PLASTIC

GFK CFK

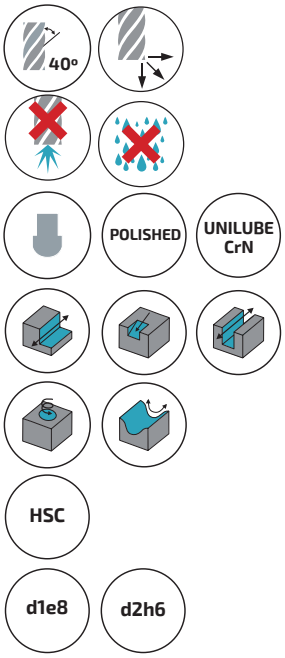
GOLD

Ref.	d1	r	d2	l1	l2	l3	z	€
607060200	6	0,5	6	65	15	9	3	50,40
607060210	6	1,0	6	65	15	9	3	50,40
607080200	8	0,5	8	70	20	12	3	71,00
607080210	8	1,0	8	70	20	12	3	71,00
607100200	10	1,0	10	75	25	15	3	86,55
607100210	10	2,0	10	75	25	15	3	86,55
607120200	12	1,0	12	80	30	20	3	105,25
607120210	12	2,0	12	80	30	20	3	105,25
607120220	12	3,0	12	80	30	20	3	105,25
607160200	16	1,0	16	110	35	25	3	226,90
607160210	16	2,0	16	110	35	25	3	226,90
607160220	16	3,0	16	110	35	25	3	226,90
607200200	20	2,0	20	110	50	30	3	305,95
607200210	20	3,0	20	110	50	30	3	305,95

Condiciones de corte | Cutting data pag. 141

Fresa metal duro esférica para aluminio

Solid carbide ball nose 3D end mill for aluminium



ALU <12% SI

COPPER

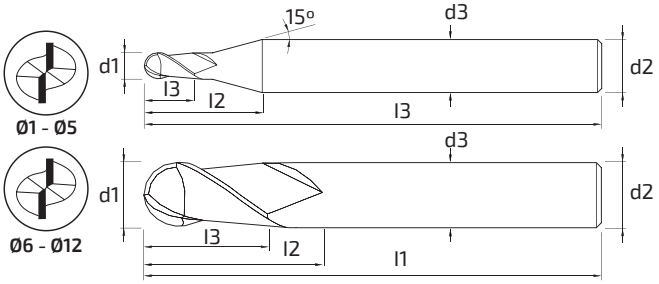
GFK CFK

PLASTIC

GOLD

Fresa esférica de metal duro para el mecanizado de aluminio, aleaciones de magnesio, aleaciones de cobre tanto de viruta larga como viruta corta. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado a alta velocidad. Los 2 labios, la geometría y los 40º de espiral de hélice permiten grandes avances y gran volumen de extracción de virutas.

Solid carbide ball nose end mill, for aluminum <12% Si, magnesium alloys and copper alloys, bath for long and shost chips. The tool, material and coating are specially designed for high-speed-cutting HSC. 2 fluted, the positive polished geometry and 40º spiral angle allow big feed rates and high chip removal.



Ref.	d1	d2	d3	l1	l2	l3	z	€
223010200	1	6	0,9	60	15	2	2	**61,15**
223020200	2	6	1,8	60	20	4	2	**50,85**
223030200	3	6	2,8	70	25	6	2	**49,60**
223040200	4	6	3,7	70	25	8	2	**49,60**
223050200	5	6	4,6	70	25	10	2	**49,60**
223060200	6	6	5,5	80	35	12	2	**55,10**
223080200	8	8	7,4	80	35	16	2	**70,20**
223100200	10	10	9,2	90	45	20	2	**93,15**
223120200	12	12	11,0	100	50	24	2	**123,40**

Condiciones de corte | Cutting data pag. 140

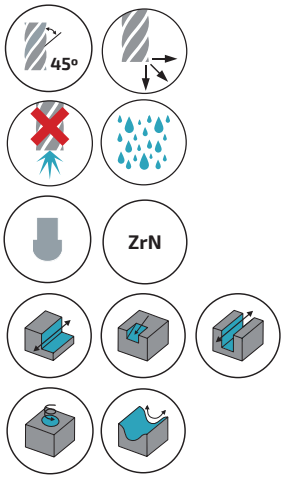
F-273

Fresa metal duro esférica recubierta para aluminio

Solid carbide ball nose end mill with coating for aluminium

Fresa esférica de 2 labios con recubrimiento ZrN para el mecanizado de aluminio, cobre, latón, bronce, aleaciones de magnesio y termoplásticos. La hélice de 45º permite una buena evacuación de viruta y el recubrimiento le proporciona una gran durabilidad.

2 Fluted solid carbide ball nose end mil with ZrN coating for aluminium, copper, brass, magnesium alloys and thermoplastics. 45º helix allows good chip extraction and the coating provides long lifetime.

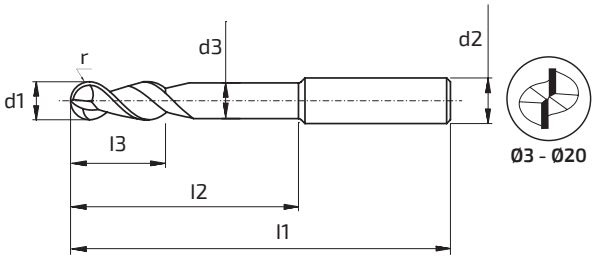


ALU

COPPER

GFK CFK

PLASTIC

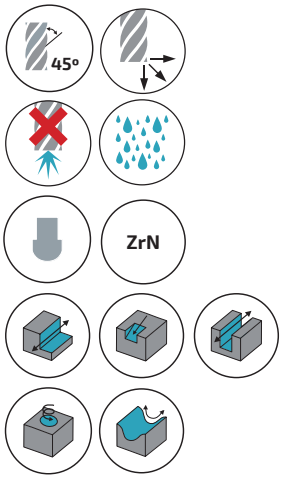


Ref.	d1	d2	d3	l1	l2	l3	r	z	€
273030200	3	3	2,7	50	16	6	1,5	2	**50,65**
273030210	3	3	2,7	75	32	10	1,5	2	**73,30**
273040200	4	4	3,7	54	17	7	2,0	2	**60,40**
273040210	4	4	3,7	75	36	13	2,0	2	**84,70**
273050200	5	5	4,6	54	18	8	2,5	2	**67,15**
273050210	5	5	4,6	75	40	15	2,5	2	**97,50**
273060200	6	6	5,5	54	21	10	3,0	2	**65,55**
273060210	6	6	5,5	100	44	16	3,0	2	**89,15**
273080200	8	8	7,5	59	27	12	4,0	2	**83,60**
273080210	8	8	7,5	100	54	22	4,0	2	**123,55**
273100200	10	10	9,4	67	32	13	5,0	2	**109,70**
273100210	10	10	9,4	100	60	25	5,0	2	**164,60**
273120200	12	12	11,4	73	38	16	6,0	2	**148,25**
273120210	12	12	11,4	100	60	26	6,0	2	**212,80**
273140200	14	14	13,2	75	38	16	7,0	2	**184,95**
273140210	14	14	13,2	100	60	26	7,0	2	**243,20**
273160200	16	16	15	83	44	20	8,0	2	**236,95**
273160210	16	16	15	150	92	30	8,0	2	**343,35**
273200200	20	20	19	93	50	25	10,0	2	**330,55**
273200210	20	20	19	150	92	40	10,0	2	**477,50**

Condiciones de corte | Cutting data pag. 146

Fresa metal duro esférica larga recubierta para aluminio

Solid carbide long ball nose end mill with coating for aluminium



ALU

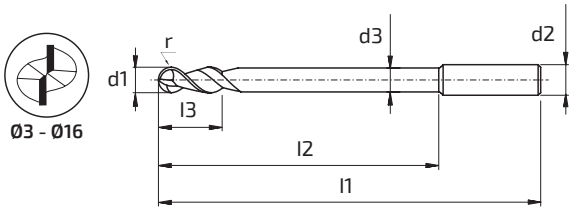
COPPER

GFK
CFK

PLASTIC

Fresa esférica de 2 labios larga con recubrimiento ZrN para el mecanizado de aluminio, cobre, latón, bronce, aleaciones de magnesio y termoplásticos. La hélice de 45º permite una buena evacuación de viruta y el recubrimiento le proporciona una gran durabilidad.

2 Fluted solid carbide long ball nose end mil with ZrN coating for aluminium, copper, brass, magnesium alloys and thermoplastics. 45º helix allows good chip extraction and the coating provides long lifetime



Ref.	d1	d2	d3	l1	l2	l3	r	z	€
274030200	3	3	2,7	125	82	10	1,5	2	**117,30**
274040200	4	4	3,7	125	86	13	2,0	2	**123,10**
274060200	6	6	5,5	150	94	16	3,0	2	**142,65**
274080200	8	8	7,5	150	104	22	4,0	2	**196,70**
274100200	10	10	9,4	150	110	25	5,0	2	**216,15**
274120200	12	12	11,4	150	105	26	6,0	2	**340,60**
274160200	16	16	15	250	192	30	8,0	2	**549,15**

Condiciones de corte | Cutting data pag. 147

FRESAS/ CBN

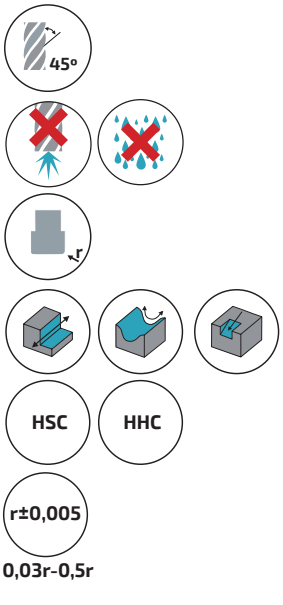
END MILLS/CBN

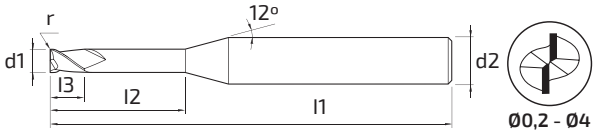
Fresa CBN 2 labios tórica <70 HRC

2 Fluted CBN corner radius end mill <70 HRC

Fresa CBN tórica de 2 labios especial para el mecanizado de materiales extremadamente duros (70 HRC) a alta velocidad. Adecuada para mecanizar acero de moldes endurecido y

Special 2 fluted CBN corner radius end mill for milling extremely hard materials (70HRC) at high speed. Applicable finish processing for hardened mold steel and graphite.



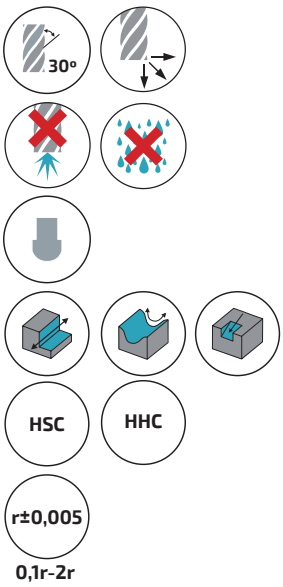


Ref.	d1	r	d2	l1	l2	l3	z	€
112002200	0,2	0,03	4	54	0,3	0,3	2	**288,10**
112003200	0,3	0,05	4	54	0,3	0,3	2	**187,45**
112004200	0,4	0,05	4	54	1,0	0,4	2	**172,55**
112005200	0,5	0,05	4	54	1,5	0,5	2	**169,40**
112006200	0,6	0,05	4	54	2,0	0,6	2	**165,35**
112008200	0,8	0,10	4	54	2,0	0,8	2	**161,85**
112010200	1,0	0,10	4	54	2,0	0,9	2	**165,55**
112012200	1,2	0,10	4	45	3,0	1,0	2	**176,75**
112015200	1,5	0,10	4	54	4,0	1,4	2	**181,15**
112020200	2,0	0,10	4	54	3,0	1,7	2	**218,50**
112020210	2,0	0,20	4	54	3,0	1,7	2	**224,75**
112030200	3,0	0,10	4	54	6,0	2,3	2	**320,35**
112030210	3,0	0,20	4	54	6,0	2,3	2	**326,65**
112030220	3,0	0,30	4	54	6,0	2,3	2	**332,95**
112040200	4,0	0,10	4	54	12,0	3,0	2	**544,95**
112040210	4,0	0,20	4	54	12,0	3,0	2	**552,45**
112040230	4,0	0,30	4	54	12,0	3,0	2	**560,00**
112040240	4,0	0,50	4	54	12,0	3,0	2	**567,75**

Condiciones de corte | Cutting data pag. 148

Fresa CBN 2 labios esférica <70 HRC

2 Fluted CBN ball end mill <70 HRC



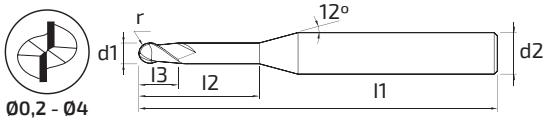
STEEL <70 HRC

HG

GRAPHITE

Fresa CBN esférica de 2 labios especial para el mecanizado de materiales extremadamente duros (70 HRC) a alta velocidad. Adecuada para mecanizar acero de moldes endurecido y

Special 2 fluted CBN ball end mill for milling extremely hard materials (70HRC) at high speed. Applicable finish processing for hardened mold steel and graphite.



Ref.	d1	r	d2	l1	l2	l3	z	€
110002200	0,2	0,10	4	54	0,3	0,3	2	**275,10**
110003200	0,3	0,15	4	54	0,3	0,3	2	**178,35**
110004200	0,4	0,20	4	54	0,4	0,4	2	**170,45**
110005200	0,5	0,25	4	54	1,0	0,5	2	**164,15**
110006200	0,6	0,30	4	54	0,6	0,6	2	**160,60**
110008200	0,8	0,40	4	54	0,7	0,7	2	**158,00**
110010200	1,0	0,50	4	54	2,0	0,8	2	**159,55**
110012200	1,2	0,60	4	54	3,0	1,0	2	**171,15**
110015200	1,5	0,75	4	54	4,0	1,4	2	**177,95**
110020200	2,0	1,00	4	54	5,0	1,7	2	**264,75**
110030200	3,0	1,50	4	54	8,0	2,3	2	**399,05**
110040200	4,0	2,00	4	54	12,0	3,0	2	**560,00**

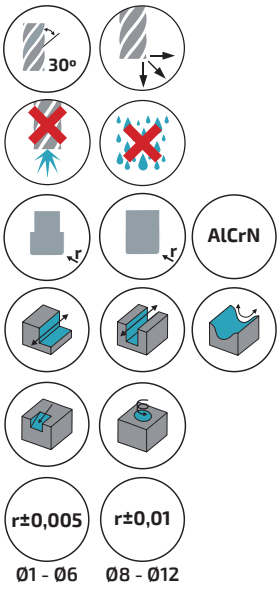
Condiciones de corte | Cutting data pag. 148

FRESAS/ COBRE

END MILLS/COPPER

Fresa metal duro 2 labios tórica para cobre (0,2µm)

2 Fluted solid carbide corner radius end mill for copper (0,2µm)



COPPER

ALU <12% SI

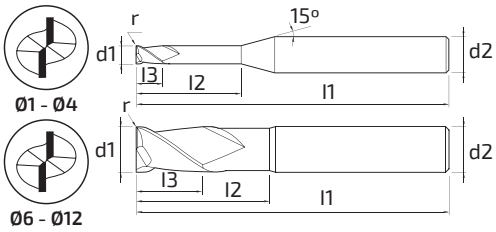
PLASTIC

GFK CFK

GOLD

Fresa de metal duro tórica de 2 labios y hélice de 30º para el mecanizado de cobre, aleaciones de cobre, materiales no férricos y materiales no metálicos. Mejora la resistencia al desgaste así como evita el estrés en el en diferentes aplicaciones. Evacúa la viruta gracias a la profundidad del canal. Ofrece gran rendimiento en el mecanizado de alta velocidad gracias a su grado WC ul (0,2 µm).

2 Fluted 30º helix solid carbide corner radius end mill for copper, copper alloys, non-ferrous and non-metallic materials. Improves wear resistance as well as avoids edge stress in various applications. Smooth chip outflow by deep chip pocket. Outstanding performance at high speed machining by ultrafine (0,2 µm).



Ref.	d1	r	d2	l1	l2	l3	z	€
290010200	1,0	0,1	4	50	6	1,5	2	30,80
290010210	1,0	0,1	4	50	12	1,5	2	32,30
290010220	1,0	0,1	4	50	20	1,5	2	33,75
290015200	1,5	0,1	4	50	10	2,0	2	32,30
290015210	1,5	0,1	4	50	16	2,0	2	32,30
290015220	1,5	0,1	4	60	25	2,0	2	35,25
290015230	1,5	0,2	4	50	10	2,0	2	32,30
290015240	1,5	0,2	4	50	16	2,0	2	32,30
290015250	1,5	0,2	4	60	25	2,0	2	35,25
290020200	2,0	0,2	4	50	10	3,0	2	32,30
290020210	2,0	0,2	4	50	16	3,0	2	32,30
290020220	2,0	0,2	4	60	25	3,0	2	35,25
290020230	2,0	0,5	4	50	10	3,0	2	32,30
290020240	2,0	0,5	4	50	16	3,0	2	32,30
290020250	2,0	0,5	4	60	25	3,0	2	35,25
290025200	2,5	0,2	4	50	10	3,5	2	32,30
290025210	2,5	0,2	4	50	16	3,5	2	32,30
290025220	2,5	0,2	4	60	25	3,5	2	35,25
290025230	2,5	0,5	4	50	10	3,5	2	32,30
290025240	2,5	0,5	4	50	16	3,5	2	32,30
290025250	2,5	0,5	4	60	25	3,5	2	35,25
290030200	3,0	0,2	6	55	12	4,0	2	32,60
290030210	3,0	0,2	6	55	16	4,0	2	32,60
290030220	3,0	0,2	6	65	25	4,0	2	36,80
290030230	3,0	0,2	6	80	40	4,0	2	44,50

Ref.	d1	r	d2	l1	l2	l3	z	€
290030240	3	0,5	6	55	12	4	2	32,60
290030250	3	0,5	6	55	16	4	2	32,60
290030260	3	0,5	6	65	25	4	2	36,80
290030270	3	0,5	6	80	40	4	2	44,50
290040200	4	0,2	6	55	16	5	2	32,60
290040210	4	0,2	6	55	20	5	2	33,95
290040220	4	0,2	6	70	30	5	2	38,85
290040230	4	0,2	6	80	40	5	2	44,50
290040240	4	0,5	6	55	16	5	2	32,60
290040250	4	0,5	6	55	20	5	2	33,95
290040260	4	0,5	6	70	30	5	2	39,75
290040270	4	0,5	6	80	40	5	2	44,50
290060200	6	0,5	6	60	20	7	2	34,25
290060210	6	1,0	6	60	20	7	2	34,25
290060220	6	1,5	6	60	20	7	2	34,25
290080200	8	0,5	8	65	25	9	2	41,40
290080210	8	1,0	8	65	25	9	2	41,40
290080220	8	1,5	8	65	25	9	2	41,40
290100200	10	0,5	10	70	32	11	2	59,35
290100210	10	1,0	10	70	32	11	2	59,35
290100220	10	1,5	10	70	32	11	2	59,35
290120200	12	0,5	12	80	38	12	2	71,80
290120210	12	1,0	12	80	38	12	2	71,80
290120220	12	1,5	12	80	38	12	2	71,80

Condiciones de corte | Cutting data pag. 148

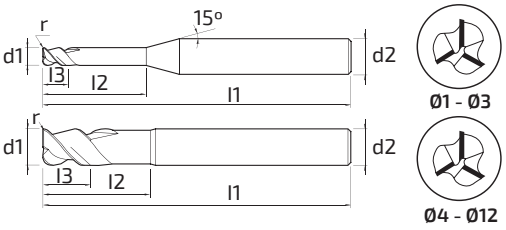
F-295

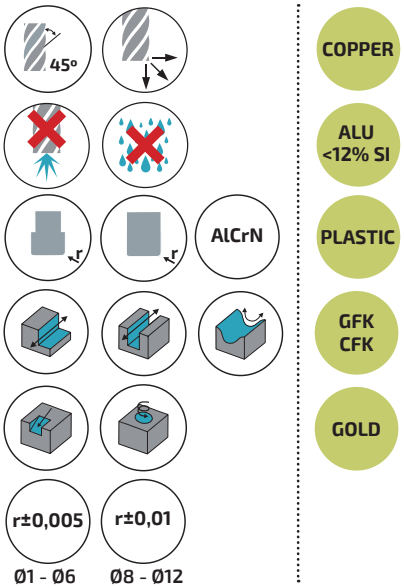
Fresa metal duro 3 labios tórica para cobre (0,2µm)

3 Fluted solid carbide corner radius end mill for copper (0,2µm)

Fresa de metal duro tórica de 3 labios para el mecanizado de cobre, aleaciones de cobre, materiales no férricos y materiales no metálicos. Mejora la resistencia al desgaste así como evita el estrés en el en diferentes aplicaciones. Su hélice de 3 labios y 45º permite alcanzar elevadas velocidades de corte y avances. Ofrece gran rendimiento en el mecanizado de alta velocidad gracias a su grado WC ul 0,2 µm).

3 Fluted solid carbide corner radius end mill for copper, copper alloys, non-ferrous and non-metallic materials. Improves wear resistance as well as avoids edge stress in various applications. High speed, feed applicable by 3 flute 45º helix design. Outstanding performance at high speed machining by ultrafine (0,2 µm) grade.



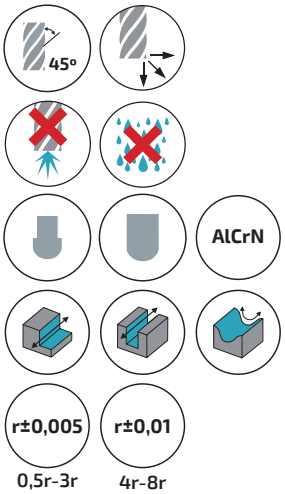


Ref.	d1	r	d2	l1	l2	l3	z	€
295010200	1,0	0,1	4	45	6	1,5	3	33,90
295010210	1,0	0,2	4	45	6	1,5	3	33,90
295015200	1,5	0,1	4	45	8	2,0	3	33,90
295015210	1,5	0,2	4	45	8	2,0	3	33,90
295020200	2,0	0,1	4	45	10	3,0	3	33,90
295020210	2,0	0,2	4	45	10	3,0	3	33,90
295025200	2,5	0,1	4	45	12	3,5	3	35,55
295025210	2,5	0,2	4	45	12	3,5	3	35,55
295025220	2,5	0,5	4	45	12	3,5	3	35,55
295030200	3,0	0,2	4	50	16	4,0	3	33,90
295030210	3,0	0,3	4	50	16	4,0	3	33,90
295030220	3,0	0,5	4	50	16	4,0	3	33,90
295040200	4,0	0,2	4	50	16	6,0	3	35,75
295040210	4,0	0,3	4	50	16	6,0	3	35,75
295040220	4,0	0,5	4	50	16	6,0	3	35,75
295060200	6,0	0,3	6	55	20	9,0	3	35,65
295060210	6,0	0,5	6	55	20	9,0	3	35,65
295060220	6,0	1,0	6	55	20	9,0	3	35,65
295080200	8,0	0,3	8	65	25	12,0	3	49,10
295080210	8,0	0,5	8	65	25	12,0	3	49,10
295080220	8,0	1,0	8	65	25	12,0	3	49,10
295100200	10,0	0,5	10	70	30	15,0	3	68,45
295100210	10,0	1,0	10	70	30	15,0	3	68,45
295120200	12,0	0,5	12	80	35	20,0	3	83,95
295120210	12,0	1,0	12	80	35	20,0	3	83,95

Condiciones de corte | Cutting data pag. 148

Fresa metal duro 2 labios esférica para cobre (0,2µm)

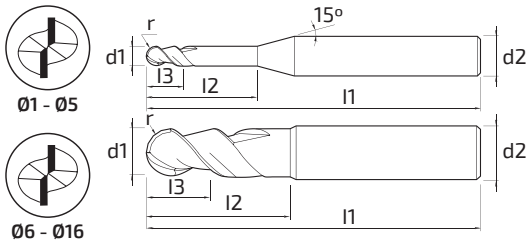
2 Fluted solid carbide ball end mill for copper (0,2µm)



COPPER
ALU <12% SI
PLASTIC
GFK CFK
GOLD

Fresa de metal duro esférica de 2 labios para el mecanizado de cobre, aleaciones de cobre, materiales no férricos y materiales no metálicos. Mejora la resistencia al desgaste así como evita el estrés en el en diferentes aplicaciones. Su hélice de 45º permite alcanzar elevadas velocidades de corte y avances. Ofrece gran rendimiento en el mecanizado de alta velocidad gracias a su grado WC ul 0,2 µm).

2 Fluted solid carbide rib ball end mill for copper, copper alloys, non-ferrous and non-metallic materials. Improves wear resistance as well as avoids edge stress in various applications. High speed, feed applicable by 45º helix design. Outstanding performance at high speed machining by ultrafine (0,2 µm) grade.



Ref.	d1	r	d2	l1	l2	l3	z	€
285010200	1,0	0,50	4	50	8	1,5	2	29,50
285010210	1,0	0,50	4	50	16	1,5	2	30,80
285015200	1,5	0,75	4	50	8	2,0	2	29,50
285015210	1,5	0,75	4	50	16	2,0	2	30,80
285020200	2,0	1,00	6	60	8	3,0	2	31,40
285020210	2,0	1,00	6	60	16	3,0	2	31,40
285020220	2,0	1,00	6	60	25	3,0	2	33,60
285025200	2,5	1,25	6	60	10	4,0	2	31,40
285025210	2,5	1,25	6	60	16	4,0	2	31,40
285030200	3,0	1,50	6	70	8	4,5	2	36,15
285030210	3,0	1,50	6	70	16	4,5	2	37,20
285030220	3,0	1,50	6	70	25	4,5	2	39,35
285030230	3,0	1,50	6	70	40	4,5	2	48,95
285040200	4,0	2,00	6	70	16	6,0	2	37,20
285040210	4,0	2,00	6	70	20	6,0	2	37,20
285040220	4,0	2,00	6	70	25	6,0	2	39,35
285040230	4,0	2,00	6	80	40	6,0	2	48,95
285050200	5,0	2,50	6	80	16	8,0	2	40,15
295050210	5,0	2,50	6	80	20	8,0	2	40,15
285050220	5,0	2,50	6	80	25	8,0	2	40,15
285060200	6,0	3,00	6	90	15	9,0	2	42,85
285060210	6,0	3,00	6	90	30	9,0	2	44,75
285060220	6,0	3,00	6	90	40	9,0	2	46,70
285080200	8,0	4,00	8	100	20	12,0	2	60,30
285100200	10,0	5,00	10	100	25	15,0	2	79,50
285120200	12,0	6,00	12	110	30	18,0	2	105,50
285160200	16,0	8,00	16	160	60	30,0	2	237,15

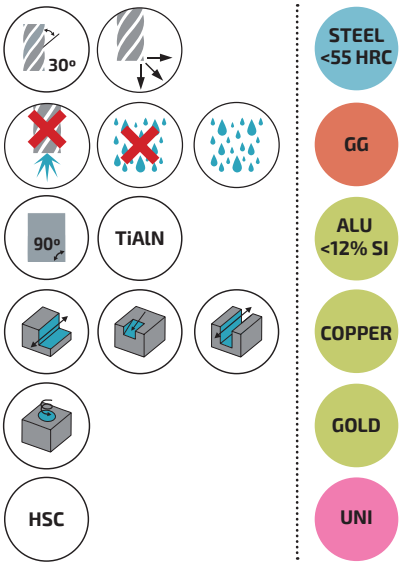
Condiciones de corte | Cutting data pag. 148

FRESAS/ ACERO

END MILLS/STEEL

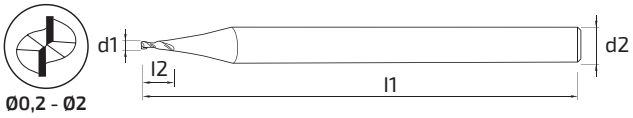
Microfresa metal duro 2 labios HSC <55 HRC (0,2µm)

2 Fluted solid carbide micro end mill for HSC <55 HRC (0,2µm)



Fresa de metal duro micro de 2 labios con corte al centro con recubrimiento TiAlN y ángulo espiral de 30º.
La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Podemos utilizarla para fresados a alta velocidad(HSC). Herramienta para uso general, para materiales hasta 55 HRC. También válida para materiales no férricos y aluminio.

Solid carbide miniature 2 fluted end mill with TiAlN coating and 30º helix. The positive geometry together with this coating help to get a soft cutting with a very long tool life.
For universal application, for high tense material up to 55 HRC. Also for non ferrous metals and aluminum, specially suited for HSC milling.



Ref.	d1	d2	l1	l2	z	€
901002200	0,2	4	50	0,4	2	**56,90**
901003200	0,3	4	50	0,6	2	**41,15**
901004200	0,4	4	50	0,8	2	**41,15**
901005200	0,5	4	50	1,0	2	**41,15**
901006200	0,6	4	50	1,2	2	**41,15**
901007200	0,7	4	50	1,4	2	**41,15**
901008200	0,8	4	50	1,6	2	**41,15**
901009200	0,9	4	50	1,8	2	**41,15**
901010200	1,0	4	50	3,0	2	**29,15**
901011200	1,1	4	50	3,0	2	**29,15**
901012200	1,2	4	50	3,0	2	**29,15**
901013200	1,3	4	50	3,0	2	**29,15**
901014200	1,4	4	50	3,0	2	**29,15**
901015200	1,5	4	50	4,0	2	**29,15**
901016200	1,6	4	50	4,0	2	**29,15**
901017200	1,7	4	50	4,0	2	**29,15**
901018200	1,8	4	50	4,0	2	**29,15**
901019200	1,9	4	50	4,0	2	**29,15**
901020200	2,0	4	50	6,0	2	**29,15**

Condiciones de corte | Cutting data pag. 149

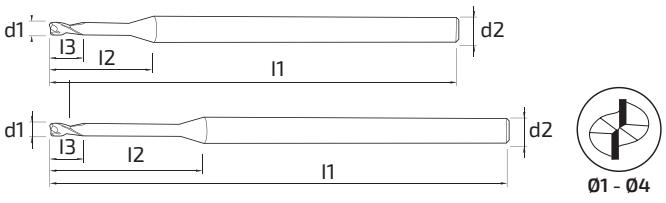
F-812

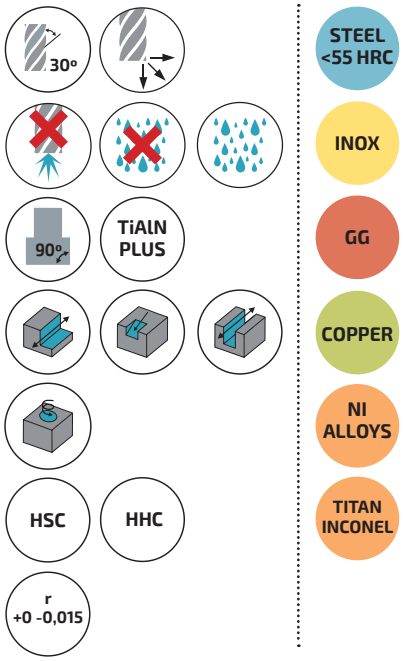
Fresa metal duro 2 labios HSC/HHC<55HRC

2 Fluted solid carbide end mill for HSC/HHC <55 HRC

Fresa de metal duro de cuello largo de 2 labios con corte al centro y recubrimiento TiAlN. Ángulo espiral de 30º. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado HSC (High Speed Cutting) + HHC (High Hard Cutting) <55 HRC. También podemos utilizar esta herramienta para aceros y materiales no férricos. El diámetro posterior al corte es menor que el diámetro de punta para evitar el desvío de la herramienta.

Solid carbide miniature end mills with TiAlN coating and 30º spiral angle. For universal use, for standard steel and non-ferrous materials. The tool, material and coating are specially designed for dry high speed cutting HSC and high hard cutting HHC <55 HRC large cone diameter for minimum deflection.





Ref.	d1	d2	l1	l2	l3	z	€
812010200	1,0	6	55	5	1,5	2	**36,00**
812010210	1,0	6	65	12	1,5	2	**37,75**
812015200	1,5	6	55	5	1,8	2	**36,00**
812015210	1,5	6	65	12	1,8	2	**37,75**
812020200	2,0	6	55	10	2,0	2	**36,00**
812020210	2,0	6	65	16	2,0	2	**37,75**
812030200	3,0	6	65	9	2,0	2	**37,75**
812030210	3,0	6	65	15	2,0	2	**37,75**
812040200	4,0	6	65	12	2,0	2	**37,75**
812040210	4,0	6	65	20	2,0	2	**37,75**

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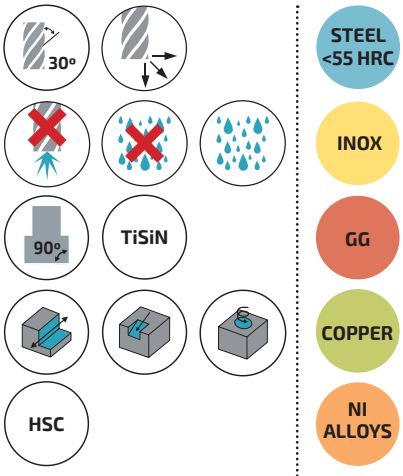
Fresa metal duro punta plana 2 labios <55 HRC (0,2µm)

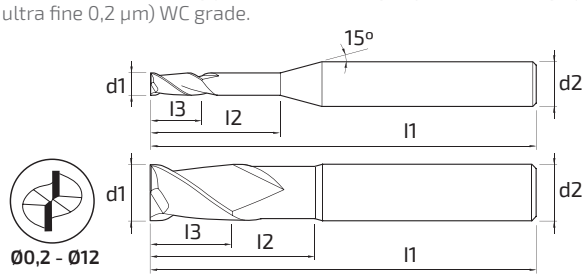
2 Fluted high speed rib end mill <55 HRC (0,2µm)



STEEL <55 HRC
INOX
GG
COPPER
NI ALLOYS
TITAN INCONEL

Fresa de punta plana de cuello largo rebajado y dos labios con recubrimiento TiSiN. Ángulo espiral de 30º. La herramienta, el material y el recubrimiento están especialmente diseñados para el mecanizado HSC <55 HRC. Ofrece una excelente resistencia al desgaste gracias a su recubrimiento PVD con base de Si. Elevada precisión en la tolerancia del Espectacular rendimiento a altas velocidades gracias a su grado WC ul 0,2 µm).

2 Fluted long neck rib end mil with TiSiN coating. 30º spiral angle. Good wear resistance by Si-based PVD coating. High precise edge tolerance. Outstanding performance at high speed machining by ultra fine 0,2 µm) WC grade.



Ref.	d1	d2	l1	l2	l3	€
913001200	0,1	4	40	-	0,3	53,35
913001210	0,1	4	40	-	0,5	53,35
913002210	0,2	4	40	0,5	0,2	34,25
913002220	0,2	4	40	1	0,2	34,25
913002230	0,2	4	40	1,5	0,2	34,25
913002200	0,2	4	40	2	0,2	34,25
913003210	0,3	4	40	1	0,3	29,75
913003220	0,3	4	40	1,5	0,3	29,75
913003230	0,3	4	40	2	0,3	29,75
913003240	0,3	4	40	3	0,3	29,75
913003200	0,3	4	40	4	0,3	36,30
913003250	0,3	4	40	5	0,3	36,30
913004210	0,4	4	40	1	0,4	29,75
913004220	0,4	4	40	2	0,4	29,75
913004230	0,4	4	40	3	0,4	29,75
913004200	0,4	4	40	4	0,4	29,75
913004240	0,4	4	40	5	0,4	29,75
913004250	0,4	4	40	6	0,4	29,75
913004260	0,4	4	40	8	0,4	29,75
913004270	0,4	4	40	10	0,4	36,30
913005220	0,5	4	40	2	0,5	26,40
913005230	0,5	4	40	3	0,5	26,40
913005200	0,5	4	40	4	0,5	26,40
913005240	0,5	4	40	5	0,5	26,40
913005250	0,5	4	40	6	0,5	26,40
913005210	0,5	4	40	8	0,5	26,40
913005260	0,5	4	40	10	0,5	31,00
913005270	0,5	4	45	12	0,5	37,80
913005280	0,5	4	45	14	0,5	37,80
913006220	0,6	4	40	2	0,6	26,40

Ref.	d1	d2	l1	l2	l3	€
913006230	0,6	4	40	3	0,6	26,40
913006200	0,6	4	40	4	0,6	26,40
913006240	0,6	4	40	5	0,6	26,40
913006250	0,6	4	40	6	0,6	26,40
913006210	0,6	4	40	8	0,6	26,40
913006260	0,6	4	40	10	0,6	26,40
913006270	0,6	4	45	12	0,6	31,00
913006280	0,6	4	45	14	0,6	37,80
913006290	0,6	4	45	16	0,6	37,80
913007210	0,7	4	40	2	0,7	25,15
913007220	0,7	4	40	4	0,7	25,15
913007230	0,7	4	40	6	0,7	25,15
913007200	0,7	4	40	8	0,7	25,15
913007240	0,7	4	40	10	0,7	25,15
913007250	0,7	4	45	12	0,7	31,55
913008230	0,8	4	40	2	0,8	25,15
913008240	0,8	4	40	4	0,8	25,15
913008200	0,8	4	40	6	0,8	25,15
913008210	0,8	4	40	8	0,8	25,15
913008250	0,8	4	40	10	0,8	25,15
913008220	0,8	4	45	12	0,8	26,40
913008260	0,8	4	45	14	0,8	32,95
913009200	0,9	4	40	6	0,9	25,15
913009210	0,9	4	40	8	0,9	25,15
913009220	0,9	4	40	10	0,9	25,15
913010260	1,0	4	45	2	1,0	21,80
913010270	1,0	4	45	3	1,0	21,80
913010280	1,0	4	45	4	1,0	21,80
913010290	1,0	4	45	5	1,0	21,80
913010200	1,0	4	45	6	1,0	21,80

F-913

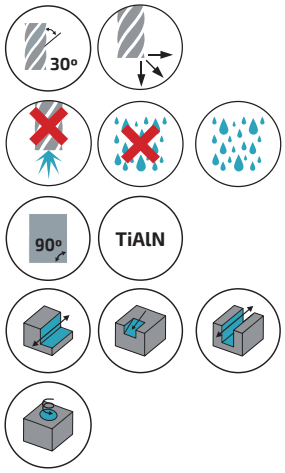
Ref.	d1	d2	l1	l2	l3	€
913010210	1,0	4	45	8	1,0	**21,80**
913010220	1,0	4	45	10	1,0	**23,60**
913010230	1,0	4	45	12	1,0	**23,60**
913010300	1,0	4	45	14	1,0	**23,60**
913010240	1,0	4	50	16	1,0	**23,60**
913010310	1,0	4	50	18	1,0	**23,60**
913010250	1,0	4	50	20	1,0	**23,60**
913010320	1,0	4	60	25	1,0	**26,40**
913010330	1,0	4	70	30	1,0	**35,65**
913012240	1,2	4	45	4	1,2	**21,80**
913012250	1,2	4	45	6	1,2	**21,80**
913012200	1,2	4	45	8	1,2	**21,80**
913012260	1,2	4	45	10	1,2	**23,60**
913012210	1,2	4	45	12	1,2	**23,60**
913012220	1,2	4	50	16	1,2	**23,60**
913012230	1,2	4	50	20	1,2	**23,60**
913012270	1,2	4	60	25	1,2	**26,40**
913012280	1,2	4	70	30	1,2	**35,65**
913014210	1,4	4	45	6	1,4	**23,60**
913014220	1,4	4	45	8	1,4	**23,60**
913014230	1,4	4	45	10	1,4	**23,60**
913014200	1,4	4	45	14	1,4	**23,60**
913014240	1,4	4	50	16	1,4	**23,60**
913014250	1,4	4	50	20	1,4	**23,60**
913015260	1,5	4	45	4	1,5	**21,80**
913015270	1,5	4	45	6	1,5	**21,80**
913015200	1,5	4	45	8	1,5	**21,80**
913015280	1,5	4	45	10	1,5	**21,80**
913015210	1,5	4	45	12	1,5	**23,60**
913015290	1,5	4	50	14	1,5	**23,60**
913015220	1,5	4	50	16	1,5	**23,60**
913015300	1,5	4	50	18	1,5	**23,60**
913015230	1,5	4	50	20	1,5	**23,60**
913015240	1,5	4	60	25	1,5	**26,40**
913015250	1,5	4	70	30	1,5	**35,65**
913016210	1,6	4	45	10	1,6	**23,60**
913016220	1,6	4	45	14	1,6	**23,60**
913016200	1,6	4	60	18	1,6	**23,60**
913018210	1,8	4	45	10	1,8	**23,60**
913018220	1,8	4	45	14	1,8	**23,60**
913018200	1,8	4	50	18	1,8	**23,60**
913020270	2,0	4	45	4	2,0	**21,80**
913020280	2,0	4	45	6	2,0	**21,80**
913020200	2,0	4	45	8	2,0	**21,80**
913020290	2,0	4	45	10	2,0	**21,80**
913020210	2,0	4	45	12	2,0	**21,80**
913020300	2,0	4	45	14	2,0	**21,80**
913020220	2,0	4	50	16	2,0	**21,80**
913020310	2,0	4	50	18	2,0	**21,80**
913020230	2,0	4	50	20	2,0	**21,80**
913020320	2,0	4	60	22	2,0	**23,60**
913020240	2,0	4	60	25	2,0	**23,60**
913020250	2,0	4	60	30	2,0	**26,95**
913020330	2,0	4	70	35	2,0	**29,20**
913020260	2,0	4	80	40	2,0	**31,95**
913020340	2,0	4	80	45	2,0	**38,35**
913020350	2,0	4	90	50	2,0	**44,60**

Ref.	d1	d2	l1	l2	l3	€
913025220	2,5	4	45	8	2,5	**23,60**
913025230	2,5	4	45	10	2,5	**23,60**
913025240	2,5	4	45	12	2,5	**23,60**
913025200	2,5	4	50	16	2,5	**23,60**
913025250	2,5	4	50	20	2,5	**23,60**
913025260	2,5	4	60	25	2,5	**23,60**
913025210	2,5	4	70	30	2,5	**26,95**
913025270	2,5	4	70	35	2,5	**29,20**
913025280	2,5	4	80	40	2,5	**31,95**
913025290	2,5	4	90	50	2,5	**38,50**
913030200	3,0	6	45	6	3,0	**24,75**
913030270	3,0	6	45	10	3,0	**24,75**
913030280	3,0	6	50	12	3,0	**24,75**
913030210	3,0	6	55	16	3,0	**24,75**
913030220	3,0	6	60	20	3,0	**27,35**
913030230	3,0	6	65	25	3,0	**27,35**
913030240	3,0	6	70	30	3,0	**33,45**
913030290	3,0	6	75	35	3,0	**38,50**
913030250	3,0	6	80	40	3,0	**39,75**
913030300	3,0	6	90	45	3,0	**41,30**
913030260	3,0	6	100	50	3,0	**44,15**
913030310	3,0	6	100	60	3,0	**50,75**
913040260	4,0	6	50	8	4,0	**26,15**
913040270	4,0	6	50	10	4,0	**26,15**
913040280	4,0	6	50	12	4,0	**26,15**
913040200	4,0	6	55	16	4,0	**26,15**
913040210	4,0	6	60	20	4,0	**28,60**
913040220	4,0	6	65	25	4,0	**28,60**
913040230	4,0	6	70	30	4,0	**33,45**
913040290	4,0	6	75	35	4,0	**38,50**
913040240	4,0	6	80	40	4,0	**39,75**
913040300	4,0	6	90	45	4,0	**41,30**
913040250	4,0	6	100	50	4,0	**44,15**
913040310	4,0	6	100	55	4,0	**50,75**
913040320	4,0	6	100	60	4,0	**55,60**
913050230	5,0	6	55	16	5,0	**28,60**
913050200	5,0	6	60	20	5,0	**28,60**
913050240	5,0	6	65	25	5,0	**33,45**
913050210	5,0	6	70	30	5,0	**33,45**
913050250	5,0	6	75	35	5,0	**38,50**
913050260	5,0	6	80	40	5,0	**39,75**
913050220	5,0	6	100	50	5,0	**44,15**
913050270	5,0	6	100	60	5,0	**50,75**
913060210	6,0	6	60	20	10,0	**28,60**
913060200	6,0	6	75	30	10,0	**33,45**
913060220	6,0	6	80	40	10,0	**39,75**
913060230	6,0	6	90	50	10,0	**41,80**
913060240	6,0	6	110	60	10,0	**47,55**
913080210	8,0	8	65	20	12,0	**42,35**
913080200	8,0	8	80	30	12,0	**47,55**
913080220	8,0	8	100	40	12,0	**54,10**
913100210	10,0	10	70	25	15,0	**62,70**
913100200	10,0	10	80	35	15,0	**69,35**
913100220	10,0	10	100	45	15,0	**77,95**
913120200	12,0	12	80	30	18,0	**72,30**
913120210	12,0	12	100	40	18,0	**83,20**
913120220	12,0	12	120	50	18,0	**95,15**

Condiciones de corte | Cutting data pag. 150

Fresa metal duro 2 labios <55HRC

2 Fluted solid carbide end mill <55 HRC



STEEL <55 HRC

INOX

GG

ALU <12% SI

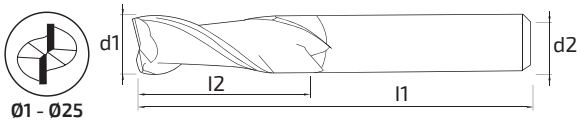
COPPER

GFK CFK

UNI

Fresa de metal duro de 2 labios con corte al centro con recubrimiento TiAlN. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general, para materiales hasta 55 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para ranurado y acabado.

2 Fluted cutting to centre solid carbide end mills plus TiAlN coating. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose. For high tense material. Also for aluminium and non-ferrous material. For materials up to 55 HRC. Tool especially designed for slotting and finishing.



Ref.	d1	d2	l1	l2	z	€
202010200	1,0	3	38	3	2	10,00
202010210	1,0	4	50	3	2	12,00
202015200	1,5	3	38	4	2	10,00
202020200	2,0	3	38	6	2	10,00
202020210	2,0	4	50	6	2	12,00
202025200	2,5	3	38	8	2	10,00
202030200	3,0	3	38	8	2	10,00
202030210	3,0	4	50	8	2	12,00
202035200	3,5	4	50	10	2	12,00
202040200	4,0	4	50	11	2	10,90
202045200	4,5	6	50	13	2	15,75
202050200	5,0	5	50	13	2	13,45
202055200	5,5	6	50	13	2	16,60
202060200	6,0	6	50	16	2	14,60
202065200	6,5	8	60	16	2	26,75
202070200	7,0	8	60	16	2	26,75
202075200	7,5	8	60	19	2	26,75
202080200	8,0	8	60	19	2	21,35

Ref.	d1	d2	l1	l2	z	€
202085200	8,5	10	75	20	2	40,10
202090200	9,0	10	75	19	2	40,10
202095200	9,5	10	75	25	2	40,10
202097200	9,7	10	75	25	2	40,10
202100200	10,0	10	75	22	2	30,30
202105200	10,5	12	75	25	2	57,10
202110200	11,0	12	75	30	2	57,10
202115200	11,5	12	75	30	2	57,10
202120200	12,0	12	75	26	2	42,15
202130200	13,0	13	100	40	2	79,30
202140200	14,0	16	90	30	2	67,15
202150200	15,0	16	100	40	2	95,15
202160200	16,0	16	100	32	2	82,75
202170200	17,0	20	100	45	2	120,15
202180200	18,0	18	100	38	2	108,45
202190200	19,0	20	100	45	2	139,30
202200200	20,0	20	100	38	2	127,15
202250200	25,0	25	100	38	2	221,3

Condiciones de corte | Cutting data pag. 151

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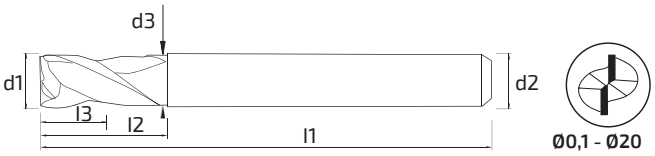
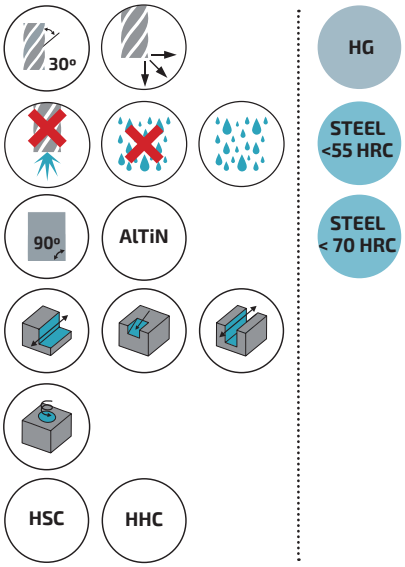
Fresa metal duro 2 labios <70 HRC

2 Fluted solid carbide end mill <70 HRC

Fresa de metal duro de 2 labios, con corte al centro y recubrimiento AlTiN y ángulo de hélice de 30º. Especialmente diseñada para materiales endurecidos hasta 70 HRC. Adecuada para mecanizado en seco y HSC.

2 Fluted cutting to centre solid carbide end mill with AlTiN coating and 30º helix angle. Specially designed to machine high hardened materials up to HRC 70. Suitable for dry cutting and high speed cutting (HSC).



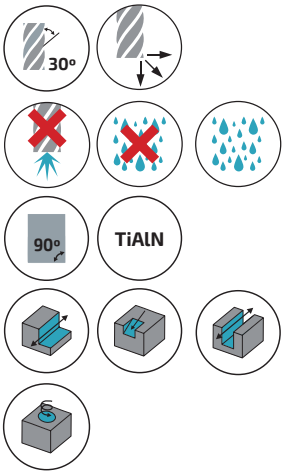


Ref.	d1	d2	d3	l1	l2	l3	z	€
214001200	0,1	4	-	40	-	0,2	2	**50,60**
214002200	0,2	4	-	40	-	0,4	2	**46,60**
214003200	0,3	4	-	40	-	0,5	2	**39,30**
214004200	0,4	4	-	40	-	0,7	2	**39,30**
214005200	0,5	4	-	40	-	1,0	2	**35,30**
214006200	0,6	4	-	40	-	1,2	2	**35,30**
214007200	0,7	4	-	40	-	1,4	2	**35,30**
214008200	0,8	4	-	40	-	1,6	2	**35,30**
214009200	0,9	4	-	40	-	2,0	2	**35,30**
214010200	1,0	6	-	40	-	1,5	2	**30,05**
214015200	1,5	6	-	40	-	2,2	2	**30,05**
214020200	2,0	6	1,9	40	6	3,0	2	**30,05**
214025200	2,5	6	2,4	40	6	4,0	2	**31,50**
214030200	3,0	6	2,9	45	7	4,0	2	**31,50**
214035200	3,5	6	3,3	45	9	6,0	2	**31,50**
214040200	4,0	6	3,8	45	9	6,0	2	**31,50**
214045200	4,5	6	4,3	45	10	6,0	2	**31,50**
214050200	5,0	6	4,8	50	11	6,0	2	**34,45**
214060200	6,0	6	5,8	50	14	7,0	2	**34,45**
214080200	8,0	8	7,8	60	18	9,0	2	**39,55**
214100200	10,0	10	9,7	75	25	12,0	2	**54,20**
214120200	12,0	12	11,7	75	30	15,0	2	**70,30**
214160200	16,0	16	15,7	90	38	18,0	2	**183,05**
214200200	20,0	20	19,7	100	45	24,0	2	**253,30**

Condiciones de corte | Cutting data pag. 152

Fresa metal duro 2 labios <55 HRC

2 Fluted solid carbide long end mill <55 HRC



STEEL <55 HRC

INOX

GG

ALU <12% SI

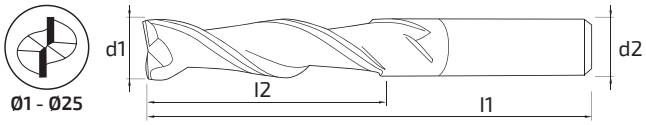
COPPER

GFK CFK

UNI

Fresa de metal duro de 2 labios con corte al centro con recubrimiento TiAlN serie larga. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general, para materiales hasta 55 HRC. También válida para materiales no férricos y aluminio.

2 Fluted cutting to centre solid carbide end mills plus TiAlN coating long type. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose. For high tense material. Also for aluminium and non-ferrous material. For hardened materials up to 55 HRC.



Ref.	d1	d2	l1	l2	€
204010200	1	3	60	5	14,15
204020200	2	3	60	10	14,15
204030200	3	3	60	15	14,15
204040200	4	4	80	20	16,75
204050200	5	5	80	25	18,75
204060200	6	6	80	25	19,45
204080200	8	8	90	35	31,70
204100200	10	10	100	45	43,65
204120200	12	12	100	50	61,75
204140200	14	14	150	65	136,15
204160200	16	16	150	65	150,00
204200200	20	20	150	70	220,60
204250200	25	25	150	75	363,90

Condiciones de corte | Cutting data pag. 151

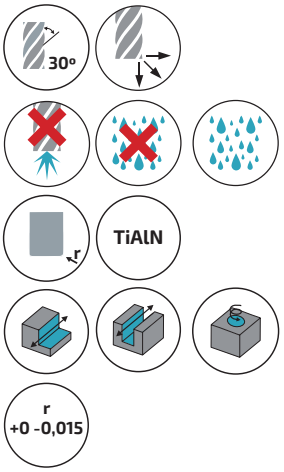
F-218

Fresa metal duro extra larga 2 labios <55 HRC

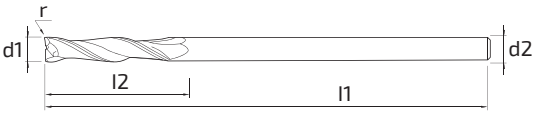
2 Fluted solid carbide extra long end mill <55 HRC

Fresa de metal duro de 2 labios con corte al centro con recubrimiento TiAlN serie extra larga con radio en punta. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para materiales hasta 55 HRC. También válida para materiales no férricos y aluminio.

2 Fluted cutting to centre solid carbide end mills plus TiAlN coating extra long type with corner radius. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life.
Universal purpose. For high tense material. Also for aluminium and non-ferrous material. For hardened materials up to 55 HRC.



STEEL <55 HRC
INOX
GG
ALU <12% SI
COPPER
GFK CFK
PLASTIC
UNI



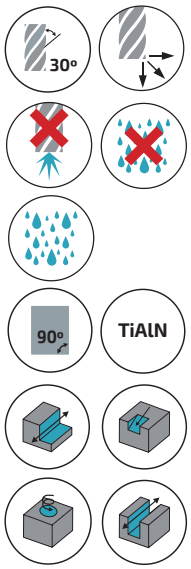
Ø6 - Ø12

Ref.	d1	r	d2	l1	l2	z	€
218060200	6	0,3	6	200	25	2	**65,60**
218080200	8	0,3	8	200	25	2	**105,75**
218100200	10	0,3	10	200	50	2	**116,50**
218120200	12	0,4	12	200	50	2	**145,95**

Condiciones de corte | Cutting data pag. 151

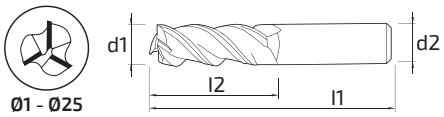
Fresa metal duro 3 labios <55 HRC

3 Fluted solid carbide end mill <55 HRC



Fresa de metal duro de 3 labios con corte al centro con recubrimiento TiAlN. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para materiales hasta 55 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para ranurado, contorneado y acabado.

3 Fluted cutting to centre solid carbide end mills plus TiAlN coating. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose. For high tense material. Also for aluminium and non-ferrous material. For materials up to 55 HRC. Tool especially designed for slotting, contouring and finishing.



Ref.	d1	d2	l1	l2	z	€
302010200	1,0	3	38	3	3	**10,00**
302015200	1,5	3	38	4	3	**10,00**
302020200	2,0	3	38	6	3	**10,00**
302025200	2,5	3	38	8	3	**10,00**
302025210	2,5	4	38	8	3	**10,00**
302030200	3,0	3	38	8	3	**10,00**
302035200	3,5	4	50	11	3	**12,00**
302040200	4,0	4	50	11	3	**10,90**
302040210	4,0	6	50	11	3	**10,90**
302045200	4,5	5	50	13	3	**15,75**
302050200	5,0	5	50	13	3	**13,45**
302050210	5,0	6	50	13	3	**13,45**
302055200	5,5	6	50	16	3	**16,60**
302060200	6,0	6	50	16	3	**14,60**
302065200	6,5	8	60	19	3	**26,75**
302070200	7,0	8	60	19	3	**26,75**
302075200	7,5	8	60	19	3	**26,75**
302080200	8,0	8	60	19	3	**21,35**
302085200	8,5	10	75	22	3	**40,10**
302090200	9,0	10	75	22	3	**40,10**
302095200	9,5	10	75	22	3	**40,10**
302100200	10,0	10	75	22	3	**30,30**
302110200	11,0	12	75	26	3	**57,10**
302120200	12,0	12	75	26	3	**42,15**
302130200	13,0	14	90	30	3	**79,30**
302140200	14,0	14	90	30	3	**67,15**
302150200	15,0	16	100	32	3	**95,15**
302160200	16,0	16	100	32	3	**82,75**
302170200	17,0	18	100	38	3	**108,45**
302180200	18,0	18	100	38	3	**127,15**
302185200	18,5	20	100	38	3	**139,30**
302190200	19,0	20	100	38	3	**139,30**
302200200	20,0	20	100	38	3	**127,15**
302250200	25,0	25	100	38	3	**221,30**

Condiciones de corte | Cutting data pag. 153

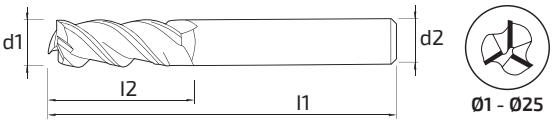
F-332

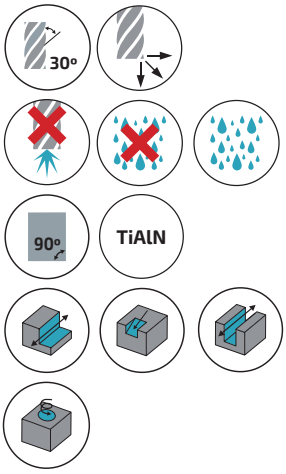
Fresa metal duro extra larga 3 labios <55 HRC

3 Fluted solid carbide long end mill <55 HRC

Fresa de metal duro larga de 3 labios con corte al centro con recubrimiento TiAlN. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para materiales hasta 55 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para ranurado, contorneado y acabado.

3 Fluted cutting to centre solid carbide end mills long plus TiAlN coating. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose. For high tense material. Also for aluminium and non-ferrous material. For materials up to 55 HRC. Tool especially designed for slotting, contouring and finishing.





STEEL <55 HRC

INOX

GG

ALU <12% SI

COPPER

PLASTIC

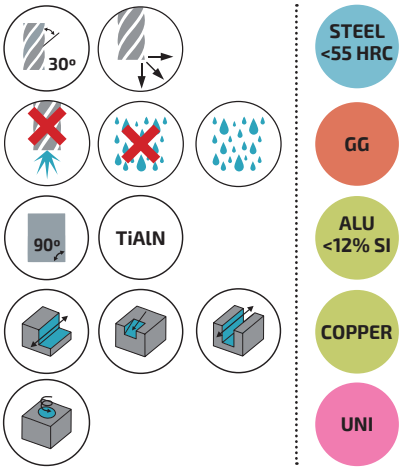
UNI

Ref.	d1	d2	l1	l2	z	€
332010200	1	3	60	5	3	**14,15**
332020200	2	3	60	10	3	**14,15**
332030200	3	3	60	15	3	**14,15**
332040200	4	4	80	20	3	**16,75**
332050200	5	5	80	25	3	**18,75**
332060200	6	6	80	25	3	**19,45**
332080200	8	8	90	35	3	**31,70**
332100200	10	10	100	45	3	**43,65**
332120200	12	12	100	50	3	**84,60**
332140200	14	14	150	65	3	**136,15**
332160200	16	16	150	65	3	**150,00**
332200200	20	20	150	70	3	**220,60**
332250200	25	25	150	75	3	**363,90**

Condiciones de corte | Cutting data pag. 153

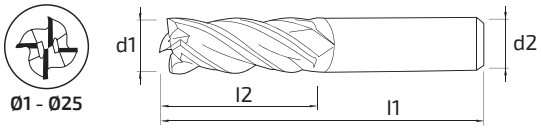
Fresa metal duro 4 labios <55 HRC

4 Fluted solid carbide end mill <55 HRC



Fresa de metal duro de 4 labios con corte al centro y recubrimiento TiAlN. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para materiales hasta 55 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para ranurado, contorneado y acabado.

4 Fluted cutting to centre solid carbide end mills plus TiAlN coating. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose. For high tense material. Also for aluminium and non-ferrous material. For materials up to 55 HRC. Tool especially designed for slotting, contouring and finishing.



Ref.	d1	d2	l1	l2	z	€
402010200	1,0	3	38	3	4	10,00
402015200	1,5	3	38	4	4	10,00
402020200	2,0	3	38	6	4	10,00
402025200	2,5	3	38	8	4	10,00
402030200	3,0	3	38	8	4	10,00
402035200	3,5	4	50	11	4	12,00
402040200	4,0	4	50	11	4	10,90
402045200	4,5	5	50	13	4	15,75
402050200	5,0	5	50	13	4	13,45
402055200	5,5	6	50	16	4	16,60
402060200	6,0	6	50	16	4	14,60
402065200	6,5	8	60	16	4	26,75
402070200	7,0	8	60	16	4	26,75
402075200	7,5	8	60	20	4	26,75
402080200	8,0	8	60	19	4	21,35
402085200	8,5	10	75	22	4	40,10
402090200	9,0	10	75	22	4	40,10
402095200	9,5	10	75	22	4	40,10
402100200	10,0	10	75	22	4	30,30
402110200	11,0	12	75	26	4	57,10
402120200	12,0	12	75	26	4	42,15
402130200	13,0	14	90	30	4	79,30
402140200	14,0	14	90	30	4	67,15
402150200	15,0	16	100	32	4	95,15
402160200	16,0	16	100	32	4	82,75
402165200	16,5	18	100	38	4	120,15
402170200	17,0	18	100	38	4	120,15
402180200	18,0	18	100	38	4	108,45
402185200	18,5	20	100	38	4	139,30
402190200	19,0	20	100	38	4	139,30
402200200	20,0	20	100	38	4	127,15
402250200	25,0	25	100	38	4	221,30

Condiciones de corte | Cutting data pag. 154

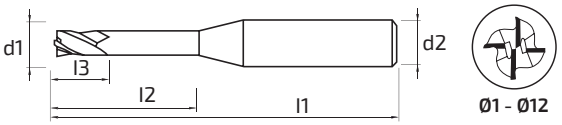
F-401

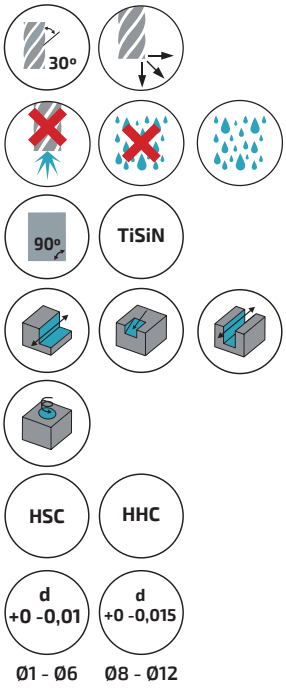
Fresa metal duro 4 labios larga < 70 HRC

4 Fluted solid carbide end mill long < 70 HRC

Fresa de metal duro de 4 labios larga con cuello rebajado, con corte al centro y recubrimiento TiSiN, ángulo de hélice de 30º. Especialmente diseñada para materiales endurecidos hasta 70 HRC. Adecuada para mecanizado en seco y HSC.

4 Fluted cutting to centre solid carbide end mill with TiSiN coating and 30º helix angle. Specially designed to machine high hardened materials up to HRC 70. Suitable for dry cutting and high speed cutting (HSC).





HG

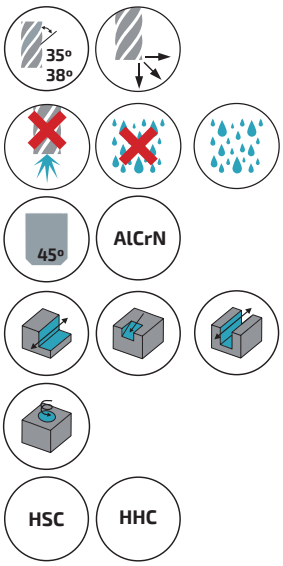
STEEL <65 HRC

Ref.	d1	d2	l1	l2	l3	z	€
401010200	1,0	4	45	3	1,5	4	24,75
401010210	1,0	4	45	4	1,5	4	24,75
401010220	1,0	4	45	6	1,5	4	24,75
401010230	1,0	4	45	8	1,5	4	24,75
401015200	1,5	4	45	4	2,3	4	24,75
401015210	1,5	4	45	6	2,3	4	24,75
401015220	1,5	4	45	8	2,3	4	24,75
401015230	1,5	4	45	10	2,3	4	27,00
401020200	2,0	4	45	6	3,0	4	24,75
401020210	2,0	4	45	8	3,0	4	24,75
401020220	2,0	4	45	10	3,0	4	27,50
401020230	2,0	4	45	12	3,0	4	27,50
401020240	2,0	4	50	16	3,0	4	27,50
401030200	3,0	6	50	8	4,5	4	29,15
401030210	3,0	6	50	10	4,5	4	29,15
401030220	3,0	6	50	12	4,5	4	29,15
401030230	3,0	6	60	16	4,5	4	29,15
401030240	3,0	6	60	20	4,5	4	30,60
401040200	4,0	6	50	10	6,0	4	29,15
401040210	4,0	6	50	12	6,0	4	29,15
401040220	4,0	6	60	16	6,0	4	29,15
401040230	4,0	6	60	20	6,0	4	32,10
401040240	4,0	6	65	25	6,0	4	32,10
401050200	5,0	6	70	30	8,0	4	37,25
401060200	6,0	6	70	30	9,0	4	37,25
401080200	8,0	8	80	30	12,0	4	54,35
401100200	10,0	10	100	35	15,0	4	80,95
401120200	12,0	12	110	40	18,0	4	94,20

Condiciones de corte | Cutting data pag. 167

Fresa metal duro de 4 labios con hélice variable de 35º/38º < 60 HRC

4 Fluted solid carbide 35º/38º variable helix end mill < 60 HRC



STEEL ≤ 60 HRC

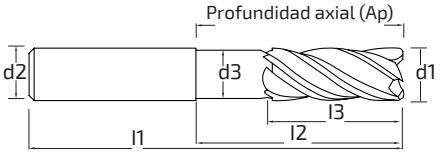
GG

HG

Fresa metal duro de cuatro labios con hélice variable 35º/38º y recubrimiento AlCrN, la hélice en ángulo variable garantiza una gran estabilidad en el mecanizado y un alto rendimiento. Herramienta para acero hasta 60 HRC, fundición y templado.

4 Fluted 35º/38º variable helix end mill with AlCrN coating. Reliability and high performance are guaranted during machining. Suitable for steel up to 60 HRC, cast iron and hardened steel.

Ø3 - Ø25



Ref.	d1	d2	d3	l1	l2	l3	ap	€
452030200	3	6	2,8	57	15,4	8	15 mm	**17,70**
452040200	4	6	3,8	57	17,3	11	17 mm	**17,70**
452050200	5	6	4,8	57	19,1	13	19 mm	**17,70**
452060200	6	6	5,8	57	21,0	13	21 mm	**17,70**
452080200	8	8	7,8	63	27,0	19	27 mm	**28,75**
452100200	10	10	9,8	72	32,0	22	32 mm	**42,00**
452120200	12	12	11,8	83	38,0	26	38 mm	**58,50**
452140200	14	14	13,8	83	38,0	26	38 mm	**81,50**
452160200	16	16	15,8	92	44,0	32	44 mm	**94,95**
452180200	18	18	17,8	92	44,0	32	44 mm	**127,15**
452200200	20	20	19,8	104	54,0	38	54 mm	**158,65**
452250200	25	25	24,8	121	65,0	45	65 mm	**270,90**

Condiciones de corte | Cutting data pag. 171

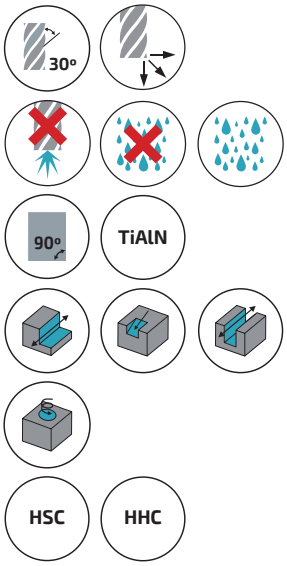
F-414

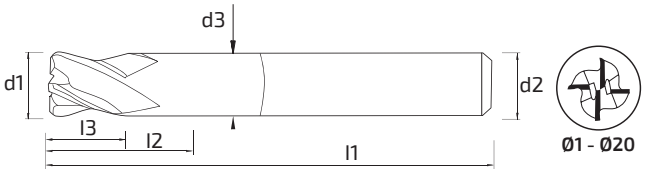
Fresa metal duro 4 labios <70 HRC

4 Fluted solid carbide end mill <70 HRC

Fresa de metal duro de 4 labios, con corte al centro y recubrimiento AlTiN y ángulo de hélice de 30º. Especialmente diseñada para materiales endurecidos hasta 70 HRC. Adecuada para mecanizado en seco y HSC.

4 Fluted cutting to centre solid carbide end mill with AlTiN coating and 30º helix angle. Specially designed to machine high hardened materials up to HRC 70. Suitable for dry cutting and high speed cutting (HSC).



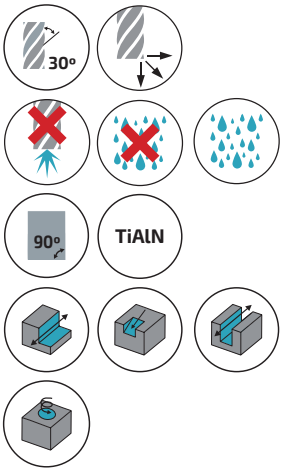


Ref.	d1	d2	d3	l1	l2	l3	z	€
414010200	1,0	6	-	40	-	1,5	4	**34,45**
414015200	1,5	6	-	40	-	2,2	4	**34,45**
414020200	2,0	6	1,9	40	6	3,0	4	**34,45**
414025200	2,5	6	2,4	40	6	4,0	4	**35,90**
414030200	3,0	6	2,9	45	7	4,0	4	**35,90**
414035200	3,5	6	3,3	45	9	5,0	4	**35,90**
414040200	4,0	6	3,8	45	9	5,0	4	**35,90**
414045200	4,5	6	4,3	45	10	6,0	4	**35,90**
414050200	5,0	6	4,8	50	11	6,0	4	**37,35**
414060200	6,0	6	5,8	50	14	7,0	4	**37,35**
414080200	8,0	8	7,8	60	18	9,0	4	**43,20**
414100200	10,0	10	9,7	75	25	12,0	4	**58,60**
414120200	12,0	12	11,7	75	30	15,0	4	**76,15**
414160200	16,0	16	15,7	90	38	18,0	4	**193,30**
414200200	20,0	20	19,7	100	45	24,0	4	**265,05**

Condiciones de corte | Cutting data pag. 155

Fresa metal duro 4 labios largas <55 HRC

4 Fluted solid carbide long end mill <55 HRC



STEEL <55 HRC

INOX

GG

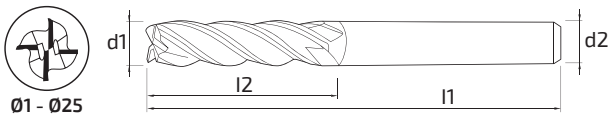
ALU <12% SI

COPPER

UNI

Fresa de metal duro larga de 4 labios con corte al centro y recubrimiento TiAlN. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para materiales hasta 55 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para contorneado y acabado.

Long 4 fluted cutting to centre solid carbide end mills long plus TiAlN coating. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose. For high tense material. Also for aluminium and non-ferrous material. For materials up to 55 HRC. Tool especially designed for contouring and finishing.



Ref.	d1	d2	l1	l2	z	€
404010200	1	3	60	5	4	14,15
404020200	2	3	60	10	4	14,15
404030200	3	3	60	15	4	14,15
404040200	4	4	80	20	4	16,75
404050200	5	5	80	25	4	18,75
404060200	6	6	80	25	4	19,45
404070200	7	8	90	35	4	38,60
404080200	8	8	90	35	4	31,70
404090200	9	10	100	45	4	55,15
404100200	10	10	100	45	4	43,65
404110200	11	12	100	50	4	75,75
404120200	12	12	100	50	4	61,75
404130200	13	14	150	65	4	156,60
404140200	14	14	150	65	4	136,15
404150200	15	16	150	65	4	169,15
404160200	16	16	150	65	4	150,00
404170200	17	20	150	70	4	205,60
404180200	18	20	150	70	4	187,75
404200200	20	20	150	70	4	220,60
404250200	25	25	150	75	4	363,90

Condiciones de corte | Cutting data pag. 154

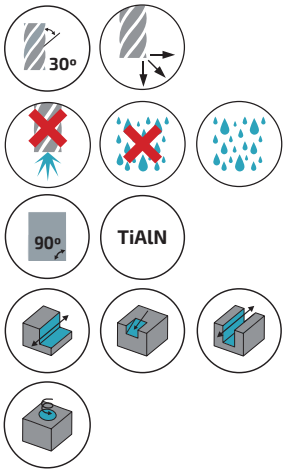
F-444

Fresa metal duro 4 labios extra larga <55 HRC

4 Fluted solid carbide extra long end mill <55 HRC

Fresa de metal duro de 4 labios extra larga con corte al centro y recubrimiento TiAlN. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para materiales hasta 55 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para contorneado y acabado.

4 Fluted cutting to centre solid carbide end mill extra long plus TiAlN coating. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose. For high tense material. Also for aluminium and non-ferrous material. For materials up to 55 HRC. Tool especially designed for contouring and finishing.



STEEL <55 HRC

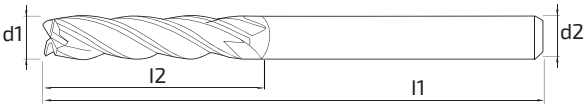
INOX

GG

ALU <12% SI

COPPER

UNI



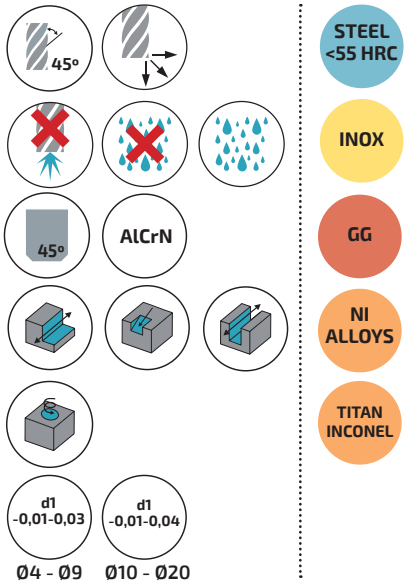
Ø3 - Ø20

Ref.	d1	d2	l1	l2	z	€
444030200	3	3	75	25	4	**15,30**
444040200	4	4	100	25	4	**18,60**
444050200	5	5	100	25	4	**20,60**
444060200	6	6	100	25	4	**22,45**
444060210	6	6	150	25	4	**35,15**
444080200	8	8	150	25	4	**45,60**
444100200	10	10	150	38	4	**68,30**
444120200	12	12	150	38	4	**96,30**
444120210	12	12	200	38	4	**118,00**
444140200	14	14	200	65	4	**179,45**
444160200	16	16	200	90	4	**218,60**
444160210	16	16	250	90	4	**252,90**
444200200	20	20	200	110	4	**300,60**
444200210	20	20	250	110	4	**370,60**

Condiciones de corte | Cutting data pag. 154

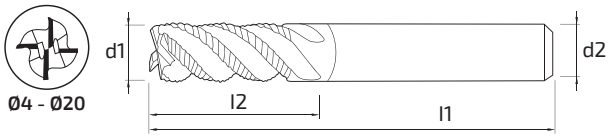
Fresa metal duro desbaste 3 y 4 labios "plus" <55 HRC

3 and 4 fluted solid carbide roughing "plus" end mill <55 HRC



Fresa de metal duro de 3 y 4 labios alto rendimiento con corte al centro y recubrimiento AlCrN para desbaste. Ángulo espiral de 45º. Fresa especialmente diseñada para ranurado y contorneado en operaciones de desbaste. La geometría especial conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para mecanizado de fundición, aceros, aceros aleados e inoxidables.

3 and 4 fluted solid carbide roughing high performance end mill with AlCrN coating. 45º Spiral angle. The geometry, coating and the substrate are specially designed for slotting and contouring on roughing operations. For milling of cast iron, malleable cast iron, steel, steel castings and stainless steel.



Ref.	d1	d2	l1	l2	z	€
418040200	4	6	50	10	3	**51,20**
418050200	5	6	50	13	3	**51,20**
418060200	6	6	55	16	3	**51,20**
418070200	7	8	65	18	3	**73,45**
418080200	8	8	65	19	3	**61,75**
418090200	9	10	70	22	4	**86,30**
418100200	10	10	70	22	4	**71,55**
418120200	12	12	80	25	4	**85,85**
418140200	14	14	90	30	4	**140,05**
418160200	16	16	90	32	4	**160,90**
418180200	18	18	100	38	4	**193,80**
418200200	20	20	110	38	4	**225,90**

Condiciones de corte | Cutting data pag. 155

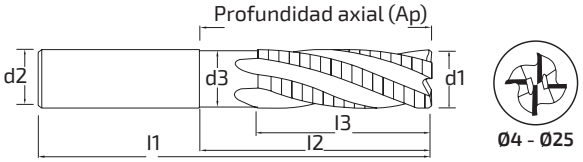
F-419

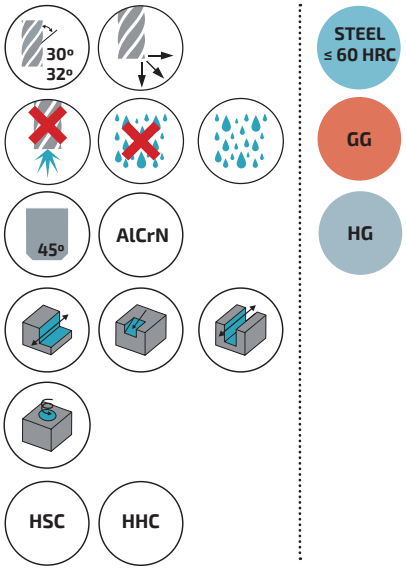
Fresa de 4 labios con hélice variable de 30º/32º para desbaste < 60 HRC

4 Fluted 30º/32º variable helix roughing end mill < 60 HRC

Fresa metal duro de cuatro labios con hélice variable 30º/32º y recubrimiento AlCrN, la hélice en ángulo variable garantiza una gran estabilidad en el mecanizado y un alto rendimiento. Herramienta para acero hasta 60 HRC, fundición y templado para desbaste.

4 Fluted 30º/32º variable helix end mill with AlCrN coating. Realiability and high performance are guaranted during machining. Suitable for steel up to 60 HRC, cast iron and hardened steel.



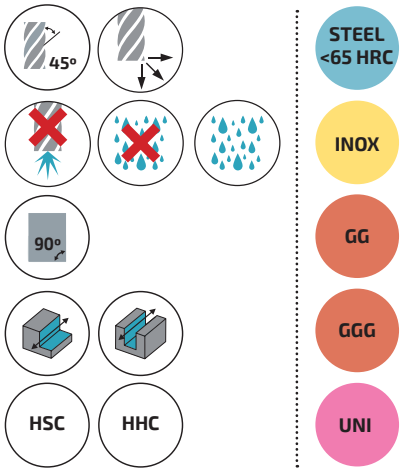


Ref.	d1	d2	d3	l1	l2	l3	ap	€
419040200	4	6	3,8	57	17,0	11	17 mm	**27,15**
419050200	5	6	4,8	57	19,3	13	19 mm	**27,15**
419060200	6	6	5,8	57	21,0	13	21 mm	**27,15**
419080200	8	8	7,8	63	27,0	19	27 mm	**38,20**
419100200	10	10	9,8	72	32,0	22	32 mm	**54,75**
419120200	12	12	11,8	83	38,0	26	38 mm	**71,15**
419160200	16	16	15,8	92	44,0	32	44 mm	**111,80**
419200200	20	20	19,8	104	54,0	38	54 mm	**181,85**
419250200	25	25	24,8	121	65,0	45	65 mm	**318,95**

Condiciones de corte | Cutting data pag. 171

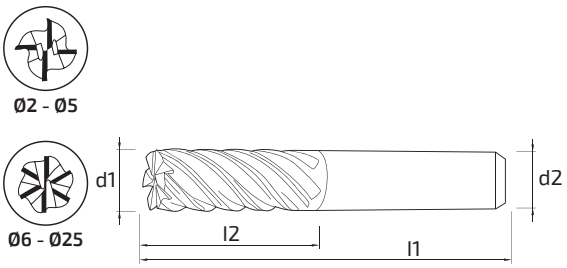
Fresa metal duro para acabado HSC - HHC <65 HRC

Solid carbide finishing HSC - HHC end mill <65 HRC



Fresa de metal duro de 4 y 6 labios con corte al centro y recubrimiento TiAlN para super acabado. Ángulo espiral de 45º. HSC (Mecanizado a alta velocidad) y HHC (Mecanizado de materiales templados) para materiales hasta 65 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para contorneado y acabado.

4 and6 Fluted solid carbide end mill for super finishing. 45º Spiral angle. HSC (High Speed Cutting) /HHC (High Hard Cutting) < 65 HRC. For universal application, specially suited for high temperature, stainless steel, as well as for casting and all non ferrous metals. Specially designed for contoruing and finishing operations.



Ref.	d1	d2	l1	l2	z	€
502020200	2	3	38	8	4	**24,95**
502030200	3	3	38	8	4	**24,95**
502040200	4	4	50	11	4	**24,95**
502050200	5	5	50	13	4	**24,95**
502060200	6	6	50	16	6	**24,95**
502080200	8	8	60	19	6	**34,75**
502100200	10	10	75	22	6	**53,15**
502120200	12	12	75	26	6	**66,90**
502140200	14	14	90	32	6	**102,60**
502160200	16	16	100	32	6	**139,50**
502180200	18	18	100	38	6	**181,45**
502200200	20	20	100	38	6	**208,50**
502250200	25	25	100	38	6	**282,30**

Condiciones de corte | Cutting data pag. 156

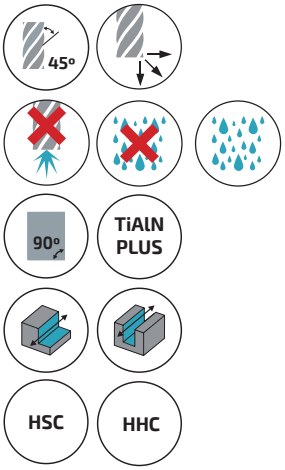
F-504

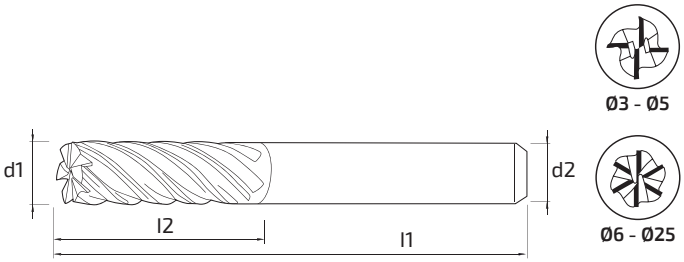
Fresa metal duro larga para acabado HSC - HHC <65 HRC

Long solid carbide finishing HSC - HHC end mill <65 HRC

Fresa de metal duro larga de 4 y 6 labios con corte al centro y recubrimiento TiAlN para super acabado. Ángulo espiral de 45º. HSC (Mecanizado a alta velocidad) y HHC (Mecanizado de materiales templados) para materiales hasta 65 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para contorneado y acabado.

4 and 6 Fluted solid carbide long end mill for super finishing. 45º Spiral angle. HSC (High Speed Cutting) /HHC (High Hard Cutting) < 65 HRC. For universal application, specially suited for high temperature, stainless steel, as well as for casting and all non ferrous metals. Specially designed for contoruing and finishing operations.



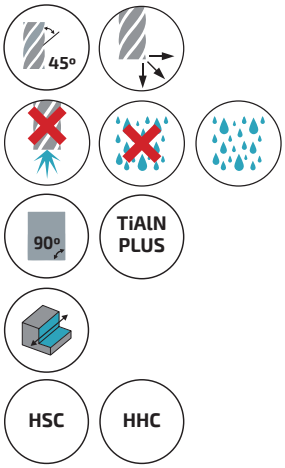


Ref.	d1	d2	l1	l2	z	€
504030200	3	3	60	15	4	**28,45**
504040200	4	4	80	20	4	**30,75**
504050200	5	5	80	25	4	**32,20**
504060200	6	6	80	25	6	**32,20**
504080200	8	8	90	35	6	**38,60**
504100200	10	10	100	45	6	**68,00**
504120200	12	12	100	50	6	**115,40**
504140200	14	14	150	65	6	**207,15**
504160200	16	16	150	65	6	**241,65**
504200200	20	20	150	70	6	**347,55**
504250200	25	25	150	75	6	**489,15**

Condiciones de corte | Cutting data pag. 156

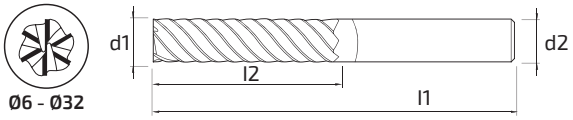
Fresa metal duro extra larga para acabado HSC - HHC <65 HRC

Extra long solid carbide HSC - HHC finishing end mill <65 HRC



Fresa de metal duro extra larga de 6 labios con corte al centro y recubrimiento TiAlN para super acabado. Ángulo espiral de 45º. HSC (Mecanizado a alta velocidad) y HHC (Mecanizado de materiales templados) para materiales hasta 65 HRC. También válida para materiales no férricos, fundición y aluminio. Fresa especialmente diseñada para contorneado y acabado.

6 Fluted solid carbide extra long end mill for super finishing. 45º Spiral angle. HSC (High Speed Cutting) /HHC (High Hard Cutting) < 65 HRC. For universal application, specially suited for high temperature, stainless steel, as well as for casting and all non ferrous metals. Specially designed for contouring and finishing operations.



Ref.	d1	d2	l1	l2	z	€
509060200	6	6	80	30	6	**36,30**
509080200	8	8	90	40	6	**43,60**
509100200	10	10	100	50	6	**75,60**
509120200	12	12	125	70	6	**152,70**
509140200	14	14	150	100	6	**235,15**
509160200	16	16	150	100	6	**274,00**
509200200	20	20	150	100	6	**371,70**
509200210	20	20	200	135	6	**465,15**
509250200	25	25	150	100	6	**537,00**
509250210	25	25	200	140	6	**702,10**
509320200	32	32	150	100	6	**793,00**
509320210	32	32	210	150	6	**985,10**

Condiciones de corte | Cutting data pag. 156

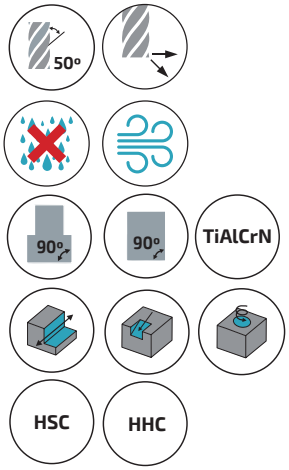
F-367

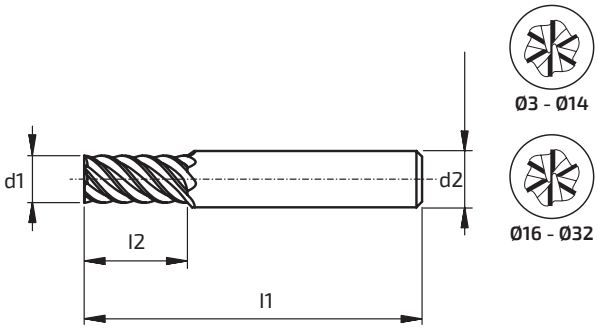
Fresa metal duro para acabado HG <64 HRC

HG Solid carbide finishing end mill < 64 HRC

Fresa de metal duro de 6 y 8 labios con corte al centro y recubrimiento TiAlCrN para acabado. Su combinación de metal duro y recubrimiento está especialmente diseñada para el mecanizado duro y de materiales templados hasta 64 HRC a alta velocidad. Se recomienda usar aire comprimido durante el mecanizado.

6 and 8 Fluted solid carbide end mill with TiAlCrN for finishing. Specially designed for HHC machining up to 64 HRC. Air coolant should be used during machining.



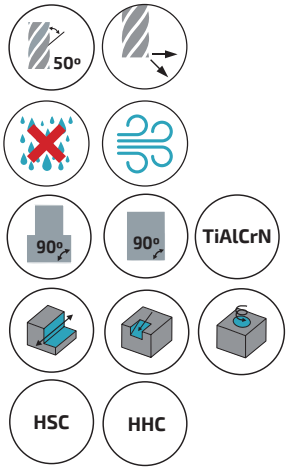


Ref.	d1	d2	l1	l2	z	€
367030200	3	6	57	8	6	**41,20**
367040200	4	6	57	11	6	**41,20**
367050200	5	6	57	13	6	**38,60**
367060200	6	6	57	13	6	**43,40**
367080200	8	8	63	19	6	**49,45**
367100200	10	10	72	22	6	**84,95**
367120200	12	12	83	26	6	**115,20**
367140200	14	14	83	26	6	**150,75**
367160200	16	16	92	32	8	**205,15**
367180200	18	18	92	32	8	**226,65**
367200200	20	20	104	38	8	**292,70**
367250200	25	25	150	75	8	**928,15**
367320200	32	32	150	75	8	**1111,80**

Condiciones de corte | Cutting data pag. 158

Fresa metal duro larga para acabado HG <64 HRC

HG Long solid carbide finishing end mill < 64 HRC

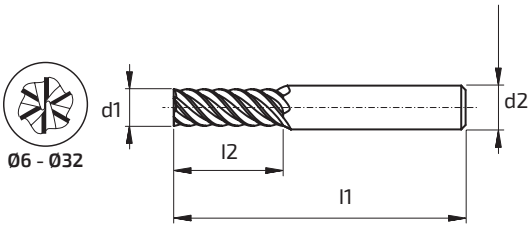


HG

STEEL <65 HRC

Fresa de metal duro larga de 6 y 8 labios con corte al centro y recubrimiento TiAlCrN para acabado. Su combinación de metal duro y recubrimiento está especialmente diseñada para el mecanizado duro y de materiales templados hasta 64 HRC a alta velocidad. Se recomienda usar aire comprimido durante el mecanizado.

6 and 8 Fluted long solid carbide end mill with TiAlCrN for finishing. Specially designed for HHC machining up to 64 HRC. Air coolant should be used during machining



Ref.	d1	d2	l1	l2	z	€
368030200	3	6	62	12	6	**46,85**
368040200	4	6	62	16	6	**46,85**
368050200	5	6	62	18	6	**44,65**
368060200	6	6	62	18	6	**49,45**
368080200	8	8	68	24	6	**57,30**
368100200	10	10	80	30	6	**97,50**
368120200	12	12	93	36	6	**134,20**
368140200	14	14	99	42	6	**184,95**
368160200	16	16	108	48	8	**252,00**
368180200	18	18	114	54	8	**291,20**
368200200	20	20	126	60	8	**373,60**
368250200	25	25	160	95	8	**959,90**
368320200	32	32	160	95	8	**1140,95**

Condiciones de corte | Cutting data pag. 159

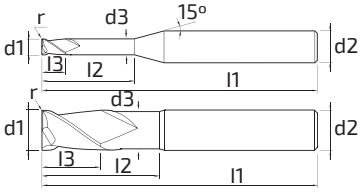
F-422
F-442

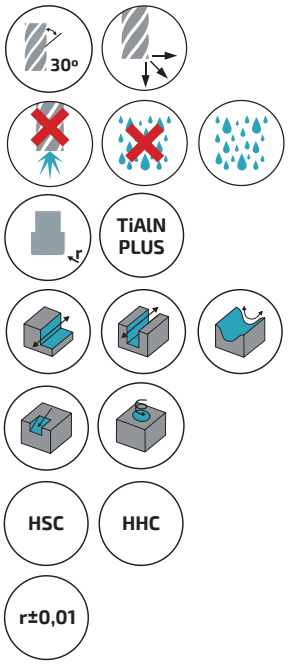
Fresa metal duro tórica 2 labios HSC - HHC <65 HRC

2 Fluted HSC - HHC solid carbide radius end mill <65 HRC

Fresa metal duro de 2 labios tórica y recubrimiento TiAlN. Para mecanizado HSC y HHC. 30º de hélice. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado a alta velocidad (HSC) y materiales duros (HHC). Para máquinas CNC con 3 y 5 ejes. También podemos trabajar en seco. Para aceros hasta 65 HRC. También válida para materiales no férricos, materiales termo resistentes, aleaciones exóticas y fundiciones. Fresa especialmente diseñada para trabajos 3D.

2 Fluted solid carbide end mill with corner radius and TiAlN coating for HSC and HHC mechining. 30º Spiral angle. Specially for tool maker, mould maker. Also for aircraft / turbine construction. The tool, material and coating are specially designed for HSC and HHC. For CNC machines with 3 and 5 axes. Reduces milling time rapidly. Also for dry milling. Universal purpose for normal and high tense materials, for 3D operations.





STEEL <65 HRC

INOX

GG

GGG

Condiciones de corte | Cutting data pag. 157

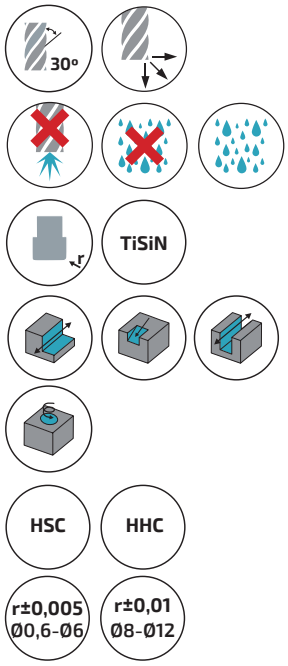
Ref.	d1	r	d2	d3	l1	l2	l3	z	€
422020200	2	0,2	6	1,8	57	21	4	2	43,80
422030200	3	0,3	6	2,8	57	21	6	2	43,80
422030210	3	0,5	6	1,8	80	15	4	2	43,80
422040200	4	0,4	6	3,6	57	21	6	2	43,80
422040210	4	1,0	6	3,6	57	21	6	2	43,80
422050200	5	0,2	6	4,7	57	21	6	2	43,80
422060200	6	0,3	6	5,5	57	21	7	2	43,80
422060210	6	0,5	6	5,5	57	21	7	2	43,80
422060220	6	1,0	6	5,5	57	21	7	2	43,80
422060230	6	1,5	6	5,5	57	21	7	2	43,80
422060240	6	1,6	6	5,5	57	21	7	2	43,80
422060250	6	2,0	6	5,5	57	21	7	2	43,80
422080200	8	0,5	8	7,4	63	27	9	2	53,45
422080210	8	1,0	8	7,4	63	27	9	2	53,45
422080220	8	1,5	8	7,4	63	27	9	2	53,45
422080230	8	2,0	8	7,4	63	27	9	2	53,45
422100200	10	‘0,5	10	9,2	72	32	11	2	69,50
422100210	10	1,05	10	9,2	72	32	11	2	69,50
422100220	10	1,5	10	9,2	72	32	11	2	69,50
422100230	10	2,0	10	9,2	72	32	11	2	69,50
422120200	12	0,5	12	11,0	83	38	12	2	100,75
422120210	12	1,0	12	11,0	83	38	12	2	100,75
422120220	12	1,5	12	11,0	83	38	12	2	100,75
422120230	12	2,0	12	11,0	83	38	12	2	100,75
422160200	16	0,5	16	15,0	92	44	16	2	175,75
422160210	16	1,0	16	15,0	92	44	16	2	175,75

Serie larga | Long series

Ref.	d1	r	d2	l1	l2	l3	z	€
442030230	3	0,5	6	80	15	15	2	35,30
442040200	4	0,2	6	80	20	4	2	35,30
442100230	10	1	10	100	45	45	2	70,90

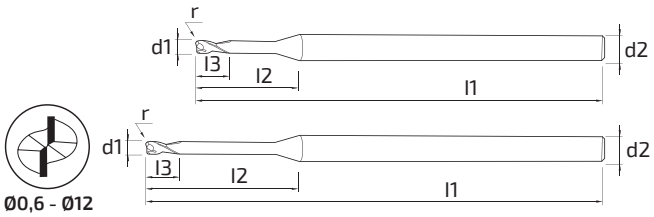
Fresa metal duro tórica 2 labios HSC/HCC <65 HRC (0,2µm)

2 Fluted solid carbide corner radius end mill for HSC/HHC <65 HRC (0,2µm)



Fresa de metal duro de cuello largo de 2 labios con corte al centro y radio en punta con recubrimiento TiSiN. Ángulo espiral de 30º. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado HSC (High Speed Cutting) + HHC (High Hard Cutting) < 65 HRC. También podemos utilizar esta herramienta para aceros y materiales no férricos. El diámetro posterior al corte es menor que el diámetro de punta para evitar el desvío de la herramienta.

Solid carbide miniature end mills with corner radius, 30º spiral angle and TiSiN coating. For universal use, for standard steel and non-ferrous materials. The tool, material and coating are specially designed for dry high speed cutting HSC and high hard cutting HHC < 65 HRC large cone diameter for minimum deflection. With corner radius for minimize the wear out.



Condiciones de corte | Cutting data pag. 160

Ref.	d1	r	d2	l1	l2	l3	€
813006200	0,6	0,05	4	45	4	0,7	32,15
813006210	0,6	0,05	4	45	6	0,7	33,60
813008200	0,8	0,10	4	45	4	1,0	30,95
813008210	0,8	0,10	4	45	8	1,0	30,95
813010200	1,0	0,20	4	45	4	1,2	29,35
813010210	1,0	0,20	4	50	10	1,2	30,80
813010220	1,0	0,20	4	50	20	1,2	32,10
813012200	1,2	0,20	4	45	6	1,5	29,35
813012210	1,2	0,20	4	50	10	1,5	30,80
813012220	1,2	0,20	4	50	20	1,5	32,10
813015200	1,5	0,20	4	50	10	1,8	30,80
813015210	1,5	0,20	4	50	16	1,8	30,80
813015220	1,5	0,20	4	50	20	1,8	32,10
813015230	1,5	0,20	4	60	25	1,8	34,75
813020200	2,0	0,20	4	50	10	2,5	30,80
813020210	2,0	0,20	4	50	16	2,5	32,10
813020220	2,0	0,20	4	60	20	2,5	32,10
813020230	2,0	0,20	4	70	25	2,5	34,75
813020240	2,0	0,20	4	50	30	2,5	37,20
813025200	2,5	0,20	4	50	10	3,0	29,35
813025210	2,5	0,20	4	50	20	3,0	32,10
813030200	3,0	0,30	6	50	10	3,5	30,30
813030210	3,0	0,30	6	60	20	3,5	33,10
813030220	3,0	0,30	6	70	30	3,5	37,80
813030230	3,0	0,30	6	80	40	3,5	46,00
813040200	4,0	0,50	6	60	20	4,5	33,10
813040210	4,0	0,50	6	70	30	4,5	37,80
813040220	4,0	0,50	6	80	40	4,5	46,00
813050200	5,0	0,20	6	60	15	6,0	31,70
813050210	5,0	0,20	6	70	30	6,0	37,80
813050220	5,0	0,20	6	80	40	6,0	46,00
813050230	5,0	0,50	6	60	15	6,0	31,70
813050240	5	0,5	6	70	30	6	37,80
813050250	5	0,5	6	80	40	6	46,00
813060200	6	0,3	6	60	20	7	33,35
813060210	6	0,3	6	90	40	7	43,85
813060220	6	0,5	6	60	20	7	33,35
813060230	6	0,5	6	90	40	7	43,85
813060240	6	1,0	6	60	20	7	33,35
813060250	6	1,0	6	90	40	7	43,85
813060260	6	1,5	6	60	20	7	33,35
813060270	6	1,5	6	90	40	7	43,85
813080200	8	0,5	8	100	40	9	55,55
813080210	8	1,0	8	65	22	9	40,65
813080220	8	1,0	8	100	40	9	55,55
813080230	8	1,5	8	65	22	9	40,65
813080240	8	1,5	8	100	40	9	55,55
813100200	10	0,5	10	70	24	11	58,20
813100210	10	0,5	10	100	45	11	77,95
813100220	10	1,0	10	70	24	11	58,20
813100230	10	1,0	10	100	45	11	77,95
813100240	10	1,5	10	70	24	11	58,20
813100250	10	1,5	10	100	45	11	77,95
813100260	10	2,0	10	70	24	11	58,20
813100270	10	2,0	10	100	45	11	77,95
813120200	12	0,5	12	80	26	13	70,40
813120210	12	0,5	12	110	50	13	100,35
813120220	12	1,0	12	80	26	13	70,40
813120230	12	1,0	12	110	50	13	100,35
813120240	12	1,5	12	80	26	13	70,40
813120250	12	1,5	12	110	50	13	100,35
813120260	12	2,0	12	80	26	13	70,40
813120270	12	2,0	12	110	50	13	100,35
813120280	12	3,0	12	80	26	13	70,40
813120290	12	3,0	12	110	50	13	100,35

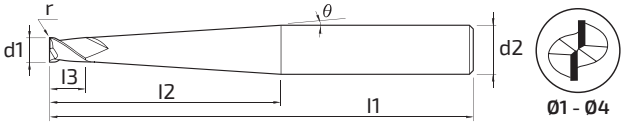
F-216

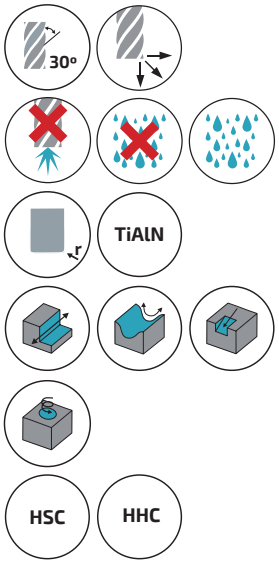
Fresa metal duro de 2 labios tórica con cuello cónico <65 HRC (0,2µm)

2 Fluted taper neck corner radius end mill <65 HRC (0,2µm)

Fresa de alta calidad tórica de 2 labios con recubrimiento TiSiN. Ofrece una excelente resistencia al desgaste gracias a su recubrimiento PVD con base de Si. Tolerancia de de alta precisión. Espectacular rendimiento en el mecanizado a altas velocidades gracias a su grado WC ul (0,2 µm). Indicada para fresado de aceros pre endurecidos y endurecidos (50-65 HRC).

2 Fluted high quality taper neck corner radius end mill with TiSiN coating. Good wear resistance by Si-based PVD coating. High precise edge tolerance. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade. End mill for pre-hardened and hardened steel (HRC 50-65).





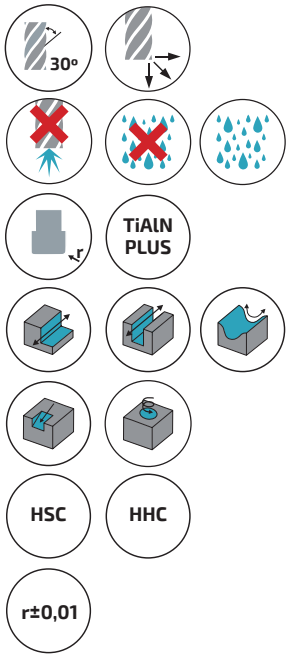
Ref.	d1	r	d2	l1	l2	l3	θ	z	€
216010200	1,0	0,1	4	50	10	1,0	1	2	33,60
216010210	1,0	0,1	4	60	20	1,0	1	2	37,80
216010220	1,0	0,1	4	70	30	1,0	1	2	42,05
216010230	1,0	0,2	4	50	10	1,0	1	2	33,60
216010240	1,0	0,2	4	60	20	1,0	1	2	37,80
216010250	1,0	0,2	4	70	30	1,0	1	2	42,05
216010260	1,0	0,3	4	50	10	1,0	1	2	33,60
216010270	1,0	0,3	4	60	20	1,0	1	2	37,80
216010280	1,0	0,3	4	70	30	1,0	1	2	42,05
216015200	1,5	0,2	4	50	10	1,5	1	2	33,60
216015210	1,5	0,2	4	60	20	1,5	1	2	37,80
216015220	1,5	0,2	4	70	30	1,5	1	2	42,05
216015230	1,5	0,3	4	50	10	1,5	1	2	33,60
216015240	1,5	0,3	4	60	20	1,5	1	2	37,80
216015250	1,5	0,3	4	70	30	1,5	1	2	42,05
216015260	1,5	0,5	4	50	10	1,5	1	2	33,60
216015270	1,5	0,5	4	60	20	1,5	1	2	37,80
216015280	1,5	0,5	4	70	30	1,5	1	2	42,05
216020200	2,0	0,2	4	60	20	2,0	1	2	37,80
216020210	2,0	0,2	4	70	30	2,0	1	2	42,05
216020220	2,0	0,2	4	80	40	2,0	1	2	47,45
216020230	2,0	0,3	4	60	20	2,0	1	2	37,80
216020240	2,0	0,3	4	70	30	2,0	1	2	42,05
216020250	2,0	0,3	4	80	40	2,0	1	2	47,45
216020260	2,0	0,5	4	60	20	2,0	1	2	37,80
216020270	2,0	0,5	4	70	30	2,0	1	2	42,05
216020280	2,0	0,5	4	80	40	2,0	1	2	47,45
216030200	3,0	0,2	6	70	30	3,0	1	2	48,35
216030210	3,0	0,2	6	80	40	3,0	1	2	51,80
216030220	3,0	0,2	6	90	50	3,0	1	2	60,35

Ref.	d1	r	d2	l1	l2	l3	θ	z	€
216030230	3,0	0,2	6	100	60	3,0	1	2	64,10
216030240	3,0	0,3	6	70	30	3,0	1	2	48,35
216030250	3,0	0,3	6	80	40	3,0	1	2	51,80
216030260	3,0	0,3	6	90	50	3,0	1	2	60,35
216030270	3,0	0,3	6	100	60	3,0	1	2	64,10
216030280	3,0	0,5	6	70	30	3,0	1	2	48,35
216030290	3,0	0,5	6	80	40	3,0	1	2	51,80
216030300	3,0	0,5	6	90	50	3,0	1	2	60,35
216030310	3,0	0,5	6	100	60	3,0	1	2	64,10
216030320	3,0	1,0	6	70	30	3,0	1	2	48,35
216030330	3,0	1,0	6	80	40	3,0	1	2	51,80
216030340	3,0	1,0	6	90	50	3,0	1	2	60,35
216030350	3,0	1,0	6	100	60	3,0	1	2	64,10
216040200	4,0	0,2	6	70	30	4,0	1	2	48,35
216040210	4,0	0,2	6	80	40	4,0	1	2	51,80
216040220	4,0	0,2	6	90	50	4,0	1	2	60,35
216040230	4,0	0,2	6	100	60	4,0	1	2	64,10
216040240	4,0	0,3	6	70	30	4,0	1	2	48,35
216040250	4,0	0,3	6	80	40	4,0	1	2	51,80
216040260	4,0	0,3	6	90	50	4,0	1	2	60,35
216040270	4,0	0,3	6	100	60	4,0	1	2	64,10
216040280	4,0	0,5	6	70	30	4,0	1	2	48,35
216040290	4,0	0,5	6	80	40	4,0	1	2	51,80
216040300	4,0	0,5	6	90	50	4,0	1	2	60,35
216040310	4,0	0,5	6	100	60	4,0	1	2	64,10
216040320	4,0	1,0	6	70	30	4,0	1	2	48,35
216040330	4,0	1,0	6	80	40	4,0	1	2	51,80
216040340	4,0	1,0	6	90	50	4,0	1	2	60,35
216040350	4,0	1,0	6	100	60	4,0	1	2	64,10

Condiciones de corte | Cutting data pag. 161

Fresa de metal duro tórica cónica HSC/HCC <65 HRC

High performance HSC/HHC solid carbide conical corner radius end mill <65 HRC



STEEL <65 HRC

INOX

GG

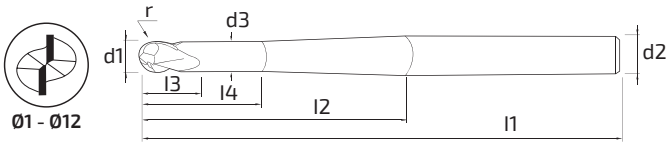
GGG

NI ALLOYS

TITAN INCONEL

Fresa metal duro con 2 labios tórica, mango reforzado y recubrimiento TiAlN. 30º de hélice. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado a alta velocidad (HSC) y materiales duros (HHC). Para máquinas CNC con 3 y 5 ejes. También podemos trabajar en seco. Para aceros hasta 65 HRC. También válida para materiales no férricos, materiales termo resistentes, aleaciones exóticas y fundiciones. Fresa especialmente diseñada para trabajos 3D.

2 Fluted solid carbide end mill with corner radius and TiAlN coating. 30º Spiral angle. Specially for tool and mould manufacturers. Also for aircraft and turbine construction. The tool, material and coating are specially designed for HSC and HHC. For CNC machines with 3 and 5 axes. Reduces milling time rapidly. Also for dry milling. Universal purpose for normal and high tense materials, for 3D operations.



Ref.	d1	r	d2	d3	l1	l2	l3	l4	z	€
217010200	1	0,25	6	0,8	100	40	2	6	2	**89,50**
217020200	2	0,30	6	1,8	100	40	2	8	2	**89,50**
217020210	2	0,50	6	1,8	100	40	2	8	2	**89,50**
217030200	3	0,50	6	2,8	100	40	2	12	2	**89,50**
217040200	4	0,50	6	3,8	100	40	3	16	2	**89,50**
217040210	4	1,00	6	3,8	100	40	3	16	2	**89,50**
217050200	5	0,50	6	4,8	100	40	4	20	2	**89,50**
217060200	6	1,00	8	4,8	100	50	4	25	2	**115,20**
217060210	6	2,00	8	5,8	100	50	4	25	2	**115,20**
217080200	8	1,00	10	7,8	120	60	4	32	2	**149,95**
217080210	8	2,00	10	0,8	120	60	4	32	2	**149,95**
217100200	10	1,50	12	1,8	160	80	6	40	2	**215,60**
217100210	10	3,00	12	1,8	160	80	6	40	2	**215,60**
217120200	12	1,50	16	2,8	200	100	8	50	2	**266,45**
217120210	12	4,00	16	3,8	200	100	8	50	2	**266,45**

Condiciones de corte | Cutting data pag. 157

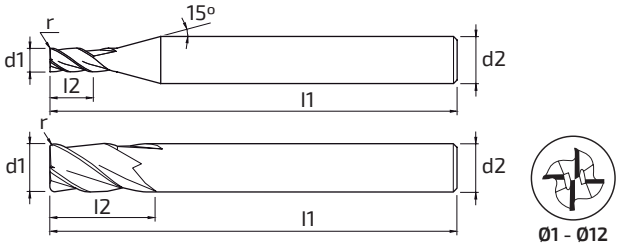
F-410

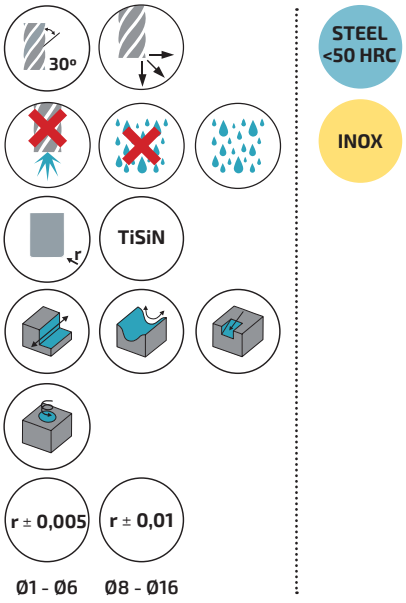
Fresa metal duro tórica 4 labios < 50 HRC

4 Fluted corner radius solid carbide end mill < 50 HRC

Fresa metal duro de 4 labios tórica con recubrimiento TiSiN para acero hasta 50 HRC.

4 Fluted solid carbide end mill with corner radius and TiSiN coating for steel up to 50 HRC.





Ref.	d1	r	d2	l1	l2	z	€
410010200	1,0	0,05	4	45	2,5	4	26,40
410010210	1,0	0,10	4	45	2,5	4	26,40
410010220	1,0	0,20	4	45	2,5	4	26,40
410010230	1,0	0,30	4	45	2,5	4	26,40
410015200	1,5	0,05	4	45	4,0	4	26,40
410015210	1,5	0,10	4	45	4,0	4	26,40
410015220	1,5	0,20	4	45	4,0	4	26,40
410015230	1,5	0,30	4	45	4,0	4	26,40
410015240	1,5	0,50	4	45	4,0	4	26,40
410020200	2,0	0,05	4	45	6,0	4	26,40
410020210	2,0	0,10	4	45	6,0	4	26,40
410020220	2,0	0,20	4	45	6,0	4	26,40
410020230	2,0	0,30	4	45	6,0	4	26,40
410020240	2,0	0,50	4	45	6,0	4	26,40
410025200	2,5	0,10	4	50	6,0	4	29,00
410025210	2,5	0,20	4	50	6,0	4	29,00
410025220	2,5	0,30	4	50	6,0	4	29,00
410025230	2,5	0,50	4	50	6,0	4	29,00
410030200	3,0	0,10	6	60	8,0	4	34,60
410030210	3,0	0,20	6	60	8,0	4	34,60
410030220	3,0	0,30	6	60	8,0	4	34,60
410030230	3,0	0,50	6	60	8,0	4	34,60
410030240	3,0	1,00	6	60	8,0	4	34,60
410040200	4,0	0,10	4	60	9,0	4	31,70
410040210	4,0	0,10	4	80	9,0	4	32,80
410040220	4,0	0,10	6	70	10,0	4	34,60
410040230	4,0	0,20	4	60	9,0	4	31,70
410040240	4,0	0,20	4	80	9,0	4	32,80
410040250	4,0	0,20	6	70	10,0	4	34,60
410040260	4,0	0,30	4	60	9,0	4	31,70

Ref.	d1	r	d2	l1	l2	z	€
410040270	4	0,3	4	45	9	4	32,80
410040280	4	0,3	6	45	10	4	34,60
410040290	4	0,5	4	45	9	4	31,70
410040300	4	0,5	4	45	9	4	32,80
410040310	4	0,5	6	45	10	4	34,60
410040320	4	1,0	4	45	9	4	31,70
410040330	4	1,0	4	45	9	4	32,80
410040340	4	1,0	6	45	10	4	34,60
410050200	5	0,1	6	45	13	4	36,55
410050210	5	0,2	6	45	13	4	36,55
410050220	5	0,3	6	45	13	4	36,55
410050230	5	0,5	6	45	13	4	36,55
410050240	5	1,0	6	45	13	4	36,55
410060200	6	0,1	6	45	11	4	34,35
410060210	6	0,1	6	50	13	4	38,20
410060220	6	0,2	6	50	11	4	34,35
410060230	6	0,2	6	50	13	4	38,20
410060240	6	0,3	6	50	11	4	34,35
410060250	6	0,3	6	60	13	4	38,20
410060260	6	0,5	6	60	11	4	34,35
410060270	6	0,5	6	60	13	4	38,20
410060280	6	1,0	6	60	11	4	34,35
410060290	6	1,0	6	60	13	4	38,20
410060300	6	1,5	6	60	11	4	34,35
410060310	6	1,5	6	80	13	4	38,20
410060320	6	2,0	6	70	11	4	34,35
410060330	6	2,0	6	60	13	4	38,20
410080200	8	0,1	8	80	16	4	50,15
410080210	8	0,1	8	70	19	4	55,90
410080220	8	0,2	8	60	16	4	50,15

Ref.	d1	r	d2	l1	l2	z	€
410080230	8	0,2	8	90	19	4	**55,90**
410080240	8	0,3	8	70	16	4	**50,15**
410080250	8	0,3	8	90	19	4	**55,90**
410080260	8	0,5	8	70	16	4	**50,15**
410080270	8	0,5	8	90	19	4	**55,90**
410080280	8	0,5	8	110	19	4	**67,05**
410080290	8	1,0	8	70	16	4	**50,15**
410080300	8	1,0	8	90	19	4	**55,90**
410080310	8	1,0	8	110	19	4	**67,05**
410080320	8	1,5	8	70	16	4	**50,15**
410080330	8	1,5	8	90	19	4	**55,90**
410080340	8	1,5	8	110	19	4	**67,05**
410080350	8	2,0	8	70	16	4	**50,15**
410080360	8	2,0	8	90	19	4	**55,90**
410080370	8	2,0	8	110	19	4	**67,05**
410080380	8	2,5	8	90	19	4	**61,40**
410100200	10	0,1	10	75	19	4	**72,30**
410100210	10	0,1	10	100	22	4	**80,25**
410100220	10	0,2	10	75	19	4	**72,30**
410100230	10	0,2	10	100	22	4	**80,25**
410100240	10	0,3	10	75	19	4	**72,30**
410100250	10	0,3	10	100	22	4	**80,25**
410100260	10	0,5	10	75	19	4	**72,30**
410100270	10	0,5	10	100	22	4	**80,25**
410100280	10	0,5	10	120	22	4	**96,40**
410100290	10	1,0	10	75	19	4	**72,30**
410100300	10	1,0	10	100	22	4	**80,25**
410100310	10	1,0	10	120	22	4	**96,40**
410100320	10	1,5	10	75	19	4	**72,30**
410100330	10	1,5	10	100	22	4	**80,25**
410100340	10	1,5	10	120	22	4	**96,40**
410100350	10	2,0	10	75	19	4	**72,30**
410100360	10	2,0	10	100	22	4	**80,25**

Ref.	d1	r	d2	l1	l2	z	€
410100370	10	2,0	120	120	22	4	**96,40**
410100380	10	2,5	75	75	19	4	**72,30**
410100390	10	2,5	100	100	22	4	**80,25**
410100400	10	2,5	120	120	22	4	**96,40**
410120200	12	3,0	100	100	22	4	**88,20**
410120210	12	0,2	80	80	22	4	**87,55**
410120220	12	0,2	110	110	26	4	**97,30**
410120230	12	0,3	80	80	22	4	**87,55**
410120240	12	0,3	110	110	26	4	**97,30**
410120250	12	0,5	80	80	22	4	**87,55**
410120260	12	0,5	110	110	26	4	**97,30**
410120270	12	0,5	130	130	26	4	**116,75**
410120280	12	1,0	80	80	22	4	**87,55**
410120290	12	1,0	110	110	26	4	**97,30**
410120300	12	1,0	130	130	26	4	**116,75**
410120310	12	1,5	80	80	22	4	**87,55**
410120320	12	1,5	110	110	26	4	**97,30**
410120330	12	1,5	130	130	26	4	**116,75**
410120340	12	2,0	80	80	22	4	**87,55**
410120350	12	2,0	110	110	26	4	**97,30**
410120360	12	2,0	130	130	26	4	**116,75**
410120370	12	2,5	80	80	22	4	**87,55**
410120380	12	2,5	110	110	26	4	**97,30**
410120390	12	2,5	130	130	26	4	**116,75**
410120400	12	3,0	80	80	22	4	**87,55**
410120410	12	3,0	110	110	26	4	**97,30**
410120420	12	3,0	130	130	26	4	**116,75**
410120430	12	3,5	110	110	26	4	**106,90**
410120440	12	4,0	110	110	26	4	**106,90**
410160200	16	0,5	110	110	32	4	**190,60**
410160210	16	0,5	160	160	32	4	**266,85**
410160220	16	1,0	110	110	32	4	**190,60**
410160230	16	1,0	160	160	32	4	**266,85**

Condiciones de corte | Cutting data pag. 169

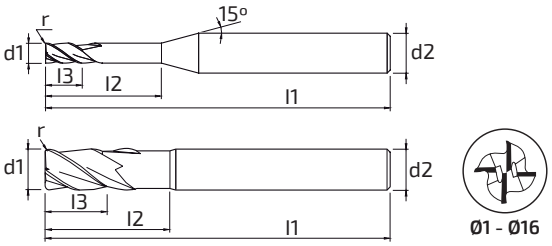
F-411

Fresa metal duro tórica 4 labios < 60 HRC

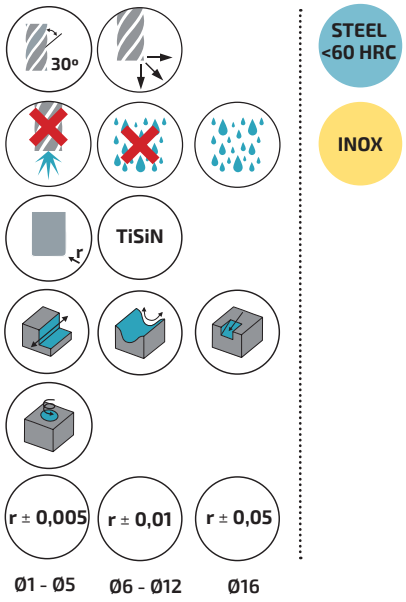
4 Fluted corner radius solid carbide end mill < 60 HRC

Fresa metal duro de 4 labios tórica con recubrimiento TiSiN para acero hasta 60 HRC. Diseñada para trabajar a baja velocidad de corte y alto avance. Es adecuada para aplicaciones de mecanizado pesado y desbaste. Tiene gran resistencia al desgaste gracias a su grado WC ul

4 Fluted solid carbide end mill with corner radius and TiSiN coating for steel up to 60 HRC. Designed for low speed with high feed condition. Suitable for heavy duty and roughing application. Minimize fracturing at high feed by high TRS ultra fine WC grade.



Ø1 - Ø16



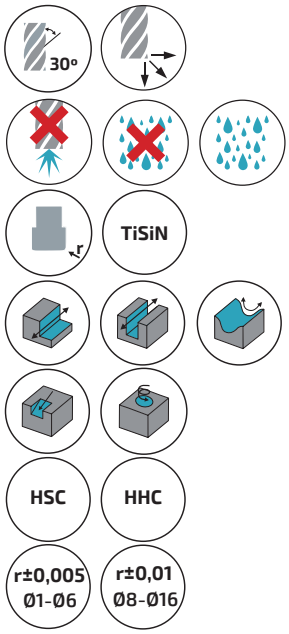
Ref.	d1	r	d2	l1	l2	l3	z	€
411010200	1,0	0,2	4	50	2,5	1,0	4	30,40
411015200	1,5	0,5	4	50	4,0	1,5	4	30,40
411020200	2,0	0,5	6	50	6,0	2,0	4	35,25
411030200	3,0	0,5	6	50	8,0	3,0	4	35,25
411040200	4,0	0,5	6	60	12,0	4,0	4	35,25
411040210	4,0	0,5	6	60	16,0	4,0	4	35,25
411040220	4,0	1,0	6	60	12,0	4,0	4	35,25
411040230	4,0	1,0	6	60	16,0	4,0	4	35,25
411050200	5,0	0,5	6	60	15,0	5,0	4	35,25
411050210	5,0	1,0	6	60	15,0	5,0	4	35,25
411060200	6,0	0,3	6	60	15,0	6,0	4	35,25
411060210	6,0	0,5	6	60	15,0	6,0	4	35,25
411060220	6,0	1,0	6	60	15,0	6,0	4	35,25
411060230	6,0	1,5	6	60	15,0	6,0	4	35,25
411080200	8,0	0,3	8	60	16,0	8,0	4	55,25
411080210	8,0	0,5	8	60	16,0	8,0	4	55,25
411080220	8,0	0,5	8	80	20,0	8,0	4	62,45
411080230	8,0	0,5	8	110	30,0	8,0	4	79,90
411080240	8,0	1,0	8	60	16,0	8,0	4	55,25
411080250	8,0	1,0	8	80	20,0	8,0	4	62,45
411080260	8,0	1,0	8	110	30,0	8,0	4	79,90
411080270	8,0	2,0	8	60	16,0	8,0	4	55,25
411080280	8,0	2,0	8	80	20,0	8,0	4	62,45
411080290	8,0	2,0	8	110	30,0	8,0	4	79,90

Ref.	d1	r	d2	l1	l2	l3	z	€
411100200	10,0	0,3	10	70	20	10	20	75,50
411100210	10,0	0,5	10	70	20	10	20	75,50
411100220	10,0	0,5	10	90	25	10	25	84,20
411100230	10,0	0,5	10	120	30	10	30	106,00
411100240	10,0	1,0	10	70	20	10	20	75,50
411100250	10,0	1,0	10	90	25	10	25	84,20
411100260	10,0	1,0	10	120	30	10	30	106,00
411100270	10,0	2,0	10	70	20	10	20	75,50
411100280	10,0	2,0	10	90	25	10	25	84,20
411100290	10,0	2,0	10	120	30	10	30	106,00
411120200	12,0	0,5	12	80	25	12	25	90,00
411120210	12,0	0,5	12	100	30	12	30	104,60
411120220	12,0	0,5	12	130	35	12	35	124,85
411120230	12,0	1,0	12	80	25	12	25	90,00
411120240	12,0	1,0	12	100	30	12	30	104,60
411120250	12,0	1,0	12	130	35	12	35	124,85
411120260	12,0	2,0	12	80	25	12	25	90,00
411120270	12,0	2,0	12	100	30	12	30	104,60
411120280	12,0	2,0	12	130	35	12	35	124,85
411120290	12,0	3,0	12	80	25	12	25	90,00
411160200	16,0	1,0	16	110	30	16	30	198,30
411160210	16,0	1,0	16	160	40	16	40	282,35
411160220	16,0	2,0	16	110	30	16	30	198,30
411160230	16,0	2,0	16	160	40	16	40	282,35

Condiciones de corte | Cutting data pag. 171

Fresa metal duro tórica 4 labios HSC-HHC <65 HRC

Corner radius HSC-HHC solid carbide end mill <65 HRC



STEEL <65 HRC

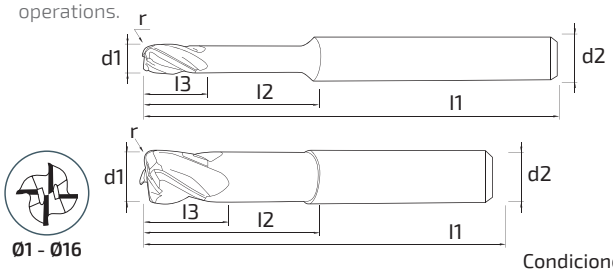
INOX

GG

GGG

Fresa metal duro de 4 labios tórica y recubrimiento TiSiN. 30º de hélice. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado a alta velocidad (HSC) y materiales duros (HHC). Para máquinas CNC con 3 y 5 ejes. También podemos trabajar en seco. Para aceros hasta 65 HRC. También válida para materiales no férricos, materiales termo resistentes, aleaciones exóticas y fundiciones. Fresa especialmente diseñada para trabajos 3D.

4 Fluted solid carbide end mill with corner radius and TiSiN coating. 30º Spiral angle. Specially for tool maker, mould maker. Also for aircraft / turbine construction. The tool, material and coating are specially designed for HSC and HHC. For CNC machines with 3 and 5 axes. Reduces milling time rapidly. Also for dry milling. Universal purpose for normal and high tense materials for 3D operations.



Ø1 - Ø16

Condiciones de corte | Cutting data pag. 161

Ref.	d1	r	d2	l1	l2	l3	z	€
412010200	1,0	0,2	4	50	10	1	4	31,15
412010210	1,0	0,2	4	50	20	1	4	32,30
412012200	1,2	0,2	4	50	10	1,2	4	31,15
412012210	1,2	0,2	4	50	20	1,2	4	32,30
412015200	1,5	0,2	4	50	10	1,5	4	31,15
412015210	1,5	0,2	4	50	20	1,5	4	32,30
412020200	2,0	0,2	4	50	10	2	4	31,15
412020210	2,0	0,2	4	50	20	2	4	31,15
412025200	2,5	0,2	4	50	10	2,5	4	31,15
412025210	2,5	0,2	4	50	20	2,5	4	31,15
412030200	3,0	0,3	6	50	10	3	4	30,40
412030210	3,0	0,3	6	60	20	3	4	33,20
412030220	3,0	0,3	6	70	30	3	4	37,95
412030230	3,0	0,3	6	80	40	3	4	44,35
412040200	4,0	0,5	6	60	20	4	4	33,45
412040205	4,0	0,5	6	70	30	4	4	38,35
412040210	4,0	0,5	6	80	40	4	4	44,75
412040220	4,0	1,0	6	60	20	4	4	33,45
412040230	4,0	1,0	6	70	30	4	4	38,35
412040240	4,0	1,0	6	80	40	4	4	44,75
412050200	5,0	0,2	6	60	16	5	4	33,45
412050210	5,0	0,2	6	70	30	5	4	38,35
412050220	5,0	0,2	6	80	40	5	4	44,75
412050230	5,0	0,5	6	60	16	5	4	33,45
412050240	5,0	0,5	6	70	30	5	4	38,35
412050250	5,0	0,5	6	80	40	5	4	44,75
412060200	6,0	0,3	6	60	20	7	4	33,45
412060205	6,0	0,3	6	80	40	7	4	44,75
412060206	6,0	0,3	6	100	50	7	4	55,25
412060210	6,0	0,5	6	60	20	7	4	33,45
412060215	6,0	0,5	6	80	40	7	4	44,75
412060216	6,0	0,5	6	100	50	7	4	55,25
412060220	6,0	1,0	6	60	20	7	4	33,45
412060225	6,0	1,0	6	80	40	7	4	44,75

Ref.	d1	r	d2	l1	l2	l3	z	€
412060226	6,0	1,0	6	100	50	7	4	55,25
412060230	6,0	1,5	6	60	20	7	4	33,45
412060235	6,0	1,5	6	80	40	7	4	44,75
412060236	6,0	1,5	6	100	50	7	4	55,25
412060240	6,0	1,6	6	60	20	8	4	50,06
412060250	6,0	2,0	6	60	20	8	4	50,06
412080200	8,0	0,5	8	65	22	9	4	50,50
412080205	8,0	0,5	8	100	40	9	4	65,15
412080210	8,0	1,0	8	65	22	9	4	50,50
412080215	8,0	1,0	8	100	40	9	4	65,15
412080220	8,0	1,5	8	65	22	9	4	50,50
412080225	8,0	1,5	8	100	40	9	4	65,15
412080230	8,0	2,0	8	65	22	9	4	50,50
412100200	10,0	0,5	10	70	24	11	4	70,55
412100205	10,0	0,5	10	100	40	11	4	90,75
412100210	10,0	1,0	10	70	24	11	4	70,55
412100215	10,0	1,0	10	100	40	11	4	90,75
412100220	10,0	1,5	10	70	24	11	4	70,55
412100225	10,0	1,5	10	100	40	11	4	90,75
412100230	10,0	2,0	10	70	24	11	4	70,55
412100235	10,0	2,5	10	70	24	11	4	70,55
412120200	12,0	0,5	12	80	26	13	4	86,55
412120205	12,0	0,5	12	110	40	13	4	109,60
412120210	12,0	1,0	12	80	26	13	4	86,55
412120215	12,0	1,0	12	110	40	13	4	109,60
412120220	12,0	1,5	12	80	26	13	4	86,55
412120225	12,0	1,5	12	110	40	13	4	109,60
412120230	12,0	2,0	12	80	26	13	4	86,55
412120235	12,0	3,0	12	80	26	13	4	86,55
412160200	16,0	0,5	16	92	44	16	4	175,75
412160210	16,0	1,0	16	92	44	16	4	175,75
412160220	16,0	1,5	16	92	44	16	4	175,75
412160230	16,0	2,0	16	92	44	16	4	175,75
412160240	16,0	3,0	16	92	44	16	4	175,75

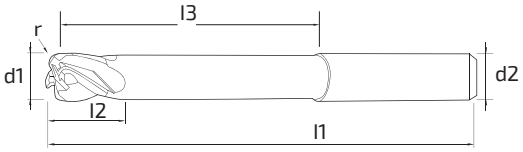
F-413

Fresa de metal duro tórica larga para acabado HSC/HCC <65 HRC

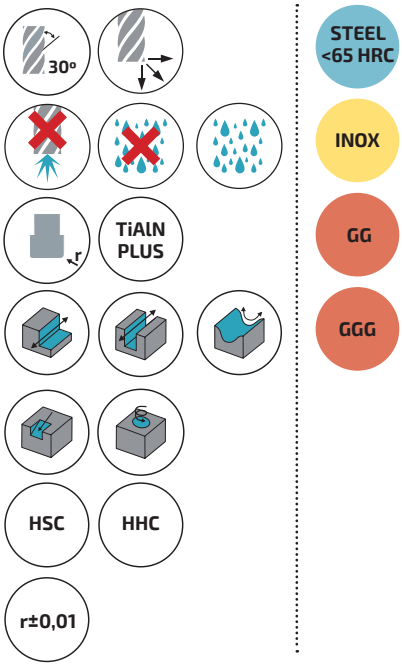
Long HSC-HHC solic carbide corner radius end mill <65 HRC

Fresa metal duro con 4 labios larga tórica y recubrimiento TiAlN. 30º de hélice. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado a alta velocidad (HSC) y materiales duros (HHC). Para máquinas CNC con 3 y 5 ejes. También podemos trabajar en seco. Para aceros hasta 65 HRC. También válida para materiales no férricos, materiales termo resistentes, aleaciones exóticas y fundiciones. Fresa especialmente diseñada para trabajos 3D.

4 Fluted solid carbide long end mill with corner radius and TiAlN coating. 30º Spiral angle. Specially for tool maker and mould maker. Also for aircraft / turbine construction. The tool, material and coating are specially designed for HSC and HHC. For CNC machines with 3 and 5 axes. Reduces milling time rapidly. Also for dry milling. Universal purpose for normal and high tense materials for 3D operations.



Ø2 - Ø16



Ref.	d1	r	d2	l1	l2	l3	z	€
413020200	2	0,2	6	80	2	10	4	35,30
413020210	2	0,2	6	80	10	10	4	35,30
413020220	2	0,5	6	80	2	10	4	35,30
413020230	2	0,5	6	80	10	10	4	35,30
413030200	3	0,2	6	80	3	15	4	35,30
413030210	3	0,2	6	80	15	15	4	35,30
413030220	3	0,5	6	80	3	15	4	35,30
413030230	3	0,5	6	80	15	15	4	35,30
413040200	4	0,2	6	80	4	20	4	35,30
413040210	4	0,2	6	80	20	20	4	35,30
413040220	4	0,5	6	80	4	20	4	35,30
413040230	4	0,5	6	80	20	20	4	35,30
413040240	4	1,0	6	80	4	20	4	35,30
413040250	4	1,0	6	80	20	20	4	35,30
413050200	5	0,2	6	80	7	25	4	35,30
413050210	5	0,2	6	80	25	25	4	35,30
413050220	5	0,5	6	80	7	25	4	35,30
413050230	5	0,5	6	80	25	25	4	35,30
413050240	5	1,0	6	80	7	25	4	35,30
413050250	5	1,0	6	80	25	25	4	35,30
413060150	6	0,2	6	80	13	13	4	35,30
413060160	6	0,2	6	80	25	25	4	48,45
413060200	6	0,5	6	80	13	44	4	48,45
413060205	6	0,5	6	80	25	25	4	48,45
413060210	6	1,0	6	80	13	44	4	48,45
413060215	6	1,0	6	80	25	25	4	39,90
413060220	6	1,5	6	80	13	44	4	39,90
413060230	6	2,0	6	80	13	44	4	39,90

Ref.	d1	r	d2	l1	l2	l3	z	€
413060240	6	2,0	6	80	25	25	4	39,90
413080150	8	0,5	8	90	19	54	4	72,90
413080160	8	0,5	8	90	35	35	4	72,90
413080200	8	1,0	8	90	19	54	4	72,90
413080205	8	1,0	8	90	35	35	4	72,90
413080210	8	1,5	8	90	19	54	4	55,75
413080220	8	2,0	8	90	19	54	4	55,75
413080230	8	2,0	8	90	35	35	4	55,75
413100150	10	0,5	10	100	22	22	4	70,90
413100160	10	0,5	10	100	45	45	4	101,45
413100200	10	1,0	10	100	22	60	4	101,45
413100205	10	1,0	10	100	45	45	4	101,45
413100210	10	1,5	10	100	22	60	4	70,90
413100220	10	2,0	10	100	22	60	4	85,45
413100230	10	2,0	10	100	45	45	4	85,45
413100240	10	3,0	10	100	22	22	4	85,45
413100250	10	3,0	10	100	45	45	4	85,45
413120150	12	0,5	12	100	26	26	4	110,60
413120160	12	0,5	12	100	50	50	4	142,30
413120200	12	1,0	12	100	26	75	4	142,30
413120205	12	1,0	12	100	50	50	4	142,30
413120210	12	2,0	12	100	26	75	4	110,60
413120220	12	2,0	12	100	26	75	4	126,60
413120230	12	2,0	12	100	50	50	4	126,60
413120240	12	3,0	12	100	26	26	4	126,60
413120250	12	3,0	12	100	50	50	4	126,60
413160200	16	2,0	16	150	75	92	4	247,75

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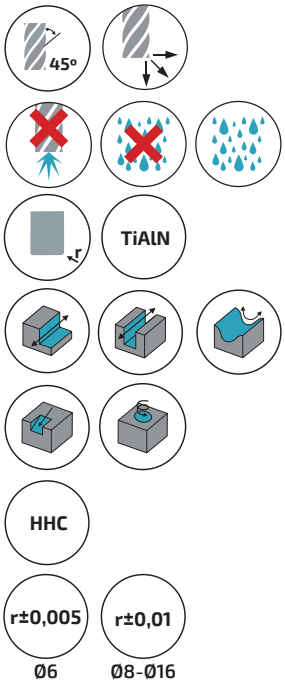
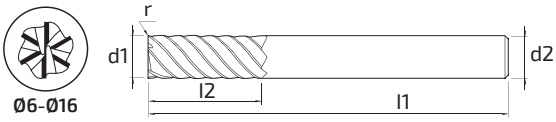
Fresa metal duro tórica 6 labios larga <50 HRC (0,2µm)

6 Fluted solid carbide corner radius long end mill <50 HRC (0,2µm)



Fresa de metal duro tórica de 6 labios larga con recubrimiento TiSiN para aceros preendurecidos y endurecidos hasta 50HRC. Ofrece una excelente resistencia al desgaste gracias a su recubrimiento PVD con base de Si. La hélice de 45º está diseñada para optimizar las condiciones de corte. Mejora la resistencia al desgaste gracias a un más largo y a la alta calidad Espectacular rendimiento en el mecanizado a altas velocidades gracias a su grado WC ul (0,2 µm).

6 Fluted solid carbide corner radius long end mill with TiSiN coating for pre-hardened and hardened steel (HRC 50). Good wear resistance by Si-based PVD coating. 45º helix design for high speed and feed condition. Improved wear resistance with longer edge and excellent work surface finish. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade.



Ref.	d1	r	d2	l1	l2	€
620060200	6	0,3	6	60	15	**44,50**
620060210	6	0,3	6	80	15	**50,65**
620060220	6	0,5	6	60	15	**44,50**
620060230	6	0,5	6	80	15	**50,65**
620060240	6	1,0	6	60	15	**44,50**
620060250	6	1,0	6	80	15	**50,65**
620080200	8	0,5	8	70	20	**65,40**
620080210	8	0,5	8	90	20	**71,90**
620080220	8	1,0	8	70	20	**65,40**
620080230	8	1,0	8	90	20	**71,90**
620100200	10	0,5	10	75	25	**86,55**
620100210	10	0,5	10	100	25	**97,00**
620100220	10	1,0	10	75	25	**86,55**
620100230	10	1,0	10	100	25	**97,00**
620120200	12	0,5	12	80	30	**101,65**
620120210	12	0,5	12	110	30	**115,90**
620120220	12	1,0	12	80	30	**101,65**
620120230	12	1,0	12	110	30	**115,90**
620160200	16	0,5	16	110	50	**220,50**
620160210	16	1,0	16	110	50	**220,50**

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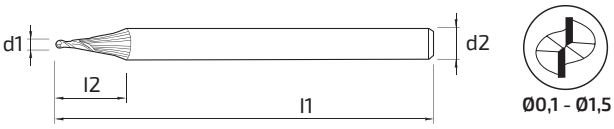
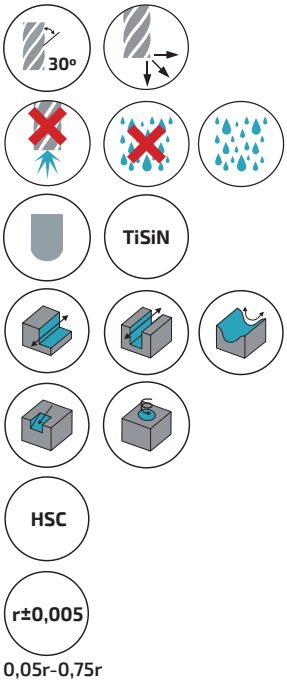
Micro-fresa metal duro punta esférica 2 labios HSC <55 HRC (0,2µm)

2 Fluted HSC solid carbide ball nose micro end mill <55 HRC (0,2µm)

Micro-fresa esférica de metal duro de 2 labios con recubrimiento TiSiN. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta de bola especial para contornos 3D. La herramienta, material y recubrimiento están especialmente diseñados para mecanizado HSC de materiales hasta 55 HRC, también para uso general.

2 Fluted solid carbide micro ball nose end mill with TiSiN coating and 30º spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Ball nose end mill for 3D milling in deep contour pocketing operations: The tool, material and coating are specially designed for high speed cutting HSC.





STEEL <55 HRC

INOX

GG

Ref.	d1	d2	l1	l2	z	€
921001200	0,1	4	0,2	40	2	**64,20**
921002200	0,2	4	0,4	40	2	**39,50**
921003200	0,3	4	0,6	40	2	**35,40**
921004200	0,4	4	0,8	40	2	**33,95**
921005200	0,5	4	1,0	45	2	**31,00**
921006200	0,6	4	1,2	45	2	**28,10**
921007200	0,7	4	1,5	45	2	**28,10**
921008200	0,8	4	2,0	45	2	**25,65**
921009200	0,9	4	2,0	45	2	**25,65**
921010200	1,0	4	2,5	50	2	**24,35**
921012200	1,2	4	3,0	50	2	**24,35**
921015200	1,5	4	4,0	50	2	**24,35**

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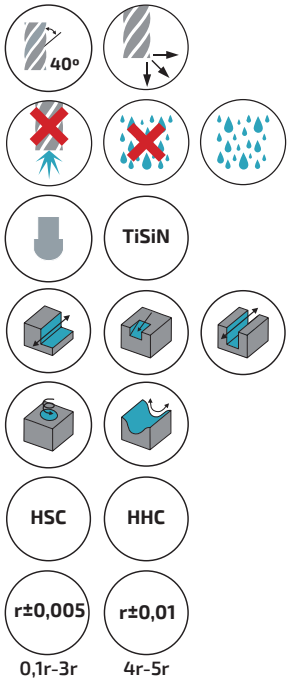
Fresa metal duro punta esférica larga 2 labios HSC/HHC <65 HRC (0,2µm)

2 Fluted long HSC/HHC solid carbide ball nose end mill <65 HRC (0,2µm)



STEEL <65 HRC

INOX

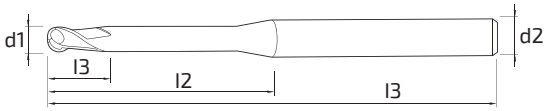
GG

GGG

Fresa de bola metal duro de cuello largo rebajado de 2 labios con recubrimiento TiSiN. Ángulo espiral de 30º. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado HSC (High Speed Cutting) + HHC (High Hard Cutting) < 65 HRC. También podemos utilizar esta herramienta para aceros y materiales no férricos. El diámetro posterior al corte es menor que el diámetro de punta para evitar el desvío de la herramienta. Herramienta de bola especial para contornos 3D.

2 Fluted solid carbide long ball nose end mill with TiSiN coating. 30º Spiral angle. The tool, material and coating are specially designed for dry high speed cutting HSC and high hard cutting HHC < 65 HRC. Large core diameter for minimum deflection. With corner radius for minimize the wear out. Ball nose end mill for 3D milling in deep contour pocketing operations.

Ø0,1 - Ø12



Ref.	d1	d2	l1	l2	l3	z	€
823001200	0,1	4	40	-	0,3	2	67,80
823001210	0,1	4	40	-	0,5	2	67,80
823002210	0,2	4	40	0,5	0,2	2	42,85
823002220	0,2	4	40	1,0	0,2	2	42,85
823002230	0,2	4	40	1,5	0,2	2	42,85
823002200	0,2	4	40	2,0	0,2	2	42,85
823003210	0,3	4	40	1,0	0,3	2	40,30
823003220	0,3	4	40	1,5	0,3	2	40,30
823003230	0,3	4	40	2,0	0,3	2	40,30
823003240	0,3	4	40	3,0	0,3	2	40,30
823003200	0,3	4	40	4,0	0,3	2	47,15
823003250	0,3	4	40	5,0	0,3	2	47,15
823004210	0,4	4	40	1,0	0,4	2	38,75
823004220	0,4	4	40	2,0	0,4	2	38,75
823004230	0,4	4	40	3,0	0,4	2	38,75
823004200	0,4	4	40	4,0	0,4	2	38,75
823004240	0,4	4	40	5,0	0,4	2	38,75
823004250	0,4	4	40	6,0	0,4	2	38,75
823004260	0,4	4	40	8,0	0,4	2	38,75
823004270	0,4	4	40	10,0	0,4	2	45,15
823005220	0,5	4	45	1,0	0,5	2	35,40
823005230	0,5	4	45	2,0	0,5	2	35,40
823005240	0,5	4	45	3,0	0,5	2	35,40
823005200	0,5	4	45	4,0	0,5	2	35,40
823005250	0,5	4	45	5,0	0,5	2	36,40
823005260	0,5	4	45	6,0	0,5	2	36,40
823005210	0,5	4	45	8,0	0,5	2	36,40
823005270	0,5	4	45	10,0	0,5	2	36,40
823005280	0,5	4	45	12,0	0,5	2	43,10
823005290	0,5	4	45	14,0	0,5	2	43,10

Ref.	d1	d2	l1	l2	l3	z	€
823006260	0,6	4	45	1	0,6	2	33,20
823006220	0,6	4	45	2	0,6	2	33,20
823006230	0,6	4	45	3	0,6	2	33,20
823006200	0,6	4	45	4	0,6	2	33,20
823006240	0,6	4	45	5	0,6	2	33,20
823006250	0,6	4	45	6	0,6	2	33,20
823006210	0,6	4	45	8	0,6	2	34,25
823006270	0,6	4	45	10	0,6	2	34,25
823006280	0,6	4	45	12	0,6	2	34,25
823006290	0,6	4	45	14	0,6	2	40,75
823006300	0,6	4	45	16	0,6	2	40,75
823007210	0,7	4	45	2	0,7	2	34,25
823007220	0,7	4	45	4	0,7	2	34,25
823007200	0,7	4	45	8	0,7	2	34,25
823007230	0,7	4	45	10	0,7	2	40,75
823007240	0,7	4	45	12	0,7	2	40,75
823008240	0,8	4	45	2	0,8	2	31,00
823008250	0,8	4	45	4	0,8	2	31,00
823008200	0,8	4	45	6	0,8	2	31,00
823008210	0,8	4	45	8	0,8	2	31,00
823008260	0,8	4	45	10	0,8	2	31,00
823008220	0,8	4	45	12	0,8	2	31,00
823008270	0,8	4	45	14	0,8	2	37,70
823008230	0,8	4	45	16	0,8	2	37,70
823009200	0,9	4	45	4	0,9	2	31,00
823010260	1,0	4	50	2	1,0	2	27,55
823010270	1,0	6	50	2	1,0	2	32,60
823010280	1,0	4	50	3	1,0	2	27,55
823010290	1,0	6	50	3	1,0	2	32,60
823010300	1,0	4	50	4	1,0	2	27,55

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Ref.	d1	d2	l1	l2	l3	z	€
823010310	1,0	6	50	4	1,0	2	32,60
823010320	1,0	4	50	5	1,0	2	27,55
823010330	1,0	6	50	5	1,0	2	32,60
823010200	1,0	4	50	6	1,0	2	27,55
823010340	1,0	6	50	6	1,0	2	32,60
823010210	1,0	4	50	8	1,0	2	27,55
823010350	1,0	6	50	8	1,0	2	32,60
823010220	1,0	4	50	10	1,0	2	28,75
823010360	1,0	6	50	10	1,0	2	32,60
823010230	1,0	4	50	12	1,0	2	28,75
823010370	1,0	6	50	12	1,0	2	32,60
823010380	1,0	4	50	14	1,0	2	28,75
823010390	1,0	6	50	14	1,0	2	32,60
823010240	1,0	4	50	16	1,0	2	28,75
823010400	1,0	6	60	16	1,0	2	34,25
823010410	1,0	4	50	18	1,0	2	28,75
823010420	1,0	6	60	18	1,0	2	34,25
823010250	1,0	4	50	20	1,0	2	28,75
823010430	1,0	6	60	20	1,0	2	34,25
823010440	1,0	4	60	22	1,0	2	31,70
823010450	1,0	6	65	22	1,0	2	36,40
823010460	1,0	4	60	25	1,0	2	37,95
823012240	1,2	4	45	4	1,2	2	28,75
823012250	1,2	6	50	4	1,2	2	32,60
823012260	1,2	4	45	6	1,2	2	28,75
823012270	1,2	6	50	6	1,2	2	32,60
823012200	1,2	4	45	8	1,2	2	28,75
823012280	1,2	6	50	8	1,2	2	32,60
823012290	1,2	4	50	10	1,2	2	28,75
823012300	1,2	6	50	10	1,2	2	32,60
823012210	1,2	4	50	12	1,2	2	28,75
823012310	1,2	6	50	12	1,2	2	32,60
823012220	1,2	4	50	16	1,2	2	28,75
823012320	1,2	6	60	16	1,2	2	34,25
823012230	1,2	4	50	20	1,2	2	28,75
823012330	1,2	6	60	20	1,2	2	34,25
823012340	1,2	4	60	24	1,2	2	31,70
823012350	1,2	6	65	24	1,2	2	36,40
823014210	1,4	4	45	6	1,4	2	28,75

Ref.	d1	d2	l1	l2	l3	z	€
823014220	1,4	4	45	8	1,4	2	28,75
823014200	1,4	4	50	12	1,4	2	28,75
823014230	1,4	4	50	16	1,4	2	28,75
823015260	1,5	4	45	3	1,5	2	27,55
823015270	1,5	6	50	3	1,5	2	32,60
823015280	1,5	4	45	4	1,5	2	27,55
823015290	1,5	6	50	4	1,5	2	32,60
823015300	1,5	4	45	6	1,5	2	27,55
823015310	1,5	6	50	6	1,5	2	32,60
823015200	1,5	4	45	8	1,5	2	27,55
823015320	1,5	6	50	8	1,5	2	32,60
823015330	1,5	4	50	10	1,5	2	28,75
823015340	1,5	6	50	10	1,5	2	32,60
823015210	1,5	4	50	12	1,5	2	28,75
823015350	1,5	6	50	12	1,5	2	32,60
823015360	1,5	4	50	14	1,5	2	28,75
823015370	1,5	6	50	14	1,5	2	32,60
823015220	1,5	4	50	16	1,5	2	28,75
823015380	1,5	6	60	16	1,5	2	34,25
823015390	1,5	4	50	18	1,5	2	28,75
823015400	1,5	6	60	18	1,5	2	34,25
823015230	1,5	4	50	20	1,5	2	28,75
823015410	1,5	6	60	20	1,5	2	34,25
823015420	1,5	4	60	22	1,5	2	31,70
823015430	1,5	6	65	22	1,5	2	36,40
823015240	1,5	4	60	25	1,5	2	31,70
823015440	1,5	6	65	25	1,5	2	36,40
823015250	1,5	4	70	30	1,5	2	34,60
823015450	1,5	6	70	30	1,5	2	41,55
823015460	1,5	4	70	35	1,5	2	41,05
823016210	1,6	4	45	6	1,6	2	33,20
823016220	1,6	4	45	8	1,6	2	33,20
823016230	1,6	4	50	12	1,6	2	33,20
823016200	1,6	4	50	16	1,6	2	33,20
823016240	1,6	4	50	20	1,6	2	33,20
823018200	1,8	4	45	6	1,8	2	33,20
823018210	1,8	4	45	8	1,8	2	33,20
823018220	1,8	4	50	12	1,8	2	33,20
823018230	1,8	4	50	16	1,8	2	33,20

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Ref.	d1	d2	l1	l2	l3	z	€
823018240	1,8	4	50	20	1,8	2	**33,20**
823020270	2,0	4	45	4	2,0	2	**27,55**
823020280	2,0	6	50	4	2,0	2	**32,60**
823020290	2,0	4	45	6	2,0	2	**27,55**
823020300	2,0	6	50	6	2,0	2	**32,60**
823020200	2,0	4	45	8	2,0	2	**27,55**
823020310	2,0	6	50	8	2,0	2	**32,60**
823020320	2,0	4	50	10	2,0	2	**27,55**
823020330	2,0	6	50	10	2,0	2	**32,60**
823020210	2,0	4	50	12	2,0	2	**27,55**
823020340	2,0	6	50	12	2,0	2	**32,60**
823020350	2,0	4	50	14	2,0	2	**27,55**
823020360	2,0	6	50	14	2,0	2	**32,60**
823020220	2,0	4	50	16	2,0	2	**27,55**
823020370	2,0	6	60	16	2,0	2	**34,25**
823020380	2,0	4	50	18	2,0	2	**27,55**
823020390	2,0	6	60	18	2,0	2	**34,25**
823020230	2,0	4	50	20	2,0	2	**29,65**
823020400	2,0	6	60	20	2,0	2	**34,25**
823020410	2,0	4	60	22	2,0	2	**29,65**
823020420	2,0	6	65	22	2,0	2	**36,40**
823020240	2,0	4	60	25	2,0	2	**29,65**
823020430	2,0	6	65	25	2,0	2	**36,40**
823020250	2,0	4	70	30	2,0	2	**34,75**
823020440	2,0	6	70	30	2,0	2	**41,55**
823020450	2,0	4	70	35	2,0	2	**34,75**
823020460	2,0	6	75	35	2,0	2	**45,65**
823020260	2,0	4	80	40	2,0	2	**39,10**
823020470	2,0	6	80	40	2,0	2	**49,90**
823020480	2,0	4	80	45	2,0	2	**45,50**
823025220	2,5	4	45	8	2,5	2	**29,65**
823025230	2,5	4	50	10	2,5	2	**29,65**
823025200	2,5	4	50	16	2,5	2	**29,65**
823025240	2,5	4	60	20	2,5	2	**29,65**
823025250	2,5	4	60	25	2,5	2	**32,30**
823025210	2,5	4	70	30	2,5	2	**35,00**
823025260	2,5	4	70	35	2,5	2	**35,00**
823030270	3,0	6	50	6	3,0	2	**31,95**
823030200	3,0	6	50	8	3,0	2	**31,95**

Ref.	d1	d2	l1	l2	l3	z	€
823030280	3	6	50	10	3	2	**31,95**
823030290	3	6	50	12	3	2	**31,95**
823030210	3	6	60	16	3	2	**34,25**
823030220	3	6	60	20	3	2	**34,25**
823030230	3	6	65	25	3	2	**36,40**
823030240	3	6	70	30	3	2	**41,55**
823030300	3	6	75	35	3	2	**45,65**
823030250	3	6	80	40	3	2	**49,90**
823030310	3	6	90	45	3	2	**52,55**
823030260	3	6	100	50	3	2	**56,80**
823030320	3	6	100	60	3	2	**63,20**
823040260	4	6	50	8	4	2	**32,60**
823040270	4	6	50	10	4	2	**32,60**
823040280	4	6	50	12	4	2	**32,60**
823040200	4	6	60	16	4	2	**34,25**
823040210	4	6	60	20	4	2	**34,25**
823040220	4	6	65	25	4	2	**36,40**
823040230	4	6	70	30	4	2	**41,55**
823040290	4	6	75	35	4	2	**45,65**
823040240	4	6	80	40	4	2	**49,90**
823040300	4	6	90	45	4	2	**52,55**
823040250	4	6	100	50	4	2	**56,80**
823040310	4	6	100	55	4	2	**63,20**
823040320	4	6	100	60	4	2	**63,20**
823050200	5	6	60	20	6	2	**36,40**
823050230	5	6	70	25	6	2	**41,55**
823050210	5	6	75	30	6	2	**45,65**
823050240	5	6	80	40	6	2	**49,90**
823050250	5	6	90	45	6	2	**52,55**
823050220	5	6	100	50	6	2	**56,80**
823050260	5	6	100	60	6	2	**63,20**
823060210	6	6	55	15	10	2	**31,30**
823060200	6	6	110	30	10	2	**49,90**
823080210	8	8	60	25	12	2	**42,95**
823080200	8	8	100	30	12	2	**58,10**
823100210	10	10	70	30	16	2	**56,30**
823100200	10	10	100	35	16	2	**76,55**
823120200	12	12	75	30	18	2	**73,35**
823120210	12	12	110	40	18	2	**101,65**

Condiciones de corte | Cutting data pag. 163

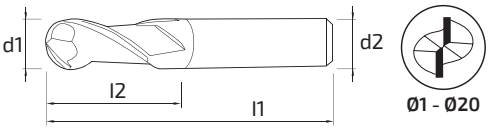
F-221

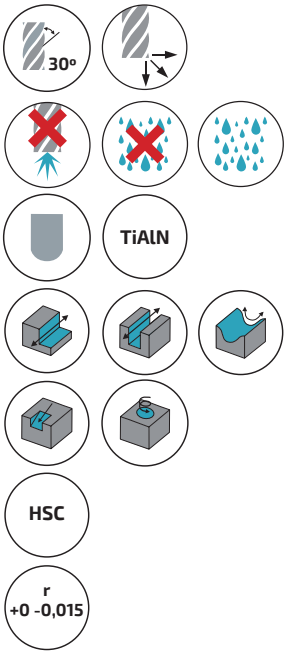
Fresa metal duro punta esférica 2 labios HSC <55 HRC

2 Fluted HSC solid carbide ball nose end mill <55 HRC

Fresa esférica metal duro de 2 labios con recubrimiento TiAlN. Ángulo espiral de 30º. La geometría positiva conjuntamente con este recubrimiento ayuda a tener un corte muy suave y prolongar la vida del de corte. Herramienta de bola especial para contornos 3D. La herramienta, material y recubrimiento están especialmente diseñadas para mecanizado HSC para materiales hasta 55 HRC, también para uso general.

2 Fluted solid carbide ball nose end mill with TiAlN coating and 30º spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Ball nose end mill for 3D milling in deep contour pocketing operations: tool, material and coating are specially designed for high speed cutting HSC up to 55 HRC.





STEEL <55 HRC

GG

INOX

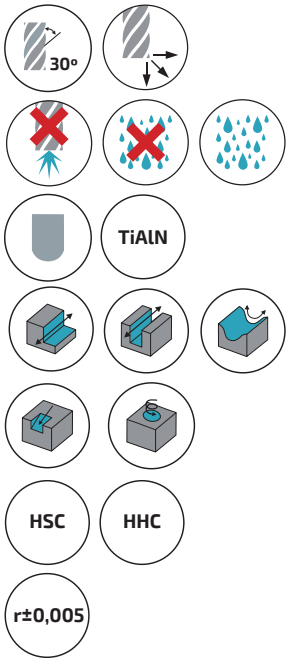
UNI

Ref.	d1	d2	l1	l2	z	€
221010200	1,0	3	38	2	2	**14,10**
221010210	1,0	4	38	2	2	**15,30**
221015200	1,5	3	38	3	2	**14,10**
221020200	2,0	3	38	4	2	**14,10**
221020210	2,0	4	38	4	2	**15,30**
221025200	2,5	3	38	5	2	**14,10**
221030200	3,0	3	38	6	2	**14,10**
221030210	3,0	4	38	6	2	**15,30**
221040200	4,0	4	50	8	2	**15,30**
221050200	5,0	5	50	10	2	**17,60**
221060200	6,0	6	50	12	2	**19,70**
221070200	7,0	8	60	14	2	**28,45**
221080200	8,0	8	60	15	2	**26,45**
221090200	9,0	10	75	18	2	**37,00**
221100200	10,0	10	75	20	2	**32,25**
221120200	12,0	12	75	20	2	**45,00**
221140200	14,0	14	90	25	2	**74,15**
221160200	16,0	16	100	25	2	**99,45**
221180200	18,0	18	100	30	2	**125,75**
221200200	20,0	20	100	30	2	**150,45**

Condiciones de corte | Cutting data pag. 164 - 165 - 166 -167

Fresa metal duro larga punta esférica 2 labios HSC/HHC <65 HRC

2 Fluted long HSC/HHC solid carbide ball nose end mill <65 HRC



STEEL <65 HRC

INOX

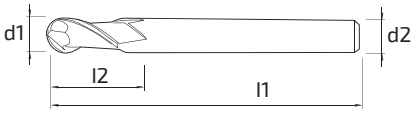
GG

GGG

Fresa esférica metal duro de 2 labios con recubrimiento TiAlN. Ángulo hélice de 30º. La geometría positiva conjuntamente con este recubrimiento ayuda a tener un corte muy suave y a prolongar la vida del de corte. Herramienta de bola especial para contornos 3D. La herramienta, material y recubrimiento están especialmente diseñadas para mecanizado HSC y materiales hasta 65 HRC (HHC).

2 Fluted solid carbide ball nose end mill with TiAlN coating and 30º spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Ball nose end mill for 3D milling in deep contour pocketing operations: the tool, material and coating are specially designed for high speed cutting HSC and HHC high hard cutting up to 65 HRC.

Ø1 - Ø20



Ref.	d1	d2	l1	l2	z	€
224010200	1,0	6	70	2,5	2	**30,00**
224015200	1,5	6	70	4,0	2	**30,00**
224020200	2,0	6	100	5,0	2	**34,30**
224025200	2,5	6	100	6,0	2	**34,30**
224030200	3,0	6	100	8,0	2	**34,30**
224040200	4,0	6	90	8,0	2	**32,90**
224050200	5,0	6	75	10,0	2	**30,00**
224060200	6,0	6	80	12,0	2	**31,45**
224080200	8,0	8	110	14,0	2	**37,90**
224100200	10,0	10	100	18,0	2	**54,15**
224120200	12,0	12	110	22,0	2	**76,75**
224160200	16,0	16	160	30,0	2	**161,60**
224200200	20,0	20	160	38,0	2	**238,30**

Condiciones de corte | Cutting data pag. 164 - 165 - 166 - 167

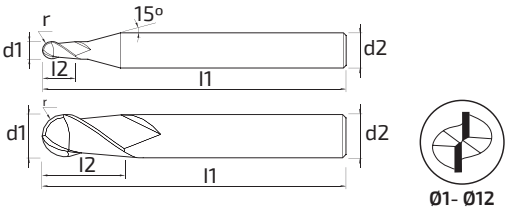
F-222

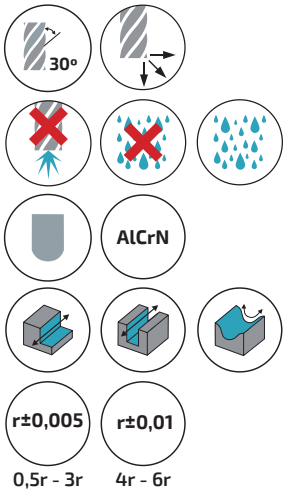
Fresa metal duro esférica 2 labios para uso general

2 Fluted solid carbide ball end mill for general use

Fresa de metal duro esférica de 2 labios y hélice de 30º para uso general. Su recubrimiento AlCrN permite usarla en varios materiales hasta 52 HRC, acero preendurecido, acero al carbono y acero para moldes. Tiene tolerancia en el de alta precisión y minimiza la fractura gracias a su grado TRS ul

2 Fluted 30º helix solid carbide ball end mill for general use. AlCrN coated optimum for various work materials up to HRC52, pre-hardened steel, carbon steel and mold steel. High precise edge tolerance. Minimizes fracturing by high TRS ultra fine WC grade.



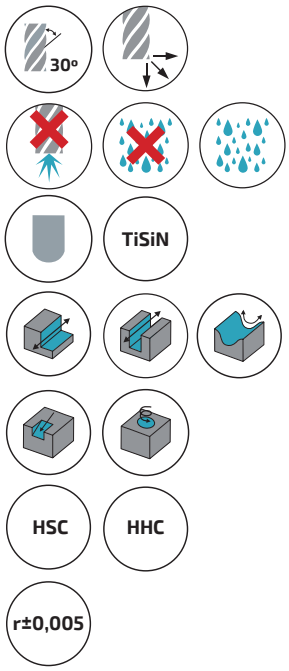


Ref.	d1	d2	l1	l2	€
222010200	1,0	6	50	2,5	**21,80**
222015200	1,5	6	50	4,0	**21,80**
222020200	2,0	6	50	5,0	**21,80**
222025200	2,5	4	50	6,0	**19,75**
222030200	3,0	6	60	8,0	**22,05**
222040200	4,0	6	70	8,0	**22,45**
222050200	5,0	6	75	10,0	**25,55**
222060200	6,0	6	80	12,0	**25,55**
222080200	8,0	8	90	14,0	**37,70**
222100200	10,0	10	100	18,0	**52,20**
222120200	12,0	12	110	22,0	**68,95**

Condiciones de corte | Cutting data pag. 168

Fresa metal duro larga punta esférica 2 labios HSC/HHC <65 HRC (0,2µm)

2 Fluted long HSC/HHC solid carbide ball nose end mill <65 HRC (0,2µm)



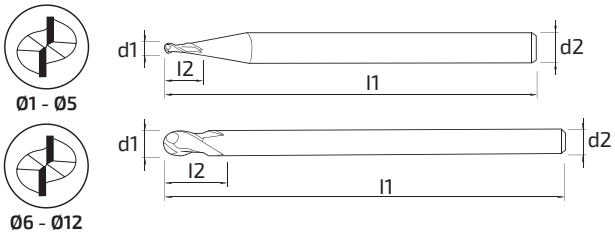
STEEL <65 HRC

GG

GGG

Fresa de bola metal duro 2 labios de alto rendimiento con recubrimiento TiSiN. Ángulo hélice de 30º. Su geometría positiva junto con este recubrimiento facilitan un corte muy suave prolongando la vida del de corte. La herramienta, material y recubrimiento están especialmente diseñadas para mecanizado HSC y para materiales hasta 65 HRC (HHC). Fresa especialmente diseñada para trabajos 3D.

2 Fluted high performance solid carbide ball nose end mill with TiSiN coating. 30º Spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. The tool, material and coating are specially designed for high speed cutting HSC and HHC high hard cutting up to 65 HRC.



Ref.	d1	d2	l1	l2	z	€
225010200	1,00	6	75	3	2	**50,0**
225020200	2,00	6	75	4	2	**50,0**
225030200	3,00	6	75	5	2	**50,0**
225040200	4,00	6	75	6	2	**50,0**
225050200	5,00	6	100	9	2	**60,6**
225060200	6,00	6	100	9	2	**60,6**
225063500	6,35	8	90	11	2	**84,0**
225080200	8,00	8	100	16	2	**84,0**
225095200	9,50	10	100	16	2	**110,0**
225100200	10,00	10	100	20	2	**110,0**
225120200	12,00	12	100	24	2	**140,9**

Condiciones de corte | Cutting data pag. 164 - 165 - 166 - 167

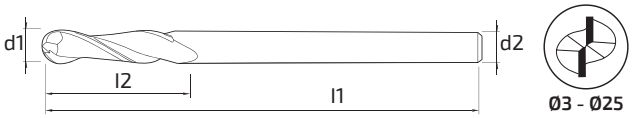
F-234

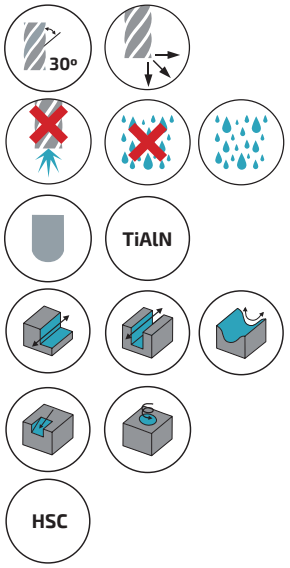
Fresa metal duro punta esférica extra larga 2 labios HSC/HHC <55 HRC

2 Fluted long HSC solid carbide ball nose end mill <55 HRC

Fresa esférica metal duro de 2 labios larga con recubrimiento TiAlN. Ángulo hélice de 30º. La geometría positiva conjuntamente con este recubrimiento ayuda a tener un corte muy suave y a prolongar la vida del de corte. Herramienta de bola especial para contornos 3D. La herramienta, material y recubrimiento están especialmente diseñados para mecanizado HSC y materiales hasta 55 HRC, también para uso general y materiales no férricos.

2 Fluted solid carbide long ball nose end mill with TiAlN coating and 30º spiral angle. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Ball nose end mill for 3D milling in deep contour pocketing operations: the tool, material and coating are specially designed for high speed cutting HSC up to 55 HRC. Also for non ferrous materials.



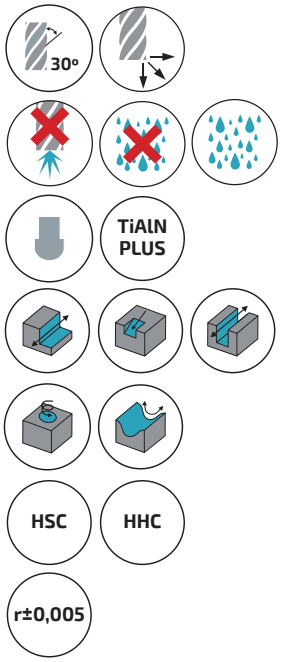


Ref.	d1	d2	l1	l2	z	€
234030200	3	3	75	6	2	**19,60**
234030210	3	3	100	6	2	**19,60**
234040200	4	4	100	6	2	**25,45**
234050200	5	5	100	6	2	**26,90**
234060200	6	6	100	15	2	**32,00**
234060210	6	6	150	15	2	**44,60**
234060220	6	6	200	30	2	**59,60**
234080200	8	8	150	25	2	**61,60**
234080210	8	8	200	50	2	**85,15**
234100200	10	10	150	25	2	**84,90**
234100210	10	10	200	50	2	**113,15**
234120200	12	12	150	25	2	**130,90**
234120210	12	12	200	25	2	**163,45**
234140200	14	14	200	50	2	**178,60**
234160200	16	16	200	50	2	**264,00**
234200200	20	20	200	50	2	**402,90**
234250200	25	25	200	50	2	**592,90**

Condiciones de corte | Cutting data pag. 164 - 165 - 166 - 167

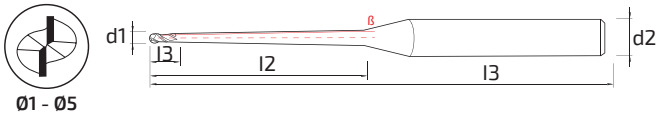
Fresa metal duro larga punta esférica cónica HSC/HHC <65 HRC

High performance conical HSC/HHC solid carbide ball nose end mill <65 HRC



Fresa esférica de metal duro de cuello largo rebajado y 2 labios con recubrimiento TiAlN. Ángulo espiral de 30º. Mango reforzado de Ø 6mm. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado HSC (High Speed Cutting) + HHC (High Hard Cutting) < 65 HRC. También podemos utilizar esta herramienta para aceros <1200N/mm2 y materiales no férricos. Herramienta de bola especial para contornos 3D.

2 Fluted solid carbide ball nose end mill 30º Spiral angle. For HSC (High Speed Cutting) + HHC (High Hard Cutting) < 65 HRC. Also for universal use, for standard steel <1200N/mm2. The tool, material and coating are specially designed for dry high speed cutting HSC and high hard cutting HHC. Ball nose end mill for 3D milling in deep contour pocketing operations.



Ref.	d1	d2	l1	l2	l3	ß	€
227010200	1,0	6	60	20	2	1,5º	**36,90**
227015200	1,5	6	60	20	3	1,5º	**36,90**
227020200	2,0	6	60	20	3	6,7º	**36,90**
227020210	2,0	6	60	25	6	6,0º	**36,90**
227025200	2,5	6	60	25	5	1,0º	**36,90**
227030200	3,0	6	60	20	7	6,6º	**36,90**
227040200	4,0	6	60	25	8	3,3º	**36,90**
227050200	5,0	6	60	25	9	1,8º	**36,90**

Condiciones de corte | Cutting data pag. 164 - 165 - 166 - 167

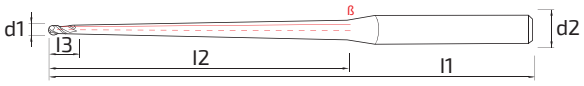
F-229

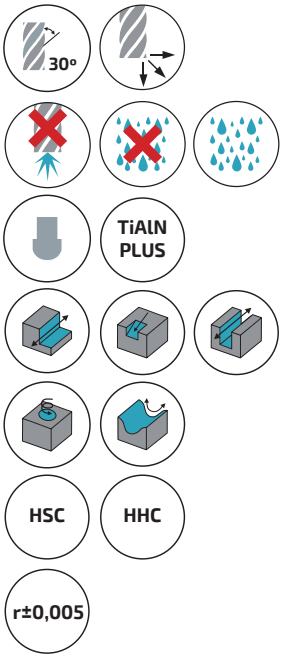
Fresa metal duro larga punta esférica cónica HSC/HHC <65 HRC

High performance long conical HSC/HHC solid carbide ball nose end mill <65 HRC

Fresa esférica de metal duro de cuello extra largo rebajado y 2 labios con recubrimiento TiAlN. Ángulo espiral de 30º La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado HSC (High Speed Cutting) + HHC (High Hard Cutting) < 65 HRC. También podemos utilizar esta herramienta para aceros <1200N/mm2 y materiales no férricos. Herramienta de bola especial para contornos 3D.

2 Fluted long solid carbide ball nose end mill. 30º Spiral angle. For HSC (High Speed Cutting) + HHC (High Hard Cutting) < 65 HRC. Also for universal use, for standard steel < 1200N/mm2. The tool, material and coating are specially designed for dry high speed cutting HSC and high hard cutting HHC. Ball nose end mill for 3D milling in deep contour pocketing operations.





STEEL <65 HRC

INOX

GG

GGG

NI ALLOYS

TITAN INCONEL

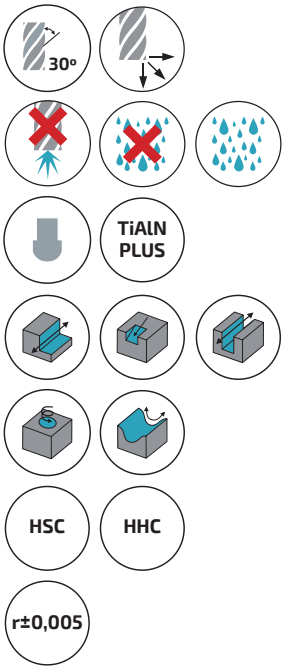
UNI

Ref.	d1	d2	l1	l2	l3	ß	€
229010200	1,0	6	80	40	1,5	3,7º	**41,45**
229015200	1,5	6	80	40	2	3,4º	**41,45**
229020100	2,0	6	80	40	3	3,1º	**41,45**
229020200	2,0	6	100	60	3	0,5º	**45,15**
229020210	2,0	6	100	60	3	1,0º	**45,15**
229020220	2,0	6	100	60	3	1,5º	**45,15**
229020230	2,0	6	100	57	3	2,0º	**45,15**
229030100	3,0	6	100	50	4	1,8º	**45,15**
229030200	3,0	6	100	60	4	0,5º	**45,15**
229030210	3,0	6	100	60	4	1,0º	**45,15**
229030220	3,0	6	100	57	4	1,5º	**45,15**
229030230	3,0	6	100	43	4	2,0º	**45,15**
229040100	4,0	6	100	50	5	1,3º	**45,15**
229040200	4,0	6	100	60	5	0,5º	**45,15**
229040210	4,0	6	100	57	5	1,0º	**45,15**
229040220	4,0	6	100	38	5	1,5º	**45,15**
229040230	4,0	6	100	29	5	2,0º	**45,15**
229040240	4,0	8	100	50	8	2,7º	**62,00**
229050200	5,0	8	90	41	12	3,0º	**59,75**
229050210	5,0	6	100	50	6	0,6º	**45,15**
229060200	6,0	8	90	33	14	3,0º	**59,75**
229060210	6,0	8	100	50	8	1,4º	**62,00**
229060220	6,0	10	100	50	12	3,0º	**86,30**
229080200	8,0	10	100	40	15	4,6º	**86,30**
229080210	8,0	12	100	50	15	3,3º	**117,75**
229080220	8,0	10	150	70	10	1,9º	**127,45**
229100200	10,0	12	100	50	20	1,9º	**117,75**
229100210	10,0	16	150	60	20	4,3º	**235,75**
229120220	12,0	12	130	65	15	1,3º	**142,30**
229120200	12,0	16	150	60	20	2,9º	**235,75**

Condiciones de corte | Cutting data pag. 164 - 165 - 166 - 167

Fresa metal duro extra larga punta esférica cónica HSC/HHC <65 HRC

High performance extra long conical HSC/HHC solid carbide ball nose end mill <65 HRC



STEEL <65 HRC

INOX

GGG

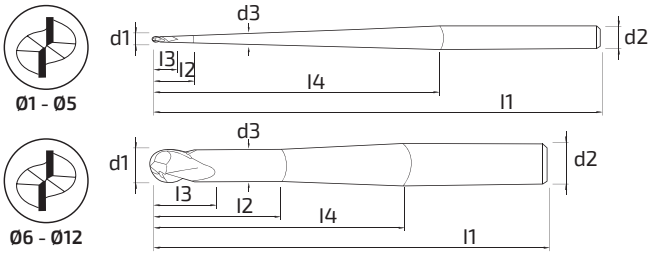
GG

NI ALLOYS

TITAN INCONEL

Fresa esférica de metal duro de cuello largo rebajado y 2 labios con recubrimiento TiAlN. Ángulo espiral de 30º. La herramienta, material y el recubrimiento están especialmente diseñados para el mecanizado HSC (High Speed Cutting) + HHC (High Hard Cutting) < 65 HRC. También podemos utilizar esta herramienta para aceros < 1200N/mm2 y materiales no férricos. Herramienta de bola especial para contornos 3D.

2 Fluted solid carbide ball nose end mill 30º Spiral angle, for HSC (High Speed Cutting) + HHC (High Hard Cutting) < 65 HRC. Also for universal use, for standard steel <1200N/mm2. The tool, material and coating are specially designed for dry high speed cutting HSC and high hard cutting HHC. Ball nose end mill for 3D milling in deep contour pocketing operations.



Ref.	d1	d2	d3	l1	l2	l3	l4	z	€
228010200	1,0	6	0,80	100	6	2,0	40	2	**80,45**
228015200	1,5	6	1,45	120	5	2,3	75	2	**80,75**
228020200	2,0	6	1,90	70	16	2,0	33	2	**80,45**
228020210	2,0	6	1,80	100	8	3,0	40	2	**80,45**
228020220	2,0	6	1,80	120	8	3,0	60	2	**80,45**
228030200	3,0	6	2,90	70	18	3,0	33	2	**80,45**
228030210	3,0	6	2,80	100	12	4,0	40	2	**80,45**
228030220	3,0	6	2,90	120	12	4,0	60	2	**80,45**
228040200	4,0	6	3,80	100	16	5,0	40	2	**80,45**
228040210	4,0	6	3,80	120	16	5,0	60	2	**85,60**
228040220	4,0	6	3,80	160	-	4,0	94	2	**211,60**
228050200	5,0	6	4,80	100	20	6,0	40	2	**80,45**
228060200	6,0	8	5,80	100	25	6,0	50	2	**108,15**
228060210	6,0	8	5,80	120	25	6,0	50	2	**114,70**
228060220	6,0	10	-	150	-	9,0	60	2	**157,05**
228080200	8,0	10	7,80	120	32	7,0	60	2	**145,50**
228080210	8,0	10	-	150	-	12,0	60	2	**157,05**
228100200	10,0	12	9,80	160	40	9,0	80	2	**217,20**
228120200	12,0	16	11,80	160	50	12,0	100	2	**382,30**
228120210	12,0	16	11,80	200	50	12,0	100	2	**436,15**

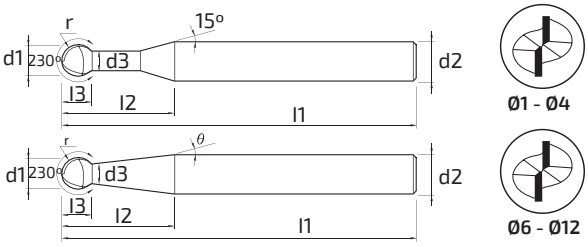
F-232

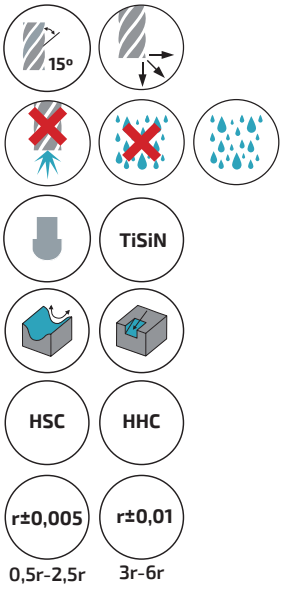
Fresa metal duro esférica de 2 labios 3D corte 230º <65 HRC (0,2µm)

2 Fluted spherical end mill for 3D cut 230º <65 HRC (0,2µm)

Fresa de alta calidad de 2 labios con punta de bola de 230º con recubrimiento TiSiN para mecanizados de 3D. Ofrece una excelente resistencia al desgaste gracias a su recubrimiento PVD con base de Si. Espectacular rendimiento a altas velocidades gracias a su grado WC ul (0,2 µm). Indicada para fresado de aceros pre endurecidos y endurecidos (50-65 HRC).

2 Fluted high quality 230º ball shape with TiSiN coating for wide range of 3D machining. Good wear resistance by Si-based PVD coating. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade. For pre-hardened and hardened steel (HRC 50-65).





STEEL <65 HRC

INOX

TITAN INCONEL

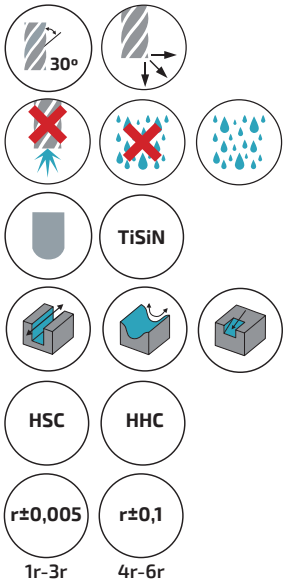
HG

Ref.	d1	r	d2	d3	l1	l2	l3	θ	z	€
232010200	1,0	0,50	6	0,91	60	6	0,7	0	2	**40,30**
232015200	1,5	0,75	6	1,36	60	6	1,0	0	2	**40,30**
232020200	2,0	1,00	6	1,80	60	10	1,4	0	2	**40,30**
232030200	3,0	1,50	6	2,70	70	15	2,1	0	2	**42,85**
232040200	4,0	2,00	6	3,60	70	20	2,8	0	2	**42,95**
232060200	6,0	3,00	6	5,40	90	15	4,2	0	2	**56,15**
232080200	8,0	4,00	8	7,20	100	28	5,7	1	2	**87,05**
232100200	10,0	5,00	10	9,00	110	35	7,1	1	2	**115,90**
232120200	12,0	6,00	12	10,80	120	42	8,5	1	2	**156,75**

Condiciones de corte | Cutting data pag. 168

Fresa de metal duro esférica de 3 labios < 65hrc (0,2µm)

3 Fluted ball end mill < 65 HRC (0,2µm)



STEEL <65 HRC

NI ALLOYS

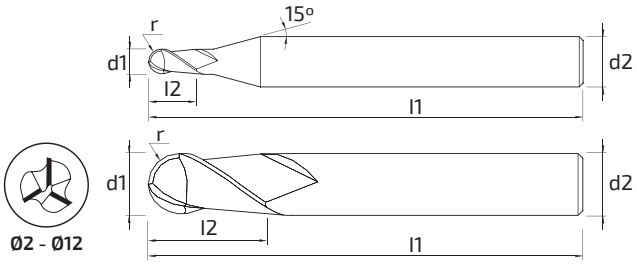
TITAN INCONEL

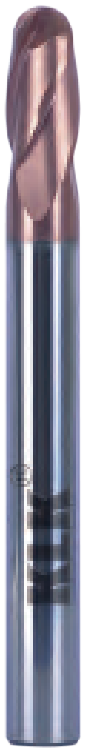
HG

UNI

Fresa de metal duro de 3 labios con recubrimiento TiSiN. Ofrece una excelente resistencia al desgaste gracias a su recubrimiento PVD con base de Si. Tolerancia de de alta precisión. Sus tres de corte permiten trabajar a alta velocidad de corte y avance. Ofrece un espectacular rendimiento en el mecanizado a altas velocidades gracias a su grado WC ul (0,2 µm). Indicada para fresado de aceros pre endurecidos y endurecidos (50-65 HRC).

3 Fluted ball end mill with TiSiN coating. Good wear resistance by Si-based PVD coating. High precise edge tolerance. High precise edge tolerance. High speed, feed applicable by 3 flute ball edge. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade. End mill for pre-hardened and hardened steel (HRC 50-65).





Ref.	d1	r	d2	l1	l2	z	€
324020200	2	1,0	6	50	5	3	**31,80**
324030200	3	1,5	6	65	8	3	**33,20**
324040200	4	2,0	6	70	8	3	**33,20**
324050200	5	2,5	6	75	10	3	**36,70**
324060200	6	3,0	6	80	12	3	**36,70**
324080200	8	4,0	8	90	14	3	**58,60**
324100200	10	5,0	10	100	18	3	**80,15**
324120200	12	6,0	12	110	22	3	**104,75**

Condiciones de corte | Cutting data pag. 169

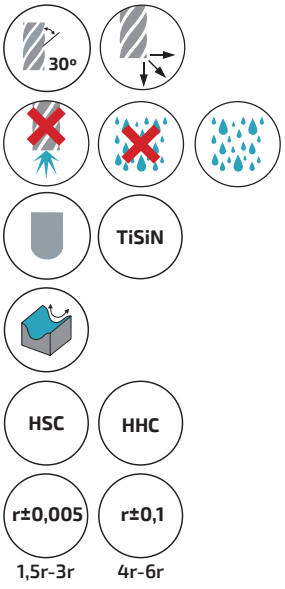
F-424

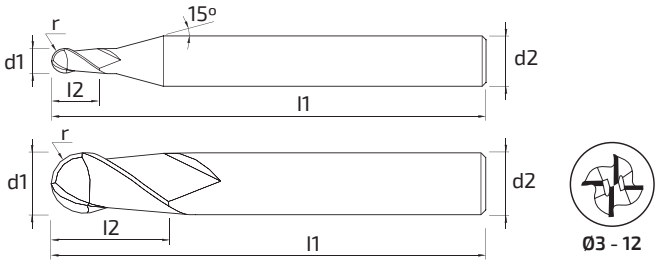
Fresa de metal duro esférica 4 labios <65 HRC (0,2µm)

4 Fluted solid carbide ball end mill < 65 HRC (0,2µm)

Fresa de metal duro de 4 labios con recubrimiento TiSiN. Ofrece una excelente resistencia al desgaste gracias a su recubrimiento PVD con base de Si. Tolerancia de de alta precisión. Sus cuatro de corte permiten trabajar a alta velocidad de corte y avance. Ofrece un espectacular rendimiento en el mecanizado a altas velocidades gracias a su grado WC ul (0,2 µm). Indicada para fresado de aceros pre endurecidos y endurecidos (50-65 HRC).

4 Fluted solide carbide ball end mill with TiSiN coating. Good wear resistance by Si-based PVD coating. High precise edge tolerance. High speed, feed applicable by 4 flute ball edge. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade. For pre-hardened and hardened steel (HRC 50-65).



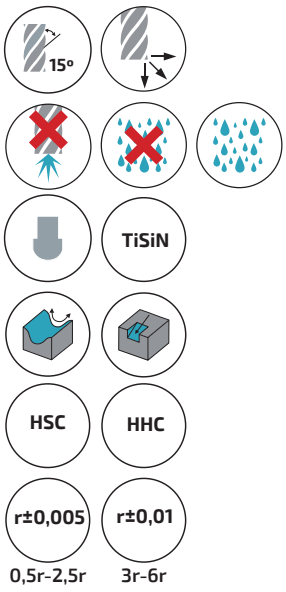


Ref.	d1	r	d2	l1	l2	z	€
424030200	3	1,5	6	60	8	4	**33,20**
424040200	4	2,0	6	70	8	4	**33,20**
424050200	5	2,5	6	80	10	4	**36,70**
424060200	6	3,0	6	90	12	4	**38,60**
424080200	8	4,0	8	100	14	4	**61,95**
424100200	10	5,0	10	100	18	4	**80,15**
424120200	12	6,0	12	110	22	4	**104,75**

Condiciones de corte | Cutting data pag. 170

Fresa metal duro esférica de 4 labios 3d corte 230º <65 HRC (0,2µm)

4 Fluted spherical end mill for 3D cut 230º <65 HRC (0,2µm)



STEEL <65 HRC

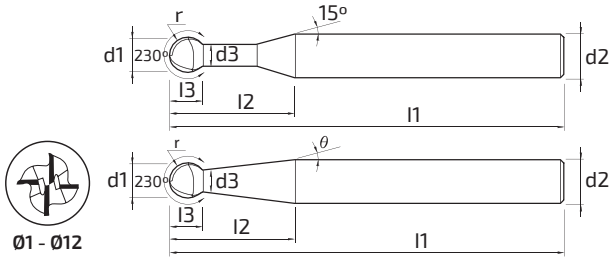
INOX

TITAN INCONEL

HG

Fresa de alta calidad de 4 labios con punta de bola de 230º con recubrimiento TiSiN para mecanizados de 3D. Ofrece una excelente resistencia al desgaste gracias a su recubrimiento PVD con base de Si. Espectacular rendimiento en el mecanizado a altas velocidades gracias a su grado WC ul (0,2 µm). Indicada para fresado de aceros pre endurecidos y endurecidos (50-65 HRC).

4 Fluted high quality 230º ball shape with TiSiN coating for wide range 3D machining. Good wear resistance by Si-based PVD coating. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade. For pre-hardened and hardened steel (HRC 50-65).



Ø1 - Ø12

Ref.	d1	r	d2	d3	l1	l2	l3	θ	z	€
432010200	1,0	0,50	6	0,91	60	6	0,7	0	4	44,35
432015200	1,5	0,75	6	1,36	60	8	1,0	0	4	44,35
432020200	2,0	1,00	6	1,80	60	10	1,4	0	4	44,35
432030200	3,0	1,50	6	2,70	70	15	2,1	0	4	47,10
432040200	4,0	2,00	6	3,60	70	20	2,8	0	4	47,10
432060200	6,0	3,00	6	5,40	90	15	4,2	0	4	61,65
432080200	8,0	4,00	8	7,20	100	28	5,7	1	4	96,00
432100200	10,0	5,00	10	9,00	110	35	7,1	1	4	127,80
432120200	12,0	6,00	12	10,80	120	42	8,5	1	4	172,80

Condiciones de corte | Cutting data pag. 168

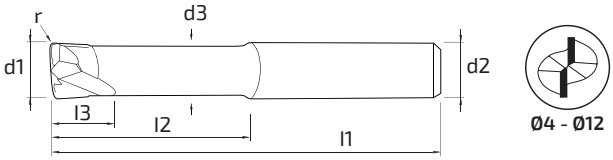
F-212

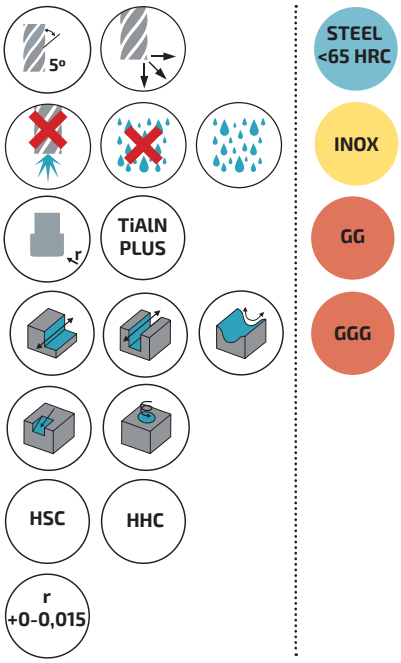
Fresa metal duro turbo HSC/HHC < 65HRC

High performance HSC / HHC solid carbide turbo end mill < 65 HRC

Fresa de metal duro TURBO de 2 labios con recubrimiento TiAlN. Ángulo espiral de 5º. Mango rebajado. El substrato, recubrimiento y geometría están especialmente diseñados para alta velocidad de arranque de viruta. Podemos trabajar con avances por diente muy altos y pasadas axiales pequeñas. Especial para grandes volúmenes de extracción de viruta (cm3/min). Se reducen los tiempos de mecanizado. También podemos trabajar en seco. Para aceros hasta 65 HRC. También válida para materiales no férricos, materiales termo resistentes, aleaciones exóticas y fundiciones.

2 Fluted solid carbide TURBO end mill with TiAlN coating. 5º Spiral angle. Clearance shank. Excellent performance tool: substrate, coating and geometry are specially designed for high High Speed Cutting – We can work with really big feed rates with small Ap. Specially to remove big volume of chips (cm3/min). For tool makers and mould makers. Reduces milling time rapidly. Also for dry milling. Universal purpose for normal and high tense materials.



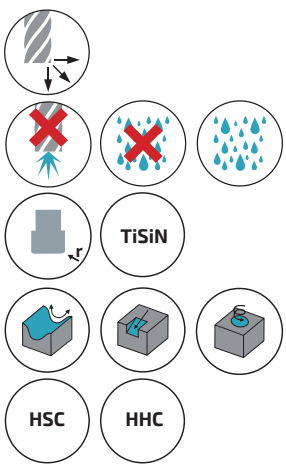


Ref.	d1	r	d2	d3	l1	l2	l3	z	€
212040200	4	0,4	6	3,4	57	20	1,5	2	**58,90**
212050200	5	0,5	6	4,2	57	20	2,0	2	**58,90**
212060200	6	0,6	6	5,0	57	25	2,5	2	**58,90**
212080200	8	0,8	8	6,7	63	25	3,0	2	**77,50**
212100200	10	1,0	10	8,5	72	35	3,5	2	**118,90**
212120200	12	1,2	12	10,0	83	40	4,0	2	**132,20**

Condiciones de corte | Cutting data pag. 162

Fresa metal duro “turbo” <65 HRC

Solid carbide “turbo” end mill < 65 HRC



STEEL <65 HRC

INOX

GG

GGG

NI ALLOYS

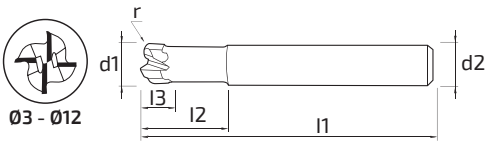
TITAN INCONEL

HG

UNI

Fresa de metal duro “TURBO” de 4 labios con recubrimiento TiSiN. La geometría de esta fresa permite trabajar a alto avance con pasadas axiales pequeñas. Especialmente indicada para grandes volúmenes de extracción de viruta. Puede trabajar con o sin refrigeración.

4 Fluted solid carbide “TURBO” end mill with TiSiN coating. Special geometry allows high feed rates with small axial steps. Specially recommended for high chip-removal volume rates. It can work with or without coolant.



Ref.	d1	r	d2	l1	l2	l3	z	€
551030200	3	0,5	3	60	8	1,5	4	**43,20**
551030210	3	0,5	3	80	20	1,5	4	**53,15**
551040200	4	0,5	4	60	8	2,0	4	**43,20**
551040210	4	0,5	4	80	20	2,0	4	**53,15**
551060200	6	1,0	6	60	14	3,0	4	**43,20**
551060210	6	1,0	6	80	30	3,0	4	**53,15**
551080200	8	2,0	8	63	18	4,0	4	**54,35**
551080210	8	2,0	8	80	40	4,0	4	**66,90**
551100200	10	2,0	10	72	20	5,0	4	**73,80**
551100210	10	2,0	10	100	50	5,0	4	**90,75**
551120200	12	2,0	12	83	22	6,0	4	**108,15**
551120210	12	2,0	12	110	50	6,0	4	**133,00**

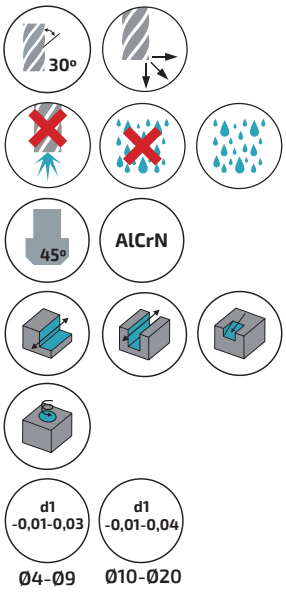
Condiciones de corte | Cutting data pag. 170

FRESAS/ FUNDICIÓN

END MILLS/CAST IRON

Fresa metal duro desbaste 3 y 4 labios “plus” <55 HRC

3 and 4 Fluted solid carbide roughing end mill “plus” <55 HRC



STEEL <55 HRC

GG

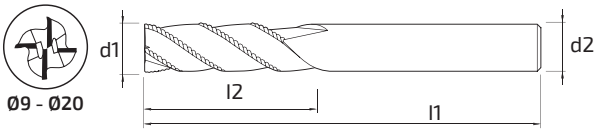
GGG

UNI

Fresa de metal duro de 3 y 4 labios de alto rendimiento con recubrimiento AlCrN para desbaste. Ángulo espiral de 30º. Mejora la resistencia al desgaste, evita el estrés en el y reduce el tiempo de mecanizado gracias al buen control de viruta. Permite mecanizar a alta velocidad, por lo que maximiza la del trabajo. Indicada para el mecanizado de fundición, acero para herramientas y acero aleado.

3 and 4 fluted high performance end mill with AlCrN coating for roughing operations. 30º Spiral angle. Improves wear resistance as well as avoids edge stress and reduces machining time by excellent chip control. Maximizes work efficiency by high speed machining. Recommended for cast iron, tool steel and alloy steel.

Ø4 - Ø8



Ø9 - Ø20

Ref.	d1	d2	l1	l2	z	€
417040200	4	6	50	10	3	**42,35**
417050200	5	6	50	13	3	**42,35**
417060200	6	6	55	15	3	**44,75**
417070200	7	8	65	18	3	**65,40**
417080200	8	8	65	19	3	**61,55**
417090200	9	10	70	22	4	**82,95**
417100200	10	10	70	22	4	**78,95**
417120200	12	12	80	26	4	**95,35**
417160200	16	16	90	32	4	**232,40**
417200200	20	20	110	38	4	**297,10**

Condiciones de corte | Cutting data pag. 172

FRESAS/ INOXIDABLE

END MILLS/STAINLESS STEEL

INOX.

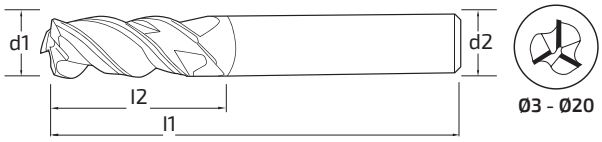
F-1305

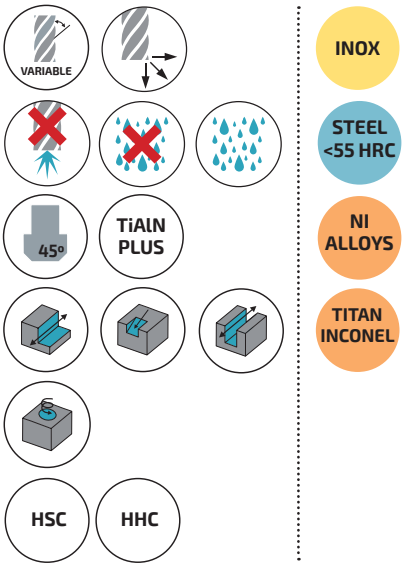
Fresa metal duro 3 labios de alto rendimiento < 55 HRC doble grado 35º/38º

3 Fluted high performance solid carbide end mill < 55HRC

Fresa de metal duro de 3 labios con corte al centro con recubrimiento TiSiN y hélice variable. Fresa de muy alto rendimiento especialmente diseñada para desbastar y acabar. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para inoxidable y también apta para uso general: para materiales hasta 55 HRC.

3 Fluted cutting to centre solid carbide end mills plus TiSiN coating. Variable helix. Tool especially designed for finishing and roughing. An exceptional tool for the moulding industry. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose, for high tense material, up to 55 HRC.



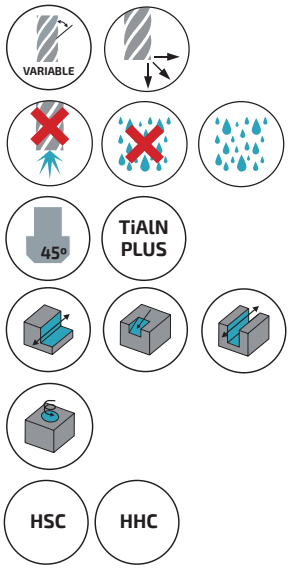


Ref.	d1	d2	l1	l2	z	€
1305030200	3	6	50	8	3	**26,75**
1305040200	4	6	50	11	3	**26,75**
1305050200	5	6	50	13	3	**26,75**
1305060200	6	6	50	16	3	**22,45**
1305080200	8	8	60	19	3	**30,60**
1305100200	10	10	73	22	3	**42,15**
1305120200	12	12	75	26	3	**55,90**
1305140200	14	14	85	30	3	**84,00**
1305160200	16	16	93	32	3	**101,15**
1305200200	20	20	100	38	3	**152,15**

Condiciones de corte | Cutting data pag. 172

Fresa metal duro 4 labios de alto rendimiento < 55 HRC doble grado 35º/38º

4 Fluted high performance solid carbide end mill < 55HRC



INOX

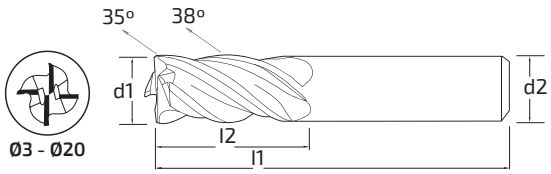
STEEL <55 HRC

NI ALLOYS

TITAN INCONEL

Fresa de metal duro de 4 labios con corte al centro con recubrimiento TiSiN y hélice variable. Fresa de muy alto rendimiento especialmente diseñada para desbastar y acabar. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para inoxidable y también apta para uso general: para materiales hasta 55 HRC.

4 Fluted cutting to centre solid carbide end mills plus TiSiN coating. Variable helix. Tool especially designed for finishing and roughing. An exceptional tool for the moulding industry. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life. Universal purpose, for high tense material, up to 55 HRC.



Ref.	d1	d2	l1	l2	z	€
1403030200	3	6	50	8	4	**26,75**
1403040200	4	6	50	11	4	**26,75**
1403050200	5	6	50	13	4	**26,75**
1403060200	6	6	50	16	4	**22,45**
1403080200	8	8	60	19	4	**30,60**
1403100200	10	10	73	22	4	**42,15**
1403120200	12	12	75	26	4	**55,90**
1403140200	14	14	85	30	4	**84,00**
1403160200	16	16	93	32	4	**101,15**
1403200200	20	20	100	38	4	**152,15**

Condiciones de corte | Cutting data pag. 172

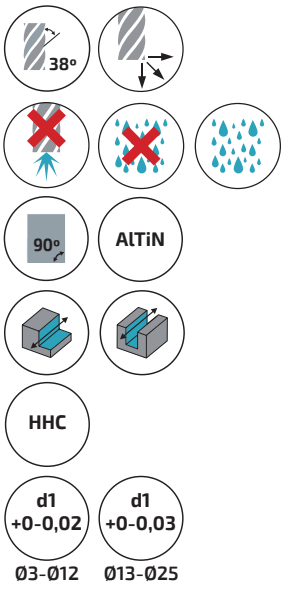
F-454

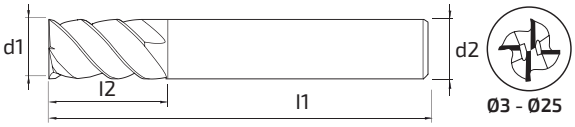
Fresa metal duro plana de 4 labios

4 Fluted solid carbide end mill

Fresa de metal duro plana de 4 labios y hélice de 38º con recubrimiento AlTiN. Ofrece alta precisión y excelente acabado gracias a su geometría de cuatro desiguales. Su diseño único y patentado disminuye las vibraciones y permite lograr una profundidad axial de 1xD en operaciones de ranurado.

4 Fluted 38º helix solid carbide end mill with AlTiN coating. It provides high precision and excellent surface due to each 4 flutes broken index geometry. The unique patented design decrease chatter and resonance and can achieve an axial depth 1xD in slotting operations.





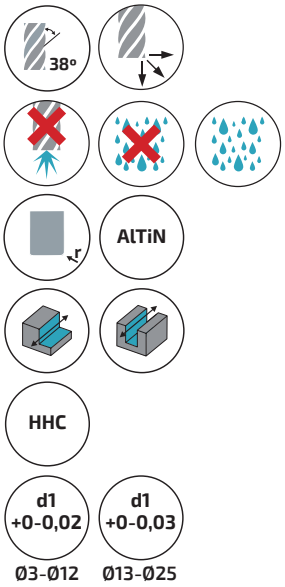
INOX
STEEL <55 HRC
GG
GGG
NI ALLOYS
TITAN INCONEL
UNI

Ref.	d1	d2	l1	l2	€
454030200	3	6	50	8	**27,95**
454040200	4	6	50	11	**27,95**
454050200	5	6	50	13	**27,95**
454060200	6	6	50	13	**27,95**
454070200	7	8	60	16	**38,70**
454080200	8	8	60	19	**38,70**
454090200	9	10	70	19	**53,05**
454100200	10	10	70	22	**53,05**
454110200	11	12	75	22	**70,90**
454120200	12	12	75	26	**70,90**
454130200	13	12	80	26	**81,55**
454140200	14	14	80	26	**114,55**
454160200	16	16	90	32	**163,45**
454180200	18	18	100	32	**231,20**
454200200	20	20	100	38	**259,40**
454250200	25	25	120	45	**447,15**

Condiciones de corte | Cutting data pag. 173

Fresa metal duro tórica de 4 labios

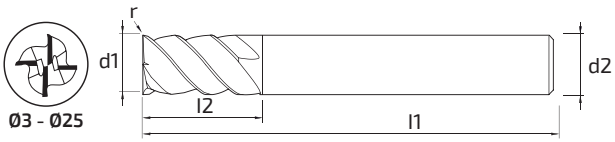
4 Fluted solid carbide corner radius end mill



INOX
STEEL <55 HRC
GG
GGG
NI ALLOYS
TITAN INCONEL
UNI

Fresa de metal duro tórica de 4 labios y hélice de 38º con recubrimiento AlTiN. Ofrece alta precisión y excelente acabado gracias a su geometría de cuatro desiguales. La punta con radio evita el astillamiento del material en el mecanizado de alto rendimiento.

4 Fluted 38º helix solid carbide corner radius end mill with AlTiN coating. It provides high precision and excellent surface due to each 4 flutes broken index geometry. It has corner radius against chipping in high performance machining.



Ref.	d1	r	d2	l1	l2	€
455030200	3	0,1	6	50	8	**29,35**
455040200	4	0,2	6	50	11	**29,35**
455050200	5	0,2	6	50	13	**29,35**
455060200	6	0,2	6	50	13	**29,35**
455070200	7	0,2	8	60	16	**40,60**
455080200	8	0,2	8	60	19	**40,60**
455090200	9	0,2	10	70	19	**55,70**
455100200	10	0,3	10	70	22	**55,70**
455110200	11	0,3	12	75	22	**74,45**
455120200	12	0,3	12	75	26	**74,45**
455130200	13	0,3	12	80	26	**85,60**
455140200	14	0,3	14	80	26	**120,30**
455160200	16	0,3	16	90	32	**171,65**
455180200	18	0,3	18	100	32	**242,80**
455200200	20	0,3	20	100	38	**272,35**
455250200	25	0,3	25	120	45	**469,50**

Condiciones de corte | Cutting data pag. 173

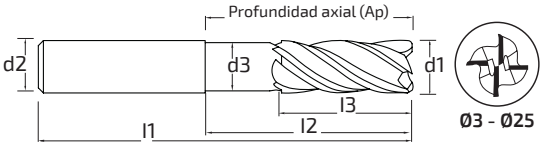
F-453

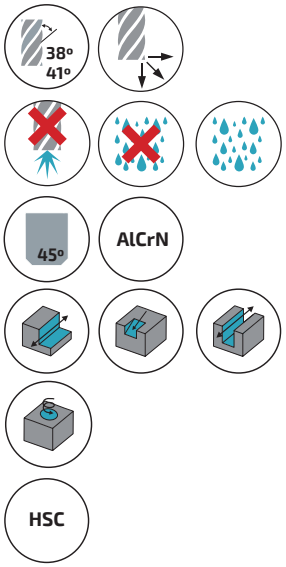
Fresa de 4 labios con hélice variable de 38º/41º para inoxidable

4 Fluted 38º/41º helix end mill

Fresa metal duro de cuatro labios con hélice variable 38º/41º y recubrimiento AlCrN, la hélice en ángulo variable garantiza una gran estabilidad en el mecanizado y un alto rendimiento. Herramienta para inoxidable.

4 Fluted 38º/41º variable helix end mill with AlCrN coating. Realiability and high performance are guaranted during machining. For INOX.



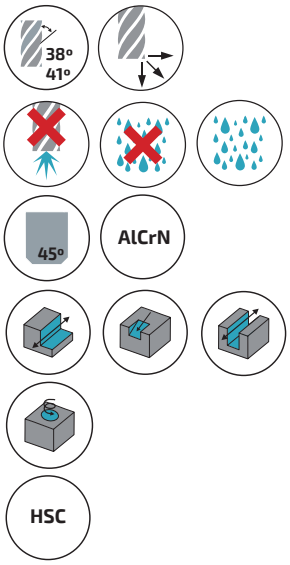


Ref.	d1	d2	d3	l1	l2	l3	ap	€
453030200	3	6	2,8	57	15	8	15 mm	**19,35**
453040200	4	6	3,8	57	17	11	17 mm	**19,35**
453050200	5	6	4,8	57	19	13	19 mm	**19,35**
453060200	6	6	5,8	57	21	13	21 mm	**19,35**
453080200	8	8	7,8	63	27	19	27 mm	**30,40**
453100200	10	10	9,8	72	32	22	32 mm	**43,65**
453120200	12	12	11,8	83	38	26	38 mm	**60,15**
453140200	14	14	13,8	83	38	26	38 mm	**78,30**
453160200	16	16	15,8	92	44	32	44 mm	**96,55**
453180200	18	18	17,8	92	44	32	44 mm	**128,75**
453200200	20	20	19,8	104	54	38	54 mm	**161,90**
453250200	25	25	24,8	121	65	45	65 mm	**286,40**

Condiciones de corte | Cutting data pag. 174

Fresa de 4 labios con hélice variable de 38º/41º para desbaste inoxidable

4 Fluted 38º/41º helix end mill



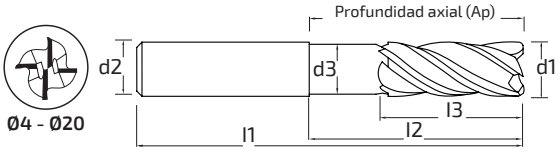
INOX

STEEL ≤ 42 HRC

SUPER ALLOYS

Fresa metal duro de cuatro labios con hélice variable 38º/41º y recubrimiento AlCrN, la hélice en ángulo variable garantiza una gran estabilidad en el mecanizado y un alto rendimiento. Herramienta para inoxidable.

4 Fluted 38º/41º variable helix end mill with AlCrN coating. Realiability and high performance are guaranted during machining. For INOX.



Ref.	d1	d2	d3	l1	l2	l3	ap	€
420040200	4	6	3,8	57	17,0	11	17 mm	**24,95**
420050200	5	6	4,8	57	19,3	13	19 mm	**24,95**
420060200	6	6	5,8	57	21,0	13	21 mm	**24,95**
420080200	8	8	7,8	63	27,0	19	27 mm	**36,00**
420100200	10	10	9,8	72	32,0	22	32 mm	**52,60**
420120200	12	12	11,8	83	38,0	26	38 mm	**68,95**
420140200	14	14	13,8	83	44,0	32	38 mm	**91,30**
420160200	16	16	15,8	92	54,0	38	44 mm	**109,65**
420180200	18	18	17,8	92	65,0	45	44 mm	**181,85**
420200200	20	20	19,8	104	38,0	16	54 mm	**318,95**

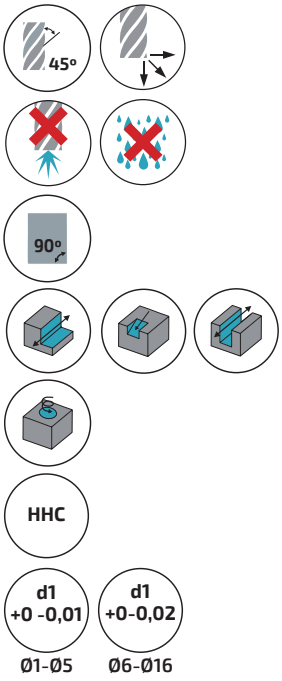
Condiciones de corte | Cutting data pag. 174

FRESAS/ MATERIALES EXÓTICOS

END MILLS/EXOTIC MATERIALS

Fresa metal duro plana de 3 labios para materiales exóticos (0,2 µm)

3 Fluted solid carbide end mill for exotic materials (0,2µm)



NI ALLOYS

TITAN INCONEL

STEEL <65 HRC

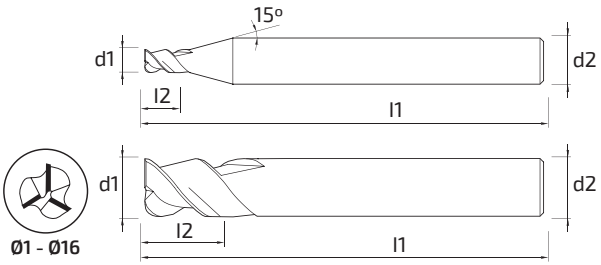
INOX

HG

UNI

Fresa de metal duro plana de 3 labios y hélice de 45º con recubrimiento TiSiN especial para aleaciones de acero, aleaciones con base Ti/Ni, inconel y materiales difíciles de mecanizar. Tiene buena resistencia al desgaste gracias a su recubrimiento PVD con base Si. Proporciona un excelente acabado gracias a los 3 de corte y a la fácil evacuación de viruta. Su geometría con hélice de 45º está diseñada para trabajar a alta velocidad de corte y avance. Ofrece un espectacular rendimiento en el mecanizado a altas velocidades gracias a su grado WC ul 0,2 µm).

3 Fluted 45º hélix solid carbide end mill with TiSiN coating. Recommended for alloy steel, Ti/Ni base alloys, inconel and hard to cut materials. It has good wear resistance by Si-based PVD coating. Excellent work surface finish by 3 flutes and deep chip pocket.45º helix design for high speed, feed condition. Outstanding performance at high speed machining by ultrafine (0,2 µm) WC grade.



Ref.	d1	d2	l1	l2	z	€
388010200	1,0	6	45	2,5	3	**26,55**
388015200	1,5	6	45	4,0	3	**26,55**
388020200	2,0	6	45	5,0	3	**26,55**
388030200	3,0	6	45	8,0	3	**26,55**
388040200	4,0	6	50	10,0	3	**27,85**
388050200	5,0	6	50	12,0	3	**27,85**
388060200	6,0	6	50	12,0	3	**27,85**
388080200	8,0	8	60	19,0	3	**41,05**
388100200	10,0	10	70	22,0	3	**53,10**
388120200	12,0	12	80	26,0	3	**63,10**
388160200	16,0	16	100	36,0	3	**169,20**

Condiciones de corte | Cutting data pag. 174

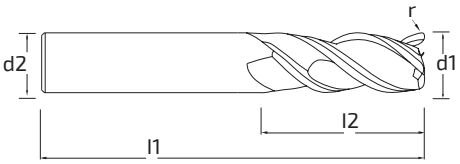
F-468

Fresa metal duro tórica de 3 labios con hélice variable

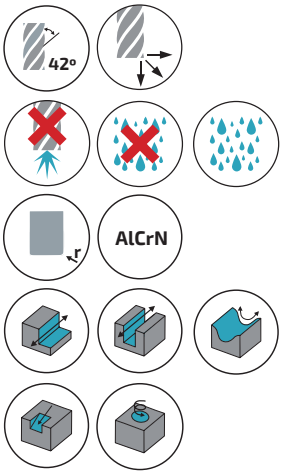
3 Fluted solid carbide corner radius variable helixend mill

Fresa de metal duro tórica de 4 labios y hélice variable con recubrimiento AlCrN especial para aleaciones de acero, aleaciones con base Ti/Ni, INCONEL y materiales difíciles de mecanizar. Mejora la resistencia al desgaste evitando el estrés en el Minimiza las vibraciones gracias a su diseño con indexado irregular.

3 Fluted variable helix solid carbide corner radius end mill with AlCrN coating. Recommended for alloy steel, Ti/Ni base alloys, inconel and hard to cut materials. Improves wear resistance as well as avoids edge stress. Minimizes chattering by unequal flute spacing design.



Ø3 - Ø20



Ø3-Ø20

NI ALLOYS

TITAN INCONEL

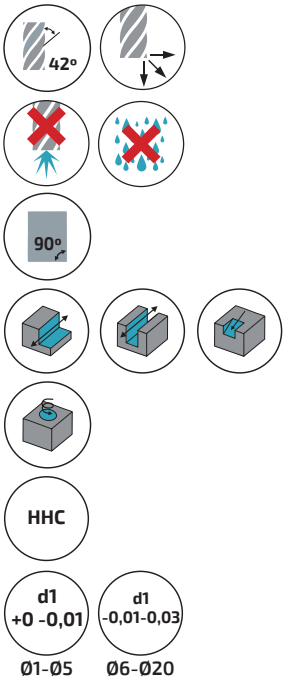
INOX

Ref.	d1	r	d2	l1	l2	€
468030200	3	0,3	6	57	9	37,50
468040200	4	0,3	6	57	12	37,50
468050200	5	0,3	6	57	15	37,50
468060200	6	0,5	6	57	19	37,50
468080200	8	0,5	8	63	20	47,40
468100200	10	0,5	10	72	27	65,35
468120200	12	0,5	12	83	30	83,70
468160200	16	1,0	16	92	38	131,10
468200200	20	1,0	20	104	46	192,65

Condiciones de corte | Cutting data pag. 175

Fresa metal duro plana de 4 labios para materiales exóticos

4 Fluted solid carbide end mill for exotic materials



NI ALLOYS

TITAN INCONEL

STEEL <65 HRC

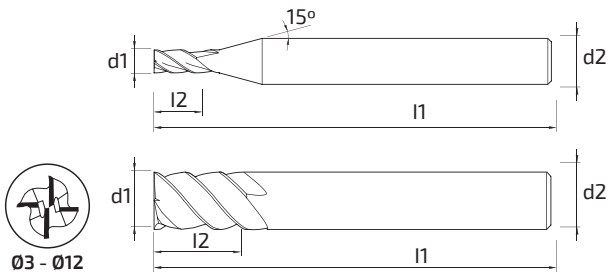
INOX

HG

UNI

Fresa de metal duro plana de 4 labios y hélice de 42º con recubrimiento AlCrN especial para aleaciones de acero, aleaciones con base Ti/Ni, inconel y materiales difíciles de mecanizar. Mejora la resistencia al desgaste evitando el estrés en el Minimiza las vibraciones gracias a su diseño con espacio desigual entre los Proporciona un excelente acabado gracias a los 4 de corte y a la fácil evacuación de viruta.

4 Fluted 42º helix solid carbide end mill with AlCrN coating. Recommended for alloy steel, Ti/Ni base alloys, inconel and hard to cut materials. Improves wear resistance as well as avoids edge stress. Minimizes chattering by unequal flute spacing design. Excellent work surface finish by 4 flutes and deep chip pocket.



Ref.	d1	d2	l1	l2	z	€
488010200	1,0	4	50	1,5	4	25,30
488015200	1,5	4	50	2,5	4	25,30
488020200	2,0	4	50	3,0	4	25,30
488025200	2,5	4	50	3,5	4	25,30
488030200	3,0	6	60	4,5	4	26,95
488040200	4,0	6	60	6,0	4	26,95
488050200	5,0	6	60	7,5	4	27,95
488060200	6,0	6	60	15,0	4	27,95
488080200	8,0	8	70	20,0	4	48,10
488100200	10,0	10	80	25,0	4	68,60
488120200	12,0	12	90	30,0	4	82,30
488160200	16,0	16	100	24,0	4	164,60
488200200	20,0	20	100	30,0	4	233,15

Condiciones de corte | Cutting data pag. 175

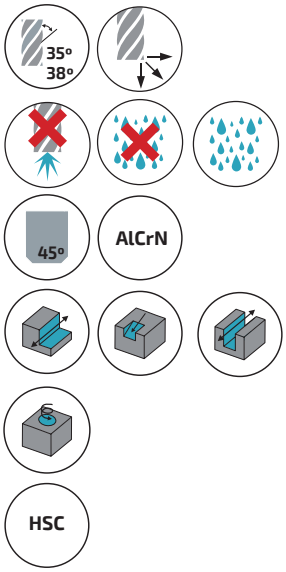
F-408

Fresa metal duro alto rendimiento con doble ángulo de hélice

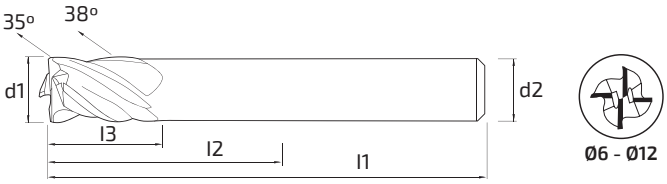
4 Fluted high performance solid carbide end mill with double helix angle

Fresa de metal duro larga de muy alto rendimiento de 4 labios con corte al centro y recubrimiento TiAlN. Ángulo espiral de 35º/38º versión reforzada. Fresa especialmente diseñada para ranurado, contorneado y acabado de materiales exóticos. Permite trabajar con parámetros de corte más altos. La geometría especial conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para materiales hasta 55 HRC.

4 fluted cutting to centre long high performance solid carbide end mill plus TiAlN coating. 35º/38º Spiral angle, reinforced version. Tool specially designed for slotting, contouring and finishing exotic materials. Due to the double helix angle we avoid the vibrations and get extremely high performance. The special geometry together with this coating will help you to get a soft cutting with a very long tool life. Also for universal purpose. For materials up to 55 HRC.



NI ALLOYS
TITAN INCONEL
STEEL <55 HRC
INOX

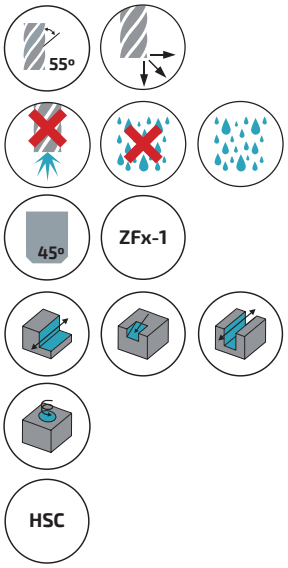


Ref.	d1	d2	l1	l2	l3	z	€
408060200	6	6	57	21	13	4	**35,75**
408080200	8	8	63	37	19	4	**48,15**
408100200	10	10	72	32	22	4	**68,30**
408120200	12	12	83	38	26	4	**85,15**

Condiciones de corte | Cutting data pag. 175

Fresa metal duro 4 labios para materiales exóticos

4 Fluted high performance solid carbide end mill for exotic materials



NI ALLOYS

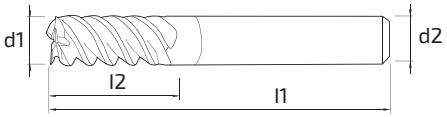
TITAN INCONEL

INOX

Fresa de metal duro de muy alto rendimiento de 4 labios con corte al centro con recubrimiento ZFx1. Ángulo espiral de 55º. Fresa especialmente diseñada para ranurado, contorneado y acabado de materiales exóticos. La geometría positiva conjuntamente con este recubrimiento nos ayudará a tener un corte muy suave y a prolongar la vida del de corte. Herramienta para uso general: para materiales hasta 55 HRC.

4 Fluted cutting to centre high performance solid carbide end mills plus ZFx1 coating. 55º Spiral angle. Tool especially designed for slotting, contouring and finishing of exotic materials. The positive geometry together with this coating will help you to get a soft cutting with a very long tool life.
Also for universal purpose. For materials up to < 55 HRC.

Ø6 - Ø16



Ref.	d1	d2	l1	l2	z	€
407060200	6	6	57	13	4	**40,15**
407080200	8	8	63	19	4	**41,85**
407100200	10	10	72	22	4	**63,60**
407120200	12	12	83	26	4	**73,60**
407160200	16	16	92	32	4	**165,70**

Condiciones de corte | Cutting data pag. 175

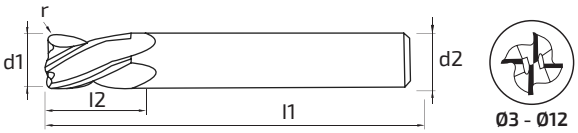
F-479

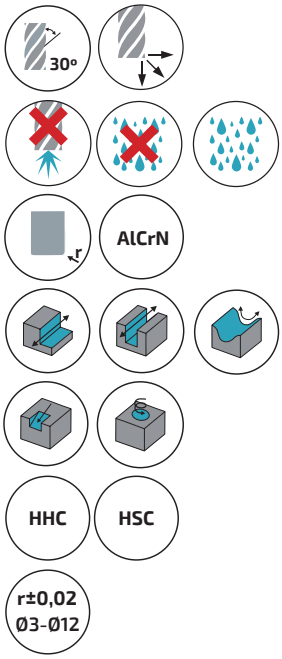
Fresa metal duro tórica de 4 labios para materiales exóticos

4 Fluted solid carbide corner radius end mill for exotic materials

Fresa de metal duro tórica de 4 labios y hélice de 30º con recubrimiento AlTiN especial para aleaciones de acero, aleaciones con base Ti/Ni, INCONEL y materiales difíciles de mecanizar.

4 Fluted 30º helix solid carbide corner radius end mill with AlTiN coating. Recommended for alloy steel, Ti/Ni base alloys, inconel and hard to cut materials.





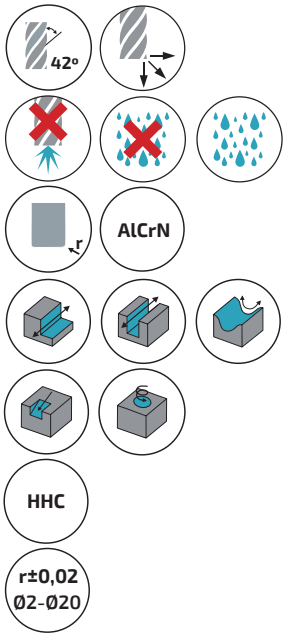
NI ALLOYS
TITAN INCONEL
STEEL <55 HRC
GG
INOX
HG
UNI

Ref.	d1	r	d2	l1	l2	z	€
479030200	3	0,2	4	60	8	4	39,00
479030210	3	0,2	6	60	8	4	37,00
479030220	3	0,5	4	60	8	4	39,00
479030230	3	0,5	6	60	8	4	37,00
479040200	4	0,2	4	70	11	4	39,00
479040210	4	0,2	6	70	11	4	37,00
479040220	4	0,5	4	70	11	4	39,00
479040230	4	0,5	6	70	11	4	37,00
479040240	4	1,0	4	70	11	4	39,00
479040250	4	1,0	6	70	11	4	37,00
479050200	5	0,2	6	80	13	4	41,95
479050210	5	0,5	6	80	13	4	41,95
479050220	5	1,0	6	80	13	4	41,95
479060200	6	0,2	6	90	13	4	47,30
479060210	6	0,5	6	90	13	4	47,30
479060220	6	1,0	6	90	13	4	47,30
479080200	8	0,5	8	100	19	4	58,10
479080210	8	1,0	8	100	19	4	58,10
479080220	8	1,5	8	100	19	4	58,10
479080230	8	2,0	8	100	19	4	58,10
479100200	10	0,5	10	100	22	4	84,15
479100210	10	1,0	10	100	22	4	84,15
479100220	10	1,5	10	100	22	4	84,15
479100230	10	2,0	10	100	22	4	84,15
479100240	10	2,5	10	100	22	4	84,15
479120200	12	0,5	12	110	26	4	100,55
479120210	12	1,0	12	110	26	4	100,55
479120220	12	1,5	12	110	26	4	100,55
479120230	12	2,0	12	110	26	4	100,55
479120240	12	2,5	12	110	26	4	100,55
479120250	12	3,0	12	110	26	4	100,55

Condiciones de corte | Cutting data pag. 178

Fresa metal duro tórica de 4 labios para materiales exóticos

4 Fluted solid carbide corner radius end mill for exotic materials



TITAN INCONEL

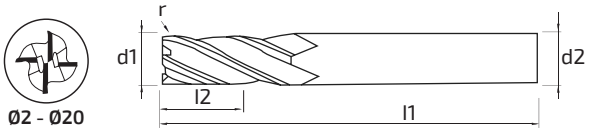
STEEL <55 HRC

INOX

HG

Fresa de metal duro tórica de 4 labios y hélice variable con recubrimiento AlTiN para acero al carbono, aleaciones de acero, inoxidable y materiales difíciles de mecanizar. La hélice variable ofrece alta precisión y excelente calidad superficial y una Ap de 1xD.

4 Fluted variable helix solid carbide corner radius end mill with AlTiN coating. Recommended for carbon steel alloy steel, stainless steel and hard to cut materials. It offers high precision and excellent surface due to variable helix geometry with Ap 1xD.



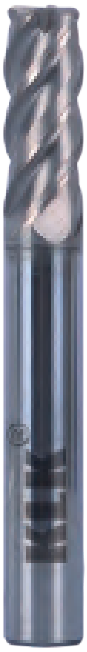
Ref.	d1	r	d2	l1	l2	z	€
477020200	2	0,1	4	45	5	4	34,35
477020210	2	0,2	4	45	5	4	34,35
477030200	3	0,2	6	50	8	4	30,80
477030210	3	0,3	6	50	8	4	30,80
477030220	3	0,5	6	50	8	4	30,80
477040200	4	0,3	6	50	10	4	30,80
477040210	4	0,5	6	50	10	4	30,80
477040220	4	1,0	6	50	10	4	30,80
477050200	5	0,5	6	50	13	4	34,30
477050210	5	1,0	6	50	13	4	34,30
477060200	6	0,5	6	50	13	4	34,30
477060210	6	1,0	6	50	13	4	34,30
477060220	6	1,5	6	50	13	4	34,30
477080200	8	0,5	8	60	19	4	42,60
477080210	8	1,0	8	60	19	4	42,60
477080220	8	1,5	8	60	19	4	42,60
477080230	8	2,0	8	60	19	4	42,60
477100200	10	0,5	10	70	22	4	58,50
477100210	10	1,0	10	70	22	4	58,50
477100220	10	1,5	10	70	22	4	58,50
477100230	10	2,0	10	70	22	4	58,50
477120200	12	0,5	12	75	26	4	78,15
477120210	12	1,0	12	75	26	4	78,15
477120220	12	1,5	12	75	26	4	78,15
477120230	12	2,0	12	75	26	4	78,15
477120240	12	3,0	12	75	26	4	78,15
477160200	16	1,5	16	90	32	4	180,20
477160210	16	2,0	16	90	32	4	180,20
477160220	16	3,0	16	90	32	4	180,20
477200200	20	3,0	20	100	38	4	286,40
477200210	20	4,0	20	100	38	4	300,70
477200220	20	5,0	20	100	38	4	315,75

Condiciones de corte | Cutting data pag. 178 - 179

F-478

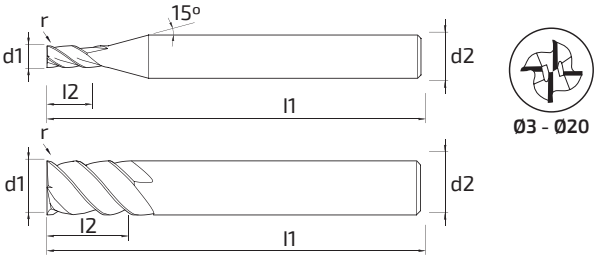
Fresa metal duro tórica de 4 labios para materiales exóticos

4 Fluted solid carbide corner radius end mill for exotic materials

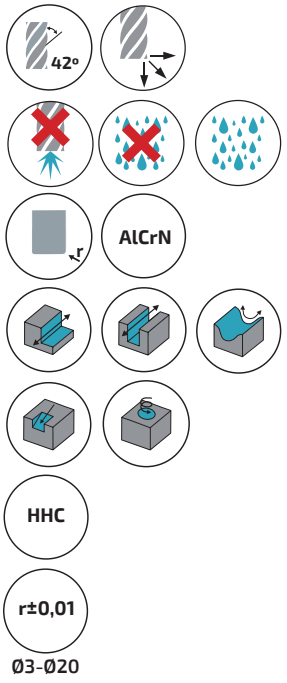


Fresa de metal duro tórica de 4 labios y hélice de 42º con recubrimiento AlCrN especial para aleaciones de acero, aleaciones con base Ti/Ni, INCONEL y materiales difíciles de mecanizar. Mejora la resistencia al desgaste evitando el estrés en el Minimiza las vibraciones gracias a su diseño con espacio desigual entre los

4 Fluted 42º helix solid carbide corner radius end mill with AlCrN coating. Recommended for alloy steel, Ti/Ni base alloys, inconel and hard to cut materials. Improves wear resistance as well as avoids edge stress. Minimizes chattering by unequal flute spacing design.



Ø3 - Ø20



NI ALLOYS

TITAN INCONEL

STEEL <65 HRC

INOX

HG

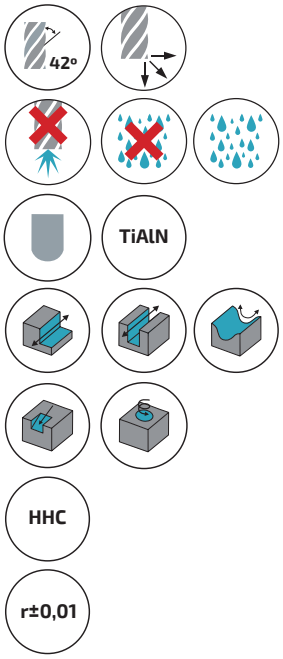
UNI

Ref.	d1	r	d2	l1	l2	z	€
478030200	3	0,2	6	60	10	4	36,95
478040200	4	0,2	6	60	12	4	36,95
478050200	5	0,5	6	60	15	4	36,95
478060200	6	0,5	6	60	15	4	36,95
478060210	6	1,0	6	60	15	4	36,95
478080200	8	0,5	8	80	20	4	55,25
478080210	8	1,0	8	80	20	4	55,25
478100200	10	0,5	10	80	25	4	79,50
478100210	10	1,0	10	80	25	4	79,50
478100220	10	1,5	10	80	25	4	79,50
478100230	10	2,0	10	80	25	4	79,50
478120200	12	0,5	12	100	30	4	96,30
478120210	12	1,0	12	100	30	4	96,30
478120220	12	1,5	12	100	30	4	96,30
478120230	12	2,0	12	100	30	4	96,30
478160200	16	1,0	16	110	42	4	188,55
478200200	20	1,0	20	110	48	4	252,00

Condiciones de corte | Cutting data pag. 176

Fresa metal duro esférica de 2 labios para materiales exóticos

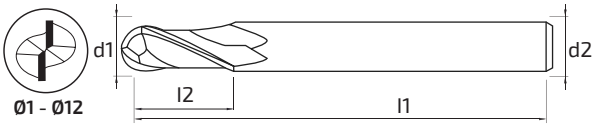
2 Fluted solid carbide ball end mill for exotic materials



NI ALLOYS
TITAN INCONEL
STEEL <55 HRC
INOX
HG

Fresa de metal duro esférica de 2 labios y hélice de 38º con recubrimiento TiAlN especial para aleaciones de acero, aleaciones con base Ti/Ni, inconel y materiales difíciles de mecanizar.

2 Fluted 38º hélix solid carbide ball end mill with TiAlN coating. Recommended for alloy steel, Ti/Ni base alloys, inconel and hard to cut materials.



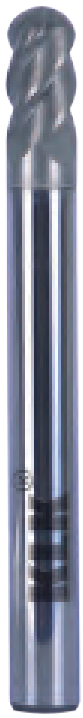
Ref.	d1	d2	l1	l2	z	€
298010200	1	6	50	3	2	32,50
298020200	2	6	50	6	2	32,50
298030200	3	6	50	8	2	32,50
298030210	3	6	70	8	2	33,55
298040200	4	6	50	10	2	33,70
298040210	4	6	70	10	2	34,90
298050200	5	6	50	13	2	35,70
298050210	5	6	80	13	2	37,55
298060200	6	6	50	13	2	35,95
298060210	6	6	90	13	2	37,55
298080200	8	8	60	19	2	49,70
298080210	8	8	100	19	2	55,00
298100200	10	10	70	22	2	55,95
298100210	10	10	100	22	2	70,95
298120200	12	12	75	26	2	82,55
298120210	12	12	110	26	2	94,25

Condiciones de corte | Cutting data pag. 177

F-498

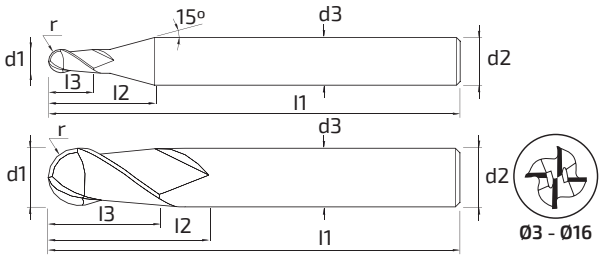
Fresa metal duro esférica de 4 labios para materiales exóticos (0,2µm)

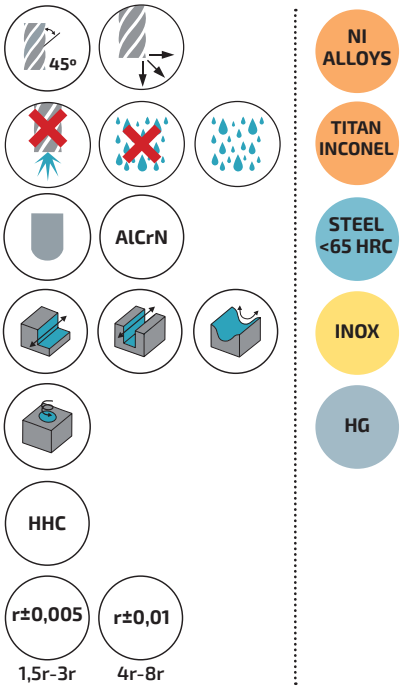
4 Fluted solid carbide ball end mill for exotic materials (0,2µm)



Fresa de metal duro esférica de 4 labios y hélice de 45º con recubrimiento AlCrN especial para aleaciones de acero, aleaciones con base Ti/Ni, inconel y materiales difíciles de mecanizar. Mejora la resistencia al desgaste evitando el estrés en el Proporciona un excelente acabado gracias a los 4 orte y a la fácil evacuación de viruta.

4 Fluted 45º hélix solid carbide ball end mill with AlCrN coating. Recommended for alloy steel, Ti/Ni base alloys, inconel and hard to cut materials. Improves wear resistance as well as avoids edge stress. Excellent work surface finish by 4 flutes and deep chip pocket.



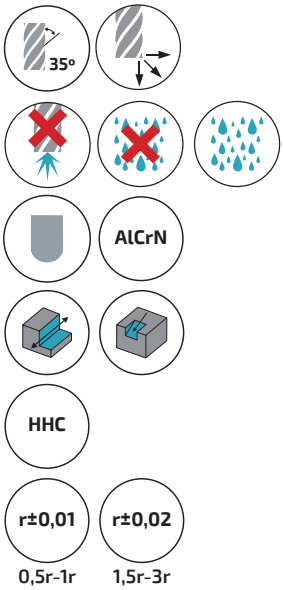


Ref.	d1	r	d2	l1	l2	z	€
498030200	3	1,5	6	60	8	4	**37,55**
498040200	4	2,0	6	70	8	4	**38,85**
498050200	5	2,5	6	80	10	4	**41,55**
498060200	6	3,0	6	90	12	4	**44,50**
498080200	8	4,0	8	100	14	4	**62,70**
498100200	10	5,0	10	100	18	4	**85,60**
498120200	12	6,0	12	110	22	4	**111,90**
498160200	16	8,0	16	130	30	4	**200,75**

Condiciones de corte | Cutting data pag. 177

Fresa metal duro cónica con punta esférica de 3 labios

3 Fluted solid carbide taper ball end mill

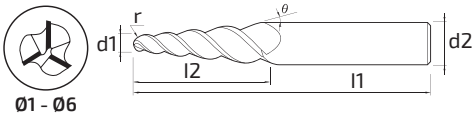


NI ALLOYS

TITAN INCONEL

Fresa de metal duro cónica de 3 labios y hélice de 35º con punta esférica para el mecanizado de inconel aleaciones de Cr/Ni y aleaciones de Al. Indicada para trabajos en máquinas de 3 y 5 ejes del sector aeronáutico, como aspas de turbina, rotores, impulsores y llantas. Mejora la resistencia al desgaste y evita el estrés en el en las diferentes operaciones de mecanizado. Con la misma herramienta se puede hacer desbaste y acabado.

3 Fluted solid carbide taper ball 35º helix end mill for inconel, Al alloys and Cr/Ni alloys. Suitable for special components with 3 axes and 5 axes sector such as impellers, blisks, tire pro and turbine blades. Improves wear resistance as well as avoids edge stress in various applications. Available for simultaneous machining of roughing and with only one tool.



Ref.	d1	r	d2	l1	l2	θ	z	€
591010200	1	0,5	6	60	20	1º	3	64,10
591010210	1	0,5	6	60	20	3º	3	64,10
591010220	1	0,5	6	60	20	5º	3	64,10
591010230	1	0,5	6	60	20	7º	3	64,10
591020200	2	1,0	6	60	20	1º	3	64,10
591020210	2	1,0	6	60	20	3º	3	64,10
591020220	2	1,0	8	75	30	5º	3	84,50
591020230	2	1,0	8	70	25	7º	3	84,50
591030200	3	1,5	6	75	32	1º	3	71,90
591030210	3	1,5	6	80	39	3º	3	77,95
591030220	3	1,5	8	75	30	5º	3	84,50
591030230	3	1,5	10	80	30	7º	3	109,60
591040200	4	2,0	6	75	32	1º	3	71,90
591040210	4	2,0	8	80	32	3º	3	84,50
591040220	4	2,0	10	80	32	5º	3	109,60
591040230	4	2,0	10	80	26	7º	3	104,35
591060200	6	3,0	8	75	32	1º	3	84,50
591060210	6	3,0	10	90	40	3º	3	117,55
591060220	6	3,0	12	80	32	5º	3	128,10
591060230	6	3,0	12	80	27	7º	3	128,10

FRESAS/ GRAFITO

END MILLS/GRAPHITE

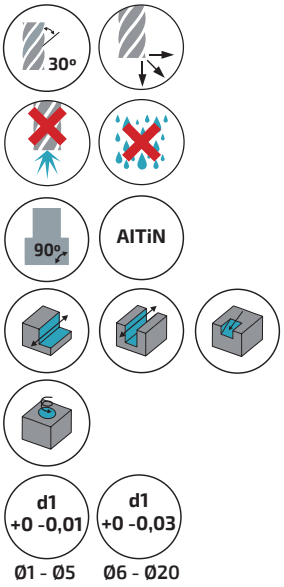
F-702

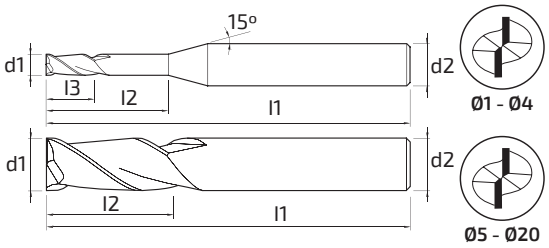
Fresa metal duro 2 labios mango largo para grafito

3 Fluted solid carbide long shank end mill for graphite

Fresa de metal duro de 2 labios y mango largo para varios tipos de materiales, como acero endurecido, acero preendurecido, acero para herramientas y fundición. Ofrece un excelente rendimiento empleando poca fuerza de corte gracias a su recubrimiento AlTiN. El de corte largo está optimizado para el mecanizado de paredes profundas en el Es adecuada para varias aplicaciones de aleaciones de acero hasta 48 HRC por su grado WC ul

2 Fluted solid carbide long shank end mill for various work materials, graphite, hardened steel, pre-hardened steel, tool steel and cast iron. Excellent performance with low cutting force by AlTiN coating. Long length optimized for deep side wall machining of graphite. Applied ultra WC grade optimized for various alloy steels applications up to HRC48.



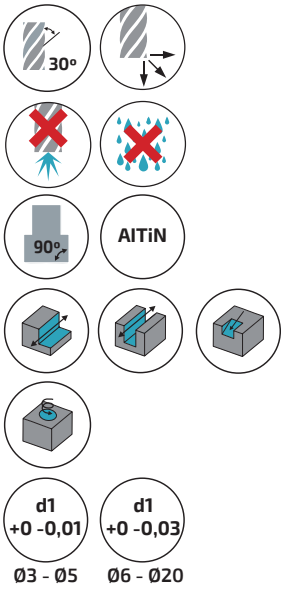


Ref.	d1	d2	l1	l2	l3	z	€
702010200	1,0	4	60	15	5	2	**32,10**
702015200	1,5	4	60	20	8	2	**30,95**
702020200	2,0	4	70	25	10	2	**33,35**
702030200	3,0	4	75	25	15	2	**30,95**
702040200	4,0	6	100	40	20	2	**47,80**
702050200	5,0	5	100	-	25	2	**46,95**
702060200	6,0	6	110	-	30	2	**44,75**
702060210	6,0	6	150	-	30	2	**56,70**
702080200	8,0	8	150	-	40	2	**73,50**
702100200	10,0	10	150	-	45	2	**91,90**
702100210	10,0	10	200	-	50	2	**118,70**
702120200	12,0	12	150	-	60	2	**115,75**
702120210	12,0	12	200	-	60	2	**137,00**
702160200	16,0	16	160	-	70	2	**194,55**
702160210	16,0	16	200	-	70	2	**233,75**
702200200	20,0	20	200	-	90	2	**432,70**
702200210	20,0	20	320	-	120	2	**711,55**

Condiciones de corte | Cutting data pag. 180

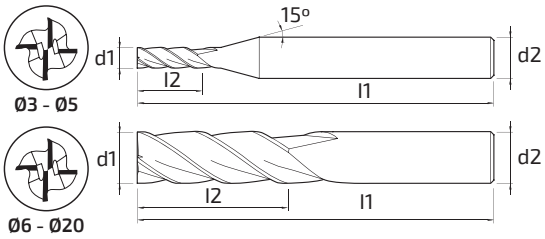
Fresa metal duro 4 labios mango largo para grafito

4 Fluted solid carbide long shank end mill for graphite



Fresa de metal duro de 4 labios y mango largo para varios tipos de materiales, como acero endurecido, acero preendurecido, acero para herramientas y fundición. Ofrece un excelente rendimiento empleando poca fuerza de corte gracias a su recubrimiento AlTiN. El de corte largo está optimizado para el mecanizado de paredes profundas en el Es adecuada para varias aplicaciones de aleaciones de acero hasta 48 HRC por su grado WC ul

4 Fluted solid carbide long shank end mill for various work materials, graphite, hardened steel, pre-hardened steel, tool steel and cast iron. Excellent performance with low cutting force by AlTiN coating. Long flute length optimized for deep side wall machining of graphite. Applied ultra fine WC grade optimized for various alloy steels applications up to HRC48.



Ref.	d1	d2	l1	l2	z	€
704030200	3	6	100	15	4	**47,55**
704040200	4	6	100	20	4	**49,10**
704050200	5	6	100	20	4	**49,10**
704060200	6	6	110	30	4	**47,55**
704060210	6	6	150	30	4	**67,15**
704080200	8	8	150	40	4	**79,10**
704080210	8	8	200	40	4	**88,55**
704100200	10	10	150	50	4	**91,90**
704100210	10	10	200	50	4	**118,70**
704120200	12	12	150	60	4	**115,75**
704120210	12	12	200	60	4	**139,85**
704160200	16	16	160	70	4	**200,50**
704160210	16	16	200	80	4	**233,75**
704200200	20	20	160	75	4	**316,55**
704200210	20	20	200	90	4	**432,70**
704200220	20	20	320	100	4	**711,55**

Condiciones de corte | Cutting data pag. 180

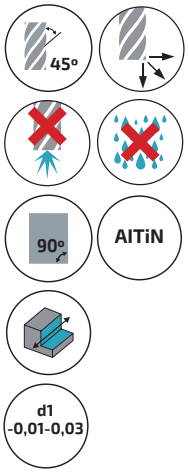
F-706

Fresa metal duro 6 labios mango largo para grafito

6 Fluted solid carbide long shank end mill for graphite

Fresa de metal duro de 6 labios y hélice de 45º con mango largo para varios tipos de materiales, como acero endurecido, acero preendurecido, acero para herramientas y fundición. Ofrece un excelente rendimiento empleando poca fuerza de corte gracias a su recubrimiento AlTiN. El de corte largo está optimizado para el mecanizado de paredes profundas en el Es adecuada para varias aplicaciones de aleaciones de acero hasta 50 HRC por su grado WC ul

6 Fluted 45º helix solid carbide long shank end mill for various work materials, graphite, hardened steel, pre-hardened steel, tool steel and cast iron. Excellent performance with low cutting force by AlTiN coating. Long length optimized for deep side wall machining of graphite. Applied ultra WC grade optimized for various alloy steels applications up to HRC50.

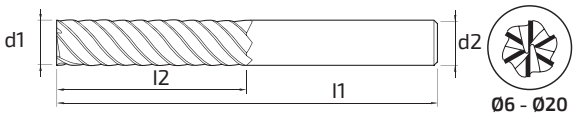


GRAPHITE

STEEL <55 HRC

GG

GGG

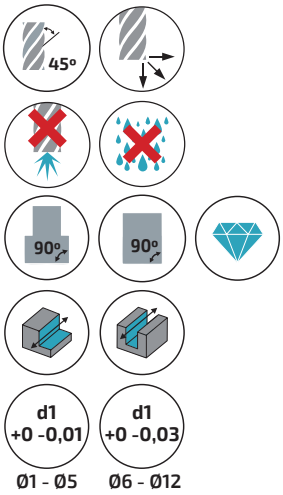


Ref.	d1	d2	l1	l2	z	€
706060200	6	6	110	30	6	**63,35**
706080200	8	8	110	40	6	**105,10**
706100200	10	10	120	50	6	**111,80**
706100210	10	10	150	50	6	**135,25**
706120200	12	12	130	60	6	**119,50**
706120210	12	12	160	60	6	**136,75**
706160200	16	16	200	90	6	**268,40**
706160210	16	16	250	90	6	**464,75**
706200200	20	20	200	100	6	**474,90**
706200210	20	20	250	100	6	**682,50**
706200220	20	20	320	100	6	**784,10**

Condiciones de corte | Cutting data pag. 180

Fresa metal duro 2 labios recubierta de **diamante** para grafito (0,2µm)

2 Fluted solid carbide diamond coated end mill for graphite (0,2µm)



GRAPHITE

ALU <12% SI

COPPER

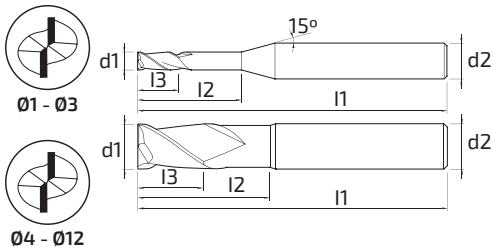
PLASTIC

GFK CFK

GOLD

Fresa de metal duro de 2 labios y hélice de 30º recubierta de diamante para plástico reforzado, de carbono, materiales no férricos y materiales no metálicos. Tiene una excelente resistencia al desgaste gracias a su recubrimiento CVD de diamante. Ofrece además muy buen rendimiento en diferentes operaciones de mecanizado.

2 Fluted 30º helix solid carbide diamond coated end mill for graphite, reinforced plastic, carbon fiber, non-ferrous and non-metallic materials. Excellent wear resistance by applying qualified CVD diamond coating. It also offers very good performance at different machining operations.



Ref.	d1	d2	l1	l2	l3	z	€
712010200	1,0	4	60	15	3	2	**49,35**
712015200	1,5	4	60	15	6	2	**49,35**
712020200	2,0	4	80	15	8	2	**49,35**
712020210	2,0	4	80	30	8	2	**53,20**
712030200	3,0	4	80	20	12	2	**49,35**
712030210	3,0	4	80	30	12	2	**53,20**
712040200	4,0	4	80	-	16	2	**47,70**
712050200	5,0	6	105	-	20	2	**77,15**
712060200	6,0	6	105	-	25	2	**332,95**
712060210	6,0	6	150	-	25	2	**83,75**
712080200	8,0	8	150	40	25	2	**111,40**
712100200	10,0	10	160	50	25	2	**157,90**
712120200	12,0	12	160	60	25	2	**198,00**

Condiciones de corte | Cutting data pag. 180

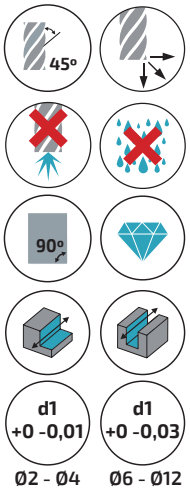
F-716

Fresa metal duro 4 labios recubierta de **diamante** para grafito (0,2µm)

4 Fluted solid carbide diamond coated end mill for graphite (0,2µm)

Fresa de metal duro de 4 labios y hélice de 30º recubierta de diamante para plástico reforzado, de carbono, materiales no férricos y materiales no metálicos. Tiene una excelente resistencia al desgaste gracias a su recubrimiento CVD de diamante. Ofrece además muy buen rendimiento en diferentes operaciones de mecanizado.

4 Fluted 30º helix solid carbide diamond coated end mill for graphite, reinforced plastic, carbon , non-ferrous and non-metallic materials. Excellent wear resistance by applying CVD diamond coating. It also offers very good performance at different machining operations.



GRAPHITE

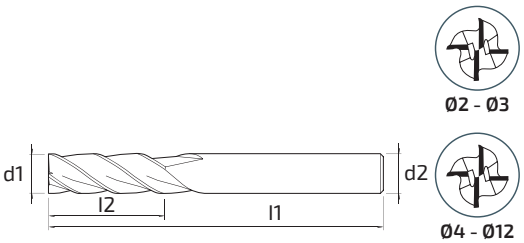
ALU <12% SI

COPPER

PLASTIC

GFK CFK

GOLD

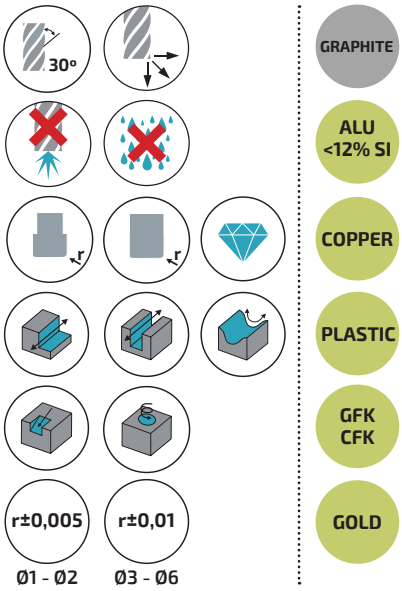


Ref.	d1	d2	l1	l2	z	€
716020200	2	4	60	10	4	**62,55**
716030200	3	4	60	15	4	**62,55**
716040200	4	4	80	20	4	**67,95**
716060200	6	6	105	25	4	**86,30**
716060210	6	6	150	25	4	**98,20**
716080200	8	8	105	35	4	**129,60**
716080210	8	8	150	35	4	**141,30**
716100200	10	10	80	25	4	**168,95**
716100210	10	10	105	40	4	**184,80**
716120200	12	12	80	25	4	**209,95**
716120210	12	12	105	45	4	**231,10**

Condiciones de corte | Cutting data pag. 181

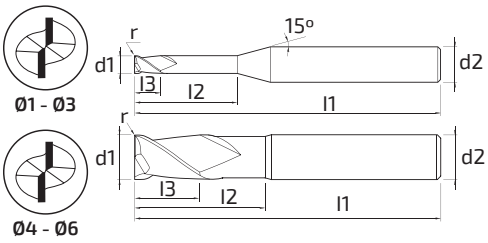
Fresa metal duro 2 labios recubierta de **diamante** para grafito (0,2µm)

2 Fluted solid carbide diamond coated end mill for graphite (0,2µm)



Fresa de metal duro tórica de 2 labios y hélice de 30º recubierta de diamante para plástico reforzado, de carbono, materiales no férricos y materiales no metálicos. Tiene una excelente resistencia al desgaste gracias a su recubrimiento CVD de diamante. Ofrece además muy buen rendimiento en diferentes operaciones de mecanizado.

2 Fluted 30º helix solid carbide diamond coated corner radius end mill for graphite, reinforced plastic, carbon fiber, non-ferrous and non-metallic materials. Excellent wear resistance by applying qualified CVD diamond coating. It also offers very good performance at different machining operations.



Ref.	d1	r	d2	l1	l2	l3	z	€
718010200	1,0	0,05	4	60	10	2,0	2	**64,60**
718010210	1,0	0,05	4	60	20	2,0	2	**67,45**
718010220	1,0	0,10	4	60	10	2,0	2	**64,60**
718010230	1,0	0,10	4	60	20	2,0	2	**67,45**
718010240	1,0	0,20	4	60	10	2,0	2	**64,60**
718010250	1,0	0,20	4	60	20	2,0	2	**67,45**
718015200	1,5	0,05	4	60	10	3,0	2	**67,45**
718015210	1,5	0,05	4	60	20	3,0	2	**70,25**
718015220	1,5	0,10	4	60	10	3,0	2	**67,45**
718015230	1,5	0,10	4	60	20	3,0	2	**70,25**
718015240	1,5	0,15	4	60	10	3,0	2	**67,45**
718015250	1,5	0,15	4	60	20	3,0	2	**70,25**
718015260	1,5	0,20	4	60	10	3,0	2	**67,45**
718015270	1,5	0,20	4	60	20	3,0	2	**70,25**
718015280	1,5	0,30	4	60	10	3,0	2	**67,45**
718015290	1,5	0,30	4	60	20	3,0	2	**70,25**
718020200	2,0	0,05	4	60	18	3,5	2	**67,45**
718020210	2,0	0,05	4	60	25	3,5	2	**70,25**
718020220	2,0	0,20	4	60	18	3,5	2	**67,45**
718020230	2,0	0,20	4	60	25	3,5	2	**70,25**
718020240	2,0	0,30	4	60	18	3,5	2	**67,45**
718020250	2,0	0,30	4	60	25	3,5	2	**70,25**
718020260	2,0	0,50	4	60	18	3,5	2	**67,45**

Ref.	d1	r	d2	l1	l2	l3	z	€
718020270	2	0,50	4	60	25	3,5	2	**70,25**
718030200	3	0,05	4	80	20	4,0	2	**70,55**
718030210	3	0,05	4	80	30	4,0	2	**73,70**
718030220	3	0,20	4	80	20	4,0	2	**70,55**
718030230	3	0,20	4	80	30	4,0	2	**73,70**
718030240	3	0,30	4	80	20	4,0	2	**70,55**
718030250	3	0,30	4	80	30	4,0	2	**73,70**
718030260	3	0,50	4	80	20	4,0	2	**70,55**
718030270	3	0,50	4	80	30	4,0	2	**73,70**
718030280	3	1,00	4	80	20	4,0	2	**70,55**
718030290	3	1,00	4	80	30	4,0	2	**73,70**
718040200	4	0,05	4	80	25	5,0	2	**73,20**
718040210	4	0,20	4	80	25	5,0	2	**73,20**
718040220	4	0,50	4	80	25	5,0	2	**73,20**
718040230	4	1,00	4	80	25	5,0	2	**73,20**
718050200	5	0,05	6	105	30	6,0	2	**97,00**
718050210	5	0,20	6	105	30	6,0	2	**97,00**
718050220	5	0,50	6	105	30	6,0	2	**97,00**
718060200	6	0,05	6	105	30	7,0	2	**97,00**
718060210	6	0,20	6	105	30	7,0	2	**97,00**
718060220	6	0,50	6	105	30	7,0	2	**97,00**
718060230	6	1,00	6	105	30	7,0	2	**97,00**

Condiciones de corte | Cutting data pag. 181

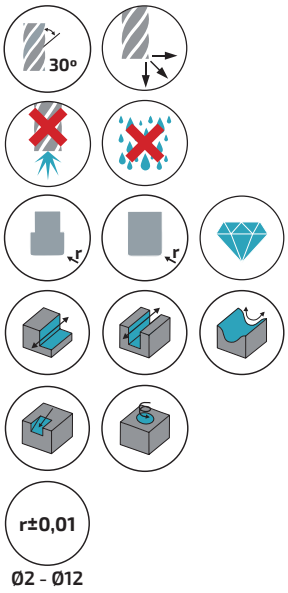
F-724

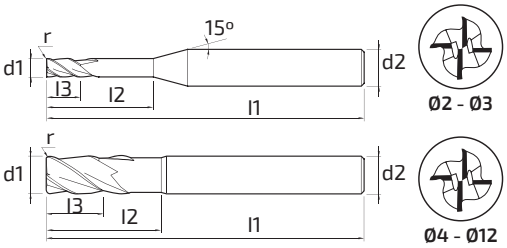
Fresa metal duro 4 labios tórica recubierta de diamante para grafito (0,2µm)

4 Fluted solid carbide diamond coated corner radius end mill for graphite (0,2µm)

Fresa de metal duro tórica de 4 labios y hélice de 30º recubierta de diamante para plástico reforzado, de carbono, materiales no férricos y materiales no metálicos. Tiene una excelente resistencia al desgaste gracias a su recubrimiento CVD de diamante. Ofrece además muy buen rendimiento en diferentes operaciones de mecanizado.

4 Fluted 30º helix solid carbide diamond coated corner radius end mill for graphite, reinforced plastic, carbon , non-ferrous and non-metallic materials. Excellent wear resistance by applying CVD diamond coating. It also offers very good performance at different machining operations.



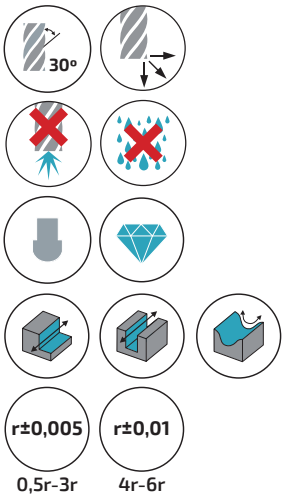


Ref.	d1	r	d2	l1	l2	l3	z	€
724020200	2	0,05	4	60	18	3,5	4	**74,20**
724020210	2	0,20	4	60	18	3,5	4	**74,20**
724020220	2	0,30	4	60	18	3,5	4	**74,20**
724020230	2	0,50	4	60	18	3,5	4	**74,20**
724030200	3	0,05	4	80	20	4,0	4	**77,55**
724030210	3	0,20	4	80	20	4,0	4	**77,55**
724030220	3	0,30	4	80	20	4,0	4	**77,55**
724030230	3	0,50	4	80	20	4,0	4	**77,55**
724030240	3	1,00	4	80	20	4,0	4	**77,55**
724040200	4	0,50	4	100	20	6,0	4	**81,40**
724040210	4	1,00	4	100	20	6,0	4	**81,40**
724060200	6	0,50	6	105	25	9,0	4	**102,05**
724060210	6	1,00	6	105	25	9,0	4	**102,05**
724080200	8	0,50	8	105	30	12,0	4	**139,35**
724080210	8	1,00	8	105	30	12,0	4	**139,35**
724100200	10	0,50	10	105	35	15,0	4	**187,65**
724100210	10	1,00	10	105	35	15,0	4	**187,65**
724120200	12	0,50	12	105	40	18,0	4	**229,55**
724120210	12	1,00	12	105	40	18,0	4	**229,55**

Condiciones de corte | Cutting data pag. 181

Fresa metal duro 4 labios esférica recubierta de **diamante** para grafito (0,2µm)

4 Fluted solid carbide diamond coated ball end mill for graphite (0,2µm)



GRAPHITE

ALU <12% SI

COPPER

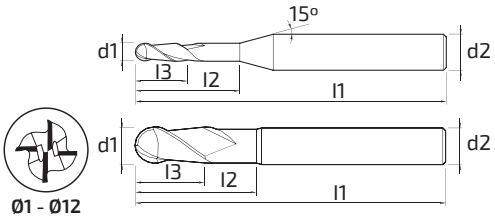
PLASTIC

GFK CFK

GOLD

Fresa de metal duro esférica de 4 labios y hélice de 30º recubierta de diamante para grafito, plástico reforzado, fibra de carbono, materiales no férricos y materiales no metálicos. Tiene una excelente resistencia al desgaste gracias a su recubrimiento CVD de diamante. Ofrece además muy buen rendimiento en diferentes operaciones de mecanizado.

4 Fluted 30º helix solid carbide diamond coated ball end mill for graphite, reinforced plastic, carbon fiber, non-ferrous and non-metallic materials. Excellent wear resistance by applying qualified CVD diamond coating. It also offers very good performance at different machining operations.



Ref.	d1	d2	r	l1	l2	l3	z	€
714010200	1,0	4	0,50	60	15	3	4	**57,05**
714015200	1,5	4	0,75	60	15	5	4	**57,05**
714020200	2,0	4	1,00	80	20	6	4	**56,30**
714030200	3,0	4	1,50	100	20	8	4	**60,90**
714040200	4,0	4	2,00	100	-	16	4	**65,75**
714060200	6,0	6	3,00	105	25	16	4	**79,20**
714080200	8,0	8	4,00	105	30	20	4	**97,00**
714080210	8,0	8	4,00	150	35	20	4	**113,15**
714120200	12,0	12	6,00	160	50	25	4	**203,80**

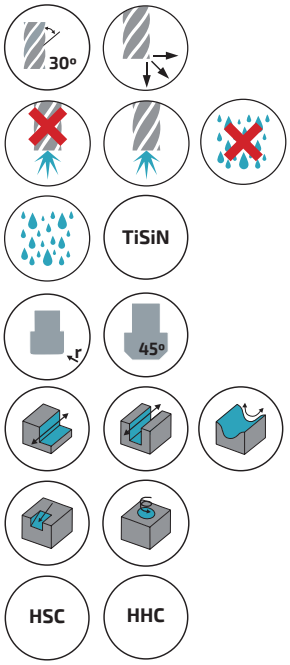
Condiciones de corte | Cutting data pag. 181

FRESAS/ OTRAS APLICACIONES

END MILLS/OTHER APPLICATIONS

Fresa de metal duro alto rendimiento <65HRC

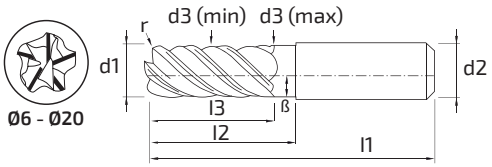
HIgh performance solid carbide end mill <65 HRC



STEEL <65 HRC
INOX
GG
GGG
NI ALLOYS
TITAN INCONEL
HG
UNI

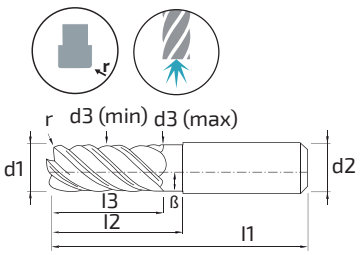
Fresa de metal duro alto rendimiento de 5 labios con recubrimiento TiSiN. Está especialmente diseñada para un alto avance en operaciones de contorneado. Los tres ángulos distintos de la hélice permiten mecanizar contorneando con toda la longitud útil de corte de la herramienta.
Esta herramienta está disponible con radio o ambas con o sin refrigeración interna.

5 Fluted high performance solid carbide end mill with TiSiN coating. Specially designed for high feed rates in contouring operations. 3 Different helix angle allow to make a good use of the whole cutting lenght of the tool.
This tool is available with radius or bevel, both with or without internal coolant.



Con radio sin refrigeración interna

Ref.	d1	r	d2	l1	l2	l3	ß	d3 (min)	d3 (max)	z	€
555060200	6	0,5	6	53,0	14	-	-	-	-	5	**38,40**
555060210	6	0,5	6	65,0	32	14	1º	5,4	5,8	5	**44,50**
555060220	6	0,5	6	65,0	42	14	1º	5,0	5,8	5	**46,75**
555060230	6	0,5	6	81,5	51	14	1º	4,7	5,8	5	**53,15**
555080200	8	0,5	8	53,0	18	18	-	-	-	5	**49,95**
555080210	8	0,5	8	65,0	42	18	1º	7,2	7,8	5	**53,75**
555080220	8	0,5	8	81,5	58	18	1º	6,6	7,8	5	**61,30**
555080230	8	0,5	8	109,0	71	18	1º	6,1	7,8	5	**70,30**
555100200	10	0,5	10	65,0	22	22	-	-	-	5	**65,15**
555100210	10	0,5	10	81,5	51	22	1º	9,0	9,8	5	**73,50**
555100220	10	0,5	10	109,0	71	22	1º	8,3	9,8	5	**86,90**
555100230	10	0,5	10	109,0	82	22	1º	7,9	9,8	5	**88,25**
555120200	12	1,0	12	81,5	26	26	-	-	-	5	**107,00**
555120210	12	1,0	12	81,5	51	26	1º	11,1	11,8	5	**115,45**
555120220	12	1,0	12	109,0	71	26	1º	10,4	11,8	5	**134,30**
555120230	12	1,0	12	109,0	86	26	1º	9,9	11,8	5	**136,35**
555160200	16	2,0	16	81,5	38	38	-	-	-	5	**147,45**
555160210	16	2,0	16	109,0	61	38	1º	15,2	15,8	5	**163,70**
555160220	16	2,0	16	109,0	76	38	1º	14,7	15,8	5	**166,20**
555160230	16	2,0	16	150,0	101	38	1º	13,8	15,8	5	**230,30**
555200200	20	2,0	20	100,0	45	45	-	-	-	5	**222,30**
555200210	20	2,0	20	109,0	71	45	1º	19,1	19,8	5	**245,95**
555200220	20	2,0	20	130,0	86	45	1º	18,6	19,8	5	**263,35**
555200230	20	2,0	20	150,0	101	45	1º	18,0	19,8	5	**342,10**

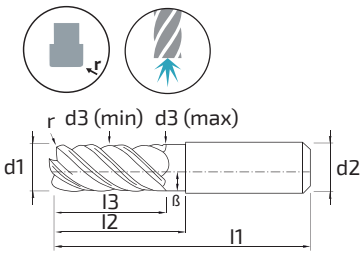


Condiciones de corte | Cutting data pag. 182 - 183

F-555

Con radio con refrigeración interna

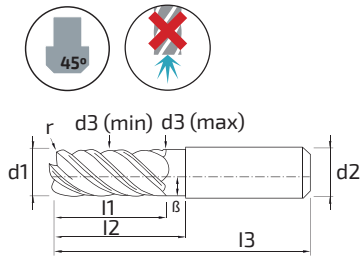
Ref.	d1	r	d2	l1	l2	l3	ß	d3 (min)	d3 (max)	z	€
555060205	6	0,5	6	53,0	14	14	-	-	-	4	46,40
555060215	6	0,5	6	65,0	32	14	1º	5,4	5,8	5	54,75
555060225	6	0,5	6	65,0	42	14	1º	5,0	5,8	5	57,05
555060235	6	0,5	6	81,5	51	14	1º	4,7	5,8	5	63,10
555080205	8	0,5	8	53,0	18	18	-	-	-	4	60,25
555080215	8	0,5	8	65,0	42	18	1º	7,2	7,8	5	67,45
555080225	8	0,5	8	81,5	58	18	1º	6,6	7,8	5	75,00
555080235	8	0,5	8	109,0	71	18	1º	6,1	7,8	5	84,00
555100205	10	0,5	10	65,0	22	22	-	-	-	5	81,15
555100215	10	0,5	10	81,5	51	22	1º	9,0	9,8	5	89,50
555100225	10	0,5	10	109,0	71	22	1º	8,3	9,8	5	108,60
555100235	10	0,5	10	109,0	82	22	1º	7,9	9,8	5	109,95
555120205	12	1,0	12	81,5	26	26	-	-	-	5	128,70
555120215	12	1,0	12	81,5	51	26	1º	11,1	11,8	5	137,15
555120225	12	1,0	12	109,0	71	26	1º	10,4	11,8	5	161,75
555120235	12	1,0	12	109,0	86	26	1º	9,9	11,8	5	163,80
555160205	16	2,0	16	81,5	38	38	-	-	-	5	176,00
555160215	16	2,0	16	109,0	61	38	1º	15,2	15,8	5	201,40
555160225	16	2,0	16	109,0	76	38	1º	14,7	15,8	5	203,90
555160235	16	2,0	16	150,0	101	38	1º	13,8	15,8	5	268,00
555200205	20	2,0	20	100,0	45	45	-	-	-	5	264,50
555200215	20	2,0	20	109,0	71	45	1º	19,1	19,8	5	302,55
555200225	20	2,0	20	130,0	86	45	1º	18,6	19,8	5	323,90
555200235	20	2,0	20	150,0	101	45	1º	18,0	19,8	5	396,80



Condiciones de corte | Cutting data pag. 182 - 183

Con chaflán sin refrigeración interna

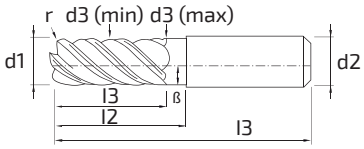
Ref.	d1	r	d2	l1	l2	l3	ß	d3 (min)	d3 (max)	z	€
555060300	6	0,10	6	53,0	14	14	-	-	-	4	32,70
555060310	6	0,10	6	65,0	32	14	1º	5,4	5,8	5	37,85
555060320	6	0,10	6	65,0	42	14	1º	5,0	5,8	5	39,80
555060330	6	0,10	6	81,5	51	14	1º	4,7	5,8	5	45,15
555080300	8	0,10	8	53,0	18	18	-	-	-	4	42,50
555080310	8	0,10	8	65,0	42	18	1º	7,2	7,8	5	45,75
555080320	8	0,10	8	81,5	58	18	1º	6,6	7,8	5	52,15
555080330	8	0,10	8	109,0	71	18	1º	6,1	7,8	5	59,90
555100300	10	0,15	10	65,0	22	22	-	-	-	5	55,45
555100310	10	0,15	10	81,5	51	22	1º	9,0	9,8	5	62,55
555100320	10	0,15	10	109,0	71	22	1º	8,3	9,8	5	73,85
555100330	10	0,15	10	109,0	82	22	1º	7,9	9,8	5	75,10
555120300	12	0,20	12	81,5	26	26	-	-	-	5	91,00
555120310	12	0,20	12	81,5	51	26	1º	11,1	11,8	5	98,20
555120320	12	0,20	12	109,0	71	26	1º	10,4	11,8	5	114,25
555120330	12	0,20	12	109,0	86	26	1º	9,9	11,8	5	120,00
555160300	16	0,20	16	81,5	38	38	-	-	-	5	125,35
555160310	16	0,20	16	109,0	61	38	1º	15,2	15,8	5	139,20
555160320	16	0,20	16	109,0	76	38	1º	14,7	15,8	5	141,30
555160330	16	0,20	16	150,0	101	38	1º	13,8	15,8	5	195,80
555200300	20	0,30	20	100,0	45	45	-	-	-	5	189,95
555200310	20	0,30	20	109,0	71	45	1º	19,1	19,8	5	210,20
555200320	20	0,30	20	130,0	86	45	1º	18,6	19,8	5	225,05
555200330	20	0,30	20	150,0	101	45	1º	18,0	19,8	5	292,35



Condiciones de corte | Cutting data pag. 182 - 183

Con radio con refrigeración interna

Ref.	d1	r	d2	l1	l2	l3	ß	d3 (min)	d3 (max)	z	€
555060305	6	0,10	6	53,0	14	14	-	-	-	4	**39,45**
555060315	6	0,10	6	65,0	32	14	1º	5,4	5,8	5	**46,55**
555060325	6	0,10	6	65,0	42	14	1º	5,0	5,8	5	**48,50**
555060335	6	0,10	6	81,5	51	14	1º	4,7	5,8	5	**53,95**
555080305	8	0,10	8	53,0	18	18	-	-	-	4	**51,20**
555080315	8	0,10	8	65,0	42	18	1º	7,2	7,8	5	**57,30**
555080325	8	0,10	8	81,5	58	18	1º	6,6	7,8	5	**63,70**
555080335	8	0,10	8	109,0	71	18	1º	6,1	7,8	5	**71,45**
555100305	10	0,15	10	65,0	22	22	-	-	-	5	**69,15**
555100315	10	0,15	10	81,5	51	22	1º	9,0	9,8	5	**76,25**
555100325	10	0,15	10	109,0	71	22	1º	8,3	9,8	5	**92,30**
555100335	10	0,15	10	109,0	82	22	1º	7,9	9,8	5	**93,75**
555120305	12	0,20	12	81,5	26	26	-	-	-	5	**109,50**
555120315	12	0,20	12	81,5	51	26	1º	11,1	11,8	5	**116,60**
555120325	12	0,20	12	109,0	71	26	1º	10,4	11,8	5	**137,50**
555120335	12	0,20	12	109,0	86	26	1º	9,9	11,8	5	**139,35**
555160305	16	0,20	16	81,5	38	38	-	-	-	5	**149,60**
555160315	16	0,20	16	109,0	61	38	1º	15,2	15,8	5	**171,20**
555160325	16	0,20	16	109,0	76	38	1º	14,7	15,8	5	**173,40**
555160335	16	0,20	16	150,0	101	38	1º	13,8	15,8	5	**227,90**
555200305	20	0,30	20	100,0	45	45	-	-	-	5	**225,95**
555200315	20	0,30	20	109,0	71	45	1º	19,1	19,8	5	**258,55**
555200325	20	0,30	20	130,0	86	45	1º	18,6	19,8	5	**276,80**
555200335	20	0,30	20	150,0	101	45	1º	18,0	19,8	5	**339,10**



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F-552

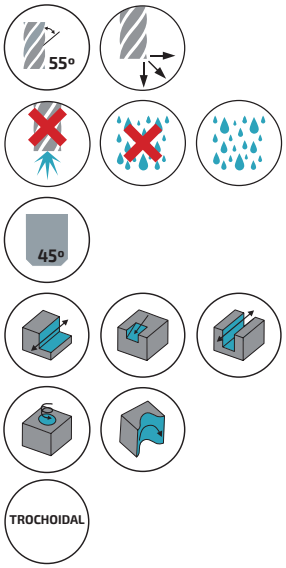
Trocoidal
Trochoidal

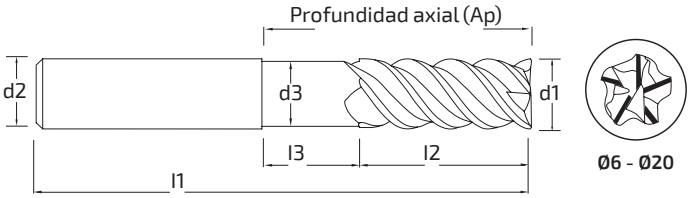
Fresa metal duro 5 labios con rompevirutas para mecanizado trocoidal

5 Fluted solid carbide end mill with chipbreaker for trochoidal milling

Fresa metal duro de 5 labios, diseñada para el mecanizado trocoidal. Sus 5 labios nos permiten alcanzar condiciones de corte elevadas, garantizando un alto rendimiento.

5 Fluted solid carbide end mill with chipbreakers for trochoidal milling. Its 5 flutes allow us to achieve high cutting conditions, which guarantees high performance.



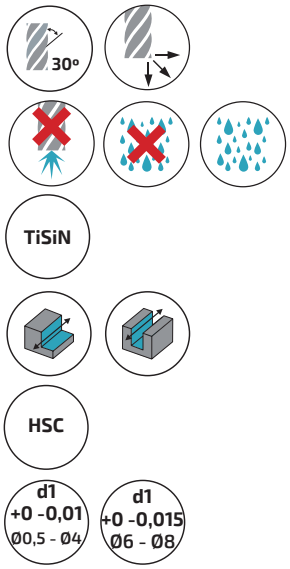


Ref.	d1	d2	d3	l1	l2	l3	ap	€
552060200	6	6	5,8	62	18	7	25 mm	**41,00**
552080200	8	6	7,6	68	24	6	30 mm	**57,75**
552100200	10	6	9,5	80	30	5	35 mm	**73,95**
552120200	12	8	11,5	93	36	9	45 mm	**105,00**
552160200	16	10	15,5	108	48	7	55 mm	**141,55**
552200200	20	12	19,5	126	60	10	70 mm	**290,35**

Condiciones de corte | Cutting data pag. 183

Fresa metal duro cónica de 2 labios (0,2µm)

2 Fluted solid carbide taper end mill (0,2µm)

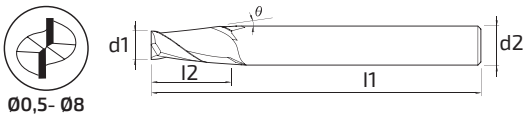


STEEL <55 HRC

INOX

Fresa de metal duro cónica de 2 labios y hélice de 30º recubierta de TiSiN para el mecanizado de acero preendurecido y acero endurecido hasta 50 HRC. Ofrece buena resistencia al desgaste gracias a su recubrimiento PVD con base Si. Tiene tolerancia en el de alta precisión y deja muy buen acabado Espectacular rendimiento en el mecanizado a altas velocidades gracias a su grado WC ul 0,2 µm).

2 Fluted 30º helix solid carbide taper end mill with TiSiN coating for pre-hardened steel and hardened steel up to HRC 50. Good wear resistance by Si-based PVD coating. High precise edge tolerance and very nice work surface Outstanding performance at high speed machining by ul 0,2 µm) WC grade.



Condiciones de corte | Cutting data pag. 184

Ref.	d1	d2	l1	l2	θ	z	€
595005200	0,5	4	40	2,0	1º	2	36,80
595005210	0,5	4	40	2,0	3º	2	36,80
595005220	0,5	4	40	2,0	5º	2	36,80
595005230	0,5	4	40	2,5	7º	2	36,80
595010200	1,0	4	45	4,0	1º	2	36,80
595010210	1,0	4	45	4,0	3º	2	36,80
595010220	1,0	4	45	4,0	5º	2	36,80
595010230	1,0	4	45	4,0	7º	2	36,80
595015200	1,5	4	45	5,0	1º	2	36,80
595015210	1,5	4	45	8,0	3º	2	36,80
595015220	1,5	4	50	10,0	5º	2	36,80
595015230	1,5	4	50	10,0	7º	2	36,80
595020200	2,0	4	45	6,0	1º	2	36,80
595020210	2,0	4	50	10,0	3º	2	36,80
595020220	2,0	4	50	10,0	5º	2	36,80
595020230	2,0	6	50	10,0	7º	2	40,15
595025200	2,5	6	50	10,0	1º	2	40,15
595025210	2,5	6	50	12,0	3º	2	40,15
595025220	2,5	6	50	12,0	5º	2	40,15
595025230	2,5	6	50	12,0	7º	2	40,15
595030200	3,0	6	50	12,0	1º	2	40,15
595030210	3,0	6	50	12,0	3º	2	40,15
595030220	3,0	6	50	12,0	5º	2	40,15
595030230	3,0	6	50	12,0	7º	2	40,15
595040200	4,0	6	60	15,0	1º	2	43,20
595040210	4,0	6	60	18,0	3º	2	43,20
595040220	4,0	8	65	23,0	5º	2	65,00
595060200	6,0	8	65	20,0	1º	2	61,00
595060210	6,0	8	65	19,0	3º	2	61,00
595060220	6,0	10	75	23,0	5º	2	65,00
595060230	6,0	12	75	24,0	7º	2	98,70
595080200	8,0	10	90	35,0	1º	2	72,30
595080210	8,0	12	90	35,0	3º	2	98,70
595080220	8,0	16	100	45,0	5º	2	171,35
595080230	8,0	16	90	32,0	7º	2	153,95

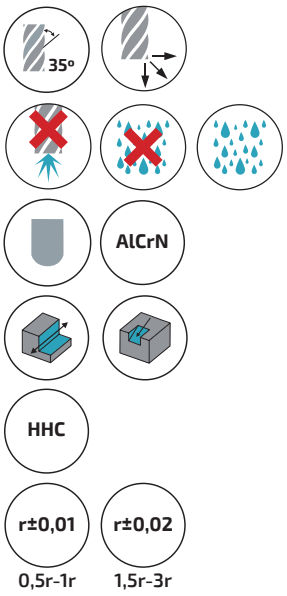
F-590

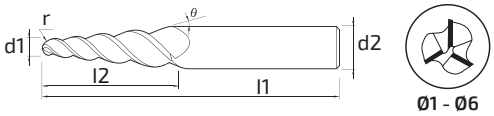
Fresa metal duro cónica con punta esférica de 3 labios

3 Fluted solid carbide taper ball end mill

Fresa de metal duro cónica de 3 labios y hélice de 35º con punta esférica recubierta de AlCrN para el mecanizado de acero preendurecido, fundición y materiales no metálicos. Indicada para trabajos en máquinas de 3 y 5 ejes del sector aeronáutico, como aspas de turbina, rotores, impulsores y llantas. Mejora la resistencia al desgaste y evita el estrés en el en las diferentes operaciones de mecanizado. Con la misma herramienta se puede hacer desbaste y acabado.

3 Fluted solid carbide taper ball 35º helix end mill with AlCrN coating for pre-hardened steel, cast iron and non-metallic materials. Suitable for special components with 3 axes and 5 axes sector such as impellers, blisks, tire profiles and turbine blades. Improves wear resistance as well as avoids edge stress in various applications. Available for simultaneous machining of roughing and finishing with only one tool.





STEEL <55 HRC

GG

GGG

ALU <12% SI

COPPER

PLASTIC

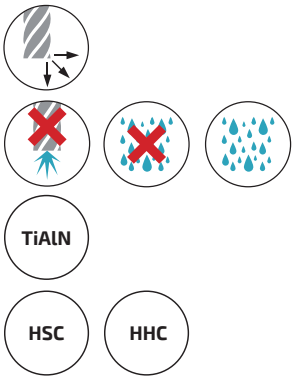
GFK CFK

GOLD

Ref.	d1	r	d2	l1	l2	θ	z	€
590010200	1	0,5	6	60	20	1º	3	64,10
590010210	1	0,5	6	60	20	3º	3	64,10
590010220	1	0,5	6	60	20	5º	3	64,10
590010230	1	0,5	6	60	20	7º	3	64,10
590020200	2	1,0	6	60	20	1º	3	64,10
590020210	2	1,0	6	60	20	3º	3	64,10
590020220	2	1,0	8	75	30	5º	3	84,50
590020230	2	1,0	8	70	25	7º	3	84,50
590030200	3	1,5	6	75	32	1º	3	71,90
590030210	3	1,5	8	80	39	3º	3	77,95
590030220	3	1,5	8	75	30	5º	3	84,50
590030230	3	1,5	10	80	30	7º	3	109,60
590040200	4	4,0	6	75	32	1º	3	71,90
590040210	4	4,0	8	80	32	3º	3	84,50
590040220	4	4,0	10	80	32	5º	3	109,60
590040230	4	4,0	10	80	26	7º	3	104,35
590060200	6	3,0	8	75	32	1º	3	84,50
590060210	6	3,0	10	90	40	3º	3	117,55
590060220	6	3,0	12	80	32	5º	3	128,10
590060230	6	3,0	12	80	27	7º	3	128,10

Chaflanador metal duro 60° HSC < 65 HRC

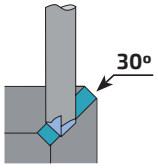
60º HSC Solid carbide beveling end mill < 65 HRC

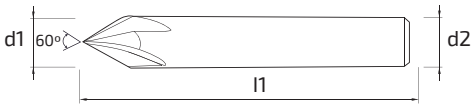


STEEL <65 HRC
INOX
GG
GGG
ALU <12% SI
COPPER
NI ALLOYS
TITAN INCONEL
UNI

de metal duro 60º con mango cilíndrico (mirar dibujo adjunto), para obtener a 30º. Adecuada para el mecanizado a alta velocidad (HSC). Apta para uso general y para materiales hasta 65 HRC.

60º Solid carbide beveling end mill with cylindrical shank (see attached drawing) to get 30º chamfers. Suitable for HSC machining. For general use and materials up to 65 HRC.





Ref.	d1	d2	l1	Z	€
460040200	4	4	54	4	**23,45**
460060200	6	6	57	4	**26,80**
460080200	8	8	63	5	**33,50**
460100200	10	10	72	6	**40,20**
460120200	12	12	83	6	**58,60**
460160200	16	16	92	6	**93,70**

Condiciones de corte | Cutting data pag. 184

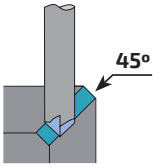
F-490

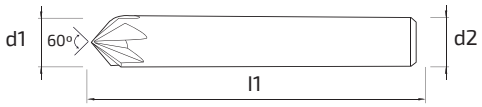
Chaflanador metal duro 90º HSC < 65HRC

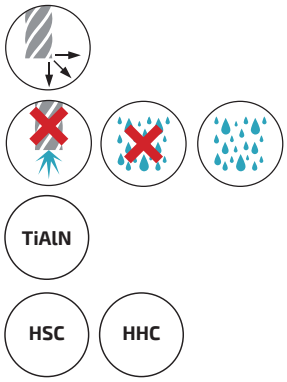
90º HSC Solid carbide beveling end mill < 65 HRC

de metal duro 90º con mango cilíndrico (mirar dibujo adjunto), para obtener a 45º. Adecuada para el mecanizado a alta velocidad (HSC). Apta para uso general y para materiales hasta 65 HRC.

90º Solid carbide beveling end mill with cylindrical shank (see attached drawing) to get 45º chamfers. Suitable for HSC machining. For general use and materials up to 65 HRC.







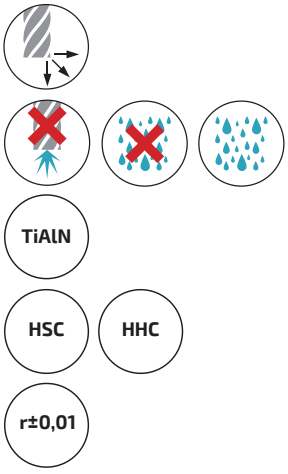
STEEL <65 HRC
INOX
GG
GGG
ALU <12% SI
COPPER
NI ALLOYS
TITAN INCONEL
UNI

Ref.	d1	d2	l1	z	€
490040200	4	4	54	4	23,45
490060200	6	6	57	4	26,80
490080200	8	8	63	4	33,50
490100200	10	10	72	6	40,20
490120200	12	12	83	6	58,60
490160200	16	16	92	6	93,70

Condiciones de corte | Cutting data pag. 184

Fresa metal duro para radios cóncavos HSC < 65 HRC

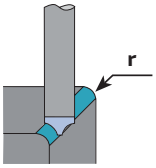
HSC Solid carbide end mill for concave radius < 65 HRC

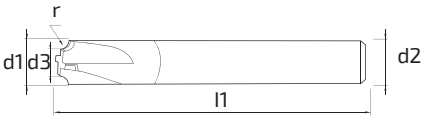


STEEL <65 HRC
INOX
GG
GGG
ALU <12% SI
COPPER
NI ALLOYS
TITAN INCONEL
UNI

Fresa de metal duro mango cilíndrico para hacer radios cóncavos en las aristas de las piezas (mirar dibujo adjunto). Recubrimiento TiAlN. Para uso general, alta velocidad y materiales hasta 65 HRC.

Solid carbide end mill for concave radius on workpiece edges (see attached drawing) with TiAlN coating. For general use, HSC and materials up to 65 HRC.





Ref.	r	d1	d2	d3	l1	z	€
480005200	0,5	10	10	9	75	4	**149,75**
480010200	1,0	10	10	8	75	4	**149,75**
480015200	1,5	10	10	7	75	4	**149,75**
480020200	2,0	10	10	6	75	4	**149,75**
480025200	2,5	10	10	5	75	4	**154,65**
480030200	3,0	12	12	6	75	4	**154,65**
480040200	4,0	16	16	8	75	4	**171,00**
480050200	5,0	16	16	6	80	4	**242,95**

Condiciones de corte | Cutting data pag. 184

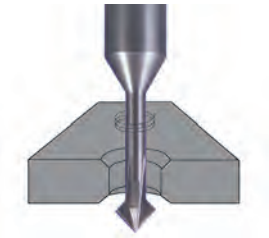
F-845

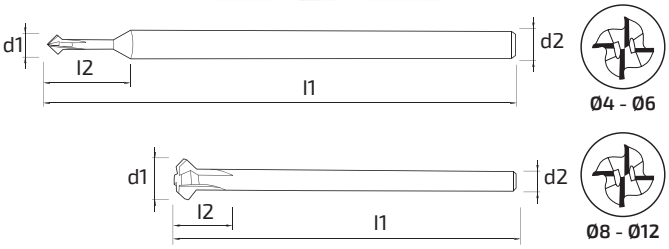
Fresa metal duro para chaflanes interiores y exteriores < 65HRC

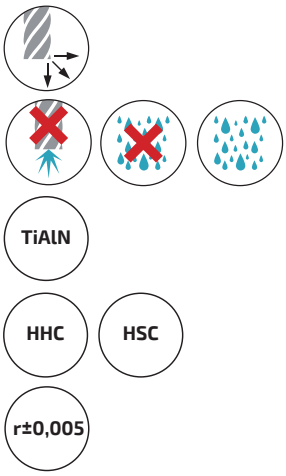
Solid carbide end mill for internal and external bevels < 65HRC

de metal duro 90º con mango cilíndrico. Herramienta diseñada para biselado doble: interior y exterior por la misma entrada (mirar dibujo adjunto), para obtener cha- a 45º. Adecuada para el mecanizado a alta velocidad (HSC). Apta para uso general y para materiales hasta 65 HRC. Podemos ahorrarnos un giro dependiendo de la pieza a mecanizar.

Solid carbide long end mill for 90º internal and external bevels with cylindrical shank (see attached drawing) to get 45º chamfer. Very good for dry milling through TiAlN coating. We can save clamping of the work piece with this tool. The positive geometry together with this coating will help you the get a soft cutting with a very long tool life. Universal purpose. For high tense material up to 65 HRC.







STEEL <65 HRC
INOX
GG
GGG
ALU <12% SI
COPPER
NI ALLOYS
TITAN INCONEL
UNI

Ref.	d1	d2	l1	l2	z	€
845040200	4	6	100	20	4	**59,20**
845060200	6	6	100	20	4	**63,75**
845080200	8	6	100	20	4	**83,05**
845100200	10	6	100	40	4	**101,70**
845120200	12	6	100	40	4	**121,65**

Condiciones de corte | Cutting data pag. 184

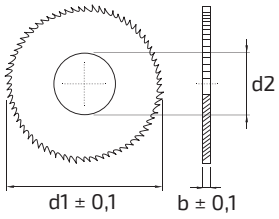
Sierra circular metal duro paso fino

Solid carbide fine toothing saw blade

STEEL <55 HRC | DIN 1837 | INOX | GG | GGG | ALU <12% SI | COPPER | NI ALLOYS | TITAN INCONEL | UNI

Fresa de disco metal duro paso Ángulo de corte: 6º. Para mecanizar acero, fundición gris, fundición nodular, bronce, aluminio, plástic y

Solid carbide toothing saw blade. Clearance ground on both sides (secondary edges) rake angle 6 degrees. For steel, cast iron, malleable cast iron, brass, aluminum, plastic, and carbon- e.



d1	b	d2	z	€
20	0,10	5	80	**42,20**
20	0,15	5	80	**32,60**
20	0,20	5	80	**26,05**
20	0,25	5	64	**26,05**
20	0,30	5	64	**26,05**
20	0,40	5	64	**27,10**
20	0,50	5	48	**28,60**
20	0,60	5	48	**28,60**
20	0,70	5	48	**33,15**
20	0,80	5	48	**33,15**
20	0,90	5	40	**34,20**
20	1,00	5	40	**37,70**
20	1,10	5	40	**40,00**
20	1,20	5	40	**40,00**
20	1,30	5	40	**42,20**
20	1,40	5	40	**45,55**
20	1,50	5	40	**45,55**
20	1,60	5	40	**47,90**
20	1,70	5	40	**50,10**
20	1,80	5	32	**52,50**
20	1,90	5	32	**54,25**
20	2,00	5	32	**56,40**
20	2,50	5	32	**66,10**
20	3,00	5	32	**75,85**
20	3,50	5	24	**84,30**
20	4,00	5	24	**100,15**
20	5,00	5	24	**125,15**
20	6,00	5	24	**150,15**

d1	b	d2	z	€
25	0,10	8	80	**44,05**
25	0,15	8	80	**33,65**
25	0,20	8	80	**27,10**
25	0,25	8	80	**27,10**
25	0,30	8	80	**27,10**
25	0,40	8	64	**29,70**
25	0,50	8	64	**34,20**
25	0,60	8	64	**34,20**
25	0,70	8	48	**37,70**
25	0,80	8	48	**42,20**
25	0,90	8	48	**45,55**
25	1,00	8	48	**45,55**
25	1,10	8	48	**49,85**
25	1,20	8	48	**51,10**
25	1,30	8	40	**54,70**
25	1,40	8	40	**56,95**
25	1,50	8	40	**56,95**
25	1,60	8	40	**62,70**
25	1,70	8	40	**62,70**
25	1,80	8	40	**64,90**
25	1,90	8	40	**69,55**
25	2,00	8	40	**71,75**
25	2,50	8	40	**83,50**
25	3,00	8	32	**93,25**
25	3,50	8	32	**110,70**
25	4,00	8	32	**125,75**
25	5,00	8	32	**150,60**
25	6,00	8	24	**177,80**

F-850

d1	b	d2	z	€
30	0,10	8	100	**52,10**
30	0,15	8	100	**41,20**
30	0,20	8	100	**34,65**
30	0,25	8	100	**34,65**
30	0,30	8	80	**34,65**
30	0,40	8	80	**35,80**
30	0,50	8	80	**36,95**
30	0,60	8	64	**36,95**
30	0,70	8	64	**40,00**
30	0,80	8	64	**46,55**
30	0,90	8	64	**47,80**
30	1,00	8	64	**51,10**
30	1,10	8	64	**52,10**
30	1,20	8	48	**56,40**
30	1,30	8	48	**58,60**
30	1,40	8	48	**63,95**
30	1,50	8	48	**67,25**
30	1,60	8	48	**69,50**
30	1,70	8	48	**72,70**
30	1,80	8	48	**75,85**
30	1,90	8	48	**77,00**
30	2,00	8	48	**80,20**
30	2,50	8	40	**82,40**
30	3,00	8	40	**94,35**
30	3,50	8	40	**106,20**
30	4,00	8	40	**125,75**
30	5,00	8	32	**143,05**
30	6,00	8	32	**171,20**

d1	b	d2	z	€
40	0,10	10	128	**66,10**
40	0,15	10	128	**54,70**
40	0,20	10	128	**47,90**
40	0,25	10	100	**47,90**
40	0,30	10	100	**47,90**
40	0,40	10	100	**50,10**
40	0,50	10	80	**53,15**
40	0,60	10	80	**54,70**
40	0,70	10	80	**61,90**
40	0,80	10	80	**63,00**
40	0,90	10	64	**64,90**
40	1,00	10	64	**67,25**
40	1,10	10	64	**69,55**
40	1,20	10	64	**71,75**
40	1,30	10	64	**72,80**
40	1,40	10	64	**77,45**
40	1,50	10	64	**79,70**
40	1,60	10	64	**81,95**
40	1,70	10	48	**86,50**
40	1,80	10	48	**88,80**
40	1,90	10	48	**91,00**
40	2,00	10	48	**93,25**
40	2,50	10	48	**118,40**
40	3,00	10	48	**136,65**
40	3,50	10	48	**152,50**
40	4,00	10	40	**168,45**
40	5,00	10	40	**199,35**
40	6,00	10	40	**229,70**

d1	b	d2	z	€
50	0,20	13	128	**73,35**
50	0,25	13	128	**69,50**
50	0,30	13	128	**63,80**
50	0,40	13	100	**63,80**
50	0,50	13	100	**66,10**
50	0,60	13	100	**66,10**
50	0,70	13	80	**69,55**
50	0,80	13	80	**75,15**
50	0,90	13	80	**77,45**
50	1,00	13	80	**79,70**
50	1,10	13	80	**81,95**
50	1,20	13	80	**84,30**
50	1,30	13	64	**94,50**
50	1,40	13	64	**96,80**
50	1,50	13	64	**101,35**
50	1,60	13	64	**103,60**
50	1,70	13	64	**104,70**
50	1,80	13	64	**111,55**
50	1,90	13	64	**111,55**
50	2,00	13	64	**116,05**
50	2,50	13	64	**141,10**
50	3,00	13	48	**163,85**
50	3,50	13	48	**186,70**
50	4,00	13	48	**198,00**
50	5,00	13	48	**241,25**
50	6,00	13	40	**283,90**

d1	b	d2	z	€
63	0,20	16	160	**106,20**
63	0,25	16	160	**97,55**
63	0,30	16	128	**89,95**
63	0,40	16	128	**89,95**
63	0,50	16	128	**87,65**
63	0,60	16	100	**89,95**
63	0,70	16	100	**101,35**
63	0,80	16	100	**106,20**
63	0,90	16	100	**110,70**
63	1,00	16	100	**112,70**
63	1,10	16	80	**120,60**
63	1,20	16	80	**123,50**
63	1,30	16	80	**126,80**
63	1,40	16	80	**129,00**
63	1,50	16	80	**131,95**
63	1,60	16	80	**138,80**
63	1,70	16	80	**145,60**
63	1,80	16	80	**148,00**
63	1,90	16	80	**154,70**
63	2,00	16	80	**156,15**
63	2,50	16	64	**188,50**
63	3,00	16	64	**213,45**
63	3,50	16	64	**248,00**
63	4,00	16	64	**275,25**
63	5,00	16	48	**331,55**
63	6,00	16	48	**387,85**

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d1	b	d2	z	€
80	0,3	22	160	**210,10**
80	0,4	22	160	**164,00**
80	0,5	22	128	**148,10**
80	0,6	22	128	**143,50**
80	0,7	22	128	**156,15**
80	0,8	22	128	**156,15**
80	0,9	22	100	**163,00**
80	1,0	22	100	**163,00**
80	1,1	22	100	**167,55**
80	1,2	22	100	**174,50**
80	1,3	22	100	**181,35**
80	1,4	22	100	**188,25**
80	1,5	22	100	**190,20**
80	1,6	22	100	**194,55**
80	1,7	22	80	**212,05**
80	1,8	22	80	**214,15**
80	1,9	22	80	**220,40**
80	2,0	22	80	**227,20**
80	2,5	22	80	**268,50**
80	3,0	22	80	**306,00**
80	3,5	22	64	**355,75**
80	4,0	22	64	**400,00**
80	5,0	22	64	**475,80**
80	6,0	22	64	**566,35**

d1	b	d2	z	€
100	0,5	22	160	**270,80**
100	0,6	22	160	**261,70**
100	0,7	22	128	**250,25**
100	0,8	22	128	**220,80**
100	0,9	22	128	**224,95**
100	1,0	22	128	**216,40**
100	1,1	22	128	**231,75**
100	1,2	22	128	**236,00**
100	1,3	22	100	**249,20**
100	1,4	22	100	**257,95**
100	1,5	22	100	**266,75**
100	1,6	22	100	**275,45**
100	1,7	22	100	**289,20**
100	1,8	22	100	**306,00**
100	1,9	22	100	**327,90**
100	2,0	22	100	**332,30**
100	2,5	22	100	**389,10**
100	3,0	22	80	**463,35**
100	3,5	22	80	**531,15**
100	4,0	22	80	**596,55**
100	5,0	22	80	**700,95**
100	6,0	22	64	**831,60**

d1	b	d2	z	€
125	0,6	22	160	**403,10**
125	0,7	22	160	**393,90**
125	0,8	22	160	**389,25**
125	0,9	22	160	**382,25**
125	1,0	22	160	**357,55**
125	1,1	22	128	**370,70**
125	1,2	22	128	**379,55**
125	1,4	22	128	**407,75**
125	1,5	22	128	**423,95**
125	1,6	22	128	**440,30**
125	1,8	22	128	**475,05**
125	2,0	22	128	**514,35**
125	2,5	22	100	**604,75**
125	3,0	22	100	**713,50**
125	3,5	22	100	**820,15**
125	4,0	22	100	**933,60**
125	5,0	22	80	**1.030,00**
125	6,0	22	80	**1.259,90**

d1	b	d2	z	€
160	1,5	32	160	**507,00**
160	1,8	32	128	**583,35**

Condiciones de corte | Cutting data pag. 182

F-851

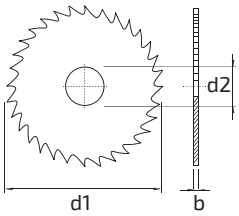
Sierra metal duro paso basto

Solid carbide large toothing saw blade

Fresa de disco metal duro paso grueso. Ángulo de corte: 8º. Para mecanizar acero, fundición gris, fundición nodular, bronce, aluminio, plástic y

Solid carbide large toothing saw blade. Clearance ground on both sides (secondary edges) rake angle 8 degrees. For steel, cast iron, malleable cast iron, brass, aluminum, graphite, plastics, glass- and carbon-fibre.

STEEL <55 HRC | DIN 1837 | INOX | GG | GGG | ALU <12% SI | COPPER | NI ALLOYS | TITAN INCONEL | UNI



d1	b	d2	z	€
25	0,20	8	20	**27,10**
25	0,25	8	20	**27,10**
25	0,30	8	20	**27,10**
25	0,40	8	20	**29,70**
25	0,50	8	20	**34,20**
25	0,60	8	20	**34,20**
25	0,70	8	20	**37,70**
25	0,80	8	20	**42,20**
25	0,90	8	20	**45,55**
25	1,00	8	20	**45,55**
25	1,20	8	20	**51,10**
25	1,50	8	20	**56,95**
25	1,60	8	20	**62,70**
25	1,80	8	20	**64,90**
25	2,00	8	20	**71,75**
25	2,50	8	20	**83,50**
25	3,00	8	20	**93,25**
25	4,00	8	20	**125,75**
25	5,00	8	20	**150,60**
25	6,00	8	20	**177,80**

d1	b	d2	z	€
30	0,20	8	30	**34,65**
30	0,25	8	30	**34,65**
30	0,30	8	30	**34,65**
30	0,40	8	30	**35,80**
30	0,50	8	30	**36,95**
30	0,60	8	30	**39,55**
30	0,70	8	30	**46,55**
30	0,80	8	24	**47,80**
30	0,90	8	24	**51,10**
30	1,00	8	24	**52,10**
30	1,20	8	24	**58,60**
30	1,50	8	24	**69,50**
30	1,60	8	24	**72,70**
30	1,80	8	24	**77,00**
30	2,00	8	24	**82,40**
30	2,50	8	24	**94,35**
30	3,00	8	24	**106,20**
30	4,00	8	24	**143,05**
30	5,00	8	24	**171,20**
30	6,00	8	24	**199,35**

Condiciones de corte | Cutting data pag. 182

d1	b	d2	z	€
40	0,20	10	40	**47,90**
40	0,25	10	40	**47,90**
40	0,30	10	40	**47,90**
40	0,40	10	40	**50,10**
40	0,50	10	40	**53,15**
40	0,60	10	40	**54,70**
40	0,70	10	40	**61,90**
40	0,80	10	32	**63,00**
40	0,90	10	32	**64,90**
40	1,00	10	32	**67,25**
40	1,20	10	32	**71,75**
40	1,50	10	32	**79,70**
40	1,60	10	32	**81,95**
40	1,80	10	32	**88,80**
40	2,00	10	32	**93,25**
40	2,50	10	32	**118,40**
40	3,00	10	32	**136,65**
40	4,00	10	32	**168,45**
40	5,00	10	32	**199,35**
40	6,00	10	32	**229,70**

d1	b	d2	z	€
50	0,40	13	48	**63,80**
50	0,50	13	48	**66,10**
50	0,60	13	48	**66,10**
50	0,70	13	40	**69,55**
50	0,80	13	40	**75,15**
50	0,90	13	40	**77,45**
50	1,00	13	40	**79,70**
50	1,20	13	40	**84,30**
50	1,50	13	32	**101,35**
50	1,60	13	32	**103,60**
50	1,80	13	32	**111,55**
50	2,00	13	32	**116,05**
50	2,50	13	32	**141,10**
50	3,00	13	24	**163,85**
50	4,00	13	24	**198,00**
50	5,00	13	24	**241,25**
50	6,00	13	20	**283,90**

d1	b	d2	z	€
63	0,4	16	64	**89,95**
63	0,5	16	64	**87,65**
63	0,6	16	48	**89,95**
63	0,7	16	48	**101,35**
63	0,8	16	48	**106,20**
63	0,9	16	48	**110,70**
63	1,0	16	48	**112,70**
63	1,2	16	40	**123,50**
63	1,5	16	40	**131,95**
63	1,6	16	40	**138,80**
63	1,8	16	40	**148,00**
63	2,0	16	40	**156,15**
63	2,5	16	32	**188,50**
63	3,0	16	32	**213,45**
63	4,0	16	32	**275,25**
63	5,0	16	24	**331,55**
63	6,0	16	24	**387,85**

d1	b	d2	z	€
80	0,6	22	64	**143,50**
80	0,7	22	64	**156,15**
80	0,8	22	64	**156,15**
80	0,9	22	48	**163,00**
80	1,0	22	48	**163,00**
80	1,2	22	48	**174,50**
80	1,5	22	48	**190,20**
80	1,6	22	48	**194,55**
80	1,8	22	40	**214,15**
80	2,0	22	40	**227,20**
80	2,5	22	40	**268,50**
80	3,0	22	40	**306,00**
80	4,0	22	32	**400,00**
80	5,0	22	32	**475,80**
80	6,0	22	32	**566,35**

d1	b	d2	z	€
100	0,6	22	80	**261,70**
100	0,7	22	80	**250,25**
100	0,8	22	64	**220,80**
100	0,9	22	64	**224,95**
100	1,0	22	64	**216,40**
100	1,2	22	64	**236,00**
100	1,5	22	48	**266,75**
100	1,6	22	48	**275,45**
100	1,8	22	48	**306,00**
100	2,0	22	48	**332,30**
100	2,5	22	48	**389,10**
100	3,0	22	48	**463,35**
100	4,0	22	40	**596,55**
100	5,0	22	40	**700,95**
100	6,0	22	32	**831,60**

d1	b	d2	z	€
125	0,8	22	80	**389,25**
125	0,9	22	80	**382,25**
125	1,0	22	80	**357,55**
125	1,2	22	64	**379,55**
125	1,5	22	64	**423,95**
125	1,6	22	64	**440,30**
125	1,8	22	64	**475,05**
125	2,0	22	64	**514,35**
125	2,5	22	48	**604,75**
125	3,0	22	48	**713,50**
125	4,0	22	48	**933,60**
125	5,0	22	40	**1.030,00**
125	6,0	22	40	**1.259,90**

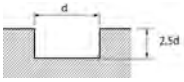
Condiciones de corte | Cutting data pag. 182

FRESAS/ CONDICIONES DE CORTE

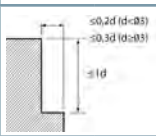
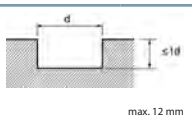
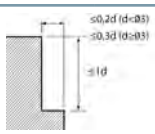
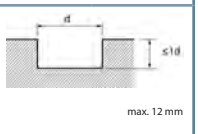
END MILLS/CUTTING DATA

CONDICIONES DE CORTE
CUTTING DATA

F-200 - pag. 10

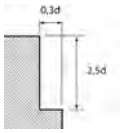
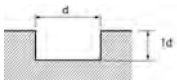
MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*		Acero de aluminio 6-12% Si *Al alloys 6-12% Si*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1,5	32.000	2.000	23.000	1.300
2,0	32.000	2.200	23.000	1.500
3,0	25.000	2.400	18.000	1.700
4,0	20.000	2.400	15.000	1.800
5,0	15.000	2.200	12.000	1.800
6,0	13.500	2.300	10.000	1.800
8,0	10.000	2.400	7.800	1.900
10,0	8.000	2.400	6.000	2.000
12,0	7.000	2.200	5.000	1.900
Profundidad de corte *Depth of cut*				

F-282 - pag. 12 | **F-303** - pag. 19 | **F-283** - pag. 22 | **F-223** - pag. 27

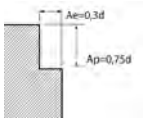
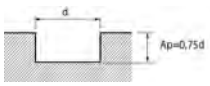
MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*				Acero de aluminio 6-12% Si *Al alloys 6-12% Si*			
Vc	**300 m/min**		**240 m/min**		**240 m/min**		**200 m/min**	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	34.000	500	34.000	400	34.000	400	34.000	300
2	34.000	950	32.300	720	32.300	720	32.300	470
3	27.200	1.200	21.300	800	21.300	800	21.300	510
4	20.400	1.300	16.000	850	16.000	850	16.000	550
5	16.200	1.400	13.000	850	13.000	850	13.000	600
6	13.600	1.600	11.000	940	11.000	940	11.000	640
8	10.200	1.600	8.000	1.000	8.000	1.000	8.000	680
10	8.100	1.600	6.500	1.000	6.500	1.000	6.500	680
12	6.800	1.600	5.400	1.000	5.400	1.000	5.400	680
16	5.100	1.600	4.100	1.000	4.100	1.000	4.100	610
20	4.100	1.300	3.200	850	3.200	850	3.200	560
Profundidad de corte *Depth of cut*								

CONDICIONES DE CORTE
CUTTING DATA

F-606 - pag. 17 | **F-607** - pag. 26

MATERIAL	Aleaciones de aluminio <12% Si *Al alloys <12% Si*		Cobre *Copper*	
Vc	80 - 150 m/min		80 m/min	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
4	9.000	1.200	5.000	320
6	8.000	1.200	4.200	320
8	6.000	1.200	3.200	320
10	4.800	1.200	2.600	320
12	4.000	1.200	2.100	320
16	3.000	1.200	1.600	320
20	2.400	1.200	1.300	320
Profundidad de corte *Depth of cut*				

F-301 - pag. 13

MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*		
d1 [mm]	**n** [rpm]	**F** [mm/min]	
1	25.500	930	770
2	25.500	1.800	1.530
3	18.400	2.000	1.700
4	14.000	2.000	1.700
5	11.000	2.000	1.700
6	9.200	2.000	1.700
8	7.000	2.000	1.700
10	5.500	2.000	1.700
12	4.400	2.000	1.700
16	3.200	1.900	1.530
20	2.000	1.700	1.360
Profundidad de corte *Depth of cut*			

CONDICIONES DE CORTE
CUTTING DATA

F-201 - pag. 11

MATERIAL	0,1 - 2,0	3,0 - 6,0	8,0 - 12,0
Aluminio *Aluminium*	2.000 - 4.000	1.000 - 3.600	900 - 2.000
Cobre *Copper*	1.000 - 1.500	800 - 1.200	500 - 800
		fx = 0,01 x d1	

F-281 - pag. 23 - 24

MATERIAL		Aluminio, cobre y bronce *Aluminum, copper and brass*			
d1 [mm]	**l2** [mm]	**n** [rpm]	**Vf** [mm/min]	**Fz** [mm]	**Ap** [mm]
0,1	0,2	70.000	1.400	0,010	0,010
0,1	0,3	70.000	1.120	0,008	0,008
0,1	0,4	70.000	700	0,005	0,005
0,2	0,5	60.000	1.900	0,016	0,020
0,2	1,0	60.000	1.900	0,016	0,014
0,2	1,5	60.000	1.440	0,012	0,010
0,2	2,0	60.000	1.200	0,010	0,006
0,3	1,0	58.000	2.400	0,021	0,018
0,3	1,5	56.000	2.240	0,020	0,015
0,3	2,0	52.000	2.050	0,020	0,012
0,3	2,5	48.000	1.728	0,018	0,010
0,3	3,0	45.000	1.450	0,016	0,008
0,3	5,0	38.000	900	0,012	0,005
0,4	1,0	52.000	2.600	0,025	0,030
0,4	1,5	50.000	2.300	0,023	0,028
0,4	2,0	48.000	2.000	0,021	0,026
0,4	3,0	45.000	1.800	0,020	0,018
0,4	4,0	43.000	1.600	0,019	0,010
0,4	6,0	43.000	1.600	0,019	0,005
0,5	1,0	52.000	2.600	0,250	0,030
0,5	2,0	48.000	2.880	0,030	0,020
0,5	3,0	42.000	2.200	0,026	0,018
0,5	4,0	42.000	2.200	0,026	0,016
0,5	5,0	42.000	2.200	0,026	0,013
0,5	6,0	40.000	1.840	0,023	0,010
0,6	2,0	42.000	2.800	0,033	0,025
0,6	3,0	42.000	2.772	0,033	0,022

CONDICIONES DE CORTE
CUTTING DATA

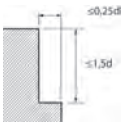
F-281 - pag. 23 - 24

MATERIAL		Aluminio, cobre y bronce *Aluminum, copper and brass*			
d1 [mm]	**l2** [mm]	**n** [rpm]	**Vf** [mm/min]	**Fz** [mm]	**Ap** [mm]
0,6	4	42000	2.800	0,033	0,022
0,6	5	42000	2.772	0,033	0,018
0,6	6	42000	2.800	0,033	0,015
0,6	8	42000	2.800	0,033	0,010
0,7	6	36000	2.600	0,027	0,040
0,7	10	34000	1.800	0,022	0,030
0,8	2	52000	4.160	0,040	0,060
0,8	4	48000	2.700	0,028	0,040
0,8	5	48000	2.688	0,028	0,036
0,8	6	48000	2.700	0,028	0,034
0,8	8	48000	2.700	0,028	0,030
0,8	10	42000	2.200	0,026	0,022
0,9	6	36000	2.600	0,036	0,035
0,9	12	34000	2.250	0,033	0,025
1,0	2	45000	4.500	0,050	0,070
1,0	3	44000	3.500	0,040	0,065
1,0	4	40000	3.200	0,040	0,040
1,0	5	38000	2.900	0,038	0,040
1,0	6	38000	3.040	0,040	0,040
1,0	7	38000	2.900	0,038	0,040
1,0	8	38000	3.040	0,040	0,030
1,0	9	38000	2.736	0,036	0,028
1,0	10	38000	2.700	0,036	0,025
1,0	12	33000	2.200	0,033	0,025
1,0	15	33000	1.850	0,028	0,015
1,,0	20	26000	1.350	0,010	0,010
1,0	25	21000	750	0,018	0,008
1,2	6	38000	2.900	0,038	0,040
1,2	8	38000	2.900	0,038	0,040
1,2	10	38000	2.700	0,036	0,025
1,2	12	33000	2.200	0,033	0,025
1,2	18	24000	1.250	0,026	0,010
1,2	25	21000	750	0,018	0,008
1,4	8	38000	2.900	0,038	0,045
1,4	16	33000	1.700	0,026	0,030
1,5	4	33000	2.400	0,036	0,060
1,5	6	32000	2.300	0,036	0,060
1,5	8	31000	2.200	0,036	0,055
1,5	10	31000	2.200	0,036	0,055
1,5	12	30000	2.100	0,036	0,050

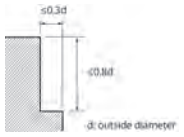
MATERIAL		Aluminio, cobre y bronce *Aluminum, copper and brass*			
d1 [mm]	**l2** [mm]	**n** [rpm]	**Vf** [mm/min]	**Fz** [mm]	**Ap** [mm]
1,5	14	28.000	1.848	0,033	0,040
1,5	16	26.000	1.700	0,033	0,035
1,5	18	26.000	1.560	0,030	0,030
1,5	20	26.000	1.350	0,026	0,030
1,5	25	24.000	1.000	0,021	0,025
1,6	8	31.000	2.200	0,036	0,060
1,6	16	26.000	1.700	0,033	0,037
1,8	10	31.000	2.200	0,036	0,060
1,8	20	26.000	1.700	0,033	0,037
2,0	5	25.000	3.200	0,065	0,200
2,0	6	25.000	3.000	0,060	0,160
2,0	8	25.000	3.000	0,060	0,140
2,0	10	24.000	2.800	0,060	0,100
2,0	12	22.000	2.600	0,060	0,080
2,0	15	22.000	2.600	0,060	0,080
2,0	20	22.000	2.600	0,060	0,050
2,0	25	20.000	2.000	0,050	0,025
2,0	30	20.000	2.000	0,050	0,016
2,5	10	24.000	2.800	0,060	0,100
2,5	20	22.000	2.600	0,060	0,060
3,0	5	20.000	2.600	0,066	0,300
3,0	10	20.000	2.600	0,066	0,210
3,0	15	20.000	2.600	0,066	0,120
3,0	20	17.000	2.000	0,060	0,120
3,0	25	17.000	2.000	0,060	0,100
3,0	30	14.000	2.000	0,060	0,080
4,0	10	15.000	3.000	0,100	0,300
4,0	15	15.000	3.000	0,100	0,250
4,0	20	13.000	2.300	0,090	0,200
4,0	25	13.000	2.300	0,090	0,130
4,0	30	11.000	1.800	0,090	0,100
5,0	10	11.000	2.600	0,120	0,400
5,0	20	11.000	2.600	0,120	0,380
5,0	30	11.000	2.600	0,120	0,200
5,0	40	10.000	2.000	0,110	0,120
6,0	10	11.000	2.600	0,120	0,400
6,0	20	10.000	3.000	0,150	0,300
6,0	30	10.000	2.800	0,140	0,250
6,0	40	8.000	2.000	0,130	0,240
6,0	50	7.000	1.800	0,130	0,160

CONDICIONES DE CORTE
CUTTING DATA

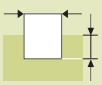
F-604 - pag. 18

MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*		Aleaciones de aluminio <6-12% Si *Al alloys <6-12% Si*	
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
4	30.000	4.200	16.000	1.800
5	27.000	4.900	14.400	2.000
6	24.300	5.500	11.700	2.100
8	18.000	5.400	9.000	2.200
10	14.400	5.200	7.200	2.100
12	11.700	4.800	5.900	1.900
16	9.000	4.600	4.500	1.800
20	7.200	4.300	3.600	1.700
Profundidad de corte *Depth of cut*				

F-284 - pag. 25

MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*			
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
6	20.000	8.400	20.000	6.600
8	18.000	7.500	18.000	5.400
10	15.000	6.000	15.000	4.000
12	13.000	5.400	13.000	3.200
16	10.000	5.400	10.000	3.200
20	8.000	5.000	8.000	3.000
Profundidad de corte *Depth of cut*				

F-151 - pag. 14

Materiales	d1		RPM				
			fz	10.000	15.000	20.000	30.000
			Vf (mm/min)				
Aluminio de construcción para aviación AlMgSiCu/6061 AlCu4MgSi/2017 AlCu2Mg1, 5Ni/2618	6	ae 1xD	0,060	1.800	2.700	3.600	54.00
	8		0,075	2.250	3.375	4.500	6.750
	10		0,095	2.850	4.275	5.700	8.550
	12		0,115	3.450	5.175	6.100	10.350
	16		0,125	3.750	5.625	7.500	11.250
	20		0,130	3.900	2.850	7.800	11.700
	25		0,140	4.200	6.300	8.400	12.600
Fundición de aleación de aluminio AlMgSi1/6082 Cast Alluminium, G - AlSiIIMg	6	ae 0,5xD	0,060	1.800	2.700	3.600	5.400
	8		0,075	2.250	3.375	4.500	6.750
	10		0,095	2.850	4.275	5.700	8.550
	12		0,115	3.450	5.175	6.900	10.350
	16		0,125	3.750	5.625	7.500	11.250
	20		0,130	3.900	2.850	7.800	11.700
	25		0,140	4.200	6.300	8.400	12.600

CONDICIONES DE CORTE

CUTTING DATA

F-271 - pag. 15 | **F-481** - pag. 20

MATERIAL	Vc [m/min]	ae max [mm]	ap max [mm]	fz [mm]				
				= Ø 3 = Ø 4	> Ø 4 = Ø 8	> Ø 8 = Ø 12	> Ø 12 = Ø 16	> Ø 16 = Ø 20
Aluminio	600	1xØ	1xØ	0,035	0,06	0,07	0,09	0,12
	600	1xØ	1xØ	0,035	0,06	0,07	0,09	0,12
	600	1xØ	1xØ	0,035	0,06	0,07	0,09	0,12
	480	1xØ	1xØ	0,035	0,06	0,07	0,09	0,12
	360	1xØ	1xØ	0,03	0,05	0,07	0,12	0,17
	240	1xØ	1xØ	0,03	0,05	0,07	0,12	0,17
Magnesio	220	1xØ	1xØ	0,03	0,05	0,07	0,12	0,17
	200	1xØ	1xØ	0,03	0,05	0,07	0,12	0,17
Cobre	170	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
	155	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
	120	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
	150	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
	120	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
	150	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
CuZn (latón)	180	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
	240	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
CuSn (bronce)	150	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
	170	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
CuAlFe (AMPCO)	55	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12
	70	1xØ	1xØ	0,02	0,04	0,06	0,08	0,12

F-272 - pag. 16 | **F-482** - pag. 21

MATERIAL	Vc [m/min]	ae max [mm]	ap max [mm]				
				> Ø 6 = Ø 8	> Ø 8 = Ø 12	> Ø 12 = Ø 16	> Ø 16 = Ø 20
Aluminio	300	1xØ	1xØ	0,06	0,07	0,09	0,12
	300	1xØ	1xØ	0,06	0,07	0,09	0,12
	300	1xØ	1xØ	0,06	0,07	0,09	0,12
	260	1xØ	1xØ	0,06	0,07	0,09	0,12
	200	1xØ	1xØ	0,05	0,07	0,12	0,17
	140	1xØ	1xØ	0,05	0,07	0,12	0,17
Magnesio	130	1xØ	1xØ	0,05	0,07	0,12	0,17
	120	1xØ	1xØ	0,05	0,07	0,12	0,17
Cobre	110	1xØ	1xØ	0,04	0,06	0,08	0,12
	100	1xØ	1xØ	0,04	0,06	0,08	0,12
	80	1xØ	1xØ	0,04	0,06	0,08	0,12
	90	1xØ	1xØ	0,04	0,06	0,08	0,12
	80	1xØ	1xØ	0,04	0,06	0,08	0,12
	90	1xØ	1xØ	0,04	0,06	0,08	0,12
CuZn (latón)	100	1xØ	1xØ	0,04	0,06	0,08	0,12
	140	1xØ	1xØ	0,04	0,06	0,08	0,12
CuSn (bronce)	90	1xØ	1xØ	0,04	0,06	0,08	0,12
	100	1xØ	1xØ	0,04	0,06	0,08	0,12
CuAlFe (AMPCO)	35	1xØ	1xØ	0,04	0,06	0,08	0,12
	45	1xØ	1xØ	0,04	0,06	0,08	0,12

CONDICIONES DE CORTE
CUTTING DATA

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MATERIAL	Vc [m/min]	ae max [mm]	ap max [mm]	fz [mm]				
				= Ø 3 = Ø 4	> Ø 4 = Ø 8	> Ø 8 = Ø 12	> Ø 12 = Ø 16	> Ø 16 = Ø 20
Aluminio	750	1xØ	0,03xØ	0,040	0,06	0,08	0,15	0,20
	750	1xØ	0,03xØ	0,040	0,06	0,08	0,15	0,20
	750	1xØ	0,03xØ	0,040	0,06	0,08	0,15	0,20
	670	1xØ	0,03xØ	0,040	0,06	0,08	0,15	0,20
	600	1xØ	0,03xØ	0,030	0,05	0,07	0,12	0,17
	400	1xØ	0,03xØ	0,030	0,05	0,07	0,12	0,17
Magnesio	350	1xØ	0,03xØ	0,030	0,05	0,07	0,12	0,17
	315	1xØ	0,03xØ	0,030	0,05	0,07	0,12	0,17
Cobre	230	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
	190	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
	155	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
	190	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
	155	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
	190	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
CuZn (latón)	135	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
	180	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
CuSn (bronce)	120	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
	145	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
CuAlFe (AMPCO)	80	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
	95	1xØ	0,03xØ	0,020	0,04	0,06	0,08	0,12
Termoplásticos	240	1xØ	0,03xØ	0,075	0,15	0,25	0,35	0,45
	240	1xØ	0,03xØ	0,075	0,15	0,25	0,35	0,45
	240	1xØ	0,03xØ	0,075	0,15	0,25	0,35	0,45
	110	1xØ	0,03xØ	0,075	0,15	0,25	0,35	0,45
	140	1xØ	0,03xØ	0,075	0,15	0,25	0,35	0,45
	140	1xØ	0,03xØ	0,075	0,15	0,25	0,35	0,45
	240	1xØ	0,03xØ	0,075	0,15	0,25	0,35	0,45
	210	1xØ	0,03xØ	0,125	0,25	0,35	0,45	0,55
	65	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40
Duroplásticos	65	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40
	65	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40
	65	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40
	110	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40
	65	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40
	60	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40
	65	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40
	65	1xØ	0,03xØ	0,050	0,10	0,20	0,30	0,40

CONDICIONES DE CORTE

CUTTING DATA

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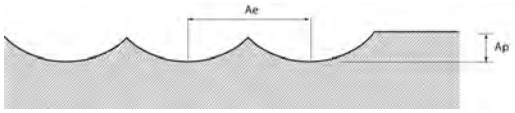
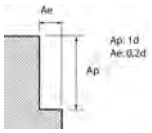
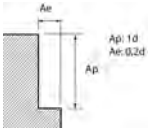
MATERIAL	Vc [m/min]	ae max [mm]	ap max [mm]	fz [mm]			
				= Ø 3 = Ø 4	> Ø 4 = Ø 8	> Ø 8 = Ø 12	> Ø 12 = Ø 16
Aluminio	450	1xØ	0,03xØ	0,040	0,06	0,08	0,15
	450	1xØ	0,03xØ	0,040	0,06	0,08	0,15
	450	1xØ	0,03xØ	0,040	0,06	0,08	0,15
	400	1xØ	0,03xØ	0,040	0,06	0,08	0,15
	360	1xØ	0,03xØ	0,030	0,05	0,07	0,12
	240	1xØ	0,03xØ	0,030	0,05	0,07	0,12
Magnesio	210	1xØ	0,03xØ	0,030	0,05	0,07	0,12
	190	1xØ	0,03xØ	0,030	0,05	0,07	0,12
Cobre	170	1xØ	0,03xØ	0,020	0,04	0,06	0,08
	145	1xØ	0,03xØ	0,020	0,04	0,06	0,08
	120	1xØ	0,03xØ	0,020	0,04	0,06	0,08
	145	1xØ	0,03xØ	0,020	0,04	0,06	0,08
	120	1xØ	0,03xØ	0,020	0,04	0,06	0,08
	145	1xØ	0,03xØ	0,020	0,04	0,06	0,08
CuZn (latón)	105	1xØ	0,03xØ	0,020	0,04	0,06	0,08
	140	1xØ	0,03xØ	0,020	0,04	0,06	0,08
CuSn (bronce)	70	1xØ	0,03xØ	0,020	0,04	0,06	0,08
	85	1xØ	0,03xØ	0,020	0,04	0,06	0,08
CuAlFe (AMPCO)	55	1xØ	0,03xØ	0,020	0,04	0,06	0,08
	65	1xØ	0,03xØ	0,020	0,04	0,06	0,08
Termoplásticos	145	1xØ	0,03xØ	0,075	0,15	0,25	0,35
	145	1xØ	0,03xØ	0,075	0,15	0,25	0,35
	145	1xØ	0,03xØ	0,075	0,15	0,25	0,35
	65	1xØ	0,03xØ	0,075	0,15	0,25	0,35
	50	1xØ	0,03xØ	0,075	0,15	0,25	0,35
	85	1xØ	0,03xØ	0,075	0,15	0,25	0,35
	145	1xØ	0,03xØ	0,075	0,15	0,25	0,35
	125	1xØ	0,03xØ	0,125	0,25	0,35	0,45
	35	1xØ	0,03xØ	0,050	0,10	0,20	0,30
Duroplásticos	40	1xØ	0,03xØ	0,050	0,10	0,20	0,30
	40	1xØ	0,03xØ	0,050	0,10	0,20	0,30
	40	1xØ	0,03xØ	0,050	0,10	0,20	0,30
	65	1xØ	0,03xØ	0,050	0,10	0,20	0,30
	40	1xØ	0,03xØ	0,050	0,10	0,20	0,30
	35	1xØ	0,03xØ	0,050	0,10	0,20	0,30
	40	1xØ	0,03xØ	0,050	0,10	0,20	0,30
	40	1xØ	0,03xØ	0,050	0,10	0,20	0,30

CONDICIONES DE CORTE
CUTTING DATA

F-110 - pag. 33 | F-112 - pag. 32

MATERIAL	Acero preendurecido y acero endurecido < 52 HRC *Prehardened and hardened steel < 52 HRC*				Acero endurecido 52-56 HRC *Herdened steel 52-56 HRC*				Acero endurecido 62-68 HRC *Herdened steel 62-68 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
0,2	0,010	0,003	60.000	400	0,008	0,003	60.000	360	0,007	0,003	55.000	330
0,3	0,010	0,006	50.000	450	0,010	0,006	50.000	400	0,010	0,006	45.000	300
0,4	0,013	0,007	45.000	540	0,012	0,007	45.000	500	0,012	0,007	40.000	430
0,5	0,012	0,007	35.000	500	0,012	0,007	35.000	450	0,012	0,007	30.000	330
0,6	0,020	0,010	38.000	720	0,020	0,010	38.000	630	0,020	0,010	35.000	500
0,8	0,025	0,013	35.000	760	0,025	0,013	35.000	700	0,025	0,013	32.000	530
1,0	0,030	0,014	30.000	720	0,025	0,014	30.000	600	0,025	0,014	26.000	450
1,2	0,030	0,020	35.000	1.100	0,030	0,020	35.000	1.000	0,025	0,020	32.000	900
1,5	0,030	0,025	33.000	1.000	0,030	0,025	33.000	900	0,025	0,025	27.000	800
2,0	0,030	0,020	32.000	1.000	0,030	0,020	32.000	800	0,030	0,020	30.000	700
3,0	0,040	0,030	25.000	1.000	0,040	0,030	25.000	900	0,030	0,030	20.000	660
4,0	0,080	0,030	25.000	1.200	0,050	0,030	25.000	1.100	0,040	0,030	20.000	800
Profundidad de corte *Depth of cut*												

F-290 - pag. 35 | F-295 - pag. 36

MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*				Acero de aluminio 6-12% Si *Al alloys 6-12% Si*			
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	24.000	690	24.000	520	12.700	200	12.700	130
2	20.600	800	20.600	590	9.600	230	9.600	200
3	16.800	900	16.800	620	6.400	260	6.400	260
4	12.400	1.000	12.400	650	4.800	290	4.800	300
6	8.300	1.120	8.300	760	3.200	320	3.200	320
8	6.400	1.200	6.400	800	2.400	370	2.400	370
10	5.100	1.360	5.100	920	1.900	380	1.900	380
12	4.200	1.400	4.200	960	1.600	400	1.600	410
Profundidad de corte *Depth of cut*								

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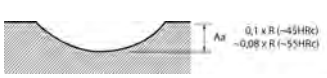
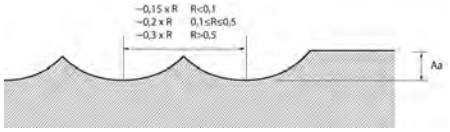
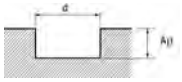
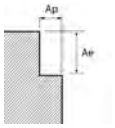
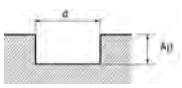
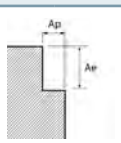
MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*		Cobre *Copper*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1,0	43.200	1.300	43.200	900
1,5	31.500	1.200	31.500	1.000
2,0	21.600	10.000	21.600	1.100
3,0	14.400	840	14.400	1.100
4,0	11.000	840	10.800	1.100
5,0	8.700	840	8.700	1.100
6,0	7.200	840	7.200	1.100
8,0	5.400	810	5.400	1.100
10,0	4.300	810	4.300	1.000
12,0	3.600	810	3.600	950
16,0	2.700	810	2.700	950
Profundidad de corte *Depth of cut*				

CONDICIONES DE CORTE

CUTTING DATA

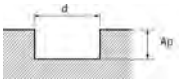
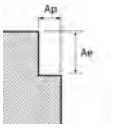
F-901 - pag. 39 | **F-812** - pag. 40

MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*				Acero de aluminio 6-12% Si *Al alloys 6-12% Si*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
0,2	0,060	0,020	50.000	2.300	0,054	0,018	45.000	2.070
0,3	0,063	0,021	50.000	2.300	0,057	0,019	45.000	2.070
0,4	0,120	0,040	40.000	2.400	0,108	0,036	36.000	2.160
0,5	0,060	0,020	36.000	1.940	0,054	0,018	32.400	1.750
0,6	0,072	0,024	36.000	2.450	0,065	0,022	32.400	2.200
0,8	0,096	0,032	36.000	2.450	0,086	0,029	32.400	2.200
1,0	0,300	0,100	36.000	3.240	0,270	0,090	32.400	2.915
1,2	0,120	0,040	28.800	2.360	0,108	0,036	25.920	2.125
1,4	0,165	0,055	25.200	2.070	0,149	0,050	22.680	1.860
1,5	0,180	0,060	25.200	2.070	0,162	0,054	22.680	1.860
1,6	0,195	0,065	23.400	2.100	0,176	0,059	21.060	1.895
1,8	0,210	0,070	23.400	2.100	0,189	0,063	18.900	1.700
2,0	0,420	0,140	21.000	3.150	0,378	0,126	17.010	2.550
3,0	0,630	0,210	16.000	2.400	0,567	0,189	12.960	1.945
4,0	0,840	0,280	11.500	2.300	0,756	0,252	9.315	1.865
Profundidad de corte *Depth of cut*								

MATERIAL	Aleaciones de aluminio <6% Si *Al alloys <6% Si*				Acero de aluminio 6-12% Si *Al alloys 6-12% Si*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
0,2	0,048	0,016	42.500	1.700	0,390	0,013	37.500	1.350
0,3	0,050	0,017	42.500	1.700	0,041	0,014	35.700	1.285
0,4	0,096	0,032	34.000	1.835	0,078	0,026	30.000	1.440
0,5	0,048	0,016	30.600	1.650	0,039	0,013	27.000	1.300
0,6	0,058	0,019	30.600	2.080	0,047	0,016	27.000	1.620
0,8	0,077	0,026	30.600	2.080	0,062	0,021	27.000	1.620
1,0	0,240	0,080	30.600	2.510	0,195	0,065	27.000	1.945
1,2	0,096	0,032	24.480	2.010	0,78	0,026	21.600	1.550
1,4	0,132	0,044	21.420	1.750	0,107	0,036	18.900	1.360
1,5	0,144	0,048	21.420	1.750	0,117	0,039	18.900	1.360
1,6	0,156	0,052	19.890	1.790	0,127	0,042	17.550	1.400
1,8	0,168	0,056	19.890	1.790	0,137	0,046	17.550	1.400
2,0	0,336	0,112	17.850	2.680	0,273	0,091	15.750	1.890
3,0	0,504	0,168	13.600	2.040	0,410	0,137	12.000	1.440
4,0	0,672	0,224	9.775	1.955	0,546	0,182	8.625	1.380
Profundidad de corte *Depth of cut*								

CONDICIONES DE CORTE
CUTTING DATA

F-913 - pag. 41 - 42

MATERIAL		Ae [mm]	Acero aleado <325 HB *Alloy steel <325 HB*			Acero preendurecido y endurecido 35-45 HRC *Prehardened and hardened steel 35-45 HRC*			Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*		
d1 [mm]	**l2** [mm]		**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
0,2	2	0,004	0,003	45.200	210	0,002	45.200	180	0,002	35.500	120
0,3	4	0,001	0,001	20.400	80	0,001	20.400	70	0,001	16.300	50
0,4	4	0,002	0,003	31.200	280	0,002	28.100	220	0,001	21.100	140
0,5	4	0,002	0,005	26.500	300	0,004	20.700	220	0,002	17.700	150
0,8	8	0,007	0,010	17.300	370	0,008	15.200	270	0,005	10.800	180
1,0	6	0,136	0,040	24.400	770	0,030	19.500	480	0,025	15.200	370
1,0	10	0,009	0,010	14.200	370	0,008	11.800	280	0,006	10.000	190
1,0	20	0,002	0,003	9.600	140	0,002	8.800	120	0,001	6.900	80
1,5	8	0,120	0,040	15.100	620	0,035	11.300	400	0,025	9,150	275
1,5	16	0,006	0,009	8.200	260	0,008	7.200	200	0,005	5.900	130
1,5	30	0,002	0,005	6.500	130	0,004	6.000	110	0,002	4.800	80
2,0	8	0,060	0,060	13.500	765	0,005	10.100	500	0,035	7.900	350
2,0	20	0,016	0,022	7.500	360	0,015	6.000	260	0,012	5.000	170
2,0	40	0,002	0,004	4.500	130	0,003	4.200	110	0,002	3.000	60
2,5	30	0,012	0,015	5.300	300	0,012	4.500	230	0,008	3.700	150
3,0	16	0,440	0,080	7.350	685	0,060	5.550	470	0,040	4.450	330
3,0	30	0,024	0,030	4.800	370	0,020	4.200	270	0,015	3.200	180
3,0	50	0,011	0,015	4.200	260	0,010	3.600	200	0,008	2.800	130
4,0	16	0,800	0,450	5.950	775	0,078	4.300	500	0,055	3.500	345
4,0	30	0,080	0,050	3.700	440	0,045	3.100	310	0,025	2.300	210
4,0	50	0,032	0,035	3.200	310	0,025	2.600	230	0,020	2.100	160
5,0	30	0,200	0,100	3.200	480	0,070	2.400	320	0,060	1.800	200
6,0	30	0,500	0,100	2.100	390	0,070	1.600	240	0,050	1.200	150
8,0	30	0,200	0,100	2.000	410	0,800	1.500	250	0,060	1.100	160
10,0	35	0,240	0,120	2.000	400	0,700	1.300	220	0,050	900	150
Profundidad de corte *Depth of cut*											

CONDICIONES DE CORTE
CUTTING DATA

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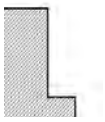
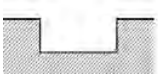
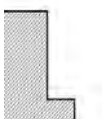
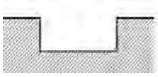
MATERIAL	Acero no aleado <500 N/mm² *Unalloyed steel <500 N/mm²*		Acero no aleado 500-700 N/mm² *Unalloyed steel 500-700 N/mm²*		Acero no aleado >700 N/mm² *Unalloyed steel >700 N/mm²*		Acero aleado <1.400 N/mm² *Alloyed Steel <1.400 N/mm²*		Acero aleado > 1.400 N/mm² *Alloyed Steel <1.400 N/mm²*		Acero inoxidable *Stainless steel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	47.745	2.385	38.195	1.530	23.875	955	19.100	570	12.730	380	1.635	485
2	23.875	1.195	19.100	765	11.935	475	9.550	285	6.365	190	8.115	245
3	15.915	795	12.730	510	7.960	320	6.365	190	4.245	125	5.410	160
4	11.935	955	9.550	570	5.970	360	4.775	190	3.185	125	4.060	160
5	9.550	765	7.640	460	4.775	285	3.820	155	2.545	100	3.245	130
6	7.955	795	6.635	510	3.980	240	3.185	125	2.120	85	2.705	110
7	6.820	680	5.455	435	3.410	205	2.730	110	1.820	75	2.230	95
8	5.965	595	4.775	380	2.985	180	2.385	95	1.590	65	2.030	80
9	5.305	635	4.245	425	2.655	210	2.120	105	1.415	70	1.805	90
10	4.775	670	3.820	460	2.385	240	1.910	115	1.270	75	1.625	95
11	4.340	610	3.470	415	2.170	215	1.735	105	1.155	70	1.475	90
12	3.980	555	3.185	380	1.990	200	1.590	95	1.060	65	1.355	80
14	3.410	475	2.730	325	1.705	170	1.365	95	910	65	1.160	80
16	2.985	420	2.385	285	1.490	150	1.195	95	795	65	1.015	80
18	2.655	370	2.120	255	1.325	135	1.060	95	705	65	900	80
20	2.385	380	1.910	265	1.195	145	955	95	635	65	810	80
Profundidad de corte *Depth of cut*												

MATERIAL	Acero no aleado <500 N/mm² *Unalloyed steel <500 N/mm²*		Acero no aleado 500-700 N/mm² *Unalloyed steel 500-700 N/mm²*		Acero no aleado >700 N/mm² *Unalloyed steel >700 N/mm²*		Acero aleado <1.400 N/mm² *Alloyed Steel <1.400 N/mm²*		Acero aleado > 1.400 N/mm² *Alloyed Steel <1.400 N/mm²*		Acero inoxidable *Stainless steel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	35.015	1.750	28.650	1.145	23.875	1.195	20.690	830	55.705	2.230	143.240	5.730
2	17.505	875	14.325	570	11.935	595	10.345	415	27.850	1.115	71.620	2.865
3	11.670	585	9.550	380	7.960	400	6.895	275	18.570	740	47.745	1.910
4	8.755	700	7.160	430	5.970	595	5.170	415	13.925	1.115	35.810	3.580
5	7.000	560	5.730	345	4.775	480	4.140	330	11.140	890	28.650	2.865
6	5.835	585	4.775	285	3.980	475	3.450	275	9.285	740	23.875	2.865
7	5.000	500	4.095	245	3.410	410	2.955	235	7.960	635	20.460	2.455
8	4.375	440	3.580	215	2.985	360	2.585	205	6.960	555	17.905	2.150
9	3.890	430	3.185	225	2.655	370	2.300	230	6.190	620	15.915	2.545
10	3.500	420	2.865	230	2.385	380	2.070	250	5.570	670	14.325	2.865
11	3.185	380	2.605	210	2.170	345	1.880	225	5.065	610	13.020	2.605
12	2.920	350	2.385	190	1.990	320	1.725	205	4.640	555	11.935	2.385
14	2.500	325	2.045	185	1.705	290	1.480	205	3.980	555	10.230	2.455
16	2.190	305	1.790	180	1.490	270	1.295	205	3.480	555	8.950	2.505
18	1.945	290	1.590	175	1.325	265	1.150	205	3.095	555	7.960	2.545
20	1.750	280	1.430	170	1.195	285	1.035	230	2.785	555	7.160	2.580
Profundidad de corte *Depth of cut*												

CONDICIONES DE CORTE
CUTTING DATA

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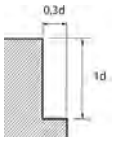
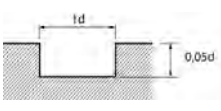
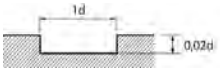
MATERIAL	Acero endurecido 30-40 HRC *Hardened steel 30-40 HRC*		Acero endurecido 40-50 HRC *Hardened steel 40-50 HRC*		Acero endurecido 50-55 HRC *Hardened steel 50-55 HRC*		Acero endurecido 55-60 HRC *Hardened steel 55-60 HRC*		Acero endurecido 60-65 HRC *Hardened steel 60-65 HRC*		Acero endurecido 65-70 HRC *Hardened steel 65-70 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	48.000	1.050	38.000	820	25.500	510	20.500	310	16.000	190	12.500	125
2	33.300	1.200	26.000	970	17.500	600	14.500	370	11.000	230	9.500	165
3	21.800	1.200	17.300	970	11.500	600	9.500	370	7.500	230	6.400	165
4	16.700	1.250	13.200	1.000	8.800	625	7.200	385	5.600	240	4.750	170
5	15.700	1.450	12.500	1.150	8.300	710	6.400	410	5.100	260	4.450	190
6	13.100	1.350	10.350	1.100	6.900	690	5.300	400	4.200	255	3.700	185
8	9.880	1.320	7.800	1.030	5.200	635	4.000	365	3.200	235	2.800	170
10	7.800	1.200	6.150	970	4.100	590	3.200	340	2.550	220	2.200	160
12	6.650	1.200	5.250	970	3.500	590	2.650	340	2.100	220	1.860	160
16	4.900	1.050	3.900	840	2.600	520	2.000	300	1.600	190	1.400	140
20	3.900	950	3.100	750	2.050	475	1.600	275	1.300	175	1.100	125
12	3.979	557	3.183	382	1.989	199	1.592	96	1.061	64	1.353	81
14	3.410	477	2.728	327	1.705	171	1.364	95	909	64	1.160	81
16	2.984	418	2.387	286	1.492	149	1.194	96	796	64	1.015	81
18	2.653	371	2.122	255	1.326	133	1.061	95	707	64	902	81
20	2.387	382	1.910	267	1.194	143	955	96	637	64	812	81
Profundidad de corte *Depth of cut*												

MATERIAL	Acero endurecido 30-40 HRC *Hardened steel 30-40 HRC*		Acero endurecido 40-50 HRC *Hardened steel 40-50 HRC*		Acero endurecido 50-55 HRC *Hardened steel 50-55 HRC*		Acero endurecido 55-60 HRC *Hardened steel 55-60 HRC*		Acero endurecido 60-65 HRC *Hardened steel 60-65 HRC*		Acero endurecido 65-70 HRC *Hardened steel 65-70 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
0,2	50.000	130	45.000	115	40.000	95	33.000	60	33.000	45	26.400	30
0,3	50.000	190	45.000	140	40.000	115	33.000	70	25.000	50	20.000	35
0,4	50.000	235	45.000	180	40.000	140	33.000	90	25.000	55	20.000	40
0,5	50.000	370	45.000	280	40.000	220	33.000	140	25.000	85	20.000	60
0,6	50.000	470	45.000	360	40.000	285	30.000	160	25.000	105	20.000	75
0,8	50.000	600	40.000	440	30.000	295	25.000	185	19.000	110	15.200	80
0,9	49.000	655	39.000	520	27.800	330	22.700	205	17.500	125	14.000	90
1,0	48.000	750	38.000	570	25.500	360	20.500	215	16.000	135	12.500	85
2,0	33.300	850	26.000	680	17.500	420	14.500	260	11.000	160	9.500	115
3,0	21.800	850	17.300	680	11.500	420	9.500	260	7.500	160	16.400	115
4,0	16.700	880	13.200	700	8.800	440	7.200	270	5.600	170	4.750	118
5,0	15.700	1.000	12.500	805	8.300	500	6.400	285	5.100	180	4.450	132
6,0	13.200	950	10.350	770	6.900	480	5.300	280	4.200	180	3.700	130
8,0	9.880	930	7.800	720	5.200	445	4.000	255	3.200	165	2.800	120
10,0	7.800	850	6.150	680	4.100	415	3.200	240	2.550	155	2.200	112
12,0	6.650	850	5.250	680	3.500	415	2.650	240	2.100	155	1.860	112
16,0	4.900	730	3.900	580	2.600	365	2.000	210	1.600	135	1.400	95
20,0	3.900	660	3.100	525	2.050	335	1.600	195	1.300	125	1.100	85
Profundidad de corte *Depth of cut*												

CONDICIONES DE CORTE
CUTTING DATA

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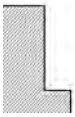
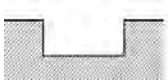
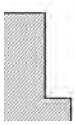
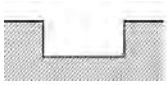
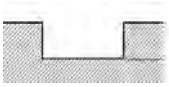
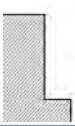
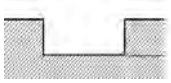
MATERIAL	Acero no aleado <500 N/mm² *Unalloyed steel <500 N/mm²*		Acero no aleado 500-700 N/mm² *Unalloyed steel 500-700 N/mm²*		Acero no aleado >700 N/mm² *Unalloyed steel >700 N/mm*		Acero aleado <1.400 N/mm² *Alloyed steel <1.400 N/mm²*		Acero aleado >1.400 N/mm² *Alloyed steel >1.400 N/mm²*		Acero inoxidable *Stainless steel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	47.745	3.580	38.195	2.290	23.875	1.430	19.100	860	12.730	570	16.235	730
2	23.875	1.790	19.100	1.145	11.935	715	9.550	430	6.365	285	8.115	365
3	15.915	1.195	12.730	765	7.960	475	6.365	285	4.245	190	5.410	245
4	11.935	1.430	9.550	860	5.970	535	4.775	285	3.185	190	4.060	245
5	9.550	1.145	7.640	690	4.775	430	3.820	230	2.545	155	3.245	195
6	7.960	1.195	6.365	765	3.980	360	3.185	190	2.120	125	2.705	160
7	6.820	1.020	5.455	655	3.410	305	2.730	165	1.820	110	2.320	140
8	5.970	895	4.775	570	2.985	270	2.385	145	1.590	95	2.030	120
9	5.305	955	4.245	635	2.655	320	2.120	160	1.415	105	1.805	135
10	4.775	1.000	3.820	690	2.385	360	1.910	170	1.270	115	1.625	145
11	4.340	910	3.470	625	2.170	325	1.735	155	1.155	105	1.475	135
12	3.980	835	3.185	570	1.990	300	1.590	145	1.060	95	1.355	120
14	3.410	715	2.730	490	1.705	255	1.365	145	910	95	1.160	120
16	2.985	625	2.385	430	1.490	225	1.195	145	795	95	1.015	120
18	2.655	555	2.120	380	1.325	200	1.060	145	705	95	900	120
20	2.385	570	1.910	400	1.195	215	955	145	635	95	810	120
Profundidad de corte *Depth of cut*												

MATERIAL	Fundición GG <500 N/mm² *Cast iron <500 N/mm²*		Fundición GG >500 N/mm² *Cast iron GG >500 N/mm²*		Fundición GGG <200 HB *Cast iron GGG <200 HB*		Fundición GGG >200 HB *Cast iron GGG >200 HB*		Cobre *Copper*		Aleaciones de aluminio *Al alloys*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	35.015	2.625	28.650	1.720	23.875	1.790	20.690	1.240	55.705	3.340	143.240	8.595
2	17.505	1.315	14.325	860	11.935	895	10.345	620	27.850	1.670	71.620	4.295
3	11.670	875	9.550	570	7.960	595	6.895	415	18.570	1.115	47.745	2.865
4	8.755	1.050	7.160	645	5.970	895	5.170	620	13.925	1.670	35.810	5.370
5	7.000	840	5.730	515	4.775	715	4.140	495	11.140	1.335	28.650	4.295
6	5.835	875	4.775	430	3.980	715	3.450	415	9.285	1.115	23.875	4.295
7	5.000	750	4.095	370	3.410	615	2.955	355	7.960	955	20.460	3.685
8	4.375	655	3.580	320	2.985	535	2.585	310	6.960	835	17.905	3.225
9	3.890	640	3.185	335	2.655	555	2.300	345	6.190	930	15.915	3.820
10	3.500	630	2.865	345	2.385	570	2.070	370	5.570	1.000	14.325	4.295
11	3.185	570	2.605	310	2.170	520	1.880	340	5.065	910	13.020	3.905
12	2.920	525	2.385	285	1.990	475	1.725	310	4.640	835	11.935	3.580
14	2.500	490	2.045	275	1.705	435	1.480	310	3.980	835	10.230	3.685
16	2.190	460	1.790	270	1.490	400	1.295	310	3.480	835	8.950	3.760
18	1.945	440	1.590	265	1.325	400	1.150	310	3.095	835	7.960	3.820
20	1.750	420	1.430	260	1.195	430	1.035	340	2.785	835	7.160	3.865
Profundidad de corte *Depth of cut*												

CONDICIONES DE CORTE
CUTTING DATA

F-402 - pag. 49 | **F-404** - pag. 53 | **F-444** - pag. 54

MATERIAL	Acero no aleado <500 N/mm² *Unalloyed steel <500 N/mm²*		Acero no aleado 500-700 N/mm² *Unalloyed steel 500-700 N/mm²*		Acero no aleado >700 N/mm² *Unalloyed steel >700 N/mm*		Acero aleado <1.400 N/mm² *Alloyed steel <1.400 N/mm²*		Acero aleado >1.400 N/mm² *Alloyed steel >1.400 N/mm²*		Acero inoxidable *Stainless steel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	47.745	4.775	38.195	3.055	23.875	1.910	19.100	1.145	12.730	765	16.235	975
2	23.875	2.385	19.100	1.530	11.935	955	9.550	570	6.365	380	8.115	485
3	15.915	1.590	12.730	1.020	7.960	635	6.365	380	4.245	255	5.410	325
4	11.935	1.910	9.550	1.145	5.970	715	4.775	380	3.185	255	4.060	325
5	9.550	1.530	7.640	915	4.775	570	3.820	305	2.545	205	3.245	260
6	7.960	1.590	6.365	1.020	3.980	475	3.185	255	2.120	170	2.705	215
7	6.820	1.365	5.455	870	3.410	410	2.730	220	1.820	145	2.320	185
8	5.970	1.195	4.775	765	2.985	360	2.385	190	1.590	125	2.030	160
9	5.305	1.270	4.245	850	2.655	425	2.120	210	1.415	140	1.805	180
10	4.775	1.335	3.820	915	2.385	475	1.910	230	1.270	155	1.625	195
11	4.340	1.215	3.470	830	2.170	435	1.735	210	1.155	140	1.475	175
12	3.980	1.115	3.185	765	1.990	400	1.590	190	1.060	125	1.355	160
14	3.410	955	2.730	655	1.705	340	1.365	190	910	125	1.160	160
16	2.985	835	2.385	570	1.490	300	1.195	190	795	125	1.015	160
18	2.655	740	2.120	510	1.325	265	1.060	190	705	125	900	160
20	2.385	765	1.910	535	1.195	285	955	190	635	125	810	160
Profundidad de corte *Depth of cut*												

MATERIAL	Fundición GG <500 N/mm² *Cast iron <500 N/mm²*		Fundición GG >500 N/mm² *Cast iron GG >500 N/mm²*		Fundición GGG <200 HB *Cast iron GGG <200 HB*		Fundición GGG >200 HB *Cast iron GGG >200 HB*		Cobre *Copper*		Aleaciones de aluminio *Al alloys*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	35.015	3.500	28.650	2.290	23.875	2.385	20.690	1.655	55.705	4.455	143.240	11.460
2	17.505	1.750	14.325	1.145	11.935	1.195	10.345	830	27.850	2.230	71.620	5.730
3	11.670	1.165	9.550	765	7.960	795	6.895	550	18.570	1.485	47.745	3.820
4	8.755	1.400	7.160	860	5.970	1.195	5.170	830	13.925	2.230	35.810	7.160
5	7.000	1.120	5.730	690	4.775	955	4.140	660	11.140	1.785	28.650	5.730
6	5.835	1.165	4.775	570	3.980	955	3.450	550	9.285	1.485	23.875	5.730
7	5.000	1.000	4.095	490	3.410	820	2.955	470	7.960	1.270	20.460	4.910
8	4.375	875	3.580	430	2.985	715	2.585	415	6.960	1.115	17.905	4.295
9	3.890	855	3.185	445	2.655	740	2.300	460	6.190	1.240	15.915	5.095
10	3.500	840	2.865	460	2.385	765	2.070	495	5.570	1.335	14.325	5.730
11	3.185	765	2.605	415	2.170	695	1.880	450	5.065	1.215	13.020	5.210
12	2.920	700	2.385	380	1.990	635	1.725	415	4.640	1.115	11.935	4.775
14	2.500	650	2.045	370	1.705	580	1.480	415	3.980	1.115	10.230	4.910
16	2.190	610	1.790	360	1.490	535	1.295	415	3.480	1.115	8.950	5.015
18	1.945	585	1.590	350	1.325	530	1.150	415	3.095	1.115	7.960	5.095
20	1.750	560	1.430	345	1.195	570	1.035	455	2.785	1.115	7.160	5.155
Profundidad de corte *Depth of cut*												

CONDICIONES DE CORTE
CUTTING DATA

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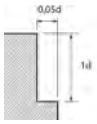
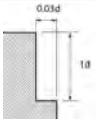
MATERIAL	Acero endurecido 30-40 HRC *Hardened steel 35-40 HRC*		Acero endurecido 40-50 HRC *Hardened steel 40-50 HRC*		Acero endurecido 50-55 HRC *Hardened steel 50-55 HRC*		Acero endurecido 55-60 HRC *Hardened steel 50-60 HRC*		Acero endurecido 60-65 HRC *Hardened steel 60-65 HRC*		Acero endurecido 65-70 HRC *Hardened steel 65-70 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	48.000	1.480	38.000	1.050	25.500	710	20.500	430	16.000	270	12.500	175
2	33.300	1.750	26.000	1.250	17.500	840	14.500	520	11.000	320	9.500	230
3	21.800	1.750	17.300	1.250	11.500	840	9.500	520	7.500	320	6.400	230
4	16.700	1.800	13.200	1.300	8.800	880	7.200	540	5.600	335	4.750	240
5	15.700	2.000	12.500	1.500	8.300	1.000	6.400	580	5.100	370	4.450	270
6	13.100	1.950	10.350	1.400	6.900	950	5.300	560	4.200	350	3.700	260
8	9.880	1.880	7.800	1.350	5.200	900	4.000	520	3.200	330	2.800	240
10	7.800	1.750	6.150	1.260	4.100	840	3.200	480	2.550	310	2.200	220
12	6.650	1.750	5.250	1.260	3.500	840	2.650	480	2.100	300	1.860	220
16	4.900	1.500	3.900	1.100	2.600	730	2.000	420	1.600	270	1.400	200
20	3.900	1.300	3.100	970	2.050	650	1.600	380	1.300	250	1.100	180
Profundidad de corte *Depth of cut*												

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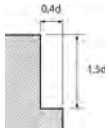
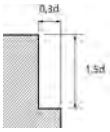
MATERIAL	Acero al carbono <750 N/mm² *Carbon steel <750 N/mm²*		Acero aleado <30 HRC *Alloy steel <30 HRC*		Acero endurecido 30-38 HRC *Prehardened steel 30-38 HRC*		Acero inoxidable 38-45 HRC *Stainless steel 38-45 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
4	5.800	600	4.800	300	4.100	200	3.200	150
5	5.800	600	4.800	310	3.700	230	2.800	170
6	4.800	600	4.200	330	3.200	250	2.400	200
8	3.700	600	3.100	380	2.400	290	1.800	220
10	3.000	600	2.500	400	1.800	300	1.500	250
12	2.400	600	2.100	410	1.600	310	1.300	250
14	1.850	600	1.600	440	1.200	330	1.000	250
20	1.500	550	1.300	430	900	320	750	240
Profundidad de corte *Depth of cut*								

MATERIAL	Acero al carbono <750 N/mm² *Carbon steel <750 N/mm²*		Aleación de acero <30 HRC *Alloy steel <30 HRC*		Acero preendurecido 30-38 HRC *Prehardened steel 30-38 HRC*		Acero inoxidable 38-45 HRC *Stainless steel 38-45 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
4	4.600	500	4.400	230	3.200	160	2.800	130
5	4.600	500	4.000	250	2.900	180	2.500	150
6	4.100	500	3.500	280	2.700	210	2.200	170
8	3.100	500	2.500	310	2.100	240	1.700	210
10	2.500	500	2.100	330	1.600	250	1.300	210
12	2.100	500	1.700	350	1.400	270	1.100	220
14	1.600	500	1.300	360	1.000	290	800	230
20	1.300	480	1.000	360	800	270	650	210
Profundidad de corte *Depth of cut*								

CONDICIONES DE CORTE
CUTTING DATA

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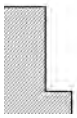
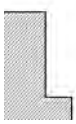
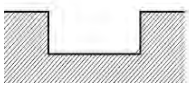
Desbaste / Roughing

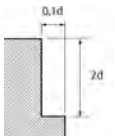
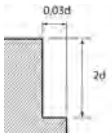
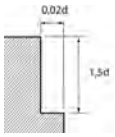
MATERIAL	Acero <1.000 N/mm² *Steel <1.000 N/mm²*		Acero 1.000-1.600 N/mm² *Steel 1.000-1.600 N/mm²*		Fundición GG <200 HB *Cast iron GG <200 HB*		Fundición GGG 200-300 HB *Cast iron GGG 200-300 HB*		Acero inoxidable *Stainless steel*		Titanio *Titanium*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
2	25.465	6.110	15.915	3.150	24.985	5.995	17.505	3.360	14.960	2.244	11.775	1.765
3	16.975	4.075	10.610	2.100	16.660	4.000	11.670	2.240	9.975	1.496	7.850	1.180
4	12.730	3.055	7.960	1.575	12.495	3.000	8.755	1.680	7.480	1.122	5.890	880
5	10.185	2.445	6.365	1.260	9.995	2.400	7.000	1.345	5.985	898	4.710	705
6	8.490	2.035	5.305	1.050	8.330	2.000	5.835	1.120	4.985	748	3.925	590
8	6.365	2.290	3.980	1.240	6.245	2.250	4.375	1.260	3.740	561	2.945	440
10	5.095	2.445	3.185	1.300	4.995	2.400	3.500	1.345	2.290	898	2.355	705
12	4.245	2.545	2.655	1.355	4.165	2.500	2.920	1.400	2.495	897	1.965	705
14	3.640	2.185	2.275	1.160	3.570	2.140	2.500	1.200	2.135	769	1.680	605
16	3.185	1.910	1.990	1.015	3.125	1.875	2.190	1.050	1.870	673	1.470	530
18	2.830	1.865	1.770	955	2.775	1.830	1.945	1.015	1.660	698	1.310	550
20	2.545	1.835	1.590	955	2.500	1.800	1.750	1.010	1.495	718	1.180	565
25	2.035	1.590	1.270	840	2.000	1.560	1.400	840	1.195	575	940	450
Profundidad de corte *Depth of cut*												

Acabado / Finishing

MATERIAL	Acero <1.000 N/mm² *Steel <1.000 N/mm²*		Acero 1.000-1.600 N/mm² *Steel 1.000-1.600 N/mm²*		Fundición GG <200 HB *Cast iron GG <200 HB*		Fundición GGG 200-300 HB *Cast iron GGG 200-300 HB*		Acero inoxidable *Stainless steel*		Titanio *Titanium*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
2	29.920	7.180	20.690	4.095	29.920	7.180	21.170	4.065	17.985	2.700	14.005	2.100
3	19.945	4.075	13.790	2.730	19.945	4.785	14.110	2.710	11.990	1.800	9.335	1.400
4	14.960	3.590	10.345	2.050	14.960	3.590	10.585	2.030	8.990	1.350	7.000	1.050
5	11.970	2.870	8.275	1.640	11.970	2.870	8.465	1.625	7.195	1.080	5.600	840
6	9.975	2.395	6.895	1.365	9.975	2.395	7.055	1.355	5.995	900	4.670	700
8	7.480	2.695	5.170	1.615	7.480	2.695	5.290	1.525	4.495	675	3.500	525
10	5.985	2.870	4.140	1.690	5.985	2.870	4.235	1.625	3.595	1.080	2.800	840
12	4.985	2.990	3.450	1.760	4.985	2.990	3.530	1.695	2.995	1.080	2.335	840
14	4.275	2.565	2.955	1.510	4.275	2.565	3.025	1.450	2.570	925	2.000	720
16	3.740	2.245	2.585	1.320	3.740	2.245	2.645	1.270	2.250	810	1.750	630
18	3.325	2.195	2.300	1.240	3.325	2.195	2.350	1.230	2.000	840	1.555	655
20	2.990	2.155	2.070	1.240	2.990	2.155	2.115	1.220	1.800	860	1.400	670
25	2.395	1.865	1.655	1.090	2.395	1.865	1.695	1.015	1.440	690	1.120	540
Profundidad de corte *Depth of cut*												

CONDICIONES DE CORTE
CUTTING DATA

Acabado / Finishing

MATERIAL	Acero preendurecido <35 HRC *Prehardened steel <35 HRC*		Acero preendurecido 35-45 HRC *Prehardened steel 35-45 HRC*		Acero endurecido 46-55 HRC *Herdened steel 46-55 HRC*		Acero endurecido 56-65 HRC *Hardened steel 56-65 HRC*		Acero endurecido 66-70 HRC *Hardened steel 66-70 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
2	42.175	10.120	41.380	9.930	34.220	8.210	26.260	6.300	19.100	4.585
3	28.115	6.750	27.585	6.620	22.810	5.475	17.505	4.200	12.730	3.055
4	21.090	5.060	20.690	4.965	17.110	4.105	13.130	3.150	9.550	2.290
5	16.870	4.050	16.550	3.970	13.685	3.285	10.505	2.520	7.640	1.835
6	14.060	3.375	13.790	3.310	11.405	2.735	8.755	2.100	6.365	1.530
8	10.545	3.795	10.345	3.725	8.555	3.080	6.565	2.365	4.775	1.720
10	8.435	4.050	8.275	3.970	6.845	3.285	5.250	2.520	3.820	1.835
12	7.030	4.215	6.895	4.140	5.700	3.420	4.375	2.625	3.185	1.910
14	6.025	3.615	5.910	3.545	4.890	2.935	3.750	2.250	2.730	1.635
16	5.270	3.165	5.170	3.105	4.275	2.565	3.285	1.970	2.385	1.430
18	4.680	3.095	4.600	3.035	3.800	2.510	2.920	1.925	2.120	1.400
20	4.220	3.035	4.140	2.980	3.420	2.465	2.625	1.890	1.910	1.375
25	3.375	2.630	3.310	2.580	2.735	2.135	2.100	1.640	1.530	1.190
Profundidad de corte *Depth of cut*										

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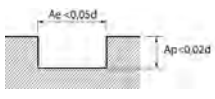
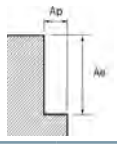
MATERIAL	Acero <1.200 N/mm² *Steel <1.200 N/mm²*		Acero 1.200-1.600 N/mm² *Steel 1.200-1.600 N/mm²*		Acero endurecido <54 HRC *Hardened steel <68 HRC*		Acero templado <68 HRC *Hardened steel <68 HRC*		Aleaciones Cr-Ni <900 N/mm² *Cr-Ni alloys <900 N/mm²*		Aleaciones Ti <850 N/mm² *Ti alloys <850 N/mm²*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	37.500	3.200	35.000	3.000	26.500	2.200	13.600	1.200	56.000	4.650	48.000	3.950
2	37.500	3.100	35.000	2.900	26.500	2.100	13.500	1.100	56.000	4.550	48.000	3.850
3	37.500	3.000	35.000	2.800	26.500	2.000	13.400	1.000	56.000	4.450	48.000	3.700
4	28.000	2.550	27.000	2.350	19.500	1.800	10.000	900	42.000	3.750	36.000	3.250
5	225.00	2.250	21.000	2.100	16.000	1.600	7.500	800	33.500	3.300	29.000	2.900
6	19.000	1.900	17.500	1.900	13.000	1.400	6.500	700	28.000	3.050	24.000	2.600
8	14.000	1.400	11.000	1.750	10.000	1.300	5.000	650	21.000	2.700	1.800	2.350
10	11.000	1.750	10.500	1.500	8.000	1.100	4.000	550	17.000	2.350	14.500	2.000
12	9.500	1.500	8.500	1.400	6.500	1.050	3.500	500	14.000	2.250	12.000	1.900
16	6.400	1.250	6.550	1.175	4.850	850	2.500	435	10.500	1.850	9.000	1.650
Profundidad de corte *Depth of cut*												

CONDICIONES DE CORTE
CUTTING DATA

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MATERIAL		Vc [m/min]	ae max [mm]	ap max [mm]	fz [mm] = Ø 3 = Ø 4	> Ø 4 = Ø 8	> Ø 8 = Ø 12	> Ø 12 = Ø 16	> Ø 16 = Ø 20	> Ø 20 = Ø 25	> Ø 25 = Ø 30
Acero para muelles		130	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		120	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		115	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero de nitruración		120	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero templado y revenido		120	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		110	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero para herramientas sin alear		135	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero para herramientas (trabajo en frío)		130	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		120	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		110	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		100	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		90	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero para herramientas (trabajo en caliente)		120	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		110	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		100	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		90	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		85	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero para herramientas templado	< 55 HRC	80	0,05xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
	55 - 58 HRC	70	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
	58 - 60 HRC	60	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
	60 - 62 HRC	45	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
	62 - 64 HRC	35	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16

CONDICIONES DE CORTE
CUTTING DATA

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MATERIAL		Vc [m/min]	ae max [mm]	ap max [mm]	fz [mm] = Ø 3 = Ø 4	> Ø 4 = Ø 8	> Ø 8 = Ø 12	> Ø 12 = Ø 16	> Ø 16 = Ø 20	> Ø 20 = Ø 25	> Ø 25 = Ø 30
Acero para muelles		110	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		100	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		90	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero de nitruración		95	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero templado y revenido		95	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		90	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero para herramientas sin alear		120	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero para herramientas (trabajo en frío)		110	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		100	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		90	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		80	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		60	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero para herramientas (trabajo en caliente)		100	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		90	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		80	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		70	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
		60	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
Acero para herramientas templado	< 55 HRC	55	0,03xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
	55 - 58 HRC	50	0,02xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
	58 - 60 HRC	40	0,02xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
	60 - 62 HRC	30	0,02xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16
	62 - 64 HRC	25	0,02xØ	1,5xØ	0,04	0,045	0,06	0,07	0,1	0,125	0,16

CONDICIONES DE CORTE
CUTTING DATA

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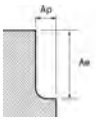
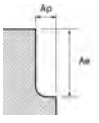
MATERIAL		Cobre *Copper*				Acero endurecido 35-45 HRC *Hardened steel 35-45 HRC*			
d1 [mm]	d2 [mm]	Ae [mm]	Ap [mm]	n [rpm]	F [mm/min]	Ae [mm]	Ap [mm]	n [rpm]	F [mm/min]
0,6	6	0,031	0,038	14.300	250	0,009	0,003	14.300	210
0,8	4	0,112	0,168	15.000	460	0,099	0,012	14.800	380
0,8	8	0,026	0,085	11.000	260	0,077	0,004	11.000	230
1	4	0,171	0,344	12.000	830	0,230	0,012	12.000	700
1	10	0,041	0,268	7.500	330	0,107	0,004	7.500	270
1	20	0,015	0,191	6.000	200	0,023	0,026	6.000	160
1,2	10	0,046	0,344	5.800	380	0,061	0,009	5.800	320
1,5	10	0,128	0,482	7.200	760	0,245	0,003	7.200	640
1,5	20	0,036	0,306	5.100	410	0,092	0,006	5.100	350
2	16	0,158	0,612	8.000	830	0,383	0,027	8.000	700
2	30	0,043	0,383	5.100	570	0,115	0,004	5.100	470
2,5	10	0,288	0,727	9.000	1.030	0,459	0,044	9.000	870
3	10	0,332	0,723	9.000	1.360	0,536	0,089	9.000	980
3	30	0,119	0,587	6.000	740	0,323	0,043	6.000	610
4	30	0,170	1,052	5.000	780	0,583	0,024	5.000	650
5	30	0,297	1,530	4.600	850	0,900	0,046	4.600	710
6	20	0,522	1,908	5.200	1.200	1,179	0,414	5.200	1.060
6	40	0,491	1,782	4.000	1.000	1,134	0,356	4.000	790
8	22	0,459	2,210	4.800	1.100	1,320	0,364	4.800	940
8	40	0,432	1,980	3.600	840	1,150	0,314	3.600	700
10	24	0,390	2,510	4.000	900	1,430	0,310	3.900	800
10	45	0,368	2,120	3.000	710	1,160	0,267	3.000	590
12	26	0,328	2,620	3.300	760	1,760	0,260	3.300	670
12	50	0,309	2,100	2.500	600	1,220	0,224	2.500	500

Profundidad de corte
Depth of cut



MATERIAL		Acero endurecido 45-55 HRC *Hardened steel*				Acero endurecido 55-65 HRC *Hardened steel 55-65 HRC*			
d1 [mm]	d2 [mm]	Ae [mm]	Ap [mm]	n [rpm]	F [mm/min]	Ae [mm]	Ap [mm]	n [rpm]	F [mm/min]
0,6	6	0,009	0,003	11.800	160	0,009	0,001	7.600	20
0,8	4	0,099	0,013	12.800	300	0,099	0,006	8.600	35
0,8	8	0,077	0,003	9.300	160	0,077	0,002	6.500	15
1	4	0,230	0,030	10.200	570	0,230	0,014	7.200	70
1	10	0,107	0,011	6.500	230	0,107	0,005	4.600	25
1	20	0,023	0,004	5.200	140	0,023	0,002	3.700	15
1,2	10	0,061	0,007	5.200	260	0,061	0,003	3.800	30
1,5	10	0,245	0,036	6.600	550	0,245	0,020	5.100	70
1,5	20	0,092	0,005	4.700	300	0,092	0,003	3.600	40
2	16	0,383	0,037	7.200	630	0,383	0,012	5.900	90
2	30	0,115	0,004	4.700	430	0,115	0,002	3.700	60
2,5	10	0,459	0,064	8.500	820	0,459	0,041	7.100	130
3	10	0,536	0,089	8.500	760	0,536	0,064	7.600	170
3	30	0,323	0,043	5.500	470	0,323	0,025	5.100	100
4	30	0,583	0,036	4.100	570	0,583	0,026	3.500	130
5	30	0,900	0,065	3.300	470	0,900	0,048	2.800	145
6	20	1,179	0,162	3.100	900	1,179	0,126	2.700	340
6	40	1,134	0,142	2.300	660	1,134	0,107	2.000	265
8	22	1,320	0,143	2.800	790	1,320	0,111	2.400	300
8	40	1,150	0,125	2.100	580	1,150	0,094	1.700	235
10	24	1,430	0,121	2.400	670	1,430	0,094	2.000	255
10	45	1,160	0,106	1.700	490	1,160	0,080	1.500	200
12	26	1,760	0,102	2.000	560	1,760	0,079	1.700	215
12	50	1,220	0,089	1.500	420	1,220	0,067	1.200	165

Profundidad de corte
Depth of cut



CONDICIONES DE CORTE
CUTTING DATA

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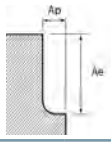
MATERIAL		Acero preendurecido y acero endurecido < 45 HRC *Prehardened and hardened steel < 45 HRC*				Acero endurecido < 55 HRC *Herdened steel < 55 HRC*				Cobre / Aluminio *Copper / Aluminium*			
d1 [mm]	**l2** [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	10	0,35	0,05	18.000	1.000	0,35	0,05	14.000	700	0,50	0,15	18.000	1.200
1	20	0,10	0,03	14.000	700	0,06	0,03	11.000	500	0,30	0,08	14.000	850
1	30	0,03	0,02	10.000	480	0,02	0,02	8.000	300	0,09	0,05	10.000	600
1,5	10	0,55	0,10	16.000	1.300	0,55	0,10	12.800	900	0,60	0,30	16.000	1.500
1,5	20	0,30	0,05	14.000	800	0,20	0,05	11.200	550	0,50	0,16	14.000	900
1,5	10	0,05	0,03	12.000	450	0,03	0,03	9.600	300	0,15	0,09	12.000	550
2	20	0,70	0,07	12.000	1.200	0,70	0,07	9.600	850	0,70	0,20	12.000	1.400
2	30	0,30	0,04	10.000	750	0,30	0,03	8.000	500	0,70	0,13	12.000	900
2	40	0,20	0,03	8.000	400	0,20	0,02	6.400	300	0,50	0,10	10.000	500
3	30	1,05	0,10	9.000	1.200	1,05	0,07	7.200	850	1,10	0,30	8.000	1.400
3	40	0,60	0,07	9.000	1.000	0,60	0,05	7.200	700	0,90	0,21	9.000	1.200
3	50	0,35	0,05	8.000	640	0,35	0,04	6.400	450	0,80	0,15	9.000	750
3	60	0,20	0,03	8.000	480	0,20	0,02	6.400	300	0,70	0,10	8.000	550
4	30	2,00	0,15	8.000	1.400	2,00	0,14	6.500	1.000	2,00	0,60	8.000	1.600
4	40	1,20	0,12	8.000	1.200	1,20	0,10	5.800	850	1,60	0,40	8.000	1.400
4	50	0,70	0,10	7.000	800	0,70	0,08	4.800	600	1,20	0,30	8.000	1.000
4	60	0,40	0,08	7.000	600	0,40	0,04	4.800	400	0,80	0,20	7.000	800
Profundidad de corte *Depth of cut*													

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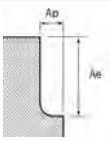
MATERIAL	Acero preendurecido y acero endurecido < 45 HRC *Prehardened and hardened steel < 45 HRC*				Acero endurecido < 55 HRC *Herdened steel < 55 HRC*				Acero endurecido < 65 HRC *Herdened steel < 65 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,107	0,009	7.500	430	0,085	0,008	6.500	430	0,043	0,005	4.600	300
1,2	0,153	0,014	7.700	680	0,128	0,008	6.200	510	0,043	0,005	5.400	680
1,5	0,275	0,025	7.200	710	0,252	0,022	6.600	660	0,138	0,009	5.000	250
2	0,344	0,039	7.800	880	0,344	0,037	7.200	820	0,153	0,015	5.900	360
2,5	0,230	0,041	6.600	1.000	0,191	0,026	6.400	570	0,077	0,019	5.400	250
3	0,493	0,049	7.100	1.300	0,493	0,031	6.700	1.300	0,271	0,019	5.400	470
4	0,800	0,060	6.200	1.200	0,800	0,047	5.200	1.120	0,560	0,022	4.500	630
6	1,148	0,085	2.500	680	0,638	0,085	1.400	400	0,468	0,034	1.200	300
8	2,540	0,184	4.000	1.600	1,320	0,184	2.400	680	1,320	0,087	2.000	650
10	2,730	0,210	3.200	1.750	1,430	0,220	1.900	540	1,450	0,094	1.600	460
12	2,700	0,230	2.500	1.800	1,490	0,240	1.500	430	1,500	0,110	1.300	450
Profundidad de corte *Depth of cut*												

CONDICIONES DE CORTE
CUTTING DATA

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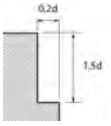
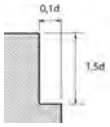
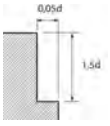
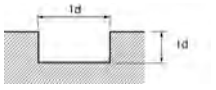
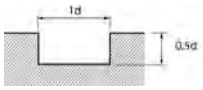
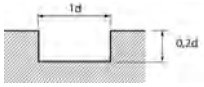
MATERIAL	Acero preendurecido <30 HRC *Prehardened steel <30 HRC*		Acero preendurecido 30-45 HRC *Prehardened steel 30-45 HRC*		Acero inox./ Aleaciones de Ti *Stainless steel/Ti alloys*		Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*		Inconel *Inconel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
6	4.700	880	3.000	510	3.000	480	1.900	265	1.700	185
8	3.500	880	2.200	530	2.200	480	1.400	265	1.300	180
10	2.800	800	1.800	450	1.100	260	1.100	260	1.000	160
12	2.300	800	1.500	510	1.500	420	1.000	260	900	140
16	1.800	640	1.100	400	1.100	360	700	200	650	100
Profundidad de corte *Depth of cut*										

MATERIAL	Acero preendurecido <30 HRC *Prehardened steel <30 HRC*		Acero preendurecido 30-45 HRC *Prehardened steel 30-45 HRC*		Acero inox./ Aleaciones de Ti *Stainless steel/ Ti alloys*		Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*		Inconel *Inconel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
6	4.000	640	2.200	320	2.200	160	1.300	130	800	75
8	3.000	640	1.600	320	1.600	160	1.000	140	600	70
10	2.400	580	1.300	290	1.300	140	800	130	500	65
12	2.000	580	1.000	290	1.000	140	650	130	400	60
16	1.600	480	800	220	800	120	500	100	300	40
Profundidad de corte *Depth of cut*										

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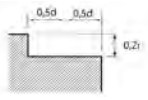
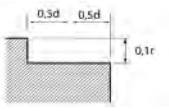
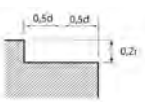
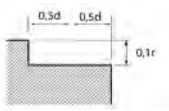
MATERIAL	Acero al carbono <800 N/mm² *Carbon steel <800 N/mm²*			Acero aleado <1.200 N/mm² *Alloy steel <1.200 N/mm²*			Acero inox./ Aleaciones de Ti *Stainless steel/Ti alloys*		
d1 [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
4	0,2	15.120	30.240	0,16	12.730	19.100	0,12	11.140	11.140
6	0,3	10.080	15.120	0,24	8.490	12.730	0,18	7.425	7.425
8	0,4	7.560	7.560	0,32	6.365	9.550	0,24	5.570	5.570
10	0,5	6.050	4.840	0,4	5.095	7.640	0,3	4.455	4.455
12	0,6	5.040	12.095	0,48	4.245	6.365	0,36	3.715	3.715
Profundidad de corte *Depth of cut*									

MATERIAL	Acero 52 - 56 HRC *Steel 52 - 56 HRC*			Fundición gris GG *Cast iron GG*			Fundición nodular GGG *Cast iron GGG*		
d1 [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
4	0,08	8355	6685	0,2	19.100	45.835	0,16	14.325	24.350
6	0,12	5570	4455	0,3	12.730	60.555	0,24	9.550	16.235
8	0,16	4180	3340	0,4	9.550	22.915	0,32	7.160	12.175
10	0,20	3340	2675	0,5	7.640	18.335	0,40	5.730	9.740
12	0,24	2785	2230	0,6	6.365	15.280	0,48	4.775	8.115
Profundidad de corte *Depth of cut*									

CONDICIONES DE CORTE
CUTTING DATA

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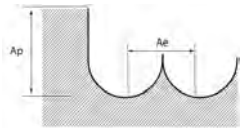
MATERIAL	Acero preendurecido y acero endurecido < 45 HRC *Prehardened and hardened steel < 45 HRC*				Acero endurecido < 55 HRC *Herdened steel < 55 HRC*				Cobre *Copper*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
0,1	0,040	0,004	40.000	250	0,030	0,003	30.000	180	0,040	0,008	40.000	250
0,2	0,035	0,015	50.000	230	0,030	0,080	41.300	240	0,005	0,004	50.000	400
0,3	0,065	0,022	50.000	620	0,045	0,020	41.300	530	0,010	0,010	50.000	680
0,4	0,100	0,035	50.000	800	0,080	0,028	41.300	600	0,010	0,010	50.000	790
0,5	0,120	0,040	46.000	950	0,080	0,030	30.300	700	0,018	0,018	52.000	1.050
0,6	0,145	0,050	45.500	920	0,110	0,040	37.500	720	0,020	0,020	54.000	1.210
0,8	0,150	0,060	42.000	980	0,150	0,050	33.500	800	0,030	0,030	48.000	1.570
1,0	0,204	0,080	33.600	1.000	0,160	0,064	28.000	800	0,020	0,020	32.800	1.300
1,2	0,141	0,077	25.600	640	0,112	0,061	20.160	520	0,014	0,014	21.760	1.120
1,5	0,260	0,120	27.200	800	0,208	0,096	20.800	640	0,042	0,042	21.600	1.500
Profundidad de corte *Depth of cut*												

En operaciones de ranurado disminuir el avance más del 50% | *In slotting operations decrease feed rate more than 50%*

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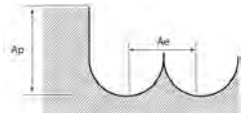
MATERIAL	Acero preendurecido y acero endurecido < 45 HRC *Prehardened and hardened steel < 45 HRC*				Acero endurecido < 55 HRC *Herdened steel < 55 HRC*				Acero endurecido < 65 HRC *Herdened steel < 65 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
0,2	0,004	0,003	42.000	230	0,004	0,003	42.000	180	0,003	0,003	42.000	150
0,3	0,007	0,006	34.000	300	0,005	0,005	28.000	220	0,005	0,004	28.000	180
0,4	0,010	0,010	37.000	400	0,010	0,009	27.000	260	0,010	0,008	27.000	220
0,5	0,008	0,008	29.000	460	0,010	0,007	26.000	370	0,009	0,006	26.000	180
0,6	0,043	0,012	24.000	420	0,042	0,008	22.000	330	0,040	0,007	22.000	280
0,8	0,068	0,028	24.000	530	0,068	0,020	18.000	350	0,065	0,015	18.000	290
1,0	0,056	0,020	13.600	500	0,056	0,014	12.500	380	0,050	0,008	11.400	260
1,5	0,110	0,022	10.100	420	0,110	0,020	8.000	360	0,110	0,012	8.000	340
2,0	0,110	0,060	13.300	500	0,110	0,055	10.600	500	0,110	0,035	10.600	410
3,0	0,320	0,145	10.300	1.230	0,310	0,120	7.100	940	0,300	0,080	4.800	550
4,0	0,320	0,200	7.400	1.150	0,300	0,150	5.500	880	0,300	0,130	5.500	680
5,0	0,550	0,300	7.000	1.150	0,550	0,220	5.000	900	0,500	0,200	5.000	680
6,0	0,650	0,300	6.000	1.400	0,650	0,220	4.200	980	0,600	0,220	3.700	660
8,0	0,750	0,300	5.800	940	0,600	0,160	4.000	720	0,600	0,200	3.600	600
10,0	0,850	0,350	4.500	900	0,600	0,150	3.800	680	0,600	0,200	3.200	540
Profundidad de corte *Depth of cut*												

CONDICIONES DE CORTE
CUTTING DATA

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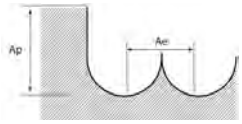
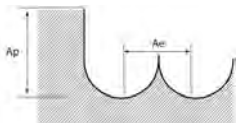
Desbaste convencial / Conventional roughing

MATERIAL	Acero aleado < 1.200 N/mm² *Alloy steel < 1.200 N/mm²*				Acero aleado 1.200 - 1.450 N/mm² *Alloy steel 1.200 - 1:450 N/mm²*				Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,300	0,070	38.195	750	0,300	0,070	38.195	750	0,250	0,055	33.420	400
2	0,600	0,140	19.100	1.200	0,600	0,140	19.100	1.200	0,500	0,110	16.710	600
3	0,900	0,210	12.730	1.600	0,900	0,210	12.730	1.600	0,750	0,165	11.140	1.000
4	1,200	0,280	9.550	1.700	1,200	0,280	9.550	1.400	1,000	0,220	8.355	900
5	1,500	0,350	7.640	1.900	1,500	0,350	7.640	1.600	1,250	0,275	6.685	1.000
6	1,800	0,420	6.365	2.100	1,800	0,420	6.365	1.700	1,500	0,330	5.570	1.200
8	2,400	0,560	4.775	2.200	2,400	0,560	4.775	1.800	2,000	0,440	4.175	1.250
10	3,000	0,700	3.820	2.000	3,000	0,700	3.820	1.800	2,500	0,550	3.340	1.100
12	3,600	0,840	3.185	1.800	3,600	0,840	3.185	1.600	3,000	0,660	2.785	1.000
14	4,200	0,980	2.730	1.700	4,200	0,980	2.730	1.500	3,500	0,770	2.385	950
16	4,800	1,120	2.385	1.600	4,800	1,120	2.385	1.400	4,000	0,880	2.090	900
20	6,000	1,400	1.190	1.500	6,000	1,400	1.910	1.300	5,000	1,100	1.670	800
Profundidad de corte *Depth of cut*												

MATERIAL	Acero endurecido 55-65 HRC *Hardened steel 55-65 HRC*				Acero endurecido 65-70 HRC *Hardened steel 65-70 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,250	0,035	28.645	400	0,200	0,025	2.0690	330
2	0,500	0,070	14.325	500	0,400	0,050	10.345	330
3	0,750	0,105	9.550	650	0,600	0,075	6.895	340
4	1,000	0,140	7.160	800	0,800	0,100	5.170	400
5	1,250	0,175	5.730	800	1,000	0,125	4.140	500
6	1,500	0,210	4.775	900	1,200	0,150	3.450	600
8	2,000	0,280	3.580	800	1,600	0,200	2.585	550
10	2,500	0,350	2.865	900	2,000	0,250	2.070	600
12	3,000	0,420	2.385	800	2,400	0,300	1.725	550
14	3,500	0,490	2.045	800	2,800	0,350	1.475	500
16	4,000	0,560	1.790	700	3,200	0,400	1.295	500
20	5,000	0,700	1.430	700	4,000	0,500	1.035	450
Profundidad de corte *Depth of cut*								

CONDICIONES DE CORTE
CUTTING DATA

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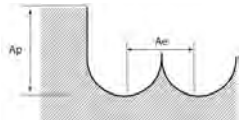
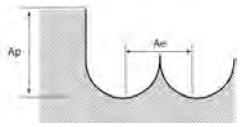
Acabado alta velocidad / HSC

MATERIAL	Acero aleado < 1.200 N/mm² *Alloy steel < 1.200 N/mm²*				Acero aleado 1.200 - 1.450 N/mm² *Alloy steel 1.200 - 1:450 N/mm²*				Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,300	0,070	79.575	3.200	0,300	0,070	95.490	3.200	0,250	0,055	68.435	3.000
2	0,600	0,140	39.790	2.800	0,600	0,140	47.745	2.800	0,500	0,110	34.220	2.300
3	0,900	0,210	26.525	3.200	0,900	0,210	31.830	3.200	0,750	0,165	22.810	2.200
4	1,200	0,280	19.895	3.400	1,200	0,280	23.875	2.900	1,000	0,220	17.110	2.500
5	1,500	0,350	15.915	3.600	1,500	0,350	19.100	3.000	1,250	0,275	13.685	2.600
6	1,800	0,420	13.260	4.000	1,800	0,420	15.915	3.300	1,500	0,330	11.405	2.700
8	2,400	0,560	9.945	4.100	2,400	0,560	11.935	3.500	2,000	0,440	8.555	2.600
10	3,000	0,700	7.955	3.900	3,000	0,700	9.550	3.400	2,500	0,550	6.845	2.500
12	3,600	0,840	6.630	3.500	3,600	0,840	7.960	3.000	3,000	0,660	5.705	2.200
14	4,200	0,980	5.685	3.400	4,200	0,980	6.820	2.900	3,500	0,770	4.890	2.100
16	4,800	1,120	4.975	3.300	4,800	1,120	5.970	2.800	4,000	0,880	4.275	2.000
20	6,000	1,400	3.980	3.100	6,000	1,400	4.775	2.600	5,000	1,100	3.420	1.900
Profundidad de corte *Depth of cut*												

MATERIAL	Acero endurecido 55-65 HRC *Hardened steel 55-65 HRC*				Acero endurecido 65-70 HRC *Hardened steel 65-70 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,250	0,035	66.845	1.100	0,200	0,025	44.565	800
2	0,500	0,070	33.420	1.000	0,400	0,050	22.280	800
3	0,750	0,105	22.280	1.700	0,600	0,075	14.855	1.000
4	1,000	0,140	16.710	1.600	0,800	0,100	11.140	900
5	1,250	0,175	13.370	1.800	1,000	0,125	8.910	1.200
6	1,500	0,210	11.140	2.000	1,200	0,150	7.425	1.400
8	2,000	0,280	8.355	1.900	1,600	0,200	5.570	1.300
10	2,500	0,350	6.685	2.000	2,000	0,250	4.455	1.350
12	3,000	0,420	5.570	1.800	2,400	0,300	3.715	1.200
14	3,500	0,490	4.775	1.700	2,800	0,350	3.185	1.150
16	4,000	0,560	4.175	1.600	3,200	0,400	2.785	1.100
20	5,000	0,700	3.340	1.400	4,000	0,500	2.230	1.000
Profundidad de corte *Depth of cut*								

CONDICIONES DE CORTE
CUTTING DATA

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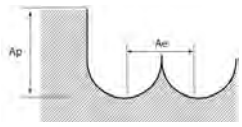
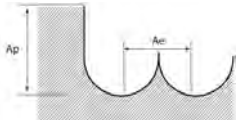
Desbaste convencial / Conventional roughing

MATERIAL	Acero aleado < 1.200 N/mm² *Alloy steel < 1.200 N/mm²*				Acero aleado 1.200 - 1.450 N/mm² *Alloy steel 1.200 - 1.450 N/mm²*				Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,035	0,075	41.380	1.900	0,035	0,075	41.380	0,030	0,030	0,065	33420	1.500
2	0,070	0,150	20.690	2.300	0,070	0,150	20.690	0,060	0,060	0,130	16710	1.900
3	0,105	0,225	13.790	2.700	0,105	0,225	13.790	0,090	0,090	0,195	11140	1.700
4	0,140	0,300	10.345	2.600	0,140	0,300	10.345	0,120	0,120	0,260	8355	1.600
5	0,175	0,375	8.275	2.400	0,175	0,375	8.275	0,150	0,150	0,325	6685	1.700
6	0,210	0,450	6.895	2.100	0,210	0,450	6.895	0,180	0,180	0,390	5570	1.800
8	0,280	0,600	5.170	2.000	0,280	0,600	5.170	0,240	0,240	0,520	4180	1.400
10	0,350	0,750	4.140	1.700	0,350	0,750	4.140	0,300	0,300	0,650	3340	1.200
12	0,420	0,900	3.450	1.500	0,420	0,900	3.450	0,360	0,360	0,780	2785	1.100
14	0,490	1,050	2.955	1.400	0,490	1,050	2.955	0,420	0,420	0,910	2385	1.000
16	0,560	1,200	2.585	1.300	0,560	1,200	2.585	0,480	0,480	1,040	2090	900
20	0,700	1,500	2.070	1.200	0,700	1,500	2.070	0,600	0,600	1,300	1670	750
Profundidad de corte *Depth of cut*												

MATERIAL	Acero endurecido 55-65 HRC *Hardened steel 55-65 HRC*				Acero endurecido 65-70 HRC *Hardened steel 65-70 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,030	0,050	33.420	1100	0,025	0,030	28.965	1.200
2	0,060	0,100	16.710	2000	0,050	0,060	14.480	1.400
3	0,090	0,150	11.140	1500	0,075	0,090	9.655	1.200
4	0,120	0,200	8.355	1500	0,100	0,120	7.240	1.100
5	0,150	0,250	6.685	1600	0,125	0,150	5.790	1.200
6	0,180	0,300	5.570	1600	0,150	0,180	4.830	1.300
8	0,240	0,400	4.180	1300	0,200	0,240	3.620	1.000
10	0,300	0,500	3.340	1100	0,250	0,300	2.895	900
12	0,360	0,600	2.785	1000	0,300	0,360	2.415	800
14	0,420	0,700	2.385	900	0,350	0,420	2.070	700
16	0,480	0,800	2.090	800	0,400	0,480	1.810	650
20	0,600	1,000	1.670	700	0,500	0,600	1.450	600
Profundidad de corte *Depth of cut*								

CONDICIONES DE CORTE
CUTTING DATA

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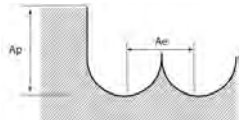
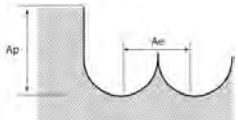
Acabado alta velocidad / HSC

MATERIAL	Acero aleado < 1.200 N/mm² *Alloy steel < 1.200 N/mm²*				Acero aleado 1.200 - 1.450 N/mm² *Alloy steel 1.200 - 1:450 N/mm²*				Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,035	0,075	95.490	1.900	0,035	0,075	95.490	1.900	0,030	0,065	84.350	1.500
2	0,070	0,150	47.745	2.300	0,070	0,150	47.745	2.300	0,060	0,130	4.2175	1.900
3	0,105	0,225	31.830	2.700	0,105	0,225	31.830	2.700	0,090	0,195	2.8115	1.700
4	0,140	0,300	23.875	2.600	0,140	0,300	23.875	2.600	0,120	0,260	21.090	1.600
5	0,175	0,375	19.100	2.400	0,175	0,375	19.100	2.400	0,150	0,325	16.870	1.700
6	0,210	0,450	15.915	2.100	0,210	0,450	15.915	2.100	0,180	0,390	14.060	1.800
8	0,280	0,600	11.935	2.000	0,280	0,600	11.935	2.000	0,240	0,520	10.545	1.400
10	0,350	0,750	9.550	1.700	0,350	0,750	9.550	1.700	0,300	0,650	8.435	1.200
.12	0,420	0,900	7.960	1.500	0,420	0,900	7.960	1.500	0,360	0,780	7.030	1.100
14	0,490	1,050	6.820	1.400	0,490	1,050	6.820	1.400	0,420	0,910	6.025	1.000
16	0,560	1,200	5.970	1.300	0,560	1,200	5.970	1.300	0,480	1,040	5.270	900
20	0,700	1,500	4.775	1.200	0,700	1,500	4.775	1.200	0,600	1,300	4.220	750
Profundidad de corte *Depth of cut*												

MATERIAL	Acero endurecido 55-65 HRC *Hardened steel 55-65 HRC*				Acero endurecido 65-70 HRC *Hardened steel 65-70 HRC*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
1	0,030	0,050	71.620	1.100	0,025	0,030	55.705	1.200
2	0,060	0,100	35.810	2.000	0,050	0,060	27.850	1.400
3	0,090	0,150	23.875	1.500	0,075	0,090	18.570	1.200
4	0,120	0,200	17.905	1.500	0,100	0,120	13.925	1.100
5	0,150	0,250	14.325	1.600	0,125	0,150	11.140	1.200
6	0,180	0,300	11.935	1.600	0,150	0,180	9.285	1.300
8	0,240	0,400	8.950	1.300	0,200	0,240	6.960	1.000
10	0,300	0,500	7.160	1.100	0,250	0,300	5.570	900
12	0,360	0,600	5.970	1.000	0,300	0,360	4.640	800
14	0,420	0,700	5.115	900	0,350	0,420	3.980	700
16	0,480	0,800	4.475	800	0,400	0,480	3.480	650
20	0,600	1,000	3.580	700	0,500	0,600	2.785	600
Profundidad de corte *Depth of cut*								

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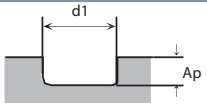
MATERIAL	Acero preendurecido < 45 HRC *Prehardened steel < 45 HRC*			Acero endurecido 45-55 HRC *Stainless steel / Tí alloys*			Acero endurecido 55-65 HRC *Hardened steel 55-65 HRC*		
d1 [mm]	**Ap** [rpm]	**n** [rpm]	**F** [mm/min]	**Ap** [rpm]	**n** [rpm]	**F** [mm/min]	**Ap** [rpm]	**n** [rpm]	**F** [mm/min]
1,0	0.010~0.050	12.000~25.000	75	0.003~0.030	10.000~20.000	300~1.800	0.002~0.040	8.000~18.000	200~1.200
1,5	0.020~0.060	9.000~23.000	90	0.010~0.030	8.000~20.000	400~1.600	0.005~0.040	7.000~18.000	200~1.200
2,0	0.030~0.080	7.000~20.000	100	0.015~0.050	6.000~18.000	400~1.600	0.010~0.050	5.000~15.000	200~1.200
3,0	0.050~0.100	5.000~16.000	155	0.020~0.060	5.000~15.000	400~1.600	0.015~0.070	4.000~10.000	200~1.200
4,0	0.050~0.150	4.500~14.000	185	0.025~0.080	4.000~10.000	400~2.000	0.025~0.070	3.000~.8000	200~1.200
5,0	0.050~0.120	3.500~12.000	200	0.040~0.100	3.000~8.000	400~1.000	0.030~0.080	2.500~6.000	250~800
6,0	0.050~0.120	3.500~12.000	210	0.040~0.120	3.000~8.000	400~1.000	0.030~0.080	2.500~6.000	250~800
8,0	0.060~0.150	4.500~10.000	210	0.050~0.120	2.500~7.000	350~900	0.040~0.100	2.000~5.000	300~700
10,0	0.080~0.150	4.000~8.000	165	0.060~0.120	2.000~5.000	300~800	0.040~0.100	2.000~4500	300~700
12,0	0.080~0.200	3.500~7.000	130	0.070~0.180	2.000~4.000	300~800	0.050~0.120	1.500~4.000	300~650
Profundidad de corte *Depth of cut*									

CONDICIONES DE CORTE
CUTTING DATA

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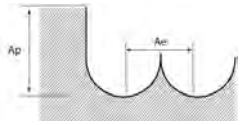
MATERIAL	Acero preendurecido y acero endurecido < 45 HRC *Prehardened and hardened steel < 45 HRC*				Acero endurecido < 55 HRC *Herdened steel < 55 HRC*				Cobre *Copper*			
d1 [mm]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]	**Ae** [mm]	**Ap** [mm]	**n** [rpm]	**F** [mm/min]
0,1	0,040	0,004	40.000	225	0,030	0,003	30.000	160	0,040	0,008	40.000	225
0,2	0,035	0,015	50.000	205	0,030	0,080	41.300	215	0,005	0,004	50.000	360
0,3	0,065	0,022	50.000	560	0,045	0,020	41.300	475	0,010	0,010	50.000	610
0,4	0,100	0,035	50.000	720	0,080	0,028	41.300	540	0,014	0,010	50.000	710
0,5	0,120	0,040	46.000	855	0,080	0,030	38.300	630	0,017	0,018	52.000	945
0,6	0,145	0,050	45.500	830	0,110	0,040	37.500	650	0,020	0,020	54.000	1.090
0,8	0,150	0,060	42.000	880	0,150	0,050	33.500	720	0,025	0,030	48.000	1.415
1,0	0,204	0,080	33.600	900	0,160	0,064	28.000	720	0,032	0,020	32.800	1.170
1,2	0,141	0,077	25.600	575	0,112	0,061	20.160	470	0,032	0,014	21.760	1.010
1,5	0,260	0,120	27.200	720	0,208	0,096	20.800	575	0,054	0,042	21.600	1.350
Profundidad de corte *Depth of cut*												

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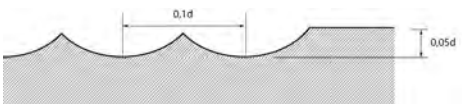
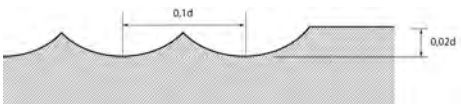
MATERIAL	Acero <30 HRC *Steel <30 HRC*		Acero preendurecido 30-38 HRC *Prehardened steel 30-38 HRC*		Acero endurecido 38-45 HRC/Acero Inoxidable *Hardened steel 38-45 HRC/ Stainless steel*		Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*		Acero endurecido 55 - 60 HRC *Hardened steel 55 - 60 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1,0	25.600	680	25.600	680	25.600	680	25.600	680	25.600	610
1,5	22.000	850	22.000	850	22.000	850	22.000	850	22.000	750
2,0	19.200	1.080	19.200	1.080	19.200	1.080	19.200	1.080	17.600	960
4,0	12.400	1.440	11.200	1.160	10.800	1.160	10.000	1.080	8.800	920
6,0	8.400	1.480	7.600	1.240	7.200	1.240	6.800	1.200	5.900	1.040
8,0	6.400	1.120	5.700	960	5.500	960	5.100	880	4.400	790
10,0	5.100	880	4.600	785	4.400	785	4.000	720	3.600	640
12,0	4.800	840	3.800	640	3.640	640	3.400	600	3.000	540
Profundidad de corte *Depth of cut*										

CONDICIONES DE CORTE
CUTTING DATA

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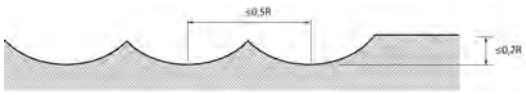
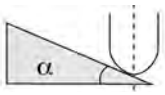
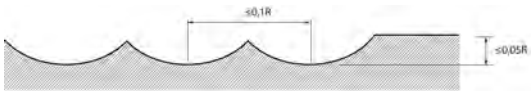
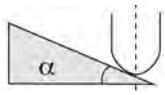
Desbaste / Roughing

MATERIAL	Acero preendurecido < 45 HRC *Prehardened steel < 45 HRC*				Acero endurecido 45-55 HRC / Acero inoxidable *Hardened steel 45-55 HRC / Stainless steel*			
	α ≤ 15º		α ≤ 15º		α ≤ 15º		α ≤ 15º	
d1 [mm]	n [mm]	F [mm]	n [rpm]	F [mm/min]	n [mm]	F [mm]	n [rpm]	F [mm/min]
2	28.800	2.700	22.500	1.100	16.200	1.300	14.400	580
3	22.800	3.000	18.000	1.200	13.100	1.500	11.400	630
4	16.700	3.300	13.000	1.300	10.000	1.600	8.300	670
5	14.200	3.500	11.000	1.300	8.500	1.700	7.100	700
6	11.700	3.600	9.000	1.400	6.900	1.700	5.800	720
8	9.000	4.500	7.000	1.800	5.400	2.100	4.300	830
10	7.200	4.500	5.900	1.800	4.300	2.000	3.400	780
12	5.900	4.100	4.800	1.600	3.600	1.900	2.900	760
Profundidad de corte *Depth of cut*								

Acabado / Finishing

MATERIAL	Acero preendurecido < 45 HRC *Prehardened steel < 45 HRC*				Acero endurecido 45-55 HRC / Acero inoxidable *Hardened steel 45-55 HRC / Stainless steel*			
	α ≤ 15º		α ≤ 15º		α ≤ 15º		α ≤ 15º	
d1 [mm]	n [mm]	F [mm]	n [rpm]	F [mm/min]	n [mm]	F [mm]	n [rpm]	F [mm/min]
2	28.800	2.900	28.800	1.400	22.500	1.800	18.000	700
3	22.900	3.700	23.400	1.600	18.900	2.100	14.900	800
4	23.000	4.500	18.000	1.800	15.300	2.400	11.700	900
5	21.000	5.000	15.800	1.900	13.500	2.500	10.400	1.000
6	18.000	5.500	13.500	2.000	11.700	2.900	9.000	1.100
8	13.500	6.800	10.000	2.400	9.000	3.400	6.800	1.300
10	10.800	6.800	8.100	2.400	7.200	3.400	5.400	1.300
12	9.000	6.300	6.800	2.300	6.000	3.200	4.500	1.200
Profundidad de corte *Depth of cut*								

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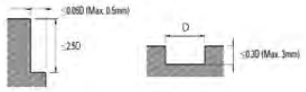
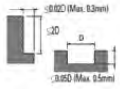
MATERIAL	Acero al carbono < 30 HRC *Carbon steel < 30 HRC*		Acero aleado 30-45 HRC *Alloy steel 30-45 HRC*		Acero inoxidable *Stainless steel*		Acero endurecido 45-55 HRC *Hardened Steels 45-55 HRC*		Acero endurecido 55-60 HRC *Hardened Steels 55-60 HRC*	
d1 [mm]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]
1	5.100	70	4.500	60	3.600	40	3.000	25	2.200	10
2	4.200	80	3.600	70	2.900	50	2.200	35	1.800	15
3	3.600	90	2.900	80	2.200	60	.1800	40	1.500	25
4	2.900	120	2.300	90	1.800	70	.1400	50	1.200	30
5	2.500	150	2.000	120	1.500	90	1.300	60	1.000	30
6	2.100	170	1.700	150	1.300	110	1.100	70	900	40
8	1.600	190	1.300	150	1.000	130	900	70	680	40
10	1.400	190	1.100	150	800	110	700	70	550	40
12	1.100	150	900	120	700	90	570	60	450	30
12	900	120	700	90	500	70	420	43	340	26
Profundidad de corte *Depth of cut*										

CONDICIONES DE CORTE
CUTTING DATA

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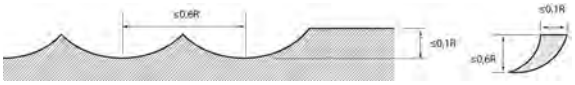
MATERIAL	Acero preendurecido y endurecido < 45 HRC *Prehardened steel < 45 HRC*		Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*		Acero endurecido 55-62 HRC *Prehardened steel 55-62 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	26.400	1.600 - 4.800	16.000	960 - 2.720	10.400	640 - 1.200
4	20.000	1.600 - 4.800	13.600	960 - 2.720	8.000	640 - 1.200
5	18.400	1.600 - 4.800	12.000	960 - 2.720	7.200	640 - 1.200
6	16.000	1.440 - 4.400	10.400	960 - 2.960	6.600	560 - 1.200
8	12.000	1.760 - 4.000	8.000	1.120 - 2.720	5.000	560 - 1.040
10	9.600	1.840 - 3.680	6.400	1.200 - 2.400	4.000	560 - 800
12	8.000	1.520 - 3.280	5.300	1.040 - 2.160	3.300	560 - 800
Profundidad de corte *Depth of cut*						

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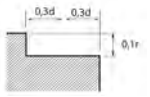
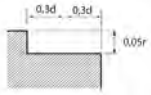
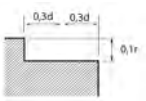
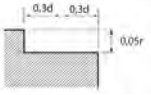
Fresado convencial/ Conventional milling

MATERIAL	Acero preendurecido < 40 HRC *Prehardened < 40 HRC*		Acero endurecido 40 - 50 HRC *Hardened steel 40 - 50 HRC*		Acero endurecido 50 - 55 HRC *Hardened steel 50 - 55 HRC*		Acero endurecido 55-60 HRC *Hardened steel 55-60 HRC*		Acero endurecido 60-65 HRC *Hardened steel 60-65 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	9.550	6.500	6.900	4.150	4.550	2.750	2.850	1.150	1.900	610
4	7.950	7.000	5.750	4.600	4.000	3.200	2.550	1.350	1.750	700
6	5.800	7.650	4.100	4.900	2.900	3.500	1.850	1.850	1.350	795
8	4.350	7.650	3.050	4.900	2.200	3.500	1.400	1.850	995	795
10	3.500	7.650	2.450	4.900	1.750	3.500	1.100	1.850	795	795
12	2.900	7.650	2.050	4.900	1.450	3.500	925	1.850	665	795
Profundidad de corte *Depth of cut*										

Fresado alta velocidad / HSC milling

MATERIAL	Acero preendurecido < 40 HRC *Prehardened < 40 HRC*		Acero endurecido 40 - 50 HRC *Hardened steel 40 - 50 HRC*		Acero endurecido 50 - 55 HRC *Hardened steel 50 - 55 HRC*		Acero endurecido 55-60 HRC *Hardened steel 55-60 HRC*		Acero endurecido 60-65 HRC *Hardened steel 60-65 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	22.000	16.000	17.000	10.000	12.500	8.000	9.500	4.600	6.900	2.500
4	17.000	17.500	13.000	12.000	11.000	9.200	8.000	5.500	5.600	2.900
6	13.500	18.500	10.500	13.800	9.000	11.000	6.400	6.400	4.500	3.600
8	10.000	18.500	8.000	14.000	6.800	11.000	4.800	6.700	3.400	4.100
10	8.000	18.500	6.400	14.000	5.400	11.000	3.800	6.800	2.700	2.800
12	6.600	18.500	5.300	14.000	4500	11.000	3.200	7.000	2.250	3.600
Profundidad de corte *Depth of cut*										

CONDICIONES DE CORTE
CUTTING DATA

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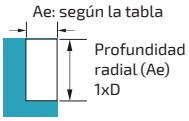
Material	Resistencia a la tracción N/mm²	Dureza	Vc (m/min) Profundidad de pasada radial (Ae) 5%	10%	30%	50%	100% Ranurado	fz (mm/diente) Diámetro de la fresa 3	4	6	8	10	12	16	20	25
			2,3	1,8	1,1	1	1	← Multiplicar fz por este factor según la Ae								
Acero de fácil mecanización y acero de baja aleación	> 500 ≤ 900	≤ 28	518	412	228	130	130	0,015	0,02	0,033	0,046	0,056	0,066	0,077	0,10	0,12
Acero de media y alta aleación, acero aleado y acero para herramientas de fácil mecanización	> 900 ≤ 1200	≤ 38	328	228	127	100	100	0,015	0,02	0,033	0,046	0,056	0,066	0,077	0,10	0,12
Acero para herramientas y acero para moldes	> 1200 ≤ 1400	≤ 44	201	164	109	73	73	0,015	0,02	0,033	0,046	0,056	0,066	0,077	0,10	0,12
Acero templado	> 1400 ≤ 1900	≤ 54	118	-	-	-	-	0,012	0,016	0,030	0,038	0,040	0,055	0,064	0,08	0,095
Acero templado	> 1900	≤ 64	70	-	-	-	-	0,010	0,013	0,025	0,032	0,034	0,046	0,054	0,067	0,08
Fundición gris	upto 240 HB		475	402	274	137	137	0,015	0,02	0,033	0,046	0,056	0,066	0,077	0,10	0,12
Fundición maleable	> 240 HB		274	191	122	84	84	0,015	0,02	0,033	0,046	0,056	0,066	0,077	0,10	0,12



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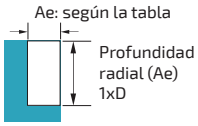
Material	Resistencia a la tracción N/mm²	Dureza	Vc (m/min) Profundidad de pasada radial (Ae) 5%	10%	30%	50%	100% Ranurado	fz (mm/diente) Diámetro de la fresa 4	6	8	10	12	16	20	25
			2,3	1,8	1,1	1	1	← Multiplicar fz por este factor según la Ae							
Acero de fácil mecanización y acero de baja aleación	> 500 ≤ 900	≤ 28	-	-	-	-	104	0,22	0,036	0,051	0,062	0,073	0,085	0,11	0,132
Acero de media y alta aleación, acero aleado y acero para herramientas de fácil mecanización	> 900 ≤ 1200	≤ 38	-	-	-	-	80	0,22	0,036	0,051	0,062	0,073	0,085	0,11	0,132
Acero para herramientas y acero para moldes	> 1200 ≤ 1400	≤ 44	-	-	-	-	58	0,22	0,036	0,051	0,062	0,073	0,085	0,11	0,132
Acero templado	> 1400 ≤ 1900	≤ 54	94	-	-	-	-	0,18	0,033	0,042	0,044	0,061	0,070	0,088	0,105
Acero templado	> 1900	≤ 64	56	-	-	-	-	0,15	0,028	0,035	0,037	0,051	0,059	0,074	0,088
Fundición gris	upto 240 HB		-	-	-	-	110	0,022	0,036	0,051	0,062	0,073	0,085	0,11	0,132
Fundición maleable	> 240 HB	≤ 64	-	-	-	-	105	0,022	0,036	0,057	0,062	0,073	0,085	0,11	0,132



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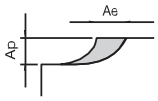
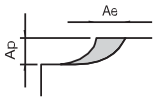
MATERIAL	Acero al carbono < 30 HRC *Carbon steel < 30 HRC*				Acero aleado 30-45 HRC *Alloy steel 30-45 HRC*				Acero endurecido 45-55 HRC *Hardened steel 45-55 HRC*				Acero endurecido 55-60 HRC *Hardened steel 55-60 HRC*			
d1 [mm]	n [rpm]	F [mm/min]	Ae [mm]	Ap [mm]	n [rpm]	F [mm/min]	Ae [mm]	Ap [mm]	n [rpm]	F [mm/min]	Ae [mm]	Ap [mm]	n [rpm]	F [mm/min]	Ae [mm]	Ap [mm]
1	37.000	9.000	0,400	0,040	33.000	7.200	0,400	0,025	27.000	6.500	0,400	0,020	22.000	2.600	0,400	0,015
2	33.000	10.000	0,800	0,080	27.000	8.400	0,800	0,050	24.000	7.500	0,800	0,040	16.000	3.000	0,800	0,030
3	22.000	11.000	1,200	0,120	18.000	9.000	1,200	0,080	16.000	8.500	1,200	0,060	11.000	3.300	1,200	0,050
4	17.000	12.000	1,500	0,150	14.000	9.500	1,500	0,120	12.000	8.800	1,500	0,080	8.000	3.500	1,500	0,070
5	13.000	13.000	2,000	0,200	11.000	10.000	2,000	0,150	9.600	9.500	2,000	0,100	6.400	3.800	2,000	0,080
6	11.000	13.000	2,500	0,250	9.000	11.000	2,000	0,150	8.000	9.600	2,500	0,100	5.300	3.800	2,500	0,100
8	8.200	13.000	3,000	0,300	7.000	11.000	3,000	0,200	6.000	9.600	3,000	0,150	4.000	3.800	3,000	0,130
10	6.500	13.000	4,500	0,300	55.00	11.000	4,500	0,200	4.800	9.500	4,500	0,150	3.200	3.800	4,500	0,130
12	5.500	12.000	5,500	0,300	5.000	10.000	5,500	0,200	4.100	9.000	4,500	0,250	2.700	3.500	4,500	0,200
16	4.100	10.000	7,500	0,450	3.400	8.800	7,500	0,300	3.000	7.800	7,500	0,250	2.000	3.200	7,500	0,200
Profundidad de corte *Depth of cut*																

CONDICIONES DE CORTE
CUTTING DATA

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MATERIAL	Fundición GG / GGG < 750 N/mm² *Cast iron GG/GGG < 750 N/mm²*		Acero para herramientas < 30 HRC *Tool steel < 30 HRC*		Acero para herramientas / Acero preendurecido 30-38 HRC *Tool steel / Prehardened steel 30-38 HRC*		Acero para herramientas 38 - 45 HRC *Tool steel 38 - 45 HRC*	
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
4	4.400	430	3.700	220	2.700	175	2.340	135
6	3.600	430	3.000	240	2.300	185	1.920	150
8	2.700	430	2.200	270	1.800	210	1.440	180
10	2.200	430	1.800	290	1.400	220	1.160	185
12	1.800	430	1.500	300	1.200	230	960	190
16	1.400	430	1.100	310	900	250	720	200
20	1.100	410	900	310	700	240	560	185
Profundidad de corte *Depth of cut*								

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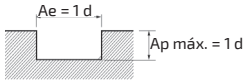
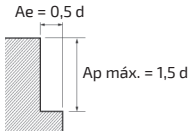
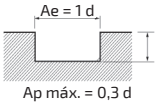
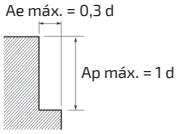
MATERIAL	Acero inoxidable < 185 HB *Stainless steel < 185 HB*		Acero inoxidable 185 - 275 HB *Stainless steel 185 - 275 HB*		Acero inoxidable 275 - 325 HB *Stainless steel 275 - 325 HB*		Aleaciones de Ti < 295 HB *Ti alloys < 295 HB*		Aleaciones de alta temperatura < 300 HB *High temperature alloys < 300 HB*		Acero endurecido 30 - 45 HRC *Hardened steel 30 - 45 HRC*			
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
3	13.585	190	9.705	130	8.085	95	9.705	170	2.590	40	6.900	550	8.495	680
4	10.190	305	7.245	220	6.050	180	7.245	220	1.910	55	5.175	415	6.370	510
5	8.150	325	5.820	225	4.850	190	5.820	265	1.550	55	4.140	415	5.095	610
6	6.795	420	4.850	265	4.045	225	4.850	305	1.295	55	3.450	415	4.245	850
8	5.095	475	3.640	305	3.030	265	3.640	340	970	75	2.588	415	3.185	765
10	4.075	475	2.910	305	2.425	265	2.910	340	775	75	2.070	415	2.550	715
12	3.395	475	2.425	305	2.020	265	2.425	340	645	75	1.725	415	2.125	765
14	2.910	475	2.080	305	1.735	265	2.080	340	555	75	1.480	415	1.820	730
16	2.545	475	1.820	305	1.515	265	1.820	340	485	75	1.295	415	1.590	700
18	2.265	285	1.615	285	1.350	225	1.615	305	430	75	1.150	370	1.415	680
20	2.040	285	1.455	285	1.215	225	1.455	305	390	75	1.035	415	1.275	660
25	1.630	280	1.160	280	970	225	1.160	305	305	55	830	400	1.020	610
Profundidad de corte *Depth of cut*														

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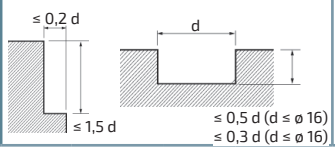
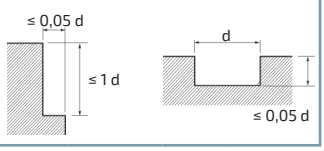
MATERIAL	Aceroal carbono / Aleaciones de acero< 45 HRC *Carbon steel / Alloy steel < 45 HRC*		Acero inoxidable / Aleaciones de titanio *Stainless steel / Ti alloys*		Acero endurecido 45 - 55 HRC *Hardened steel 45 - 55 HRC*		Inconel *Inconel*	
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
1	7.040	110	6.160	75	3.850	35	1.870	15
2	6.160	120	5.280	90	3.190	40	1.540	20
3	5.280	220	4.400	100	2.420	50	1.540	30
4	4.400	220	3.630	155	1.980	45	1.320	40
5	3.520	255	2.970	185	1.650	100	1.100	50
6	3.190	275	2.640	200	1.540	100	990	50
8	2.420	300	1.980	210	1.100	110	792	45
10	1.8270	285	1.540	210	990	120	660	45
12	1.540	250	1.320	165	770	100	550	40
16	1.100	175	990	130	605	65	396	35
20	990	185	770	145	440	75	330	30
Profundidad de corte *Depth of cut*								

En operaciones de ranurado, usar un 80 - 100 % de la velocidad y un 60 - 80 % del avance
In slotting operations use 80 - 100 % of speed and 60 - 80 % of feed rates

CONDICIONES DE CORTE
CUTTING DATA

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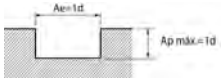
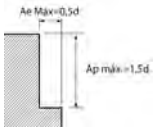
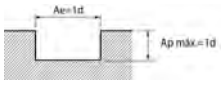
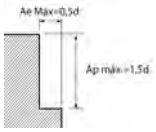
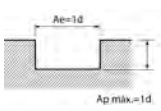
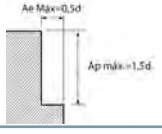
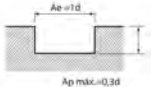
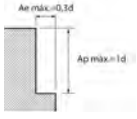
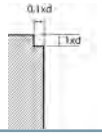
MATERIAL	Acero al carbono de baja aleación < 175 HB *Low carbon steel < 175 HB*		Acero al carbono de baja aleación 175 - 275 HB *Low carbon steel 175 - 275 HB*		Acero aleado < 275 HB *Alloy steel < 275 HB*		Acero para moldes < 275 HB *Mold steel < 275 HB*	
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
3	16.500	335	13.585	275	11.320	230	5.820	120
4	12.340	325	10.190	325	8.520	340	4.380	175
5	9.895	500	9.150	415	6.790	345	3.490	175
6	8.250	585	6.795	485	5.660	405	2.910	205
8	6.185	755	5.095	620	4.245	515	2.185	265
10	4.950	955	4.075	785	3.395	655	1.745	335
12	4.125	765	3.395	795	2.830	660	1.455	340
14	3.535	890	2.910	735	2.425	590	1.250	315
16	3.095	815	2.545	670	2.125	560	1.090	290
18	2.750	810	2.265	665	1.885	555	970	285
20	2.475	805	1.040	660	1.700	550	875	285
25	1.975	630	1.630	520	1.360	435	700	230
Profundidad de corte *Depth of cut*								

MATERIAL	Acero inoxidable <185 HB *Steinless steel <185 HB*		Fundición gris GG 200 - 300 HB *Cast iron GG 200 - 300 HB*		Fundición GGG < 300 HB *Cast iron GGG < 300 HB*		Acero inoxidable < 185 HB *Stainless steel < 185 HB*		Acero inoxidable 185 - 275 HB *Stainless steel 185 - 275 HB*		Acero inoxidable 275 - 325 HB *Stainless steel 275 - 325 HB*	
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
3	15.360	300	7.765	160	4.850	95	13.585	250	9.705	175	8.085	125
4	11.550	460	5.810	230	3.660	180	10.190	405	7.245	290	6.050	240
5	9.215	470	4.655	235	2.910	190	8.150	430	5.820	300	4.850	250
6	7.680	545	3.880	175	2.425	225	6.795	560	4.850	355	4.045	300
8	5.760	700	2.910	355	1.820	265	5.095	635	3.640	405	3.030	355
10	4.610	890	2.330	450	1.455	265	4.075	635	2.910	405	2.425	355
12	3.840	895	1.940	450	1.215	265	3.395	635	2.425	405	2.020	355
14	3.290	830	1.665	420	1.040	265	2.910	635	2.080	405	1.735	355
16	2.880	760	1.455	385	910	265	2.545	635	1.820	405	1.515	355
18	2.560	755	1.295	380	810	225	2.265	560	1.615	380	1.350	300
20	2.305	750	1.165	380	730	225	2.040	560	1.455	380	1.215	300
25	1.850	600	930	300	585	225	1.630	560	1.160	370	970	300
Profundidad de corte *Depth of cut*								

MATERIAL	Aleaciones de Ti < 295 HB *Ti alloys < 295 HB*		Aleaciones de alta temperatura < 300 HB *High temperature alloys < 300 HB*		Acero endurecido 30 - 45 HRC *Hardened steel 30 - 45 HRC*				Acero endurecido 30 - 45 HRC (HSC) *Hardened steel 30 - 45 HRC (HSC)*	
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
3	9.705	225	2.590	50	6.900	550	8.495	680	18.050	2.165
4	7.245	290	1.910	75	5.175	415	6.370	510	13.535	1.625
5	5.820	355	1.550	75	4.140	330	5.095	610	10.830	1.730
6	4.850	405	1.295	75	3.450	415	4.245	850	9.025	2.165
8	3.640	455	970	100	2.588	415	3.185	765	6.770	1.895
10	2.910	455	775	100	2.070	415	2.550	715	5.415	1.730
12	2.425	455	645	100	1.725	415	2.125	765	4.510	1.985
14	2.080	455	555	100	1.480	415	1.820	730	3.865	1.855
16	1.820	455	485	100	1.295	415	1.590	700	3.385	1.895
18	1.615	405	430	100	1.150	370	1.415	680	3.010	1.805
20	1.455	405	390	100	1.035	415	1.275	660	2.705	1.840
25	1.160	405	305	75	830	400	1.020	610	2.165	1.645
Profundidad de corte *Depth of cut*										

CONDICIONES DE CORTE
CUTTING DATA

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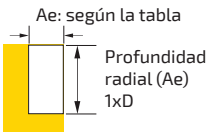
Material	Dureza	Vc (m/min)					fz (mm/diente)							
		Profundidad de pasada radial (Ae)					Diámetro de la fresa							
		5%	10%	30%	50%	100% Ranurado	3	4	6	8	10	12	16	20
		2,3	1,8	1,1	1	1	← Multiplicar fz por este factor según la Ae							
Acero inoxidable - Fácil mecanización 430F, 301, 303, 410, 416 recocido, 420F, 430F	≤ 28	320	220	120	100	100	0,015	0,02	0,036	0,046	0,056	0,066	0,078	0,12
Acero inoxidable - Mecanización media 301, 302, 303 maleable, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7 PH"	≤ 28	198	137	76	60	60	0,013	0,017	0,031	0,038	0,046	0,055	0,066	0,76
Acero inoxidale - Difícil mecanización 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8MO, Nitronic"	≤ 28	182	122	69	53	53	0,013	0,017	0,025	0,030	0,040	0,045	0,061	0,72



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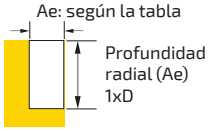
Material	Dureza	Vc (m/min)					fz (mm/diente)							
		Profundidad de pasada radial (Ae)					Diámetro de la fresa							
		5%	10%	30%	50%	100% Ranurado	3	4	6	8	10	12	16	20
		2,3	1,8	1,1	1	1	← Multiplicar fz por este factor según la Ae							
Acero inoxidable - Fácil mecanización 430F, 301, 303, 410, 416 recocido, 420F, 430F	≤ 28	272	187	102	85	85	0,017	0,025	0,042	0,053	0,065	0,077	0,090	0,139
Acero inoxidable - Mecanización media 301, 302, 303 maleable, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7 PH"	≤ 28	168	116	65	51	51	0,015	0,02	0,036	0,044	0,053	0,064	0,077	0,088
Acero inoxidale - Difícil mecanización 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8MO, Nitronic"	≤ 28	155	104	59	45	45	0,015	0,02	0,029	0,035	0,046	0,052	0,071	0,084



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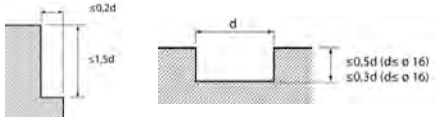
MATERIAL	Acero al carbono / Aleaciones de acero < 45 HRC *Carbon steel / Alloy steel < 45 HRC*		Acero inoxidable / Aleaciones de titanio *Stainless steel / Ti alloys*		Acero endurecido 45 - 55 HRC *Hardened steel 45 - 55 HRC*		Inconel *Inconel*	
d1 [mm]	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**	**n [rpm]**	**F [mm/min]**
1	6.400	100	5.600	70	3.500	30	1.700	15
2	5.600	110	4.800	80	2.900	35	1.400	20
3	4.800	200	4.000	90	2.200	45	1.400	25
4	4.000	200	3.300	140	1.800	70	1.200	35
5	3.200	230	2.700	170	1.500	90	1.000	45
6	2.900	250	2.400	180	1.400	90	900	45
8	2.200	270	1.800	190	1.000	100	720	40
10	1.700	260	1.400	190	900	110	600	40
12	1.400	230	1.200	150	700	90	500	35
16	1.000	160	900	120	550	60	360	30
20	900	170	700	130	400	70	300	25
Profundidad de corte *Depth of cut*								

CONDICIONES DE CORTE
CUTTING DATA

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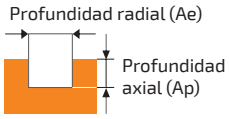
Material	HB	Ap	Ae	Vc	fz (mm/diente) Diámetro de la fresa 3	6	8	10	12	16	20
Acero inoxidable (fácil mecanización) 303, 416, 420F, 430F, 440F	< 250	1,5 1,0 1,5 1,0	0,5 1,0 0,5 1,0	183 146	0,008 0,008	0,023 0,023	0,039 0,039	0,049 0,049	0,059 0,059	0,069 0,069	0,077 0,077
Acero inoxidable (difícil mecanización) 304, 304L, 316, 316L	< 275	1,5 1,0 1,5 1,0	0,5 1,0 0,5 1,0	120 96	0,007 0,007	0,018 0,018	0,031 0,031	0,039 0,039	0,047 0,047	0,055 0,055	0,062 0,062
Acero inoxidable (PH) 13-18PH, 15-5PH, 17-4PH, 450	< 325	1,5 1,0 1,5 1,0	0,5 1,0 0,5 1,0	110 88	0,007 0,007	0,018 0,018	0,031 0,031	0,039 0,039	0,047 0,047	0,055 0,055	0,062 0,062
Superlaciones de níquel, cobalto y hierro, Inconel 601, 617, 625, Incoloy 800, Monel 400	< 300	1,5 1,0 1,5 1,0	0,5 1,0 0,5 1,0	24 19	0,006 0,006	0,02 0,02	0,027 0,027	0,034 0,034	0,04 0,04	0,047 0,047	0,053 0,053
Superlaciones de níquel, cobalto y hierro, Inconel 718, 750X, Incology 925, Wasploy, Hastelloy, Rene	< 300	1,5 1,0 1,5 1,0	0,5 1,0 0,5 1,0	19 15	0,004 0,004	0,011 0,011	0,019 0,019	0,023 0,023	0,028 0,028	0,033 0,033	0,037 0,037
Aleaciones de titanio Titanio puro, Ti6Al4V, Ti6Al2Sn4Zr2Mo	< 300	1,5 1,0 1,5 1,0	0,5 1,0 0,5 1,0	66 52	0,007 0,009	0,018 0,018	0,031 0,025	0,039 0,031	0,047 0,038	0,055 0,045	0,062 0,054
Aleaciones de titanio Ti5Al5V5Mo3Cr, Ti74l4Mo, Ti3Al8V6Cr4Zr4Mo	< 300	1,5 1,0 1,5 1,0	0,5 1,0 0,5 1,0	24 18	0,007 0,007	0,018 0,018	0,031 0,031	0,039 0,039	0,047 0,047	0,055 0,055	0,062 0,062



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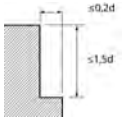
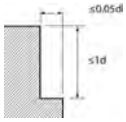
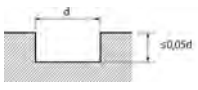
MATERIAL	Acero al carbono / Aleaciones de acero < 45 HRC *Carbon steel / Alloy steel < 45 HRC*		Acero inoxidable / Aleaciones de titanio *Stainless steel / Tí alloys*		Acero endurecido 45 - 55 HRC *Hardened steel 45 - 55 HRC*		Inconel *Inconel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	7.040	110	6.160	75	3.850	35	1.870	15
2	6.160	120	5.280	90	3.190	40	1.540	20
3	5.280	220	4.400	100	2.420	50	1.540	30
4	4.400	220	3.630	155	1.980	45	1.320	40
5	3.520	255	2.970	185	1.650	100	1.100	50
6	3.190	275	2.640	200	1.540	100	990	50
8	2.420	300	1.980	210	1.100	110	792	45
10	1.870	285	1.540	210	990	120	660	45
12	1.540	250	1.320	165	770	100	550	40
16	1.100	175	990	130	605	65	396	35
20	990	185	770	145	440	75	330	30
Profundidad de corte *Depth of cut*								

CONDICIONES DE CORTE
CUTTING DATA

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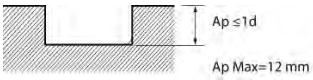
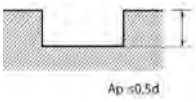
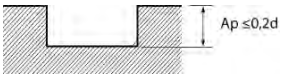
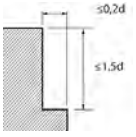
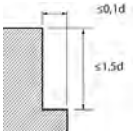
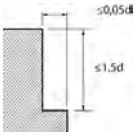
MATERIAL	Acero aleado < 30 HRC *Alloy steel < 30 HRC*		Acero preendurecido y endurecido 40 - 50 HRC *Prehardened and hardened steel 40 - 50 HRC*		Acero endurecido/ Acero inoxidable 28-45 HRC *Hardened steel/ Stainless steel 28-45 HRC*		Acero endurecido/ Aleaciones de Ti 45-55 HRC *Hardened steel/ Ti alloys 45-55 HRC*		Inconel *Inconel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	7.700	620	7.100	470	6.700	420	6.500	400	2.300	110
4	5.800	700	5.300	470	5.000	460	4.900	440	1.700	120
5	4.600	680	4.200	490	4.000	490	3.900	480	1.300	130
6	3.800	570	3.600	520	3.300	510	3.200	490	1.100	130
8	2.900	500	2.700	500	2.500	470	2.400	450	850	140
10	2.300	490	2.100	430	2.000	430	2.000	410	690	130
12	1.900	430	1.800	410	1.700	400	1.600	400	570	130
16	1.400	400	1.400	330	1.300	330	1.200	330	420	100
20	1.200	340	1.100	320	1.000	300	1.000	300	340	100
Profundidad de corte *Depth of cut*										

MATERIAL	Acero aleado < 30 HRC *Alloy steel < 30 HRC*		Acero preendurecido y endurecido 40 - 50 HRC *Prehardened and hardened steel 40 - 50 HRC*		Acero endurecido/ Acero inoxidable 28-45 HRC *Hardened steel/ Stainless steel 28-45 HRC*		Acero endurecido/ Aleaciones de Ti 45-55 HRC *Hardened steel/ Ti alloys 45-55 HRC*		Inconel *Inconel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	8.600	800	7.300	560	6.900	550	6.700	490	3.400	200
4	6.700	900	5.800	610	5.400	640	5.300	570	2.700	220
5	7.200	1200	5.500	950	4.700	650	4.500	700	4.300	600
6	4.700	1100	4.000	800	3.800	750	3.600	630	1.900	230
8	3.600	1000	3.000	730	2.800	730	2.700	600	1.400	200
10	2.900	950	2.400	650	2.300	640	2.200	570	1.100	190
12	2.400	900	2.000	650	1.900	600	1.800	550	1.000	190
16	1.800	850	1.500	570	1.400	500	1.400	450	700	190
20	1.400	680	1.200	530	1.100	460	1.100	410	600	180
Profundidad de corte *Depth of cut*										

CONDICIONES DE CORTE
CUTTING DATA

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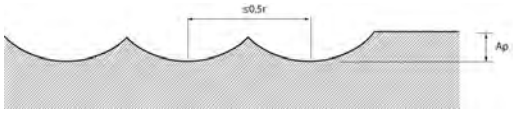
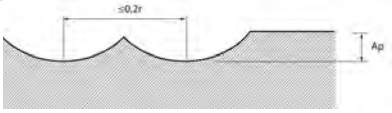
MATERIAL	Acero aleado / Acero preendurecido *Alloy steel / Prehardened steel*					Acero preendurecido *Prehardened steel*				
	α ≤ 15º		α ≤ 15º			α ≤ 15º		α ≤ 15º		
d1 [mm]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]	Ap [mm]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]	Ap [mm]
3	14.500	5.000	12.100	2.300	0,2	13.600	3.350	10.000	1.600	0,2
4	15.000	4.950	11.500	2.250	0,3	13.000	3.300	90.000	1.550	0,3
5	15.500	4.900	11.000	2.200	0,4	12.500	3.300	8.500	1.500	0,4
6	16.000	4.800	10.600	2.100	0,5	12.000	3.200	8.000	1.400	0,5
8	12.000	4.300	8.000	1.900	0,8	9.000	3.200	6.000	1.400	0,8
10	9.600	4.100	6.400	1.800	1,0	7.200	3.000	4.800	1.300	1,0
12	8.000	4.000	5.300	1.800	1,2	6.000	3.000	4.000	1.300	1,2
16	6.000	3.200	4.000	1.400	1,6	4.500	2.500	3.000	1.100	1,6
Profundidad de corte *Depth of cut*										

MATERIAL	Inconel *Incocnel*				
	α ≤ 15º		α ≤ 15º		
d1 [mm]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]	Ap [mm]
3	4.600	620	3.100	270	0,1
4	4.200	580	2.800	250	0,2
5	3.800	560	2.500	230	0,3
6	3.200	500	2.100	210	0,3
8	2.400	430	1.600	190	0,4
10	2.000	420	1.300	180	0,5
12	1.200	350	1.100	150	0,6
16	700	300	800	130	0,8
Profundidad de corte *Depth of cut*					

CONDICIONES DE CORTE

CUTTING DATA

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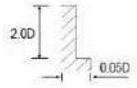
MATERIAL	Acero aleado < 30 HRC *Alloy steel < 30 HRC*		Acero aleado 30 - 45 HRC *Alloy Steel 30 - 45 HRC*		Acero templado 45 - 55 HRC *Hardened steel 45 - 55 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	6.950	195	4.500	150	3.300	100
4	5.600	240	3.600	170	2.700	105
5	4.800	250	3.050	210	2.350	125
6	4.150	250	2.650	210	2.050	125
8	3.150	265	2.000	210	1.600	125
10	2.150	265	1.700	210	1.250	125
12	1.800	210	1.500	185	1.050	105
16	1.880	185	1.100	140	840	90
20	1.300	130	860	105	625	65
Profundidad de corte *Depth of cut*						

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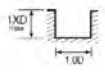
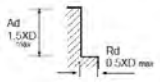
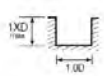
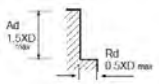
MATERIAL	Acero al carbono <175 HB *Carbon steel <175 HB*		Acero al carbono 175 - 275 HB *Carbon steel 175 - 275 HB*		Acero aleado <275 HB *Alloy steel <275 HB*		Acero para moldes <275 HB *Molsd & die steel <275 HB*		Fundicíón nodular < 300HB *Ductile cast iron < 300 HB*		Fundicíón maleable < 300HB *Malleable cast iron < 300 HB*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	16.500	335	13.585	276	11.320	230	5.820	250	15360	300	7.765	158
4	12.340	326	10.190	326	8.520	340	4.380	405	11.550	462	5.810	232
5	9.895	502	8.150	413	6.790	345	3.490	430	9.215	468	4.655	236
6	8.250	586	6.795	483	5.660	403	2.910	560	7.680	546	3.880	276
8	6.185	754	5.095	620	4.245	517	2.185	635	5.760	702	2.910	354
10	4.950	955	4.075	786	3.395	656	1.745	635	4.610	889	2.330	449
12	4.125	963	3.395	793	2.830	661	1.455	635	3.840	897	1.940	453
14	3.535	890	2.910	733	2.425	592	1.250	635	3.290	829	1.665	419
16	3.095	817	2.545	672	2.125	561	1.090	635	2.880	761	1.455	384
18	2.750	809	2.265	667	1.885	556	970	560	2.560	754	1.295	381
20	2.475	804	2.040	662	1.700	552	875	560	2.305	749	1.165	378
25	1.975	631	1.630	521	1.360	435	700	560	1.850	600	930	300
Profundidad de corte *Depth of cut*												

MATERIAL	Acero inoxidable serie 300 < 275 HB *CStainless steel 300 series < 275 HB*		Acero inoxidable serie 400 < 185 HB *Stainless steel 400 series < 185 HB*		Acero inoxidable serie PH < 325 HB *Stainless steel PH series < 325 HB*		Aleaciones de Titanio *Titanium alloys*		Aleaciones templadas < 300 HB *High temp alloys < 300 HB*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	9.705	175	13.585	250	8.085	125	9.705	225	2.590	50
4	7.245	290	10.190	407	6.050	242	7.245	290	1.910	76
5	5.820	300	8.150	430	4.850	250	5.820	355	1.550	75
6	4.850	355	6.795	560	4.045	300	4.850	405	1.295	75
8	3.460	405	5.095	635	3.030	355	3.640	455	970	100
10	2.910	405	4.075	635	2.425	355	2.910	455	775	100
12	2.425	405	3.395	635	2.020	355	2.425	455	645	100
14	2.080	405	2.910	635	1.735	355	2.080	455	555	100
16	1.820	405	2.545	635	1.515	355	1.820	455	485	100
18	1.615	380	2.265	560	1.350	300	1.615	405	430	100
20	1.455	380	2.040	560	1.215	300	1.455	405	390	100
25	1.160	370	1.630	560	970	300	1.160	405	305	73
Profundidad de corte *Depth of cut*										

CONDICIONES DE CORTE
CUTTING DATA

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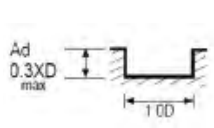
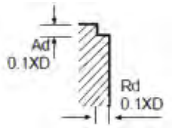
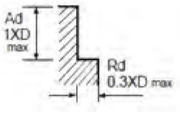
MATERIAL	Acero templado 30 - 45 HRC *Hardened steel 30 - 45 HRC*		Acero templado 30 - 45 HRC *Hardened steel 30 - 45 HRC*		Acero templado 30 - 45 HRC *Hardened steel 30 - 45 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
3	6.900	552	18.047	2.166	8.493	679
4	5.175	414	13.535	1.624	6.369	510
5	4.140	331	10.828	1.732	5.096	611
6	3.450	414	9.023	2.166	4.246	849
8	2.588	414	6.768	1.895	3.185	764
10	2.070	414	5.414	1.732	2.548	713
12	1.725	414	4.512	1.985	2.123	764
14	1.479	414	3.867	1.856	1.820	728
16	1.294	414	3.384	1.895	1.592	701
18	1.150	368	3.008	1.805	1.415	679
20	1.035	414	2.707	1.841	1.274	662
25	828	397	2.166	1.646	1.019	611
Profundidad de corte *Depth of cut*						

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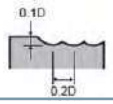
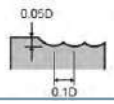
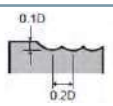
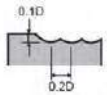
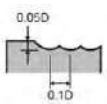
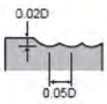
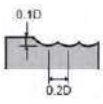
MATERIAL	Acero al carbono 150-250 HB *Carbon steel 150-250 HB*		Acero aleado 25-35 HRC *Carbon steel 175 - 275 HB*		Acero templado 35-45 HRC *Hardened steel 35-45 HRC*		Acero templado 45-55 HRC *Hardened steel 45-55 HRC*		Acero inoxi-dable *Stainless steel*		Aleaciones de Ti y Ni *Ti & Ni alloys*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
2	19100	770	12800	370	10200	270	8900	190	8900	210	6400	120
4	10800	1100	7200	550	5700	400	5000	280	5000	310	3600	180
6	7700	1300	5200	660	4100	480	3600	330	3600	380	2600	210
8	6000	1400	4000	700	3200	510	2800	360	2800	400	2000	230
10	4800	1400	3200	700	2600	520	2300	370	2300	410	1600	230
12	4000	1400	2700	710	2200	530	1900	370	1900	410	1400	240
Profundidad de corte *Depth of cut*												

MATERIAL	Acero al carbono 150-250 HB *Carbon steel 1 50-250 HB*		Acero aleado 25-35 HRC *Alloy steel 25-35 HRC*		Acero templado 35-45 HRC *Hardened steel 35-45 HRC*		Acero templado 45-55 HRC *Hardened steel 45-55 HRC*		Acero inoxidable *Stainless steel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
2	2100	2100	39800	1300	35700	960	23700	640	35700	960
4	2700	2700	19900	1700	17900	1300	11900	830	17900	1300
6	3000	3000	13300	1900	11900	1400	7900	920	11900	1400
8	3100	3100	10000	2000	9000	1500	6000	960	9000	1500
10	3100	3100	8000	2000	7200	1500	4800	960	7200	1500
12	3100	3100	6700	2000	6000	1500	4000	960	6000	1500
Profundidad de corte *Depth of cut*										

CONDICIONES DE CORTE
CUTTING DATA

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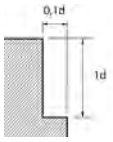
MATERIAL	*Graphite*	
d1 [mm]	**n** [rpm]	**F** [mm/min]
1	8.000	160
2	8.000	250
3	8.000	380
4	8.000	510
5	8.000	640
6	8.000	770
8	8.000	1.000
10	8.000	1.250
12	8.000	1.500
16	8.000	1.600
20	8.000	1.600
Profundidad de corte *Depth of cut*		

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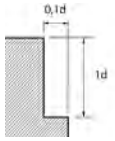
MATERIAL	*Graphite*	
d1 [mm]	**n** [rpm]	**F** [mm/min]
3	8.000	430
4	8.000	570
5	8.000	720
6	8.000	860
8	8.000	1.100
10	8.000	1.400
12	7.000	1.400
16	7.000	1.500
20	7.000	1.500
Profundidad de corte *Depth of cut*		

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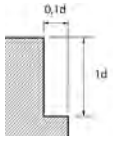
MATERIAL	*Graphite*	
d1 [mm]	**n** [rpm]	**F** [mm/min]
6	8.000	960
8	8.000	1.300
10	8.000	1.600
12	7.000	1.600
16	7.000	1.800
20	7.000	1.800
Profundidad de corte *Depth of cut*		

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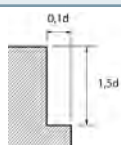
MATERIAL	*Graphite*	
d1 [mm]	**n** [rpm]	**F** [mm/min]
1	40.000	400
2	30.000	470
3	21.000	640
4	16.000	540
5	12.500	560
6	10.500	590
8	8.000	610
10	6.400	640
12	5.300	630
Profundidad de corte *Depth of cut*		

CONDICIONES DE CORTE
CUTTING DATA

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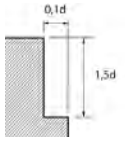
MATERIAL	*Graphite*	
d1 [mm]	**n** [rpm]	**F** [mm/min]
2	30.000	800
3	21.000	1.200
4	16.000	1.200
6	10.500	1.200
8	8.000	1.250
10	6.400	1.300
12	5.300	1.300
Profundidad de corte *Depth of cut*		

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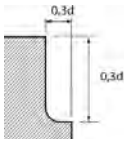
MATERIAL	*Graphite*	
d1 [mm]	**n** [rpm]	**F** [mm/min]
1	40.000	900
2	36.000	900
3	32.000	1.300
4	26.000	1.500
5	24.000	1.100
6	21.000	1.100
Profundidad de corte *Depth of cut*		

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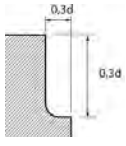
MATERIAL	*Graphite*	
d1 [mm]	**n** [rpm]	**F** [mm/min]
1	40.000	900
2	36.000	900
3	32.000	1.300
4	26.000	1.500
5	24.000	1.100
6	21.000	1.100
Profundidad de corte *Depth of cut*		

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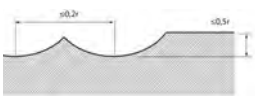
MATERIAL	*Graphite*	
d1 [mm]	**n** [rpm]	**F** [mm/min]
1	40.000	2.000
2	40.000	2.200
3	30.000	2.400
4	24.000	2.600
6	16.000	2.600
8	12.000	2.800
12	8.000	3.000
Profundidad de corte *Depth of cut*		

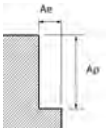
CONDICIONES DE CORTE
CUTTING DATA

F-555 - pag. 123 - 124 - 125

MATERIAL		Acero aleado / Fundición GG < 28 HRC *Alloy steel / Cast iron GG < 28 HRC*		Acero aleado / Fundición GGG 28 - 45 HRC *Alloy steel / Cast iron GGG 28 - 45 HRC*		Acero endurecido > 45 HRC *Hardened steel > 45 HRC*		Acero inoxidable *Stainless steel*		Inconel *Inconel*		Aleaciones de Titanio *Ti alloys*	
d1 [mm]	**l2** [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
6	14	15.915	6.365	10.610	4.245	9.285	2.600	10.610	1.275	3.315	165	5.970	1.670
6	32	14.590	5.105	9.945	3.480	7.960	895	9.945	1.120	3.980	250	9.285	580
6	42	9.285	1.045	8.620	970	6.630	415	7.960	500	3.980	170	9.285	580
6	51	7.960	500	6.630	415	5.440	340	6.630	415	3.980	170	9.285	580
8	18	11.935	5.250	7.960	3.500	6.965	2.230	7.960	1.910	2.485	250	4.475	1.430
8	42	10.940	4.375	7.460	2.985	5.970	1.195	7.460	1.490	2.985	375	6.965	1.395
8	58	6.965	1.395	6.465	1.295	4.975	620	5.970	745	2.985	240	6.965	870
8	71	5.970	745	4.975	620	4.080	510	4.975	620	2.985	240	6.965	870
10	22	9.550	6.325	6.365	4.215	5.570	2.645	6.365	2.305	1.990	350	3.580	1.700
10	51	8.755	4.160	5.970	2.835	4.775	1.435	5.970	1.790	2.385	415	5.570	1.670
10	71	5.570	1.670	5.175	1.555	3.980	695	4.775	835	2.385	300	5.570	975
10	82	4.775	835	3.980	695	3.265	570	3.980	695	2.385	300	5.570	975
12	26	7.960	5.770	5.305	3.845	4.640	2.550	5.305	2.385	1.660	330	2.985	1.640
12	51	7.295	4.010	4.975	2.735	3.980	1.195	4.975	1.495	1.990	400	4.640	1.390
12	71	4.640	1.390	4.310	1.295	3.315	580	3.980	695	1.990	350	4.640	810
12	86	3.980	695	3.315	580	2.720	475	3.315	580	1.990	350	4.640	810
16	38	5.970	5.375	3.980	3.580	3.480	2.260	3.980	2.190	1.245	280	2.240	1.455
16	61	5.470	3.555	3.730	2.425	2.985	1.195	3.730	1.490	1.490	335	3.480	1.390
16	76	3.480	1.390	3.235	1.295	2.485	560	2.985	670	1.490	355	3.480	785
16	101	2.985	670	2.485	560	2.040	460	2.485	560	1.490	355	3.480	785
20	45	4.775	5.370	3.185	3.585	2.785	2.365	3.185	2.190	995	300	1.790	1.520
20	71	4.375	3.720	2.985	2.535	2.385	1.195	2.985	1.495	1.195	360	2.785	1.395
20	86	2.785	1.395	2.585	1.295	1.990	595	2.385	715	1.195	300	2.785	835
20	101	2.385	715	1.990	595	1.630	490	1.990	595	1.195	300	2.785	835

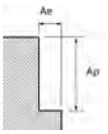
Profundidad de corte *Depth of cut*

Desbaste *Roughing*



	Ap	Ae
short	2xd	%5 to %10 x d
medium	2xd	%5 to %7 x d
long	1,5xd	%4 to %6 x d
extra long	1,5xd	%2 to %4 x d

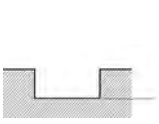
Desbaste *Roughing*

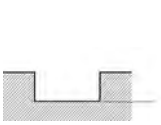


	Ap	Ae
short	2xd	%3 x d
medium	2xd	%2 x d
long	2xd	%1 x d
extra long	2xd	%1 x d

CONDICIONES DE CORTE
CUTTING DATA

F-555 - pag. 123 - 124 - 125

MATERIAL		Acero aleado / Fundición GGG 28 - 45 HRC *Alloy steel / Cast iron GGG 28 - 45 HRC*			
d1 [mm]	l2 [mm]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]
6	14	4.775	335	6.100	1.172
6	32	4.775	415	5.040	1.010
6	42	4.775	415	4.375	700
6	51	4.775	415	3.980	715
8	18	3.580	360	4.575	1.024
8	42	3.580	450	3.780	985
8	58	3.580	450	3.285	560
8	71	3.580	450	2.985	595
10	22	2.865	500	3.660	1.170
10	51	2.865	500	3.025	910
10	71	2.865	500	2.625	525
10	82	2.865	500	2.385	380
Profundidad de corte *Depth of cut*		 *Ø hole < Ø tool x 1,75 helix 2*			

MATERIAL		Acero aleado / Fundición GGG 28 - 45 HRC *Alloy steel / Cast iron GGG 28 - 45 HRC*			
d1 [mm]	l2 [mm]	n [rpm]	F [mm/min]	n [rpm]	F [mm/min]
12	26	2.385	335	3.050	1.100
12	51	2.385	415	2.520	880
12	71	2.385	415	2.190	525
12	86	2.385	415	1.990	400
16	38	1.790	360	2.290	915
16	61	1.790	450	1.890	700
16	76	1.790	450	1.640	460
16	101	1.790	450	1.490	360
20	45	1.430	500	1.830	840
20	71	1.430	500	1.510	695
20	86	1.430	500	1.315	475
20	101	1.430	500	1.195	380
Profundidad de corte *Depth of cut*		 *Ø hole < Ø tool x 1,75 helix 2*			

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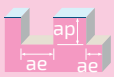
Material		ae x d1	ap x d1	Vc (m/min)	Diameter (d1) (mm)						
						6	8	10	12	16	20
Acero de carbono *Carbon steels* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 HRC ≤ 27 N/mm2 ≤ 900	Trochoidal	≤ 0,06	≤ 3	377 (300 - 400)	RPM	20.011	15.008	12.006	10.005	7.504	6.003
					Fz	0,03	0,04	0,05	0,06	0,08	0,1
					Feed (mm/min)	2.401	2.401	2.401	2.401	2.401	2.401
Aleación de acero *Alloy Steels* 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 HRC ≤ 40 N/mm2 ≤ 1260	Trochoidal	≤ 0,06	≤ 3	252 (200 - 300)	RPM	13.376	10.032	10.032	6.688	5.016	4.013
					Fz	0,03	0,04	0,04	0,06	0,08	0,1
					Feed (mm/min)	1.605	1.605	1.605	1.605	1.605	1.605
Acero Inoxidable (libre mecanizado) *Stainless steel (Free Machining)* 303, 416, 420F, 430F, 440F	Trochoidal	≤ 0,06	≤ 3	252 (200 - 300)	RPM	13.376	10.032	8.025	6.688	5.016	4.013
					Fz	0,03	0,04	0,05	0,06	0,08	0,1
					Feed (mm/min)	1.605	1.605	1.605	1.605	1.605	1.605

CONDICIONES DE CORTE
CUTTING DATA

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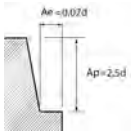
MATERIAL	Acero al carbono < 750 N/mm² *Carbon steel < 750 N/mm²*		Acero aleado < 30 HRC *Alloy steel < 30 HRC*		Acero preendurecido y endurecido 30 - 38 HRC *Prehardened and hardened steel 30 - 38 HRC*		Acero endurecido/ Acero inoxidable 38 - 45 HRC *Hardened steel/ Stainless steel 38 - 45 HRC*		Acero endurecido 45 - 55 HRC *Hardened steel 45 - 55 HRC*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
1	14.000	140	14.000	120	11.700	80	10.800	80	9.500	35
1,5	9.500	140	9.500	120	8.000	80	7.400	80	6.300	35
2	7.200	140	7.200	120	6.000	80	5.600	80	4.700	35
2,5	5.600	130	5.600	115	4.800	80	4.500	80	3.800	35
3	4.700	130	4.700	115	4.000	80	3.700	80	3.200	35
4	3.500	130	3.500	115	3.000	80	2.800	75	2.300	35
5	2.800	130	2.800	115	2.400	80	2.200	75	1.900	35
6	2.300	130	2.300	115	2.000	80	1.800	75	1.600	35
8	1.800	130	1.800	115	1.500	80	1.400	75	1.200	35
10	1.400	130	1.400	110	1.200	80	1.100	75	950	35
Profundidad de corte *Depth of cut*										

F-460 - pag. 129 | F-490 - pag. 130 | F-480 - pag. 131 | F-845 - pag. 132

MATERIAL	Acero no aleado <500 N/mm² *Unalloyed steel <500 N/mm²*		Acero no aleado 500-700 N/mm² *Unalloyed steel 500-700 N/mm²*		Acero no aleado >700 N/mm² *Unalloyed steel >700 N/mm²*		Acero aleado <1.400 N/mm² *Alloy steel <1.400 N/mm²*		Acero aleado >1.400 N/mm² *Alloy steel >1.400 N/mm²*		Acero inoxidable *Stainless steel*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
4	11.935	955	9.550	570	5.970	360	4.775	190	3.185	125	4.060	160
6	7.955	795	6.365	510	3.980	240	3.185	125	2.120	85	2.705	110
8	5.965	595	4.775	380	2.985	180	2.385	95	1.590	65	2.030	80
10	4.775	670	3.820	460	2.385	240	1.910	115	1.270	75	1.625	95
12	3.980	555	3.185	380	1.990	200	1.590	95	1.060	65	1.355	80
16	2.985	420	2.385	285	1.490	150	1.195	95	795	65	1.015	80

MATERIAL	Fundición GG <500 N/mm² *Cast iron GG <500 N/mm²*		Fundición GG >500 N/mm² *Cast iron GG >500 N/mm²*		Fundición GGG <200 HB *Cast iron GGG <200 HB*		Fundición GGG >200 HB *Cast iron GGG >200 HB*		Cobre *Copper*		Aleaciones de aluminio *Al alloys*	
d1 [mm]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]	**n** [rpm]	**F** [mm/min]
4	8.755	700	7.160	430	5.970	360	5.170	415	13.925	1.115	35.810	3.580
6	5.835	585	4.775	285	3.980	240	3.450	275	9.285	740	23.875	2.865
8	4.375	440	3.580	215	2.985	180	2.585	205	6.960	555	17.905	2.150
10	3.500	420	2.865	230	2.385	240	2.070	250	5.570	670	14.325	2.865
12	2.920	350	2.385	190	1.990	200	1.725	205	4.640	555	11.935	2.385
16	2.190	305	1.790	180	1.490	150	1.295	205	3.480	555	8.950	2.505

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MATERIAL	**Vc** [mm]	**Fz** [mm]	Refrigeración *Refrigeration*
Acero <800 N/mm²	100 - 180	0,01 - 0,04	Emulsión, aceite de corte / *Emulsion, cutting oil*
Acero 600-1.000 N/mm²	50 - 120	0,05 - 0,03	Emulsión, aceite de corte / *Emulsion, cutting oil*
Acero inoxidable	40 - 100	0,01 - 0,04	Emulsión, aceite de corte / *Emulsion, cutting oil*
Fundición GG, Fundición GGG	50 - 130	0,01 - 0,08	Emulsión, aceite de corte / *Emulsion, cutting oil*
Aluminio, aleaciones de Al	100 - 400	0,01 - 0,10	Emulsión, aceite de corte / *Emulsion, cutting oil*
Latón, bronce, cobre	80 - 300	0,02 - 0,08	Emulsión, aceite de corte/ *Emulsion, cutting oil*
Materiales plásticos	300 - 700	0,03 - 0,08	Aire comprimido / *Compresed air*
	50 - 150	0,03 - 0,10	Refrigeración por absorción / *Absorption refrigeration*

BROCAS

DRILLS

REFERENCIA REFERENCE	FOTO PHOTO	TIPO DE BROCAS DRILLS TYPE	PÁGINA PAGE
B-111		**Broca DIN 6539** DIN 6539 twist drill	**188**
B-112		**Broca DIN 338** DIN 338 twist drill	**189**
B-175		**Broca 3xD sin refrigeración interna** 3xD twist drill without internal coolant	**190**
B-179		**Broca 5xD sin refrigeración interna** 5xD twist drill without internal coolant	**191**
B-510		**Broca 5xD sin refrigeración interna** 5xD twist drill without internal coolant	**192**
B-177		**Broca 3xD con refrigeración interna** 3xD twist drill with internal coolant	**193**
B-173		**Broca 5xD con refrigeración interna** 5xD twist drill with internal coolant	**194**
B-183		**Broca 5xD con refrigeración interna tolerancia H7** 5xD twist drill with internal coolant H7 tolerance	**195**
B-820		**Broca 8xD con refrigeración interna** 8xD twist drill with internal coolant	**196**
B-1220		**Broca 12xD con refrigeración interna** 12xD twist drill with internal coolant	**197**
B-1520		**Broca 15xD con refrigeración interna** 15xD twist drill with internal coolant	**198**
B-2020		**Broca 20xD con refrigeración interna** 20xD twist drill with internal coolant	**199**

REFERENCIA REFERENCE	FOTO PHOTO	TIPO DE BROCAS DRILLS TYPE	PÁGINA PAGE
B-2520		**Broca 25xD con refrigeración interna** 25xD twist drill with internal coolant	200
B-3020		**Broca 30xD con refrigeración interna** 30xD twist drill with internal coolant	201
B-153		**Broca 5xD para aluminio con refrigeración interna** 5xD drill for aluminum with internal coolant	202
B-320		**Broca 3xD acero inoxidable con refrigeración interna** 3xD drill for stainless steel with internal coolant	203
B-520		**Broca 5xD acero inoxidable con refrigeración interna** 5xD drill for stainless steel with internal coolant	204
B-193		**Broca 5xD para titanio con refrigeración interna** 5xD drill for titanium with internal coolant	205
B-330		**Broca HHC para materiales 50-68** HRCHHC drill for 50-68 HRC materials	206
B-490 B-420 B-440		**Broca NC 90º, 120º, 142º** NC drill - countersink 90º, 120º, 142º	207
B-500		**Rompemachos** Jammed tap removal	208
B-601		**Escariador 10º** 10º reamer	209
B-610		**Escariador helicoidal 60º** 60º helix reamer	210
A-205		**Avellanador 90º < 60 HRC** 90º countersink < 60 HRC	211

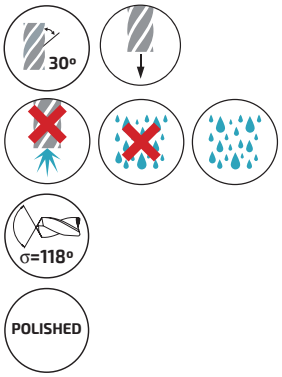
B-111

Broca metal duro DIN 6539

Solid carbide twist drill DIN 6539

Broca de metal duro (K10/20) corta, tipo N, DIN 6539. Broca r con pulida, corte a derecha y punta - lada con precisión a 118º. El ángulo de corte lateral a 30º, el espesor del alma y la hélice son normales. Se recomienda su uso en condiciones lo más estables posibles y con una presión de refrigerante alta.

Solid carbide short drill (K10/20), N type, DIN 6539. Polished surface, right hand cut and 118º precision sharped point. Helix angle 30º. Its use is recommended in stable conditions and with high pressure coolant.



STEEL <55 HRC
INOX
GG
GGG
COPPER
ALU <12% SI
NI ALLOYS
TITAN INCONEL
UNI

Ejemplo de pedido			Ref. final
B111	**030** ↕ d1=3	210	B111030210
B111	**120** ↕ d1=12,0	210	B111120210

Condiciones de corte | Cutting data pag. 214

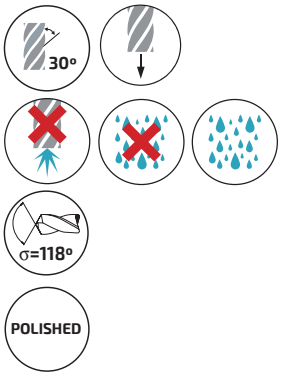
d1 h8	l1	l2	€
1,0	26	6	**5,45**
1,1	28	7	**5,65**
1,2	30	8	**6,00**
1,3	30	8	**6,20**
1,4	32	9	**4,55**
1,5	32	9	**5,55**
1,6	34	10	**4,80**
1,7	34	10	**6,10**
1,8	36	11	**4,95**
1,9	36	11	**4,95**
2,0	38	12	**6,60**
2,1	38	12	**6,60**
2,2	40	13	**6,60**
2,3	40	13	**6,90**
2,4	43	14	**6,60**
2,5	43	14	**6,60**
2,6	43	14	**6,60**
2,7	46	16	**9,70**
2,8	46	16	**9,70**
2,9	46	16	**9,70**
3,0	46	16	**9,70**
3,1	49	18	**9,70**

d1 h8	l1	l2	€
3,2	49	18	**9,70**
3,3	49	18	**12,00**
3,4	52	20	**10,20**
3,5	52	20	**10,20**
3,6	52	20	**11,00**
3,7	52	20	**11,00**
3,8	55	22	**11,95**
3,9	55	22	**12,05**
4,0	55	22	**12,05**
4,1	55	22	**13,20**
4,2	55	22	**13,20**
4,3	58	24	**13,20**
4,4	58	24	**13,20**
4,5	58	24	**13,20**
4,6	58	24	**14,05**
4,7	58	24	**14,05**
4,8	62	26	**14,05**
4,9	62	26	**14,05**
5,0	62	26	**14,05**
5,1	62	26	**16,35**
5,2	62	26	**18,15**
5,3	62	26	**18,15**

d1 h8	l1	l2	€
5,4	66	12	**19,55**
5,5	66	14	**18,15**
5,6	66	16	**18,75**
5,7	66	16	**18,95**
5,8	66	18	**19,15**
5,9	66	18	**19,50**
6,0	66	20	**19,15**
6,5	70	20	**32,70**
6,8	74	22	**30,35**
7,0	74	22	**32,95**
7,5	74	24	**33,90**
8,0	79	24	**39,00**
8,5	79	27	**48,30**
9,0	84	27	**50,80**
9,5	84	30	**54,25**
10,0	89	30	**58,45**
10,2	89	30	**74,75**
10,5	89	33	**67,75**
11,0	95	33	**74,55**
12,0	102	33	**84,70**

Broca metal duro DIN 338

Solid carbide twist drill DIN 338



Broca de metal duro (K10/20) normal, tipo N, DIN 338. Broca r con pulida, corte a derecha y punta con precisión a 118º. El ángulo de corte lateral a 30º, el espesor del alma y la hélice son normales. Se recomienda su uso en condiciones lo más estables posibles y con una presión de refrigerante alta.

Solid carbide short drill (K10/20), N type, DIN 338. Polished surface, right hand cut and 118º precision sharped point. Helix angle 30º. Its use is recommended in stable conditions and with high pressure coolant.

Ejemplo de pedido			Ref. final
B112	**030** ↕ d1=3	210	B112030210
B112	**120** ↕ d1=12,0	210	B112120210

Condiciones de corte | Cutting data pag. 214

d1 h8	l1	l2	€
1,0	34	6	**7,90**
1,1	36	7	**4,80**
1,2	38	8	**7,40**
1,3	38	8	**7,75**
1,4	40	9	**5,70**
1,5	40	9	**5,60**
1,6	43	10	**5,95**
1,7	43	10	**7,60**
1,8	46	11	**6,15**
1,9	46	11	**6,15**
2,0	49	12	**8,05**
2,1	49	12	**9,20**
2,2	53	13	**10,20**
2,3	53	13	**10,20**
2,4	57	14	**10,20**
2,5	57	14	**10,20**
2,6	57	14	**14,05**
2,7	61	16	**14,05**
2,8	61	16	**14,00**
2,9	61	16	**14,05**
3,0	61	16	**13,20**
3,1	65	18	**13,20**

d1 h8	l1	l2	€
3,2	65	36	**13,20**
3,3	65	36	**14,95**
3,4	70	39	**15,10**
3,5	70	39	**14,05**
3,6	70	39	**16,10**
3,7	70	39	**16,10**
3,8	75	43	**16,10**
3,9	75	43	**16,10**
4,0	75	43	**16,10**
4,1	75	43	**17,15**
4,2	75	43	**17,15**
4,3	80	47	**20,80**
4,4	80	47	**20,80**
4,5	80	47	**20,20**
4,6	80	47	**23,20**
4,7	80	47	**23,20**
4,8	86	52	**23,20**
4,9	86	52	**23,20**
5,0	86	52	**22,20**
5,1	86	52	**26,70**
5,2	86	52	**30,00**
5,3	86	52	**29,05**

d1 h8	l1	l2	€
5,4	93	57	**31,70**
5,5	93	57	**30,35**
5,6	93	57	**30,70**
5,7	93	57	**31,25**
5,8	93	57	**29,80**
5,9	93	57	**32,70**
6,0	93	57	**31,35**
6,5	101	63	**39,00**
6,8	109	69	**46,60**
7,0	109	69	**46,60**
7,5	109	69	**46,60**
8,0	117	75	**54,25**
8,5	117	75	**63,55**
9,0	125	81	**66,10**
9,5	125	81	**72,85**
10,0	133	87	**81,30**
10,2	133	87	**92,90**
10,5	133	87	**94,90**
11,0	142	94	**113,50**
12,0	151	101	**132,10**

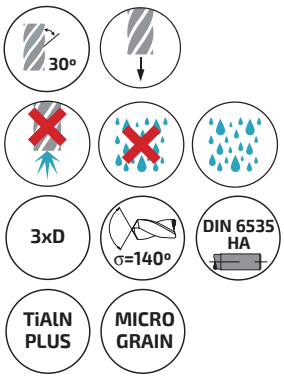
B-175

Broca metal duro 3xD sin refrigeración interna

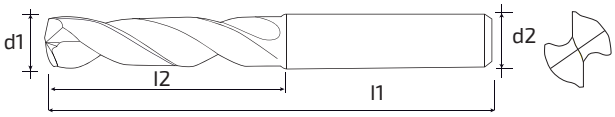
Solid carbide 3xD twist drill without internal coolant

Broca metal duro integral 3xD con recubrimiento TiAlN, sin refrigeración interior y con corte a derecha. Ángulo de punta 140º, ángulo de espiral 30º. Geometría de corte especial para taladro directo sin punteado previo que a la vez garantiza una perfecta concentricidad. A especial de los canales para disminuir el c de fricción, mejorando la extracción de viruta. Permite trabajar tanto en seco como con refrigeración externa.

Solid carbide 3xD twist drill, without internal coolant and with TiAlN coating. Cylindrical shank, right hand cut. Point angle 140°, helix angle 30°. Special profile chip flute geometry. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without external coolant.



STEEL <55 HRC
INOX
GG
GGG
NI ALLOYS
TITAN INCONEL
UNI



Ejemplo de pedido			Ref. final
B175	**030**	210	B175030210
	d1=3		
B175	**142**	210	B175142210
	d1=14,2		

Condiciones de corte | Cutting data pag. 215

d1 m7	d2 h6	l1	l2	€
1,0	4	55	7	22,05
1,1	4	55	7	22,05
1,2	4	55	7	22,05
1,3	4	55	7	22,05
1,4	4	55	7	22,05
1,5	4	55	14	22,05
1,6	4	55	14	22,05
1,7	4	55	14	22,05
1,8	4	55	14	22,05
1,9	4	55	14	22,05
2,0	4	55	20	22,05
2,1	4	55	20	22,05
2,2	4	55	20	22,05
2,3	4	55	20	22,05
2,4	4	55	20	22,05
2,5	4	55	20	22,05
2,6	4	55	20	22,05
2,7	4	55	20	22,05
2,8	4	55	20	22,05
2,9	4	55	20	22,05
3,0	6	62	20	22,05
3,1	6	62	20	22,05
3,2	6	62	20	22,05
3,3	6	62	20	22,05
3,4	6	62	20	22,05
3,5	6	62	20	22,05
3,6	6	62	20	22,05
3,7	6	62	20	22,05
3,8	6	66	24	22,05
3,9	6	66	24	22,05
4,0	6	66	24	22,05
4,1	6	66	24	22,05
4,2	6	66	24	22,05
4,3	6	66	24	22,05
4,4	6	66	24	22,05

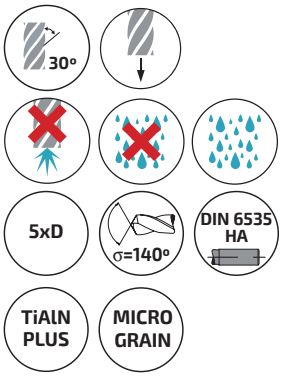
d1 m7	d2 h6	l1	l2	€
4,5	6	66	24	22,05
4,6	6	66	24	22,05
4,7	6	66	24	22,05
4,8	6	66	28	22,05
4,9	6	66	28	22,05
5,0	6	66	28	22,05
5,1	6	66	28	22,05
5,2	6	66	28	22,05
5,3	6	66	28	22,05
5,4	6	66	28	22,05
5,5	6	66	28	22,05
5,6	6	66	28	22,05
5,7	6	66	28	22,05
5,8	6	66	28	22,05
5,9	6	66	28	22,05
6,0	6	66	28	22,05
6,1	8	79	34	31,70
6,2	8	79	34	31,70
6,3	8	79	34	31,70
6,4	8	79	34	31,70
6,5	8	79	34	31,70
6,6	8	79	34	31,70
6,7	8	79	34	31,70
6,8	8	79	34	31,70
6,9	8	79	34	31,70
7,0	8	79	34	31,70
7,1	8	79	41	31,70
7,2	8	79	41	31,70
7,3	8	79	41	31,70
7,4	8	79	41	31,70
7,5	8	79	41	31,70
7,6	8	79	41	31,70
7,7	8	79	41	31,70
7,8	8	79	41	31,70
7,9	8	79	41	31,70

d1 m7	d2 h6	l1	l2	€
8,0	8	79	41	31,70
8,1	10	89	47	51,00
8,2	10	89	47	51,00
8,3	10	89	47	51,00
8,4	10	89	47	51,00
8,5	10	89	47	51,00
8,6	10	89	47	51,00
8,7	10	89	47	51,00
8,8	10	89	47	51,00
8,9	10	89	47	51,00
9,0	10	89	47	51,00
9,1	10	89	47	51,00
9,2	10	89	47	51,00
9,3	10	89	47	51,00
9,4	10	89	47	51,00
9,5	10	89	47	51,00
9,6	10	89	47	51,00
9,7	10	89	47	51,00
9,8	10	89	47	51,00
9,9	10	89	47	51,00
10,0	10	89	47	51,00
10,1	12	102	55	65,95
10,2	12	102	55	65,95
10,3	12	102	55	65,95
10,4	12	102	55	65,95
10,5	12	102	55	65,95
10,6	12	102	55	65,95
10,7	12	102	55	65,95
10,8	12	102	55	65,95
10,9	12	102	55	65,95
11,0	12	102	55	65,95
11,1	12	102	55	65,95
11,2	12	102	55	65,95
11,3	12	102	55	65,95
11,4	12	102	55	65,95

d1 m7	d2 h6	l1	l2	€
11,5	12	102	55	65,95
11,6	12	102	55	65,95
11,7	12	102	55	65,95
11,8	12	102	55	65,95
11,9	12	102	55	65,95
12,0	12	102	55	65,95
12,2	14	107	60	91,10
12,5	14	107	60	91,10
12,8	14	107	60	91,10
13,0	14	107	60	91,10
13,2	14	107	60	91,10
13,5	14	107	60	91,10
13,8	14	107	60	91,10
14,0	14	107	60	91,10
14,2	16	115	65	121,30
14,5	16	115	65	121,30
14,8	16	115	65	121,30
15,0	16	115	65	121,30
15,2	16	115	65	121,30
15,5	16	115	65	121,30
15,8	16	115	65	121,30
16,0	16	115	65	121,30
16,5	18	123	73	155,75
16,8	18	123	73	155,75
17,0	18	123	73	155,75
17,5	18	123	73	155,75
17,8	18	123	73	155,75
18,0	18	123	73	155,75
18,5	20	131	79	190,15
19,0	20	131	79	190,15
19,5	20	131	79	190,15
19,8	20	131	79	190,15
20,0	20	131	79	190,15

Broca metal duro 5xD sin refrigeración interna

Solid carbide 5xD twist drill without internal coolant



STEEL <55 HRC

INOX

GG

GGG

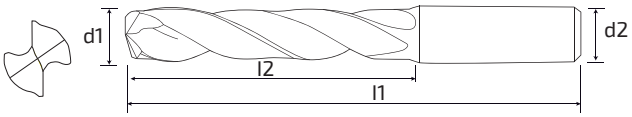
NI ALLOYS

TITAN INCONEL

UNI

Broca metal duro integral 5xD con recubrimiento TiAlN, sin refrigeración interior y con corte a derecha. Ángulo de punta 140º, ángulo de espiral 30º. Geometría de corte especial para taladro directo sin punteado previo que a la vez garantiza una perfecta concentricidad. A - lado especial de los canales para disminuir el c - te de fricción, mejorando la extracción de viruta. Permite trabajar tanto en seco como con refrigeración externa.

Solid carbide 5xD twist drill, without internal coolant and with TiAlN coating. Cylindrical shank, right hand cut. Point angle 140°, helix angle 30°. Special profile chip flute geometry. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without external coolant.



Ejemplo de pedido			Ref. final
B179	**030** ↕ d1=3	210	B179030210
B179	**120** ↕ d1=12,0	210	B179120210

Condiciones de corte | Cutting data pag. 215

d1 m7	d2 h6	l1	l2	€
3,0	6	66	28	**23,95**
3,1	6	66	28	**23,95**
3,2	6	66	28	**23,95**
3,3	6	66	28	**23,95**
3,4	6	66	28	**23,95**
3,5	6	66	28	**23,95**
3,6	6	66	28	**23,95**
3,7	6	66	28	**23,95**
3,8	6	74	36	**23,95**
3,9	6	74	36	**23,95**
4,0	6	74	36	**23,95**
4,1	6	74	36	**23,95**
4,2	6	74	36	**23,95**
4,3	6	74	36	**23,95**
4,4	6	74	36	**23,95**
4,5	6	74	36	**23,95**
4,6	6	74	36	**23,95**
4,7	6	74	36	**23,95**
4,8	6	82	44	**23,95**
4,9	6	82	44	**23,95**
5,0	6	82	44	**23,95**
5,1	6	82	44	**23,95**
5,2	6	82	44	**23,95**
5,3	6	82	44	**23,95**
5,4	6	82	44	**23,95**
5,5	6	82	44	**23,95**
5,6	6	82	44	**23,95**
5,7	6	82	44	**23,95**
5,8	6	82	44	**23,95**

d1 m7	d2 h6	l1	l2	€
5,9	6	82	44	**23,95**
6,0	6	82	44	**23,95**
6,1	8	91	44	**36,95**
6,2	8	91	44	**36,95**
6,3	8	91	44	**36,95**
6,4	8	91	53	**36,95**
6,5	8	91	53	**36,95**
6,6	8	91	53	**36,95**
6,7	8	91	53	**36,95**
6,8	8	91	53	**36,95**
6,9	8	91	53	**36,95**
7,0	8	91	53	**36,95**
7,1	8	91	53	**36,95**
7,2	8	91	53	**36,95**
7,3	8	91	53	**36,95**
7,4	8	91	53	**36,95**
7,5	8	91	53	**36,95**
7,6	8	91	53	**36,95**
7,7	8	91	53	**36,95**
7,8	8	91	53	**36,95**
7,9	8	91	53	**36,95**
8,0	8	91	53	**36,95**
8,1	10	103	53	**55,50**
8,2	10	103	53	**55,50**
8,3	10	103	53	**55,50**
8,4	10	103	61	**55,50**
8,5	10	103	61	**55,50**
8,6	10	103	61	**55,50**
8,7	10	103	61	**55,50**

d1 m7	d2 h6	l1	l2	€
8,8	10	103	61	**55,50**
8,9	10	103	61	**55,50**
9,0	10	103	61	**55,50**
9,1	10	103	61	**55,50**
9,2	10	103	61	**55,50**
9,3	10	103	61	**55,50**
9,4	10	103	61	**55,50**
9,5	10	103	61	**55,50**
9,6	10	103	61	**55,50**
9,7	10	103	61	**55,50**
9,8	10	103	61	**55,50**
9,9	10	103	61	**55,50**
10,0	10	103	61	**55,50**
10,1	12	118	61	**77,35**
10,2	12	118	71	**77,35**
10,3	12	118	71	**77,35**
10,4	12	118	71	**77,35**
10,5	12	118	71	**77,35**
10,6	12	118	71	**77,35**
10,7	12	118	71	**77,35**
10,8	12	118	71	**77,35**
10,9	12	118	71	**77,35**
11,0	12	118	71	**77,35**
11,1	12	118	71	**77,35**
11,2	12	118	71	**77,35**
11,3	12	118	71	**77,35**
11,4	12	118	71	**77,35**
11,5	12	118	71	**77,35**
11,6	12	118	71	**77,35**

d1 m7	d2 h6	l1	l2	€
11,7	12	118	71	**77,35**
11,8	12	118	71	**77,35**
11,9	12	118	71	**77,35**
12,0	12	118	71	**77,35**
12,2	14	124	71	**105,45**
12,5	14	124	77	**105,45**
12,7	14	124	77	**105,45**
13,0	14	124	77	**105,45**
13,5	14	124	77	**105,45**
13,7	14	124	77	**105,45**
14,0	14	124	77	**105,45**
14,2	16	133	77	**138,00**
14,5	16	133	83	**138,00**
14,7	16	133	83	**138,00**
15,0	16	133	83	**138,00**
15,2	16	133	83	**138,00**
15,5	16	133	83	**138,00**
15,7	16	133	83	**138,00**
16,0	16	133	83	**138,00**
16,5	18	143	93	**177,30**
17,0	18	143	93	**177,30**
17,5	18	143	93	**177,30**
18,0	18	143	93	**177,30**
18,5	20	153	101	**215,75**
19,0	20	153	101	**215,75**
19,5	20	153	101	**215,75**
20,0	20	153	101	**215,75**

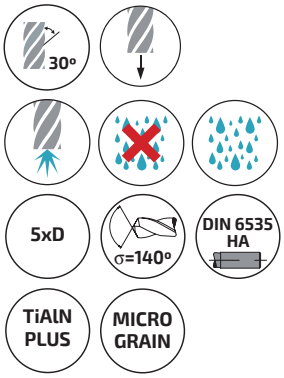
B-510

Microbroca 5xD sin refrigeración interior

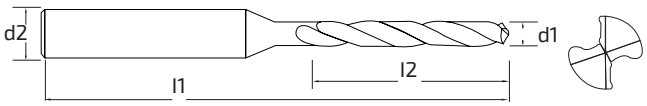
5xD Without internal spiral coolant holes

Microbroca de metal duro integral 5 xD con recubrimiento TiAlN, sin refrigeración interior y corte a derechas. Ángulo de la punta 135º. Fabricado de alta precisión que garantiza una concentricidad de 0,005 mm.

5 xD Without internal sipral coolant holes with TiAlN coating, without internal cooling and right-hand cutting. Tip angle 135º. Manufactured with high precision that guarantees concentricity.



STEEL <55 HRC
INOX
GG
GGG
NI ALLOYS
TITAN INCONEL
UNI



Ejemplo de pedido			Ref. final
B510	**004**	210	B510004210
	d1=0,4		
B510	**255**	210	B510255210
	d2=2,55		

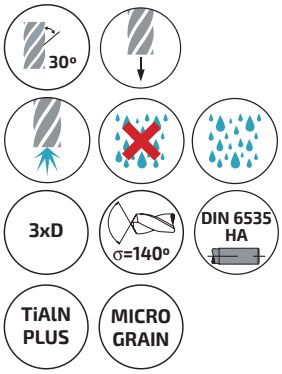
Condiciones de corte | Cutting data pag. 219

d1 m7	d2 h6	l1	l2	€
0,40	3	38	3,6	**35,45**
0,45	3	38	3,8	**35,45**
0,50	3	38	4,0	**35,45**
0,55	3	38	4,6	**35,45**
0,60	3	38	4,8	**35,45**
0,65	3	38	5,0	**35,45**
0,70	3	38	6,0	**35,45**
0,75	3	38	6,2	**35,45**
0,80	3	38	6,4	**35,45**
0,85	3	38	6,7	**35,45**
0,90	3	38	7,0	**35,45**
0,95	3	38	7,25	**35,45**
1,00	3	38	7,50	**30,10**
1,05	3	38	7,75	**30,10**
1,10	3	38	8,0	**30,10**
1,15	3	38	8,25	**30,10**
1,20	3	38	8,50	**30,10**
1,25	3	38	8,75	**30,10**
1,30	3	38	9,0	**30,10**
1,35	3	38	9,5	**30,10**
1,40	3	38	10,0	**30,10**
1,45	3	38	10,5	**30,10**
1,50	3	38	11,0	**30,10**
1,55	3	38	11,25	**30,10**
1,60	3	38	11,50	**30,10**
1,65	3	38	11,75	**30,10**

d1 m7	d2 h6	l1	l2	€
1,70	3	38	12,00	**30,10**
1,75	3	38	12,25	**30,10**
1,80	3	38	12,50	**30,10**
1,85	3	38	12,75	**30,10**
1,90	3	38	13,00	**30,10**
1,95	3	38	13,50	**30,10**
2,00	3	46	14,00	**30,25**
2,05	3	46	14,50	**30,25**
2,10	3	46	15,00	**30,25**
2,15	3	46	15,50	**30,25**
2,20	3	46	16,0	**30,25**
2,25	3	46	16,50	**30,25**
2,30	3	46	17,00	**30,25**
2,35	3	46	17,50	**30,25**
2,40	3	46	18,00	**30,25**
2,45	3	46	18,50	**30,25**
2,50	3	50	19,00	**30,25**
2,55	3	50	19,50	**30,50**
2,60	3	50	20,00	**30,50**
2,65	3	50	20,50	**30,50**
2,70	3	50	21,00	**30,50**
2,75	3	50	21,50	**30,50**
2,80	3	50	22,00	**30,50**
2,85	3	50	22,50	**30,50**
2,90	3	50	23,00	**30,50**
2,95	3	50	23,50	**30,50**

Broca metal duro 3xD con refrigeración interna

Solid carbide 3xD twist drill with internal coolant



STEEL <55 HRC

INOX

GG

GGG

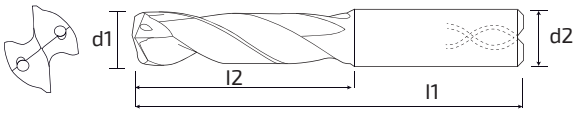
NI ALLOYS

TITAN INCONEL

UNI

Broca metal duro integral 3xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 140º, ángulo de espiral 30º. Geometría de corte especial para taladro directo sin punteado previo que a la vez garantiza una perfecta concentricidad. A especial de los canales para disminuir el c de fricción, mejorando la extracción de viruta. Permite trabajar tanto en seco como con refrigeración externa.

Solid carbide 3xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 140°, helix angle 30°. Special profile chip flute geometry. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without external coolant.



Ejemplo de pedido			Ref. final
B177	**030**	210	B177030210
	d1=3		
B177	**120**	210	B177120210
	d1=12,0		

Condiciones de corte | Cutting data pag. 215

d1 m7	d2 h6	l1	l2	€
3,0	6	62	20	**24,85**
3,1	6	62	20	**24,85**
3,2	6	62	20	**24,85**
3,3	6	62	20	**24,85**
3,4	6	62	20	**24,85**
3,5	6	62	20	**24,85**
3,6	6	62	20	**24,85**
3,7	6	62	20	**24,85**
3,8	6	66	24	**24,85**
3,9	6	66	24	**24,85**
4,0	6	66	24	**24,85**
4,1	6	66	24	**24,85**
4,2	6	66	24	**24,85**
4,3	6	66	24	**24,85**
4,4	6	66	24	**24,85**
4,5	6	66	24	**24,85**
4,6	6	66	24	**24,85**
4,7	6	66	24	**24,85**
4,8	6	66	28	**24,85**
4,9	6	66	28	**24,85**
5,0	6	66	28	**24,85**
5,1	6	66	28	**24,85**
5,2	6	66	28	**24,85**
5,3	6	66	28	**24,85**
5,4	6	66	28	**24,85**
5,5	6	66	28	**24,85**
5,6	6	66	28	**24,85**
5,7	6	66	28	**24,85**
5,8	6	66	28	**24,85**
5,9	6	66	28	**24,85**

d1 m7	d2 h6	l1	l2	€
6,0	6	66	28	**24,85**
6,1	8	79	34	**38,10**
6,2	8	79	34	**38,10**
6,3	8	79	34	**38,10**
6,4	8	79	34	**38,10**
6,5	8	79	34	**38,10**
6,6	8	79	34	**38,10**
6,7	8	79	34	**38,10**
6,8	8	79	34	**38,10**
6,9	8	79	34	**38,10**
7,0	8	79	34	**38,10**
7,1	8	79	41	**38,10**
7,2	8	79	41	**38,10**
7,3	8	79	41	**38,10**
7,4	8	79	41	**38,10**
7,5	8	79	41	**38,10**
7,6	8	79	41	**38,10**
7,7	8	79	41	**38,10**
7,8	8	79	41	**38,10**
7,9	8	79	41	**38,10**
8,0	8	79	41	**38,10**
8,1	10	89	47	**60,70**
8,2	10	89	47	**60,70**
8,3	10	89	47	**60,70**
8,4	10	89	47	**60,70**
8,5	10	89	47	**60,70**
8,6	10	89	47	**60,70**
8,7	10	89	47	**60,70**
8,8	10	89	47	**60,70**
8,9	10	89	47	**60,70**

d1 m7	d2 h6	l1	l2	€
9,0	10	89	47	**60,70**
9,1	10	89	47	**60,70**
9,2	10	89	47	**60,70**
9,3	10	89	47	**60,70**
9,4	10	89	47	**60,70**
9,5	10	89	47	**60,70**
9,6	10	89	47	**60,70**
9,7	10	89	47	**60,70**
9,8	10	89	47	**60,70**
9,9	10	89	47	**60,70**
10,0	10	89	47	**60,70**
10,1	12	102	55	**80,35**
10,2	12	102	55	**80,35**
10,3	12	102	55	**80,35**
10,4	12	102	55	**80,35**
10,5	12	102	55	**80,35**
10,6	12	102	55	**80,35**
10,7	12	102	55	**80,35**
10,8	12	102	55	**80,35**
10,9	12	102	55	**80,35**
11,0	12	102	55	**80,35**
11,1	12	102	55	**80,35**
11,2	12	102	55	**80,35**
11,3	12	102	55	**80,35**
11,4	12	102	55	**80,35**
11,5	12	102	55	**80,35**
11,6	12	102	55	**80,35**
11,7	12	102	55	**80,35**
11,8	12	102	55	**80,35**
11,9	12	102	55	**80,35**

d1 m7	d2 h6	l1	l2	€
12,0	12	102	55	**80,35**
12,5	14	107	60	**110,20**
12,8	14	107	60	**110,20**
13,0	14	107	60	**110,20**
13,5	14	107	60	**110,20**
13,8	14	107	60	**110,20**
14,0	14	107	60	**110,20**
14,5	16	115	65	**149,35**
14,8	16	115	65	**149,35**
15,0	16	115	65	**149,35**
15,5	16	115	65	**149,35**
15,8	16	115	65	**149,35**
16,0	16	115	65	**149,35**
16,5	18	123	73	**193,25**
16,8	18	123	73	**193,25**
17,0	18	123	73	**193,25**
17,5	18	123	73	**193,25**
17,8	18	123	73	**193,25**
18,0	18	123	73	**193,25**
18,5	20	131	79	**238,75**
19,0	20	131	79	**238,75**
19,5	20	131	79	**238,75**
19,8	20	131	79	**238,75**
20,0	20	131	79	**238,75**

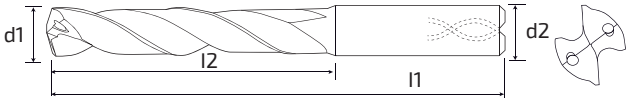
B-173

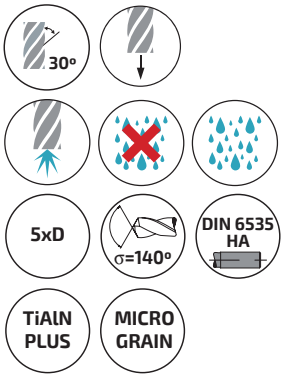
Broca metal duro 5xD con refrigeración interna

Solid carbide 5xD twist drill with internal coolant

Broca metal duro integral 5xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 140º, ángulo de espiral 30º. Geometría de corte especial para taladro directo sin punteado previo que a la vez garantiza una perfecta concentricidad. A - lado especial de los canales para disminuir el c - te de fricción, mejorando la extracción de viruta. Permite trabajar tanto en seco como con refrigeración externa.

Solid carbide 5xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 140°, helix angle 30°. Special profile chip flute geometry. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without external coolant.





STEEL <55 HRC

INOX

GG

GGG

NI ALLOYS

TITAN INCONEL

UNI

Ejemplo de pedido			Ref. final
B173	**030**	210	B173030210
	d1=3		
B173	**120**	210	B173120210
	d1=12,0		

Condiciones de corte | Cutting data pag. 215

d1 m7	d2 h6	l1	l2	€
2,5	3	57	21	**27,90**
3,0	6	66	28	**27,90**
3,1	6	66	28	**27,90**
3,2	6	66	28	**27,90**
3,3	6	66	28	**27,90**
3,4	6	66	28	**27,90**
3,5	6	66	28	**27,90**
3,6	6	66	28	**27,90**
3,7	6	66	28	**27,90**
3,8	6	74	36	**27,90**
3,9	6	74	36	**27,90**
4,0	6	74	36	**27,90**
4,1	6	74	36	**27,90**
4,2	6	74	36	**27,90**
4,3	6	74	36	**27,90**
4,4	6	74	36	**27,90**
4,5	6	74	36	**27,90**
4,6	6	74	36	**27,90**
4,7	6	74	36	**27,90**
4,8	6	82	44	**27,90**
4,9	6	82	44	**27,90**
5,0	6	82	44	**27,90**
5,1	6	82	44	**27,90**
5,2	6	82	44	**27,90**
5,3	6	82	44	**27,90**
5,4	6	82	44	**27,90**
5,5	6	82	44	**27,90**
5,6	6	82	44	**27,90**
5,7	6	82	44	**27,90**
5,8	6	82	44	**27,90**
5,9	6	82	44	**27,90**

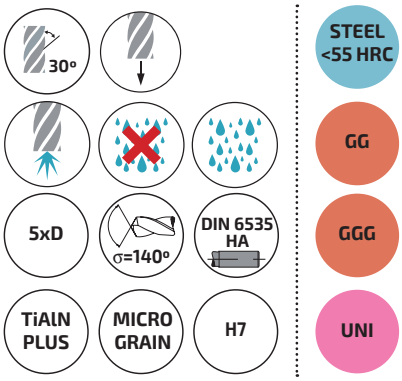
d1 m7	d2 h6	l1	l2	€
6,0	6	82	44	**27,90**
6,1	8	91	53	**44,55**
6,2	8	91	53	**44,55**
6,3	8	91	53	**44,55**
6,4	8	91	53	**44,55**
6,5	8	91	53	**44,55**
6,6	8	91	53	**44,55**
6,7	8	91	53	**44,55**
6,8	8	91	53	**44,55**
6,9	8	91	53	**44,55**
7,0	8	91	53	**44,55**
7,1	8	91	53	**44,55**
7,2	8	91	53	**44,55**
7,3	8	91	53	**44,55**
7,4	8	91	53	**44,55**
7,5	8	91	53	**44,55**
7,6	8	91	53	**44,55**
7,7	8	91	53	**44,55**
7,8	8	91	53	**44,55**
7,9	8	91	53	**44,55**
8,0	8	91	53	**44,55**
8,1	10	103	61	**65,95**
8,2	10	103	61	**65,95**
8,3	10	103	61	**65,95**
8,4	10	103	61	**65,95**
8,5	10	103	61	**65,95**
8,6	10	103	61	**65,95**
8,7	10	103	61	**65,95**
8,8	10	103	61	**65,95**
8,9	10	103	61	**65,95**
9,0	10	103	61	**65,95**

d1 m7	d2 h6	l1	l2	€
9,1	10	103	61	**65,95**
9,2	10	103	61	**65,95**
9,3	10	103	61	**65,95**
9,4	10	103	61	**65,95**
9,5	10	103	61	**65,95**
9,6	10	103	61	**65,95**
9,7	10	103	61	**65,95**
9,8	10	103	61	**65,95**
9,9	10	103	61	**65,95**
10,0	10	103	61	**65,95**
10,1	12	118	71	**94,50**
10,2	12	118	71	**94,50**
10,3	12	118	71	**94,50**
10,4	12	118	71	**94,50**
10,5	12	118	71	**94,50**
10,6	12	118	71	**94,50**
10,7	12	118	71	**94,50**
10,8	12	118	71	**94,50**
10,9	12	118	71	**94,50**
11,0	12	118	71	**94,50**
11,1	12	118	71	**94,50**
11,2	12	118	71	**94,50**
11,3	12	118	71	**94,50**
11,4	12	118	71	**94,50**
11,5	12	118	71	**94,50**
11,6	12	118	71	**94,50**
11,7	12	118	71	**94,50**
11,8	12	118	71	**94,50**
11,9	12	118	71	**94,50**
12,0	12	118	71	**94,50**
12,2	14	124	77	**129,15**

d1 m7	d2 h6	l1	l2	€
12,5	14	124	77	**129,15**
12,8	14	124	77	**129,15**
13,0	14	124	77	**129,15**
13,5	14	124	77	**129,15**
13,8	14	124	77	**129,15**
14,0	14	124	77	**129,15**
14,5	16	133	83	**170,40**
14,8	16	133	83	**170,40**
15,0	16	133	83	**170,40**
15,5	16	133	83	**170,40**
15,8	16	133	83	**170,40**
16,0	16	133	83	**170,40**
16,5	18	143	93	**220,75**
16,8	18	143	93	**220,75**
17,0	18	143	93	**220,75**
17,5	18	143	93	**220,75**
17,8	18	143	93	**220,75**
18,0	18	143	93	**220,75**
18,5	20	153	101	**271,70**
19,0	20	153	101	**271,70**
19,5	20	153	101	**271,70**
20,0	20	153	101	**271,70**

Broca metal duro 5xD con refrigeración interna tolerancia H7

H7 Tolerance solid carbide 5xD twist drill with internal coolant

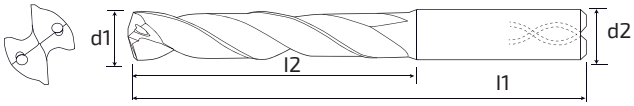


Broca metal duro integral 5xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 140º, ángulo de espiral 30º. Geometría de corte especial para taladro directo sin punteado previo que a la vez garantiza una perfecta concentricidad. A especial de los canales para disminuir el c de fricción, mejorando la extracción de viruta. Permite trabajar tanto en seco como con refrigeración externa, con una tolerancia H7.

Solid carbide 5xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 140°, helix angle 30°. Special profile chip flute geometry. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without external coolant H7 tolerance.

Ejemplo de pedido			Ref. final
B183	**030** (d1=3)	210	B183030210
B183	**120** (d1=12,0)	210	B183120210

Condiciones de corte | Cutting data pag. 215



d1 m7	d2 h6	l1	l2	€
3,0	6	66	28	**131,15**
3,5	6	66	28	**131,15**
4,0	6	74	36	**131,15**
4,5	6	74	36	**131,15**
5,0	6	82	44	**131,15**
5,5	6	82	44	**131,15**
6,0	6	82	44	**131,15**
6,5	8	91	53	**141,85**
7,0	8	91	53	**141,85**
7,5	8	91	53	**141,85**
8,0	8	91	53	**141,85**
8,5	10	103	61	**166,65**
9,0	10	103	61	**166,65**
9,5	10	103	61	**166,65**
10,0	10	103	61	**166,65**
10,5	12	118	71	**231,75**
11,0	12	118	71	**231,75**
11,5	12	118	71	**231,75**
12,0	12	118	71	**231,75**

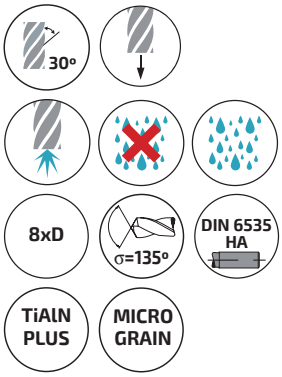
B-820

Broca metal duro 8xD con refrigeración interna

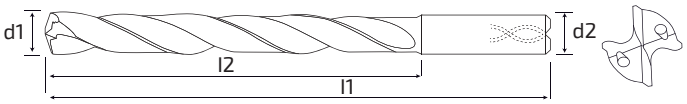
Solid carbide 8xD twist drill with internal coolant

Broca metal duro integral 8xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 135º, ángulo de espiral 30º. Geometría de corte especial para taladro directo sin punteado previo que a la vez garantiza una perfecta concentricidad. A - lado especial de los canales para disminuir el c - te de fricción, mejorando la extracción de viruta. Permite trabajar tanto en seco como con refrigeración externa.

Solid carbide 8xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 135°, helix angle 30°. Special profile chip flute geometry. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without external coolant.



STEEL <55 HRC
INOX
GG
GGG
NI ALLOYS
TITAN INCONEL
UNI
ALU <12% SI



Ejemplo de pedido			Ref. final
B820	**022**	210	B820022210
	d1=2,2		
B820	**120**	210	B820120210
	d1=12		

Condiciones de corte | Cutting data pag. 220

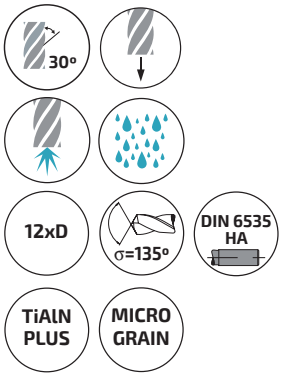
d1 m7	d2 h6	l1	l2	€
2,20	3	60	20,90	**38,85**
2,25	3	60	21,40	**38,85**
2,30	3	60	21,90	**38,85**
2,35	3	60	22,30	**38,85**
2,40	3	60	22,80	**38,85**
2,45	3	60	23,30	**38,85**
2,50	3	60	23,80	**38,85**
2,55	3	60	24,20	**38,85**
2,60	3	60	24,70	**38,85**
2,65	3	60	25,20	**38,85**
2,70	3	60	25,70	**38,85**
2,75	3	60	26,10	**38,85**
2,80	3	60	26,60	**38,85**
2,85	3	60	27,10	**38,85**
2,90	3	60	27,60	**38,85**
2,95	3	60	28,00	**38,85**
3,00	6	74	34,00	**42,15**
3,10	6	80	40,00	**42,20**
3,20	6	80	40,00	**42,20**
3,30	6	80	40,00	**42,20**
3,40	6	80	40,00	**42,20**
3,50	6	80	40,00	**42,20**
3,60	6	85	45,00	**46,05**
3,70	6	85	45,00	**46,05**

d1 m7	d2 h6	l1	l2	€
3,8	6	85	45	**46,05**
3,9	6	85	45	**46,05**
4,0	6	85	45	**46,05**
4,1	6	91	51	**47,90**
4,2	6	91	51	**47,90**
4,3	6	91	51	**47,90**
4,4	6	91	51	**47,90**
4,5	6	91	51	**47,90**
4,6	6	96	55	**47,90**
4,7	6	96	55	**47,90**
4,8	6	96	55	**47,90**
4,9	6	96	55	**47,90**
5,0	6	96	55	**47,90**
5,1	6	102	62	**49,70**
5,2	6	102	62	**49,70**
5,3	6	102	62	**49,70**
5,4	6	102	62	**49,70**
5,5	6	102	62	**49,70**
5,6	6	107	67	**50,25**
5,7	6	107	67	**50,25**
5,8	6	107	67	**50,25**
5,9	6	107	67	**50,25**
6,0	6	107	67	**50,25**
6,5	8	113	63	**73,95**

d1 m7	d2 h6	l1	l2	€
6,8	8	114	76	**73,00**
7,0	8	78	118	**73,00**
7,5	8	84	124	**82,60**
8,0	8	89	129	**104,90**
8,5	10	95	139	**104,90**
9,0	10	100	144	**104,90**
9,5	10	107	151	**104,10**
10,0	10	112	156	**172,35**
10,2	12	162	114	**149,05**
10,5	12	118	167	**172,35**
11,0	12	123	172	**172,35**
11,5	12	129	178	**198,35**
12,0	12	134	183	**199,25**
12,5	14	140	189	**200,20**
13,0	14	145	194	**201,05**
13,5	14	151	200	**266,60**
14,0	14	156	205	**266,60**
14,5	16	152	204	**266,60**
15,0	16	152	204	**266,60**
15,5	16	152	204	**352,85**
16,0	16	152	204	**352,85**
17,0	18	171	223	**352,85**
17,5	18	171	223	**329,75**
18,0	18	171	223	**329,75**

Broca metal duro 12xD con refrigeración interna

Solid carbide 12xD twist drill with internal coolant



STEEL <55 HRC

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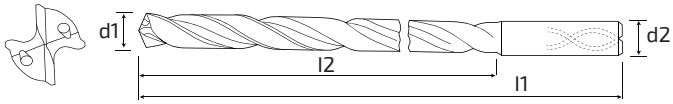
NI ALLOYS

TITAN INCONEL

UNI

Broca metal duro integral 12xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 135º, ángulo de espiral 30º. Geometría de corte especial para taladrado previo con broca 3xD, que garantiza una perfecta concentricidad. A especial de los canales para disminuir el c de fricción, mejorando la extracción de viruta. Para trabajos con refrigeración externa.

Solid carbide 12xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 135°, helix angle 30°. Special profile chip flute geometry. Before drilling, you have to use a 3xD drill. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without external coolant.



Ejemplo de pedido			Ref. final
B1220	**022**	210	B1220022210
	d1=2,2		
B1220	**120**	210	B1220120210
	d2=12		

Condiciones de corte | Cutting data pag. 220

d1 m7	d2 h6	l1	l2	€
2,20	3	65	29,7	**66,35**
2,25	3	65	30,4	**66,35**
2,30	3	65	31,1	**66,35**
2,35	3	75	31,7	**66,35**
2,40	3	75	32,4	**66,35**
2,45	3	75	33,1	**66,35**
2,50	3	75	33,8	**66,35**
2,55	3	75	34,4	**66,35**
2,60	3	75	35,1	**66,35**
2,65	3	75	35,8	**66,35**
2,70	3	75	36,5	**66,35**
2,75	3	75	37,1	**66,35**
2,80	3	75	37,8	**66,35**
2,85	3	75	38,5	**66,35**
2,90	3	75	39,2	**66,35**
2,95	3	75	39,8	**66,35**
3,00	6	86	46	**85,10**
3,10	6	94	54	**85,10**
3,20	6	94	54	**85,10**
3,30	6	94	54	**85,10**
3,40	6	94	54	**85,10**
3,50	6	94	54	**85,10**
3,60	6	101	61	**85,10**
3,70	6	101	61	**85,10**
3,80	6	101	61	**85,10**
3,90	6	101	61	**85,10**
4,00	6	101	61	**85,10**
4,10	6	109	69	**85,60**
4,20	6	109	69	**85,60**
4,30	6	109	69	**85,60**

d1 m7	d2 h6	l1	l2	€
4,4	6	109	69	**85,60**
4,5	6	109	69	**85,60**
4,6	6	116	76	**87,60**
4,7	6	116	76	**87,60**
4,8	6	116	76	**87,60**
4,9	6	116	76	**87,60**
5,0	6	116	76	**87,60**
5,1	6	124	84	**93,20**
5,2	6	124	84	**93,20**
5,3	6	124	84	**93,20**
5,4	6	124	84	**93,20**
5,5	6	124	84	**93,20**
5,6	6	131	91	**98,00**
5,7	6	131	91	**98,00**
5,8	6	131	91	**98,00**
5,9	6	131	91	**98,00**
6,0	6	131	91	**98,00**
6,5	8	139	99	**128,30**
7,0	8	146	106	**128,30**
7,5	8	154	114	**127,45**
8,0	8	161	121	**127,45**
8,5	10	173	129	**183,60**
9,0	10	180	136	**183,60**
9,5	10	189	145	**183,85**
10,0	10	196	152	**183,85**
10,5	12	209	160	**279,05**
11,0	12	216	167	**287,20**
11,5	12	224	175	**287,20**
12,0	12	231	182	**314,25**

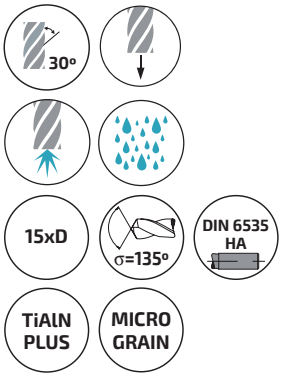
B-1520

Broca metal duro 15xD con refrigeración interna

Solid carbide 15xD twist drill with internal coolant

Broca metal duro integral 15xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 135º, ángulo de espiral 30º. Geometría de corte especial para taladrado previo con broca 3xD, que garantiza una perfecta concentricidad. A especial de los canales para disminuir el c de fricción, mejorando la extracción de viruta. Para trabajos con refrigeración interna.

Solid carbide 15xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 135°, helix angle 30°. Special profile chip flute geometry. Before drilling, you have to use a 3xD drill. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without internal coolant.



STEEL <55 HRC

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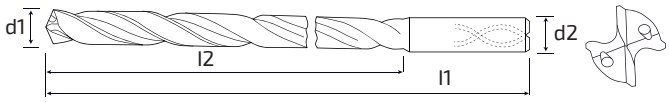
TITAN INCONEL



Ejemplo de pedido			Ref. final
B1520	**022**	210	B1520022210
	d1=2,2		
B1520	**100**	210	B1520100210
	d1=10		

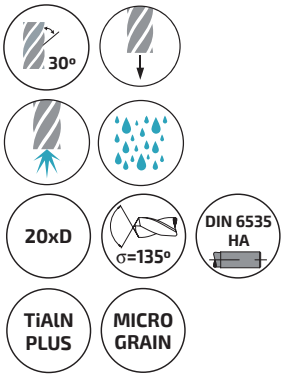
Condiciones de corte | Cutting data pag. 220

d1 m7	d2 h6	l1	l2	€
2,20	3	79	39,6	**92,60**
2,25	3	80	40,5	**92,60**
2,30	3	80	41,4	**92,60**
2,35	3	81	42,3	**92,70**
2,40	3	82	43,2	**92,70**
2,45	3	83	44,1	**92,70**
2,50	3	84	45	**92,70**
2,55	3	85	45,9	**95,15**
2,60	3	86	46,8	**95,15**
2,65	3	86	47,7	**95,15**
2,70	3	87	48,6	**95,15**
2,75	3	88	49,5	**95,15**
2,80	3	89	50,4	**95,15**
2,85	3	90	51,3	**92,70**
2,90	3	91	52,2	**95,15**
2,95	3	92	53,1	**95,15**
3,00	6	95	55	**121,5**
3,10	6	104	64	**131,50**
3,20	6	104	64	**131,50**
3,30	6	104	64	**131,50**
3,40	6	104	64	**131,50**
3,50	6	104	64	**131,50**
3,60	6	113	73	**135,10**
3,70	6	113	73	**135,10**
3,80	6	113	73	**135,10**
3,90	6	113	73	**135,10**
4,00	6	113	73	**135,10**
4,10	6	122	82	**135,10**

d1 m7	d2 h6	l1	l2	€
4,20	6	122	82	**135,10**
4,30	6	122	82	**135,10**
4,40	6	122	82	**135,10**
4,50	6	122	82	**135,10**
4,60	6	131	91	**142,90**
4,70	6	131	91	**142,90**
4,80	6	131	91	**142,90**
4,90	6	131	91	**142,90**
5,00	6	131	91	**142,90**
5,10	6	140	100	**159,60**
5,20	6	140	100	**159,60**
5,30	6	140	100	**159,60**
5,40	6	140	100	**159,60**
5,50	6	140	100	**159,60**
5,60	6	149	109	**159,60**
5,70	6	149	109	**159,60**
5,80	6	149	109	**159,60**
5,90	6	149	109	**159,60**
6,00	6	149	109	**159,60**
6,50	8	158	118	**177,95**
7,00	8	167	127	**195,90**
7,50	8	176	136	**195,90**
8,00	8	185	145	**195,90**
8,50	10	198	154	**297,45**
9,00	10	207	163	**297,45**
9,50	10	217	173	**297,45**
10,00	10	226	182	**302,50**

Broca metal duro 20xD con refrigeración interna

Solid carbide 20xD twist drill with internal coolant



STEEL <55 HRC

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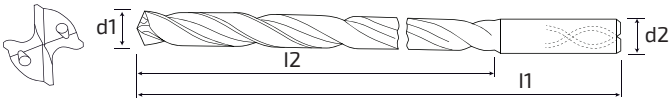
NI ALLOYS

TITAN INCONEL

UNI

Broca metal duro integral 20xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 135º, ángulo de espiral 30º. Geometría de corte especial para taladrado previo con broca 3xD, que garantiza una perfecta concentricidad. A especial de los canales para disminuir el c de fricción, mejorando la extracción de viruta. Para trabajos con refrigeración interna.

Solid carbide 20xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 135°, helix angle 30°. Special profile chip flute geometry. Before drilling, you have to use a 3xD drill. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without internal coolant.



Ejemplo de pedido			Ref. final
B2020	**022**	210	B2020022210
	d1=2,2		
B2020	**080**	210	B2020080210
	d2=8		

Condiciones de corte | Cutting data pag. 220

d1 m7	d2 h6	l1	l2	€
2,2	3	90	50,6	**149,40**
2,3	3	92	52,9	**149,40**
2,4	3	94	55,2	**149,40**
2,5	3	96	57,5	**149,40**
2,6	3	99	59,8	**149,40**
2,7	3	101	62,1	**149,40**
2,8	3	103	64,4	**149,40**
2,9	3	105	66,7	**150,35**
3,0	6	110	70	**143,45**
3,1	6	122	82	**162,90**
3,2	6	122	82	**162,90**
3,3	6	122	82	**162,90**
3,4	6	122	82	**162,90**
3,5	6	122	82	**162,90**
3,6	6	133	93	**167,55**
3,7	6	133	93	**167,55**
3,8	6	133	93	**167,55**
3,9	6	133	93	**167,55**
4,0	6	133	93	**167,55**
4,1	6	145	105	**173,00**
4,2	6	145	105	**173,00**
4,3	6	145	105	**173,00**

d1 m7	d2 h6	l1	l2	€
4,4	6	145	105	**173,00**
4,5	6	145	105	**173,00**
4,6	6	156	116	**172,15**
4,7	6	156	116	**172,15**
4,8	6	156	116	**172,15**
4,9	6	156	116	**172,15**
5,0	6	156	116	**172,15**
5,1	6	168	128	**190,40**
5,2	6	168	128	**190,40**
5,3	6	168	128	**190,40**
5,4	6	168	128	**190,40**
5,5	6	168	128	**190,40**
5,6	6	179	139	**190,40**
5,7	6	179	139	**190,40**
5,8	6	179	139	**190,40**
5,9	6	179	139	**190,40**
6,0	6	179	139	**190,40**
6,5	8	191	151	**209,35**
7,0	8	202	162	**209,35**
7,5	8	214	174	**209,35**
8,0	8	225	185	**209,35**
8,8	10	290	230	**442,86**

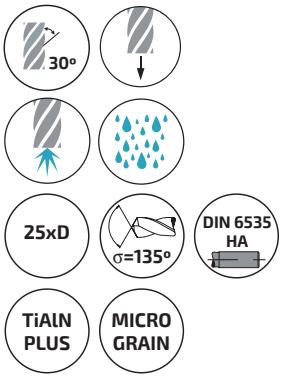
B-2520

Broca metal duro 25xD con refrigeración interna

Solid carbide 25xD twist drill with internal coolant

Broca metal duro integral 25xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 135º, ángulo de espiral 30º. Geometría de corte especial para taladrado previo con broca 3xD, que garantiza una perfecta concentricidad. A especial de los canales para disminuir el c de fricción, mejorando la extracción de viruta. Para trabajos con refrigeración interna.

Solid carbide 25xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 135°, helix angle 30°. Special profile chip flute geometry. Before drilling, you have to use a 3xD drill. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without internal coolant.



STEEL <55 HRC
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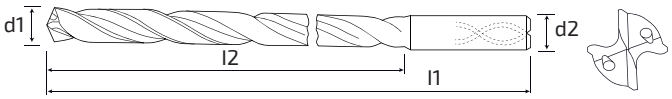


Ejemplo de pedido			Ref. final
B2520	**030**	210	B2520030210
	d1=3		
B2520	**041**	210	B2520041210
	d1=4,1		

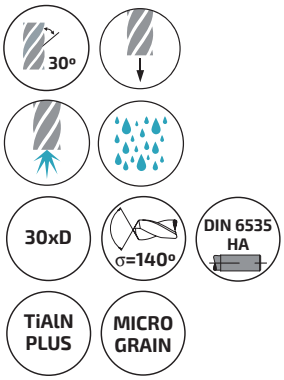
Condiciones de corte | Cutting data pag. 220

d1 m7	d2 h6	l1	l2	€
3,0	6	125	85	**190,15**
3,1	6	139	99	**194,70**
3,2	6	139	99	**194,70**
3,3	6	139	99	**194,70**
3,4	6	139	99	**194,70**
3,5	6	139	99	**194,70**
3,6	6	153	113	**193,85**
3,7	6	153	113	**193,85**
3,8	6	153	113	**193,85**
3,9	6	153	113	**193,85**
4,0	6	153	113	**193,85**
4,1	6	167	127	**212,80**
4,2	6	167	127	**212,80**
4,3	6	167	127	**212,80**
4,4	6	167	127	**212,80**
4,5	6	167	127	**212,80**

d1 m7	d2 h6	l1	l2	€
4,6	6	181	141	**212,80**
4,7	6	181	141	**212,80**
4,8	6	181	141	**212,80**
4,9	6	181	141	**212,80**
5,0	6	181	141	**212,80**
5,1	6	195	155	**228,35**
5,2	6	195	155	**228,35**
5,3	6	195	155	**228,35**
5,4	6	195	155	**228,35**
5,5	6	195	155	**228,35**
5,6	6	209	169	**234,20**
5,7	6	209	169	**234,20**
5,8	6	209	169	**234,20**
5,9	6	209	169	**234,20**
6,0	6	209	169	**234,20**

Broca metal duro 30xD con refrigeración interna

Solid carbide 30xD twist drill with internal coolant



STEEL <55 HRC

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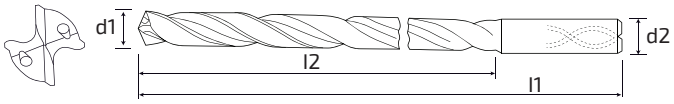
NI ALLOYS

TITAN INCONEL

UNI

Broca metal duro integral 30xD con recubrimiento TiAlN, con refrigeración interior y con corte a derecha. Ángulo de punta 140º, ángulo de espiral 30º. Geometría de corte especial para taladrado previo con broca 3xD, que garantiza una perfecta concentricidad. A especial de los canales para disminuir el c de fricción, mejorando la extracción de viruta. Para trabajos con refrigeración interna.

Solid carbide 30xD twist drill, with internal coolant and TiAlN coating. Cylindrical shank, right hand cut. Point angle 140°, helix angle 30°. Special profile chip flute geometry. Before drilling, you have to use a 3xD drill. High performance spiral twist drill for highest bore hole quality and economical output. Drilling is possible both with and without internal coolant.



Ejemplo de pedido			Ref. final
B3020	**030**	210	B3020030210
	d1=3		
B3020	**054**	210	B3020054210
	d2=5,4		

Condiciones de corte | Cutting data pag. 220

d1 m7	d2 h6	l1	l2	€
3,0	6	140	100	**251,30**
3,1	6	157	117	**250,45**
3,2	6	157	117	**250,45**
3,3	6	157	117	**250,45**
3,4	6	157	117	**250,45**
3,5	6	157	117	**250,45**
3,6	6	273	117	**255,05**
3,7	6	173	133	**255,05**
3,8	6	173	133	**255,05**
3,9	6	173	133	**255,05**
4,0	6	173	133	**255,05**
4,1	6	190	150	**270,15**
4,2	6	190	150	**270,15**
4,3	6	190	150	**270,15**
4,4	6	190	150	**270,15**
4,5	6	190	150	**270,15**

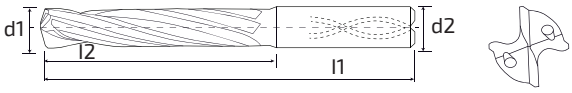
d1 m7	d2 h6	l1	l2	€
4,6	6	206	166	**279,40**
4,7	6	206	166	**277,15**
4,8	6	206	166	**277,15**
4,9	6	206	166	**277,15**
5,0	6	206	166	**277,15**
5,1	6	223	183	**292,20**
5,2	6	223	183	**292,20**
5,3	6	223	183	**292,20**
5,4	6	223	183	**292,20**
5,5	6	223	183	**292,20**
5,6	6	239	199	**292,20**
5,7	6	239	199	**292,20**
5,8	6	239	199	**292,20**
5,9	6	239	199	**292,20**
6,0	6	239	199	**292,20**

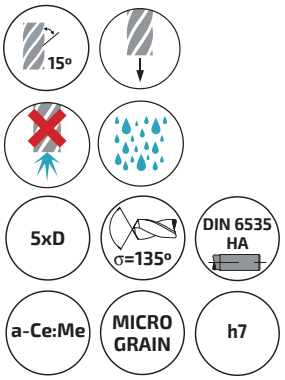
Broca metal duro 5xD para aluminio con refrigeración interna

Solid carbide 5xD drill for aluminium

Broca metal duro integral 5xD con recubrimiento a-C:Me y refrigeración interior para aluminio. Ángulo de punta 135º, ángulo de espiral 15º.

Solid carbide 5xD drill with internal coolant and a-C:Me coating for aluminum. Point angle 135º, helix angle 15º.





Ejemplo de pedido			Ref. final
B153	**030**	210	B153030210
	d1=3		
B153	**120**	210	B153120210
	d1=12,0		

Condiciones de corte | Cutting data pag. 216

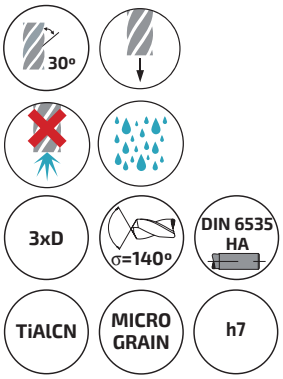
d1 m7	d2 h6	l1	l2	€
2,0	6	72	34	**99,50**
2,1	6	72	34	**99,50**
2,2	6	72	34	**99,50**
2,3	6	72	34	**99,50**
2,4	6	72	34	**99,50**
2,5	6	72	34	**99,50**
2,6	6	72	34	**99,50**
2,7	6	72	34	**99,50**
2,8	6	81	43	**99,50**
2,9	6	81	43	**99,50**
3,0	6	81	43	**99,50**
3,1	6	81	43	**99,50**
3,2	6	81	43	**99,50**
3,3	6	81	43	**99,50**
3,4	6	81	43	**99,50**
3,5	6	81	43	**99,50**
3,6	6	81	43	**99,50**
3,7	6	81	43	**99,50**
3,8	6	95	57	**98,15**
3,9	6	95	57	**98,15**
4,0	6	95	57	**98,15**
4,1	6	95	57	**98,15**
4,2	6	95	57	**98,15**
4,3	6	95	57	**98,15**
4,4	6	95	57	**98,15**
4,5	6	72	34	**98,15**
4,6	6	72	34	**98,15**
4,7	6	72	34	**98,15**
4,8	6	72	34	**96,50**
4,9	6	72	34	**96,50**
5,0	6	72	34	**96,50**
5,1	6	72	34	**96,50**
5,2	6	81	43	**96,50**
5,3	6	72	34	**96,50**
5,4	6	72	34	**96,50**

d1 m7	d2 h6	l1	l2	€
5,5	6	72	34	**96,50**
5,6	6	72	34	**96,50**
5,7	6	72	34	**96,50**
5,8	6	72	34	**96,50**
5,9	6	72	34	**96,50**
6,0	6	72	34	**96,50**
6,1	6	72	34	**107,70**
6,2	6	72	34	**107,70**
6,3	6	81	43	**107,70**
6,4	6	81	43	**107,70**
6,5	6	81	43	**107,70**
6,6	6	81	43	**107,70**
6,7	6	81	43	**107,70**
6,8	6	81	43	**107,70**
6,9	6	81	43	**107,70**
7,0	6	81	43	**107,70**
7,1	6	81	43	**107,70**
7,2	6	81	43	**107,70**
7,3	6	95	57	**107,70**
7,4	6	95	57	**107,70**
7,5	6	95	57	**107,70**
7,6	6	95	57	**107,70**
7,7	6	95	57	**107,70**
7,8	6	95	57	**107,70**
7,9	6	95	57	**107,70**
8,0	8	91	53	**107,70**
8,1	10	103	61	**126,00**
8,2	10	103	61	**126,00**
8,3	10	103	61	**126,00**
8,4	10	103	61	**126,00**
8,5	10	103	61	**126,00**
8,6	10	103	61	**126,00**
8,7	10	103	61	**126,00**
8,8	10	103	61	**126,00**
8,9	10	103	61	**126,00**

d1 m7	d2 h6	l1	l2	€
9,0	12	162	114	**126,00**
9,2	12	162	114	**126,00**
9,5	12	162	114	**126,00**
9,8	12	162	114	**126,00**
10,0	12	162	114	**126,00**
10,2	12	162	114	**175,60**
10,5	12	162	114	**175,60**
10,8	12	162	114	**175,60**
11,0	12	162	114	**175,60**
11,2	12	162	114	**175,60**
11,5	12	162	114	**175,60**
11,8	12	162	114	**175,60**
12,0	12	162	114	**175,60**
12,2	12	162	114	**243,90**
12,5	12	162	114	**243,90**
12,8	12	162	114	**243,90**
13,0	14	178	131	**243,90**
13,5	14	178	131	**243,90**
13,8	14	178	131	**243,90**
14,0	14	178	131	**243,90**
14,2	14	178	131	**298,15**
14,5	16	203	152	**298,15**
14,8	16	203	152	**298,15**
15,0	16	203	152	**298,15**
15,2	16	203	152	**298,15**
15,5	16	203	152	**298,15**
15,8	16	203	152	**298,15**
16,0	16	203	152	**298,15**

Broca metal duro 3xD para acero inoxidable con refrigeración interior

Solid carbide 3xD drill for stainless steel



INOX

STEEL <55 HRC

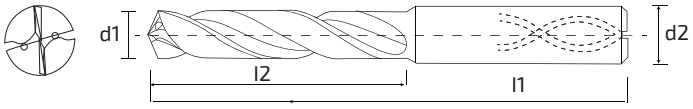
GG

GGG

TITAN INCONEL

Broca metal duro integral 3xD con recubrimiento TiAlCN y refrigeración interior para acero inoxidable. Ángulo de punta 135º, ángulo de espiral 30º.

Solid carbide 3xD drill with internal coolant and TiAlCN coating for stainless steel. Point angle 140º, helix angle 30º.



Ejemplo de pedido			Ref. final
B320	**030**	210	B320030210
	d1=3		
B320	**120**	210	B320120210
	d1=12		

Condiciones de corte | Cutting data pag. 219

d1 m7	d2 h6	l1	l2	€
2,7	3	55	11	**43,30**
3,0	6	62	20	**26,40**
3,1	6	62	20	**26,40**
3,2	6	62	20	**26,40**
3,3	6	62	20	**26,40**
3,4	6	62	20	**26,40**
3,5	6	62	20	**26,40**
3,6	6	62	20	**26,40**
3,7	6	62	20	**26,40**
3,8	6	66	24	**26,40**
3,9	6	66	24	**26,40**
4	6	66	24	**26,40**
4,1	6	66	24	**26,40**
4,2	6	66	24	**26,40**
4,3	6	66	24	**26,40**
4,4	6	66	24	**26,40**
4,5	6	66	24	**26,40**
4,6	6	66	24	**26,40**
4,7	6	66	24	**26,40**
4,8	6	66	26	**26,40**
4,9	6	66	26	**26,40**
5,0	6	66	26	**26,40**
5,1	6	66	26	**26,40**
5,2	6	66	26	**26,40**
5,3	6	66	26	**26,40**
5,4	6	66	26	**26,40**
5,5	6	66	26	**26,40**
5,6	6	66	26	**26,40**
5,7	6	66	26	**26,40**
5,8	6	66	26	**26,40**
5,9	6	66	26	**26,40**
6,0	6	66	26	**39,60**
6,1	8	79	34	**39,60**
6,2	8	79	34	**39,60**
6,3	8	79	34	**39,60**
6,4	8	79	34	**37,60**

d1 m7	d2 h6	l1	l2	€
6,5	8	79	34	**39,60**
6,6	8	79	34	**39,60**
6,7	8	79	34	**39,60**
6,8	8	79	34	**39,60**
6,9	8	79	34	**39,60**
7,0	8	79	34	**39,60**
7,1	8	79	39	**39,60**
7,2	8	79	39	**39,60**
7,3	8	79	39	**39,60**
7,4	8	79	39	**39,60**
7,5	8	79	39	**39,60**
7,6	8	79	39	**39,60**
7,7	8	79	39	**39,60**
7,8	8	79	39	**39,60**
7,9	8	79	39	**39,60**
8	8	79	39	**39,60**
8,1	10	89	45	**62,95**
8,2	10	89	45	**62,95**
8,3	10	89	45	**62,95**
8,4	10	89	45	**62,95**
8,5	10	89	45	**62,95**
8,6	10	89	45	**62,95**
8,7	10	89	45	**62,95**
8,8	10	89	45	**62,95**
8,9	10	89	45	**62,95**
9,0	10	89	45	**62,95**
9,1	10	89	45	**62,95**
9,2	10	89	45	**62,95**
9,3	10	89	45	**62,95**
9,4	10	89	45	**62,95**
9,5	10	89	45	**62,95**
9,6	10	89	45	**62,95**
9,7	10	89	45	**62,95**
9,8	10	89	45	**62,95**
9,9	10	89	45	**62,95**
10,0	10	89	53	**62,95**

d1 m7	d2 h6	l1	l2	€
10,1	12	102	53	**82,60**
10,2	12	102	53	**82,60**
10,3	12	102	53	**82,60**
10,4	12	102	53	**82,60**
10,5	12	102	53	**82,60**
10,6	12	102	53	**82,60**
10,7	12	102	53	**82,60**
10,8	12	102	53	**82,60**
10,9	12	102	53	**82,60**
11,0	12	102	53	**82,60**
11,1	12	102	53	**82,60**
11,2	12	102	53	**82,60**
11,3	12	102	53	**82,60**
11,4	12	102	53	**82,60**
11,5	12	102	53	**82,60**
11,6	12	102	53	**82,60**
11,7	12	102	53	**82,60**
11,8	12	102	53	**82,60**
11,9	12	102	53	**82,60**
12,0	12	102	53	**82,60**
12,5	14	107	58	**111,75**
12,7	14	107	58	**111,75**
13,0	14	107	58	**111,75**
13,5	14	107	58	**111,75**
14,0	14	107	58	**111,75**
14,5	16	115	63	**150,9**
15,0	16	115	63	**150,9**
15,5	16	115	63	**150,9**
16,0	16	115	63	**150,9**
16,5	18	123	71	**194,75**
17,0	18	123	71	**194,75**
17,5	18	123	71	**194,75**
18,0	18	123	71	**194,75**
18,5	20	131	77	**240,3**
19,0	20	131	77	**240,3**
19,5	20	131	77	**240,3**
20,0	20	131	77	**240,30**

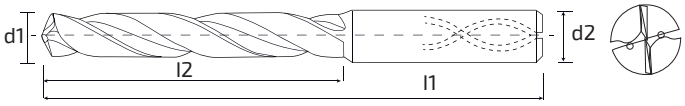
B-520

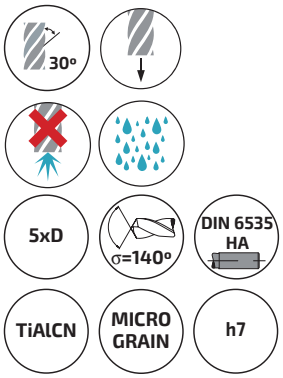
Broca metal duro 5xD para acero inoxidable con refrigeración interior

Solid carbide 5xD drill for stainless steel

Broca metal duro integral 5xD con recubrimiento TiAlCN y refrigeración interior para acero inoxidable. Ángulo de punta 140º, ángulo de espiral 30º.

Solid carbide 5xD drill with internal coolant and TiAlCN coating for stainless steel. Point angle 140º, helix angle 30º.





INOX
STEEL <55 HRC
GG
GGG
TITAN INCONEL

Ejemplo de pedido			Ref. final
B520	**030**	210	B520030210
	d1=3		
B520	**120**	210	B520120210
	d1=12		

Condiciones de corte | Cutting data pag. 219

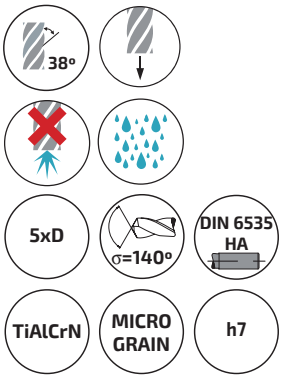
d1 m7	d2 h6	l1	l2	€
3,0	6	66	26	29,40
3,1	6	66	26	29,40
3,2	6	66	26	29,40
3,3	6	66	26	29,40
3,4	6	66	26	29,40
3,5	6	66	26	29,40
3,6	6	66	26	29,40
3,7	6	66	26	29,40
3,8	6	74	35	29,40
3,9	6	74	35	29,40
4,0	6	74	35	29,40
4,1	6	74	35	29,40
4,2	6	74	35	29,40
4,3	6	74	35	29,40
4,4	6	74	35	29,40
4,5	6	74	35	29,40
4,6	6	74	35	29,40
4,7	6	74	35	29,40
4,8	6	82	43	29,40
4,9	6	82	43	29,40
5,0	6	82	43	29,40
5,1	6	82	43	29,40
5,2	6	82	43	29,40
5,3	6	82	43	29,40
5,4	6	82	43	29,40
5,5	6	82	43	29,40
5,6	6	82	43	29,40
5,7	6	82	43	29,40
5,8	6	82	43	29,40
5,9	6	82	43	29,40
6,0	6	82	52	29,40
6,1	8	91	52	46,15
6,2	8	91	52	46,15
6,3	8	91	52	46,15
6,4	8	91	52	46,15
6,5	8	91	52	46,15

d1 m7	d2 h6	l1	l2	€
6,6	8	91	52	46,15
6,7	8	91	52	46,15
6,8	8	91	52	46,15
6,9	8	91	52	46,15
7,0	8	91	52	46,15
7,1	8	91	52	46,15
7,2	8	91	52	46,15
7,3	8	91	52	46,15
7,4	8	91	52	46,15
7,5	8	91	52	46,15
7,6	8	91	52	46,15
7,7	8	91	52	46,15
7,8	8	91	52	46,15
7,9	8	91	52	46,15
8,0	8	91	52	46,15
8,1	10	103	60	67,50
8,2	10	103	60	67,50
8,3	10	103	60	67,50
8,4	10	103	60	67,50
8,5	10	103	60	67,50
8,6	10	103	60	67,50
8,7	10	103	60	67,50
8,8	10	103	60	67,50
8,9	10	103	60	67,50
9,0	10	103	60	67,50
9,1	10	103	60	67,50
9,2	10	103	60	67,50
9,3	10	103	60	67,50
9,4	10	103	60	67,50
9,5	10	103	60	67,50
9,6	10	103	60	67,50
9,7	10	103	60	67,50
9,8	10	103	60	67,50
9,9	10	103	60	67,50
10	10	103	60	67,50
10,1	12	118	70	96,00

d1 m7	d2 h6	l1	l2	€
10,2	12	118	70	96,00
10,3	12	118	70	96,00
10,4	12	118	70	96,00
10,5	12	118	70	96,00
10,6	12	118	70	96,00
10,7	12	118	70	96,00
10,8	12	118	70	96,00
10,9	12	118	70	96,00
11,0	12	118	70	96,00
11,1	12	118	70	96,00
11,2	12	118	70	96,00
11,3	12	118	70	96,00
11,4	12	118	70	96,00
11,5	12	118	70	96,00
11,6	12	118	70	96,00
11,7	12	118	70	96,00
11,8	12	118	70	96,00
11,9	12	118	70	96,00
12,0	12	118	70	96,00
12,5	14	124	76	131,45
12,7	14	124	76	131,45
13,0	14	124	76	131,45
13,5	14	124	76	131,45
14,0	14	124	76	131,45
14,5	16	133	82	171,90
15,0	16	133	82	171,90
15,5	16	133	82	171,90
16,0	16	133	82	171,90
17,0	18	143	92	222,35
17,5	18	143	92	222,35
18,0	18	143	92	222,35
18,5	20	153	100	273,15
19,0	20	153	100	273,15
19,5	20	153	100	273,15
20,0	20	153	100	273,15

Broca metal duro 5xD para titanio con refrigeración interior

Solid carbide 5xD drill for titanium



TITAN INCONEL

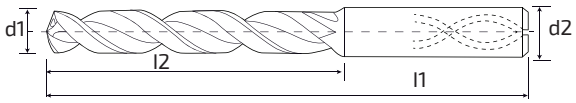
HG

STEEL <55 HRC

INOX

Broca metal duro integral de alto rendimiento, 5xD con recubrimiento TiAlCrN y refrigeración interior para titanio. Ángulo de punta 140º, ángulo de espiral 38º.

Solid carbide high performance 5xD drill with internal coolant and TiAlCrN coating for titanium. Point angle 140º, helix angle 38º.



Ejemplo de pedido			Ref. final
B193	**030** ↑ d1=3	210	B193030210
B193	**100** ↑ d1=10,0	210	B193120210

Condiciones de corte | Cutting data pag. 217

d1 m7	d2 h6	l1	l2	€
3,0	6	155	28	**134,35**
3,2	6	155	28	**147,45**
3,5	6	155	28	**147,45**
4,0	6	155	28	**147,45**
4,1	6	155	44	**157,00**
4,2	6	167	44	**157,00**
4,5	6	167	44	**157,00**
4,8	6	167	44	**157,00**
4,9	6	167	44	**157,00**
5,0	6	167	44	**157,00**
5,1	6	178	44	**157,00**
5,2	6	178	44	**157,00**
5,5	6	178	44	**157,00**
5,7	6	178	44	**157,00**
5,8	6	178	44	**157,00**
6,0	6	190	44	**157,00**
6,2	8	190	53	**204,60**
6,5	8	190	53	**204,60**
6,7	8	190	53	**204,60**
6,8	8	190	53	**204,60**

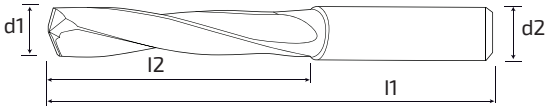
d1 m7	d2 h6	l1	l2	€
7,0	8	228	53	**204,60**
7,5	8	228	53	**204,60**
8,0	8	228	53	**204,60**
8,5	10	228	61	**263,45**
9,0	10	228	61	**263,45**
9,5	10	240	61	**263,45**
10,0	10	240	61	**263,45**
10,2	12	240	71	**326,15**
10,5	12	240	71	**326,15**
11,0	12	240	71	**326,15**
11,5	12	251	71	**326,15**
12,0	12	251	71	**326,15**
12,5	14	251	77	**488,00**
13,0	14	251	77	**488,00**
13,5	14	251	77	**488,00**
14,0	14	263	77	**488,00**
14,5	16	263	83	**582,30**
15,0	16	263	83	**582,30**
15,5	16	263	83	**582,30**
16,0	16	263	83	**582,30**

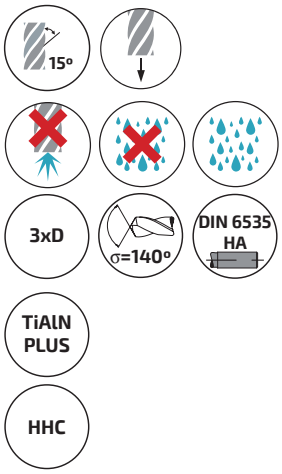
Broca metal duro HHC para materiales entre 50-68 HRC

Solid carbide HHC twist drill for 50-68 HRC materiales

Broca metal duro integral 3xD con recubrimiento TiAlN sin refrigeración interior y con corte a derecha. Ángulo de punta 140º. Ángulo de espiral 15º. Para materiales templados entre 50 y 68 HRC. Es una alternativa a la electroerosión, ofrece la máxima tolerancia (0,01mm) y tiene alta resistencia a la torsión.

Solid carbide 3xD twist drill without internal coolant and with TiAlN coating and right hand cut. Point angle 140º, helix angle 15º. For hardened materials between 50 and 68 HRC. This drill is a wire cutting alternative, offers maximum tolerance (0,01 mm) and has high torque resistence.





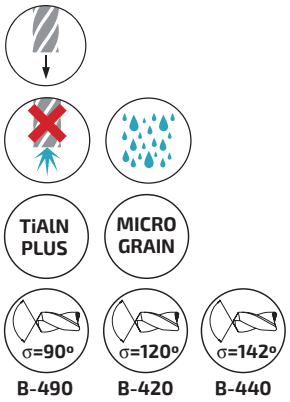
Ejemplo de pedido			Ref. final
B330	**030** ↑ d1=3	210	B330030210
B330	**120** ↑ d1=12,0	210	B330120210

Condiciones de corte | Cutting data pag. 216

d1 m7	d2 h6	l1	l2	€
3,0	6	62	20	**59,30**
3,3	6	62	20	**59,30**
3,4	6	62	20	**59,30**
3,5	6	62	20	**59,30**
4,0	6	66	24	**12,60**
4,2	6	66	24	**64,05**
4,3	6	66	24	**64,05**
4,5	6	66	24	**64,05**
5,0	6	66	28	**64,05**
5,1	6	66	28	**64,05**
5,5	6	66	28	**64,05**
6,0	6	66	28	**64,05**
6,5	8	79	34	**87,95**
6,8	8	79	34	**87,95**
7,0	8	79	34	**87,95**
7,5	8	79	41	**87,95**
8,0	8	79	41	**87,95**
8,5	10	89	47	**97,70**
8,6	10	89	47	**97,70**
9,0	10	89	47	**97,70**
9,5	10	89	47	**97,70**
10,0	10	89	47	**97,70**
10,2	12	102	55	**139,20**
10,5	12	102	55	**139,20**
11,0	12	102	55	**139,20**
11,5	12	102	55	**139,20**
12,0	12	102	55	**139,20**

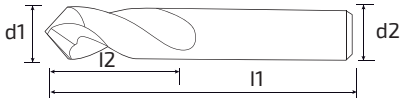
Broca metal duro NC 90º (B-490) 120º (B-420) 142º (B-440)

Solid carbide NC drill - countersink 90º (B-490) 120º (B-420) 142º (B-440)



Broca metal duro NC - avellanador con ángulo de 90º, 120º, 142º con recubrimiento TiAlN, mango cilíndrico, giro a derecha.
Ángulo de punta: 90º, 120º, 142º.
Ángulo espiral lateral: 18-20º.
Para posicionamiento preciso y rápido de brocas en CNC y taladros. Para centrado y avellanado de agujeros con una sola operación.

Solid carbide NC-center drill - countersink angle 90°, 120º, 142º with TiAlN coating, cylindrical shank, right hand cut.
Point grind: relieved cone.
Point angle: 90°, 120º, 142.
Side rake angle: 18-20°.
For quick and positionally - precise centre drilling on NC- and drilling machines. For centerring and chamfering of bore holes in one operation.



Ejemplo de pedido			Ref. final
B490	**060** d1=6	210	B490060210
B490	**120** d1=12,0	210	B490120210
B420	**060** d1=6	210	B420060210
B420	**120** d1=12,0	210	B420120210
B440	**060** d1=6	210	B440060210
B440	**120** d1=12,0	210	B440120210

B-490

d1	d2	l1	l2	€
6	6	57	13	**42,50**
8	8	63	19	**52,55**
10	10	66	20	**81,90**
12	12	72	22	**98,90**

B-420

d1	d2	l1	l2	€
6	6	57	13	**42,50**
8	8	63	19	**52,55**
10	10	66	20	**81,90**
12	12	72	22	**98,90**

B-440

d1	d2	l1	l2	€
6	6	57	13	**42,50**
8	8	63	19	**52,55**
10	10	66	20	**81,90**
12	12	72	22	**98,90**

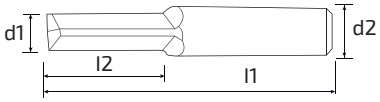
B-500

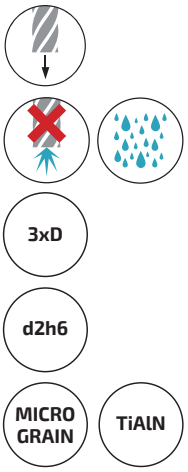
Broca metal duro rompemachos

Solid carbide drill for removing jammed taps

Herramienta de metal duro con recubrimiento TiAlN diseñada para eliminar de forma simple y económica el problema de roturas de machos en piezas de alto valor.
1. La pieza ha de estar bien amarrada.
2. La parte superior del macho no puede sobresalir en la pieza.
3. Puntear repetidamente el macho (1000-1500rpm). En caso de usar una máquina CNC, elegir el avance bajo (1000-1800rpm).
4. El macho puede extraerse en un centro CNC usando refrigeración o en un taladro manual de columna.
5. Eliminar las virutas con aire comprimido o con una punta de trazar.
6. Roscar de nuevo con un nuevo macho.
7. Comprobar las dimensiones de la nueva rosca.

Solid carbide tool with TiAlN coating for removing jammed taps on high value pieces.
1. The workpiece has to be clamped very stable and safe.
2. The overlapping part of the tap has to be made plane with the workpiece.
3. Centering of the drill by multiple tip-centering. In case of tip-centering with an NC machine please choose a lower cutting feed.
4. The remove of a tap can be made with an NC machine with lubrication also by hand with a bench drilling or column drilling machine.
5. Remove of remaining chippings with compressed air or with a scriber.
6. New thread cutting with a new tap.
7. After finishing the new thread please test the size accuracy.





HSS

HG

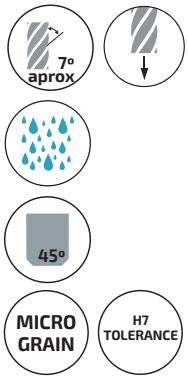
Ejemplo de pedido			Ref. final
B500	**050**	210	B500050210
	M 5		
B500	**120**	210	B500120210
	M 12		

Condiciones de corte | Cutting data pag. 217

Rosca	d1	d2	l1	l2	€
M 3	2,5	3	38	10	**47,70**
M 4	3,3	4	46	14	**48,95**
M 5	4,2	5	50	19	**57,40**
M 6	5,0	6	50	23	**75,50**
M 8	6,8	8	60	23	**94,70**
M 10	8,5	10	80	25	**114,75**
M 12	10,2	12	80	35	**175,05**
M 16	14,0	14	100	40	**315,10**
M 20	17,5	18	100	50	**554,05**
M 3 - M 12		Set (1 pieza de cada)			**552,55**

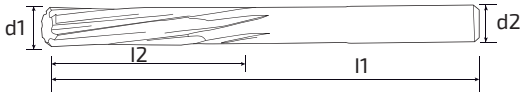
Escariador metal duro 7º

7º Solid carbide reamer



Escariador de metal duro sin recubrir forma B.
Corte a derechas con la hélice de 10º a izquierda.
Tolerancia 0/+0,004 mm.

Uncoated solid carbide reamer form B.
Right hand cutting 10º, left hand helix.
Tolerance 0/+0,004 mm.



Ejemplo de pedido			Ref. final
B601	**030** ↑ d1=3	210	B601030210
B601	**120** ↑ d1=12,0	210	B601120210

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d1 Ø	d2 Ø	l1	l2	z	€
1,00	1,0	34	5,5	4	**34,00**
1,50	1,5	40	8	4	**30,30**
2,00	2,0	49	11	4	**35,10**
2,50	2,5	57	14	4	**40,45**
3,00	3,0	61	15	4	**41,60**
3,01	3,0	64	17	4	**74,00**
3,02	3,0	64	17	4	**74,00**
3,50	3,5	70	18	4	**46,60**
3,99	4,0	77	21	4	**74,00**
4,00	4,0	75	19	4	**48,05**
4,00L	4,0	105	16	4	**108,95**
4,01	4,0	77	21	4	**74,00**
4,02	4,0	77	21	4	**74,00**
4,50	4,5	80	21	4	**56,35**
4,98	5,0	93	26	4	**91,40**
4,99	5,0	93	26	4	**91,40**
5,00	5,0	86	23	4	**57,95**
5,00L	5,0	115	16	4	**125,65**
5,01	5,0	93	26	4	**91,40**
5,02	5,0	93	26	4	**91,40**

d1 Ø	d2 Ø	l1	l2	z	€
5,10	6,0	93	26	4	**91,40**
5,20	6	93	26	4	**91,40**
5,30	6	93	26	4	**91,40**
5,50	6	93	26	4	**91,40**
5,98	6	93	26	4	**91,40**
5,99	6	93	26	4	**91,40**
6,00	6	93	26	4	**70,25**
6,00L	6	130	16	4	**136,00**
6,01	6	93	26	4	**91,40**
6,02	6	93	26	4	**91,40**
6,10	8	101	28	4	**113,70**
6,20	8	101	28	4	**113,70**
6,40	8	101	28	6	**113,70**
6,50	8	101	28	6	**113,70**
7,00	8	109	31	6	**84,10**
7,00L	7	140	18	6	**172,95**
7,50	8	109	31	6	**113,70**
7,98	8	117	33	6	**113,70**
8,00	8	117	33	6	**88,95**
8,00L	8	160	18	6	**190,70**

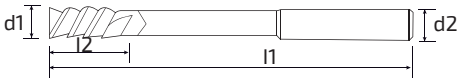
d1 Ø	d2 Ø	l1	l2	z	€
8,01	8	117	33	6	**113,70**
8,02	8	117	33	6	**113,70**
8,10	8	117	33	6	**139,50**
8,20	8	117	33	6	**139,50**
8,50	8	117	33	6	**139,50**
9,00	9	125	36	6	**101,20**
9,00L	9	175	18	6	**199,55**
9,50	9	125	36	6	**139,50**
9,99	10	133	41	6	**139,50**
10,00	10	133	41	6	**72,55**
10,00L	10	190	20	6	**205,45**
10,01	10	133	10	6	**139,50**
10,02	10	133	41	6	**139,50**
10,50L	10	190	20	6	**274,95**
11,00	11	142	41	6	**90,55**
11,00L	10	190	20	6	**248,30**
11,99	12	150	44	6	**182,85**
12,00	12	151	44	6	**83,25**
12,00L	12	220	22	6	**274,95**
12,01	12	150	44	6	**182,85**
12,02	12	150	44	6	**182,85**

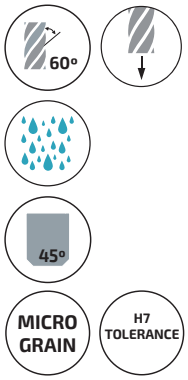
Escariador de metal duro hélice 60º

60º Solid carbide reamer

Escariador de metal duro sin recubrir.
Corte a derechas con la hélice de 60º.
Tolerancia 0/+0,005 mm.

Solid carbide reamer.
Right hand cutting with 60º helix.
Tolerante 0/+0,005 mm.





STEEL <55 HRC
INOX
GG
GGG
COPPER
ALU <12% SI
NI ALLOYS
TITAN INCONEL
UNI

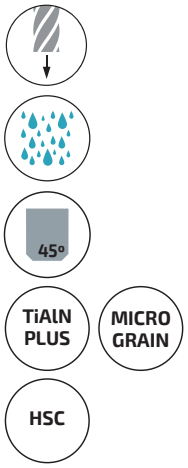
Ejemplo de pedido			Ref. final
B610	**030** ↕ d1=3	210	B610030210
B610	**120** ↕ d2=12,0	210	B610120210

Condiciones de corte | Cutting data pag. 218

d1	d2	l1	l2	z	€
3	4	70	12	4	**59,65**
4	4	75	12	4	**59,65**
5	6	80	16	4	**59,65**
6	6	80	16	4	**59,65**
8	8	100	20	4	**68,05**
10	10	110	25	4	**94,50**
12	12	120	28	4	**130,50**
14	14	145	30	4	**105,85**
16	16	155	35	6	**151,25**
18	18	170	38	6	**201,05**
20	20	180	40	6	**255,90**

Avellanador metal duro 90º < 60 HRC

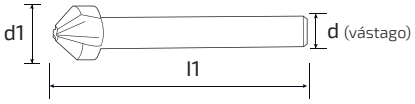
Solid carbide countersink 90º < 60 HRC



STEEL <55 HRC
INOX
GG
GGG
COPPER
ALU <12% SI
NI ALLOYS
TITAN INCONEL
UNI

Avellanador metal duro recubierto con TiAlN para materiales hasta 60 HRC con 3 labios de corte.
Para avellanado de aceros, fundición gris, aluminio, aleaciones de aluminio con Si y aceros inoxidables.
Desarrollo especial del avellanador para evitar vibraciones.

Solid carbide countersink 90° with TiAlN coating for materials up to 60 HRC.
3 Cutting edges.
For countersinking of high-strenght steel, grey cast iron, silicious aluminium
alloys and stainless steel.
Special design avoids vibrations.



Ejemplo de pedido			Ref. final
A205	**165** ↕ d1=16,5	210	A205165210
A205	**250** ↕ d1=25,0	210	A205250210

Condiciones de corte | Cutting data pag. 218

d1	d (min.)	d (vástago)	l1	z	€
6,3	1,5	5	45	3	**118,60**
8,3	2,0	6	50	3	**120,40**
10,4	2,5	6	50	3	**123,20**
12,4	2,8	8	56	3	**136,00**
16,5	3,2	10	60	3	**150,70**
20,5	3,5	10	63	3	**208,50**
25,0	3,8	10	67	3	**321,80**
31,0	4,2	12	71	3	**445,30**

BROCAS/ CONDICIONES DE CORTE

DRILLS/CUTTING DATA

CONDICIONES DE CORTE
CUTTING DATA

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MATERIAL	Vc [m/min]	f [mm]	
		ø 1-8 [mm]	ø 8,5-12 [mm]
Acero < 850 N/mm² *Steel < 850 N/mm²*	30	0,020	0,045
Acero 850-1000 N/mm² *Steel 850-1000 N/mm²*	25	0,020	0,045
Acero 1000-1400 N/mm² *Steel 1000-1400 N/mm²*	20	0,020	0,045
Acero inoxidable *Stainless steel*	20	0,020	0,045
Materiales de hierro fundido *Cast iron*	80	0,020	0,045
Aluminio, aleaciones de Al y Mg *Aluminum, Al and Mg alloys*	250	0,020	0,045
Cobre, latón, bronce *Copper, brass, bronze*	85	0,020	0,045
Aleaciones de Ti y aceros especiales *Ti alloys and special steels*	55	0,020	0,045

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MATERIAL	Vc [m/min]	f [mm]	
		ø 1-8 [mm]	ø 8,5-12 [mm]
Acero < 850 N/mm² *Steel < 850 N/mm²*	35	0,020	0,045
Acero 850-1000 N/mm² *Steel 850-1000 N/mm²*	25	0,020	0,045
Acero 1000-1400 N/mm² *Steel 1000-1400 N/mm²*	12	0,020	0,045
Acero inoxidable *Stainless steel*	20	0,020	0,045
Materiales de hierro fundido *Cast iron*	50	0,020	0,045
Aluminio, aleaciones de Al y Mg *Aluminum, Al and Mg alloys*	150	0,020	0,045
Cobre, latón, bronce *Copper, brass, bronze*	80	0,020	0,045
Aleaciones de Ti y aceros especiales *Ti alloys and special steels*	25	0,020	0,045

CONDICIONES DE CORTE
CUTTING DATA

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MATERIAL	Vc [m/min]	f [mm]				
		ø 3-5 [mm]	ø 5-8 [mm]	ø 8-12 [mm]	ø 12-16 [mm]	ø 16-12 [mm]
Acero no aleado/fundición *Unalloyed steel/casting*	60 - 100	0,10 - 0,18	0,16 - 0,24	0,20 - 0,30	0,20 - 0,33	0,25 - 0,40
Acero aleado *Alloy steel*	45 - 80	0,08 - 0,15	0,10 - 0,18	0,12 - 0,22	0,15 - 0,28	0,20 - 0,35
Acero inoxidable *Stainless steel*	30 - 50	0,06 - 0,10	0,08 - 0,15	0,12 - 0,20	0,10 - 0,20	0,16 - 0,28
Acero inoxidable (aleación CrNi) *Stainless steel (CrNi alloy)*	25 - 35	0,5 - 0,10	0,08 - 0,15	0,12 - 0,20	0,10 - 0,20	0,16 - 0,28
Fundición gris GG *Cast iron GG*	70 - 120	0,15 - 0,30	0,12 - 0,30	0,20 - 0,40	0,25 - 0,40	0,40 - 0,50
Fundición nodular GGG *Spheroidal graphite GGG*	70 - 90	0,10 - 0,20	0,10 - 0,20	0,18 - 0,32	0,28 - 0,39	0,35 - 0,55
Aluminio forjado *Forged aluminium*	50 - 350	0,15 - 0,25	0,20 - 0,30	0,25 - 0,40	0,35 - 0,50	0,40 - 0,60
Aleación de aluminio < 10% Si *Aluminium alloys <10% Si*	100 - 250	0,15 - 0,25	0,20 - 0,30	0,25 - 0,40	0,35 - 0,50	0,40 - 0,60
Aleación de aluminio >10% Si *Aluminium alloys >10% Si*	100 - 200	0,12 - 0,20	0,18 - 0,22	0,20 - 0,28	0,26 - 0,30	0,25 - 0,32
Cobre, bronce, latón, viruta corta *Copper, bronze, brass, short-chipping*	60 - 200	0,07 - 0,15	0,10 - 0,20	0,20 - 0,30	0,25 - 0,40	0,35 - 0,50
Aleación de titanio *Titanium alloys*	20 - 40	0,02 - 0,06	0,05 - 0,08	0,08 - 0,14	0,10 - 0,16	0,10 - 0,20
Materiales duros *Hard materials*	15 - 35	0,04 - 0,07	0,05 - 0,07	0,09 - 0,12	0,11 - 0,14	0,11 - 0,15

MATERIAL	Vc [m/min]	f [mm]				
		ø 3-5 [mm]	ø 5-8 [mm]	ø 8-12 [mm]	ø 12-16 [mm]	ø 16-12 [mm]
Acero no aleado/fundición *Unalloyed steel/casting*	50 - 80	0,10 - 0,18	0,16 - 0,24	0,20 - 0,30	0,20 - 0,33	0,25 - 0,40
Acero aleado *Alloy steel*	35 - 65	0,08 - 0,15	0,10 - 0,18	0,12 - 0,22	0,15 - 0,28	0,20 - 0,35
Acero inoxidable *Stainless steel*	25 - 40	0,06 - 0,10	0,08 - 0,15	0,12 - 0,20	0,10 - 0,20	0,16 - 0,28
Acero inoxidable (aleación CrNi) *Stainless steel (CrNi alloy)*	20 - 30	0,50 - 0,10	0,08 - 0,15	0,12 - 0,20	0,10 - 0,20	0,16 - 0,28
Fundición gris GG *Cast iron GG*	55 - 95	0,15 - 0,30	0,12 - 0,30	0,20 - 0,40	0,25 - 0,40	0,40 - 0,50
Fundición nodular GGG *Spheroidal graphite GGG*	55 - 70	0,10 - 0,20	0,10 - 0,20	0,18 - 0,32	0,28 - 0,39	0,35 - 0,55
Aluminio forjado *Forged aluminium*	35 - 280	0,15 - 0,25	0,20 - 0,30	0,25 - 0,40	0,35 - 0,50	0,40 - 0,60
Aleación de aluminio < 10% Si *Aluminium alloys <10% Si*	80 - 200	0,15 - 0,25	0,20 - 0,30	0,25 - 0,40	0,35 - 0,50	0,40 - 0,60
Aleación de aluminio >10% Si *Aluminium alloys >10% Si*	80 - 160	0,12 - 0,20	0,18 - 0,22	0,20 - 0,28	0,26 - 0,30	0,25 - 0,32
Cobre, bronce, latón, viruta corta *Copper, bronze, brass, short-chipping*	50 - 160	0,07 - 0,15	0,10 - 0,20	0,20 - 0,30	0,25 - 0,40	0,35 - 0,50
Aleación de titanio *Titanium alloys*	15 - 30	0,02 - 0,06	0,05 - 0,08	0,08 - 0,14	0,10 - 0,16	0,10 - 0,20
Materiales duros *Hard materials*	10 - 30	0,04 - 0,07	0,05 - 0,07	0,09 - 0,12	0,11 - 0,14	0,11 - 0,15

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CONDICIONES DE CORTE
CUTTING DATA

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MATERIAL	Vc [m/min]	f [mm]				
		ø 2-3 [mm]	ø 3-5 [mm]	ø 5-8 [mm]	ø 8-12 [mm]	ø 12-16 [mm]
Aluminio no aleado *Unalloyed aluminium*	360	0,250	0,30	0,40	0,50	0,60
Aluminio aleado < 6% Si *Aluminium alloys < 6% Si*	400	0,300	0,35	0,45	0,55	0,65
Aluminio aleado 6-12% Si *Aluminium alloys 6-12% Si*	360	0,300	0,35	0,45	0,55	0,65
Aluminio aleado >12% Si *Aluminium alloys >12% Si*	350	0,250	0,30	0,40	0,50	0,60
Cobre *Copper*	160	0,150	0,23	0,30	0,38	0,45
Latón *Brass*	200	0,150	0,23	0,30	0,38	0,45
Bronce *Bronze*	200	0,150	0,23	0,30	0,38	0,45

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MATERIAL	Vc [m/min]	f [mm]
		ø 3-12 [mm]
Acero < 52 HRC *Steel < 52 HRC*	18	0,040
Acero 52-56 HRC *Steel 52-56 HRC*	12	0,040
Acero 56-60 HRC *Steel 56-60 HRC*	12	0,040
Acero > 60 HRC *Steel > 60 HRC*	11	0,040

CONDICIONES DE CORTE
CUTTING DATA

B-193 - pag. 205

MATERIAL	Vc [m/min]	f [mm]			
		ø 3-5 [mm]	ø 5-8 [mm]	ø 8-12 [mm]	ø 12-16 [mm]
Acero de construcción *Structural steel*	70	0,100	0,15	0,20	0,26
Acero de cementación <200 HB *Case hardening steel <200 HB*	70	0,140	0,20	0,28	0,35
Acero de cementación >200 HB *Case hardening steel >200 HB*	65	0,100	0,15	0,20	0,26
Acero templado sin alear < 1.000 N/mm² *Hardened-unalloyed steel < 1.000 N/mm²*	65	0,100	0,15	0,20	0,26
Acero templado aleado < 1.000 N/mm² *Hardened-alloyed steel <1.000 N/mm²*	50	0,100	0,15	0,20	0,26
Acero inoxidable ferrítico *Ferritic stainless steel*	75	0,080	0,12	0,15	0,20
Acero inxoidable martensítico *Martensitic stainless steel*	65	0,080	0,12	0,15	0,20
Acero inxoidable austenítico *Austenitic stainless steel*	70	0,080	0,12	0,15	0,20
Aluminio no aleado *Unalloyed aluminium*	180	0,140	0,20	0,28	0,35
Aluminio aleado < 6% Si *Aluminium alloy <6% Si*	160	0,140	0,20	0,28	0,35
Aluminio aleado 6-12% Si *Aluminium alloy 6-12% Si*	140	0,140	0,20	0,28	0,35
Aluminio aleado >12% Si *Aliminium alloy >12% Si*	110	0,140	0,20	0,28	0,35
Titanio *Titanium*	45	0,040	0,08	0,12	0,16
Aleación de titanio *Titanium alloys*	40	0,040	0,08	0,12	0,16
Aleación de titanio endurecida *Hardened titanium alloys*	35	0,040	0,08	0,12	0,16

B-500 - pag. 208

MATERIAL	Vc [m/min]	f [mm]			
		ø 2,5-6,8 [mm]	ø 6,8-10,2 [mm]	ø 10,2-14,0 [mm]	ø 14-17,5 [mm]
Acero endurecido 60-65 HRC *Hardened steel 60-65 HRC*	10 - 12	0,04 - 0,08	0,08 - 0,11	0,11 - 0,14	0,15 - 0,17

CONDICIONES DE CORTE
CUTTING DATA

B-601 - pag. 209 | **B-610** - pag. 210

MATERIAL	Vc [m/min]	f [mm]	
		ø 3-10 [mm]	ø 10-20 [mm]
Acero aleado < 1.000 N/mm² *Alloy steel < 1.000 N/mm²*	8 - 12	0,15 - 0,25	0,20 - 0,40
Acero aleado 1.000 - 1.400 N/mm² *Alloy steel 1.000 - 1.400 N/mm²*	6 - 10	0,12 - 0,20	0,15 - 0,30
Hierro fundido 40 - 50 N/mm² *Casting 40 - 50 N/mm²*	8 - 12	0,15 - 0,25	0,20 - 0,40
Hierro fundido 50 - 70 N/mm² *Casting 50 - 70 N/mm²*	6 - 10	0,12 - 0,20	0,15 - 0,30
Fundición < 200 HB *Cast iron < 200 HB*	8 - 15	0,20 - 0,30	0,30 - 0,50
Fundición > 200 HB *Cast iron > 200 HB*	6 - 12	0,15 - 0,25	0,20 - 0,40
Aleaciones de aluminio *Aluminium alloys*	15 - 30	0,20 - 0,30	0,30 - 0,50

A-205 - pag. 211

MATERIAL	Vc [m/min]	f [mm]		
		ø 3-10 [mm]	ø 10-25 [mm]	ø 25-31 [mm]
Acero < 800 N/mm² *Alloy < 800 N/mm²*	45 - 75	0,08 - 0,10	0,08 - 0,10	0,10 - 0,20
Acero > 800 N/mm² *Alloy > 800 N/mm²*	30 - 45	0,04 - 0,08	0,04 - 0,08	0,08 - 0,10
Acero inoxidable *Stainless steel*	22 - 40	0,04 - 0,08	0,04 - 0,08	0,08 - 0,10
Acero termo resistente *Heat resistant steel*	12 - 24	0,03 - 0,06	0,03 - 0,06	0,06 - 0,08
Fundición gris/nodular *Cast iron/Spheroidal graphite*	22 - 45	0,08 - 0,12	0,08 - 0,12	0,12 - 0,16
HHC < 55 HRC *HHC < 55 HRC*	25 - 45	0,05 - 0,10	0,05 - 0,10	0,10 - 0,15
Aluminio y aleaciones de aluminio *Aluminium and aluminium alloys*	75 - 150	0,10 - 0,20	0,10 - 0,20	0,16 - 0,25
Latón, bronce, cobre *Brass, bronze, copper*	38 - 75	0,08 - 0,12	0,08 - 0,12	0,12 - 0,16
Plásticos *Plastics*	38 - 75	0,08 - 0,12	0,08 - 0,12	0,12 - 0,20

CONDICIONES DE CORTE
CUTTING DATA

Material	Resistencia	HRC	Día	B - 320 - pag. 203 Vc (m/min) Min	Ideal	Max	fz (mm/min)	B - 520 - pag. 204 Vc (m/min) Min	Ideal	Max	fz (mm/min)
Aceros *Steels*	> 400 ≤ 750	≤ 20	3 - 5,6	80	90	130	0,12	80	90	130	0,12
			5,7 - 8,3	80	90	130	0,16	80	90	130	0,16
			8,4 - 11,5	80	90	130	0,2	80	90	130	0,2
			12 - 16	80	90	130	0,23	80	90	130	0,23
			16,5 - 20	80	90	130	0,25	80	90	130	0,25
Aceros *Steels*	>750 ≤ 850	≤ 28	3 - 5,6	75	85	95	0,1	75	85	95	0,1
			5,7 - 8,3	75	85	95	0,12	75	85	95	0,12
			8,4 - 11,5	75	85	95	0,16	75	85	95	0,16
			12 - 16	75	85	95	0,21	75	85	95	0,21
			16,5 - 20	75	85	95	0,23	75	85	95	0,23
Acero Inoxidable *Stainless steel*	< 850		3 - 5,6	35	40	45	0,09	35	40	45	0,09
			5,7 - 8,3	35	40	45	0,12	35	40	45	0,12
			8,4 - 11,5	35	40	45	0,15	35	40	45	0,15
			12 - 16	35	40	45	0,18	35	40	45	0,18
			16,5 - 20	35	40	45	0,2	35	40	45	0,2
Acero Inoxidable *Stainless steel*	> 850		3 - 5,6	30	35	40	0,08	30	35	40	0,08
			5,7 - 8,3	30	35	40	0,11	30	35	40	0,11
			8,4 - 11,5	30	35	40	0,14	30	35	40	0,14
			12 - 16	30	35	40	0,16	30	35	40	0,16
			16,5 - 20	30	35	40	0,18	30	35	40	0,18
Titanio *Titanium*	> 850		3 - 5,6	25	30	35	0,06	25	30	35	0,06
			5,7 - 8,3	25	30	35	0,1	25	30	35	0,1
			8,4 - 11,5	25	30	35	0,13	25	30	35	0,13
			12 - 16	25	30	35	0,15	25	30	35	0,15
			16,5 - 20	25	30	35	0,16	25	30	35	0,16

Material		Microbrocas B - 510 - pag. 192 2,2 - 2,5 Vc (m/min)	f (mm/rev)	2,51 - 2,80 Vc (m/min)	f (mm/rev)	2,81 - 3 Vc (m/min)	f (mm/rev)
Acero sin aleación y acero de carbono *Non Alloy Steels & Carbon Steels*	180 - 260 HB	50 - 100	0,12	50 - 100	0,13	50 - 100	0,153
Hierro fundido *Cast Irons*	< 350 N/mm2	100 - 200	0,15	50 - 101	0,12	50 - 102	2,12
Acero endurecido *Hardened Steels*	< 50 HRC	25 - 50	0,01	25 - 50	0,011	25 - 50	0,015
Acero Inoxidable *Stainless Steels*	< 200 HB	30 - 60	0,1	30 - 60	0,11	30 - 60	0,13
Aleación de aluminio *Aluminium Alloys*	Forjado *Wrought*	80 - 150	0,12	80 - 150	0,17	100 - 200	0,2
Aleación de aluminio *Aluminium Alloys*	Fundido *Cast*	80 - 150	0,12	80 - 150	0,13	80 - 150	0,15

CONDICIONES DE CORTE
CUTTING DATA

Material		**B - 820** - pag. 196 **B - 1220** - pag. 197								**B - 1520** - pag. 198 **B - 2020** - pag. 199 **B - 2520** - pag. 200 **B - 3020** - pag. 201	
		3 - 6		**6 - 10**		**10 - 14**		**14 - 20**		**3 - 6**	
		Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
Acero templado *Mild Steel*	≤ 1.800 HB	100 (50-120)	0,20 (0,15-0,25)	130 (80-140)	0,25 (0,2-0,35)	150 (90-170)	0,3 (0,2-0,4)	160 (100-180)	0,35 (0,2-0,4)	85 (35-100)	0,2 (0,15-0,25)
Acero de carbono *Carbon Steel* Aleación de acero *Alloy Steel*	180 - 280 HB	90 (50-100)	0,20 (0,15-0,25)	110 (70-120)	0,25 (0,2-0,35)	130 (80-140)	0,25 (0,2-0,4)	140 (100-150)	0,3 (0,2-0,4)	80 (40-95)	0,2 (0,15-0,25)
	280 - 350 HB	80 (40-90)	0,20 (0,15-0,3)	90 (60-110)	0,25 (0,15-0,3)	110 (70-130)	0,25 (0,15-0,4)	120 (90-140)	0,3 (0,2-0,4)	75 (35-80)	0,15 (0,15-0,2)
Acero Inoxidable *Stainless Steels*	≤ 200 HB	50 (20-100)	0,1 (0,05-0,15)	60 (40-120)	0,2 (0,1-0,25)	70 (50-120)	0,25 (0,15-0,3)	80 (60-120)	0,25 (0,15-0,3)	50 (20-80)	0,1 (0,05-0,15)
Hierro fundido *Cast Iron*	Resistencia de tracción Tensile Strength ≤ 350 N/mm²	100 (70-120)	0,25 (0,15-0,3)	130 (100-140)	0,3 (0,2-0,35)	150 110-160)	0,35 (0,25-0,4)	160 (120-170)	0,35 (0,25-0,4)	70 (40-85)	0,25 (0,15-0,3)
Hierro fundido dúctil *Ductile Cast Iron*	Resistencia de tracción Tensile Strength ≤ 450 N/mm²	60 (30-80)	0,2 (0,15-0,25)	70 (40-90)	0,2 (0,15-0,3)	90 (50-110)	0,25 (0,2-0,4)	100 (60-110)	0,3 (0,2-0,4)	65 (35-80)	0,2 (0,15-0,25)
Aleación resistente al calor *Heat Resistant Alloy*	-	20 (10-25)	0,1 (0,05-0,15)	25 (15-30)	0,12 (0,05-0,15)	25 (15-30)	0,15 (0,1-0,2)	30 (25-35)	0,15 (0,1-0,2)	20 (10-25)	0,1 (0,5-0,15)

Fórmulas
Drilling

Velocidad de corte *Cutting speed*
$$Vc = \frac{\pi \times D \times n}{1.000} \text{ (m/min)}$$

Velocidad del cabezal *Spindle speed*
$$n = \frac{1000 \times Vc}{\pi \times D} \text{ (rev/min)}$$

Velocidad de avance *Feed speed*
$$vf = f \times n \text{ (mm/min)}$$

Alimentación por revolución *Feed per rev*
$$f = \frac{Vf}{n} \text{ (rev/min)}$$

Vc= Velocidad de corte (m/min) *Cutting speed*

n= Velocidad del cabezal (rev/min) *Spindle speed*

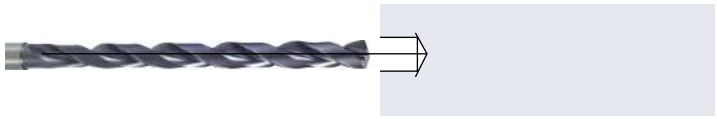
Vf= Velocidad de avance (mm/min) *Feed speed*

D= Diámetro de perforación (mm) *Drill diameter*

f= Alimentación por revolcuión (mm/rev) *Feed per rev*

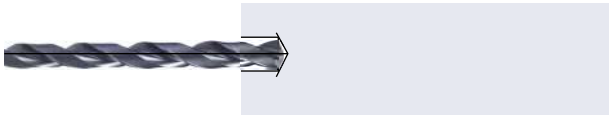
CÓMO UTILIZARLO
HOW TO USE IT

Perforación del taladro piloto
Pilot Hole Drilling



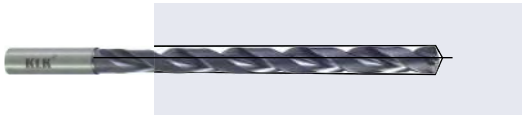
- Todas las perforadoras deben utilizar to
  All deep hole drills must utilize a pilot hole
- Realizar una perforación con un taladro 3xd a una profundidad mínima de pilotaje de 1,5 ~ 2 x d
  Machine a pilot hole with a 3xd drill to a minimum pilot depth of 1,5 ~ 2 x d

Perforación inicial
Initial Drilling



- Introducir el taladro piloto a 20% RPM y con el 50% de avance
  Enter the pilot hole at 20% RPM Value and with 50% of the feed rate

Perforación del taladro piloto
Pilot Hole Drilling



- Empezar a aplicar una presión alta y aumentar las RPM al 100%. Perforar continuamente hasta la profundidad de perforación deseada.
  Start high coolant pressure and increase RPM to 100% value. Drill continously till the desired hole depth.
- Para agujeros con salida en línea, reducir la velocidad de avance al 30% aproximadamente 1 mm antes.
  For through holes with inlined exit, reduce the feed rate to 30% about 1 mm prior to break-through.

Reacción de la broca
Drill reaction

- Después de alcanzar la profundidad de perforación deseada, reducir el RPM al 10% y retirar.
  After reaching the desired hole depth reduce RPM to 10% & withdraw the frill.

M-14
SWT

MACHOS

TAPS

M-250

Juego de machos de mano universal

Universal hand tap set

Juego de machos de roscar a mano HSS-G de métrica ISO-DIN 13. Para uso universal.

HSS-G hand tap set, metric ISO-DIN 13. For general use.

TYPE N

DIN 13

UNI

STEEL

GG

ALU

Ref.	d1 [mm]	l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	€
250020200	M 2,0 * 0,40	36	8	2,8	2,1	**19,80**
250025200	M 2,5 * 0,45	40	9	2,8	2,1	**19,80**
250030200	M 3,0 * 0,50	40	11	3,5	2,7	**10,85**
250035200	M 3,5 * 0,60	45	13	4,0	3,0	**16,05**
250040200	M 4,0 * 0,70	45	13	4,5	3,4	**10,85**
250045200	M 4,5 * 0,75	50	16	6,0	4,9	**16,05**
250050200	M 5,0 * 0,80	50	16	6,0	4,9	**11,80**
250060200	M 6,0 * 1,00	50	19	6,0	4,9	**11,80**
250070200	M 7,0 * 1,00	50	19	6,0	4,9	**19,35**
250080200	M 8,0 * 1,25	56	22	6,0	4,9	**13,95**
250090200	M 9,0 * 1,25	63	22	7,0	5,5	**24,55**
250100200	M 10,0 * 1,50	70	24	7,0	5,5	**19,10**
250110200	M 11,0 * 1,50	70	24	8,0	6,2	**31,15**
250120200	M 12,0 * 1,75	75	29	9,0	7,0	**25,00**
250140200	M 14,0 * 2,00	80	30	11,0	9,0	**28,30**
250160200	M 16,0 * 2,00	80	32	12,0	9,0	**35,40**
250180200	M 18,0 * 2,50	95	40	14,0	11,0	**45,30**
250200200	M 20,0 * 2,50	95	40	16,0	12,0	**51,90**
250220200	M 22,0 * 2,50	100	40	18,0	14,5	**66,00**
250240200	M 24,0 * 3,00	110	50	18,0	14,5	**75,45**
250270200	M 27,0 * 3,00	110	50	20,0	16,0	**124,95**
250300200	M 30,0 * 3,50	125	56	22,0	18,0	**160,30**
250330200	M 33,0 * 3,50	125	56	25,0	20,0	**216,90**
250360200	M 36,0 * 4,00	150	63	28,0	22,0	**259,30**
250390200	M 39,0 * 4,00	150	63	32,0	24,0	**339,45**
250420200	M 42,0 * 4,50	150	63	32,0	24,0	**381,90**
250450200	M 45,0 * 4,50	160	70	36,0	29,0	**462,00**
250480200	M 48,0 * 5,00	180	75	36,0	29,0	**655,30**
250520200	M 52,0 * 5,00	180	75	40,0	32,0	**655,30**
250560200	M 56,0 * 5,50	200	85	45,0	35,0	**810,90**
250600200	M 60,0 * 5,50	200	85	45,0	35,0	**1018,30**
250640200	M 64,0 * 6,00	220	90	50,0	39,0	**1178,60**
250680200	M 68,0 * 6,00	220	90	50,0	39,0	**1390,75**

Juego de machos de mano NOGRIP

NOGRIP hand tap set

M | TYPE VA | HSSE | DIN 13 | VP

INOX | STEEL | GG | ALU

Juego de machos de roscar a mano Nogrip de HSSE Co5 y métrica ISO-DIN 13 para materiales duros. Con guía de centraje para mecanizar agujeros ciegos y pasantes.

Nogrip HSSE Co5 hand tap set, metric ISO-DIN 13 for hard materials. With cylindrical pilots for blind and through holes.

Ref.	d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	€
260020200	M 2	0,40	36	8	2,5	2,1	3	**54,90**
260030200	M 3	0,50	40	11	3,5	2,7	3	**36,65**
260040200	M 4	0,70	45	13	4,5	3,4	3	**36,65**
260050200	M 5	0,80	50	16	6,0	4,9	3	**37,75**
260060200	M 6	1,00	50	19	6,0	4,9	3	**37,75**
260080200	M 8	1,25	56	22	6,0	4,9	3	**44,85**
260100200	M 10	1,50	70	24	7,0	5,5	3	**57,15**
260120200	M 12	1,75	75	29	9,0	7,0	4	**81,90**
260140200	M 14	2,00	80	30	11,0	9,0	4	**96,05**
260160200	M 16	2,00	80	32	12,0	9,0	4	**125,75**
260180200	M 18	2,50	95	40	14,0	11,0	4	**202,35**
260200200	M 20	2,50	95	40	16,0	12,0	4	**224,65**

M-270

Juego de machos de mano recubiertos de TiCN

Ticn coated hand tap set

Juego de machos de roscar a mano de HSSE Co5 recubiertos de TiCN con métrica ISO-DIN 13 para materiales duros. Con guía de centraje para mecanizar agujeros ciegos y pasantes.

TiCN coated HSSE Co5 hand tap set, metric ISO-DIN 13 for hard materials. With cylindrical pilots for blind and through holes.

M | TYPE VA

HSSE | DIN 13

TiCN

INOX

STEEL

GG

ALU

Ref.	d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	€
270030200	M 3	0,50	40	11	3,5	2,7	3	**72,90**
270040200	M 4	0,70	45	13	4,5	3,4	3	**78,85**
270050200	M 5	0,80	50	16	6,0	4,9	3	**80,00**
270060200	M 6	1,00	50	19	6,0	4,9	3	**80,00**
270080200	M 8	1,25	56	22	6,0	4,9	3	**119,35**
270100200	M 10	1,50	70	24	7,0	5,5	3	**141,15**
270120200	M 12	1,75	75	29	9,0	7,0	4	**197,00**
270140200	M 14	2,00	80	30	11,0	9,0	4	**206,05**
270160200	M 16	2,00	80	32	12,0	9,0	4	**245,70**
270180200	M 18	2,50	95	40	14,0	11,0	4	**326,50**
270200200	M 20	2,50	95	40	16,0	12,0	4	**499,95**

Macho máquina recto rosca métrica tipo VA

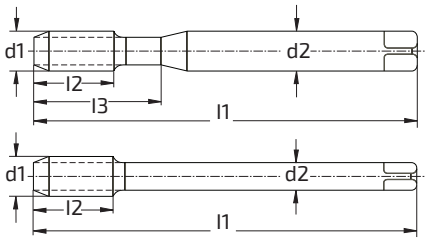
Traight fluted metric thread VA type machine tap

M | Type VA | ISO2 6H | HSSE | DIN13 | 60° P | B 3,5-5 | VP | TiCN

STEEL <1300N/mm² | INOX | ALU 0,5-15% SI | COPPER | NI ALLOYS

Macho de máquina HSS recto tipo VA con rosca métrica disponible vaporizado y recubierto de TiCN. Recomendado para inoxidable y aceros de alta tensión de rotura.

Straight fluted HSS machine tap VA type with metric thread. Available both VP and TiCN coated. Recommended for stainless materials and steels of higher tensile strength.



DIN 371 — M3 - M10

DIN 376 — M12 - M30

VAB00VP VAB00TC

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	VAB00VP/4 [VP]		VAB00TC/4 [TiCN]	
									Ref.	€	Ref.	€
M 3	0,50	56	9	18	3,5	2,7	3	2,50	601020	**12,90**	603020	**21,80**
M 4	0,70	63	12	21	4,5	3,4	3	3,30	601022	**12,90**	603022	**21,80**
M 5	0,80	70	13	25	6,0	4,9	3	4,20	601023	**12,90**	603023	**21,80**
M 6	1,00	80	15	30	6,0	4,9	3	5,00	601024	**12,90**	603024	**21,80**
M 8	1,25	90	18	35	8,0	6,2	3	6,80	601026	**17,15**	603026	**28,25**
M10	1,50	100	20	39	10,0	8,0	3	8,50	601028	**20,40**	603028	**34,65**
M12	1,75	110	23	-	9	7,0	3	10,20	601030	**26,80**	603030	**43,60**
M14	2,00	110	25	-	11	9,0	3	12,00	601031	**34,30**	603031	**52,50**
M16	2,00	110	25	-	12	9,0	3	14,00	601032	**41,80**	603032	**63,25**
M18	2,50	125	30	-	14	11,0	3	15,50	601033	**53,95**	603033	**85,75**
M20	2,50	140	30	-	16	12,0	3	17,50	601034	**63,95**	603034	**97,90**
M22	2,50	140	30	-	18	14,5	3	19,50	601036	**82,15**	603036	**120,75**
M24	3,00	160	36	-	18	14,5	4	21,00	601038	**89,30**	603038	**135,75**
M27	3,00	160	36	-	20	16,0	4	24,00	601039	**106,45**	603039	**162,90**
M30	3,50	180	40	-	22	18,0	4	26,50	601071	**147,15**	603071	**198,60**

Condiciones de corte | Cutting data pag. 248 - 249

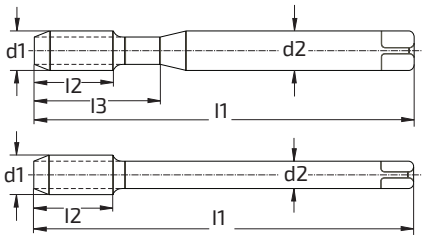
Macho máquina helicoidal rosca métrica tipo VA

Helix fluted metric thread VA type machine tap

VAC40VP VAC40TC

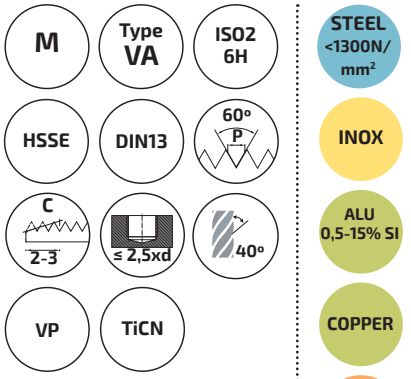
Macho de máquina HSS helicoidal tipo VA con rosca métrica disponible vaporizado y recubierto de TiCN. Recomendado para acero inoxidable y aceros de alta tensión de rotura.

Helix fluted HSS machine tap VA type with metric thread. Available both VP and TiCN coated. Recommended for stainless materials and steels of higher tensile strength.



DIN 371
M3 - M10

DIN 376
M12 - M30



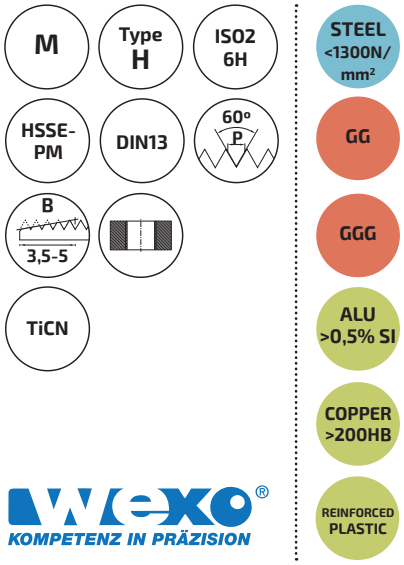
KOMPETENZ IN PRÄZISION

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	VAC40VP/4 [VP]		VAC40TC/4 [TiCN]	
									Ref.	€	Ref.	€
M 3	0,50	56	5	18	3,5	2,7	3	2,50	601120	**13,45**	603120	**22,15**
M 4	0,70	63	7	21	4,5	3,4	3	3,30	601122	**13,45**	603122	**22,15**
M 5	0,80	70	8	25	6,0	4,9	3	4,20	601123	**13,90**	603123	**22,50**
M 6	1,00	80	10	30	6,0	4,9	3	5,00	601124	**13,90**	603124	**22,50**
M 8	1,25	90	13	35	8,0	6,2	3	6,80	601126	**17,50**	603126	**28,95**
M10	1,50	100	15	39	10,0	8,0	3	8,50	601128	**20,75**	603128	**35,00**
M12	1,75	110	18	-	9	7,0	3	10,20	601130	**27,50**	603130	**44,30**
M14	2,00	110	20	-	11	9,0	4	12,00	601131	**35,00**	603131	**52,50**
M16	2,00	110	20	-	12	9,0	4	14,00	601132	**41,80**	603132	**63,25**
M18	2,50	125	25	-	14	11,0	4	15,50	601133	**58,25**	603133	**88,60**
M20	2,50	140	25	-	16	12,0	4	17,50	601134	**64,65**	603134	**99,30**
M22	2,50	140	25	-	18	14,5	4	19,50	601136	**83,60**	603136	**124,30**
M24	3,00	160	30	-	18	14,5	4	21,00	601138	**92,90**	603138	**138,60**
M27	3,00	160	30	-	20	16,0	4	24,00	601139	**109,30**	603139	**165,75**
M30	3,50	180	35	-	22	18,0	4	26,50	601171	**152,90**	603171	**204,30**

Condiciones de corte | Cutting data pag. 249

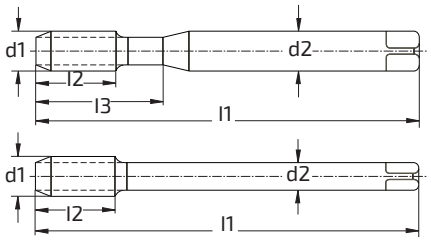
Macho máquina recto rosca métrica tipo H

Straight fluted metric thread H type machine tap



Macho de máquina HSS-PM recto tipo H con rosca métrica recubierto de TiCN. Recomendado para materiales duros y de viruta corta.

Straight fluted HSS-PM machine tap H type with metric thread and TiCN coating. Recommended for short-chipping hard materials.



DIN 371
M3 - M10

DIN 376
M12

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	HB00TC-PM/4 [TiCN]	
									Ref.	€
M 3	0,50	56	5	18	3,5	2,7	3	2,50	614000	**35,40**
M 4	0,70	63	7	21	4,5	3,4	3	3,30	614002	**35,40**
M 5	0,80	70	8	25	6,0	4,9	3	4,20	614003	**37,15**
M 6	1,00	80	10	30	6,0	4,9	3	5,00	614004	**37,15**
M 8	1,25	90	13	35	8,0	6,2	3	6,80	614006	**45,00**
M10	1,50	100	15	39	10,0	8,0	3	8,50	614008	**55,40**
M12	1,75	110	18	-	9	7,0	3	10,20	614010	**67,90**

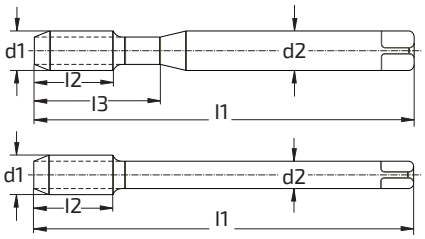
Condiciones de corte | Cutting data pag. 249

Macho máquina helicoidal rosca métrica tipo H

Helix fluted metric thread H type machine tap

Macho de máquina HSS-PM helicoidal tipo H con rosca métrica recubierto de TiCN. Recomendado para materiales duros y de viruta corta.

Helix fluted HSS-PM machine tap H type with metric thread and TiCN coating. Recommended for short-chipping hard materials.



DIN 371
M3 - M10

DIN 376
M12

M | Type H | ISO2 6H | HSSE-PM | DIN13 | 60° P | C 2-3 | ≤ 1,5xd | 15° | TiCN

STEEL <1300N/mm²
GG
GGG
ALU >15% SI
COPPER >200HB
REINFORCED PLASTIC

KOMPETENZ IN PRÄZISION

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	HC15TC-PM/4 [TiCN] Ref.	€
M 3	0,50	56	5	18	3,5	2,7	3	2,50	614020	**38,60**
M 4	0,70	63	7	21	4,5	3,4	3	3,30	614022	**38,60**
M 5	0,80	70	8	25	6,0	4,9	3	4,20	614023	**40,00**
M 6	1,00	80	10	30	6,0	4,9	3	5,00	614024	**42,15**
M 8	1,25	90	13	35	8,0	6,2	3	6,80	614026	**46,80**
M10	1,50	100	15	39	10,0	8,0	3	8,50	614028	**54,65**
M12	1,75	110	18	-	9	7,0	3	10,20	614030	**70,00**

Condiciones de corte | Cutting data pag. 249

Macho máquina recto rosca métrica tipo GG

Straight fluted metric thread GG type machine tap

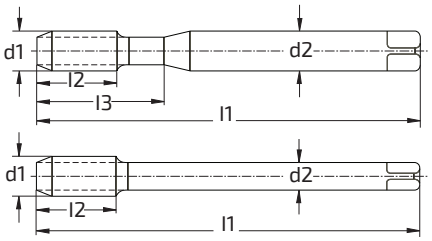
M | Type GG | 6HX | HSSE | DIN13 | 60° P | C 2-3 | ≤ 3xd | TiCN

GG | GGG | ALU >15% Si | COPPER | PLASTIC

WEXO® KOMPETENZ IN PRÄZISION

Macho de máquina HSS recto tipo GG con rosca métrica recubierto de TiCN para fundición. Permite roscar agujeros ciegos y pasantes.

Straight fluted HSS machine tap GG type with metric thread and TiCN coating for cast iron. Suitable for blind and through holes.



DIN 371 M3 - M10

DIN 376 M12 - M30

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	GGC00TC/4 [TiCN] Ref.	€
M 3	0,50	56	9	18	3,5	2,7	3	2,50	603080	**22,15**
M 4	0,70	63	12	21	4,5	3,4	3	3,30	603082	**22,15**
M 5	0,80	70	13	25	6,0	4,9	3	4,20	603083	**22,50**
M 6	1,00	80	15	30	6,0	4,9	3	5,00	603084	**22,50**
M 8	1,25	90	18	35	8,0	6,2	4	6,80	603086	**32,15**
M10	1,50	100	20	39	10,0	8,0	4	8,50	603088	**37,15**
M12	1,75	110	23	-	9	7,0	4	10,20	603090	**48,95**
M14	2,00	110	25	-	11	9,0	4	12,00	603091	**57,50**
M16	2,00	110	25	-	12	9,0	4	14,00	603092	**70,75**
M18	2,50	125	30	-	14	11,0	4	15,50	603093	**90,00**
M20	2,50	140	30	-	16	12,0	4	17,50	603094	**110,75**
M22	2,50	140	30	-	18	14,5	4	19,50	603095	**134,30**
M24	3,00	160	36	-	18	14,5	4	21,00	603097	**140,00**
M27	3,00	160	36	-	20	16,0	4	24,00	603098	**162,90**
M30	3,50	180	40	-	22	18,0	4	26,50	603099	**201,45**

Condiciones de corte | Cutting data pag. 249

Macho máquina recto métrica tipo AL

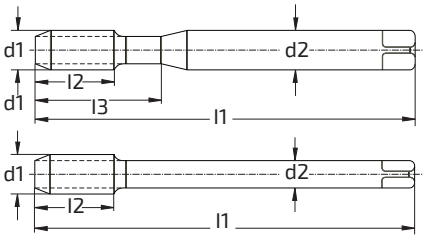
Straight fluted metric thread AL type machine tap

Macho de máquina HSS recto tipo AL con rosca métrica para aluminio.

Straight fluted HSS machine tap AL type with metric thread for aluminum.

M | Type AL | ISO2 6H | HSSE | DIN13 | 60° P | B 3,5-5

ALU >15% SI | COPPER | PLASTIC



DIN 371 M3 - M10

DIN 376 M12 - M20

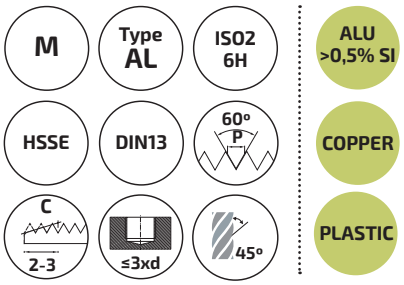
WEXO KOMPETENZ IN PRÄZISION

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	ALB00/4 Ref.	ALB00/4 €
M 3	0,50	56	9	18	3,5	2,7	3	2,50	600040	**11,40**
M 4	0,70	63	12	21	4,5	3,4	3	3,30	600042	**11,40**
M 5	0,80	70	13	25	6,0	4,9	3	4,20	600043	**11,80**
M 6	1,00	80	15	30	6,0	4,9	3	5,00	600044	**11,80**
M 8	1,25	90	18	35	8,0	6,2	3	6,80	600046	**15,40**
M10	1,50	100	20	39	10,0	8,0	3	8,50	600048	**18,25**
M12	1,75	110	23	-	9	7,0	3	10,20	600050	**24,30**
M14	2,00	110	25	-	11	9,0	3	12,00	600051	**29,65**
M16	2,00	110	25	-	12	9,0	3	14,00	600052	**37,15**
M18	2,50	125	30	-	14	11,0	3	15,50	600053	**50,40**
M20	2,50	140	30	-	16	12,0	3	17,50	600054	**58,25**

Condiciones de corte | Cutting data pag. 249

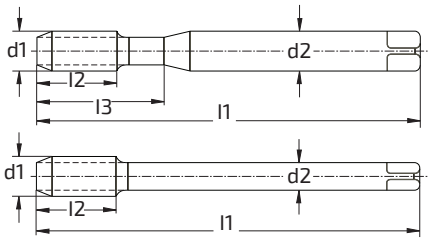
Macho máquina helicoidal rosca métrica tipo AL

Helix fluted metric thread AL type machine tap



Macho de máquina HSS helicoidal tipo AL con rosca métrica para aluminio.

Helix fluted HSS machine tap AL type with metric thread for aluminum.



DIN 371
M3 - M10

DIN 376
M12 - M20

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	ALC45/4 Ref.	ALC45/4 €
M 3	0,50	56	5	18	3,5	2,7	2	2,50	600140	**12,90**
M 4	0,70	63	7	21	4,5	3,4	2	3,30	600142	**12,90**
M 5	0,80	70	8	25	6,0	4,9	2	4,20	600143	**13,90**
M 6	1,00	80	10	30	6,0	4,9	2	5,00	600144	**13,90**
M 8	1,25	90	13	35	8,0	6,2	2	6,80	600146	**16,45**
M10	1,50	100	15	39	10,0	8,0	2	8,50	600148	**18,60**
M12	1,75	110	18	-	9	7,0	2	10,20	600150	**25,40**
M14	2,00	110	20	-	11	9,0	2	12,00	600151	**33,25**
M16	2,00	110	20	-	12	9,0	2	14,00	600152	**39,30**
M18	2,50	125	25	-	14	11,0	3	15,50	600153	**55,00**
M20	2,50	140	25	-	16	12,0	3	17,50	600154	**59,65**

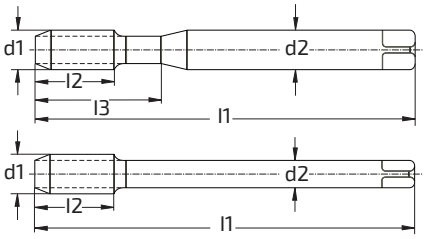
Condiciones de corte | Cutting data pag. 249

Macho de laminación rosca métrica tipo UNI

Metric thread UNI type fluteless tap

Macho de laminación HSS tipo UNI con rosca métrica recubierto de TiCN. Recomendado para uso universal.

UNI type HSS fluteless tap with metric thread and TiCN coating for universal use.



DIN 371
M3 - M10

DIN 376
M12 - M16

M | Type UNI | 6HX | HSSE | DIN2174 | DIN13 | 60° P | C 2-3 | ≤ 2,5xd | TiCN

STEEL <800N/mm²
ALU <15% Si
PLASTIC

KOMPETENZ IN PRÄZISION

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	IGF-UC00TC/4 [TiCN] Ref.	€
M 3	0,50	56	11	18	3,5	2,7	4	2,80	603300	**30,75**
M 4	0,70	63	13	21	4,5	3,4	4	3,70	603302	**40,00**
M 5	0,80	70	16	25	6,0	4,9	4	4,65	603303	**44,30**
M 6	1,00	80	19	30	6,0	4,9	4	5,55	603304	**46,10**
M 8	1,25	90	22	35	8,0	6,2	6	7,40	603306	**51,80**
M10	1,50	100	24	39	10,0	8,0	8	9,30	603308	**63,25**
M12	1,75	110	28	-	9	7,0	8	11,20	603310	**87,15**
M14	2,00	110	30	-	11	9,0	8	13,00	603311	**106,45**
M16	2,00	110	32	-	12	9,0	8	15,00	603312	**140,00**

Macho de laminación rosca métrica tipo UNI

Metric thread UNI type

M | Type UNI | 6HX | HSSE | DIN2174 | DIN13 | 60° P | SN | C 2-3 | | ≤ 2,5xd | TiCN

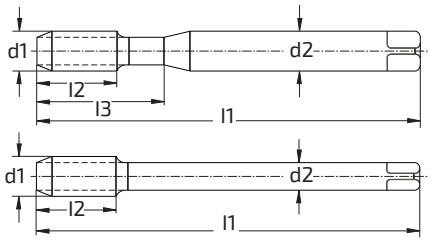
STEEL <800N/mm²

ALU <15% SI

PLASTIC

Macho de laminación HSS tipo UNI con rosca métrica recubierto de TiCN con ranuras de lubricación. Recomendado para uso universal.

UNI type HSS fluteless tap with metric thread, TiCN coating and lubrication
grooves for universal use.



DIN 371
M3 - M10

DIN 376
M12 - M16

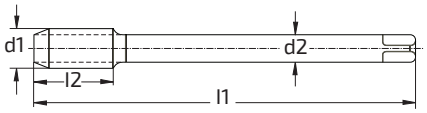
d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	l3 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	GGC00TC/4 Ref.	GGC00TC/4 €
M 3	0,50	56	5	18	3,5	2,7	4	2,80	603280	**32,15**
M 4	0,70	63	7	21	4,5	3,4	4	3,70	603282	**42,15**
M 5	0,80	70	8	25	6,0	4,9	4	4,65	603283	**46,10**
M 6	1,00	80	10	30	6,0	4,9	4	5,55	603284	**48,25**
M 8	1,25	90	13	35	8,0	6,2	6	7,40	603286	**53,95**
M10	1,50	100	15	39	10,0	8,0	8	9,30	603288	**66,45**
M12	1,75	110	18	-	9	7,0	8	11,20	603290	**90,00**
M14	2,00	110	20	-	11	9,0	8	13,00	603291	**110,75**
M16	2,00	110	20	-	12	9,0	8	15,00	603292	**145,75**

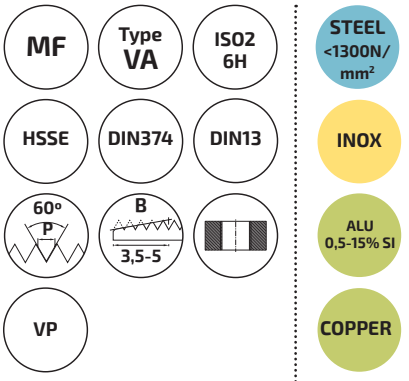
Macho máquina recto rosca métrica fina tipo VA

Straight fluted fine metric thread VA type machine tap

Macho de máquina HSS recto tipo VA vaporizado con rosca métrica
Recomendado para acero inoxidable y aceros de alta tensión de rotura.

Straight fluted HSS machine tap VA type with fine metric thread and steam treatment. Recommended for stainless materials and steels of higher tensile strength.





WEXO® KOMPETENZ IN PRÄZISION

d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	VAB00VP-MF/4 [VP]	
								Ref.	€
M 6	*0,75	80	15	4,5	3,4	3	5,20	601061	**22,15**
M 8	*1,00	90	18	6	4,9	3	7,00	601063	**23,95**
M 10	*1,00	90	20	7	5,5	3	9,00	601064	**27,50**
M 12	*1,00	100	22	9	7,0	3	11,00	601065	**34,30**
M 12	*1,50	100	21	9	7,0	3	10,50	601066	**31,10**
M 16	*1,50	100	21	12	9,0	3	14,50	601068	**48,95**
M 20	*1,50	125	24	16	12,0	3	18,50	601070	**77,15**

Condiciones de corte | Cutting data pag. 248

Macho máquina helicoidal rosca métrica fina tipo VA

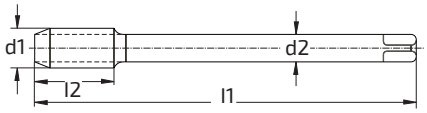
Helix fluted fine metric thread VA type machine tap

MF | Type VA | ISO2 6H | HSSE | DIN374 | DIN13 | 60° P | C 2-3 | ≤ 2,5xd | VP

STEEL <1300N/mm² | INOX | ALU 0,5-15% SI | COPPER | NI ALLOYS

Macho de máquina HSS helicoidal tipo VA vaporizado con rosca métrica Recomendado para acero inoxidable y aceros de alta tensión de rotura.

Helix fluted HSS machine tap VA type with fine metric thread and steam treatment. Recommended for stainless materials and steels of higher tensile strength.



d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	VAC40VP-MF/4 [VP] Ref.	€
M 6	*0,75	80	10,0	4,5	3,4	3	5,20	601161	**22,90**
M 8	*0,75	80	10,8	6	4,9	3	7,20	601162	**35,40**
M 8	*1,00	90	13,0	6	4,9	3	7,00	601163	**24,65**
M 10	*1,00	90	12,0	7	5,5	3	9,00	601164	**27,90**
M 12	*1,00	100	15,5	9	7,0	3	11,00	601165	**34,30**
M 12	*1,50	100	14,0	9	7,0	3	10,50	601166	**32,90**
M 14	*1,50	100	21,5	12	9,0	3	12,50	601167	**41,80**
M 16	*1,50	100	16,0	12	9,0	4	14,50	601168	**51,10**
M 20	*1,50	125	20,0	16	12,0	4	18,50	601170	**79,30**

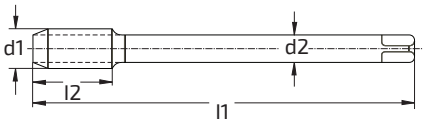
Condiciones de corte | Cutting data pag. 248

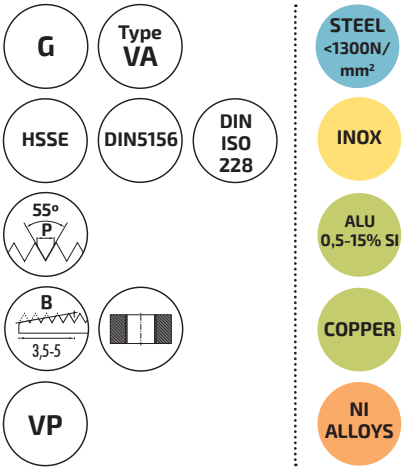
Macho máquina recto rosca GAS tipo VA

*Straight fluted **GAS** thread VA type machine tap*

Macho de máquina HSS recto tipo VA vaporizado con rosca GAS . Recomendado para acero inoxidable y aceros de alta tensión de rotura.

Straight fluted HSS machine tap VA type with GAS thread and steam treatment. Recommended for stainless materials and steels of higher tensile strength.





P [Gg/1"]		l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	VAB00VP-G/4 [VP] Ref.	€
G 1/8	28	90	20	7	5,5	3	8,80	601200	**29,65**
G 1/4	19	100	21	11	9	3	11,80	601201	**40,75**
G 3/8	19	100	21	12	9	3	15,25	601202	**49,65**
G 1/2	14	125	24	16	12	3	19,00	601203	**71,45**
G 5/8	14	125	24	18	14,5	4	21,00	601204	**97,90**
G 3/4	14	140	26	20	16	4	24,50	601205	**113,60**
G 1	11	160	30	25	20	4	30,75	601207	**182,90**
G 1 1/8	11	170	30	28	22	4	35,30	601208	**230,00**
G 1 1/4	11	170	30	32	34	4	39,50	601209	**270,00**
G 1 3/8	11	180	32	36	29	4	41,90	601210	**337,15**
G 1 1/2	11	190	32	36	29	6	45,25	601211	**382,90**
G 1 3/4	11	200	32	40	32	6	51,30	601212	**528,60**
G 2	11	200	40	45	35	6	57,00	601213	**885,75**

Condiciones de corte | Cutting data pag. 248

Macho máquina helicoidal rosca **GAS** tipo VA

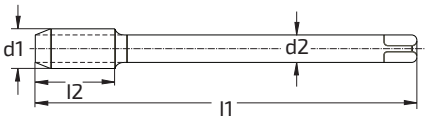
*Helix fluted **GAS** thread VA type machine tap*

G | Type VA | HSSE | DIN5156 | DIN ISO 228 | 55° P | C 2-3 | ≤ 2,5xd | 40° | VP

STEEL <1300N/mm² | INOX | ALU 0,5-15% SI | COPPER | NI ALLOYS

Macho de máquina HSS helicoidal tipo VA vaporizado con rosca GAS. Recomendado para acero inoxidable y aceros de alta tensión de rotura.

Helix futed HSS machine tap VA type with GAS thread and steam treatment. Recommended for stainless materials and steels of higher tensile strength.



WEXO® KOMPETENZ IN PRÄZISION

P [Gg/1"]		l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	VAC40VP-G/4 [VP] Ref.	€
G 1/8	28	90	12	7	5,5	3	8,80	601300	**33,95**
G 1/4	19	100	16	11	9,0	3	11,80	601301	**45,00**
G 3/8	19	100	16	12	9,0	3	15,25	601302	**61,10**
G 1/2	14	125	20	16	12,0	3	19,00	601303	**88,60**
G 5/8	14	125	20	18	14,5	4	21,00	601304	**130,00**
G 3/4	14	140	22	20	16,0	4	24,50	601305	**162,90**
G 1	11	160	30	25	20,0	4	30,75	601307	**248,60**
G 1 1/8	11	170	30	28	22,0	4	35,30	601308	**325,75**
G 1 1/4	11	170	30	32	34,0	4	39,50	601309	**351,45**
G 1 3/8	11	180	32	36	29,0	4	41,90	601310	**437,15**
G 1 1/2	11	190	32	36	29,0	6	45,25	601311	**482,90**
G 1 3/4	11	200	32	40	32,0	6	51,30	601312	**608,60**
G 2	11	200	40	45	35,0	6	57,00	601313	**985,75**

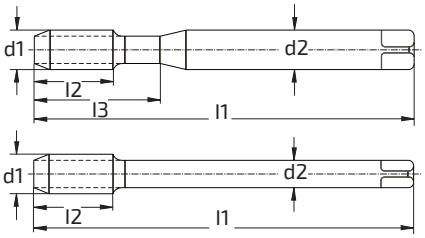
Condiciones de corte | Cutting data pag. 248

Macho máquina recto rosca UNC tipo N

*Straight fluted **UNC** thread N type machine tap*

Macho de máquina HSS recto tipo N con rosca UNC para aceros hasta 800 N/mm².

Straight fluted HSS machine tap N type with UNC thread for steels up to 800 N/mm².



Nr. 8-32 / 3/8" -16

Nr. 7/16" -14 /1"-8

UNC | Type N | 2B | HSSE | DIN 2184-1 | ANSI B 1.1 | 60° P | B 3,5-5

STEEL <1300N/mm² | ALU 0,5-15% Si | COPPER | PLASTIC

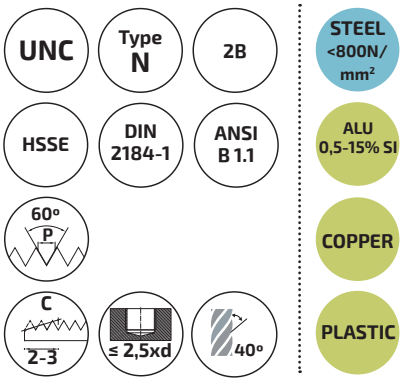
WEXO KOMPETENZ IN PRÄZISION

P [Gg/1"]		l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	NB00-UNC/4 [VP]	
								Ref.	€
UNC #	**8-32**	63	12	4,5	3,4	3	3,50	600606	**20,75**
UNC #	**10-24**	70	13	6,0	4,9	3	3,90	600607	**21,45**
UNC #	**12-24**	80	15	6,0	4,9	3	4,50	600608	**22,15**
UNC	**1/4-20**	80	15	7,0	5,5	3	5,20	600609	**24,30**
UNC	**5/16-18**	90	18	8,0	6,2	3	6,60	600610	**25,40**
UNC	**3/8-16**	90	20	9,0	7,0	3	8,00	600611	**30,40**
UNC	**7/16-14**	100	20	8,0	6,2	3	9,40	600620	**30,75**
UNC	**1/2-13**	110	23	9,0	7,0	3	10,75	600621	**39,30**
UNC	**9/16-12**	110	25	11,0	9,0	3	12,25	600622	**58,95**
UNC	**5/8-11**	110	25	12,0	9,0	3	13,50	600623	**51,10**
UNC	**3/4-10**	125	30	14,0	11,0	3	16,50	600624	**57,50**
UNC	**7/8-9**	140	30	18,0	14,5	3	19,50	600625	**71,45**
UNC	**1-8**	160	36	18,0	14,5	3	22,25	600626	**99,30**

Condiciones de corte | Cutting data pag. 248

Macho máquina helicoidal rosca **UNC** tipo N

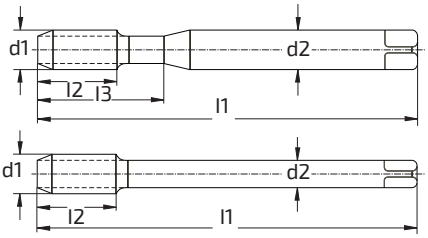
*Helix fluted **UNC** thread N type machine tap*



WEXO® KOMPETENZ IN PRÄZISION

Macho de máquina HSS recto tipo N con rosca UNC para aceros hasta 800 N/mm².

Straight fluted HSS machine tap N type with UNC thread for steels up to 800 N/mm².



Nr. 8-32 / 3/8" - 16

Nr. 7/16" - 14 /1" - 8

P [Gg/1"]		l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	NC40-UNC/4 [VP] Ref.	€
UNC #	**8-32**	63	7	4,5	3,4	3	3,50	600635	**21,10**
UNC #	**10-24**	70	8	6,0	4,9	3	3,90	600636	**22,50**
UNC #	**12-24**	80	10	6,0	4,9	3	4,50	600637	**25,00**
UNC	**1/4-20**	80	10	7,0	5,5	3	5,20	600638	**25,00**
UNC	**5/16-18**	90	13	8,0	6,2	3	6,60	600639	**26,45**
UNC	**3/8-16**	90	15	9,0	7,0	3	8,00	600640	**31,45**
UNC	**7/16-14**	100	18	8,0	6,2	3	9,40	600650	**31,45**
UNC	**1/2-13**	110	20	9,0	7,0	3	10,75	600651	**41,45**
UNC	**9/16-12**	110	20	11,0	9,0	3	12,25	600652	**60,40**
UNC	**5/8-11**	110	20	12,0	9,0	3	13,50	600653	**51,80**
UNC	**3/4-10**	125	25	14,0	11,0	4	16,50	600654	**58,25**
UNC	**7/8-9**	140	25	18,0	14,5	4	19,50	600655	**72,90**
UNC	**1-8**	160	30	18,0	14,5	4	22,25	600656	**100,75**

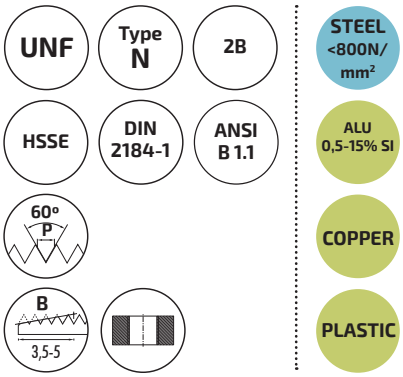
Condiciones de corte | Cutting data pag. 248

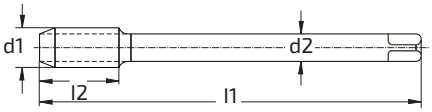
Macho máquina recto rosca UNF tipo N

*Straight fluted **UNF** thread N type machine tap*

Macho de máquina HSS recto tipo N con rosca UNF para aceros hasta 800 N/mm².

Straight fluted HSS machine tap with UNF thread for steels up to 800 N/mm².





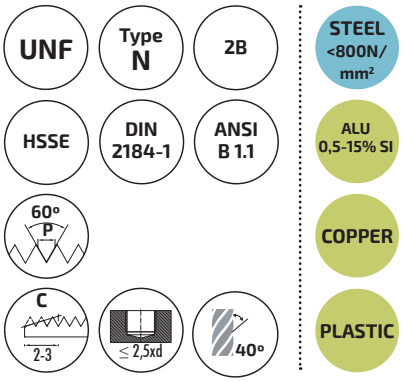
WEXO® KOMPETENZ IN PRÄZISION

P [Gg/1"]	l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	NB00-UNF/4 [VP]	
							Ref.	€
UNF # 10-32	70	13	3,5	2,7	3	4,10	600670	**30,40**
UNF # 12-28	80	15	4,0	3	3	4,65	600672	**35,40**
UNF 1/4-28	80	15	4,5	3,4	3	5,50	600673	**33,60**
UNF 16-24	90	18	6,0	4,9	3	6,90	600674	**36,10**
UNF 3/8-24	90	20	7,0	5,5	3	8,50	600675	**38,60**
UNF 7/16-20	100	20	8,0	6,2	3	9,90	600676	**47,50**
UNF 1/2-20	100	21	9,0	7,0	3	11,50	600677	**49,65**
UNF 5/8-18	100	21	12,0	9,0	3	14,50	600679	**64,30**
UNF 3/4-16	110	24	14,0	11,0	3	17,50	600680	**81,45**
UNF 7/8-14	125	24	18,0	14,5	3	20,50	600681	**105,00**
UNF 1-12	140	26	18,0	14,5	3	23,25	600682	**151,45**

Condiciones de corte | Cutting data pag. 248

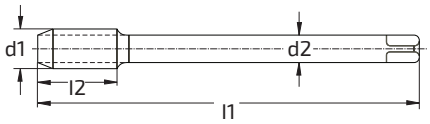
Macho máquina helicoidal rosca **UNF** tipo N

*Helix fluted **UNF** thread N type machine tap*



Macho de máquina HSS helicoidal tipo N con rosca UNF para aceros hasta 800 N/mm².

Helix fluted HSS machine tap with UNF thread for steels up to 800 N/mm².



P [Gg/1"]		l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	NC40-UNF/4 [VP] Ref.	€
UNC #	10-32	70	13	3,5	2,7	3	4,10	600853	**31,45**
UNC #	12-28	80	15	4,0	3,0	3	4,65	600854	**37,15**
UNC #	1/4-28	80	15	4,5	3,4	3	5,50	600855	**35,00**
UNC	5/16-24	90	18	6,0	4,9	3	6,90	600856	**38,60**
UNC	3/8-24	90	20	7,0	5,5	3	8,50	600857	**41,45**
UNC	7/16-20	100	20	8,0	6,2	3	9,90	600858	**50,40**
UNC	1/2-20	100	21	9,0	7,0	3	11,50	600859	**51,80**
UNC	5/8-20	100	21	12,0	9,0	3	14,50	600861	**68,60**
UNC	3/4-16	110	24	14,0	11,0	3	17,50	600862	**85,75**
UNC	7/8-14	125	24	18,0	14,5	3	20,50	600863	**109,30**
UNC	1-12	140	26	18,0	14,5	3	23,25	600864	**160,00**

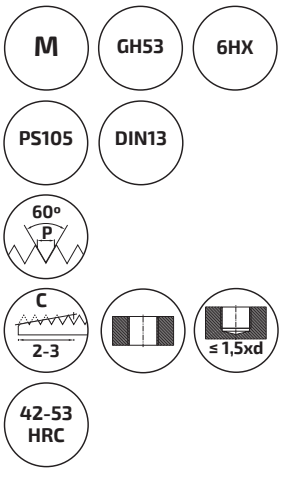
Condiciones de corte | Cutting data pag. 248

Macho máquina recto PS 105 rosca métrica

Straight fluted metric thread PS 105 machine tap

Macho de máquina PS 105 con rosca métrica recubierto de TiCN. Permite roscar agujeros ciegos y pasantes en materiales templados de 42 a 53 HRC.

Straight fluted PS 105 machine tap with metric thread and TiCN coating. Suitable for blind and through holes for hardened materials from 42 to 53 HRC.



STEEL <55 HRC

HG

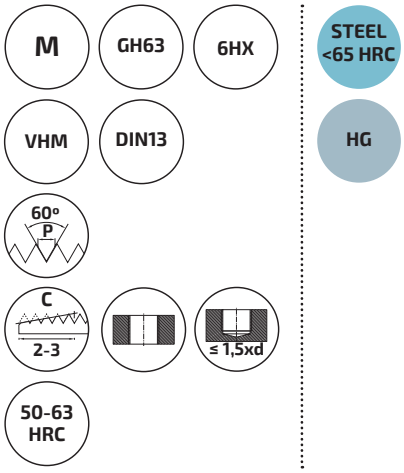
d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	GH-53-TiCN Ref.	GH-53-TiCN €
M 3	0,50	46	11	3,5	2,7	4	2,55	430970	**48,00**
M 4	0,70	52	13	4,5	3,4	4	3,40	430971	**48,95**
M 5	0,80	60	16	6,0	4,9	4	4,30	430972	**49,85**
M 6	1,00	62	19	6,0	4,9	4	5,10	430973	**50,30**
M 8	1,25	70	22	6,0	4,9	5	6,90	430974	**57,60**
M10	1,50	75	24	7,0	5,5	5	8,60	430975	**65,40**
M12	1,75	82	29	9,0	7,0	5	10,40	430976	**87,35**
M 16	2,00	95	32	12,0	9,0	5	14,10	430978	**138,10**
M 20	2,50	105	37	16,0	12,0	5	17,70	430980	**232,25**
M16	*1,50	82	29	9,0	7,0	5	10,60	430982	**128,00**
M20	*1,50	88	30	11,0	9,0	5	12,60	430984	**149,05**

P [Gg/1"]		l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	GH-53-TiCN Ref.	GH-53-TiCN €
G 1/8	**28**	63	18	7	5,5	5	8,80	430993	**124,35**
G 1/4	**19**	70	20	11	9	5	11,90	430990	**156,35**

Condiciones de corte | Cutting data pag. 250

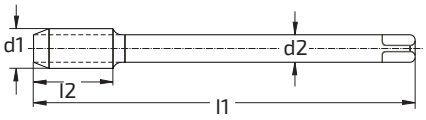
Macho de máquina recto VHM rosca métrica

Straight fluted metric thread VHM machine tap



Macho de máquina VHM con rosca métrica recubierto de TiCN. Permite roscar agujeros ciegos y pasantes en materiales templados de 50 a 63 HRC

Straight fluted VHM machine tap with metric thread and TiCN coating. Suitable for blind and through holes for hardened materials from 50 to 63 HRC.



d1 [mm]	P [mm]	l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	GH-63-TiCN Ref.	€
M 3	0,50	46	11	3,5	2,7	4	2,55	140120	**234,00**
M 3,5	0,60	46	13	4,0	3	4	3,00	140119	**241,20**
M 4	0,70	52	13	4,5	3,4	4	3,40	140121	**241,20**
M 5	0,80	60	16	6,0	4,9	4	4,30	140122	**253,80**
M 6	1,00	62	19	6,0	4,9	5	5,10	140123	**271,80**
M 8	1,25	70	22	6,0	4,9	5	6,90	140124	**347,40**
M 10	1,50	75	24	7,0	5,5	5	8,60	140125	**453,60**
M 12	1,75	82	29	9,0	7,0	5	10,40	140126	**597,60**
M 14	2,00	88	30	11,0	9,0	6	12,10	140127	**741,60**
M 16	2,00	95	32	12,0	9,0	6	14,10	140128	**900,00**
M 20	2,50	105	37	16,0	12,0	6	17,70	140130	**1.224,00**
M 8	*1,00	70	22	6,0	4,9	5	7,10	140200	**370,80**
M 10	*1,00	75	24	7,0	5,5	5	9,10	140201	**482,40**
M 12	*1,00	82	29	9,0	7,0	5	11,10	140202	**637,20**
M 12	*1,50	82	29	9,0	7,0	5	10,60	140205	**637,20**
M 14	*1,50	88	30	11,0	9,0	6	12,60	140208	**777,60**
M 16	*1,50	95	32	12,0	9,0	6	14,60	140210	**972,00**
M 20	*1,50	105	37	16,0	12,0	6	18,60	140215	**1.296,00**

P [Gg/1"]		l1 [mm]	l2 [mm]	d2 [mm]	□ [mm]	z	Ø [mm]	NB00-UNF/4 [VP] Ref.	€
G 1/8	**28**	63	18	7	5,5	5	8,90	140300	**619,20**
G 1/4	**19**	70	20	11	9	5	11,90	140301	**817,20**

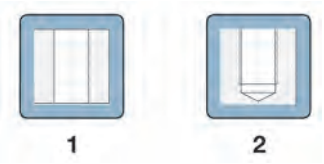
Condiciones de corte | Cutting data pag. 250

M-14
SWT

CONDICIONES DE CORTE MACHOS

CUTTING DATA TAPS

CONDICIONES DE CORTE
CUTTING DATA



Referencia | *Reference*	NB00	NC40	VAB00VP	VAC40VP
Material del macho | *Tap Material*	HSSE	HSSE	HSSE	HSSE
Forma de punta | *Chamfer*	B	C	B	C
Tolerancia | *Tolerance*	ISO 2 (6H)	ISO 2 (6H)	ISO 2 (6H)	ISO 2 (6H)
Recubrimiento | *Coating*	-	-	VP	VP
Tipo de rosca | *Type of thread*	1	2	1	2

MATERIAL

P	**Acero no aleado** | *Unalloyed steel < 800 N/mm²*	8 - 12	6 - 10	10 - 15	8 - 12
	Acero aleado | *Alloy steel < 800 N/mm2*	8 - 10	6 - 8	10 - 12	8 - 10
	Acero para herramientas | *Tool steel < 1300 N/mm²*			8 - 10	6 - 8
	Acero para trabajos en frío | *Tool steel for cold work < 1300 N/mm²*			8 - 10	6 - 8
M	**Acero inoxidable** | *Stainless steel*			6 - 8	5 - 6
K	**Fundición gris** | *Grey cast iron (GG)*			12 - 15	10 - 12
	Fundición nodular | *Nodular cast iron (GGG)*			10 - 12	8 -10
N	**Aleaciones de cobre (viruta larga)** | *Cu alloys (long chipping)*	12 - 15	10 - 12		
	Aleaciones de cobre (viruta corta) | *Cu alloys (short chipping)*	10 - 12	8 - 10	12 - 15	10 - 12
	Aleaciones de cobre | *Cu alloys 200 HB*	10 - 12	8 - 10		
	Aleaciones de cobre | *Cu alloys 200 - 300 HB*			8 - 10	8 - 10
	Aleaciones de cobre | *Cu alloys >300 HB*				
	Aluminio y aleaciones de aluminio | *Al and Al alloys < 0,5 % Si*	20 - 26	18 - 22		
	Aleaciones de aluminio | *Al alloys 0,5-15 % Si*	18 - 22	15 - 18		
	Aleaciones de aluminio | *Al alloys > 15 % Si*			15 - 18	12 - 15
	Termoplásticos | *Thermoplastics*	20 - 26	18 -22		
	Plástico reforzado | *Reinforced plastics*			18 - 22	15 - 18
S	**Titanio** | *Titanium*			3 - 4	2 -3
	Aleaciones de titanio | *Ti alloys < 900 N/mm²*			3 - 4	2 - 3
	Aleaciones de titanio | *Ti alloys 900 - 1500 N/mm²*				
	Niquel | *Nickel*	3 -4	2 - 3	3 - 4	2 - 3
	Aleaciones de níquel | *Ni alloys < 900 N/mm²*			3 - 4	2 - 3
	Aleaciones de níquel | *Ni alloys 900 - 1500 N/mm²*				

CONDICIONES DE CORTE

CUTTING DATA

VAB00TC	VAC40TC	GGC00TC	ALB00	ALC45	HB00TC-PM	HC15TC-PM	UC00TC	UC00SNTC
HSSE	HSSE	HSSE	HSSE	HSSE	HSSE-PM	HSSE-PM	HSSE	HSSE
B	C	C	B	C	B	C	C	C
ISO 2 (6H)	ISO 2 (6H)	6HX	ISO 2 (6H)	ISO 2 (6H)	ISO 2 (6H)	ISO 2 (6H)	6HX	6HX
TiCN	TiCN	TiCN	-	-	TiCN	TiCN	TiCN	TiCN
1	2	1 | 2	1	2	1	2	1 | 2	1 | 2
18 - 22	15 - 18						18 - 35	12 - 28
15 - 18	12 - 15						12 - 25	10 - 20
12 - 15	10 - 12				15 - 18	12 - 15		
12 - 15	10 - 12				15 - 18	12 - 15		
10 - 12	8 - 10							
20 - 25	15 - 20	18 - 22			26 - 32	22 - 26		
15 - 20	12 - 15	15 - 18			22 - 26	18 - 22		
18 - 22	15 - 18		12 - 15	10 - 12				
18 - 22	15 - 18	15 - 18			22 - 26	18 - 22		
18 - 22	15 - 18							
15 - 18	12 - 15	10 - 12			15 - 18	12 - 15		
		8 - 10			12 - 15	10 - 12		
26 - 32	22 - 26		20 - 26	18 - 22			22 - 40	22 - 40
26 - 32	22 - 26						22 - 40	22 - 40
22 -26	18 - 22	22 - 26			26 - 32	22 - 26		
26 - 32	22 - 26		20 - 26	18 - 22			22 - 40	22 - 40
26 - 32	22 - 26	26 - 32			30 - 40	26 - 32		
5 - 6	4 - 5							
5 - 6	4 - 5							
					4 - 5	3 - 4		

CONDICIONES DE CORTE
CUTTING DATA

GH-53-TiCN - pag. 244 | **GH-63-TiCN** - pag. 245

			GH53 / 954 200		GH63 / 914 200					
MATERIAL			8.2 42-53 HRC		8.2					
					50-54 HRC		55-59 HRC		60-63 HRC	
Vc			2,5 m/min		2,5 m/min		2,0 m/min		1,8 m/smin	
d1 [mm]	P [mm]	Ø [mm]	n [min^{-1}]	V_f [mm/min^{-1}]	n [min^{-1}]	V_f [mm/min^{-1}]	n [min^{-1}]	V_f [mm/min^{-1}]	n [min^{-1}]	V_f [mm/min^{-1}]
M 3	0,5	2,55	250	125	250	125	212	106	190	95
M 3,5	0,6	3,00			225	135	180	108	160	96
M 4	0,7	3,40	200	140	200	140	160	112	140	98
M 5	0,8	4,30	160	128	160	128	125	100	115	92
M 6	1,0	5,10	132	132	132	132	106	106	95	95
M 8	1,25	6,90	100	125	100	125	80	100	72	90
M 10	1,5	8,60	80	120	80	120	64	96	56	84
M 12	1,75	10,40	64	112	64	112	56	98	48	84
M 14	2	12,10			56	112	46	92	40	80
M 16	2	14,10	50	100	50	100	40	80	36	72
M 20	2,50	17,70	40	100	40	100	32	80	28	70
M 8	*1	7,10			100	100	80	80	72	72
M 10	*1	9,10			80	80	64	64	56	56
M 12	*1	11,10			64	64	56	56	48	48
M 12	*1,5	10,60	64	96	64	96	64	96	48	72
M 14	*1,5	12,60	56	84	56	84	46	69	40	60
M 16	*1,5	14,60			50	75	40	60	36	54
M 20	*1,5	18,60			40	60	32	48	28	42
G 1/8	28	8,90	76	69	76	69	65	59	56	51
G 1/4	19	11,90	60	80	60	80	48	64	45	60

1. Utilizar aceite insoluble JMG de KLK para esta aplicación.

2. Eliminar todas las virutas del macho después de cada rosca metalizada.

3. Si se usa roscado con embrague, se recomienda regular al máximo el esfuerzo del portamachos.

4. No usar el macho para orscar a mano en ningún caso.

5. La profundidad máxima de rosca es de 1,5xd.

6. En caso de usar un centro de macanizado con la posibilidad de roscado sincronizado, el macho ha de usarse un amarre rígido. En ese caso, la velocidad de roscado se puede aumentar aproximadamente un 10%.

1. Water-insoluble JMG oil from KLK is recommended for this application.

2. After each tapped thread, all stuck chips has to be removed from the tap.

3. By using a tap holder with overload clutch, the overload torque has to be adjusted on its maximum. The usage of a quick change tap holder without overload clutch is recommended for this application.

4. In no case, the tap should be used by hand.

5. The maximum thread depht is 1,5xd.

6. In case of using a machining center with synchronized tapping possibility, the tap should be clamped in a rigid tap holder. In such case, tapping speed can be increased by approx. 10%.

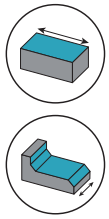
PROGRAMA
ALUMINIO

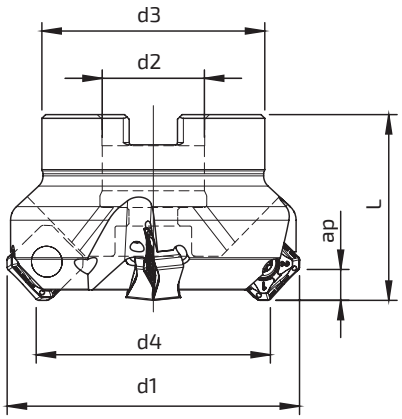
FRESADO PARA ALUMINIO

MILLING FOR ALLOY

ALP845 SNHX

Línea de fresado
Milling line





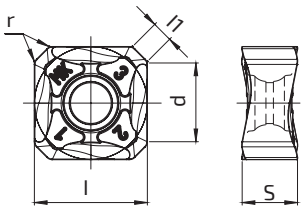
Montaje en el perno
Arbor mounting

κ_r=45º γ_p=-6º

Ref.		d1	d2	d3	d4	L	Ap max (mm)	Plaquita *Insert*	€
ALP845-050A04R	4	63	22	48	50	40	6	SN12	**275,15**
ALP845-050A06R	6	63	22	48	50	40	6	SN12	**344,00**
ALP845-063A06R	6	76	22	52	63	40	6	SN12	**344,00**
ALP845-063A08R	8	76	22	52	63	40	6	SN12	**487,45**
ALP845-080A07R	7	93	27	60	80	50	6	SN12	**393,45**
ALP845-080A10R	10	93	27	60	80	50	6	SN12	**531,15**
ALP845-100A08R	8	113	32	80	100	50	6	SN12	**487,45**
ALP845-100A12R	12	113	32	80	100	50	6	SN12	**812,00**
ALP845-125A10R	10	138	40	90	125	63	6	SN12	**531,15**
ALP845-160A12R	12	173	40	110	160	63	6	SN12	**812,00**
ALP845-200A14R	14	213	60	172	200	63	6	SN12	**1.561,15**
ALP845-250A16R	16	263	60	172	250	63	6	SN12	**2.310,60**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref P040120**		**6,00**
Llave Torx *Key (Torx)*	**T-15**		**16,00**

Plaquitas
Inserts



Ref.	l	S	d	r	l1	€
SNHX 1206AL H10T	12,70	6,35	9,30	0,80	2,00	**12,45**

Condiciones de corte
Cutting data

ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.200	0,10 - 0,35

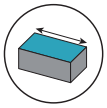
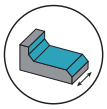
(1) Condiciones de corte ae/d1=70%.
Cutting conditions a_e/d1=70%.

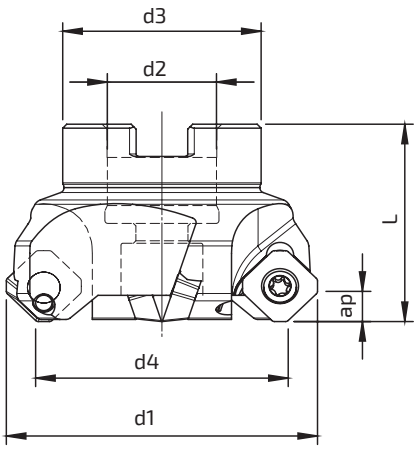
(2) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

Línea de fresado
Milling line

ALP445 SEHT



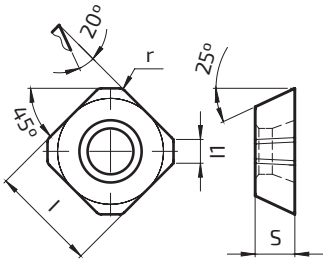
Montaje en el perno
Arbor mounting

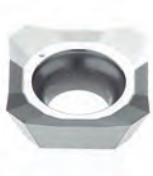
κ_r=45º γ_p=-+19º

Ref.		d1	d2	d3	d4	L	Ap max (mm)	Plaquita *Insert*	€
ALP445-050A04R	4	62	22	42	50	40	6	SE12	**262,3**
ALP445-063A05R	5	75	22	42	63	50	6	SE12	**331,75**
ALP445-080A06R	6	92	27	50	80	50	6	SE12	**470,6**
ALP445-100A06R	6	112	32	64	100	50	6	SE12	**537,45**
ALP445-125A07R	7	132	40	85	125	63	6	SE12	**701,45**
ALP445-160A08R	8	172	40	100	160	63	6	SE12	**886,6**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref P050110**		**7,80**
Llave Torx *Key (Torx)*	**T-20**		**12,80**

Plaquitas
Inserts





Ref.	l	S	r	l1	€
SEHT 1204AL H10T	12,70	4,76	0,80	2,00	**8,55**

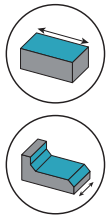
Condiciones de corte
Cutting data

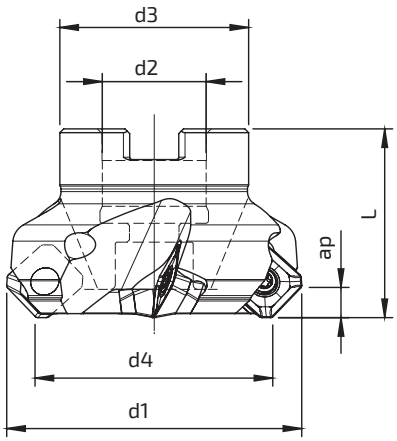
ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	0,10 - 0,25

(1) Condiciones de corte ae/d1=70%.
Cutting conditions a_e/d1=70%.
(2) Las condiciones de corte deben ajustarse de acuerdo con la máquina y la rigidez del trabajo.
Cutting conditions should be ajusted according to the machine and work rigidity.
(3) Las condiciones de corte deben ajustarse de acuerdo con la máquina y la rigidez del trabajo.
If chattering occurs, reduce ap and Vc by 30% and keep the same fz per thooth.

ALP545 SEHT

Línea de fresado
Milling line





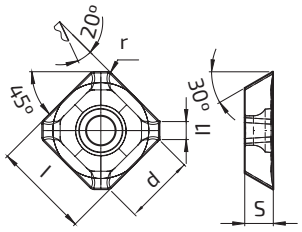
Montaje en el perno
Arbor mounting

κ_r=45º γ_p= +20º ~+21º

Ref.		d1	d2	d3	d4	L	Ap max (mm)	Plaquita *Insert*	€
ALP545-050A04R	4	63	22	40	50	40	6	SE13	**294,60**
ALP545-063A05R	5	76	22	40	63	40	6	SE13	**359,75**
ALP545-080A06R	6	93	27	50	80	50	6	SE13	**425,15**
ALP545-100A07R	7	113	32	50	100	50	6	SE13	**522,30**
ALP545-125A08R	8	138	40	63	125	63	6	SE13	**620,30**
ALP545-160A10R	10	173	40	63	160	63	6	SE13	**848,90**
ALP545-250A24R	24	263	60	63	250	63	6	SE13	**2284,30**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**Ref P035120**	**6,90**
Llave Torx *Key (Torx)*	**T-15**	**16,00**

Plaquitas
Inserts



Ref.	l	S	d	r	l1	€
SEHT 13T3AL H10T	13,35	3,97	10,00	-	2,30	**10,10**

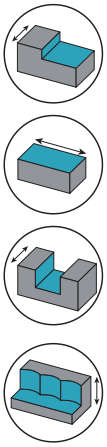
Condiciones de corte
Cutting data

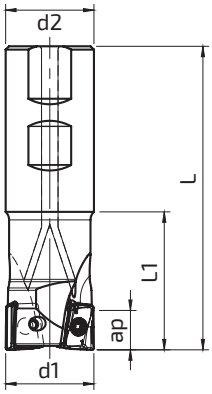
ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	0,10 - 0,20

(1) Condiciones de corte ae/d1=70%.
Cutting conditions a_e/d1=70%.
(2) Las condiciones de corte deben ajustarse a la máquina y a la rigidez del trabajo.
Cutting conditions should be ajusted to the machine and work rigidity.
(3) Si se producen temblores, reduzca el ap y el Vc en un 30% y mantenga el mismo fz por diente.
If chattering occurs, reduce ap and Vc by 30% and keep the same fz per tooth.

Línea de fresado
Milling line

ALM490
ALP490



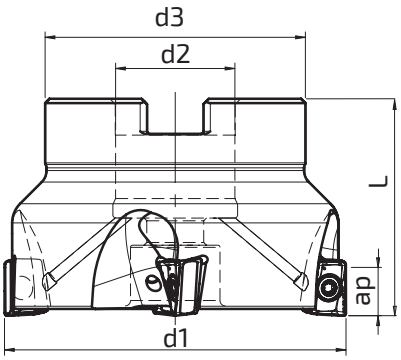


Montaje en el perno
Arbor mounting

κ_r=90º γ_p=-7º(-6º*)

Ref.		d1	d2	L	L1	Ap max (mm)	Plaquita *Insert*	€
ALM490-014A01R	1	14	16	90	23	9	AN10	**170,30**
ALM490-016A02R	2	16	16	90	25	9	AN10	**185,45**
ALM490-016A02RL	2	16	16	150	25	9	AN10	**194,90**
ALM490-018A02R	2	18	16	90	23	9	AN10	**197,75**
ALM490-020A02R	2	20	20	100	30	9	AN10	**200,00**
ALM490-020A03R	3	20	20	100	30	9	AN10	**224,00**
ALM490-025A02R	2	25	25	115	35	9	AN10	**209,45**
ALM490-025A03R	3	25	25	115	35	9	AN10	**233,15**
ALM490-032A03R	3	32	32	125	40	9	AN10	**246,60**
ALM490-032A04R	4	32	32	125	40	9	AN10	**269,45**
ALM490-040A04R	4	40	32	130	40	9	AN10	**282,30**
ALM490-040A05R	5	40	32	130	40	9	AN10	**304,90**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref. P030080**		**6,9**
Llave Torx *Key (Torx)*	**T-9**		**12,8**



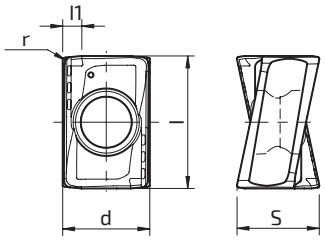
Montaje en el perno
Arbor mounting

κ_r=90º γ_p= -7º

Ref.		d1	d2	d4	L	Ap max (mm)	Plaquita *Insert*	€
ALP490-040A04R	4	16	32	40	40	9	AN10	**324,30**
ALP490-040A05R	5	16	32	40	40	9	AN10	**348,00**
ALP490-050A05R	5	22	42	50	40	9	AN10	**363,75**
ALP490-050A07R	7	22	42	50	40	9	AN10	**410,60**
ALP490-063A07R	7	22	52	63	40	9	AN10	**417,45**
ALP490-063A09R	9	22	52	63	40	9	AN10	**464,00**
ALP490-080A08R	8	27	60	80	50	9	AN10	**483,45**
ALP490-080A10R	10	27	60	80	50	9	AN10	**507,15**
ALP490-100A09R	9	32	80	100	50	9	AN10	**541,75**
ALP490-100A12R	12	32	80	100	50	9	AN10	**592,90**

ANHX

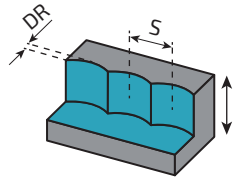
Plaquitas
Inserts



Ref.	d	S	l	r	l1	€
ANHX 100405AL H10T	6,60	6,20	10,00	0,50	1,00	**14,15**
ANHX 100412AL H10T	6,60	6,20	10,00	1,20	1,00	**14,15**

Profundidad
Plunging

L<3d1	L>3d1	S max.
fz (mm/t)		
0,10 - 0,20	0,10-0,14	$Smax = \sqrt{d1.Dr - Dr^2}$



S máx. y DR diámetro de corte correspondiente d1 *S max and DR corresponding cutting diameter d1*											
DR (mm)	d1 (mm)										
	14	16	18	20	25	32	40	50	63	80	100
1,0	3,6	3,9	4,1	4,4	4,9	5,6	6,2	7,0	7,9	8,9	9,9
2,0	4,9	5,3	5,7	6,0	6,8	7,7	8,7	9,8	11,0	12,5	14,0
3,0	5,7	6,2	6,7	7,1	8,1	9,3	10,5	11,9	13,4	15,2	17,1

Condiciones de corte
Cutting data

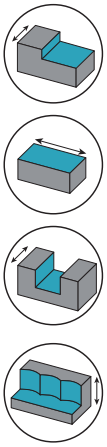
ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.200	0,10 - 0,20

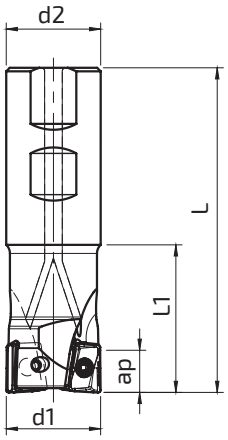
Operación *Operation*	ae	Vc & fz	Ap (mm)
Ranurado	100%	<20%	2,0 - 3,5
Escuadrado	<50%	>8%	3,0 - 6,5
	≤25%	>12%	6,0 - 8,5

(1) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

ALM590
ALR590

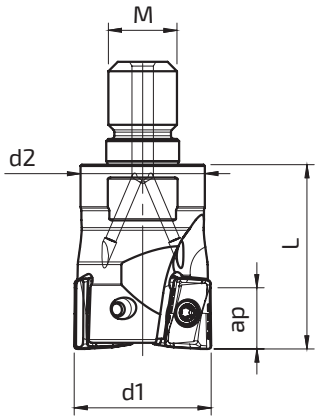




Montaje en el perno
Arbor mounting

κ_r=90º γ_p= -4º

Ref.		d1	d2	L	L1	Ap max (mm)	Plaquita *Insert*	€
ALM590-032A02R	2	32	32	110	50	15	AN16	**243,75**
ALM590-040A03R	3	40	32	115	40	15	AN16	**299,75**



Montaje en el perno
Arbor mounting

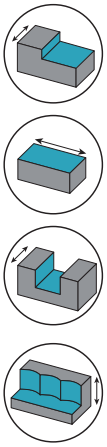
κ_r=90º γ_p= -4º

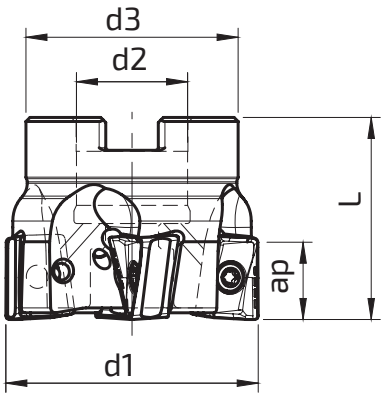
Ref.		d1	d2	M	L	Ap max (mm)	Plaquita *Insert*	€
ALR590-032A02R	2	32	29	M16	43	15	AN16	**243,75**
ALR590-040A03R	3	40	29	M16	43	15	AN16	**299,75**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref. P040120**		**6,00**
Llave Torx *Key (Torx)*	**T-15**		**16,00**

ALP590 ANHX

Línea de fresado
Milling line



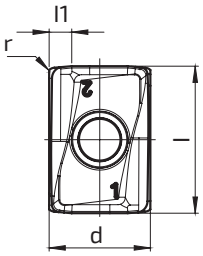


Montaje en el perno
Arbor mounting

κ_r=90º γ_p= -4º

Ref.		d1	d2	d3	L	Ap max (mm)	Plaquita *Insert*	€
ALP590-050A03R	3	50	22	42	40	15	AN16	**275,75**
ALP590-050A04R	4	50	22	42	40	15	AN16	**346,30**
ALP590-063A04R	4	63	22	52	40	15	AN16	**359,75**
ALP590-063A06R	6	63	22	52	40	15	AN16	**448,30**
ALP590-080A05R	5	80	27	60	50	15	AN16	**471,75**
ALP590-080A07R	7	80	27	60	50	15	AN16	**587,75**
ALP590-100A05R	5	100	32	80	50	15	AN16	**542,30**
ALP590-100A08R	8	100	32	80	50	15	AN16	**676,90**
ALP590-125A07R	7	125	40	90	63	15	AN16	**756,00**
ALP590-125A10R	10	125	40	90	63	15	AN16	**942,60**
ALP590-160A08R	8	160	40	110	63	15	AN16	**821,45**
ALP590-160A12R	12	160	40	110	63	15	AN16	**1.026,00**

Plaquitas
Inserts



Ref.	d	S	l	r	l1	€
ANHX 160708AL H10T	11,20	10,80	16,0	0,8	1,4	**15,45**
ANHX 160712AL H10T	11,20	10,50	16,0	1,2	1,2	**15,45**

Condiciones de corte
Cutting data

ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	300 - 1.200	0,10 - 0,40

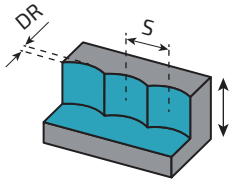
Operación *Operation*	ae	Vc & fz	Ap (mm)
Ranurado	100%	<20%	2,0 - 3,5
Escuadrado	<50%	>8%	6,0 - 8,0
	≤25%	>12%	8,0 - 15,0

(1) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina. de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

Profundidad
Plunging

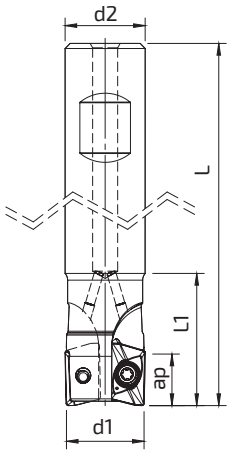
L<3d1	L>3d1	S max.
fz (mm/t)		
0,10 - 0,20	0,10-0,14	$Smax = \sqrt{d1.Dr - Dr^2}$

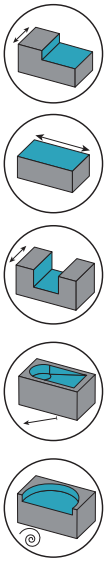


S máx. y DR diámetro de corte correspondiente d1 *S max and DR corresponding cutting diameter d1*								
DR (mm)	d1 (mm)							
	32	40	50	63	80	100	125	160
1,0	5,6	6,2	7,0	7,9	8,9	9,9	11,1	12,6
2,0	7,7	8,7	9,8	11,0	12,5	14,0	15,7	17,8
3,0	9,3	10,5	11,9	13,4	15,2	17,1	19,1	21,7
4,0	10,6	12,0	13,6	15,4	17,4	19,6	22,0	25,0
5,0	11,6	13,2	15,0	17,0	19,4	21,8	24,5	27,8

ALM290
ALR290

Línea de fresado
Milling line

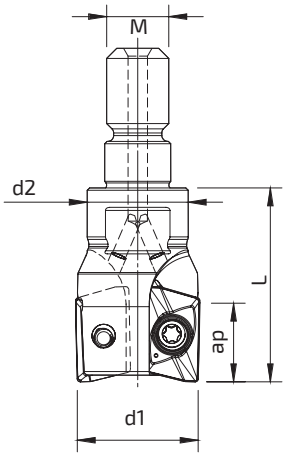




Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +5º

Ref.		d1	d2	L	L1	Ap max (mm)	Plaquita *Insert*	€
ALM290-016A02R	2	16	16	85	32	10	XP10	**191,45**
ALM290-016A02RL	2	16	16	150	70	10	XP10	**203,45**
ALM290-017A02RL	2	17	16	150	36	10	XP10	**227,45**
ALM290-020A03R	3	20	20	90	28	10	XP10	**203,45**
ALM290-020A03RL	3	20	20	150	70	10	XP10	**215,15**
ALM290-022A03RL	3	22	20	150	70	10	XP10	**251,45**
ALM290-025A04R	4	25	25	95	30	10	XP10	**293,45**
ALM290-025A04RL	4	25	25	150	80	10	XP10	**304,90**
ALM290-027A04RL	4	27	25	150	80	10	XP10	**310,90**



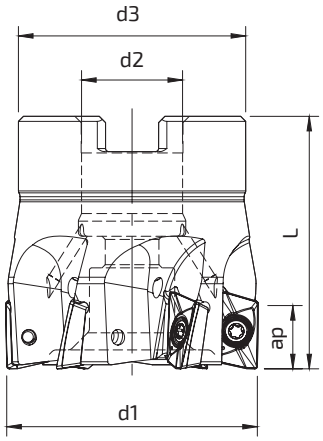
Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +5º~+6º

Ref.		d1	d2	M	L	Ap max (mm)	Plaquita *Insert*	€
ALR290-016A02R	2	16	14	16	25	10	XP10	**179,75**
ALR290-020A03R	3	20	18	16	30	10	XP10	**221,75**
ALR290-025A04R	4	25	21	16	35	10	XP10	**239,15**
ALR290-032A05R	5	32	29	20	35	10	XP10	**269,45**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**Ref. P025070**	**6,90**
Llave Torx *Key (Torx)*	**T-8**	**12,80**

ALP290 XPET

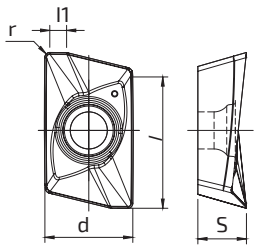


Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +7º~+8º

Ref.		d1	d2	d3	L	Ap max (mm)	Plaquita *Insert*	€
ALP290-040A06R	6	40	16	36	40	10	XP10	**323,15**
ALP290-050A07R	7	50	22	42	40	10	XP10	**365,15**
ALP290-063A08R	8	63	22	52	40	10	XP10	**400,60**

Plaquitas
Inserts



Ref.	d	S	l	r	l1	€
XPET 100304AL H10T	6,95	3,96	10,50	0,40	1,20	**13,30**
XPET 100312AL H10T	6,95	3,96	10,50	1,20	0,90	**13,30**

Condiciones de corte
Cutting data

ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	0,07 - 0,25

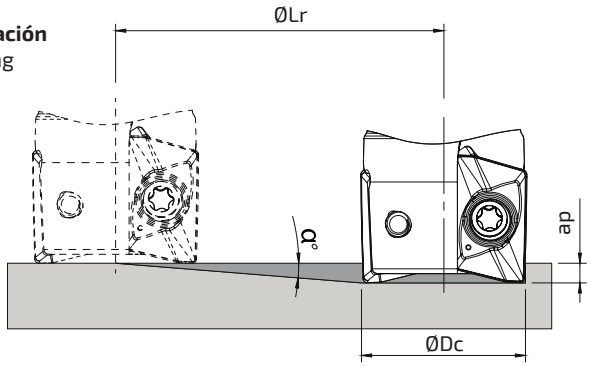
Operación *Operation*	ae	Vc & fz	Ap (mm)
Ranurado	100%	<20%	2,0 - 4,0
Escuadrado	<50%	>8%	3,0 - 6,0
	≤25%	>12%	7,0 - 9,0

(1) Condiciones de corte ae/d1=70%.
Cutting conditions ae/d1=70%.
(2) Las condiciones de corte deben ajustarse de acuerdo con la máquina y la rigidez del trabajo.
Cutting conditions should be ajusted according to the machine and work rigidity.
(3) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

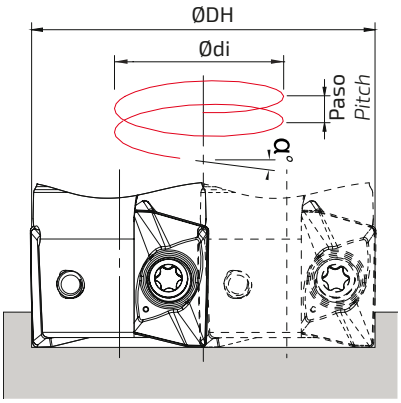
It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

Aceleración e interpolación helicoidal
Ramping and hellal interpolation

Aceleración
Ramping



Interpolación helicoidal
Hellal interpolation



Agujero ciego
Base plana
Blind hole
Flat bottom

Ødi = ØDH - ØDc

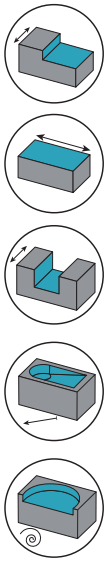
d4	Aceleración *Ramping*			Interpolación helicoidal *Hellal interpolation*		
				Diámetro para agujero ciego, cara inferior plana (1) *Diameter for blind hole, flat bottom face (1)*		Max Pitch/Rev.
	Max Ramp aº	Max ap	Min Lr	ØDHmin	ØDHmax	
16	7,5	10,0	76,0	27,6 -	- 30,4	4,8 6,0
17	7,0	10,0	81,4	29,6 -	- 32,4	4,9 5,9
20	7,0	10,0	11,43	35,6 -	- 38,4	4,3 5,1
22	4,5	10,0	127,1	35,6 -	- 42,4	4,3 5,0
25	3,5	10,0	163,5	45,6 -	- 48,4	4,0 4,5
27	3,0	10,0	190,8	49,6 -	- 52,4	3,7 4,2
32	3,0	10,0	229,0	59,6 -	- 62,4	3,8 4,2
40	1,7	10,0	336,9	75,6 -	- 78,4	3,3 3,6
50	1,3	10,0	440,7	95,6 -	- 98,4	3,2 3,4
63	1,0	10,0	572,9	121,6 -	- 124,4	3,2 3,4

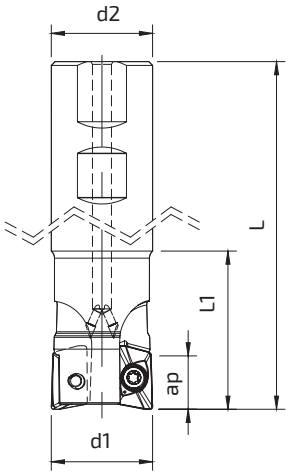
(1) Con inserción LP de radio 0,8 mm.
Durante la interpolación helicoidal no exceda del paso máximo.
Para el cálculo de ØDHmin y ØDHmax con plaquitas de alta frecuencia u otros radios de plaquitas diferentes, utille la siguiente ecuación:
- Diámetro mínimo: ØDHmin = 2x(d4- (radio de la esquina R + anchura F de la rasqueta)
- Diámetro máximo: ØDHmax = 2 x (d4 - radio de la esquina R)

Using LP insert with radius 0,8 mm.
During hellal interpolation do not exceed maximum pitch.
When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the below equation:
- Minium Diameter: ØDHmin = 2x(d4- (R corner radius + F width of edge wiper)
- Maximum Diameter: ØDHmax = 2 x (d4 - R corner radius)

Línea de fresado
Milling line

ALM390
ALP390

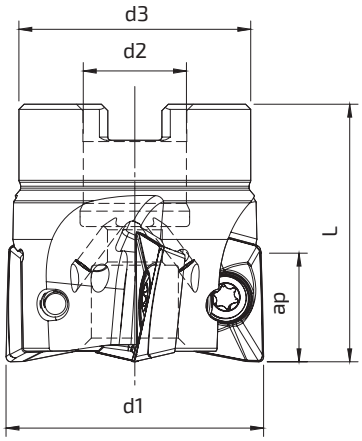




Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +6º~+7º

Ref.		d1	d2	L	L1	Ap max (mm)	Plaquita *Insert*	€
ALM390-032A02R	2	32	32	110	50	17	XP17	**227,45**
ALM390-032A02RL	2	32	32	200	60	17	XP17	**263,15**
ALM390-040A03R	3	40	40	115	50	17	XP17	**293,45**
ALM390-040A03RL	3	40	49	200	60	17	XP17	**341,15**



Montaje en el perno
Arbor mounting

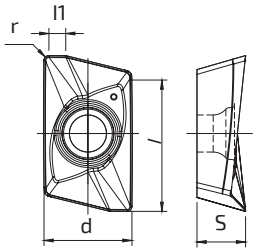
κ_r=90º γ_p= +7º~+8º

Ref.		d1	d2	d3	L	Ap max (mm)	Plaquita *Insert*	€
ALP390-040A04R	4	40	16	32	40	17	XP17	**263,15**
ALP390-050A05R	5	50	22	42	40	17	XP17	**310,90**
ALP390-063A06R	6	63	27	52	40	17	XP17	**341,15**
ALP390-080A07R	7	80	27	60	50	17	XP17	**424,60**
ALP390-100A08R	8	100	32	80	50	17	XP17	**544,00**
ALP390-125A09R	9	125	40	90	63	17	XP17	**628,00**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref. P045100**		**7,35**
Llave Torx *Key (Torx)*	**T-20**		**15,55**

XPET

Plaquitas
Inserts



Ref.	d	S	l	r	l1	€
XPET 170608AL H10T	11,30	6,35	17,50	0,80	1,20	**15,45**
XPET 170620AL H10T	11,30	6,35	17,50	2,00	1,00	**15,45**
XPET 170632AL H10T	11,30	6,35	17,50	3,20	0,80	**15,45**

Condiciones de corte
Cutting data

ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	0,10 - 0,35

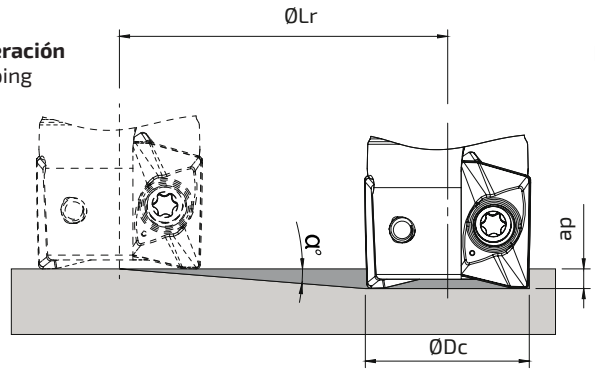
Operación *Operation*	ae	Vc & fz	Ap (mm)
Ranurado	100%	<20%	2,0 - 6,0
Escuadrado	<50%	>8%	7,0 - 13,0
	≤25%	>12%	13,0 - 16,0

(1) Condiciones de corte ae/d1=70%.
Cutting conditions ae/d1=70%.
(2) Las condiciones de corte deben ajustarse de acuerdo con la máquina y la rigidez del trabajo.
Cutting conditions should be ajusted according to the machine and work rigidity.
(3) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

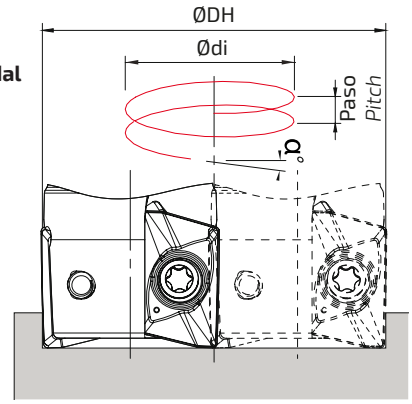
It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

Aceleración e interpolación helicoidal
Ramping and hellal interpolation

Aceleración
Ramping



Interpolación helicoidal
Hellal interpolation



Agujero ciego
Base plana
Blind hole
Flat bottom

Ødi = ØDH - ØDc

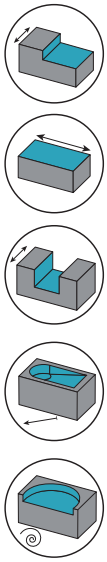
ØDc	Aceleración *Ramping*			Interpolación helicoidal *Hellal interpolation*		
				Diámetro para agujero ciego, cara inferior plana (1) *Diameter for blind hole, flat bottom face (1)*		Max Pitch/Rev.
	Max Ramp aº	Max ap	Min Lr	ØDHmin	ØDHmax	
32	3,8	17,0	255,9	58,8 -	- 62,4	5,6 6,3
40	2,7	17,0	360,5	74,8 -	- 78,4	5,2 5,7
50	2,0	17,0	486,8	94,8 -	- 98,4	4,9 5,3
63	1,5	17,0	649,2	120,8 -	- 124,4	4,8 5,0
80	1,0	17,0	973,9	154,8 -	- 158,4	4,1 4,3
100	0,8	17,0	1.217,5	194,8 -	- 198,4	4,2 4,3
125	0,7	17,0	1.498,4	244,8 -	- 248,4	4,3 4,4

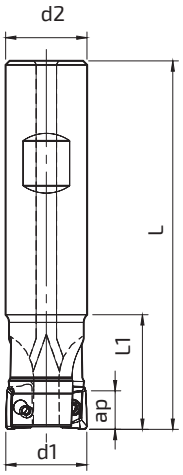
(1) Con inserción LP de radio 0,8 mm.
Durante la interpolación helicoidal no exceda del paso máximo.
Para el cálculo de ØDHmin y ØDHmax con plaquitas de alta frecuencia u otros radios de plaquitas diferentes, utille la siguiente ecuación:
- Diámetro mínimo: ØDHmin = 2x(d4- (radio de la esquina R + anchura F de la rasqueta)
- Diámetro máximo: ØDHmax = 2 x (d4 - radio de la esquina R)

Using LP insert with radius 0,8 mm.
During hellal interpolation do not exceed maximum pitch.
When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the below equation:
- Minium Diameter: ØDHmin = 2x(d4- (R corner radius + F width of edge wiper)
- Maximum Diameter: ØDHmax = 2 x (d4 - R corner radius)

ALM090
ALR090

Línea de fresado
Milling line

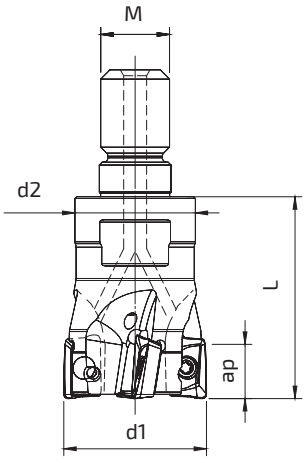




Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +7º~+9º

Ref.		d1	d2	L	L1	Ap max (mm)	Plaquita *Insert*	€
ALM090-016A02R	2	16	16	85	26	9	AP10	**146,30**
ALM090-016A02RL	2	16	16	150	26	9	AP10	**168,00**
ALM090-020A03R	3	20	20	90	28	9	AP10	**175,75**
ALM090-020A03RL	3	20	20	150	28	9	AP10	**212,30**
ALM090-025A04RL	4	25	20	150	26	9	AP10	**240,90**
ALM090-025A04R	4	25	25	95	30	9	AP10	**204,90**

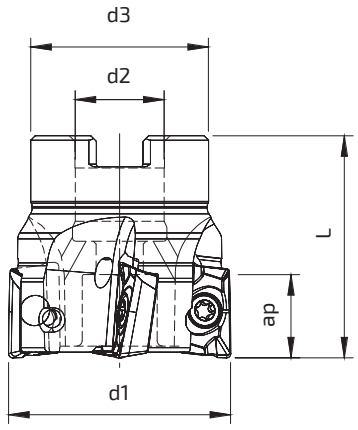


Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +7º~+9º

Ref.		d1	d2	M	L	Ap max (mm)	Plaquita *Insert*	€
ALR090-016A02R	2	16	13	M8	25	9	AP10	**176,90**
ALR090-020A03R	3	20	18	M10	30	9	AP10	**196,60**
ALR090-025A04R	4	25	21	M12	35	9	AP10	**209,45**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref. P025050**		**6,00**
Llave Torx *Key (Torx)*	**T-8**		**12,80**

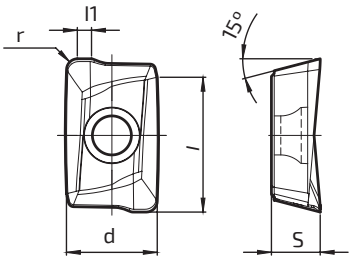


Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +9º

Ref.		d1	d2	d3	L	Ap max (mm)	Plaquita *Insert*	€
ALP090-040A06R	6	40	22	39	40	9	AP10	**312,60**
ALP090-040A07R	7	50	22	40	40	9	AP10	**344,00**
ALP090-063A08R	8	63	22	48	40	9	AP10	**374,90**

Plaquitas
Inserts



Ref.	d	S	l	r	l1	€
APHT 10035AL H10T	6,70	3,50	10,00	0,50	1,20	**10,55**

Condiciones de corte
Cutting data

ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	0,07 - 0,20

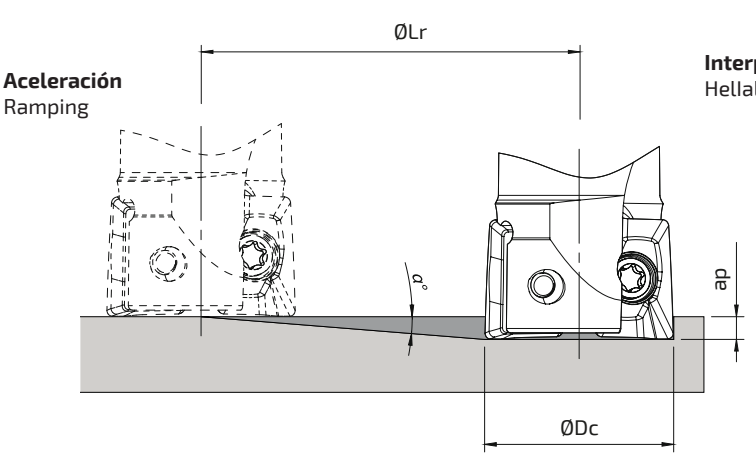
Operación *Operation*	ae	Vc & fz	Ap (mm)
Ranurado	100%	<20%	3,0 - 4,0
Escuadrado	<50%	>8%	5,0 - 6,0
	≤25%	>12%	7,0 - 8,0

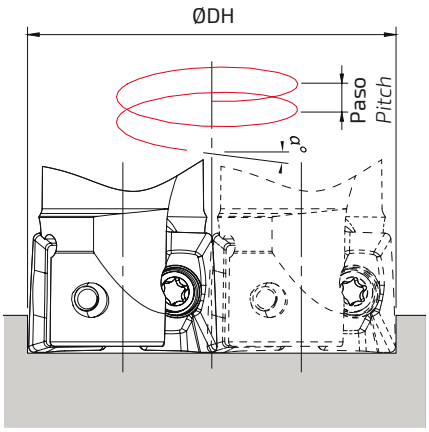
(1) Condiciones de corte ae/d1=70%.
Cutting conditions ae/d1=70%.
(2) Las condiciones de corte deben ajustarse de acuerdo con la máquina y la rigidez del trabajo.
Cutting conditions should be ajusted according to the machine and work rigidity.
(3) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

(4) Si se producen vibraciones, reduzca el ap y el Vc en un 30% y mantenga el mismo fz por diente.
If chattering occurs, reduce ap and Vc by 30% and keep the same fz per tooth.

Aceleración e interpolación helicoidal
Ramping and hellal interpolation





Ødi = ØDH - ØDc

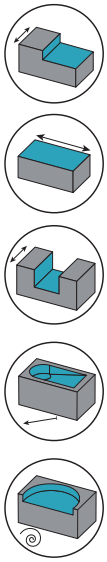
ØDc	Aceleración *Ramping*			Interpolación helicoidal *Hellal interpolation*		
				Diámetro para agujero ciego, cara inferior plana (1) *Diameter for blind hole, flat bottom face (1)*		Max Pitch/Rev.
	Max Ramp aº	Max ap	Min Lr	ØDHmin	ØDHmax	
16	1,30	9,0	396,6	29,2 -	- 31,0	0,9 1,1
20	0,90	9,0	572,9	37,2 -	- 39,0	0,8 0,9
25	0,60	9,0	859,4	47,2 -	- 49,0	0,7 0,8
40	0,40	9,0	1.289,1	77,2 -	- 79,0	0,8 0,9
50	0,25	9,0	2.062,6	97,2 -	- 99,0	0,6 0,7
63	0,20	9,0	2.578,3	123,2 -	- 129,0	0,7 0,7

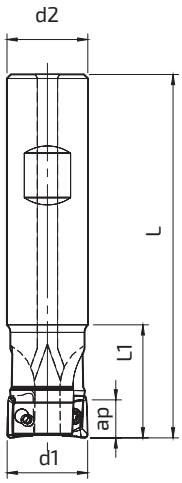
(1) Con inserción LP de radio 0,8 mm.
Durante la interpolación helicoidal no exceda del paso máximo.
Para el cálculo de ØDHmin y ØDHmax con plaquitas de alta frecuencia u otros radios de plaquitas diferentes, utille la siguiente ecuación:
- Diámetro mínimo: ØDHmin = 2x(d4- (radio de la esquina R + anchura F de la rasqueta)
- Diámetro máximo: ØDHmax = 2 x (d4 - radio de la esquina R)

Using LP insert with radius 0,8 mm.
During hellal interpolation do not exceed maximum pitch.
When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the below equation:
- Minium Diameter: ØDHmin = 2x(d4- (R corner radius + F width of edge wiper)
- Maximum Diameter: ØDHmax = 2 x (d4 - R corner radius)

Línea de fresado
Milling line

ALM190
ALP190

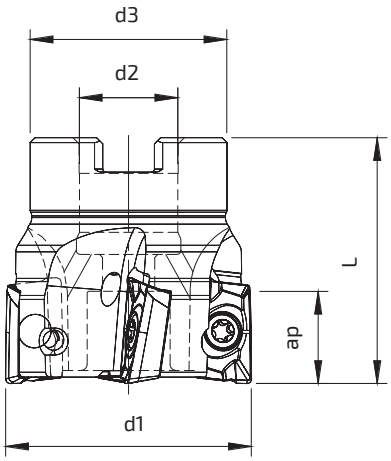




Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +6º~8º

Ref.		d1	d2	L	L1	Ap max (mm)	Plaquita *Insert*	€
ALM190-025A02R	2	25	25	100	44	14,5	AP16	161,75
ALM190-025A02RL	2	25	25	200	60	14,5	AP16	261,15
ALM190-032A03R	3	32	32	110	50	14,5	AP16	175,75
ALM190-032A03RL	3	32	32	200	60	14,5	AP16	320,60
ALM190-040A04R	4	40	32	115	40	14,5	AP16	218,60
ALM190-040A04RL	4	40	32	200	40	14,5	AP16	377,75



Montaje en el perno
Arbor mounting

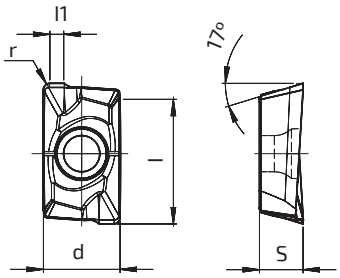
κ_r=90º γ_p= +8º~10º

Ref.		d1	d2	d3	L	Ap max (mm)	Plaquita *Insert*	€
ALP190-040A04R	4	40	16	32	40	14,5	AP16	235,75
ALP190-050A05R	5	50	22	42	40	14,5	AP16	300,90
ALP190-063A06R	6	63	22	52	40	14,5	AP16	346,30
ALP190-080A07R	7	80	27	60	50	14,5	AP16	378,90
ALP190-100A08R	8	100	32	80	50	14,5	AP16	476,90
ALP190-125A09R	9	125	40	90	63	14,5	AP16	555,15

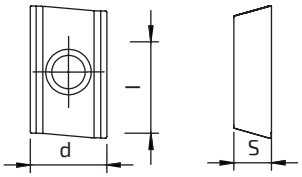
Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	Ref. P040090		6,90
Llave Torx *Key (Torx)*	T-15		16,00

Plaquitas
Inserts

APKT



APHT



Ref.	d	S	l	r	l1	€
APKT 1604AL H10T	9,45	5,35	16,00	-	1,74	**11,60**
APHT 160408AL H10T	9,45	5,35	16,00	0,80	1,74	**11,60**

Condiciones de corte
Cutting data

ISO	Material	HB (Brinell)	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	0,07 - 0,20

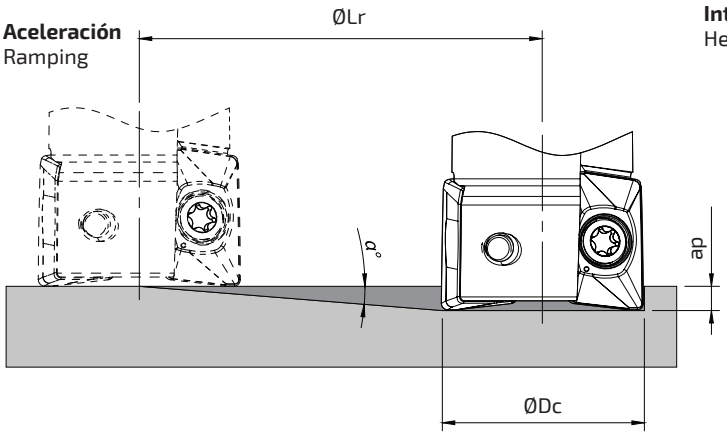
Operación *Operation*	ae	Vc & fz	Ap (mm)
Ranurado	100%	<20%	5,0 - 6,0
Escuadrado	<50%	>8%	6,0 - 9,0
	≤25%	>12%	10,0 - 12,5

(1) Condiciones de corte ae/d1=70%.
Cutting conditions ae/d1=70%.
(2) Las condiciones de corte deben ajustarse de acuerdo con la máquina y la rigidez del trabajo.
Cutting conditions should be ajusted according to the machine and work rigidity.
(3) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

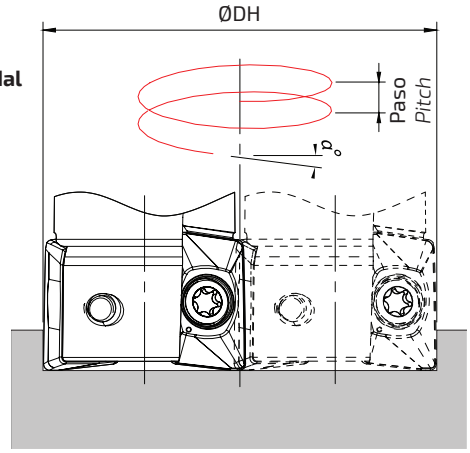
It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

Aceleración e interpolación helicoidal
Ramping and hellal interpolation

Aceleración
Ramping



Interpolación helicoidal
Hellal interpolation



Agujero ciego
Base plana
Blind hole
Flat bottom

Ødi = ØDH - ØDc

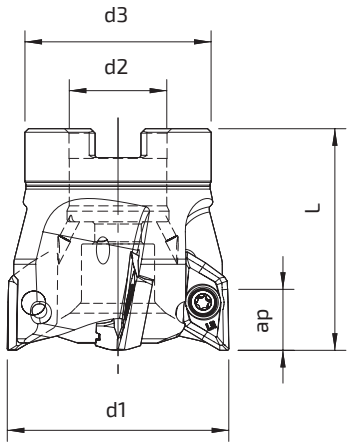
ØDc	Aceleración *Ramping*			Interpolación helicoidal *Hellal interpolation*		
				Diámetro para agujero ciego, cara inferior plana (1) *Diameter for blind hole, flat bottom face (1)*		Max Pitch/Rev.
	Max Ramp a°	Max ap	Min Lr	ØDHmin	ØDHmax	
25	3,00	14,5	276,7	46,1 -	- 48,4	3,5 3,9
32	2,00	14,5	415,2	60,1 -	- 62,4	3,1 3,3
40	1,50	14,5	553,7	76,1 -	- 78,4	3,0 3,2
50	1,10	14,5	755,2	96,1 -	- 98,4	2,8 2,9
63	0,85	14,5	977,3	122,1 -	- 124,4	2,7 2,7
80	0,64	14,5	1.298,1	156,1 -	- 158,4	2,6 2,7
100	0,50	14,5	1.661,5	196,1 -	- 198,4	2,6 2,7
125	0,38	14,5	2.186,3	246,1 -	- 248,4	2,5 2,6

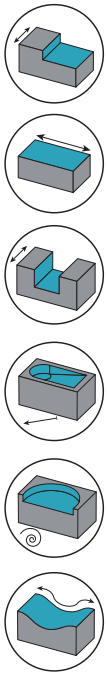
(1) Con inserción LP de radio 0,8 mm.
Durante la interpolación helicoidal no exceda del paso máximo.
Para el cálculo de ØDHmin y ØDHmax con plaquitas de alta frecuencia u otros radios de plaquitas diferentes, utille la siguiente ecuación:
- Diámetro mínimo: ØDHmin = 2x(d4- (radio de la esquina R + anchura F de la rasqueta)
- Diámetro máximo: ØDHmax = 2 x (d4 - radio de la esquina R)

Using LP insert with radius 0,8 mm.
During hellal interpolation do not exceed maximum pitch.
When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the below equation:
- Minium Diameter: ØDHmin = 2x(d4- (R corner radius + F width of edge wiper)
- Maximum Diameter: ØDHmax = 2 x (d4 - R corner radius)

ALP690 XDGX

Línea de fresado
Milling line





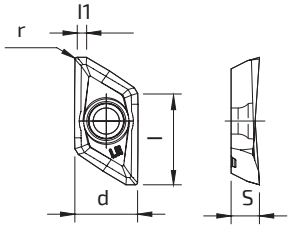
Montaje en el perno
Arbor mounting

κ_r=90° γ_p= +11°

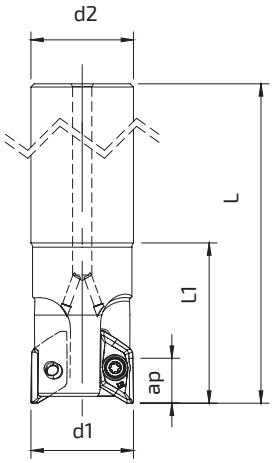
Ref.		d1	d2	d3	L	Ap max (mm)	Plaquita *Insert*	€
ALP690-040A03R-32	3	40	16	32	50	14	XD15/0,4~3,2	**418,60**
ALP690-050A04R-32	4	50	22	42	50	14	XD15/0,4~3,2	**478,00**
ALP690-063A05R-32	5	63	22	48	50	14	XD15/0,4~3,2	**538,00**
ALP690-080A05R-32	5	80	27	60	50	14	XD15/0,4~3,2	**567,75**
ALP690-100A06R-32	6	100	32	73	63	14	XD15/0,4~3,2	**657,75**
ALP690-040A03R-50	3	40	16	32	50	14	XD15/4,0~5,0	**418,60**
ALP690-050A04R-50	4	50	22	42	50	14	XD15/4,0~5,0	**478,00**
ALP690-063A05R-50	5	63	22	48	50	14	XD15/4,0~5,0	**538,00**
ALP690-080A05R-50	5	80	27	60	50	14	XD15/4,0~5,0	**567,75**
ALP690-100A06R-50	6	100	32	73	63	14	XD15/4,0~5,0	**657,75**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref. P040080**		**6,9**
Llave Torx *Key (Torx)*	**T-15**		**16,0**

Plaquitas
Inserts



Ref.	d	S	l	r	l1	€
XDGX15M504AL H10T	11,2	5	16,00	0,4	1,5	**16,75**
XDGX15M508AL H10T	11,2	5	16,00	0,8	1,1	**16,75**
XDGX15M512AL H10T	11,2	5	16,00	1,2	0,7	**16,75**
XDGX15M516AL H10T	11,2	5	16,00	1,6	0,4	**16,75**
XDGX15M520AL H10T	11,2	5	16,00	2,0	0,2	**16,75**
XDGX15M530AL H10T	11,2	5	16,00	3,0	0,6	**16,75**
XDGX15M532AL H10T	11,2	5	16,00	3,2	0,6	**16,75**
XDGX15M540AL H10T	11,2	5	16,00	4,0	0,5	**16,75**
XDGX15M550AL H10T	11,2	5	16,00	5,0	0,4	**16,75**



Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +6º~+11º

Ref.		d1	d2	L	L1	rpm max	Ap max (mm)	Plaquita *Insert*	€
ALM690-020A01R-32	1	20	20	150	60	40.000	15	XD15/0,4~3,2	**299,15**
ALM690-025A02R-32	2	25	25	180	90	38.000	15	XD15/0,4~3,2	**328,90**
ALM690-032A02R-32	2	32	32	200	120	33.000	15	XD15/0,4~3,2	**358,60**
ALM690-040A03R-32	3	40	40	250	65	29.000	15	XD15/0,4~3,2	**478,00**
ALM690-020A01R-50	1	20	20	150	60	40.000	15	XD15/4,0~5,0	**299,15**
ALM690-025A02R-50	2	25	25	180	90	38.000	15	XD15/4,0~5,0	**328,90**
ALM690-032A02R-50	2	32	32	200	120	33.000	15	XD15/4,0~5,0	**358,60**
ALM690-040A03R-50	3	40	40	250	65	29.000	15	XD15/4,0~5,0	**478,00**

Condiciones de corte para escuadrado
Cutting data for shouldering

ISO	Material	HB (Brinell)	Vc (m/min)	Profundidad de cote Width of cut ae (mm)	Profundidad de cote Depth of cut ap (mm)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	≤25 d4	≤5,0	0,35 - 0,40
					5,0-10,0	0,30-0,35
					10,0-15,0	0,25-0,30
				< 50% d4	≤5,0	0,35-0,40
					5,0-10,0	0,30-0,35
					10,0-15,0	0,25-0,30
				≤75% d4	≤5,0	0,30-0,35
					5,0-10,0	0,25-0,30
					10,0-15,0	0,20-0,25

Condiciones de corte para ranurado
Cutting data for slotting

ISO	Material	HB (Brinell)	Vc (m/min)	Profundidad de cote Width of cut ae (mm)	Profundidad de cote Depth of cut ap (mm)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	100% d4	≤5,0	0,25 - 0,35
					5,0-10,0	0,20-0,30
					10,0-15,0	0,15-0,25

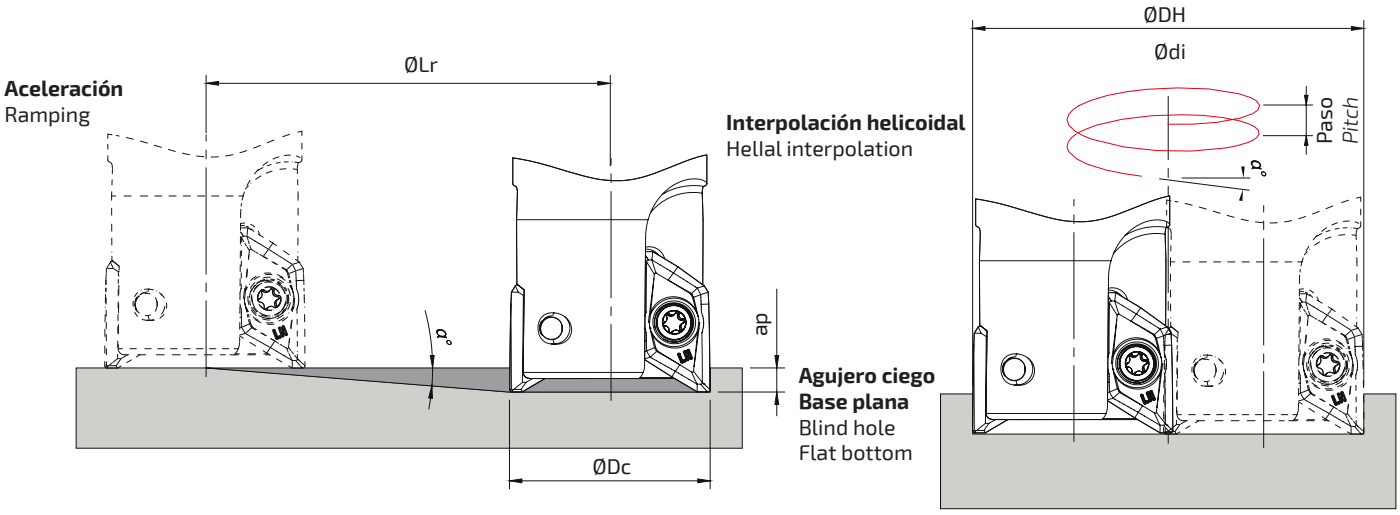
(1) Condiciones de corte ae/d1=70%.
Cutting conditions ae/d1=70%.

(2) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

(3) Utilizar el suministro interno de refrigerante.
Use internal coolant supply.

Aceleración e interpolación helicoidal
Ramping and hellal interpolation



Ødi = ØDH - ØDc

ØDc	Aceleración *Ramping*			Interpolación helicoidal *Hellal interpolation*		
				Diámetro para agujero ciego, cara inferior plana (1) *Diameter for blind hole, flat bottom face (1)*		Max Pitch/Rev.
	Max Ramp aº	Max ap	Min Lr	ØDHmin	ØDHmax	
20	23,0	15,0	35,3	36,2 -	- 38,4	21,6 24,5
25	21,0	15,0	39,1	46,2 -	- 48,4	25,6 28,2
32	15,0	15,0	56,0	60,2 -	- 62,4	23,7 25,6
40	10,0	15,0	85,1	76,2 -	- 78,4	20,0 21,3
50	8,0	15,0	106,7	96,2 -	- 98,4	20,4 21,4
63	6,0	15,0	142,7	122,2 -	- 124,4	19,5 20,3
80	4,0	15,0	214,5	156,2 -	- 158,4	16,7 17,2
100	2,5	15,0	343,6	196,2 -	- 198,4	13,2 13,5
20	20,0	13,5	37,1	36,2 -	- 38,4	18,5 21,0
25	18,5	13,5	40,3	46,2 -	- 48,4	22,3 24,6
32	13,5	13,5	56,2	60,2 -	- 62,4	21,3 22,9
40	8,5	13,5	90,3	76,2 -	- 78,4	17,0 18,0
50	7,0	13,5	109,9	96,2 -	- 98,4	17,8 18,7
63	5,5	13,5	140,2	122,2 -	- 124,4	17,9 18,6
80	3,5	13,5	220,7	156,2 -	- 158,4	14,6 15,1
100	2,5	13,5	309,2	196,2 -	- 198,4	13,2 13,5

(1) Con inserción LP de radio 0,8 mm.
Durante la interpolación helicoidal no exceda el paso máximo.
Para el cálculo de ØDHmin y ØDHmax con plaquitas de alta frecuencia u otros radios de plaquitas diferentes, utille la siguiente ecuación:
- Diámetro mínimo: ØDHmin = 2x(d4- (radio de la esquina R + anchura F de la rasqueta)
- Diámetro máximo: ØDHmax = 2 x (d4 - radio de la esquina R)
Using LP insert with radius 0,8 mm.
During hellal interpolation do not exceed maximum pitch.
When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the below equation:
- Minium Diameter: ØDHmin = 2x(d4- (R corner radius + F width of edge wiper)
- Maximum Diameter: ØDHmax = 2 x (d4 - R corner radius)

Guía de funcionamiento
Operational guide

- Las revoluciones máximas permitidas se muestran en la Tabla 1. Asegúrese de que la cortadora funciona por debajo de las revoluciones máximas permitidas.
Las revoluciones máximas permitidas por motivos de seguridad se determinan de acuerdo con la norma ISO 15641 (Fresas para mecanizado de alta velocidad - Requisitos de seguridad).
- The maximum allowable revolutions are shown in Table 1. Ensure that the cutter operates under the maximum allowable revolutions.
The maximum allowable revolutions for safety purposes are determined in accordance with ISO 15641 (Milling Cutters for high speed machining–Safety requirements).

1. Revoluciones máximas permitidas
1. Maximum allowable revolutions

d4	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
RPM (min^{-1})	40.000	38.000	33.000	29.000	24.000	21.000	19.000	16.000

- Incluso cuando se opera bajo la velocidad máxima permitida del husillo, si la velocidad del husillo es igual o mayor que los valores que se muestran en la Tabla 2., se recomienda que la calidad del equilibrio (con el eje o plato) sea conforme a ISO 1940.
- Even when operating under the maximum allowable spindle speed, if the spindle speed is equal or higher than the values shown in Table 2., it is recommended that the balance quality (with the arbor or chuck) according ISO 1940.

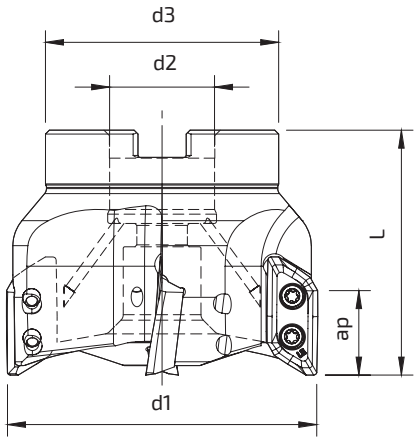
2. Revoluciones máximas cuando no se ha logrado el equilibrio con el eje o plato
2. Maximum revolutions when balancing with the arbor or chuck has not been achieved

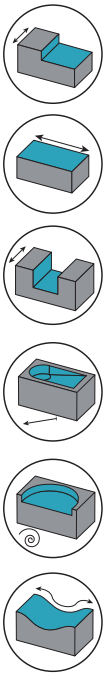
d4	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
RPM (min^{-1})	15.000	12.000	9.500	8.500	7.600	6.800	6.000	5.400

- Cuando ajuste la velocidad del husillo, tenga en cuenta las revoluciones máximas permitidas del eje o plato.
- Use el perno de ajuste especiflado cuando use el tipo de árbol con suministro interno de refrigerante.
- When setting the spindle speed, take into consideration the maximum allowable revolutions of arbor or chuck.
- Use the specified set bolt when using the arbor type with internal coolant supply.

ALP790
ALM790

Línea de fresado
Milling line



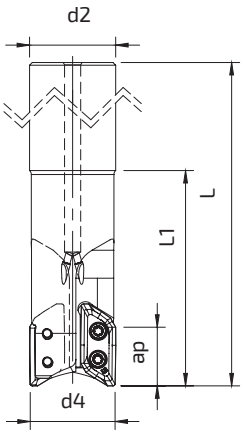


Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +7º

Ref.		d1	d2	d3	L	rpm max	Ap max (mm)	Plaquita *Insert*	€
ALP790-050A03R-32	3	50	22	42	50	30.000	21,5	XD22/0,8~3,2	**478,00**
ALP790-063A03R-32	3	63	22	42	50	25.000	21,5	XD22/0,8~3,2	**538,00**
ALP790-080A04R-32	4	80	27	60	63	23.000	21,5	XD22/0,8~3,2	**597,45**
ALP790-100A05R-32	5	100	32	70	63	19.000	21,5	XD22/0,8~3,2	**687,45**
ALP790-125A06R-32	6	125	40	100	63	16.000	21,5	XD22/0,8~3,2	**777,15**
ALP790-050A03R-50	3	50	22	42	50	30.000	21,0	XD22/4,0~5,0	**478,00**
ALP790-063A03R-50	3	63	22	42	50	25.000	21,0	XD22/4,0~5,0	**538,00**
ALP790-080A04R-50	4	80	27	60	63	23.000	21,0	XD22/4,0~5,0	**597,45**
ALP790-100A05R-50	5	100	32	70	63	19.000	21,0	XD22/4,0~5,0	**687,45**
ALP790-125A06R-50	6	125	40	100	63	16.000	21,0	XD22/4,0~5,0	**777,15**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**Ref. 040120**	**6,00**
Llave Torx *Key (Torx)*	**T-15**	**16,00**

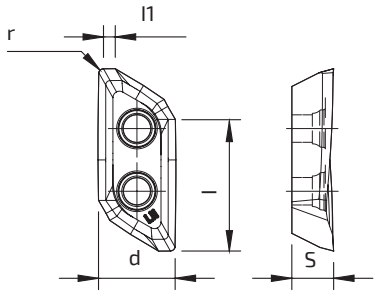


Montaje en el perno
Arbor mounting

κ_r=90º γ_p= +6º

Ref.		d1	d2	L	L1	rpm max	Ap max (mm)	Plaquita *Insert*	€
ALM790-032A02R-32	2	32	32	170	80	41.000	21,5	XD22/0,8~3,2	**328,90**
ALM790-040A02R-32	2	40	40	170	80	36.000	21,5	XD22/0,8~3,2	**418,60**
ALM790-032A02R-50	2	32	32	170	80	41.000	21,0	XD22/4,0~5,0	**328,90**
ALM790-040A02R-50	2	40	40	170	80	36.000	21,0	XD22/4,0~5,0	**418,60**

Plaquitas
Inserts



Ref.	d	S	l	r	l1	€
XDGX22R708AL H10T	13,00	7,00	22,00	0,80	2,00	**24,25**
XDGX22R716AL H10T	13,00	7,00	22,00	1,60	1,20	**24,25**
XDGX22R720AL H10T	13,00	7,00	22,00	2,00	0,80	**24,25**
XDGX22R732AL H10T	13,00	7,00	22,00	3,20	0,60	**24,25**
XDGX22R740AL H10T	13,00	7,00	22,00	4,00	0,90	**24,25**
XDGX22R750AL H10T	13,00	7,00	22,00	5,00	0,40	**24,25**

Condiciones de corte para escuadrado
Cutting data for shouldering

ISO	Material	HB (Brinell)	Vc (m/min)	Profundidad de cote Width of cut ae (mm)	Profundidad de cote Depth of cut ap (mm)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	≤25 d4	≤5,0	0,35 - 0,40
					5,0-10,0	0,30-0,35
					10,0-15,0	0,25-0,30
					15,0-20,0	0,20-0,25
				< 50% d4	≤5,0	0,35-0,40
					5,0-10,0	0,30-0,35
					10,0-15,0	0,25-0,30
					15,0-20,0	0,20-0,25
				≤75% d4	≤5,0	0,30-0,35
					5,0-10,0	0,25-0,30
					10,0-15,0	0,20-0,25
					15,0-20,0	0,15-0,20

Condiciones de corte para ranurado
Cutting data for slotting

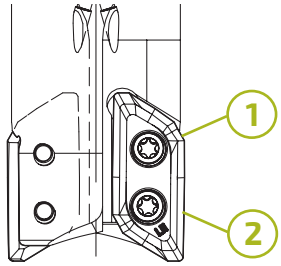
ISO	Material	HB (Brinell)	Vc (m/min)	Profundidad de cote Width of cut ae (mm)	Profundidad de cote Depth of cut ap (mm)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30 - 130	350 - 1.400	100% d4	≤5,0	0,25 - 0,35
					5,0-10,0	0,20-0,30
					10,0-15,0	0,15-0,25
					15,0-20,0	0,10-0,20

(1) Condiciones de corte ae/d1=70%.
Cutting conditions ae/d1=70%.
(2) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

(3) Utilizar el suministro interno de refrigerante.
Use internal coolant supply.

Guía de funcionamiento
Operating guide



- Utille únlamente los insertos y las piezas suministradas con esta herramienta. El uso de los tornillos de sujeción correctos es especialmente importante para garantizar la seguridad general de la herramienta. No utille tornillos de apriete dañados o desgastados.
- Al apretar los tornillos de a el orden de la imagen. El valor de par recomendado es de 3,5 Nm.
- Las revoluciones máximas permitidas se muestran en la Tabla 1. Asegúrese de que la cortadora funciona por debajo de las revoluciones máximas permitidas.
Las revoluciones máximas permitidas por motivos de seguridad se determinan de acuerdo con la norma ISO 15641 (Fresas para mecanizado de alta velocidad - Requisitos de seguridad).

- Only use the inserts and parts provided with this tool. Use of the correct insert clamp screws is especially important to ensure overall tool safety. Do not use damaged or worn clamp screws.
- When tightening the clamp screws, follow the order in plture. The recommended torque value is 3.5Nm.
- The maximum allowable revolutions are shown in Table 1. Ensure that the cutter operates under the maximum allowable revolutions.
The maximum allowable revolutions for safety purposes are determined in accordance with ISO 15641 (Milling Cutters for high speed machining–Safety requirements).

1. Revoluciones máximas permitidas
1. Maximum allowable revolutions

d4	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125
RPM (min^{-1})	41.000	36.000	30.000	25.000	23.000	19.000	16.000

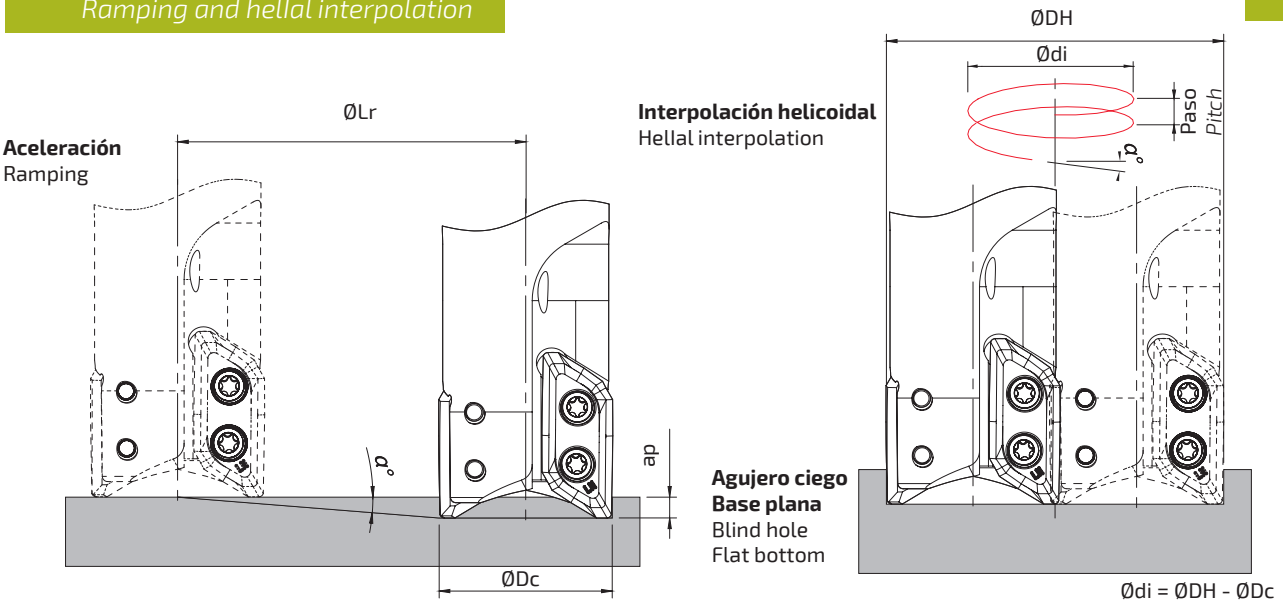
- Incluso cuando se opera bajo la velocidad máxima permitida del husillo, si la velocidad del husillo es igual o mayor que los valores que se muestran en la Tabla 2., se recomienda que la calidad del equilibrio (con el eje o plato) sea conforme a ISO 1940.
- Even when operating under the maximum allowable spindle speed, if the spindle speed is equal or higher than the values shown in Table 2., it is recommended that the balance quality (with the arbor or chuck) according ISO 1940.

2. Revoluciones máximas cuando no se ha logrado el equilibrio con el eje o plato
2. Maximum revolutions when balancing with the arbor or chuck has not been achieved

d4	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125
RPM (min^{-1})	9.500	7.600	6.000	4.800	3.800	3.000	2.400

- Cuando ajuste la velocidad del husillo, tenga en cuenta las revoluciones máximas permitidas del eje o plato.
- Use el perno de ajuste especiflado cuando use el tipo de árbol con suministro interno de refrigerante.
- When setting the spindle speed, take into consideration the maximum allowable revolutions of arbor or chuck.
- Use the specified set bolt when using the arbor type with internal coolant supply.

Aceleración e interpolación helicoidal
Ramping and hellal interpolation



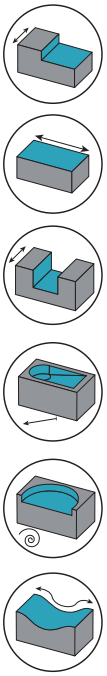
ØDc	Aceleración *Ramping*			Interpolación helicoidal *Hellal interpolation*		
				Diámetro para agujero ciego, cara inferior plana (1) *Diameter for blind hole, flat bottom face (1)*		Max Pitch/Rev.
	Max Ramp aº	Max ap	Min Lr	ØDHmin	ØDHmax	
32	19	21,5	62,4	60,0 -	- 62,4	30,3 32,9
40	13	21,5	93,1	76,0 -	- 78,4	26,1 27,8
50	9	21,5	135,7	96,0 -	- 98,4	22,9 24,1
63	7	21,5	175,1	122,0 -	- 124,4	22,7 23,7
80	5	21,5	245,7	156,0 -	- 158,4	20,9 21,5
100	4	21,5	307,5	196,0 -	- 198,4	21,1 21,6
125	3	21,5	410,2	246,0 -	- 248,4	19,9 20,3
32	18	21,0	64,6	60,0 -	- 62,4	28,6 31,0
40	11	21,0	108,0	76,0 -	- 78,4	22,0 23,4
50	8	21,0	149,4	96,0 -	- 98,4	20,3 21,4
63	6	21,0	199,8	122,0 -	- 124,4	19,5 20,3
80	4	21,0	300,3	156,0 -	- 158,4	16,7 17,2
100	3	21,0	400,7	196,0 -	- 198,4	15,8 16,2
125	2	21,0	601,4	246,0 -	- 248,4	13,3 13,5

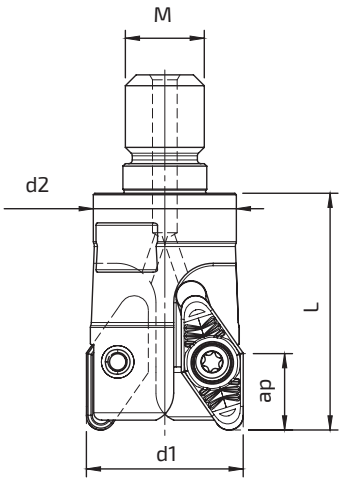
(1) Con inserción LP de radio 0,8 mm.
Durante la interpolación helicoidal no exceda del paso máximo.
Para el cálculo de ØDHmin y ØDHmax con plaquitas de alta frecuencia u otros radios de plaquitas diferentes, utille la siguiente ecuación:
- Diámetro mínimo: ØDHmin = 2x(d4- (radio de la esquina R + anchura F de la rasqueta)
- Diámetro máximo: ØDHmax = 2 x (d4 - radio de la esquina R)

Using LP insert with radius 0,8 mm.
During hellal interpolation do not exceed maximum pitch.
When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the below equation:
- Minium Diameter: ØDHmin = 2x(d4- (R corner radius + F width of edge wiper)
- Maximum Diameter: ØDHmax = 2 x (d4 - R corner radius)

ALR890 VCGX

Línea de fresado
Milling line





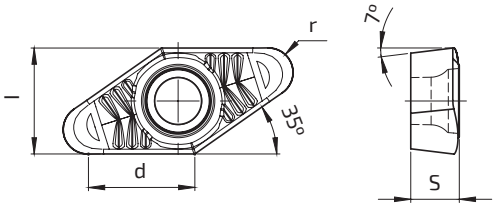
Acoplamiento de rosca
Threaded Coupling

κ_r=90º γ_p= 0º

Ref.		d1	d2	M	L	Ap max (mm)	Plaquita *Insert*	€
ALR890-032A02R	2	32	42	22	50	21,5	0,8~3,2	**340,00**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref. 045100**		**7,35**
Llave Torx *Key (Torx)*	**T-20**		**15,55**

Plaquitas
Inserts



Ref.	d	S	I	R	I1	€
VCGX220530AL H10T	12,70	5,60	12,700	3,00	-	**25,10**

Condiciones de corte
Cutting data

ISO	Material	Vc (m/min)	Fz (mm/t)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	350 - 1.400	0,20 - 0,50

d4	Ø32
RPM (min^{-1})	9.500

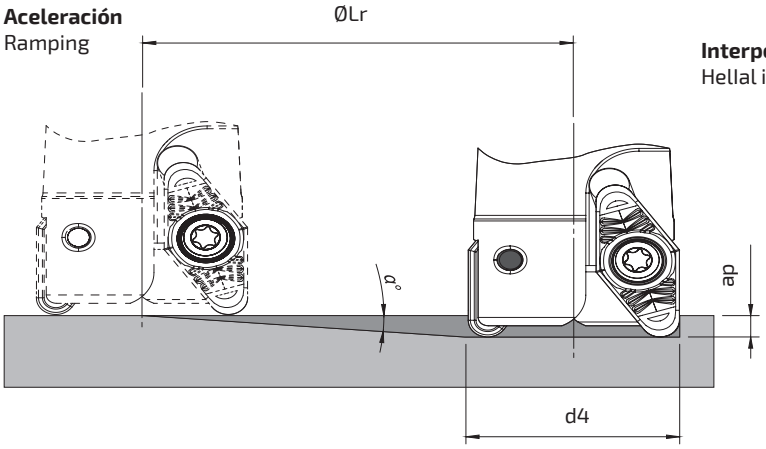
(1) Condiciones de corte ae/d1=70%.
Cutting conditions ae/d1=70%.
(2) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la apllación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When appllation has poor clamping rigidity or when using a low rigidity machine.*

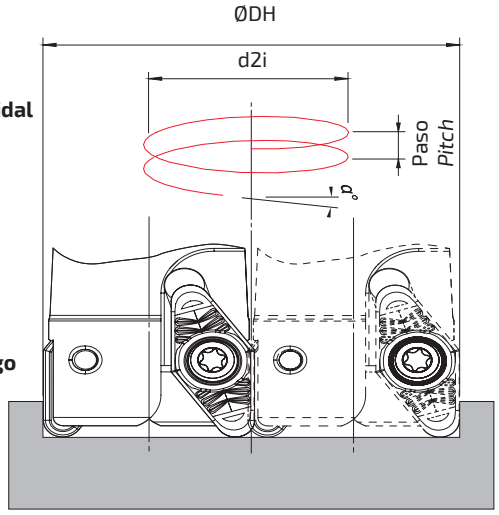
(3) Utilizar el suministro interno de refrigerante.
Use internal coolant supply.

Aceleración e interpolación helicoidal
Ramping and hellal interpolation

Aceleración
Ramping



Interpolación helicoidal
Hellal interpolation



Agujero ciego
Base plana
Blind hole
Flat bottom

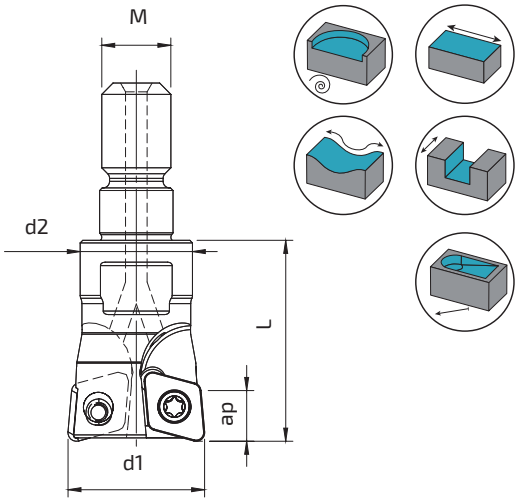
Ødi = ØDH - ØDc

ØDc	Aceleración *Ramping*			Interpolación helicoidal *Hellal interpolation*		
				Diámetro para agujero ciego, cara inferior plana (1) *Diameter for blind hole, flat bottom face (1)*		Max Pitch/Rev.
	Max Ramp aº	Max ap	Min Lr	ØDHmin	ØDHmax	
35	6,5	15,0	25,4	53,0 -	- 62,0	7,0 11,0

Durante la interpolación helicoidal no exceda el paso máximo.
During hellal interpolation do not exceed max Pitch.

XD04
XD10

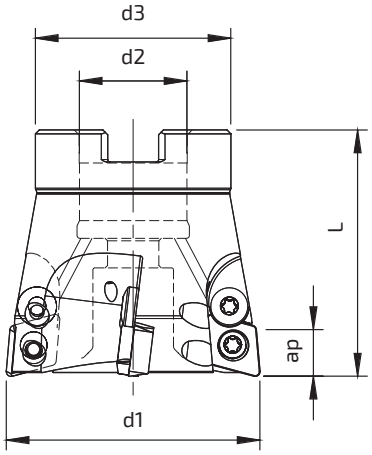
Línea de fresado
Milling line



Acoplamiento de rosca
Threaded Coupling

κ_r=90º γ_p= +7º~(+9*)

Ref.		d1	d2	M	L	Ap max (mm)	Plaquita *Insert*	€
XD04-010R02R	2	10	9,8	M6	20	0,8	XD04	**164,00**
XD04-012R02R	2	12	9,8	M6	20	0,8	XD04	**164,00**
XD04-016R02R	2	16	13	M8	23	1,0	XD06	**164,00**
XD04-020R03R	3	20	18	M10	28	1,0	XD06	**170,30**
XD04-025R03R	3	25	21	M12	30	1,0	XD06	**183,75**
XD04-025R04R	4	25	21	M12	30	1,0	XD06	**183,75**
XD04-025R02R	2	25	21	M12	35	1,0	XD010	**164,00**
XD04-035R03R	3	35	29	M16	43	1,0	XD010	**196,60**
XD04-042R04R	4	42	29	M16	43	1,0	XD010	**229,15**



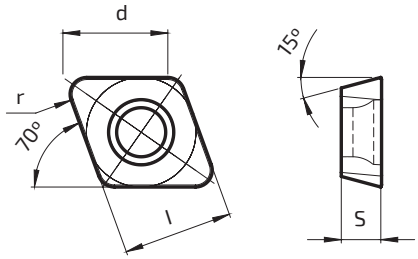
Montaje en el perno
Arbor Mounting

κ_r=90º γ_p= +7º

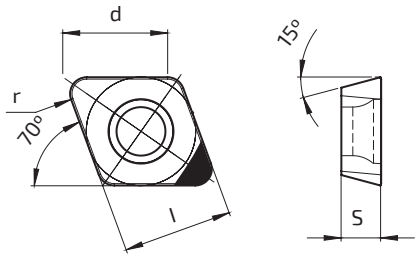
Ref.		d1	d2	d3	L	Ap max (mm)	Plaquita *Insert*	€
XD10-052A05R	5	52	22	40	50	1,0	XD10	**307,45**
XD10-066A06R	6	66	27	48	50	1,0	XD10	**366,30**
XD10-080A07R	7	80	27	60	50	1,0	XD10	**457,15**

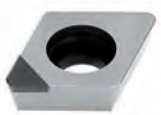
Ø		€		€
10-12	**Ref. P018040**	**12,55**	**T-6**	**12,35**
16-25	**Ref. P025050**	**7,00**	**T-8**	**6,00**
25-42	**Ref. P035080**	**7,45**	**T-15**	**7,35**
52-80	**Ref. P018040**	**12,55**	**T-15**	**12,35**

Plaquitas
Inserts



Ref.	l	S	d	r	€
XDHW040105AL H10T	4,00	1,59	4,00	0,50	**35,10**
XDHW040110AL H10T	4,00	1,59	4,00	1,00	**35,10**
XDHW060210AL H10T	6,50	2,38	6,20	1,00	**38,10**
XDHW10T310AL H10T	10,00	3,97	9,90	1,00	**46,45**





Ref.	l	S	d	r	€
XDHW040110AL D10	4,00	1,59	4,00	1,00	**76,35**
XDHW060210AL D10	6,50	2,38	6,20	1,00	**76,35**
XDHW10T310AL D10	10,00	3,97	9,90	1,00	**76,35**

Condiciones de corte
Cutting data

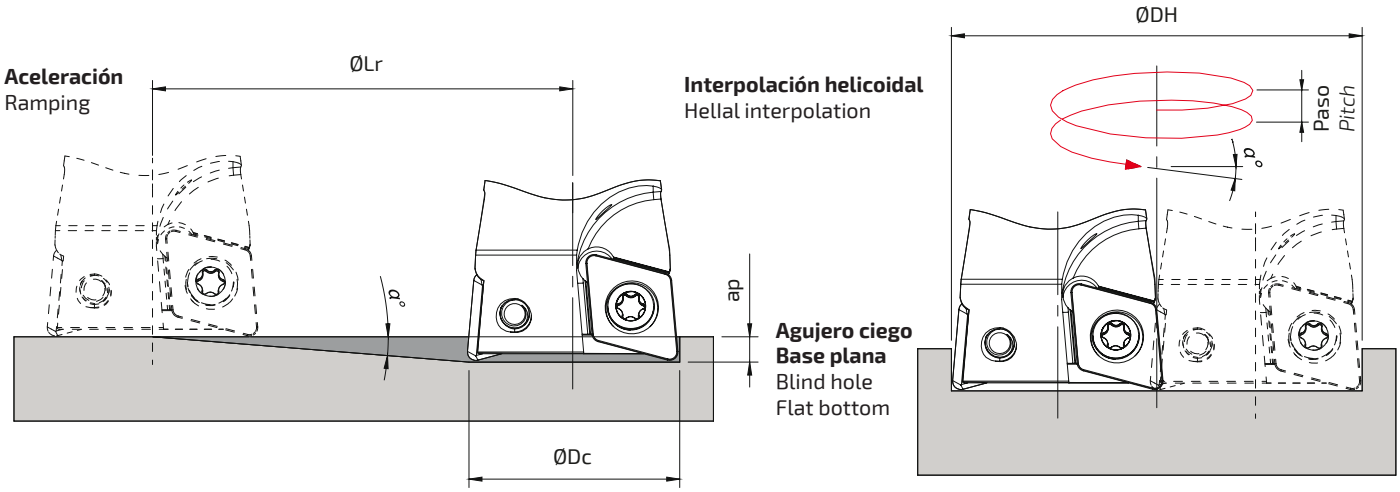
ISO	Material	HB (Brinell)	Vc (m/min)
N	Aluminio y no ferrosos *Aluminium and Non Ferrous*	30-130	300 - 1.000

Plaquita *Insert*	Fz (mm/t)		ap Rec.
	Desbaste	Acabado	
XD04	0,10-0,20	0,10-0,15	0,10-0,50
XD06	0,15-0,30	0,10-0,25	0,20-0,80
Xd10	0,15-0,35	0,10-0,30	0,20-0,80

(1) Las condiciones de corte deben ajustarse de acuerdo conla máquina y la rigidez del trabajo.
Cutting conditions should be ajusted according to the machine and work rigidity
(2) Si se produce chisporroteo, reduzca ap y Vc en un 30% y mantenga el mismo fz por minuto.
If chattering occurs, reduce ap and Vc by 30% and keep the same fz per thooth.

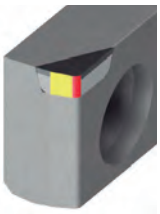
XDHW

Aceleración e interpolación helicoidal
Ramping and hellal interpolation



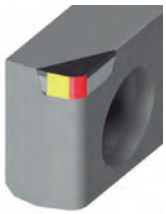
Ødi = ØDH - ØDc

Plaquita *Insert*	ØDc	Aceleración *Ramping*			Interpolación helicoidal *Hellal interpolation*		Max Pitch/Rev.
					Diámetro para agujero ciego, cara inferior plana (1) *Diameter for blind hole, flat bottom face (1)*		
		Max Ramp aº	Max ap	Min Lr	ØDHmin	ØDHmax	
XDHW04	10	7,3	0,8	6,2	18,0 -	- 20,0	3,2 4,0
XDHW04	12	5,3	0,8	8,6	22,0 -	- 24,0	2,9 3,5
XDHW06	16	8,0	1,0	7,1	30,0 -	- 32,0	6,2 7,1
XDHW06	20	5,7	1,0	10,0	38,0 -	- 40,0	5,6 6,3
XDHW06	25	4,0	1,0	14,3	48,0 -	- 50,0	5,1 5,5
XDHW10	25	8,7	1,0	6,5	48,0 -	- 50,0	11,1 12,0
XDHW10	35	5,2	1,0	11,0	68,0 -	- 70,0	9,4 10,0
XDHW10	42	4	1,0	14,3	82,0 -	- 84,0	8,8 9,2
XDHW10	52	3	1,0	19,1	102,0 -	- 104,0	8,2 8,6
XDHW10	66	2,3	1,0	24,9	130,0 -	- 132,0	8,1 8,3
XDHW10	80	1,8	1,0	31,8	158,0 -	- 160,0	7,7 7,9

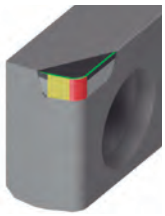


XNHW 120504-015045 d10

XNHW 120504-000080 d10

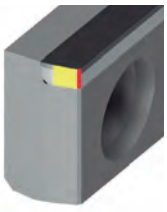


XNHW 120508-015045 d10

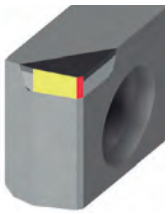


XNHW 120508-015045 d10

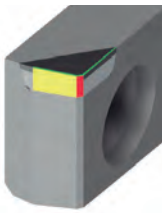
XNHW 120508-000080 d10



XNHW 1205-020120 d10



XNHW 1205-030045 d10



XNHW 1205-030045 d10

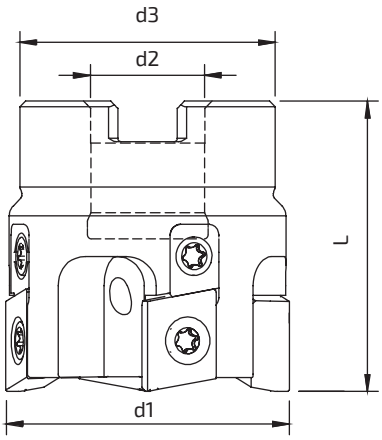
Tipo de corte ( )
Cutting edge Type (radius, chamfer)

Filo de corte del rascador
Wipper cutting edge

Preparación de bordes
Edge Preparation (F, T)

PCD090

Línea de fresado
Milling line



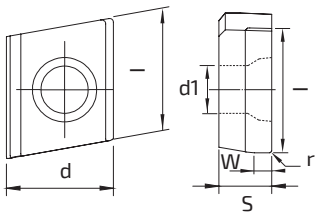
Acoplamiento de rosca
Threaded Coupling

κ_r=90º γ_p= 7º

Ref.		d1	d2	d3	L	N max (mm)	Plaquita *Insert*	€
PCD090 040A04R	4	40	16	36	40	32.000	XN12	**639,45**
PCD090 050A04R	4	50	22	46	40	32.000	XN12	**651,75**
PCD090 050A05R	5	50	22	46	40	32.000	XN12	**735,15**
PCD090 063A04R	4	63	22	49	40	29.000	XN12	**675,75**
PCD090 063A07R	7	63	22	49	40	29.000	XN12	**910,00**
PCD090 080A05R	5	80	27	60	50	26.000	XN12	**953,75**
PCD090 080A09R	9	80	27	60	50	26.000	XN12	**1.058,00**
PCD090 100A06R	6	100	32	70	50	24.000	XN12	**1.075,45**
PCD090 100A12R	12	100	32	70	50	24.000	XN12	**1.541,75**
PCD090 125A08R	8	125	40	72	63	22.000	XN12	**1.275,45**
PCD090 125A14R	14	125	40	72	63	22.000	XN12	**1.743,45**
PCD090 160A10R	10	160	40	72	63	18.000	XN12	**1.587,15**
PCD090 160A16R	16	160	40	118	63	18.000	XN12	**4.575,45**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref. P040110**		**6,00**
Llave Torx *Key (Torx)*	**T-15**		**16,00**

Plaquitas
Inserts

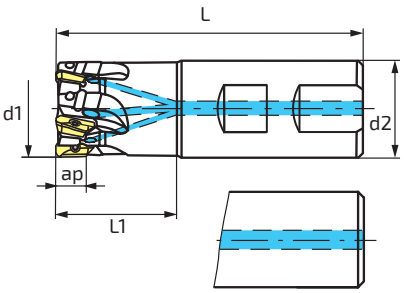


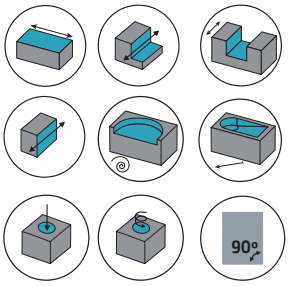
Ref.	l	S	d	d1	r	W	€
XNHW 120504-015045 D10	12,25	5,4	4,5	4,8	0,4	1,5	**144,90**
XNHW 120504-000080 D10	12,25	5,4	8,0	4,8	0,4	-	**144,90**
XNHW 120508-015045 D10	12,25	5,4	4,5	4,8	0,8	1,5	**144,90**
XNHW 120508-000080 D10	12,25	5,4	8,0	4,8	0,8	-	**144,90**
XNHW 1205-020120 D10	12,25	5,4	12	4,8	-	2,0	**155,10**
XNHW 1205-030045 D10	12,25	5,4	4,5	4,8	-	3,0	**144,90**

Condiciones de corte
Cutting data

ISO	Material		HB (Brinell)	Vc (m/min)	Feed fz (mm/t)
	Material de la pieza de trabajo *Workpiece material*	Tipo de tratamiento/aleación *Type of treatment/alloy*			
N	Aleaciones de aluminio forjado *Aluminium wrought alloys*		80	300 - 4.000	0,05 - 0,40
			90	300 - 1.500	
	Aleaciones de aluminio fundido *Aluminium cast alloys*	< 12% Si	130	300 - 5.000	
		< 12% Si	90	300 - 3.000	
		> 12% Si	100	300 - 1.000	
		Latón, bronce rojo *Brass, red bronze*	100	100 - 700	
		Bronce *Bronze*	-	100 - 1.500	
		Cobre sin plomo y cobre electrolítlo *Lead-free copper and electrolytl copper*	-	300 - 3.000	
	Materiales no metállos *Non-metalll materials*	Plástlos termoendurecibles *Thermosetting plastls*	-	80 - 300	
		Plástlos reforzados con *Fibre-reinforced plastls*	200-320	80 - 300	
		Caucho endurecido *Hard rubber*		80 - 300	

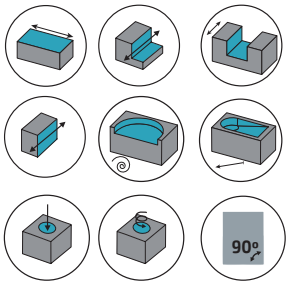
Línea de fresado
Milling line

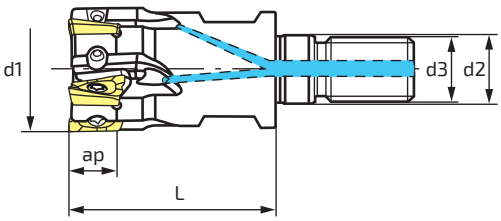




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
XD11-012M01R	XD..11..	12	16	75	20	1	10	**199,80**
XD11-016M02R	XD..11..	16	15	165	32	2	10	**224,00**
XD11-016M02RM	XD..11..	16	16	75	25	2	10	**224,00**
XD11-016M02RL	XD..11..	16	16	165	32	2	10	**224,00**
XD11-020M02R	XD..11..	20	19	200	40	2	10	**236,10**
XD11-020M02RM	XD..11..	20	20	77	25	2	10	**236,10**
XD11-020M02RL	XD..11..	20	20	200	40	2	10	**236,10**
XD11-020M03RM	XD..11..	20	20	77	25	3	10	**254,30**
XD11-020M03RL	XD..11..	20	20	165	32	3	10	**254,30**
XD11-025M02R	XD..11..	25	25	225	50	2	10	**248,40**
XD11-025M03R	XD..11..	25	24	225	50	3	10	**266,50**
XD11-025M03RM	XD..11..	25	25	90	32	3	10	**266,50**
XD11-025M03RL	XD..11..	25	25	225	50	3	10	**266,50**
XD11-025M04RM	XD..11..	25	25	90	32	4	10	**284,60**
XD11-025M04RL	XD..11..	25	25	165	40	4	10	**284,60**
XD11-032M04R	XD..11..	32	25	102	40	4	10	**296,70**
XD11-032M04RM	XD..11..	32	32	102	40	4	10	**296,70**
XD11-032M04RL	XD..11..	32	32	250	64	4	10	**296,70**
XD11-032M05R	XD..11..	32	32	102	40	5	10	**315,00**
XD11-032M05RL	XD..11..	32	32	165	50	5	10	**315,00**
XD11-032M05RM	XD..11..	32	32	102	40	5	10	**315,00**
XD11-040M06RL	XD..11..	40	40	122	50	6	10	**345,10**

Tornillo de inserción *Insert screw*	€
11368132	**4,00**
11114238	**4,00**
11114242	**4,00**



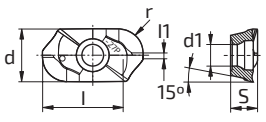


Tornillo de inserción *Insert screw*	€
11114238	5,35
11114242	5,35

Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
XD11-016R04R	XD..11..	16	8,5	8	27	2	10	224,00
XD11-020R04R	XD..11..	20	10,5	10	33	2	10	236,10
XD11-020R03R	XD..11..	20	10,5	10	33	3	10	254,30
XD11-025R03R	XD..11..	25	12,5	12	35	3	10	266,40
XD11-025R04R	XD..11..	25	12,5	12	35	4	10	284,60
XD11-032R04R	XD..11..	32	17,0	16	35	4	10	296,70
XD11-032R05R	XD..11..	32	17,0	16	35	5	10	315,00
XD11-040R05R	XD..11..	40	17,0	16	35	6	10	345,10

Plaquitas
Inserts

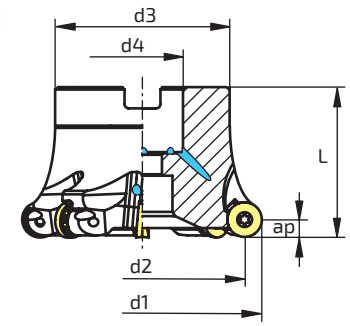
P	
M	
K	●
N	●
S	
H	

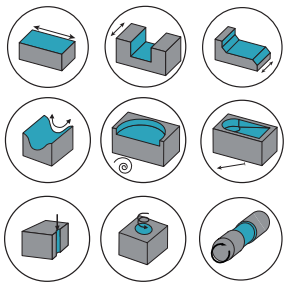


Ref.	H10T	Medidas *Dimensions* d	l	S	l1	r	d1	€
XDHT11T302FR-27P	✓	6,8	10,6	3,5	2	0,2	2,8	25,65
XDHT11T304FR-27P	✓	6,8	10,6	3,5	1,8	0,4	2,8	25,65
XDHT11T308FR-27P	✓	6,8	10,6	3,5	1,4	0,8	2,8	25,65
XDHT11T312FR-27P	✓	6,8	10,6	3,5	1,4	1,2	2,8	25,65
XDHT11T316FR-27P	✓	6,8	10,6	3,5	1,4	1,6	2,8	25,65
XDHT11T320FR-27P	✓	6,8	10,6	3,5	1,4	2	2,8	25,65
XDHT11T325FR-27P	✓	6,8	10,6	3,5	1,4	2,5	2,8	25,65
XDHT11T332FR-27P	✓	6,8	10,6	3,5	0,8	3,2	2,8	25,65
XDHT11T340FR-27P	✓	6,8	10,6	3,5	-	4	2,8	25,65
XDHT11T350FR-27P	✓	6,8	10,6	3,5	-	5	2,8	25,65

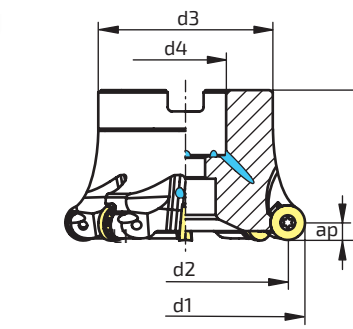
CRP10
CRP16

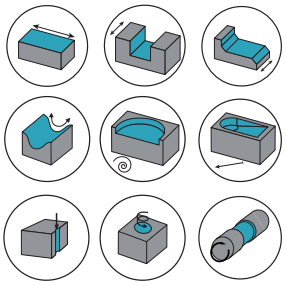
Línea de fresado
Milling line



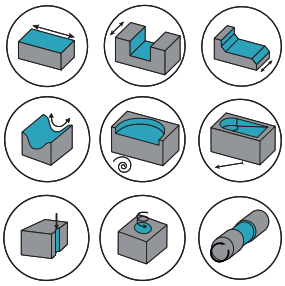


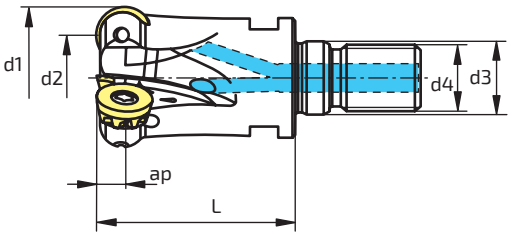
Ref.	Plaquita *Inserts*	d1	d2	d3	d4	L	z	ap	€	Tornillo de inserción *Insert screw*	€
CRP10-040A03R	RP..10T3..	40	30	38	16	40	3	5	306,70	11464141	2,5
CRP10-040A05R	RP..10T3..	40	30	38	16	40	5	5	345,70		
CRP10-040A05RB	RP..10T3..	40	30	38	16	40	5	5	345,70		
CRP10-042A06R	RP..10T3..	42	32	38	16	40	6	5	397,30		
CRP10-042A06RB	RP..10T3..	42	32	38	16	40	6	5	397,30		
CRP10-050A04R	RP..10T3..	50	40	43	22	40	4	5	336,80		
CRP10-050A06R	RP..10T3..	50	40	43	22	40	6	5	411,10		
CRP10-050A06RB	RP..10T3..	50	40	43	22	40	6	5	411,10		
CRP10-052A06R	RP..10T3..	52	42	43	22	40	6	5	411,10		
CRP10-052A06RB	RP..10T3..	52	42	43	22	40	6	5	411,10		
CRP12-040A04R	RP..1204..	40	28	38	16	40	4	6	318,00	11610311	3,05
CRP12-040A04RB	RP..1204..	40	28	38	16	40	4	6	318,00	165795	3,05
CRP12-050A04R	RP..1204..	50	38	43	22	40	4	6	328,20		
CRP12-050A05R	RP..1204..	50	38	43	22	40	5	6	385,90	11610311	3,05
CRP12-050A05RB	RP..1204..	50	38	43	22	40	5	6	385,90	165795	3,05
CRP12-052A05R	RP..1204..	52	40	43	22	40	5	6	404,80	11610311	3,05
CRP12-052A05RB	RP..1204..	52	40	43	22	40	5	6	404,80	165795	3,05
CRP12-063A06R	RP..1204..	63	51	48	22	40	6	6	476,50	11610311	3,05
CRP12-063A06RB	RP..1204..	63	51	48	22	40	6	6	476,50	165795	3,05
CRP12-066A07R	RP..1204..	66	54	48	22	40	7	6	502,30	11610311	3,05
CRP12-066A07RB	RP..1204..	66	54	48	22	40	7	6	502,30	165795	3,05
CRP12-080A05R	RP..1204..	80	68	58	27	50	5	6	434,90		
CRP12-080A07R	RP..1204..	80	68	58	27	45	7	6	537,50	11610311	3,05
CRP12-080A07RB	RP..1204..	80	68	58	27	50	7	6	537,50		
CRP12-100A06R	RP..1204..	100	88	78	32	50	6	6	485,30	165795	3,05
CRP12-100A10R	RP..1204..	100	88	78	32	50	10	6	709,00		





Ref.	Plaquita *Inserts*	d1	d2	d3	d4	L	z	ap	€	Tornillo de inserción *Insert screw*	€
CRP16-050A04R	RP..1605..	50	34	48	22	40	4	8	385,90	106022	3,05
CRP16-052A04R	RP..1605..	52	36	48	22	40	4	8	385,90		
CRP16-063A05R	RP..1605..	63	47	48	22	40	5	8	486,50		
CRP16-080A06R	RP..1605..	80	64	58	27	50	6	8	590,90		
CRP16-100A07R	RP..1605..	100	84	78	32	50	7	8	690,30		
CRP16-080A05R	RP..1605..	80	60	58	27	50	5	10	500,30		
CRP16-100A06R	RP..1605..	100	80	78	32	50	6	10	598,40	11107792	4,00
CRP16-125A06R	RP..1605..	125	105	88	40	63	6	10	605,90		



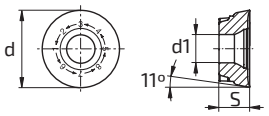


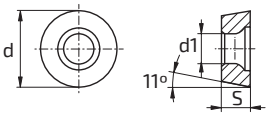
Tornillo de inserción *Insert screw*	€
76913	2,50
11464141	2,50
165795	3,05

Ref.	Plaquita *Inserts*	d1	d2	d3	d4	L	z	ap	€
CRP10-020R02R	RP..10T3..	20	10	10,5	10	33	2	5	205,70
CRP10-025R03R	RP..10T3..	25	15	12,5	12	35	3	5	276,60
CRP10-025R03RB	RP..10T3..	25	15	12,5	12	35	3	5	276,60
CRP10-032R04R	RP..10T3..	32	22	17,0	16	35	4	5	321,90
CRP10-032R04RB	RP..10T3..	32	22	17,0	16	35	4	5	321,90
CRP10-035R05R	RP..10T3..	35	25	17,0	16	35	5	5	359,50
CRP12-025R02R	RP..1204..	25	13	12,5	12	35	2	6	199,50
CRP12-032R03R	RP..1204..	32	20	17,0	16	35	3	6	243,40
CRP12-035R03R	RP..1204..	35	23	17,0	16	35	3	6	243,40
CRP12-042R04R	RP..1204..	42	30	17,0	16	42	4	6	289,30

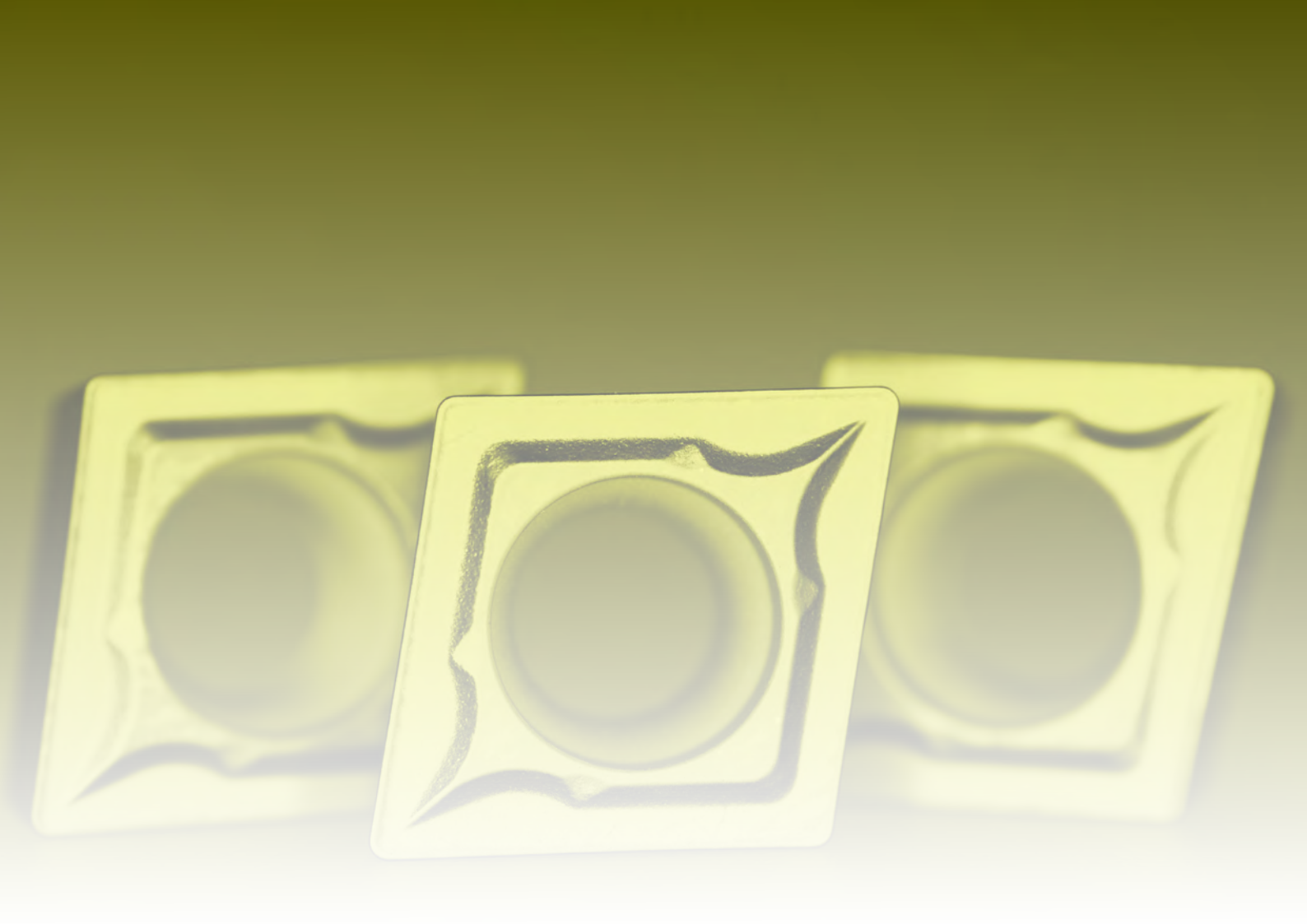
Plaquitas
Inserts

P	
M	
K	●
N	●
S	
H	





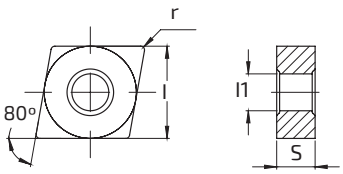
Ref.	H10T	Medidas *Dimensions* d	S	d1	€
RPHX10T3MOFN-27P	✓	10	3,97	3,4	14,10
RPHX1204MOFN-27P	✓	12	4,76	4,4	15,65
RPHX1605MOFN-27P	✓	16	5,56	5,5	21,35



TORNEADO PARA ALUMINIO

Aliminum turning

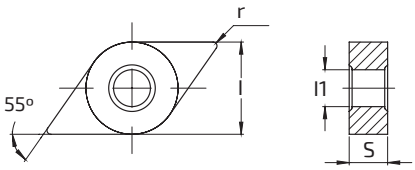
Rómbica 80º negativa
Rhombic 80º negative



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
CNGG 120404AL H10T	**6,15**	12,7	4,76	0,4	5,16	1,5	0,2	3,6	0,15	0,1	0,2
CNGG 120408AL H10T	**6,15**	12,7	4,76	0,8	5,16	2,0	0,3	3,8	0,25	0,1	0,4
CNGG 120412AL H10T	**6,15**	12,7	4,76	1,2	5,16	2,5	0,4	4,0	0,3	0,15	0,6
CNGG 120416AL H10T	**6,15**	12,7	4,76	1,6	5,16	2,8	0,4	4,5	0,4	0,15	0,8

Portaherramientas | Tool holder pag. 436 / 442

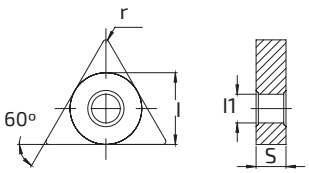
Rómbica 55º negativa
Rhombic 55º negative



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
DNGG 150404AL H10T	**8,35**	12,7	4,76	0,4	5,16	1,5	0,2	3,6	0,15	0,1	0,2
DNGG 150408AL H10T	**8,35**	12,7	4,76	0,8	5,16	2,0	0,3	3,8	0,25	0,1	0,4
DNGG 150412AL H10T	**8,35**	12,7	4,76	1,2	5,16	2,5	0,4	4,0	0,3	0,15	0,6
DNGG 150416AL H10T	**8,35**	12,7	4,76	1,6	5,16	2,8	0,4	4,5	0,4	0,15	0,8
DNGG 150604AL H10T	**8,80**	12,7	6,35	0,4	5,16	1,5	0,2	3,6	0,15	0,1	0,2
DNGG 150608AL H10T	**8,80**	12,7	6,35	0,8	5,16	2,0	0,3	4,0	0,25	0,1	0,4
DNGG 150612AL H10T	**8,80**	12,7	6,35	1,2	5,16	2,8	0,4	4,5	0,3	0,15	0,6

Portaherramientas | Tool holder pag. 437 / 442 - 443

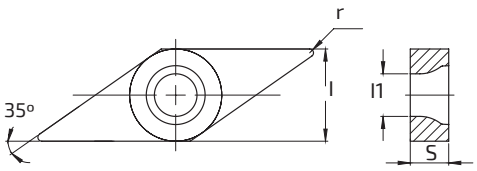
Triangular 60º negativa
Triangular 60º negative



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
TNGG 160404AL H10T	**6,15**	9,525	4,76	0,4	3,81	2	0,3	3,8	0,15	0,10	0,2
TNGG 160408AL H10T	**6,15**	9,525	4,76	0,8	3,81	2	0,3	3,8	0,25	0,10	0,4
TNGG 160412AL H10T	**6,15**	9,525	4,76	1,2	3,81	2	0,4	3,8	0,30	0,15	0,6

Portaherramientas | Tool holder pag. 438 - 439 / 443

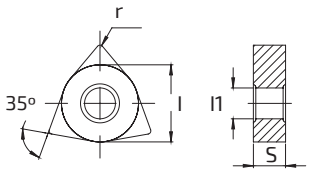
Rómbica 35º negativa
Rhombic 35º negative



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
VNGG 160404AL H10T	**8,55**	9,525	4,76	0,4	3,81	2	0,2	4	0,15	0,10	0,2
VNGG 160408AL H10T	**8,55**	9,525	4,76	0,8	3,81	2	0,2	4	0,25	0,15	0,4

Portaherramientas | Tool holder pag. 440 / 444

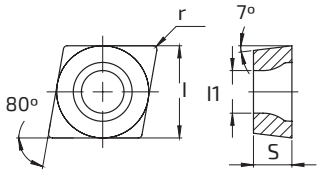
Trígono 80º negativo
Trigon 80º negative



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
WNGG 080408AL H10T	**8,20**	12,7	4,76	0,8	5,16	2,5	0,7	4	0,25	0,20	0,40
WNGG 080412AL H10T	**8,20**	12,7	4,76	1,2	5,16	2,5	0,3	4	0,30	0,25	0,55

Portaherramientas | Tool holder pag. 441 / 444

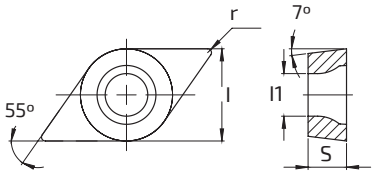
Rómbica 80º positiva
Rhombic 80º positive



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
CCGT 060202AL H10T	**8,15**	6,350	2,38	0,2	2,8	1	0,05	3,0	0,07	0,10	0,12
CCGT 060204AL H10T	**8,15**	6,350	2,38	0,4	2,8	1,55	0,10	3,0	0,15	0,10	0,20
CCGT 09T302AL H10T	**8,80**	9,525	3,97	0,2	4,4	1,53	0,05	3,0	0,07	0,15	0,12
CCGT 09T304AL H10T	**8,80**	9,525	3,97	0,4	4,4	2,55	0,10	5,0	0,16	0,15	0,22
CCGT 09T308AL H10T	**8,80**	9,525	3,97	0,8	4,4	2,55	0,10	5,0	0,22	0,10	0,45
CCGT 120402AL H10T	**10,10**	12,700	4,76	0,2	5,5	2,03	0,05	4,0	0,07	0,10	0,12
CCGT 120404AL H10T	**10,10**	12,700	4,76	0,4	5,5	2,55	0,10	5,0	0,17	0,15	0,26
CCGT 120408AL H10T	**10,10**	12,700	4,76	0,8	5,5	2,8	0,10	5,5	0,25	0,15	0,50

Portaherramientas | Tool holder pag. 424 / 428 - 429

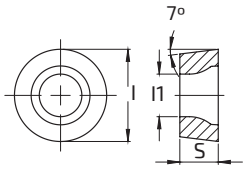
Rómbica 55º positiva
Rhombic 55º positive



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
DCGT 070202AL H10T	**8,15**	6,350	2,38	0,2	1,00	1,5	0,2	3,6	0,07	0,10	0,12
DCGT 070204AL H10T	**8,15**	6,350	2,38	0,4	2,05	2,0	0,3	3,8	0,15	0,10	0,20
DCGT 11T302AL H10T	**8,80**	9,525	3,97	0,2	2,03	2,5	0,4	4,0	0,07	0,15	0,12
DCGT 11T304AL H10T	**8,80**	9,525	3,97	0,4	2,55	2,8	0,4	4,5	0,16	0,15	0,22
DCGT 11T308AL H10T	**8,80**	9,525	3,97	0,8	2,55	1,5	0,2	3,6	0,22	0,10	0,50
DCGT 11T312AL H10T	**8,80**	9,525	3,97	1,2	2,70	2,0	0,3	3,8	0,35	0,10	0,70

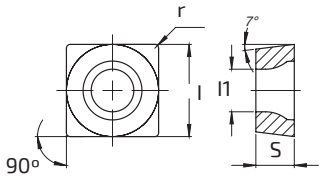
Portaherramientas | Tool holder pag. 424 - 425 / 429 - 430

Redonda Rº positiva
Round Rº positive



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
RCGT 0602M0AL H10T	**8,80**	6	2,38	-	2,8	0,5	2,0	2,0	0,13	0,05	0,20
RCGT 0803M0AL H10T	**9,25**	8	3,18	-	3,4	0,5	2,5	2,5	0,15	0,05	0,25
RCGT 1003M0AL H10T	**10,55**	10	3,18	-	4,4	1,0	3,0	3,0	0,20	0,10	0,30
RCGT 1204M0AL H10T	**12,00**	12	4,76	-	4,4	1,0	3,5	3,5	0,23	0,10	0,35

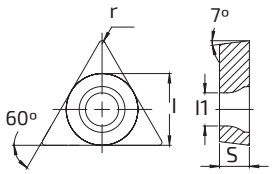
Rómbica 80º positiva
Rhombic 80º positive



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
SCGT 09T304AL H10T	**8,35**	9,525	3,97	0,4	4,4	2,05	0,1	4	0,16	0,10	0,26
SCGT 09T308AL H10T	**8,35**	9,525	3,97	0,8	4,4	2,55	0,1	5	0,22	0,10	0,40
SCGT 120404AL H10T	**10,10**	12,700	4,76	0,4	5,5	2,55	0,1	5	0,20	0,15	0,26
SCGT 120408AL H10T	**10,10**	12,700	4,76	0,8	5,5	2,55	0,1	5	0,30	0,15	0,50

Portaherramientas | Tool holder pag. 425

Triangular 60º positiva
Triangular 60º positive



Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	r	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
TCGT 090202AL H10T	**8,15**	6	2,38	-	2,8	0,5	2,0	2,0	0,13	0,05	0,20
TCGT 090204AL H10T	**8,15**	8	3,18	-	3,4	0,5	2,5	2,5	0,15	0,05	0,25
TCGT 110202AL H10T	**8,35**	10	3,18	-	4,4	1,0	3,0	3,0	0,20	0,10	0,30
TCGT 110204AL H10T	**8,35**	12	4,76	-	4,4	1,0	3,5	3,5	0,23	0,10	0,35
TCGT 110208AL H10T	**8,35**	6	2,38	-	2,8	0,5	2,0	2,0	0,13	0,05	0,20
TCGT 16T302AL H10T	**10,10**	8	3,18	-	3,4	0,5	2,5	2,5	0,15	0,05	0,25
TCGT 16T304AL H10T	**10,10**	10	3,18	-	4,4	1,0	3,0	3,0	0,20	0,10	0,30
TCGT 16T308AL H10T	**10,10**	12	4,76	-	4,4	1,0	3,5	3,5	0,23	0,10	0,35
TCGT 16T312AL H10T	**10,10**	6	2,38	-	2,8	0,5	2,0	2,0	0,13	0,05	0,20
TCGT 16T316AL H10T	**10,10**	8	3,18	-	3,4	0,5	2,5	2,5	0,15	0,05	0,25

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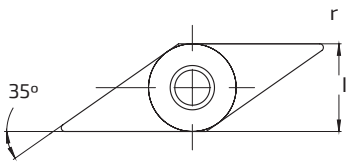
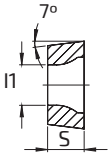
Rómbica 80º positiva
Rhombic 80º positive





Ref.	€	Dimensiones *Dimensions (mm)*				Condiciones de corte *Cutting conditions*					
		l	S	Re	l1	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
VCGT 110301AL H10T	**10,10**	6,350	3,18	0,4	2,8	1,53	0,05	3	0,04	0,02	0,06
VCGT 110302AL H10T	**10,10**	6,350	3,18	0,8	2,8	1,53	0,05	3	0,07	0,05	0,12
VCGT 110304AL H10T	**10,10**	6,350	3,18	0,4	2,8	1,53	0,05	3	0,15	0,10	0,25
VCGT 110308AL H10T	**10,10**	6,350	3,18	0,8	2,8	1,53	0,05	3	0,22	0,15	0,45
VCGT 130302AL H10T	**10,55**	7,940	3,18	0,4	3,4	2,00	0,10	4	0,07	0,05	0,12
VCGT 130304AL H10T	**10,55**	7,940	3,18	0,8	3,4	2,00	0,10	4	0,15	0,10	0,25
VCGT 160402AL H10T	**10,55**	9,525	4,76	0,4	4,4	2,30	0,10	5	0,07	0,05	0,12
VCGT 160304AL H10T	**10,55**	9,525	4,76	0,8	4,4	2,55	0,10	5	0,15	0,10	0,25
VCGT 160308AL H10T	**10,55**	9,525	4,76	0,4	4,4	2,55	0,10	5	0,22	0,15	0,45
VCGT 160312AL H10T	**10,55**	9,525	4,76	0,8	4,4	2,55	0,10	5	0,40	0,15	0,60
VCGT 220530AL H10T	**17,60**	12,700	5,56	0,4	5,5	3,55	0,10	7	0,80	0,15	1,60

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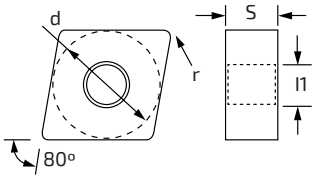
CCGT

- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	
N	●
S	
H	



Ref.	PCD	Medidas *Dimensions (mm)* d	S	r	l1	€
CCGT060202L-Z1	✓	6,35	2,38	0,2	2,8	**53,35**
CCGT060204L-Z1	✓	6,35	2,38	0,4	2,8	**53,35**
CCGT09T304L-Z1	✓	9,52	3,07	0,4	4,4	**53,35**
CCGT09T308L-Z1	✓	9,52	3,97	0,8	4,4	**53,35**

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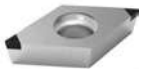
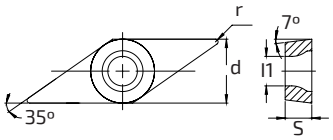
DCGT



- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	
N	●
S	
H	



Ref.	PCD	Medidas *Dimensions (mm)* d	S	r	l1	€
DCGT070202L-Z1	✓	6,35	2,38	0,2	2,8	**53,35**
DCGT070204L-Z1	✓	6,35	2,38	0,4	2,8	**53,35**
DCGT11T302L-Z1	✓	9,25	3,97	0,2	4,4	**53,35**
DCGT11T304L-Z1	✓	9,25	3,97	0,4	4,4	**53,35**

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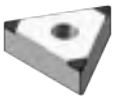
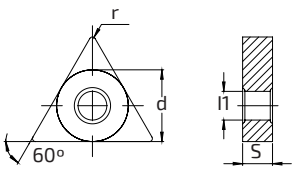
TPGT



- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	
N	●
S	
H	



Ref.	PCD	Medidas *Dimensions (mm)* d	S	r	l1	€
TPGT110302-Z3	✓	6,35	3,18	0,2	3,4	**73,10**
TPGT110304-Z3	✓	6,35	3,18	0,4	3,4	**73,10**
TPGT160302-Z3	✓	9,52	3,18	0,2	4,4	**73,10**
TPGT160304-Z3	✓	9,52	3,18	0,4	4,4	**73,10**
TPGT160308-Z3	✓	9,52	3,18	0,8	4,4	**73,10**

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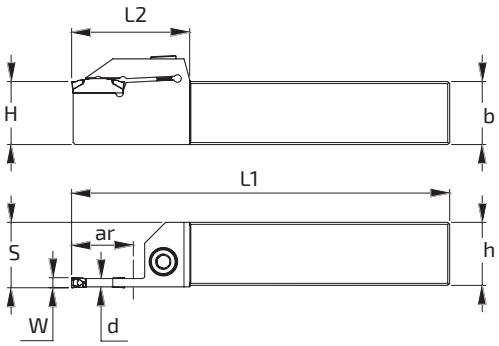
TRONZADO Y RANURADO PARA ALUMINIO

Turning for aluminium

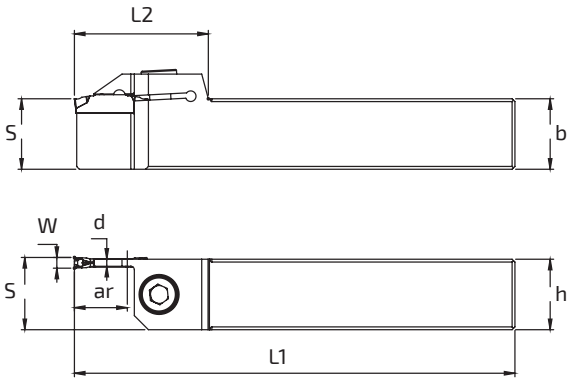
GPRC



Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**Ref. D060220**	**4,15**

Ref.	Dimensiones *Dimensions*									€	Plaquita *Insert*	Tornillo *Screw*
	ar	L1	h	b	H	L2	s	d	W			
GPRC 150015 2525E1	15	150	25	25	25	34	26,00	4	6	**219,75**	GP06	**D060220**
GPRC 150023 2525E1	23	150	25	25	25	42	26,00	4	6	**219,75**	GP06	**D060220**
GPRC 150015 2525F1	15	150	25	25	25	34	25,75	6,5	8	**219,75**	GP08	**D060220**
GPRC 150023 2525F1	23	150	25	25	25	42	25,75	6,5	8	**219,75**	GP08	**D060220**

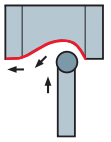
GPLC

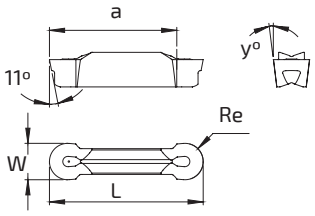


Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**Ref. D060220**	**4,15**

Ref.	Dimensiones *Dimensions*									€	Plaquita *Insert*	Tornillo *Screw*
	ar	L1	h	b	H	L2	s	d	W			
GPLC 150015 2525E1	15	150	25	25	25	34	26,00	4,0	6	**219,75**	GP06	**D060220**
GPLC 150023 2525E1	23	150	25	25	25	42	26,00	4,0	6	**219,75**	GP06	**D060220**
GPLC 150015 2525F1	15	150	25	25	25	34	25,75	6,5	8	**219,75**	GP08	**D060220**
GPLC 150023 2525F1	23	150	25	25	25	42	25,75	6,5	8	**219,75**	GP08	**D060220**

GP06





Ref.	€	Dimensiones *Dimensions (mm)*						Condiciones de corte *Cutting conditions*					
		W	Re	L	xº	a	yº	ap (mm)	Min	Max	fn (mm/rev)	Min	Max
GP0600E300-N02-NP H10T	**20,55**	6	3	25,4	-	18,5	7	1,3	0,5	2,5	0,2	0,15	0,25

FRESADO

Milling

Descripción del grado de fresado

Milling grade description

Tipo de grado Grade type	**Propiedades** Properties	**Aplicación de mecanizado** Machining Application	**Aplicación material** Material application	**Ámbito industrial** Industry area
KS2100	·HRA 92 ·Resistencia al desgaste. ·Propiedades de recubrimiento anticorrosivo. ·Alta dureza y alta resistencia a la abrasión. *·HRA 92* *·Wear resistance.* *·Anti-corrosion coating properties.* *·High hardness & high abrasion resistance.*	·Alta velocidad. ·Semiacabado. ·Mecanizado continuo. ·Aceros endurecidos. *·High speed.* *·Semi-finishing.* *·Continuous machining.* *·Hardened steels.*	P ★ ★ M ★ K ★ ★ S ★ H ★ ★ ★	·Moldes y matrices. ·Mecanizado de acero de alta dureza. *·Mold & die.* *·Hardness steel machining.*
KS3100	·HRA 91.8 ·Resistencia al desgaste. ·Propiedades de recubrimiento anticorrosivo. ·Alta dureza y alta resistencia a la abrasión. *·HRA 91.8* *·Wear resistance.* *·Anti-corrosion coating properties.* *·High hardness & high abrasion resistance.*	·De velocidad media a alta. ·De profundidad moderada a alta. ·Mecanizado en general. *·Medium to high speed.* *·Moderate to large depth.* *·General machining.*	P ★ ★ ★ M ★ K ★ ★ ★ S ★ H ★ ★	·Automotriz. ·Moldes y matrices. ·Mecanizado de acero. *·Automotive.* *·Mold & die.* *·Steel machining.*
KS4100	·HRA 91.7 ·Resistencia al desgaste. ·Propiedades de recubrimiento anticorrosivas y de bajo coeficiente de fricción. ·Prevenir astillamientos y roturas. *·HRA 91.7* *·Wear resistance.* *·Anti-corrosion & low friction coefficient coating properties.* *·Prevent chipping and fracture.*	·Alta velocidad. ·De profundidad moderada a alta. ·Desbaste. ·Mecanizado en general. *·High speed.* *·Moderate to large depth.* *·Medium to roughing.* *·General machining.*	P ★ ★ ★ M ★ ★ K ★ ★ ★ S ★ H ★	·Automotriz. ·Moldes y matrices. ·Mecanizado de acero y acero inoxidable. *·Automotive.* *·Mold & die.* *·Steel & stainless machining.*
KS5100	·HRA 90.5 ·Resistencia al desgaste. ·Propiedades de recubrimiento antiadherente. ·Borde antiacumulación que impide la soldadura. *·HRA 91.7* *·Wear resistance.* *· Anti-sticky coating properties.* *·Anti-build-up edge and prevent welding.*	·Alta velocidad. ·Desbaste. ·Corte interrumpido. *·High speed.* *·Medium to roughing.* *·Interrupted cutting.*	P ★ ★ M ★ ★ ★ K ★ ★ S ★ ★ ★ H	·Aeroespacial ·Mecanizado de titanio e inoxidable. *·Aerospace* *·Titanium & stainless machining.*

Geometría de las plaquitas de fresado

Milling insert geometries

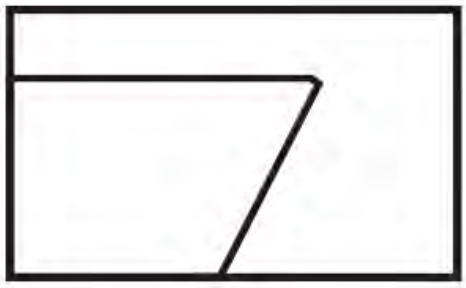
·Pequeño filo de corte positivo y redondeado.
·Excelente superficie para el acabado.
·*Positive and small rounded cutting edge.*
·*Excellent surface for finishing purpose.*

LS

·Filo de corte positivo y redondeado.
·Baja fuerza de corte y reducción del parpadeo para cortes ligeros cuando se requieren bajas fuerzas/ potencia.
·*Positive and rounded cutting edge.*
·*Low cutting force and chattering reduction for light cutting when low forces/power are required.*

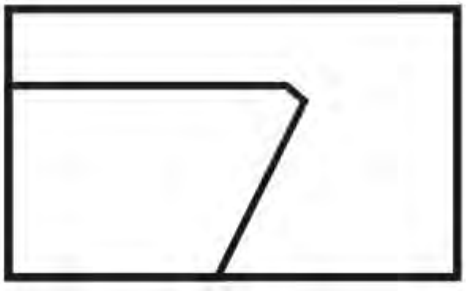
MG

·Grado de corte negativo y biselado.
·Recomendado para el mecanizado general en la producción mixta.
·*Negative and chamfering cutting dege.*
·*Highly recommended for general machining in mixed production.*



RG

·Filo de corte negativo y biselado de gran tamaño.
·Fuerte resistencia de los bordes para operaciones de desbaste, forjado, fundición de piel y vibraciones.
·*Negative and big chamfering cutting edge.*
·*Strong edge strength for rough operations, forging, cast skin and vibrations.*

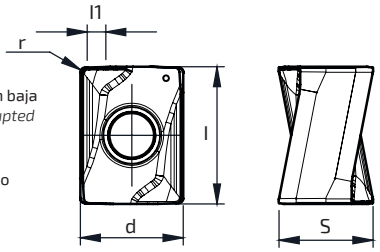


HG

ANHX

P	●	●	✱
M		●	✱
K	●		✱
N			
S		●	✱
H			

● Interrupción baja *Light interrupted*
● General
✱ Interrumpido *Interrupted*



Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	l1	r	€
ANHX120604PNER-LS	✓	✓	✓	9	12	8,3	1,6	0,4	**15,35**
ANHX120608PNER-LS	✓	✓	✓	9	12	8,3	1,2	0,8	**15,35**
ANHX120616PNER-LS	✓	✓	✓	9	12	8,3	0,4	1,6	**15,35**
ANHX120604PNSR-MP	✓		✓	9	12	8,3	1,6	0,4	**15,35**
ANHX120608PNSR-MP	✓		✓	9	12	8,3	1,2	0,8	**15,35**
ANHX120616PNSR-MP	✓		✓	9	12	8,3	0,4	1,6	**15,35**

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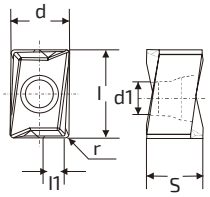
ANMX

P	●	●
M	●	●
K	●	●
N		
S	●	●
H		

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*



Ref.	KS2100	KS3100	Medidas *Dimensions* d	l	S	l1	r	d1	€
ANMX080408-PDR	✓	✓	6,6	8,6	5,2	2,5	0,8	3,5	**9,70**
ANMX130508-PDR	✓	✓	10	13,7	8,9	3,4	0,8	4,4	**10,65**
ANMX160608-PDR	✓	✓	11,2	16,7	10,4	4,7	0,8	5,4	**12,10**

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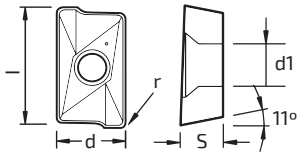
APKT

P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
APKT100304PDER-MG	✓	✓		10,5	6,700	3,5	0,4	2,8	**6,85**
APKT100308PDER-MG	✓	✓		10,5	6,700	3,5	0,8	2,8	**6,85**
APKT100304PDER-RG			✓	10,5	6,700	3,5	0,4	2,8	**8,00**
APKT160408PDER-MG			✓	16,3	9,525	5,25	0,8	4,5	**9,55**
APKT160408PDER-RG			✓	16,3	9,525	5,25	0,8	4,5	**9,55**
APKT160416PDER-MG		✓		16,3	9,525	5,25	0,8	4,5	**9,75**
APKT160424PDER-MG		✓		16,3	9,525	5,25	0,8	4,5	**9,75**
APKT160432PDER-MG		✓		16,3	9,525	5,25	0,8	4,5	**9,75**

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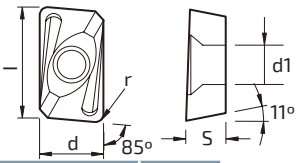
APMT

P	◎	◎
M	○	◎
K	◎	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
APMT113508PDER-MG	✓	✓	11,0	6,350	3,50	0,8	2,8	**6,20**
APMT113508PDER-RG	✓	✓	11,0	6,350	3,50	0,8	2,8	**6,20**
APMT113508PDER-HG		✓	11,0	6,350	3,50	0,8	2,8	**4,95**
APMT160408PDER-MG	✓	✓	16,5	9,525	4,76	0,8	4,4	**7,85**
APMT160408PDER-RG	✓	✓	16,5	9,525	4,76	0,8	4,4	**7,85**
APMT160408PDER-HG		✓	16,5	9,525	4,76	0,8	4,4	**6,20**

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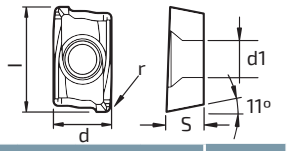
AXMT

P	◎	◎	○	◎ 1ª opción *1st choice*
M	○	◎	◎	○ 2ª opción *2nd choice*
K	◎	◎	○	



Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
AXMT123508PEER-RG	✓	✓		12,18	6,93	3,58	0,8	3,4	**7,5**

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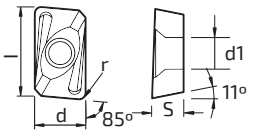
P	◎	◎	○	◎ 1ª opción *1st choice*
M	○	◎	◎	○ 2ª opción *2nd choice*
K	◎	◎	○	



Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
AXMT170508PEER-RG		✓	✓	17,5	10,2	5,56	0,8	4,6	**10**
AXMT170516PEER-RG		✓	✓	17,5	10,2	5,56	1,6	4,6	**10**

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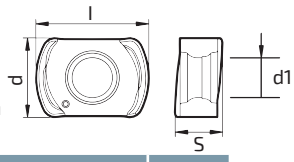
BNMX
De doble cara/ *Double sided*

P	◎	◎	○	◎ 1ª opción *1st choice*
M	○	◎	◎	○ 2ª opción *2nd choice*
K	◎	◎	○	



Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* l	d	S	d1	€
BNMX0603-SG	✓	✓		9	6,38	3,75	3,2	**12,15**
BNMX0603-MG	✓	✓		9	6,38	3,75	3,2	**12,15**
BNMX0603-RG	✓	✓	✓	9	6,38	3,75	3,2	**12,15**
BNMX0904-MG		✓	✓	11,9	9,18	4,80	4,2	**11,75**

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CNHQ-MOGU

Ref.	SKY77	NER026	€
CNHQ07T30600811SL28W	✓	✓	**16,81**
CNHQ07T30004301SR28V	✓	✓	**12,66**
MOGU10031003104TR28	✓		**16,60**

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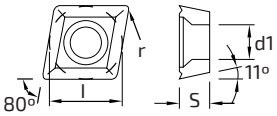
CPMT

P	◎
M	○
K	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS3100	Medidas *Dimensions (mm)* l	S	r	d1	€
CPMT 090308-MG	✓	9,525	3,18	0,8	4,4	9,3
CPMT 120408-MG	✓	12,700	4,76	0,8	5,5	9,3

ENHQ

Ref.	SKY77	NERO26	€
ENHQ08T30601209SL28W	✓	✓	15,67
ENHQ08T30601409SR28W	✓	✓	15,67
ENHQ08T30601726SL28V	✓	✓	15,67
ENHQ08T30601626SR28V	✓	✓	15,67
ENHQ08T30600154SL30	✓		15,67
ENHQ08T30600254SR30	✓		15,67
ENHQ09040802312SL28W	✓	✓	17,85
ENHQ09040802212SR28W	✓	✓	17,85
ENHQ09040801726SL28V	✓	✓	17,85
ENHQ09040801626SR28V	✓	✓	17,85
ENHQ09040800354SL30	✓		17,85
ENHQ09040800254SR30	✓		17,85

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Ref.	SKY77	NERO26	€
ENHQ06030402721SL28V	✓		12,66
ENHQ06030002620SR28V	✓		12,66
ENHQ06030400254SL30	✓		12,66
ENHQ06030000355SR30	✓		12,66
ENHQ08T30601726SL28V	✓	✓	15,67
ENHQ08T30001625SR28V	✓		15,67
ENHQ08T30600154SL30	✓		15,67
ENHQ08T30000255SR30	✓		15,67
ENHQ09040801726SL28V	✓	✓	17,85
ENHQ09040001625SR28V	✓	✓	17,85
ENHQ09040800354SL30	✓		17,85
ENHQ09040000255SR30	✓		17,85
ENHQ10050801740SL25V	✓		19,19
ENHQ10050801742SL28V	✓		19,19
ENHQ10050001641SR25V	✓		19,19
ENHQ10050001643SR28V	✓		19,19
ENHQ12061002718SL25V	✓	✓	20,44
ENHQ12060002619SR25V	✓	✓	20,44
ENHQ12061002913SL28W	✓	✓	20,44
ENHQ12060002620SR28V	✓	✓	20,44
ENHQ12061000352SL28	✓		20,44
ENHQ12060000253SR28	✓		20,44
ENHQ12061000354SL30	✓		20,44
ENHQ12060000255SR30	✓		20,44
ENHQ16091502713TL25V	✓		25,52
ENHQ16090002614TR25V	✓		25,52
LNEX20071000903TR25	✓		18,26
LNEX25062500405TR25	✓		26,77

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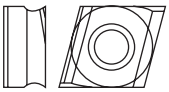
ENHQ



Ref.	SKY77	NERO26	€
ENHQ08T30601209SL28W	✓	✓	15,67
ENHQ08T30601409SR28W	✓	✓	15,67
ENHQ08T30601726SL28V	✓	✓	15,67
ENHQ08T30601626SR28V	✓	✓	15,67
ENHQ08T30600154SL30	✓		15,67
ENHQ08T30600254SR30	✓		15,67
ENHQ09040802312SL28W	✓	✓	17,85
ENHQ09040802212SR28W	✓	✓	17,85
ENHQ09040801726SL28V	✓	✓	17,85
ENHQ09040801626SR28V	✓	✓	17,85
ENHQ09040800354SL30	✓		17,85
ENHQ09040800254SR30	✓		17,85
ENHQ12061002718SL25V	✓	✓	20,44
ENHQ12061002618SR25V	✓	✓	20,44
ENHQ12061002913SL28W	✓	✓	20,44
ENHQ12061003013SR28W	✓		20,44
ENHQ12061000354SL30	✓		20,44
ENHQ12061000254SR30	✓		20,44

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FNHQ/LNHX/MOGU

Ref.	SKY77	NERO26	€
FNHQ08T30600409SL28V	✓	✓	15,67
FNHQ08T30000510SR28V	✓	✓	15,67
FNHQ11060801801TL25V	✓		21,17
FNHQ11060801802SL28V	✓		21,17
FNHQ11060801901TR25V	✓		21,17
FNHQ11060801902SR28V	✓		21,17
LNHX25082500201TR25	✓		31,85
MOGU10031003104TR28	✓		16,60

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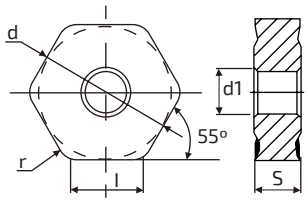
HNMX

P	●
M	●
K	●
N	
S	●
H	

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*



Ref.	KS3100	Medidas *Dimensions*					€
		d	l	S	r	d1	
HNMX050410-NM	✓	12,7	7,1	5	1	5	**10,65**

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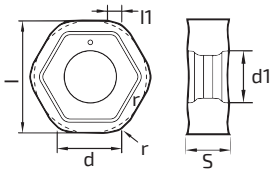
HNMX

P	
M	◎
K	

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS5100	Medidas *Dimensions (mm)*						€
		l	d	S	r	d1	l1	
HNMX 0704-MS	✓	6,8	12,7	4,45	1,2	4,9	1,4	**13,95**

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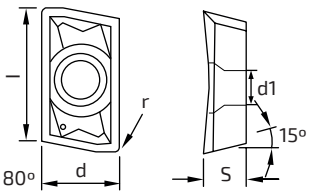
JDMT

P	◎
M	○
K	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

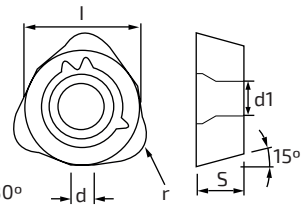


Ref.	KS3100	Medidas *Dimensions (mm)*					€
		l	d	S	r	d1	
JDMT 150508R-MG	✓	15,1	9,12	5,0	0,8	4,5	**6,20**

JDMW

P	◎
M	○
K	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

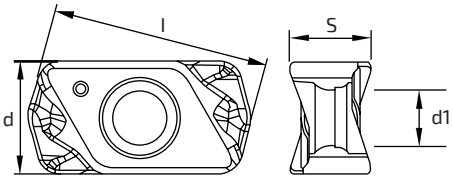


Ref.	KS3100	Medidas *Dimensions (mm)* d	l	S	r	d1	€
JDMW 120420ZDSR-RG	✓	2,5	12,0	4,76	2,0	4,75	**6,50**

LNMX

P	●
M	○
K	●
S	○
H	○

● Aplicación principal *Main use*
○ Aplicación complementaria *Complementary use*



Ref.	KS3100	Medidas *Dimensions (mm)* l	d	S	d1	€
LNMX0303-MG	✓	11,59	6,0	4,29	2,85	**10,10**

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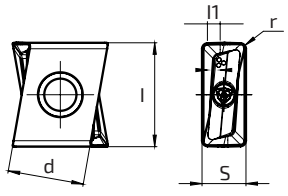
LNXT

P	●	✱
M		✱
K	●	✱
N		
S		
H		

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
✱ General
✱ Interrumpido *Interrupted*



Ref.	KS3100	KS5100	Medidas *Dimensions* d	l	S	l1	r	€
LNXT130604PNER-MP	✓	✓	9,8	3,0	6,8	9	0,4	**15,80**
LNXT130608PNER-MP	✓	✓	9,8	2,6	6,8	9	0,8	**15,80**

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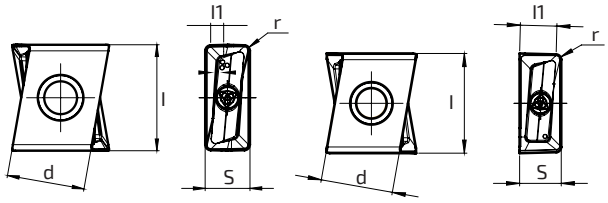
LNXT

P	●	●	✱
M			
K		●	
N			
S			
H			

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
✱ Interrumpido *Interrupted*



Ref.	KS2100	KS3100	KS5100	Medidas *Dimensions* d	l	S	l1	r	€
LNXT150608PNER-MP	✓	✓	✓	11	15	6,35	1,8	0,8	**16,75**
LNXT150612PNER-MP		✓	✓	11	15	6,35	1,8	1,2	**16,75**
LNXT150608PNER-HP		✓	✓	11	15	6,35	1,8	0,8	**16,75**
LNXT150608PNER-W	✓			11	15,2	6,35	5,5	0,8	**21,40**

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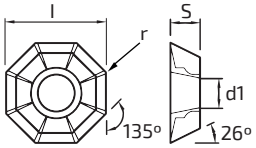
OFMT

P	◎
M	○
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS3100	Medidas *Dimensions (mm)* l	S	r	d1	€
OFMT05T3TN-MG	✓	12,7	3,8	0,6	4,6	**6,20**
OFMT05T3TN-RG	✓	12,7	3,8	0,6	4,6	**6,20**

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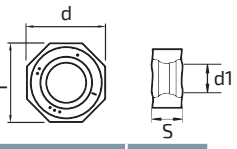
ONMX

P	◎
M	◎
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

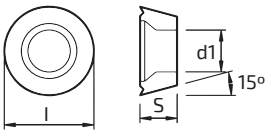


Ref.	KS3100	Medidas *Dimensions (mm)* d	l	S	d1	€
ONMX0505-RG	✓	12,7	12,7	12,7	6	**14,85**

RD..

P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* l	S	d1	€
RDKW0501MOE	✓	✓		5	1,59	2,2	**7,15**
RDKW0702MOE	✓	✓	✓	7	2,38	2,8	**8,35**
RDKW0702MOT	✓	✓	✓	7	2,38	2,8	**8,35**
RDMT1003MOE		✓		10	3,18	3,9	**5,30**
RDMT1003MOT	✓	✓		10	3,18	3,9	**6,70**
RDMX1003MOE	✓	✓	✓	10	3,18	4,15	**7,90**
RDMX1003MOT	✓	✓		10	3,18	4,15	**6,70**
RDMT10T3MOE		✓		10	3,97	4,5	**5,30**
RDMT10T3MOT		✓		10	3,97	4,5	**5,30**
RDMW10T3MOE		✓		10	3,97	4,5	**5,30**
RDMT12T3MOE		✓	✓	12	3,97	4,1	**8,50**
RDMX12T3MOE		✓	✓	12	3,97	4,1	**8,50**
RDMX12T3MOT	✓	✓	✓	12	3,97	4,1	**8,50**
RDMT1204MOT		✓		12	4,76	4,4	**5,85**
RDMW1204MOT		✓		12	4,76	4,4	**5,85**
RDMT1604MOT		✓		16	4,76	5,5	**6,90**
RDMW1604MOT		✓		16	4,76	5,5	**6,90**

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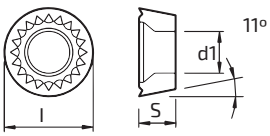
RPM..

P	◎
M	◎
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS3100	Medidas *Dimensions (mm)* l	S	d1	€
RPMT08T2MOE	✓	8	2,78	3,2	**5,30**
RPMT08T2MOT	✓	8	2,78	3,2	**5,30**
RPMW1003MOE	✓	10	3,18	4,6	**4,90**
RPMW1003MOT	✓	10	3,18	4,6	**4,90**
RPMT10T3MOE	✓	10	3,97	4,5	**5,30**
RPMT10T3MOT	✓	10	3,97	4,3	**5,30**
RPMT1204MOE	✓	12	4,76	4,3	**5,75**
RPMT1204MOT	✓	12	4,76	4,3	**5,75**
RPMW1204MOE	✓	12	4,76	4,3	**5,75**
RPMW1204MOT	✓	12	4,76	4,3	**5,75**

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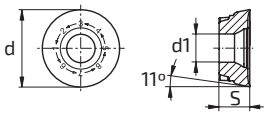
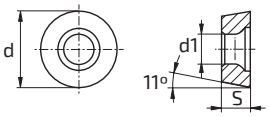
RDHX/RPHX/RPNX

P	●	○	○
M	○	●	●
K			○
N			
S			●
H			

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use





Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	S	d1	KS3100 €	KS4100 €	KS5100 €
RDHX0802MOSN-F50		✓		8	2,38	2,80	-	11,90	-
RPHX10T3MOSN-F50	✓	✓		10	3,97	3,4	12,35	12,35	-
RPHX1204MOSN-F50	✓	✓		12	4,76	4,4	13,55	13,55	-
RPHX1605MOSN-F50		✓		16	5,56	5,5	-	18,40	-
RPNX10T3MOSN-F50	✓			10	3,97	3,40	10,80	-	-
RPNX1204MOSN-F50	✓			12	4,76	4,4	10,80	-	-
RPNX1605MOSN-F50	✓			16	5,56	5,5	14,70	-	-
RPNX2006MOSN-F50		✓		20	6,35	6,0	-	19,10	-
RPHX10T3MOEN-M30	✓	✓		10	3,97	3,4	12,35	12,35	-
RPHX1204MOEN-M30		✓		12	4,76	4,4	-	13,55	-
RPHX1605MOEN-M30		✓		16	5,56	5,5	-	18,40	-
RPNX2006MOEN-M30	✓	✓		20	6,35	6,0	19,10	19,10	-
RDHX0501MOEN-M31			✓	5	1,59	2,50	-	-	10,70
RDHX0802MOEN-M31			✓	8	2,38	2,80	-	-	14,10
RDHX0802M4EN-M31			✓	8	2,38	2,80	-	-	14,10
RPHX10T3M4EN-M31			✓	10	3,97	3,4	-	-	15,60
RPHX10T3M8EN-M31			✓	10	3,97	3,4	-	-	15,60
RPHX1204M4EN-M31			✓	12	4,76	4,4	-	-	17,15
RPHX1204M6EN-M31			✓	12	4,76	4,4	-	-	17,15
RPHX1204M8EN-M31			✓	12	4,76	4,4	-	-	17,15
RPHX1605M8EN-M31			✓	16	5,56	5,5	-	-	23,40
RPNX10T3M8EN-M31			✓	10	3,97	3,4	-	-	12,95
RPNX1204M4EN-M31			✓	12	4,76	4,4	-	-	15,25
RPNX1204M8EN-M31			✓	12	4,76	4,4	-	-	15,25
RPNX2006M8EN-M31			✓	20	6,35	6,0	-	-	23,40
RPHX10T3M4EN-M32			✓	10	3,97	3,4	-	-	15,60
RPHX1204M4EN-M32			✓	12	4,76	4,4	-	-	17,15
RPHX10T3MOSN-M50	✓	✓	✓	10	3,97	3,4	12,35	12,35	15,60
RPHX1204MOSN-M50		✓	✓	12	4,76	4,4	-	13,55	17,15
RPNX10T3MOSN-M50	✓			10	3,97	3,4	9,40	-	-
RPNX1204MOSN-M50	✓			12	4,76	4,4	10,80	-	-
RPNX1605MOSN-M50	✓			16	5,56	5,5	14,70	-	-
RPHX10T3MOEN-R30			✓	10	3,97	3,4	-	-	15,60
RPHX1204MOEN-R30			✓	12	4,76	4,4	-	-	17,15
RPHX10T3MOSN	✓			10	3,97	3,4	12,35	-	-
RPHX1204MOSN	✓			12	4,76	4,4	13,55	-	-
RPHX1204M4EN			✓	12	4,76	4,4	-	-	17,15
RPHX1605MOSN	✓			16	5,56	5,5	18,40	-	-
RPNX1204MOSN	✓			12	4,76	4,4	10,80	-	-
RPNX1605MOSN	✓			16	5,56	5,5	14,70	-	-
RPNX2006MOSN	✓			20	6,35	6,0	19,10	-	-

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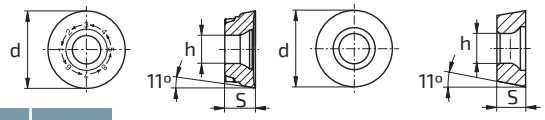
RDHX / RPHX / RPNX

P	●	○	○
M	○	●	●
K			○
N			
S			●
H			

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use



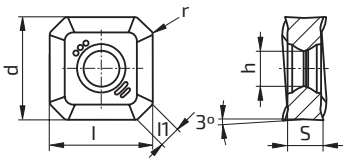
Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	S	d1	€
RDHX0501MOSN	✓			5	1,59	2,5	**11,65**
RDHX0802MOSN	✓			8	2,38	2,8	**11,90**
RPHX10T3MOSN	✓			10	3,97	3,4	**12,35**
RPHX1204MOSN	✓			12	4,76	4,4	**13,55**
RPHX1204M4EN			✓	12	4,76	4,4	**17,15**
RPHX1605MOSN	✓			16	5,56	5,5	**18,40**
RPNX1204MOSN	✓			12	4,76	4,4	**10,80**
RPNX1605MOSN	✓			16	5,56	5,5	**14,70**
RPNX2006MOSN	✓			20	6,35	6,0	**19,10**

SAKU

P	●	○	○
M	○	●	●
K			○
N			
S			
H			

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use



Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	l1	r	d1	KS3100 €	KS4100 €	KS5100 €
SAKU1706ABSR-F50	✓	✓	✓	17	17	6,35	3,7	0,8	5,8	**28,05**	**28,05**	**34,50**
SAKU1706ABSR-M50	✓	✓		17	17	6,35	3,7	0,8	5,8	**28,05**	**28,05**	-

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SD..

P	◎		
M	◎		
K	◎		

◎ 1ª opción
1st choice

○ 2ª opción
2nd choice

Ref.	KS3100	Medidas *Dimensions (mm)* l	S	r	d1	€
SDMT1205ZDEN-SG	✓	12,7	5,56	15	4,6	**6,90**
SDMT1205ZDTN-MG	✓	12,7	5,56	15	4,6	**6,90**
SDMT1205ZDTN-RG	✓	12,7	5,56	15	4,6	**6,90**
SDNW1205ZDTN-RG	✓	12,7	5,56	15	4,6	**6,90**

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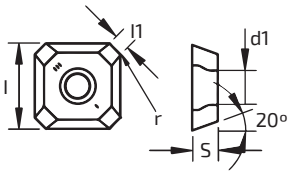
SEMT

P	◎
M	◎
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS3100	Medidas *Dimensions (mm)* l	l1	S	r	d1	€
SEMT13T3AGSN-MG	✓	13,4	1,9	3,97	1,5	4,2	**6,30**
SEMT13T3AGSN-RG	✓	13,4	1,9	3,97	1,5	4,2	**6,30**
SEMT13T3AGSN-HG	✓	13,4	1,9	3,97	1,5	4,2	**6,30**

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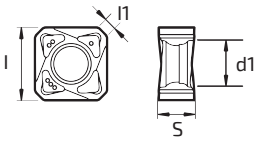
SNMX

P	◎	◎
M	○	◎
K	◎	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	Medidas *Dimensions (mm)* l	l1	S	d1	€
SNMX1205-MG	✓	✓	12,7	1,5	6,4	6	**15,65**
SNMX1205-RG	✓	✓	12,7	1,5	6,4	6	**15,65**

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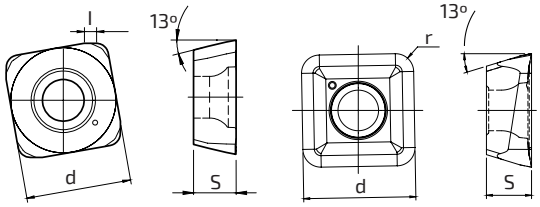
SO13

P	●	◖	◖	⇕
M				⇕
K	●	◖		⇕
N				
S			◖	⇕
H				

● Continuo *Continuous*
◖ Interrupción baja *Light interrupted*
◖ General
⇕ Interrumpido *Interrupted*



Ref.	KS2100	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	r	€
SOEW13M510 S	✓	✓		✓	12,43	1	5	1,2	**13,95**
SOET13M520-MS			✓	✓	12,43		5	2,0	**13,95**
SOKW13M510 S	✓	✓		✓	12,43	1	5	1,2	**11,40**

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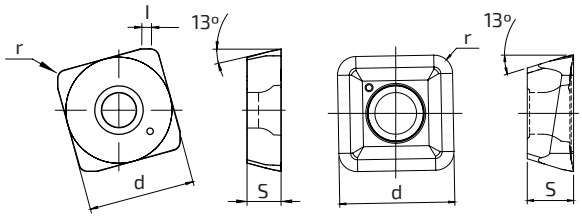
SO16

P	●	◖	◖	⇕
M			◖	⇕
K	●	◖		⇕
N				
S			◖	⇕
H				

● Continuo *Continuous*
◖ Interrupción baja *Light interrupted*
◖ General
⇕ Interrumpido *Interrupted*



Ref.	KS2100	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	r	€
SOEW160512 S	✓	✓		✓	16,4	1,5	5,26	1,2	**16,30**
SOET160520-MS			✓	✓	16,4		5,26	2,0	**16,30**

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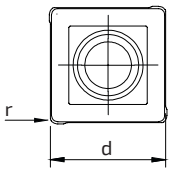
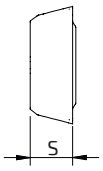
SOMT

P	●
M	●
K	●
N	
S	
H	

● Continuo *Continuous*
◐ Interrupción baja *Light interrupted*
◑ General
◒ Interrupmido *Interrupted*





Ref.	KS3100	Medidas *Dimensions* d	S	r	€
SOMT11T308	✓	10,87	3,97	0,8	**8,95**

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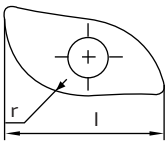
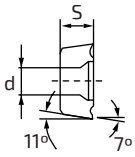
SPE

P	◑
M	◑
K	◑
N	
S	◑
H	

● Continuo *Continuous*
◐ Interrupción baja *Light interrupted*
◑ General
◒ Interrupmido *Interrupted*





Ref.	KS3100	Medidas *Dimensions* l	S	r	d	€
SPE100CE	✓	20	3,97	10,0	4,0	**77,30**
SPE100SE	✓	20	3,97	10,0	4,0	**77,30**
SPE125CE	✓	25	4,76	12,5	4,7	**92,75**
SPE125SE	✓	25	4,76	12,5	4,7	**92,75**
SPE150CE	✓	30	6,35	15,0	5,8	**115,90**
SPE150SE	✓	30	6,35	15,0	5,8	**115,90**
SPE160CE	✓	32	6,35	16,0	5,8	**123,60**
SPE160SE	✓	32	6,35	16,0	5,8	**123,60**

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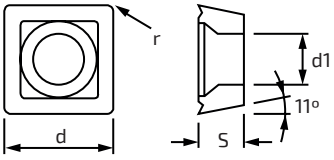
SPMG

P	◎	○
M	○	◎
K	○	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS3100	KS4100	Medidas *Dimensions (mm)* d	S	r	d1	€
SPMG050204-MG	✓		5,00	2,38	0,4	2,30	**6,30**
SPMG 060204-MG	✓		6,00	2,38	0,4	2,65	**6,75**
SPMG 07T308-MG	✓	✓	7,94	3,97	0,8	2,85	**10,05**
SPMG 090408-MG	✓	✓	9,80	4,3	0,8	4,05	**10,70**
SPMG 110408-MG	✓	✓	11,50	4,8	0,8	4,45	**11,30**

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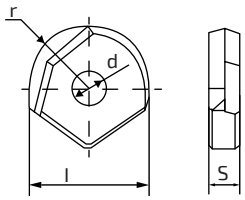
SPWE

P	●
M	●
K	●
N	
S	●
H	

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*



Ref.	KS3100	Medidas *Dimensions* d	l	S	r	€
SPWE100-50R	✓	4	10	3	5,0	**19,35**
SPWE120-60R	✓	4	12	3	6,0	**19,35**
SPWE160-80R	✓	5	16	4	8,0	**21,65**
SPWE200-100R	✓	5	20	5	10,0	**26,60**
SPWE250-125R	✓	6	25	6	12,5	**33,85**
SPWE320-160R	✓	6	32	7	16,0	**43,30**

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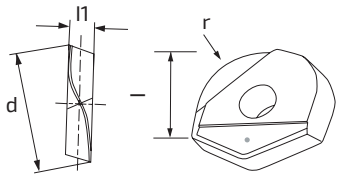
SPW/SPQ

P	●
M	
K	●
N	
S	
H	

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*



Ref.	KS2100	Medidas *Dimensions* d	l	l1	r	€
SPW 100-500R	✓	10,0	12,0	2,7	5,0	**45,30**
SPW 120-600R	✓	12,0	14,6	3,2	6,0	**45,30**
SPW 160-800R	✓	16,0	16,6	4,2	8,0	**49,05**
SPW 200-100R	✓	20,3	20,3	5,2	10,0	**53,85**
SPW 250-125R	✓	24,1	24,1	6,2	12,5	**60,35**

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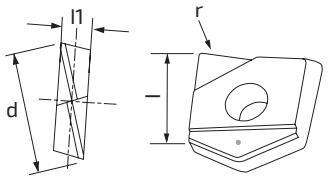
P	●
M	
K	●
N	
S	
H	

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*



Ref.	KS2100	Medidas *Dimensions* d	l	l1	r	€
SPQ 100-05R	✓	10,0	11,6	2,7	0,5	**50,95**
SPQ 100-10R	✓				1,0	**50,95**
SPQ 120-05R	✓	12,0	14,3	3,2	0,5	**50,95**
SPQ 120-10R	✓				1,0	**50,95**
SPQ 120-20R	✓				2,0	**50,95**
SPQ 160-05R	✓	16,0	16,6	4,2	0,5	**54,70**
SPQ 160-10R	✓				1,0	**54,70**
SPQ 160-20R	✓				2,0	**54,70**
SPQ 200-05R	✓	20,0	19,9	5,2	0,5	**60,35**
SPQ 200-10R	✓				1,0	**60,35**
SPQ 200-20R	✓				2,0	**60,35**
SPQ 250-05R	✓	25,0	22,3	6,2	0,5	**67,90**
SPQ 250-10R	✓				1,0	**67,90**
SPQ 250-20R	✓				2,0	**67,90**

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TCAW/TNAW

Ref.	SKY77	NERO26	€
TCAW1102ZZ00435TL28	✓		14,32
TCAW1102ZZ00435TR28	✓		14,32
TCAW1103ZZ00727TL28	✓		14,32
TCAW1103ZZ00627TR28	✓		14,32
TNAW16T3ZZ00414TL28	✓		15,15
TNAW16T3ZZ00314TR28	✓		15,15
TNAW1604ZZ00441TL28	✓	✓	15,15
TNAW1604ZZ00341TR28	✓	✓	15,15
TNAW1606ZZ00449TL28	✓	✓	15,77
TNAW1606ZZ00349TL28	✓	✓	15,77

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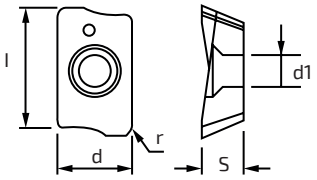
W390

P	◎	◎
M	○	○
K	◎	○

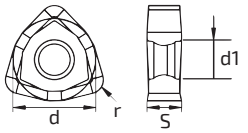
◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
W390 11T308-MG	✓	✓	11	6,9	3,59	0,8	2,8	7,45

WNMX
De doble cara/ *Double sided*

P	◎	◎	◎ 1ª opción *1st choice*						
M	○	◎	○ 2ª opción *2nd choice*						
K	◎	◎							
Ref.	**KS2100**	**KS3100**	**Medidas** *Dimensions (mm)*				**€**		
			d	**S**	**r**	**d1**			
WNMX09T316-RG	✓	✓	9,525	3,97	1,6	3,6	**11,75**		



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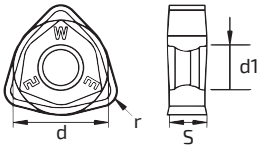
P	◎	◎ 1ª opción *1st choice*						
M	◎	○ 2ª opción *2nd choice*						
K	◎							
Ref.	**KS3100**	**Medidas** *Dimensions (mm)*				**€**		
		d	**S**	**r**	**d1**			
WNMX130516-MG	✓	12,700	6,02	1,6	4,7	**13,95**		



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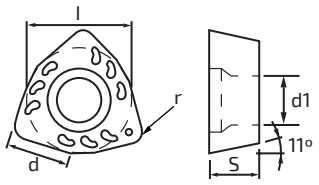
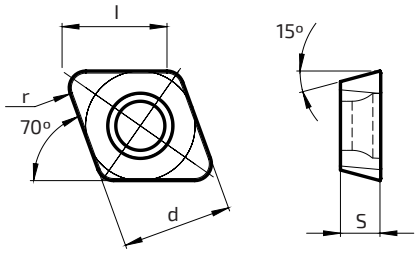
WPMW

P	◎	○	◎ 1ª opción *1st choice*						
M	◎	◎	○ 2ª opción *2nd choice*						
K	◎	○							
Ref.	**KS3100**	**KS4100**	**Medidas** *Dimensions (mm)*					**€**	
			l	**d**	**S**	**r**	**d1**		
WPMW080615ZPSR-RG	✓	✓	8	12,87	6,35	1,5	5,5	**9,75**	



XDHW

P	●	● Continuo *Continuous*					
M		◖ Interrupción baja *Light interrupted*					
K		◖ General					
N		◖ Interrumpido *Interrupted*					
S							
H							
Ref.	**KS2100**	**Medidas** *Dimensions*				**€**	
		d	**l**	**S**	**r**		
XDHW040110	✓	4,0	4,0	1,59	1,0	**7,40**	
XDHW060210	✓	6,5	6,2	2,38	1,0	**7,40**	
XDHW10T310	✓	10,0	9,9	3,97	1,0	**8,55**	



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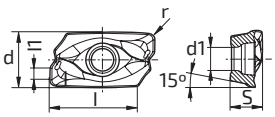
XDKT

P	●	○	○
M	○	●	●
K			○
N			
S			●
H			

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use



Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	l1	r	d1	€
XDKT070304SR-M50	✓	✓		4,9	7,8	3,18	1	0,4	2,8	**11,15**
XDKT070308SR-M50	✓	✓		4,9	7,8	3,18	1	0,8	2,8	**11,15**
XDKT11T304SR-M50	✓	✓		6,8	10,6	3,8	1,8	0,4	2,8	**13,55**
XDKT11T308SR-M50	✓	✓		6,8	10,6	3,8	1,4	0,8	2,8	**13,55**
XDKT11T312SR-M50	✓	✓		6,8	10,6	3,8	1	1,2	2,8	**13,55**
XDKT11T320SR-M50	✓	✓		6,8	10,6	3,8	2,1	1,2	2,8	**13,55**
XDKT11T325SR-M50	✓			6,8	10,6	3,8	1,6	2	2,8	**13,55**
XDKT11T332SR-M50		✓		6,8	10,6	3,8	1,5	2,5	2,8	**13,55**
XDKT11T304SR-R50	✓			6,8	10,6	3,8	1,8	3,2	2,8	**13,55**
XDKT11T308SR-R50	✓	✓		6,8	10,6	3,8	1,4	0,4	2,8	**13,55**
XDKT11T312SR-R50		✓		6,8	10,6	3,8	1	1,2	2,8	**13,55**
XDKT11T320SR-R50	✓	✓		6,8	10,6	3,8	2,1	2	2,8	**13,55**
XDKT11T325SR-R50	✓			6,8	10,6	3,8	1,6	2,5	2,8	**13,55**
XDKT11T332SR-R50		✓		6,8	10,6	3,8	1,5	3,2	2,8	**13,55**
XDKT070304ER-F40			✓	4,9	7,8	3,18	1,2	0,4	2,5	**13,30**
XDKT070308ER-F40			✓	4,9	7,8	3,18	0,8	0,8	2,5	**13,30**
XDKT11T304ER-F40			✓	6,8	10,6	3,8	1,7	0,4	2,8	**17,40**
XDKT11T308ER-F40			✓	6,8	10,6	3,8	1,4	0,8	2,8	**17,40**
XDKT11T312ER-F40			✓	6,8	10,6	3,8	1,1	1,2	2,8	**17,40**
XDKT11T316ER-F40			✓	6,8	10,6	3,8	0,8	1,6	2,8	**17,40**
XDKT11T320ER-F40			✓	6,8	10,6	3,8	0,3	2	2,8	**17,40**
XDKT11T325ER-F40			✓	6,8	10,6	3,8	1,6	2,5	2,8	**17,40**
XDKT11T332ER-F40			✓	6,8	10,6	3,8	1,5	3,2	2,8	**17,40**
XDKT11T340ER-F40			✓	6,8	10,6	3,8		4	2,8	**17,40**
XDKT070304SR-F50	✓	✓		4,9	7,8	3,18	1,2	0,4	2,5	**11,15**
XDKT070308SR-F50	✓	✓		4,9	7,8	3,18	1	0,8	2,5	**11,15**
XDKT11T304SR-F50	✓			6,8	10,6	3,8	1,8	0,4	2,8	**13,55**
XDKT11T308SR-F50	✓	✓		6,8	10,6	3,8	1,4	0,8	2,8	**13,55**
XDKT11T312SR-F50		✓		6,8	10,6	3,8	1	1,2	2,8	**13,55**
XDKT11T320SR-F50	✓	✓		6,8	10,6	3,8	2,1	2	2,8	**13,55**
XDKT11T325SR-F50	✓			6,8	10,6	3,8	1,6	2,5	2,8	**13,55**
XDKT11T332SR-F50		✓		6,8	10,6	3,8	1,5	3,2	2,8	**13,55**

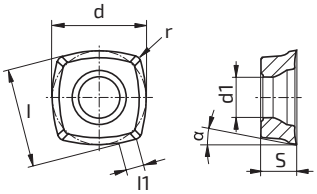
Portaherramientas | Tool holder pag. 328 - 331

XDL / XOLX / XPLX

P	●	○	○
M	○	●	●
K			○
N			
S			●
H			

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use



Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	l1	r	d1	€
XDLX09T308ER-F40			✓	9,49	9	3,97	-	0,8	4,4	**14,80**
XOLX120410ER-F40			✓	12,70	12	4,76	-	1,0	5,5	**17,30**
XPLX060305ER-F40			✓	6,35	6	2,75	-	0,5	2,8	**14,50**
XDLX09T308SR-M50	✓	✓		9,60	9	3,97	1,5	0,8	4,4	**12,25**
XOLX120410SR-M50	✓	✓		12,70	12	4,76	2,2	1,0	5,5	**14,70**
XPLX060305ER-M50	✓	✓		6,35	6	2,75	1,0	0,5	2,8	**11,90**
XOLX120410SR-R50	✓			12,70	12	4,76	2,2	1,0	5,5	**14,70**

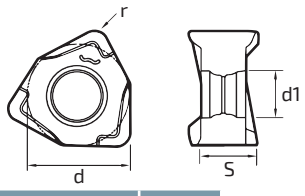
Portaherramientas | Tool holder pag. 384 - 385

XNMX
De doble cara/ *Double sided*

P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

◎ 1ª opción
1st choice

○ 2ª opción
2nd choice



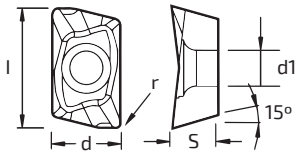
Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* d	S	r	d1	€
XNMX040308-MG	✓	✓		6,70	3,285	0,8	3,15	**15,65**
XNMX040308-RG	✓	✓		6,70	3,285	0,8	3,15	**15,65**
XNMX080608-MG		✓	✓	12,53	6,5	0,8	4,5	**13,95**

Portaherramientas | Tool holder pag. 349 - 351

XOMT
De doble cara/ *Double sided*

P	◎	◎
M	○	◎
K	◎	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



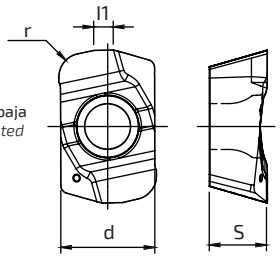
Ref.	KS2100	KS3100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
XOMT060204-MG	✓	✓	7,00	4,09	2,45	0,4	2	**8,75**
XOMT060208-MG	✓	✓	7,00	4,09	2,45	0,8	2	**8,75**

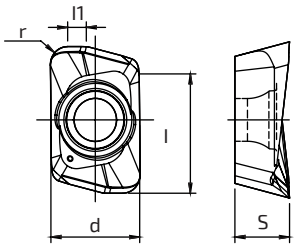
Portaherramientas | Tool holder pag. 325

XPET06

P	●	✱
M		✱
K	●	✱
N		
S		✱
H		

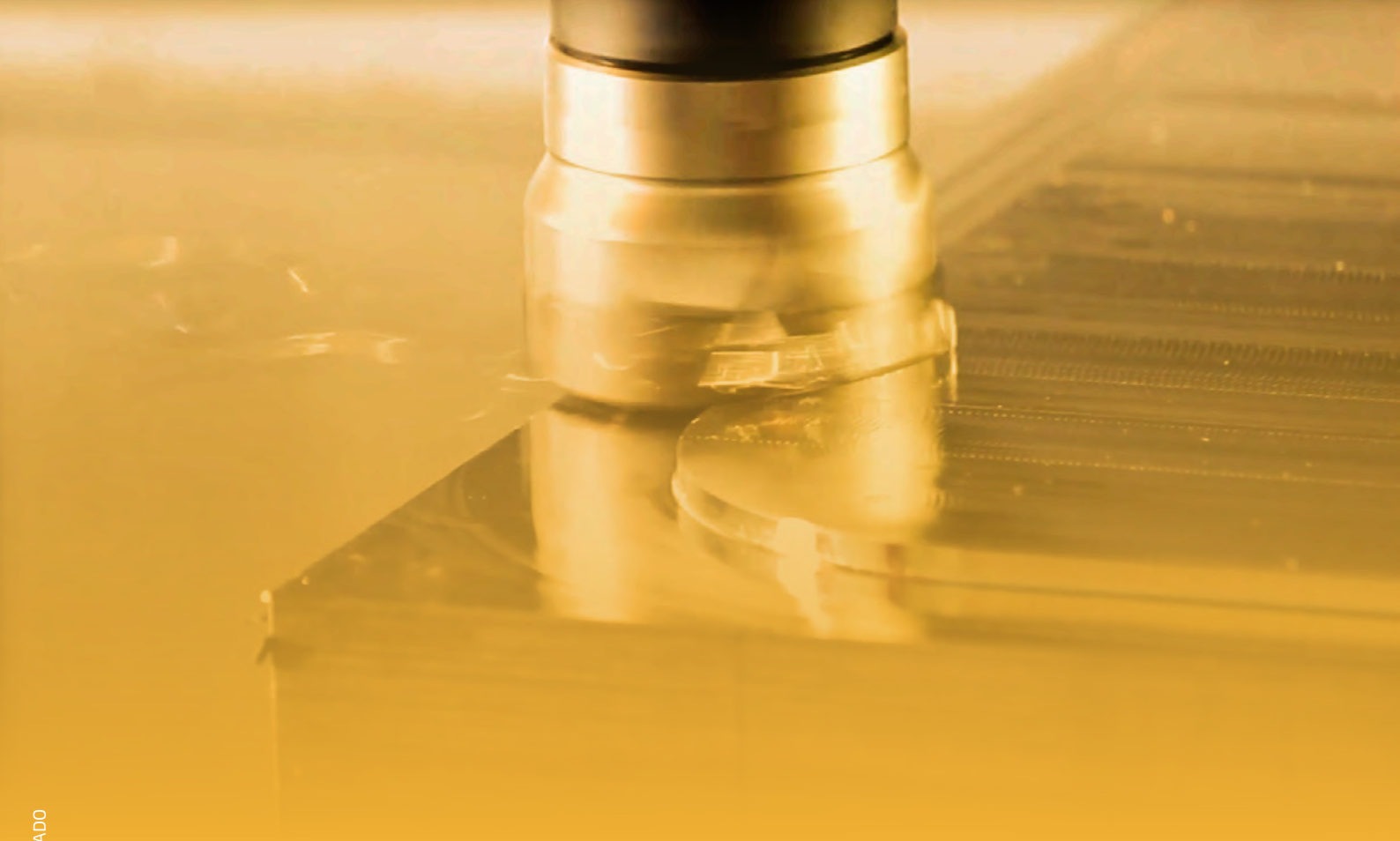
● Continuo *Continuous*
● Interrupción baja *Light interrupted*
✱ General
✱ Interrumpido *Interrupted*





Ref.	KS3100	KS4100	Medidas *Dimensions* d	l	S	l1	r	€
XPET060210ZER-HF	✓	✓	3,9	-	2,4	0,8	1,0	**11,85**
XPET060204PDER-LP	✓	✓	3,9	5,3	2,4	0,8	0,4	**11,85**
XPET060208PDER-LP	✓	✓	3,9	5,3	2,4	0,6	0,8	**11,85**
XPET060216PDER-LP	✓	✓	3,9	5,3	2,4	0,5	1,6	**11,85**

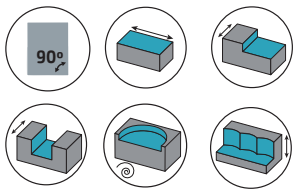
Portaherramientas | Tool holder pag. 326 - 327

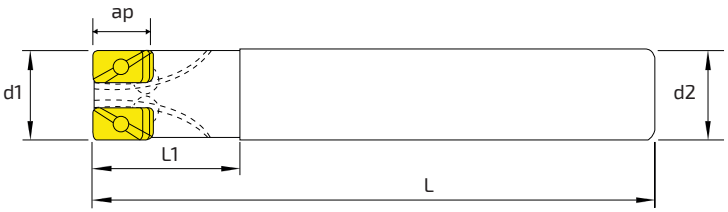


HERRAMIENTAS DE ESCUADRAR

Squaring tools

X006





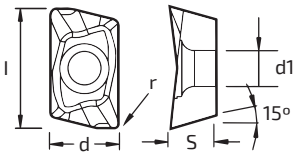
Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
X06-010M02R	XOMT0602	10	10	100	20	2	5	**119,40**
X06-011M02R	XOMT0602	11	10	100	20	2	5	**119,40**
X06-012M02R	XOMT0602	12	12	100	20	2	5	**119,40**
X06-012M03R	XOMT0602	12	12	100	20	3	5	**164,00**
X06-013M02R	XOMT0602	13	12	100	20	2	5	**119,40**
X06-013M03R	XOMT0602	13	12	100	20	3	5	**171,70**
X06-016M03R	XOMT0602	16	16	100	20	3	5	**209,10**
X06-017M04R	XOMT0602	17	16	120	30	4	5	**209,10**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P1801**		**4,90**

XOMT

P	◎	◎
M	○	◎
K	◎	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

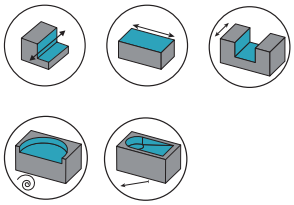


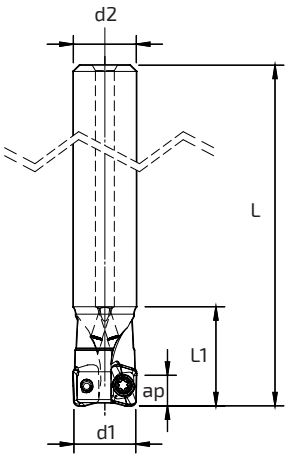
Ref.	KS2100	KS3100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
XOMT060204-MG	✓	✓	7,00	4,09	2,45	0,4	2	**8,75**
XOMT060208-MG	✓	✓	7,00	4,09	2,45	0,8	2	**8,75**

Condiciones de corte
Cutting conditions

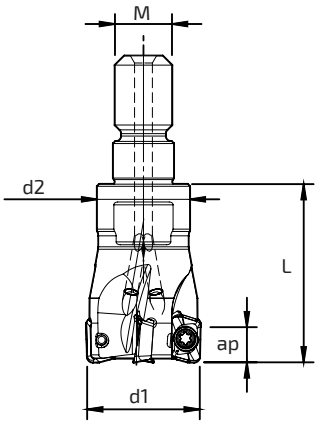
MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 220	0,05 ~ 0,13	~ 3,0
Inoxidable *Stainless 300 series*	50 ~ 110	0,05 ~ 0,10	~ 2,5
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,05 ~ 0,13	~ 3,0

XP06





Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
XP06-010M02R	XP..0602..	10	10	55	16	2	4	**167,45**
XP06-010M02RL	XP..0602..	10	10	100	25	2	4	**173,75**
XP06-012M02R	XP..0602..	12	12	80	17	2	4	**173,75**
XP06-012M03RL	XP..0602..	12	12	120	30	3	4	**203,45**
XP06-016M03R	XP..0602..	16	16	90	20	3	4	**209,45**
XP06-016M04RL	XP..0602..	16	16	90	20	4	4	**245,45**
XP06-017M05R	XP..0602..	17	16	90	35	5	4	**281,15**
XP06-021M05R	XP..0602..	21	20	90	35	5	4	**286,90**



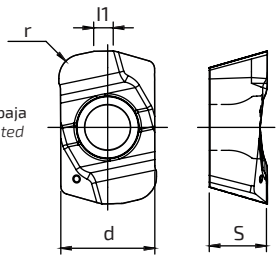
Ref.	Plaquita *Inserts*	d1	d2	L	M	z	ap	€
XP06-010R02RB	XP..0602..	10	9,8	20	M6	2	4	**161,75**
XP06-011R02R	XP..0602..	11	9,8	20	M6	2	4	**167,45**
XP06-012R03R	XP..0602..	12	9,8	20	M6	3	4	**173,75**
XP06-012R03RB	XP..0602..	12	9,8	20	M6	3	4	**173,75**
XP06-016R04R	XP..0602..	16	13	25	M8	4	4	**179,75**
XP06-017R04R	XP..0602..	17	13	25	M8	4	4	**179,75**
XP06-020R05R	XP..0602..	20	18	30	M10	5	4	**221,75**
XP06-025R07R	XP..0602..	25	21	30	M12	7	4	**286,90**
XP06-032R08R	XP..0602..	32	29	35	M16	8	4	**352,90**

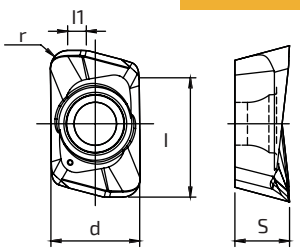
Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P01803**		**8,70**

XPET06

P	●	✱
M		✱
K	●	✱
N		
S		✱
H		

● Continuo *Continuous*
◕ Interrupción baja *Light interrupted*
◕ General
◕ Interrumpido *Interrupted*



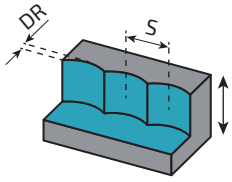


Ref.	KS3100	KS4100	Medidas *Dimensions* d	l	S	l1	r	€
XPET060210ZER-HF	✓	✓	3,9	-	2,4	0,8	1,0	**11,85**
XPET060204PDER-LP	✓	✓	3,9	5,3	2,4	0,8	0,4	**11,85**
XPET060208PDER-LP	✓	✓	3,9	5,3	2,4	0,6	0,8	**11,85**
XPET060216PDER-LP	✓	✓	3,9	5,3	2,4	0,5	1,6	**11,85**

Condiciones de corte
Cutting conditions

MATERIAL	Vc (m/min) KS3100	Vc (m/min) KS4100	fz XPET0602... LP	fz XPET0602... HF
Acero sin aleación *Unlloyed steel (HB125-220)*	180 - 240	160 - 220	0,05 - 0,07	0,40 - 0,8
Acero de baja aleación *Low-alloyed steel (HB220-280)*	170 - 250	150 - 230	0,05 - 0,07	0,40 - 0,8
Acero de alta aleación *High-alloyed steel (HB280-380)*	160 - 210	140 - 190	0,05 - 0,07	0,40 - 0,6
Ferrítico/Martensítico *Ferritic/Martensitic (HB200-330)*	-	-	0,05 - 0,07	0,40 - 0,8
Austenítico/Duplex *Austenitic/Duplex (HB 200-330)*	-	-	0,05 - 0,07	0,40 - 0,6
Dúplex *Duplex (HB230-260)*	-	-	0,05 - 0,07	0,40 - 0,6
Hierro fundido maleable *Malleable cast iron (HB130-230)*	-	160 - 350	0,05 - 0,07	0,50 - 0,8
Fundición de hierro gris *Grey cast iron (HB160-250)*	-	150 - 350	0,05 - 0,07	0,50 - 0,8
Fundición de hierro nodular *Nodular cast iron (HB180-245)*	-	120 - 260	0,05 - 0,07	0,50 - 0,8
Superaleaciones resistentes al calor *Heat resistant super alloys (HB200-320)*	-	-	0,05 - 0,07	0,40 - 0,6

L<3Dc	L>3Dc	S max.
fz (mm/t)		
0,10 - 0,20	0,10 - 0,14	$Smax = \sqrt{DC.Dr - Dr^2}$

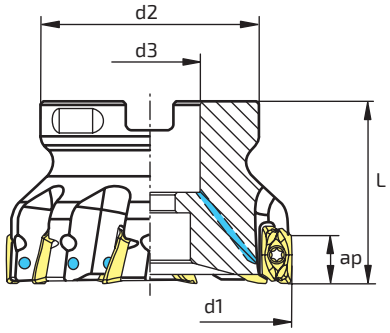


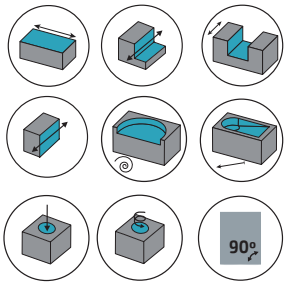
S máx. y DR diámetro de corte correspondiente Dc *S max and DR corresponding cutting diameter Dc*								
DR (mm)	Dc (mm)							
	32	40	50	63	80	100	125	160
1,0	5,6	6,2	7,0	7,9	8,9	9,9	11,1	12,6
2,0	7,7	8,7	9,8	11,0	12,5	14,0	15,7	17,8
3,0	9,3	10,5	11,9	13,4	15,2	17,1	19,1	21,7
4,0	10,6	12,0	13,6	15,4	17,4	19,6	22,0	25,0
5,0	11,6	13,2	15,0	17,0	19,4	21,8	24,5	27,8

Operación *Operation*	KS3100	KS4100	KS5100
Ranurado *Slotting*	100%	<20%	1,0 - 3,0
Escuadrado *Shouldering*	<50%	>8%	1,0 - 4,0
	≤25%	>12%	1,0 - 4,0

(1) Condiciones de corte ae/Dc=70%.
Cutting conditions a_e/Dc=70%.

XD07

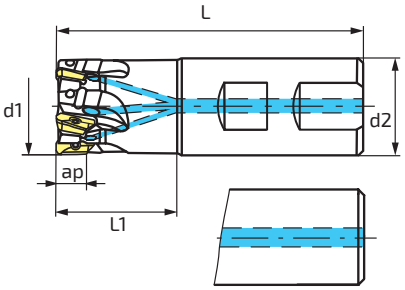


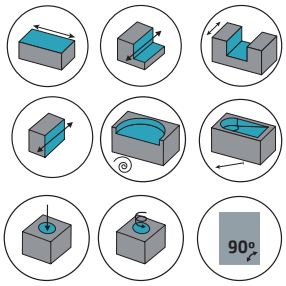


Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
XD07-032A06R	XD..07..	32	38	16	40	6	6	**308,90**
XD07-032A08R	XD..07..	32	38	16	40	8	6	**345,10**
XD07-040A08R	XD..07..	40	38	16	40	8	6	**381,40**
XD07-040A10R	XD..07..	40	38	16	40	10	6	**417,80**
XD07-050A10R	XD..07..	50	43	22	40	10	6	**454,00**
XD07-050A12R	XD..07..	50	43	22	40	12	10	**490,30**
XD07-040A04R	XD..07..	40	38	16	40	4	10	**308,90**
XD07-040A06R	XD..07..	40	38	16	40	6	10	**345,10**
XD07-050A05R	XD..07..	50	43	22	40	5	10	**363,30**
XD07-050A08R	XD..07..	50	43	22	40	8	10	**417,90**
XD07-063A06R	XD..07..	63	48	22	40	6	10	**417,90**
XD07-063A10R	XD..07..	63	48	22	40	10	10	**490,50**
XD07-080A07R	XD..07..	80	58	27	50	7	10	**472,40**
XD07-080A10R	XD..07..	80	58	27	50	10	10	**526,80**
XD07-080A12R	XD..07..	80	58	27	50	12	10	**563,20**
XD07-100A08R	XD..07..	100	78	32	50	8	10	**526,80**
XD07-100A14R	XD..07..	100	78	32	50	14	10	**635,90**
XD07-125A10R	XD..07..	125	88	40	63	10	10	**575,20**

Tornillo de inserción *Insert screw*	€
11450028	**3,10**
11114242	**4,00**

XD07

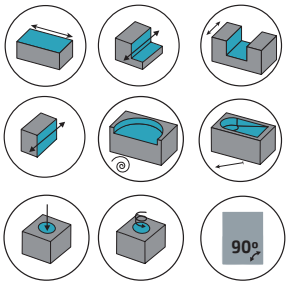


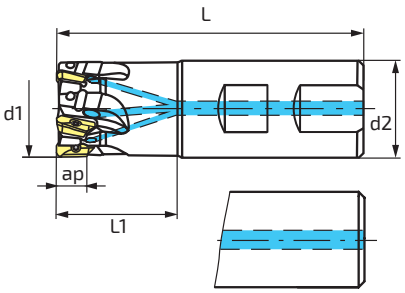


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
XD07-010M01R	XD..07..	10	10	61	20	1	6	**206,00**
XD07-012M02R	XD..07..	12	12	66,5	20	2	6	**236,10**
XD07-016M03R	XD..07..	16	16	165	32	3	6	**242,20**
XD07-016M04R	XD..07..	16	16	74,5	25	4	6	**260,40**
XD07-020M04R	XD..07..	20	20	200	40	4	6	**272,40**
XD07-020M05R	XD..07..	20	20	77	25	5	6	**290,60**
XD07-025M05R	XD..07..	25	25	225	50	5	6	**302,70**
XD07-025M06R	XD..07..	25	25	84	32	6	6	**339,00**
XD07-032M08R	XD..07..	32	32	88	40	8	6	**369,10**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**11450028**	**3,10**

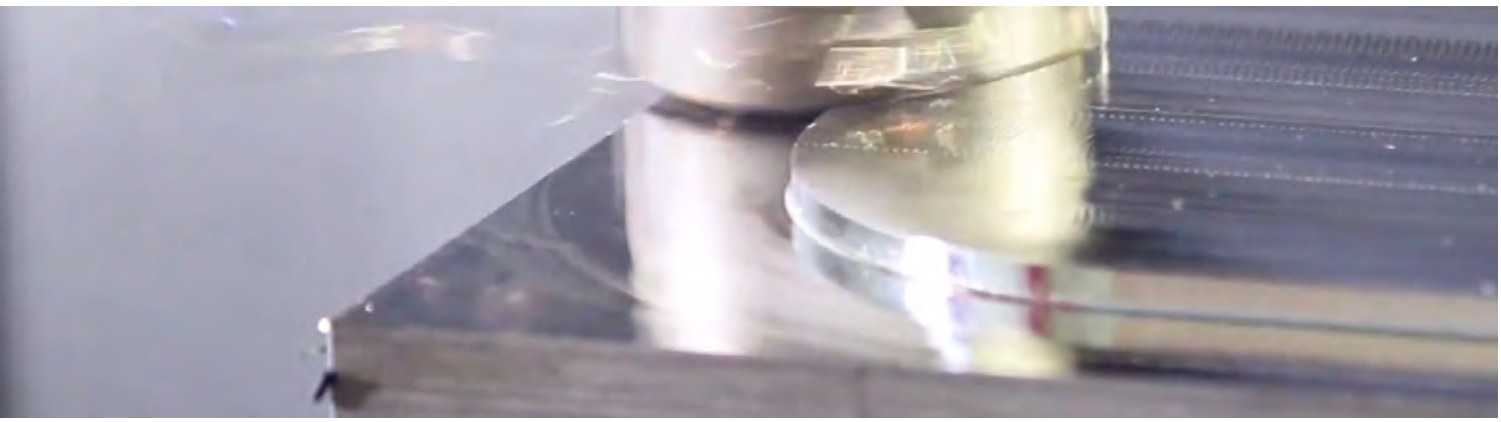
XD11



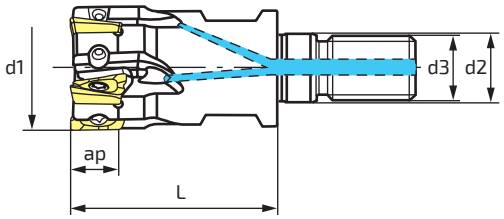


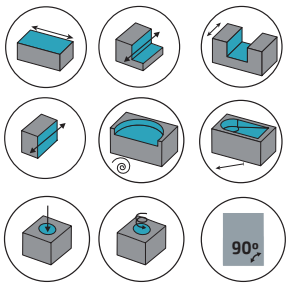
Tornillo de inserción *Insert screw*	€
11368132	4,00
11114238	4,00
11114242	4,00

Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
XD11-012M01R	XD..11..	12	16	75	20	1	10	199,80
XD11-016M02R	XD..11..	16	15	165	32	2	10	224,00
XD11-016M02RM	XD..11..	16	16	75	25	2	10	224,00
XD11-016M02RL	XD..11..	16	16	165	32	2	10	224,00
XD11-020M02R	XD..11..	20	19	200	40	2	10	236,10
XD11-020M02RM	XD..11..	20	20	77	25	2	10	236,10
XD11-020M02RL	XD..11..	20	20	200	40	2	10	236,10
XD11-020M03RM	XD..11..	20	20	77	25	3	10	254,30
XD11-020M03RL	XD..11..	20	20	165	32	3	10	254,30
XD11-025M02R	XD..11..	25	25	225	50	2	10	248,40
XD11-025M03R	XD..11..	25	24	225	50	3	10	266,50
XD11-025M03RM	XD..11..	25	25	90	32	3	10	266,50
XD11-025M03RL	XD..11..	25	25	225	50	3	10	266,50
XD11-025M04RM	XD..11..	25	25	90	32	4	10	284,60
XD11-025M04RL	XD..11..	25	25	165	40	4	10	284,60
XD11-032M04R	XD..11..	32	25	102	40	4	10	296,70
XD11-032M04RM	XD..11..	32	32	102	40	4	10	296,70
XD11-032M04RL	XD..11..	32	32	250	64	4	10	296,70
XD11-032M05R	XD..11..	32	32	102	40	5	10	315,00
XD11-032M05RL	XD..11..	32	32	165	50	5	10	315,00
XD11-032M05RM	XD..11..	32	32	102	40	5	10	315,00
XD11-040M06RL	XD..11..	40	40	122	50	6	10	345,10



XD07





Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
XD07-016R04R	XD..07..	16	8,5	8	27	4	6	**260,40**
XD07-020R04R	XD..07..	20	10,5	10	33	5	6	**290,60**
XD07-025R04R	XD..07..	25	12,5	12	35	6	6	**339,00**
XD07-032R04R	XD..07..	32	17,0	16	35	8	6	**369,10**
XD11-016R04R	XD..11..	16	8,5	8	27	2	10	**224,00**
XD11-020R04R	XD..11..	20	10,5	10	33	2	10	**236,10**
XD11-020R03R	XD..11..	20	10,5	10	33	3	10	**254,30**
XD11-025R03R	XD..11..	25	12,5	12	35	3	10	**266,40**
XD11-025R04R	XD..11..	25	12,5	12	35	4	10	**284,60**
XD11-032R04R	XD..11..	32	17,0	16	35	4	10	**296,70**
XD11-032R05R	XD..11..	32	17,0	16	35	5	10	**315,00**
XD11-040R05R	XD..11..	40	17,0	16	35	6	10	**345,10**

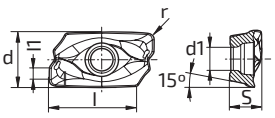
Tornillo de inserción *Insert screw*	€
11450028	**3,10**
11114238	**4,00**
11114242	**4,00**

XDKT

P	●	○	○
M	○	●	●
K			○
N			
S			●
H			

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use

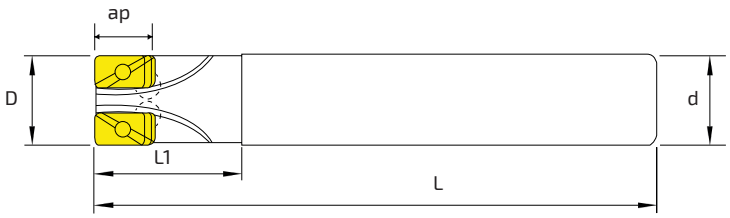


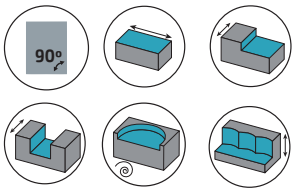
Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	l1	r	d1	€
XDKT070304SR-M50	✓	✓		4,9	7,8	3,18	1	0,4	2,8	**11,15**
XDKT070308SR-M50	✓	✓		4,9	7,8	3,18	1	0,8	2,8	**11,15**
XDKT11T304SR-M50	✓	✓		6,8	10,6	3,8	1,8	0,4	2,8	**13,55**
XDKT11T308SR-M50	✓	✓		6,8	10,6	3,8	1,4	0,8	2,8	**13,55**
XDKT11T312SR-M50	✓	✓		6,8	10,6	3,8	1	1,2	2,8	**13,55**
XDKT11T320SR-M50	✓	✓		6,8	10,6	3,8	2,1	1,2	2,8	**13,55**
XDKT11T325SR-M50	✓			6,8	10,6	3,8	1,6	2	2,8	**13,55**
XDKT11T332SR-M50		✓		6,8	10,6	3,8	1,5	2,5	2,8	**13,55**
XDKT11T304SR-R50	✓			6,8	10,6	3,8	1,8	3,2	2,8	**13,55**
XDKT11T308SR-R50	✓	✓		6,8	10,6	3,8	1,4	0,4	2,8	**13,55**
XDKT11T312SR-R50		✓		6,8	10,6	3,8	1	1,2	2,8	**13,55**
XDKT11T320SR-R50	✓	✓		6,8	10,6	3,8	2,1	2	2,8	**13,55**
XDKT11T325SR-R50	✓			6,8	10,6	3,8	1,6	2,5	2,8	**13,55**
XDKT11T332SR-R50		✓		6,8	10,6	3,8	1,5	3,2	2,8	**13,55**
XDKT070304ER-F40			✓	4,9	7,8	3,18	1,2	0,4	2,5	**13,30**
XDKT070308ER-F40			✓	4,9	7,8	3,18	0,8	0,8	2,5	**13,30**
XDKT11T304ER-F40			✓	6,8	10,6	3,8	1,7	0,4	2,8	**17,40**
XDKT11T308ER-F40			✓	6,8	10,6	3,8	1,4	0,8	2,8	**17,40**
XDKT11T312ER-F40			✓	6,8	10,6	3,8	1,1	1,2	2,8	**17,40**
XDKT11T316ER-F40			✓	6,8	10,6	3,8	0,8	1,6	2,8	**17,40**
XDKT11T320ER-F40			✓	6,8	10,6	3,8	0,3	2	2,8	**17,40**
XDKT11T325ER-F40			✓	6,8	10,6	3,8	1,6	2,5	2,8	**17,40**
XDKT11T332ER-F40			✓	6,8	10,6	3,8	1,5	3,2	2,8	**17,40**
XDKT11T340ER-F40			✓	6,8	10,6	3,8		4	2,8	**17,40**
XDKT070304SR-F50	✓	✓		4,9	7,8	3,18	1,2	0,4	2,5	**11,15**
XDKT070308SR-F50	✓	✓		4,9	7,8	3,18	1	0,8	2,5	**11,15**
XDKT11T304SR-F50	✓			6,8	10,6	3,8	1,8	0,4	2,8	**13,55**
XDKT11T308SR-F50	✓	✓		6,8	10,6	3,8	1,4	0,8	2,8	**13,55**
XDKT11T312SR-F50		✓		6,8	10,6	3,8	1	1,2	2,8	**13,55**
XDKT11T320SR-F50	✓	✓		6,8	10,6	3,8	2,1	2	2,8	**13,55**
XDKT11T325SR-F50	✓			6,8	10,6	3,8	1,6	2,5	2,8	**13,55**
XDKT11T332SR-F50		✓		6,8	10,6	3,8	1,5	3,2	2,8	**13,55**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz 07	fz 11	ap 07	ap 11
Acero < 1.000 N/mm² *Steel < 1.000 N/mm²*	200	0,03 ~ 0,9	0,07 ~ 0,18	~ 6	10
Inoxidable *Inox. < 600 N/mm²*	180	0,03 ~ 0,07	0,07 ~ 0,17	~ 5	8
Fundición < HB 180 *Fund. < HB 180*	250	0,03 ~ 0,07	0,7 ~ 0,17	~ 5	8
Titanio/Inconel *Titan. / In. < 1.450 N/mm²*	35	0,03 ~ 0,05	0,07 ~ 0,12	~ 4	6

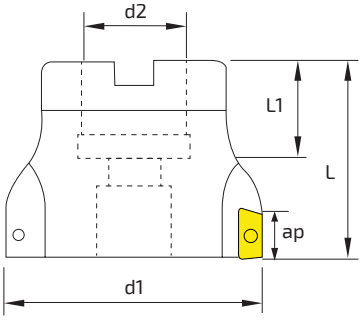
AP10

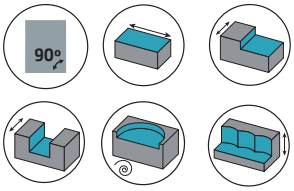




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AP10-016M02R	APKT1003	16	16	120	25	2	10	**119,40**
AP10-016M02RL	APKT1003	16	16	160	25	2	10	**134,30**
AP10-017M02R	APKT1003	17	16	120	25	2	10	**119,40**
AP10-017M02RL	APKT1003	17	16	160	25	2	10	**134,30**
AP10-020M02R	APKT1003	20	20	120	30	2	10	**119,40**
AP10-020M02RL	APKT1003	20	20	150	30	2	10	**134,30**
AP10-020M02RLL	APKT1003	20	20	200	30	2	10	**156,80**
AP10-021M02R	APKT1003	21	20	150	30	2	10	**134,30**
AP10-021M02RL	APKT1003	21	20	200	30	2	10	**156,80**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P2507**		**4,90**

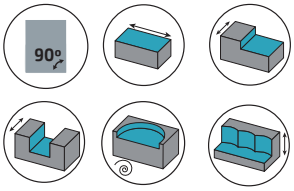


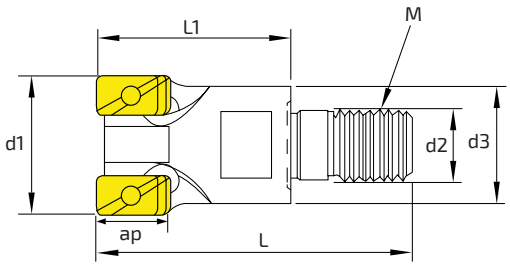


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AP10-050A06R	APKT1003	50	22	20	40	6	10	**238,80**
AP10-063A06R	APKT1003	63	22	21	45	6	10	**246,50**
AP10-080A07R	APKT1003	80	27	23	50	7	10	**328,45**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P2507**		**4,90**

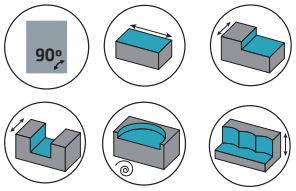
AP10

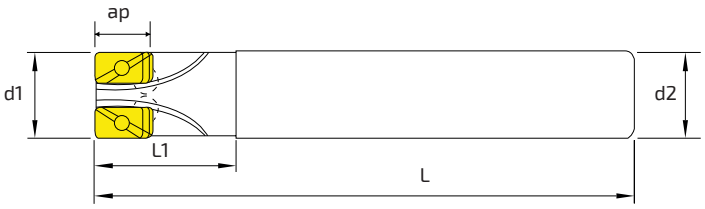




Ref.	Plaquita *Inserts*	d1	d2	d3	L	L1	M	z	ap	€
AP10-016R02R	APKT1003	16	8,5	15	43	26	M8	2	10	**141,95**
AP10-017R02R	APKT1003	17	8,5	15	43	26	M8	2	10	**141,95**
AP10-020R02R	APKT1003	20	10,5	18	50	32	M10	2	10	**141,95**
AP10-020R03R	APKT1003	20	10,5	18	50	32	M10	3	10	**179,35**
AP10-021R02R	APKT1003	21	10,5	18	50	32	M10	2	10	**149,15**
AP10-021R03R	APKT1003	21	10,5	18	50	32	M10	3	10	**179,35**
AP10-025R02R	APKT1003	25	12,5	23	50	38	M12	2	10	**156,80**
AP10-025R04R	APKT1003	25	12,5	23	60	38	M12	4	10	**209,10**
AP10-026R02R	APKT1003	26	12,5	23	60	38	M12	2	10	**156,80**
AP10-026R04R	APKT1003	26	12,5	23	60	38	M12	4	10	**209,10**
AP10-032R05R	APKT1003	32	17,0	30	63	41	M12	5	10	**238,80**
AP10-033R05R	APKT1003	33	17,0	30	63	41	M16	5	10	**238,80**
AP10-040R06R	APKT1003	40	17,0	32	65	43	M16	6	10	**298,75**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P2504**	**4,90**

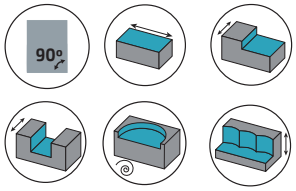


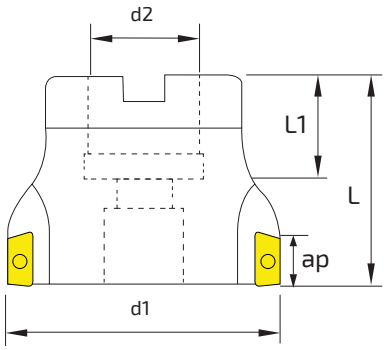


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AP16-025M02R	APKT1604	25	25	150	40	2	16	**134,30**
AP16-025M02RL	APKT1604	25	25	220	40	2	16	**164,00**
AP16-026M02R	APKT1604	26	25	150	40	2	16	**134,30**
AP16-026M02RL	APKT1604	26	25	220	40	2	16	**164,00**
AP16-032M02R	APKT1604	32	32	150	45	2	16	**141,95**
AP16-032M02RL	APKT1604	32	32	250	45	2	16	**171,70**
AP16-033M02RL	APKT1604	33	32	150	45	2	16	**141,95**
AP16-035M03R	APKT1604	35	32	150	45	3	16	**171,70**
AP16-040M04R	APKT1604	40	32	150	45	4	16	**194,20**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P4005**	**4,90**

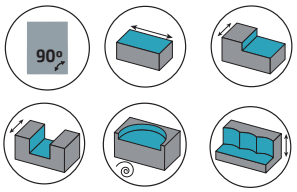
AP16

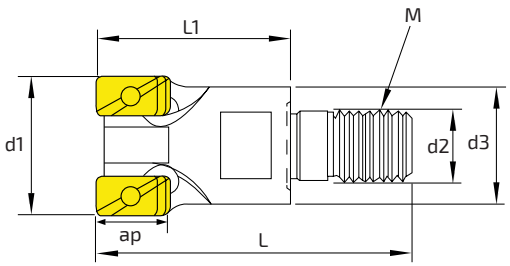




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AP16-100A09R	APKT1604	100	32	55	26	9	16	**447,85**
AP16-050A04R	APKT1604	50	22	50	23	4	16	**298,30**
AP16-063A05R	APKT1604	63	22	50	23	5	16	**238,70**
AP16-080A06R	APKT1604	80	27	55	32	6	16	**268,55**
AP16-100A08R	APKT1604	100	32	55	32	8	16	**313,60**
AP16-125A08R	APKT1604	125	40	63	38	8	16	**387,90**
AP16-160A10R	APKT1604	160	40	63	38	10	16	**515,00**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P4005**		**4,90**





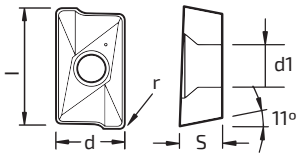
Ref.	Plaquita *Inserts*	d1	d2	d3	L	L1	M	z	ap	€
AP16-025R02R	APKT1604	25	12,5	23	60	38	M12	2	16	**141,95**
AP16-026R02R	APKT1604	26	17,0	23	60	38	M16	2	16	**141,95**
AP16-032R02R	APKT1604	32	17,0	30	63	41	M16	2	16	**156,80**
AP16-032R03R	APKT1604	32	17,0	30	63	41	M16	3	16	**194,20**
AP16-033R02R	APKT1604	33	17,0	30	63	41	M16	2	16	**156,80**
AP16-033R03R	APKT1604	33	17,0	30	63	41	M16	3	16	**194,20**
AP16-040R04R	APKT1604	40	17,0	32	65	43	M16	4	16	**238,80**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P4004**		**4,90**

APKT

P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
APKT100304PDER-MG	✓	✓		10,5	6,700	3,5	0,4	2,8	**6,85**
APKT100308PDER-MG	✓	✓		10,5	6,700	3,5	0,8	2,8	**6,85**
APKT100304PDER-RG			✓	10,5	6,700	3,5	0,4	2,8	**8,00**
APKT160408PDER-MG			✓	16,3	9,525	5,25	0,8	4,5	**9,55**
APKT160408PDER-RG			✓	16,3	9,525	5,25	0,8	4,5	**9,55**
APKT160416PDER-MG		✓		16,3	9,525	5,25	0,8	4,5	**9,75**
APKT160424PDER-MG		✓		16,3	9,525	5,25	0,8	4,5	**9,75**
APKT160432PDER-MG		✓		16,3	9,525	5,25	0,8	4,5	**9,75**

Condiciones de corte
Cutting conditions

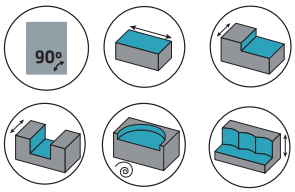
APKT1003

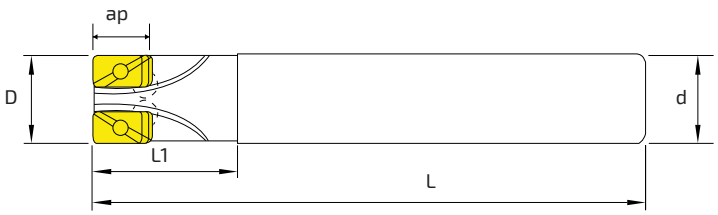
MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,08 ~ 0,20	~ 7,0
Inoxidable *Stainless 300 series*	50 ~ 110	0,05 ~ 0,15	~ 4,0
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,08 ~ 0,20	~ 6,0

APKT1604

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,12 ~ 0,28	~ 11,0
Inoxidable *Stainless 300 series*	50 ~ 110	0,10 ~ 0,22	~ 7,0
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,12 ~ 0,28	~ 10,0

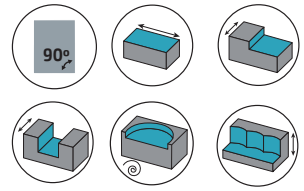
AP/AM

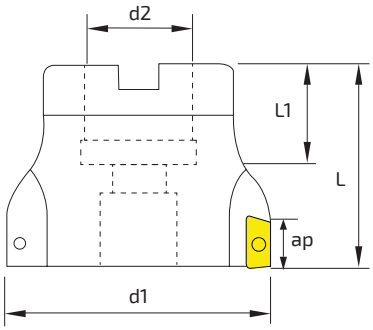




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AP11-016M02R	APMT1135	16	16	100	25	2	11	**89,70**
AP11-017M02R	APMT1135	17	16	100	30	2	11	**134,30**
AP11-019M02R	APMT1135	19	16	100	30	2	11	**134,30**
AP11-020M03R	APMT1135	20	20	100	30	3	11	**156,80**
AP11-021M03R	APMT1135	21	20	100	30	3	11	**156,80**
AP11-022M03R	APMT1135	22	20	100	35	3	11	**194,20**
AP11-023M03R	APMT1135	23	20	100	35	3	11	**194,20**
AP11-024M03R	APMT1135	24	20	100	35	3	11	**194,20**
AP11-025M04R	APMT1135	25	25	100	35	4	11	**194,20**
AP11-026M04R	APMT1135	26	25	120	35	4	11	**209,10**
AP11-027M04R	APMT1135	27	25	120	40	4	11	**238,80**
AP11-028M04R	APMT1135	28	25	120	40	4	11	**238,80**
AP11-029M04R	APMT1135	29	25	120	40	4	11	**238,80**
AP11-030M04R	APMT1135	30	25	120	40	4	11	**238,80**
AP11-031M04R	APMT1135	31	25	120	40	4	11	**238,80**
AP11-032M05R	APMT1135	32	32	120	40	5	11	**238,80**
AP11-033M05R	APMT1135	33	32	120	40	5	11	**283,40**
AP11-034M05R	APMT1135	34	32	120	40	5	11	**283,40**
AP11-035M05R	APMT1135	35	32	120	40	5	11	**298,30**
AP11-016M02RL	APMT1135	16	16	120	35	2	11	**89,70**
AP11-017M02RL	APMT1135	17	16	120	35	2	11	**112,20**
AP11-020M02RL	APMT1135	20	20	150	35	2	11	**96,85**
AP11-020M03RL	APMT1135	20	20	150	35	3	11	**171,70**
AP11-021M03RL	APMT1135	21	20	150	35	3	11	**194,20**
AP11-016M02RXL	APMT1135	16	16	160	45	2	11	**96,85**
AP11-017M02RXL	APMT1135	17	16	160	45	2	11	**119,40**
AP11-020M02RXL	APMT1135	20	20	200	50	2	11	**164,00**
AP11-021M02RXL	APMT1135	21	20	200	50	2	11	**164,00**

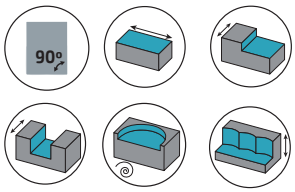
Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P2507**	**4,90**

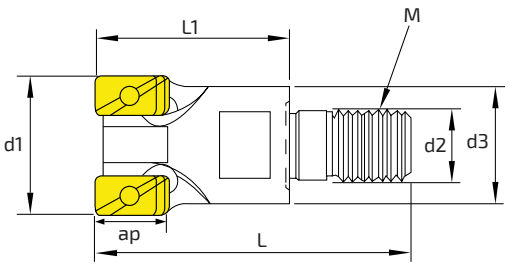




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AP11-040A05R	APMT1135	40	16	40	18	5	11	**246,50**
AP11-063A07R	APMT1135	63	22	45	22	7	11	**298,30**
AP11-080A08R	APMT1135	80	27	50	26	8	11	**343,30**
AP11-100A10R	APMT1135	100	32	50	32	10	11	**417,70**

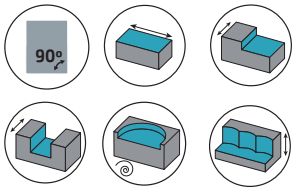
Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P2507**	**4,90**

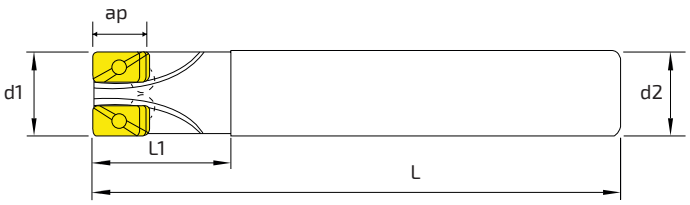




Ref.	Plaquita *Inserts*	d1	d2	d3	L	L1	z	ap	€
AP11-016R02R	APMT1135	16	2	15	43	26	2	11	**141,95**
AP11-017R02R	APMT1135	17	2	15	43	26	2	11	**141,95**
AP11-020R02R	APMT1135	20	2	18	49	30	2	11	**149,20**
AP11-020R03R	APMT1135	20	3	18	49	30	3	11	**209,10**
AP11-021R02R	APMT1135	21	2	18	49	30	2	11	**149,20**
AP11-021R03R	APMT1135	21	3	18	49	30	3	11	**209,10**
AP11-025R02R	APMT1135	25	2	23	57	35	2	11	**149,20**
AP11-025R04R	APMT1135	25	4	23	57	35	4	11	**238,70**
AP11-026R02R	APMT1135	26	2	23	57	35	2	11	**149,20**
AP11-026R04R	APMT1135	26	4	23	57	35	4	11	**238,70**
AP11-032R03R	APMT1135	32	3	30	63	40	5	11	**179,35**
AP11-032R05R	APMT1135	32	5	30	63	40	5	11	**253,60**
AP11-033R03R	APMT1135	33	3	30	63	40	6	11	**186,50**
AP11-033R05R	APMT1135	33	5	30	63	40	5	11	**186,50**

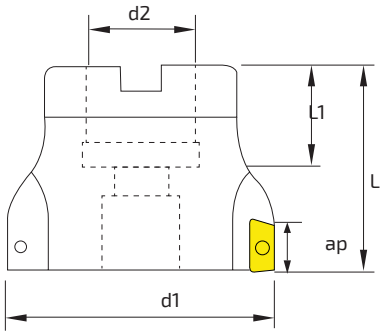
Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P2507**	**4,90**

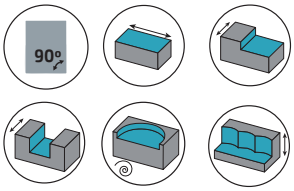




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AM16-025M02R	APMT1604	25	25	150	40	2	16	**119,40**
AM16-026M02R	APMT1604	26	25	150	40	2	16	**134,30**
AM16-030M02R	APMT1604	30	25	150	40	2	16	**149,15**
AM16-032M03R	APMT1604	32	32	150	45	3	16	**194,00**
AM16-035M03R	APMT1604	35	32	150	45	3	16	**209,10**
AM16-040M04R	APMT1604	40	32	170	45	4	16	**238,80**
AM16-025M02RL	APMT1604	25	25	200	70	2	16	**164,00**
AM16-025M02RLL	APMT1604	25	25	250	70	2	16	**238,80**
AM16-026M02RL	APMT1604	26	25	200	50	2	16	**238,80**
AM16-030M02RL	APMT1604	30	25	200	50	2	16	**238,80**
AM16-032M03RB	APMT1604	32	32	200	80	3	16	**268,55**
AM16-032M03RL	APMT1604	32	32	250	80	3	16	**313,60**
AM16-032M03RLL	APMT1604	32	32	300	80	3	16	**373,05**
AM16-035M03RB	APMT1604	35	32	200	50	3	16	**283,40**
AM16-035M03RL	APMT1604	35	32	250	50	3	16	**313,60**
AM16-035M03RLL	APMT1604	35	32	300	50	3	16	**358,20**
AM16-040M04RL	APMT1604	40	32	200	50	4	16	**283,40**
AM16-040M04RLL	APMT1604	40	32	300	50	4	16	**358,20**

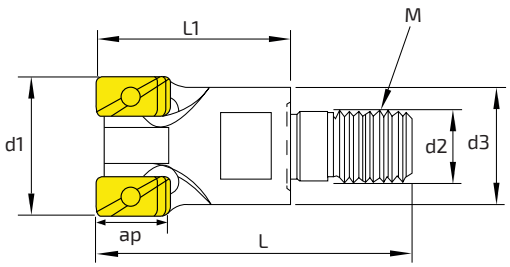
Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P4023**	**4,90**

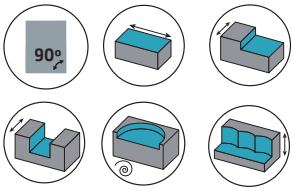




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AM16-040A04R	APMT1604	40	16	40	18	4	16	**209,10**
AM16-050A05R	APMT1604	63	22	45	22	5	16	**231,15**
AM16-063A06R	APMT1604	80	27	50	26	6	16	**261,35**
AM16-080A07R	APMT1604	100	32	50	32	7	16	**313,60**
AM16-100A08R	APMT1604	40	16	40	18	8	16	**358,20**
AM16-125A09R	APMT1604	63	22	45	22	9	16	**402,75**
AM16-160A10R	APMT1604	80	27	50	26	10	16	**492,45**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P4004**	**4,90**





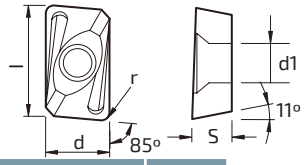
Ref.	Plaquita *Inserts*	d1	d2	L	L1	M	z	ap	€
AM16-250R02R	APMT1604	25	23	57	35	M12	2	16	**149,15**
AM16-260R02R	APMT1604	26	23	57	35	M12	2	16	**149,15**
AM16-320R03R	APMT1604	32	30	63	40	M16	3	16	**194,20**
AM16-330R03R	APMT1604	33	30	63	40	M16	3	16	**201,40**
AM16-350R03R	APMT1604	35	30	63	40	M16	3	16	**209,10**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P4004**	**4,90**

APMT

P	◎	◎
M	○	◎
K	◎	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	Medidas *Dimensions (mm)* l	d	S	r	d1	€
APMT113508PDER-MG	✓	✓	11,0	6,350	3,50	0,8	2,8	**6,20**
APMT113508PDER-RG	✓	✓	11,0	6,350	3,50	0,8	2,8	**6,20**
APMT113508PDER-HG		✓	11,0	6,350	3,50	0,8	2,8	**4,95**
APMT160408PDER-MG	✓	✓	16,5	9,525	4,76	0,8	4,4	**7,85**
APMT160408PDER-RG	✓	✓	16,5	9,525	4,76	0,8	4,4	**7,85**
APMT160408PDER-HG		✓	16,5	9,525	4,76	0,8	4,4	**6,20**

Condiciones de corte
Cutting conditions

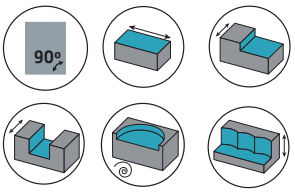
APMT1135

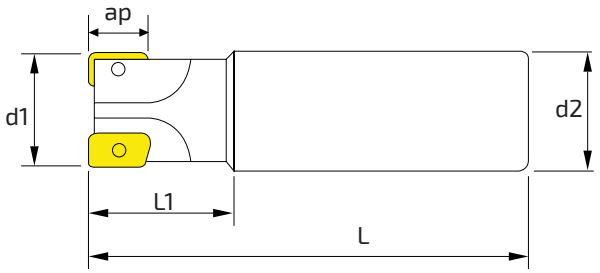
MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,08 ~ 0,20	~ 7,0
Inoxidable *Stainless 300 series*	50 ~ 110	0,05 ~ 0,15	~ 5,0
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,08 ~ 0,20	~ 7,0

APMT1604

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,12 ~ 0,28	~ 11,0
Inoxidable *Stainless 300 series*	50 ~ 110	0,10 ~ 0,22	~ 7,0
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,12 ~ 0,28	~ 10,0

AX12

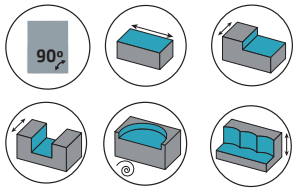


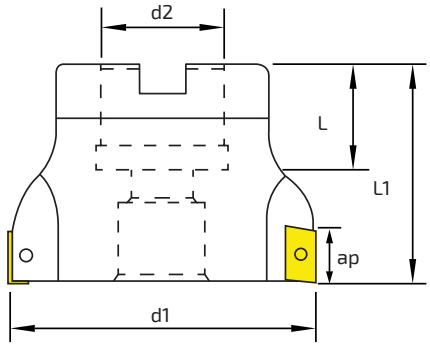


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AX12-016M02R	AXMT1235	16	16	120	35	2	12	**149,20**
AX12-017M02R	AXMT1235	17	16	120	35	2	12	**149,15**
AX12-018M02R	AXMT1235	18	16	120	35	2	12	**179,80**
AX12-019M02R	AXMT1235	19	16	120	35	2	12	**179,80**
AX12-020M03R	AXMT1235	20	20	120	40	3	12	**179,80**
AX12-021M03R	AXMT1235	21	20	120	40	3	12	**223,95**
AX12-022M03R	AXMT1235	22	20	120	40	3	12	**223,95**
AX12-023M03R	AXMT1235	23	25	150	40	3	12	**223,95**
AX12-024M03R	AXMT1235	24	25	150	40	3	12	**223,95**
AX12-025M03R	AXMT1235	25	25	150	40	3	12	**223,95**
AX12-025M04R	AXMT1235	25	25	150	45	4	12	**238,70**
AX12-026M03R	AXMT1235	26	25	150	40	3	12	**223,95**
AX12-026M04R	AXMT1235	26	25	150	45	4	12	**238,70**
AX12-027M04R	AXMT1235	27	25	150	45	4	12	**268,55**
AX12-028M04R	AXMT1235	28	25	150	45	4	12	**268,55**
AX12-029M04R	AXMT1235	29	25	150	45	4	12	**268,55**
AX12-030M04R	AXMT1235	30	25	150	45	4	12	**268,55**
AX12-031M04R	AXMT1235	31	32	150	45	4	12	**268,55**
AX12-032M04R	AXMT1235	32	32	150	45	4	12	**268,55**
AX12-033M04R	AXMT1235	33	32	150	45	4	12	**268,55**
AX12-034M04R	AXMT1235	34	32	150	45	4	12	**268,55**
AX12-035M04R	AXMT1235	35	32	150	45	4	12	**268,55**
AX12-016M02RL	AXMT1235	16	16	175	50	2	12	**209,10**
AX12-017M02RL	AXMT1235	17	16	175	35	2	12	**209,10**
AX12-020M02RL	AXMT1235	20	20	185	60	2	12	**223,95**
AX12-021M02RL	AXMT1235	21	20	185	40	2	12	**238,80**
AX12-025M03RL	AXMT1235	25	25	200	70	3	12	**253,70**
AX12-026M03RL	AXMT1235	26	25	200	45	3	12	**253,70**
AX12-025M04RL	AXMT1235	25	25	200	70	4	12	**283,90**
AX12-026M04RL	AXMT1235	26	25	200	50	4	12	**283,90**
AX12-032M04RL	AXMT1235	32	32	250	80	4	12	**313,60**
AX12-033M04RL	AXMT1235	33	32	250	50	4	12	**313,60**
AX12-035M04RL	AXMT1235	35	32	250	50	4	12	**372,95**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P3002**		**4,90**

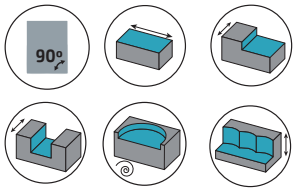
AX12/AX17

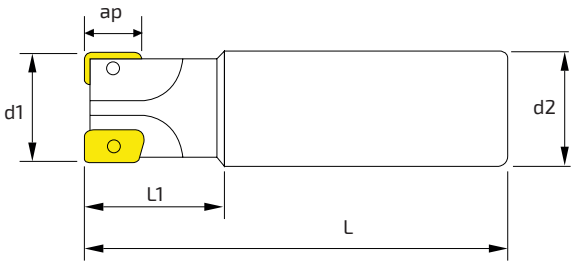




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AX12-050A06R	AXMT1235	50	22	45	20	6	12	**238,80**
AX12-063A07R	AXMT1235	63	22	45	20	7	12	**268,55**
AX12-080A08RL	AXMT1235	80	27	50	26	8	12	**328,45**
AX12-100A10R	AXMT1235	100	32	50	26	10	12	**447,85**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P3002**	**4,90**

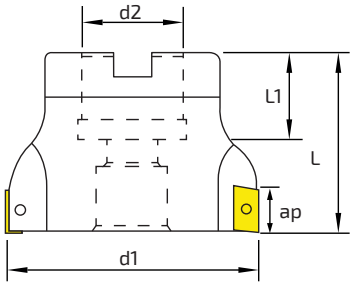


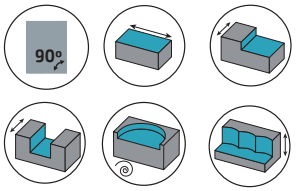


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AX17-025M02R	AXMT1235	25	25	150	40	2	17	**149,15**
AX17-026M02R	AXMT1235	26	25	150	40	2	17	**149,15**
AX17-027M02R	AXMT1235	27	25	150	40	2	17	**209,10**
AX17-028M02R	AXMT1235	28	25	150	40	2	17	**209,10**
AX17-029M02R	AXMT1235	29	25	150	40	2	17	**209,10**
AX17-030M02R	AXMT1235	30	25	150	40	2	17	**209,10**
AX17-031M02R	AXMT1235	31	25	150	40	2	17	**209,10**
AX17-032M03R	AXMT1235	32	32	150	45	3	17	**209,10**
AX17-033M03R	AXMT1235	33	32	150	45	3	17	**223,95**
AX17-034M03R	AXMT1235	34	32	150	45	3	17	**268,55**
AX17-035M03R	AXMT1235	35	32	150	45	3	17	**268,55**
AX17-036M03R	AXMT1235	36	32	150	45	3	17	**283,60**
AX17-040M03R	AXMT1235	40	32	150	45	3	17	**283,60**
AX17-025M02R	AXMT1235	25	25	200	70	2	17	**223,95**
AX17-026M02R	AXMT1235	26	25	200	45	2	17	**223,95**
AX17-027M02R	AXMT1235	27	25	200	45	2	17	**298,75**
AX17-028M02R	AXMT1235	28	25	200	45	2	17	**298,75**
AX17-029M02R	AXMT1235	29	25	200	45	2	17	**298,75**
AX17-030M02R	AXMT1235	30	25	200	45	2	17	**298,75**
AX17-031M02R	AXMT1235	31	32	200	70	2	17	**298,75**
AX17-032M02R	AXMT1235	32	32	200	70	2	17	**298,75**
AX17-033M02R	AXMT1235	33	32	200	50	2	17	**298,75**
AX17-034M02R	AXMT1235	34	32	200	50	2	17	**335,65**
AX17-035M02R	AXMT1235	35	32	200	50	2	17	**373,05**
AX17-036M02R	AXMT1235	36	32	200	50	2	17	**373,05**
AX17-040M04R	AXMT1235	40	32	200	50	4	17	**373,05**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P4004**	**4,90**

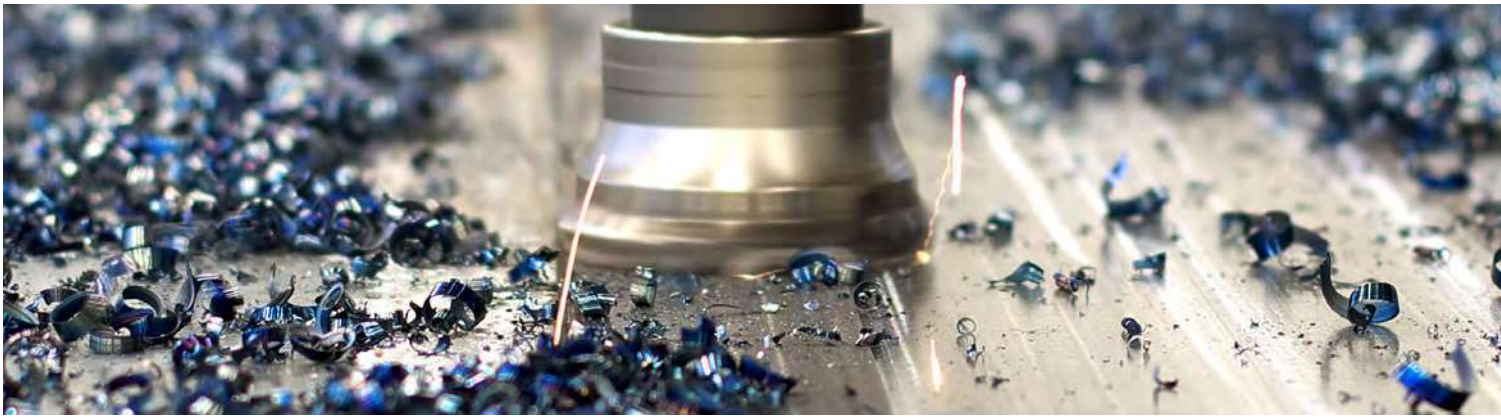
AX17





Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AX17-050A04R	AXMT1705	50	22	45	20	4	17	**209,10**
AX17-063A05R	AXMT1705	63	22	45	20	5	17	**238,80**
AX17-080A06R	AXMT1705	80	27	50	26	6	17	**283,90**
AX17-100A07R	AXMT1705	100	32	50	26	7	17	**343,30**
AX17-125A08R	AXMT1705	125	40	63	38	8	17	**522,15**
AX17-160A10R	AXMT1705	160	40	63	38	10	17	**671,30**

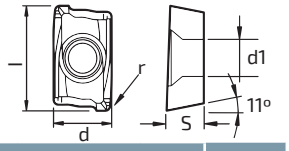
Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P4004**		**4,90**



AXMT

	KS2100	KS3100	KS4100
P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

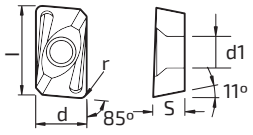
◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	Medidas *Dimensions (mm)* l	d	S	r	d1	€
AXMT123508PEER-RG	✓	✓	12,18	6,93	3,58	0,8	3,4	**7,50**

	KS2100	KS3100	KS4100
P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	Medidas *Dimensions (mm)* l	d	S	r	d1	€
AXMT170508PEER-RG		✓	✓	17,5	10,2	5,56	0,8	4,6	**10,00**
AXMT170516PEER-RG		✓	✓	17,5	10,2	5,56	1,6	4,6	**10,00**

Condiciones de corte
Cutting conditions

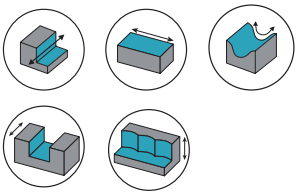
AXMT1235

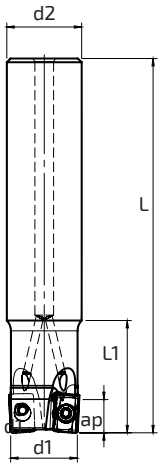
MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,08 ~ 0,20	~ 9,0
Inoxidable *Stainless 300 series*	50 ~ 110	0,05 ~ 0,15	~ 5,0
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,08 ~ 0,20	~ 8,0

AXMT1705

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,12 ~ 0,30	~ 12,0
Inoxidable *Stainless 300 series*	50 ~ 110	0,10 ~ 0,25	~ 8,0
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,12 ~ 0,30	~ 11,0

AN12

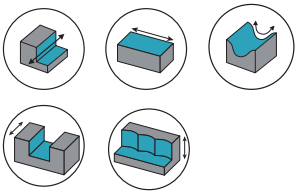


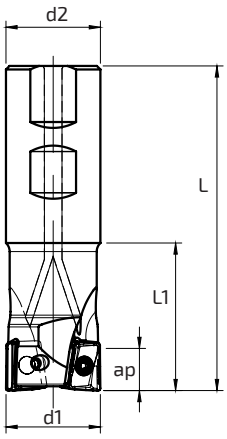


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AN12-026M02R	ANHX1206..	26	25	200	40	2	11	**263,15**
AN12-033M03R	ANHX1206..	33	32	250	40	3	11	**299,15**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**Ref. P03509**	**6,90**

AN12

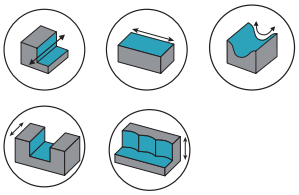


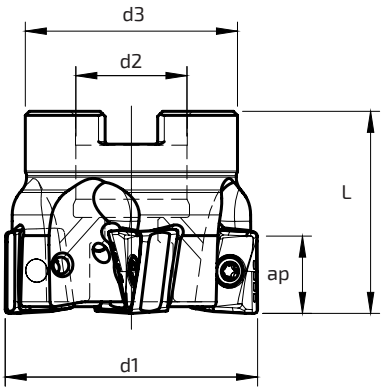


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AN12-025M02R	ANHX1206..	25	25	110	35	2	11	**239,15**
AN12-032M03R	ANHX1206..	32	32	150	35	3	11	**269,45**
AN12-040M04R	ANHX1206..	40	32	150	40	4	11	**277,50**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P03509**	**6,90**

AN12

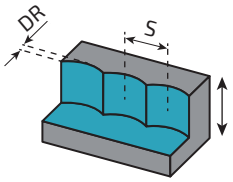




Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
AN12-040A04R	ANHX1206..	40	16	32	40	4	11	**346,90**
AN12-050A05R	ANHX1206..	50	22	42	40	5	11	**370,90**
AN12-050A06R	ANHX1206..	50	22	42	40	6	11	**394,90**
AN12-063A05R	ANHX1206..	63	22	52	40	5	11	**394,90**
AN12-063A07R	ANHX1206..	63	22	52	40	7	11	**418,60**
AN12-080A08R	ANHX1206..	80	27	60	50	8	11	**496,30**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P03509**		**6,90**

Profundidad
Plunging

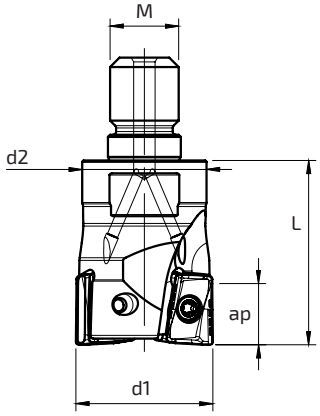


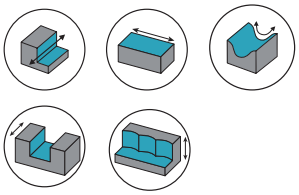
L<3Dc	L>3Dc	S max.
fz (mm/t)		
0,10 - 0,20	0,10 - 0,14	$Smax = \sqrt{DC.Dr - Dr^2}$

S máx. y DR diámetro de corte correspondiente Dc
S max and DR corresponding cutting diameter Dc

DR (mm)	Dc (mm)										
	14	16	18	20	25	32	40	50	63	80	100
1,0	3,6	3,9	4,1	4,4	4,9	5,6	6,2	7,0	7,9	8,9	9,9
2,0	4,9	5,3	5,7	6,0	6,8	7,7	8,7	9,8	11,0	12,5	14,0
3,0	5,7	6,2	6,7	7,1	8,1	9,3	10,5	11,9	13,4	15,2	17,1

AN12





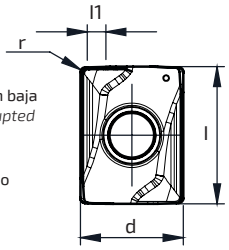
Ref.	Plaquita *Inserts*	d1	d2	L	M	z	ap	€
AN12-025R02R	ANHX1206..	25	21	35	M12	2	11	**233,15**
AN12-032R03R	ANHX1206..	32	29	43	M16	3	11	**251,45**

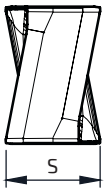
Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P03509**		**6,90**

ANHX

	KS3100	KS4100	KS5100
P	●	●	✱
M		●	✱
K	●		✱
N			
S		●	✱
H			

● Interrupción baja *Light interrupted*
● General
✱ Interrumpido *Interrupted*





Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	l1	r	€
ANHX120604PNER-LS	✓	✓	✓	9	12	8,3	1,6	0,4	**15,35**
ANHX120608PNER-LS	✓	✓	✓	9	12	8,3	1,2	0,8	**15,35**
ANHX120616PNER-LS	✓	✓	✓	9	12	8,3	0,4	1,6	**15,35**
ANHX120604PNSR-MP	✓		✓	9	12	8,3	1,6	0,4	**15,35**
ANHX120608PNSR-MP	✓		✓	9	12	8,3	1,2	0,8	**15,35**
ANHX120616PNSR-MP	✓		✓	9	12	8,3	0,4	1,6	**15,35**

Condiciones de corte
Cutting conditions

MATERIAL	Vc (m/min)			fz	
	KS3100	KS4100	KS5100	ANHX12... LS	ANHX12... MP
Acero sin aleación *Unlloyed steel (HB125-220)*	150 - 230	150 - 180	130 - 160	0,10 - 0,20	0,10 - 0,30
Acero de baja aleación *Low-alloyed steel (HB220-280)*	140 - 220	140 - 170	120 - 150	0,10 - 0,20	0,10 - 0,25
Acero de alta aleación *High-alloyed steel (HB280-380)*	130 - 180	120 - 150	100 - 130	0,10 - 0,15	0,10 - 0,20
Ferrítico/Martensítico *Ferritic/Martensitic (HB200-330)*	-	90 - 150	100 - 120	0,10 - 0,20	-
Austenítico/Duplex *Austenitic/Duplex (HB 200-330)*	-	80 - 130	80 - 110	0,10 - 0,15	-
Dúplex *Duplex (HB230-260)*	-	70 - 100	70 - 100	0,10 - 0,15	-
Hierro fundido maleable *Malleable cast iron (HB130-230)*	150 - 280	-	130 - 250	0,10 - 0,25	0,10 - 0,30
Fundición de hierro gris *Grey cast iron (HB160-250)*	130 - 230	-	100 - 200	0,10 - 0,25	0,10 - 0,30
Fundición de hierro nodular *Nodular cast iron (HB180-245)*	80 - 190	-	50 - 150	0,10 - 0,20	0,10 - 0,25
Superaleaciones resistentes al calor *Heat resistant super alloys (HB200-320)*	-	25 - 100	20 - 80	0,07 - 0,10	-

(1) Condiciones de corte ae/Dc=70%.
Cutting conditions a_e/Dc=70%.

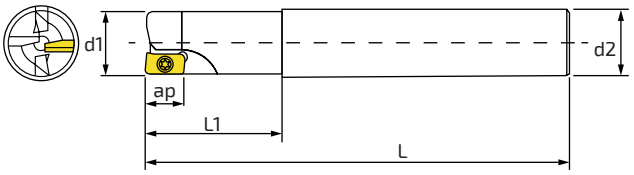
(2)

Operación *Operation*	KS3100	KS4100	KS5100
Ranurado *Slotting*	100%	<20%	2,5 - 4,0
Escuadrado *Shouldering*	<50% ≤25%	>8% >12%	4,0 - 7,0 7,0 - 10,0

(3) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la aplicación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When application has poor clamping rigidity or when using a low rigidity machine.*

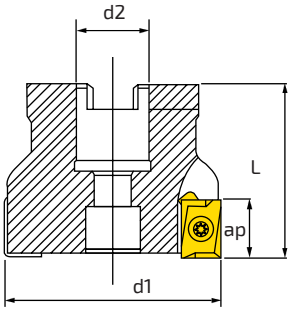
AN08 / AN13



Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
AN08-016M02R	AN..0804	16	16	125	26	2	8	**113,00**
AN08-020M03R	AN..0804	20	20	125	26	3	8	**139,10**
AN08-025M04R	AN..0804	25	25	125	26	4	8	**165,15**
AN13-025M02R	AN..1305	25	25	125	26	2	13	**165,15**
AN13-032M03R	AN..1305	32	32	160	26	3	13	**178,20**

Tornillo de inserción *Insert screw*	€
Ref. P02509	**4,90**
Ref. P04013	**4,90**

AN16



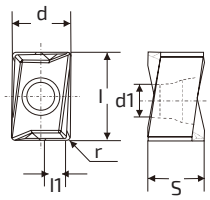
Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
AN16-050A04R	AN..0804	50	22	50	4	16	**195,55**
AN16-063A05R	AN..0804	63	22	50	5	16	**217,30**
AN16-080A06R	AN..0804	80	27	50	6	16	**252,05**
AN16-100A07R	AN..1305	100	32	50	7	16	**338,95**
AN16-125A08R	AN..1305	125	40	63	8	16	**434,55**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**Ref. P05016**	**4,90**

ANMX

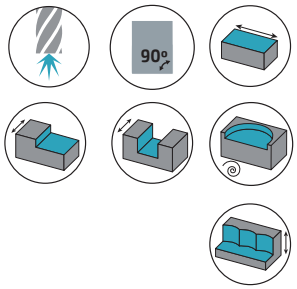
	KS2100	KS3100
P	●	●
M	●	●
K	●	●
N		
S	●	●
H		

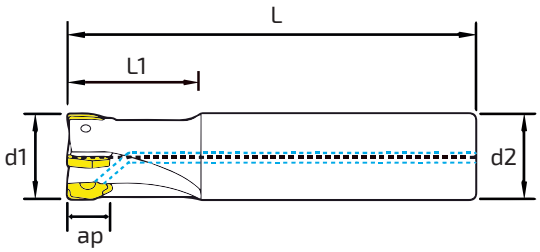
● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*



Ref.	KS2100	KS3100	Medidas *Dimensions* d	l	S	l1	r	d1	€
ANMX080408-PDR	✓	✓	6,6	8,6	5,2	2,5	0,8	3,5	**9,70**
ANMX130508-PDR	✓	✓	10	13,7	8,9	3,4	0,8	4,4	**10,65**
ANMX160608-PDR	✓	✓	11,2	16,7	10,4	4,7	0,8	5,4	**12,10**

XN04
Refrigeración interna/ *with coolant hole*

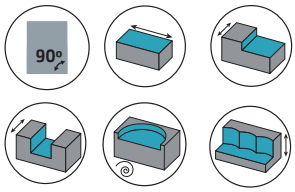


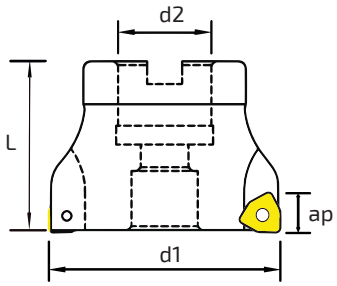


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
XN04-020M03R	XNMX0403	20	20	110	28	3	4	**287,70**
XN04-020M03RL	XNMX0403	20	20	150	28	3	4	**159,75**
XN04-025M04R	XNMX0403	25	25	120	28	4	4	**410,35**
XN04-032M05R	XNMX0403	32	30	130	30	5	4	**487,50**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P2506**	**3,20**

XN04

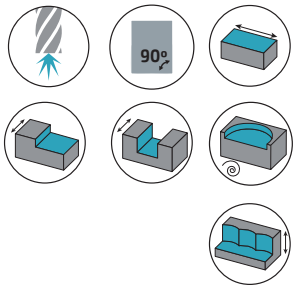


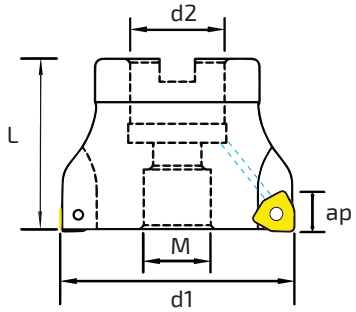


Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
XN04-050A06R	XNMX0403	50	22	50	6	4	**293,10**
XN04-063A07R	XNMX0403	63	22	50	7	4	**356,90**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P2512**	**4,90**

XN04
Refrigeración interna/ *with coolant hole*

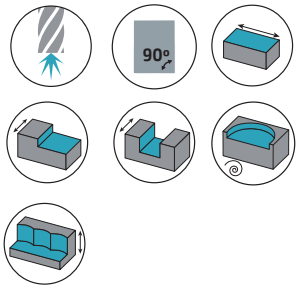


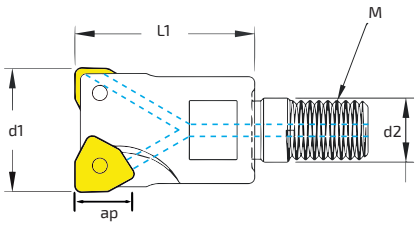


Ref.	Plaquita *Inserts*	d1	d2	L	M	z	ap	€
XN04-040A07R	XNMX0403	40	16	40	8,5	7	4	**511,40**
XN04-050A09R	XNMX0403	50	22	40	11,0	9	4	**580,95**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P2515**	**4,90**

XN04
Refrigeración interna/ *with coolant hole*

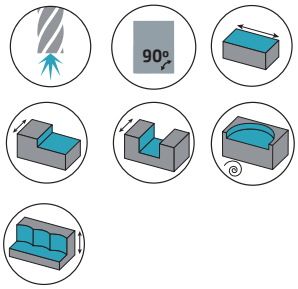


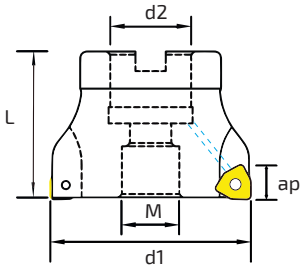


Ref.	Plaquita *Inserts*	d1	d2	L1	M	z	ap	€
XN04-021R03R	XNMX0403	21	10,5	44	M10	3	4	**194,20**
XN04-026R04RR	XNMX0403	26	12,5	49	M12	4	4	**231,15**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P2512**		**4,90**

XN04
Refrigeración interna/ *with coolant hole*





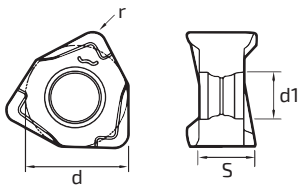
Ref.	Plaquita *Inserts*	d1	d2	L	M	z	ap	€
XN08-050A05R	XNMX0806	50	22	40	11	5	7	**479,40**
XN08-063A07R	XNMX0806	63	22	40	11	7	7	**602,10**
XN08-080A07R	XNMX0806	80	27	50	13	7	7	**761,85**
XN08-100A11R	XNMX0806	100	32	50	45	11	7	**1.257,35**
XN08-125A11R	XNMX0806	125	40	63	53	11	7	**1.651,60**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P4011**		**4,90**

XNMX

P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* d	S	r	d1	€
XNMX040308-MG	✓	✓		6,70	3,285	0,8	3,15	**15,65**
XNMX040308-RG	✓	✓		6,70	3,285	0,8	3,15	**15,65**
XNMX080608-MG		✓	✓	12,53	6,5	0,8	4,5	**13,95**

Condiciones de corte
Cutting conditions

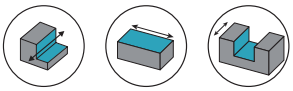
XNMX0403

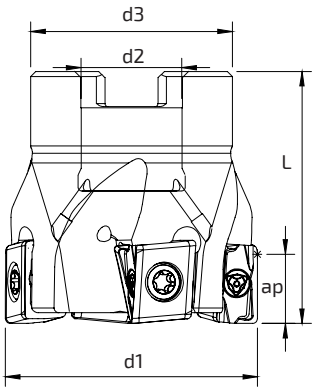
MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 220	0,10 ~ 0,16	~ 3,0
Inoxidable *Stainless 300 series*	50 ~ 130	0,08 ~ 0,12	~ 1,6
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 200	0,10 ~ 0,16	~ 3,0

XNMX0806

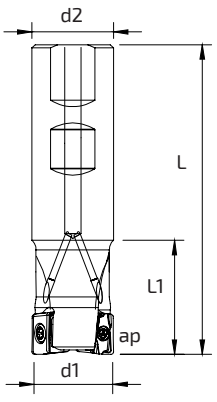
MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 220	0,13 ~ 0,25	~ 7,0
Inoxidable *Stainless 300 series*	50 ~ 130	0,10 ~ 0,20	~ 4,5
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 200	0,13 ~ 0,25	~ 7,0

LN13





Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
LN13-040A04R	LNXT1306..	40	16	32	40	4	11	**313,75**
LN13-040A05R	LNXT1306..	40	16	32	40	5	11	**350,60**
LN13-050A05R	LNXT1306..	50	22	42	40	5	11	**433,15**
LN13-050A06R	LNXT1306..	50	22	42	40	6	11	**474,60**
LN13-063A06R	LNXT1306..	63	22	52	40	6	11	**475,75**
LN13-063A08R	LNXT1306..	63	22	52	40	8	11	**558,60**
LN13-080A07R	LNXT1306..	80	27	60	50	7	11	**562,00**
LN13-080A10R	LNXT1306..	80	27	60	50	10	11	**665,75**
LN13-100A09R	LNXT1306..	100	32	80	50	9	11	**717,15**
LN13-100A13R	LNXT1306..	100	32	80	50	13	11	**950,30**
LN13-125A11R	LNXT1306..	125	40	90	63	11	11	**988,60**
LN13-125A16R	LNXT1306..	125	40	90	63	16	11	**1.255,15**



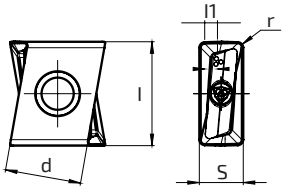
Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
LN13-025M02R	LNXT1306..	25	25	95	45	2	11	**261,75**
LN13-032M03R	LNXT1306..	32	32	110	50	3	11	**313,75**
LN13-040M04R	LNXT1306..	40	32	110	50	4	11	**399,45**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P04009**		**6,90**

LNXT

P	●	✱
M		✱
K	●	✱
N		
S		
H		

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
✱ General
✱ Interrumpido *Interrupted*



Ref.	KS3100	KS5100	Medidas *Dimensions* d	l	S	l1	r	€
LNXT130604PNER-MP	✓	✓	9,8	3,0	6,8	9	0,4	**15,80**
LNXT130608PNER-MP	✓	✓	9,8	2,6	6,8	9	0,8	**15,80**

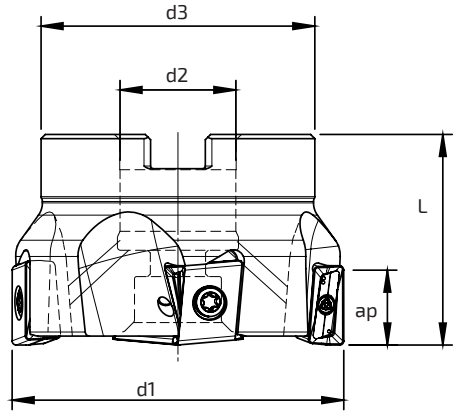
Condiciones de corte
Cutting conditions

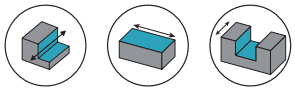
MATERIAL	Vc (m/min) KS3100	Vc (m/min) KS5100	fz LNXT13...
Acero sin aleación *Unlloyed steel (HB125-220)*	180 - 250	140 - 170	0,10 - 0,35
Acero de baja aleación *Low-alloyed steel (HB220-280)*	170 - 210	130 - 160	0,10 - 0,30
Acero de alta aleación *High-alloyed steel (HB280-380)*	160-200	110 - 140	0,10 - 0,20
Ferrítico/Martensítico *Ferritic/Martensitic (HB200-330)*	-	120 - 180	0,10 - 0,30
Austenítico/Duplex *Austenitic/Duplex (HB 200-330)*	-	100 - 150	0,10 - 0,25
Dúplex *Duplex (HB230-260)*	-	70 - 130	0,10 - 0,20
Hierro fundido maleable *Malleable cast iron (HB130-230)*	170 - 300	-	0,10 - 0,35
Fundición de hierro gris *Grey cast iron (HB160-250)*	150 - 250	-	0,10 - 0,30
Fundición de hierro nodular *Nodular cast iron (HB180-245)*	90 - 210	-	0,10 - 0,25

(1) Condiciones de corte ae/Dc=70%.
Cutting conditions a_e/Dc=70%.
(2) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la aplicación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When application has poor clamping rigidity or when using a low rigidity machine.*

LN15





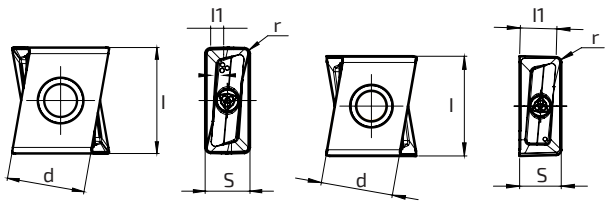
Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
LN15-050A05R	LNXT1506..	50	22	42	40	5	14	**468,90**
LN15-063A05R	LNXT1506..	63	22	52	40	5	14	**499,75**
LN15-063A08R	LNXT1506..	63	22	52	40	8	14	**562,60**
LN15-080A07R	LNXT1506..	80	27	60	50	7	14	**668,60**
LN15-080A10R	LNXT1506..	80	27	60	50	10	14	**687,45**
LN15-100A08R	LNXT1506..	100	32	80	50	8	14	**812,00**
LN15-100A12R	LNXT1506..	100	32	80	50	12	14	**999,15**
LN15-125A09R	LNXT1506..	125	40	90	63	9	14	**999,15**
LN15-125A15R	LNXT1506..	125	40	90	63	15	14	**1.454,90**
LN15-160A10R	LNXT1506..	160	40	110	63	10	14	**1.124,60**
LN15-160A20R	LNXT1506..	160	40	110	63	20	14	**1.829,75**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P04009**	**6,90**

LNXT

P	●	◐	⇅
M			
K		◐	
N			
S			
H			

● Continuo *Continuous*
◐ Interrupción baja *Light interrupted*
⇅ General
⇅ Interrumpido *Interrupted*



Ref.	KS2100	KS3100	KS5100	Medidas *Dimensions* d	l	S	l1	r	€
LNXT150608PNER-MP	✓	✓	✓	11	15	6,35	1,8	0,8	**16,75**
LNXT150612PNER-MP		✓	✓	11	15	6,35	1,8	1,2	**16,75**
LNXT150608PNER-HP		✓	✓	11	15	6,35	1,8	0,8	**16,75**
LNXT150608PNER-W	✓			11	15,2	6,35	5,5	0,8	**21,40**

Condiciones de corte
Cutting conditions

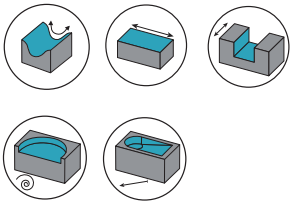
MATERIAL	Vc (m/min)			fz		
	KS2100	KS3100	KS5100	LNXT15..MP	LNXT15..HP	LNXT15..W
Acero sin aleación *Unlloyed steel (HB125-220)*	190 - 280	180 - 250	140 - 170	0,10 - 0,30	0,10 - 0,30	0,10 - 0,35
Acero de baja aleación *Low-alloyed steel (HB220-280)*	180 - 240	170 - 210	130 - 160	0,10 - 0,30	0,10 - 0,30	0,10 - 0,35
Acero de alta aleación *High-alloyed steel (HB280-380)*	170 - 220	160-200	110 - 140	0,10 - 0,25	0,10 - 0,25	0,10 - 0,35
Hierro fundido maleable *Malleable cast iron (HB130-230)*	180 - 320	170 - 300	130 - 250	0,10 - 0,40	0,10 - 0,40	0,10 - 0,50
Fundición de hierro gris *Grey cast iron (HB160-250)*	170 - 280	150 - 250	110 - 220	0,10 - 0,35	0,10 - 0,35	0,10 - 0,50
Fundición de hierro nodular *Nodular cast iron (HB180-245)*	100 - 240	90 - 210	80 - 170	0,10 - 0,30	0,10 - 0,30	0,10 - 0,50

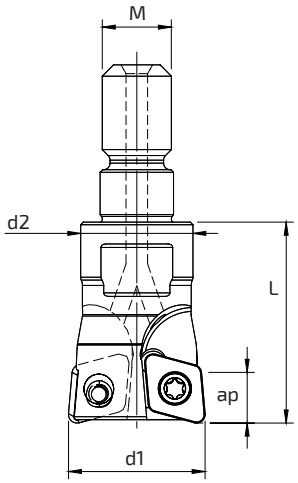
(1) Condiciones de corte ae/Dc=70%.
Cutting conditions a_e/Dc=70%.

(2) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la aplicación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When application has poor clamping rigidity or when using a low rigidity machine.*

XD04

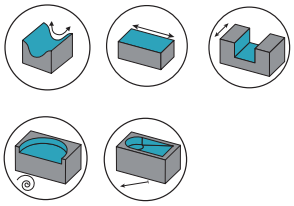


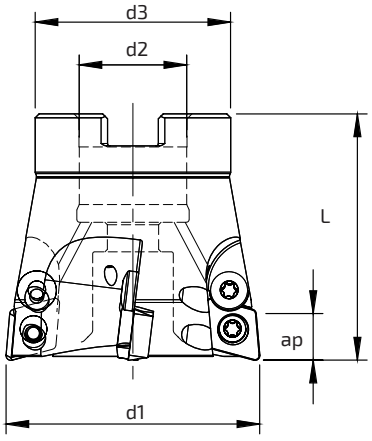


Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
XD04-010R02R	XD..0401..	10	9,8	20	2	0,8	**164,00**
XD04-012R02R	XD..0401..	12	9,8	20	2	0,8	**164,00**
XD04-016R02R	XD..0401..	16	13	23	2	1,0	**164,00**
XD04-020R03R	XD..0401..	20	18	28	3	1,0	**170,30**
XD04-025R03R	XD..0401..	25	21	30	3	1,0	**183,75**
XD04-025R04R	XD..0401..	25	21	30	4	1,0	**183,75**
XD04-025R02R	XD..0401..	25	21	35	2	1,0	**164,00**
XD04-035R03R	XD..0401..	35	29	43	3	1,0	**196,60**
XD04-042R04R	XD..0401..	42	29	43	4	1,0	**229,15**

Tornillo de inserción *Insert screw*	€
P01804	**12,35**
P02505	**6,00**
P03508	**7,35**

XD10





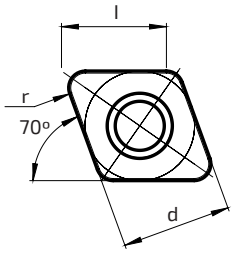
Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
XD10-052A05R	XD..10T3..	52	22	40	50	5	1	**307,45**
XD10-066A06R	XD..10T3..	66	27	48	50	6	1	**366,30**
XD10-080A07R	XD..10T3..	80	27	60	50	7	1	**457,15**

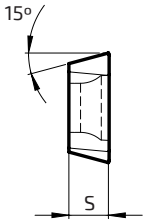
Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P03508**	**7,35**

XDHW

P	●
M	
K	
N	
S	
H	

● Continuo *Continuous*
◗ Interrupción baja *Light interrupted*
◑ General
◔ Interrumpido *Interrupted*





Ref.	KS2100	Medidas *Dimensions* d	l	S	r	€
XDHW040110	✓	4,0	4,0	1,59	1,0	**7,40**
XDHW060210	✓	6,5	6,2	2,38	1,0	**7,40**
XDHW10T310	✓	10,0	9,9	3,97	1,0	**8,55**

Condiciones de corte
Cutting conditions

MATERIAL	Vc (m/min) H10T	CBN	KS2100
Acero sin aleación *Unlloyed steel (HB125-220)*	-	180 - 300	180 - 250
Acero de baja aleación *Low-alloyed steel (HB220-280)*	-	180 - 250	170 - 210
Acero de alta aleación *High-alloyed steel (HB280-380)*	-	180-230	160 - 200
Hierro fundido maleable *Malleable cast iron (HB130-230)*	-	-	170 - 300
Fundición de hierro gris *Grey cast iron (HB160-250)*	-	-	150 - 250
Fundición de hierro nodular *Nodular cast iron (HB180-245)*	-	-	90 - 210
Aluminio y no ferrosos *Alluminium and Non Ferrous*	300 - 1000	-	-
Acero endurecido *Hardened Steels*		120 - 260	-

Plaquita *Finishing*	fz (mm/t) Desbaste *Roughing*	Acabado *Finishing*	ap Rec.
XD..04	0,10 - 0,20	0,10 - 0,15	0,1 - 0,5
XD..06	0,15 - 0,30	0,10 - 0,25	0,2 - 0,8
XD..10	0,15 - 0,35	0,10 - 0,30	0,2 - 0,8

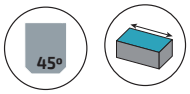
(1) Las condiciones de corte deben ajustarse en función de la máquina y de la rigidez del trabajo.
Cutting conditions should be ajusted according to the machine and work rigidity.

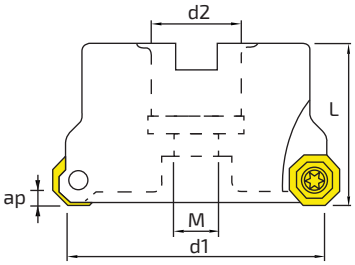
(2) Si se producen vibraciones, reducir ap y Vc en un 30% y mantener el mismo valor de fz por cada diente.
If chattering occurs, reduce ap and Vc by 30% and keep the same fz per thooth

HERRAMIENTAS DE PLANEAR

Facing tools

OF05





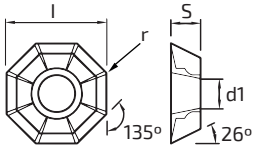
Ref.	Plaquita *Inserts*	d1	d2	L	M	z	ap	€
OF05-050A05R	OFMT05T3...	50	22	40	11	5	3	**250,80**
OF05-063A06R	OFMT05T3...	63	22	40	13	6	3	**307,40**
OF05-080A07R	OFMT05T3...	80	27	50	38	7	3	**375,95**
OF05-100A08R	OFMT05T3...	100	32	50	60	8	3	**451,20**
OF05-125A09R	OFMT05T3...	125	40	63	60	9	3	**595,55**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P4006**		**4,90**

OFMT

P	◎
M	○
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

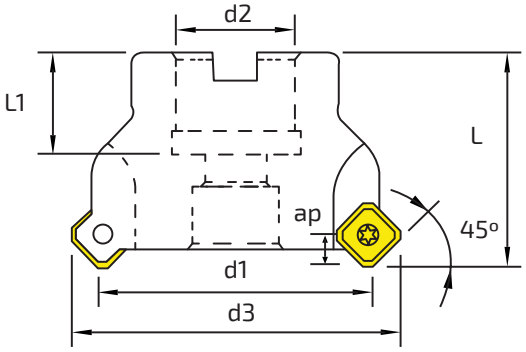


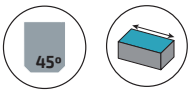
Ref.	KS3100	Medidas *Dimensions (mm)* l	S	r	d1	€
OFMT05T3TN-MG	✓	12,7	3,8	0,6	4,6	**6,20**
OFMT05T3TN-RG	✓	12,7	3,8	0,6	4,6	**6,20**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,10 ~ 0,20	~ 2,8
Inoxidable *Stainless 300 series*	50 ~ 110	0,07 ~ 0,13	~ 1,7
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,10 ~ 0,20	~ 2,8

SE13





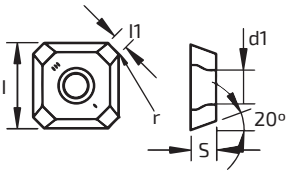
Ref.	Plaquita *Inserts*	d1	L1	L	d2	d3	z	ap	€
SE13-050A04R	SEMT13T3AGSN	50	20	40	22	63,0	4	5,5	**283,90**
SE13-063A05R	SEMT13T3AGSN	63	22	40	22	75,9	5	5,5	**328,45**
SE13-080A06R	SEMT13T3AGSN	80	26	50	27	93,2	6	5,5	**387,90**
SE13-100A07R	SEMT13T3AGSN	100	32	50	32	113,2	7	5,5	**537,00**
SE13-125A08R	SEMT13T3AGSN	125	38	63	40	138,0	8	5,5	**686,65**
SE13-160A10R	SEMT13T3AGSN	160	38	63	40	173,0	10	5,5	**932,60**
SE13-200A12R	SEMT13T3AGSN	200	38	63	60	212,9	12	5,5	**1.327,70**
SE13-250A14R	SEMT13T3AGSN	250	38	63	60	262,9	14	5,5	**1.685,90**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P3505**		**4,90**
Tornillo de inserción *Insert screw*	**PS35T**		**4,90**
Placa base *Shim*	**AS445N**		**10,60**

SEMT

P	◎
M	◎
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

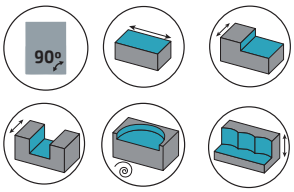


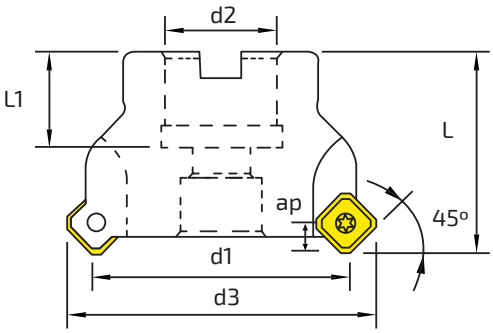
Ref.	KS3100	Medidas *Dimensions (mm)*					€
		l	l1	S	r	d1	
SEMT13T3AGSN-MG	✓	13,4	1,9	3,97	1,5	4,2	**6,30**
SEMT13T3AGSN-RG	✓	13,4	1,9	3,97	1,5	4,2	**6,30**
SEMT13T3AGSN-HG	✓	13,4	1,9	3,97	1,5	4,2	**6,30**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,10 ~ 0,30	~ 5,5
Inoxidable *Stainless 300 series*	50 ~ 110	0,08 ~ 0,25	~ 3,0
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,10 ~ 0,30	~ 5,0

SN12





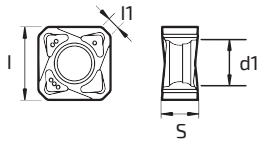
Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
SN12-050A04R	SNMX1205	50	22	40	4	6	**284,00**
SN12-063A05R	SNMX1205	63	22	40	5	6	**354,30**
SN12-080A06R	SNMX1205	80	27	50	6	6	**497,05**
SN12-100A07R	SNMX1205	100	32	50	7	6	**610,00**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P4015**		**4,90**

SNMX

	KS2100	KS3100
P	◎	◎
M	○	◎
K	◎	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

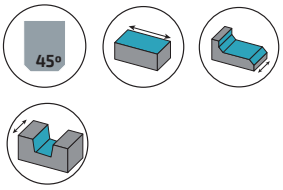


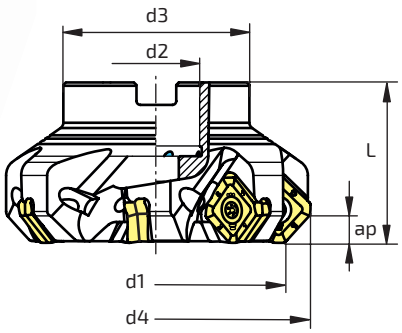
Ref.	KS2100	KS3100	Medidas *Dimensions (mm)* l	l1	S	d1	€
SNMX1205-MG	✓	✓	12,7	1,5	6,4	6	**15,65**
SNMX1205-RG	✓	✓	12,7	1,5	6,4	6	**15,65**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,10 ~ 0,30	~ 6,0
Inoxidable *Stainless 300 series*	50 ~ 110	0,08 ~ 0,25	~ 3,6
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,10 ~ 0,30	~ 6,0

SA17





Ref.	Plaquita *Inserts*	d1	d2	d3	d4	L	z	ap	€
SA17-050A04R	SAKU1706	50	22	43	66,1	40	4	8,4	**386,50**
SA17-063A06R	SAKU1706	63	22	48	79,1	40	6	8,4	**543,10**
SA17-080A07R	SAKU1706	80	27	58	96,1	50	7	8,4	**621,50**
SA17-100A08R	SAKU1706	100	32	78	116,1	50	8	8,4	**715,50**
SA17-125A10R	SAKU1706	125	40	88	141,1	63	10	8,4	**825,10**
SA17-160A12R	SAKU1706	160	40	104	176,1	63	12	8,4	**971,40**
SA17-200A13R	SAKU1706	200	60	134	216,1	63	13	8,4	**1.201,00**
SA17-250A15R	SAKU1706	250	60	134	266,1	63	15	8,4	**1.452,00**

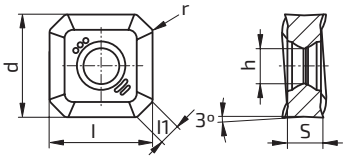
Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**11107792**		**4,00**

SAKU

P	●	○	○
M	○	●	●
K			○
N			
S			
H			

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use

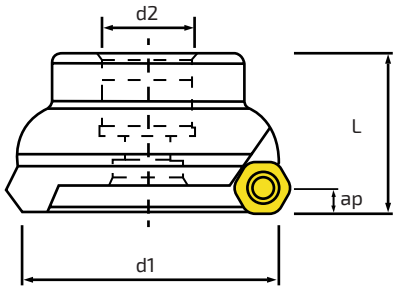


Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	l1	r	h	KS3100 €	KS4100 €	KS5100 €
SAKU1706ABSR-F50	✓	✓	✓	17	17	6,35	3,7	0,8	5,8	**28,05**	**28,05**	**34,50**
SAKU1706ABSR-M50	✓	✓		17	17	6,35	3,7	0,8	5,8	**28,05**	**28,05**	-

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz	ap
Acero < 1.000 N/mm² *Steel < 1.000 N/mm²*	200	0,25 ~ 0,45	1 ~ 8
Inoxidable *Inox. < 600 N/mm²*	180	0,15 ~ 0,35	1 ~ 8
Fundición < HB 180 *Fund. < HB 180*	250	0,20 ~ 0,40	1 ~ 8
Titanio/Inconel *Titan. / In. < 1.450 N/mm²*	35	0,12 ~ 0,25	1 ~ 8

HN05



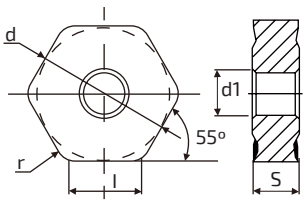
Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
HN05-050A04R	HN..0504..	50	22	50	4	4	**108,70**
HN05-063A05R	HN..0504..	63	22	50	5	4	**130,40**
HN05-080A06R	HN..0504..	80	27	50	6	4	**186,90**
HN05-100A07R	HN..0504..	100	32	50	7	4	**226,00**
HN05-125A08R	HN..0504..	125	40	63	8	4	**338,95**
HN05-160A09R	HN..0504..	160	40	63	9	4	**521,45**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P04512**		**4,90**

HNMX

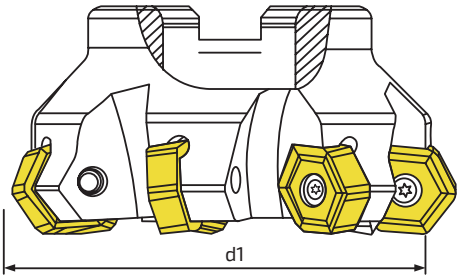
P	●
M	●
K	●
N	
S	●
H	

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*



Ref.	KS3100	Medidas *Dimensions* d	l	S	r	d1	€
HNMX050410-NM	✓	12,7	7,1	5	1	5	**10,65**

HN07

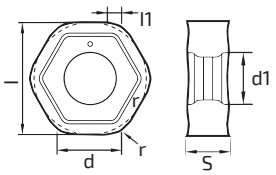


Ref.	Plaquita *Inserts*	d1	z	€
HN07-050A04R	HNMX0704	50	4	**189,00**
HN07-063A05R	HNMX0704	63	5	**226,80**
HN07-080A06R	HNMX0704	80	6	**283,50**
HN07-100A07R	HNMX0704	100	7	**378,00**

HNMX

P
M
K

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



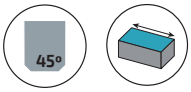
Ref.	KS5100	Medidas *Dimensions (mm)*						€
		l	d	S	r	d1	l1	
HNMX 0704-LS	✓	6,8	12,7	4,45	1,2	4,9	1,4	**13,95**

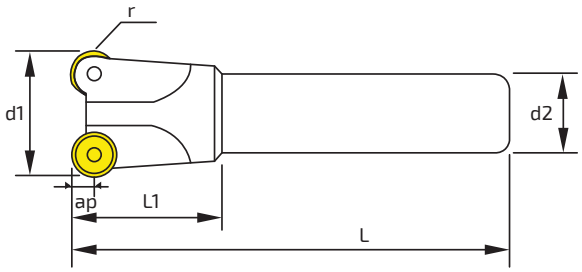
FRESADO

HERRAMIENTAS TÓRICAS

Pro tools

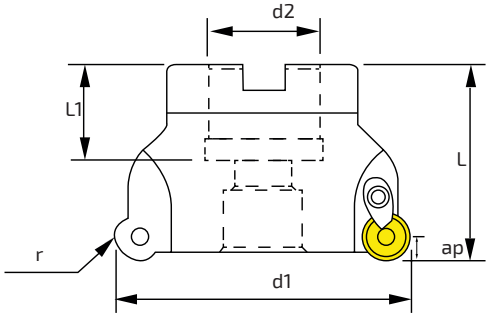
RD

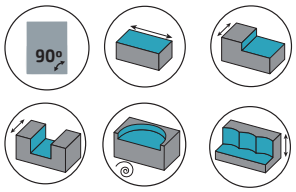




Ref.	PlMquitM *Inserts*	d1	d2	L	L1	r	z	Mp	€
RD05-010M02R	RDKW0501	10	10	100	25	2,5	2	2,5	**141,90**
RD05-012M02R	RDKW0501	12	12	100	25	2,5	2	2,5	**141,90**
RD05-012M03R	RDKW0501	12	12	130	25	2,5	3	2,5	**248,30**
RD05-016M03R	RDKW0501	16	16	130	35	2,5	3	2,5	**199,00**
RD05-016M03RL	RDKW0501	16	16	180	35	2,5	3	2,5	**248,30**
RD07-016M03R	RDKW0702	16	16	130	40	3,5	3	3,5	**177,40**
RD07-0160M03RL	RDKW0702	16	16	180	35	3,5	3	3,5	**226,75**
RD07-020M04R	RDKW0702	20	20	150	40	3,5	4	3,5	**226,75**
RD07-020M04RL	RDKW0702	20	20	200	40	3,5	4	3,5	**297,30**
RD07-025M04R	RDKW0702	25	25	150	40	3,5	4	3,5	**297,80**
RD07-025M04RL	RDKW0702	25	25	200	60	3,5	4	3,5	**368,70**
RD10-025M02R	RDMT10T3 / RDMW10T3	25	25	150	45	5,0	2	5,0	**141,95**
RD10-025M02RL	RDMT10T3 / RDMW10T3	25	25	200	70	5,0	2	5,0	**198,45**
RD10-030M05R	RDMT10T3 / RDMW10T3	30	25	150	45	5,0	2	5,0	**141,95**
RD10-030M05RL	RDMT10T3 / RDMW10T3	30	25	200	40	5,0	2	5,0	**198,45**
RD10-032M05R	RDMT10T3 / RDMW10T3	32	32	150	45	5,0	3	5,0	**198,45**
RD10-032M05RL	RDMT10T3 / RDMW10T3	32	32	200	70	5,0	3	5,0	**269,50**
RD12-032M02R	RDMT1204 / RDMW1204	32	32	150	50	6,0	2	6,0	**156,35**
RD12-032M02RL	RDMT1204 / RDMW1204	32	32	250	70	6,0	2	6,0	**212,95**
RD12-040M03R	RDMT1204 / RDMW1204	40	32	170	45	6,0	3	6,0	**229,10**
RD12-040M3RL	RDMT1204 / RDMW1204	40	32	220	45	6,0	3	6,0	**283,45**

Tornillo de inserción *Insert screw*	€
P2003	**4,90**
P2015	**4,90**
P3504	**4,90**
P4008	**4,90**

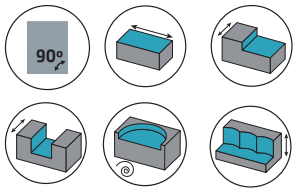


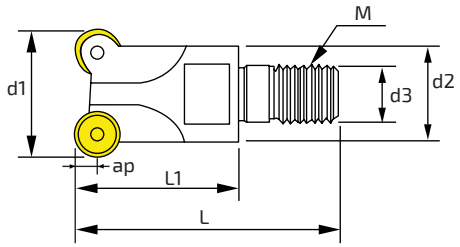


Ref.	Plaquita *Inserts*	d1	d2	L	L1	r	z	ap	€
RD10-050A04R	RDMT10T3 / RDMW10T3	50	22	45	22	5	4	5	**155,85**
RD10-063A06R	RDMT10T3 / RDMW10T3	63	22	45	22	5	6	5	**212,95**
RD12-050A04R	RDMT1204 / RDMW1204	50	22	45	22	6	4	6	**155,85**
RD12-050A05R	RDMT1204 / RDMW1204	50	22	45	22	6	5	6	**226,80**
RD12-063A05R	RDMT1204 / RDMW1204	63	22	45	22	6	5	6	**226,80**
RD12-063A06R	RDMT1204 / RDMW1204	63	22	45	22	6	6	6	**255,10**
RD12-080A07R	RDMT1204 / RDMW1204	80	27	50	26	6	7	6	**297,75**
RD12-100A08R	RDMT1204 / RDMW1204	100	32	50	32	6	8	6	**410,95**
RD16-063A04R	RDMT1604 / RDMW1604	63	22	45	22	8	4	8	**155,85**
RD16-063A05R	RDMT1604 / RDMW1604	63	22	45	22	8	5	8	**226,80**
RD16-080A06R	RDMT1604 / RDMW1604	80	27	50	27	8	6	8	**283,40**
RD16-100A07R	RDMT1604 / RDMW1604	100	32	50	32	8	7	8	**354,35**
RD16-125A08R	RDMT1604 / RDMW1604	125	40	55	40	8	8	8	**481,90**

Tornillo de inserción *Insert screw*	Tornillo de sujeción *Clamp screw*	€	Brida *Clamp*	€
P3504	**P4009**	**4,90**	**RD-45**	**9,85**
P4008	**P5004**	**4,90**	**RD-6R**	**9,85**
P5007	**P5009**	**4,90**	**RD-68**	**9,85**

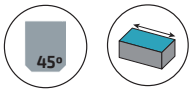
RD

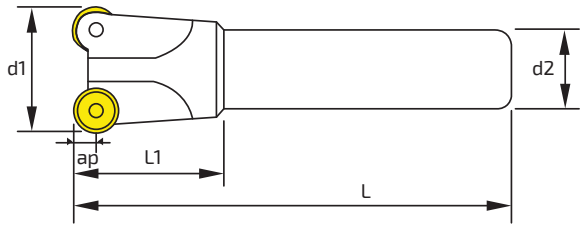




Tornillo de inserción *Insert screw*	€
P2003	4,90
P2515	4,90
P3504	4,90

Ref.	Plaquita *Inserts*	d1	d2	d3	L	L1	z	ap	€
RD05-012R02R	RDKW0501	12	11	6,5	36	21	2	2,5	141,95
RD05-012R03R	RDKW0501	12	11	6,5	36	21	3	2,5	212,95
RD05-016R03R	RDKW0501	16	15	8,5	43	26	3	2,5	198,55
RD05-016R04R	RDKW0501	16	15	8,5	43	26	4	2,5	283,40
RD07-016R02R	RDKW0702	16	15	8,5	43	26	2	3,5	141,95
RD07-016R03R	RDKW0702	16	15	8,5	43	26	3	3,5	212,95
RD07-020R03R	RDKW0702	20	18	10,5	50	32	3	3,5	209,10
RD07-020R04R	RDKW0702	20	18	10,5	50	32	4	3,5	241,20
RD07-025R04R	RDKW0702	25	23	12,5	60	38	4	3,5	248,40
RD07-025R05R	RDKW0702	25	23	12,5	60	38	5	3,5	283,40
RD10-025R02R	RDMT10T3 / RDMW10T3	25	23	12,5	60	38	2	5,0	141,95
RD10-025R03R	RDMT10T3 / RDMW10T3	25	23	12,5	60	38	3	5,0	226,80
RD10-030R03R	RDMT10T3 / RDMW10T3	30	23	12,5	60	38	3	5,0	226,80
RD10-030R04R	RDMT10T3 / RDMW10T3	30	23	12,5	60	38	4	5,0	269,50
RD10-035R04R	RDMT10T3 / RDMW10T3	35	23	12,5	60	38	4	5,0	283,40
RD10-035R05R	RDMT10T3 / RDMW10T3	35	23	12,5	60	38	5	5,0	354,35
RD10-042R05R	RDMT10T3 / RDMW10T3	42	29	17,0	66	43	5	5,0	354,35
RD10-042R06R	RDMT10T3 / RDMW10T3	42	29	17,0	66	43	6	5,0	410,95

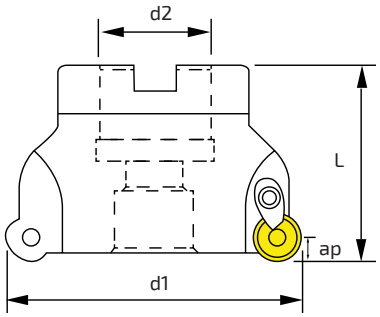


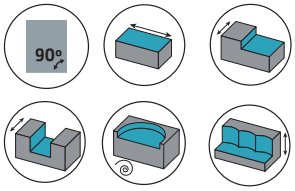


Tornillo de inserción *Insert screw*	€
P3507A	4,90
P3509A	4,90

Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
RD10-020M02R	RDMT1003/RMX1003	20	20	150	21	2	5	112,70
RD10-020M02RL	RDMT1003/RMX1003	20	20	200	21	3	5	131,90
RD10-021M02R	RDMT1003/RMX1003	21	20	150	26	3	5	112,70
RD10-021M02RL	RDMT1003/RMX1003	21	20	200	26	4	5	131,90
RD10-025M03R	RDMT1003/RMX1003	25	25	150	26	2	5	143,85
RD10-025M03RL	RDMT1003/RMX1003	25	25	200	26	3	5	163,05
RD10-025M03RXL	RDMT1003/RMX1003	25	25	250	32	3	5	182,25
RD10-026M03RL	RDMT1003/RMX1003	26	25	150	32	4	5	143,85
RD10-026M03RXL	RDMT1003/RMX1003	26	25	200	38	4	5	163,05
RD10-030M03R	RDMT1003/RMX1003	26	25	250	38	5	5	182,25
RD10-030M03RL	RDMT1003/RMX1003	30	25	150	38	2	5	151,05
RD10-030M03RXL	RDMT1003/RMX1003	30	25	200	38	3	5	170,25
RD10-035M03R	RDMT1003/RMX1003	30	25	250	38	3	5	188,00
RD10-035M03RL	RDMT1003/RMX1003	35	32	150	38	4	5	170,25
RD10-035M03RXL	RDMT1003/RMX1003	35	32	200	38	4	5	188,00
RD10-035M03RXXL	RDMT1003/RMX1003	35	32	250	38	5	5	206,70
RD10-035M04R	RDMT1003/RMX1003	35	32	300	43	5	5	225,90
RD10-035M04RL	RDMT1003/RMX1003	35	32	150	43	6	5	188,00
RD10-035M04RXL	RDMT1003/RMX1003	35	32	200	38	4	5	206,70
RD10-035M04RXXL	RDMT1003/RMX1003	35	32	250	38	5	5	225,90
RD10-035M04RXXXL	RDMT1003/RMX1003	35	32	300	43	5	5	244,55

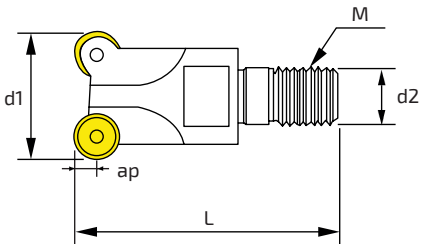
RD

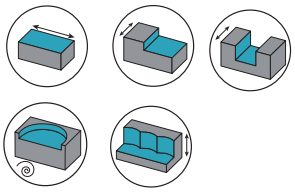




Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
RD10-050A05R	RDMT1003/RMX1003	50	22,0	40	5	5	**194,20**
RD10-066A06RL	RDMT1003/RMX1003	66	27,0	50	6	5	**238,35**

Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P3509A**	**4,90**





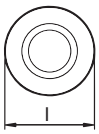
Ref.	Plaquita *Inserts*	d1	d2	L	M	z	ap	€
RD10-020R02R	RDMT1003/RMX1003	20	10,5	30	M10	2	5	**94,00**
RD10-021R02R	RDMT1003/RMX1003	21	10,5	30	M10	2	5	**119,40**
RD10-026R03R	RDMT1003/RMX1003	26	12,5	35	M12	3	5	**94,00**
RD10-035R03R	RDMT1003/RMX1003	35	17,0	43	M16	3	5	**194,20**

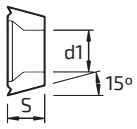
Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P3507A**	**4,90**

RD

P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



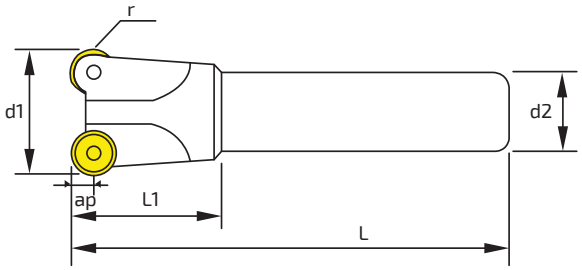


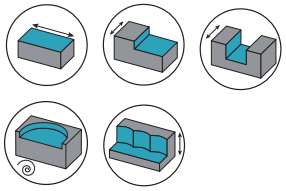
Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* l	S	d1	€
RDKW0501M0E	✓	✓		5	1,59	2,2	**7,15**
RDKW0702M0E	✓	✓	✓	7	2,38	2,8	**8,35**
RDKW0702M0T	✓	✓	✓	7	2,38	2,8	**8,35**
RDMT1003M0E		✓		10	3,18	3,9	**5,30**
RDMT1003M0T	✓	✓		10	3,18	3,9	**6,70**
RDMX1003M0E	✓	✓	✓	10	3,18	4,15	**7,90**
RDMX1003M0T	✓	✓		10	3,18	4,15	**6,70**
RDMT10T3M0E		✓		10	3,97	4,5	**5,30**
RDMT10T3M0T		✓		10	3,97	4,5	**5,30**
RDMW10T3M0E		✓		10	3,97	4,5	**5,30**
RDMT12T3M0E		✓	✓	12	3,97	4,1	**8,50**
RDMX12T3M0E		✓	✓	12	3,97	4,1	**8,50**
RDMX12T3M0T	✓	✓	✓	12	3,97	4,1	**8,50**
RDMT1204M0T		✓		12	4,76	4,4	**5,85**
RDMW1204M0T		✓		12	4,76	4,4	**5,85**
RDMT1604M0T		✓		16	4,76	5,5	**6,90**
RDMW1604M0T		✓		16	4,76	5,5	**6,90**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,08 ~ 0,40	≤ 0.4 x Dim_A
Inoxidable *Stainless 300 series*	50 ~ 110	0,05 ~ 0,35	≤ 0.3 x Dim_A
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,08 ~ 0,40	≤ 0.4 x Dim_A

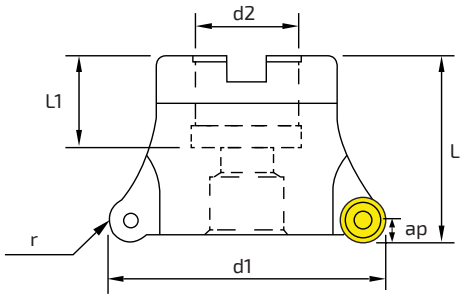
RP

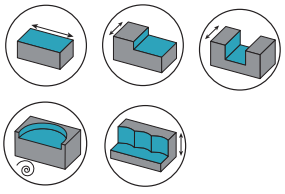




Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
RP08-012M01R	RPMT08T2	12	12	100	30	1	4	**100,75**
RP08-016M02R	RPMT08T2	16	16	150	50	2	4	**134,30**
RP08-020M02R	RPMT08T2	20	20	150	50	2	4	**149,20**
RP08-025M03R	RPMT08T2	25	25	150	40	3	4	**209,10**
RP08-020M02RL	RPMT08T2	20	20	200	50	2	4	**179,35**
RP08-020M02RXL	RPMT08T2	20	20	250	50	2	4	**223,95**
RP10-025M02R	RPMT10T3	25	25	150	40	2	5	**156,80**
RP10-030M03R	RPMT10T3	30	25	150	40	3	5	**223,95**
RP10-032M03R	RPMT10T3	32	32	150	40	3	5	**223,95**
RP10-035M03R	RPMT10T3	35	32	150	40	3	5	**238,80**
RP10-025M03R	RPMT10T3	25	25	200	50	3	5	**223,95**
RP10-025M02R	RPMT10T3	25	25	200	50	2	5	**215,30**
RP10-025M02RL	RPMT10T3	25	25	250	50	2	5	**291,10**
RP10-030M03RL	RPMT10T3	30	25	200	70	3	5	**268,55**
RP10-032M03RL	RPMT10T3	32	32	200	70	3	5	**268,55**
RP10-032M03RXL	RPMT10T3	32	32	250	50	3	5	**349,10**
RP10-035M03RL	RPMT10T3	35	32	200	50	3	5	**283,40**
RP12-032M02R	RPMT1204/RPMW1204	32	32	170	45	2	6	**209,10**
RP12-040M03R	RPMT1204/RPMW1204	40	32	170	45	3	6	**268,55**
RP12-050M04R	RPMT1204/RPMW1204	50	42	170	45	4	6	**328,45**
RP12-032M02RL	RPMT1204/RPMW1204	32	32	250	80	2	6	**295,40**
RP12-040M03RL	RPMT1204/RPMW1204	40	32	230	50	3	6	**314,10**
RP12-050M04RL	RPMT1204/RPMW1204	50	42	230	50	4	6	**373,05**

Tornillo de inserción *Insert screw*	€
P3004	**4,90**
P3503	**4,90**
P4006	**4,90**





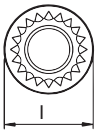
Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
RP08-040A05R	RPMT08T2	40	16	40	18	5	4	**179,35**
RP08-050A06R	RPMT08T2	50	22	45	22	6	4	**223,95**
RP10-040A04R	RPMT10T3	40	16	40	18	4	5	**149,15**
RP10-050A05R	RPMT10T3	50	22	45	22	5	5	**209,10**
RP10-063A06R	RPMT10T3	63	22	45	22	6	5	**238,80**
RP12-063A05R	RPMT1204	63	22	45	22	5	6	**223,95**
RP12-080A06R	RPMT1204	80	27	50	26	6	6	**298,30**

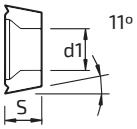
Tornillo de inserción *Insert screw*	€
P3004	**4,90**
P3503	**4,90**
P4006	**4,90**

RP

P	◎
M	◎
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



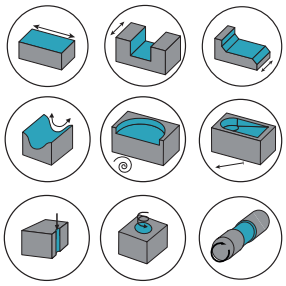


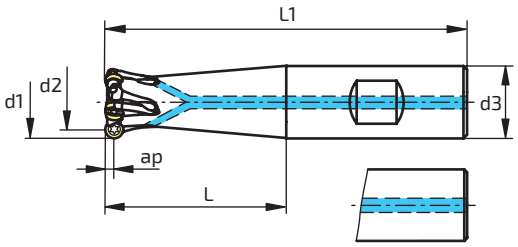
Ref.	KS3100	Medidas *Dimensions (mm)* l	S	d1	€
RPMT08T2MOE	✓	8	2,78	3,2	**5,30**
RPMT08T2MOT	✓	8	2,78	3,2	**5,30**
RPMW1003MOE	✓	10	3,18	4,6	**4,90**
RPMW1003MOT	✓	10	3,18	4,6	**4,90**
RPMT10T3MOE	✓	10	3,97	4,5	**5,30**
RPMT10T3MOT	✓	10	3,97	4,3	**5,30**
RPMT1204MOE	✓	12	4,76	4,3	**5,75**
RPMT1204MOT	✓	12	4,76	4,3	**5,75**
RPMW1204MOE	✓	12	4,76	4,3	**5,75**
RPMW1204MOT	✓	12	4,76	4,3	**5,75**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	80 ~ 200	0,08 ~ 0,40	≤ 0.4 x Dim_A
Inoxidable *Stainless 300 series*	50 ~ 110	0,05 ~ 0,35	≤ 0.3 x Dim_A
Hierro fundido *Cast iron (HB 140-220)*	80 ~ 180	0,08 ~ 0,40	≤ 0.4 x Dim_A

CRD...

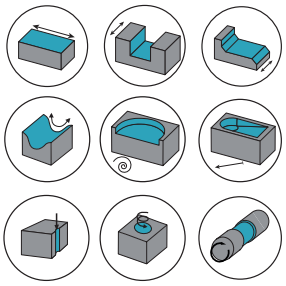


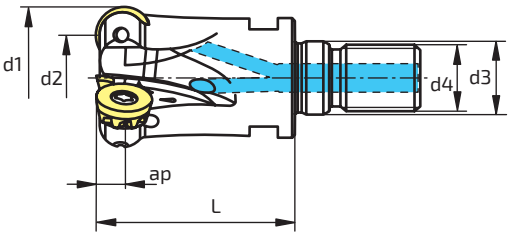


Ref.	Plaquita *Inserts*	d1	d2	d3	L	L1	z	ap	€
CRD05-010M02RL	RD..0501..	10	5	10	165	25	2	2,5	**180,90**
CRD05-010M02R	RD..0501..	10	5	12	67	20	2	2,5	**187,40**
CRD05-012M03RL	RD..0501..	12	7	12	165	32	3	2,5	**227,60**
CRD05-012M03R	RD..0501..	12	7	16	75	25	3	2,5	**227,60**
CRD05-016M04RL	RD..0501..	16	11	16	165	40	4	2,5	**270,30**
CRD05-016M04R	RD..0501..	16	11	16	81	32	4	2,5	**276,60**
CRD05-020M05RL	RD..0501..	20	15	20	165	50	5	2,5	**315,70**
CRD05-020M05R	RD..0501..	20	15	20	91	40	5	2,5	**321,90**
CRD08-016M02RB	RD..0802..	16	8	16	89	40	2	4	**194,90**
CRD08-016M02RL	RD..0802..	16	8	16	165	40	2	4	**187,40**
CRD08-016M02R	RD..0802..	16	8	16	81	32	2	4	**194,90**
CRD08-020M03RL	RD..0802..	20	12	20	200	50	3	4	**240,10**
CRD08-020M03RB	RD..0802..	20	12	20	110	60	3	4	**254,30**
CRD08-020M03RM	RD..0802..	20	12	20	110	60	3	4	**254,30**
CRD08-020M03R	RD..0802..	20	12	20	91	40	3	4	**247,70**
CRD08-025M04RB	RD..0802..	25	17	25	116	60	4	4	**284,60**
CRD08-025M04RM	RD..0802..	25	17	25	116	60	4	4	**292,90**
CRD08-025M04RL	RD..0802..	25	17	25	225	60	4	4	**285,30**
CRD08-025M04R	RD..0802..	25	17	25	107	50	4	4	**292,90**
CRD08-032M06R	RD..0802..	32	25	32	130	70	6	4	**382,20**
CRP10-020M02R	RP..10T3..	20	10	20	102	50	2	5	**207,50**
CRP10-020M02RL	RP..10T3..	20	10	20	200	50	2	5	**207,50**
CRP10-025M03R	RP..10T3..	25	15	25	117	60	3	5	**280,40**
CRP10-025M03RB	RP..10T3..	25	15	25	116	60	3	5	**280,40**
CRP10-025M03RL	RP..10T3..	25	15	25	225	60	3	5	**280,40**
CRP10-025M03RM	RP..10T3..	25	15	25	116	60	3	5	**280,40**
CRP10-032M04RL	RP..10T3..	32	22	32	131	70	4	5	**315,60**
CRP10-032M04R	RP..10T3..	32	22	32	130	70	4	5	**315,70**
CRP12-025M02R	RP..1204..	25	13	25	86	30	2	6	**255,70**
CRP12-032M03RB	RP..1204..	32	20	32	100	40	3	6	**295,70**
CRP12-032M03R	RP..1204..	32	20	32	100	40	3	6	**295,70**

Tornillo de inserción *Insert screw*	€
11077874	**2,50**
76913	**2,50**
11464141	**2,50**
165795	**3,05**

CRD...





Tornillo de inserción *Insert screw*	€
11077874	2,50
76913	2,50
11464141	2,50
165795	3,05

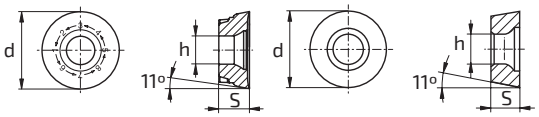
Ref.	Plaquita *Inserts*	d1	d2	d3	d4	L	z	ap	€
CRD05-020R05R	RD..0501..	20	15	10,5	10	33	5	2,5	270,90
CRD05-025R06R	RD..0501..	25	20	12,5	12	35	6	2,5	311,90
CRD05-032R07R	RD..0501..	32	27	17,0	16	35	7	2,5	374,20
CRD08-020R03R	RD..0802..	20	12	10,5	10	33	3	4	254,30
CRD08-025R04R	RD..0802..	25	17	12,5	12	35	4	4	284,60
CRD08-032R05R	RD..0802..	32	24	17,0	16	35	5	4	346,10
CRP10-020R02R	RP..10T3..	20	10	10,5	10	33	2	5	205,70
CRP10-025R03R	RP..10T3..	25	15	12,5	12	35	3	5	276,60
CRP10-025R03RB	RP..10T3..	25	15	12,5	12	35	3	5	276,60
CRP10-032R04R	RP..10T3..	32	22	17,0	16	35	4	5	321,90
CRP10-032R04RB	RP..10T3..	32	22	17,0	16	35	4	5	321,90
CRP10-035R05R	RP..10T3..	35	25	17,0	16	35	5	5	359,50
CRP12-025R02R	RP..1204..	25	13	12,5	12	35	2	6	199,50
CRP12-032R03R	RP..1204..	32	20	17,0	16	35	3	6	243,40
CRP12-035R03R	RP..1204..	35	23	17,0	16	35	3	6	243,40
CRP12-042R04R	RP..1204..	42	30	17,0	16	42	4	6	289,30

RDHX

P	●	○	○
M	○	●	●
K			○
N			
S			●
H			

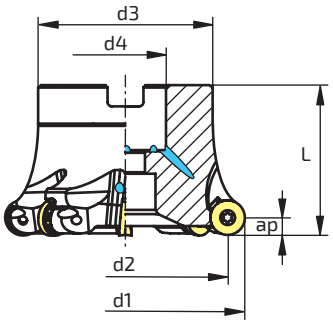
● Aplicación principal
Main use

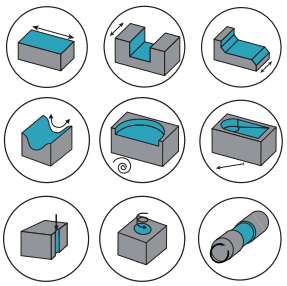
○ Aplicación complementaria
Complementary use



Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	S	h	€
RDHX0501MOSN	✓			5	1,59	2,5	11,65
RDHX0802MOSN	✓			8	2,38	2,8	11,90
RPHX10T3MOSN	✓			10	3,97	3,4	12,35
RPHX1204MOSN	✓			12	4,76	4,4	13,55
RPHX1204M4EN			✓	12	4,76	4,4	17,15
RPNX1204MOSN	✓			12	4,76	4,4	10,80

RP10 / RP12

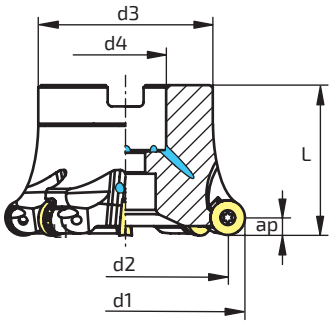


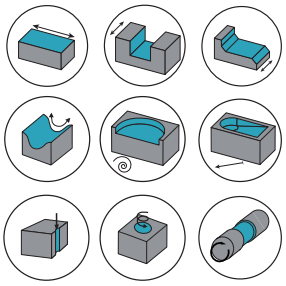


Ref.	Plaquita *Inserts*	d1	d2	d3	d4	L	z	ap	€
CRP10-040A03R	RP..10T3..	40	30	38	16	40	3	5	306,70
CRP10-040A05R	RP..10T3..	40	30	38	16	40	5	5	345,70
CRP10-040A05RB	RP..10T3..	40	30	38	16	40	5	5	345,70
CRP10-042A06R	RP..10T3..	42	32	38	16	40	6	5	397,30
CRP10-042A06RB	RP..10T3..	42	32	38	16	40	6	5	397,30
CRP10-050A04R	RP..10T3..	50	40	43	22	40	4	5	336,80
CRP10-050A06R	RP..10T3..	50	40	43	22	40	6	5	411,10
CRP10-050A06RB	RP..10T3..	50	40	43	22	40	6	5	411,10
CRP10-052A06R	RP..10T3..	52	42	43	22	40	6	5	411,10
CRP10-052A06RB	RP..10T3..	52	42	43	22	40	6	5	411,10
CRP12-040A04R	RP..1204..	40	28	38	16	40	4	6	318,00
CRP12-040A04RB	RP..1204..	40	28	38	16	40	4	6	318,00
CRP12-050A04R	RP..1204..	50	38	43	22	40	4	6	328,20
CRP12-050A05R	RP..1204..	50	38	43	22	40	5	6	385,90
CRP12-050A05RB	RP..1204..	50	38	43	22	40	5	6	385,90
CRP12-052A05R	RP..1204..	52	40	43	22	40	5	6	404,80
CRP12-052A05RB	RP..1204..	52	40	43	22	40	5	6	404,80
CRP12-063A06R	RP..1204..	63	51	48	22	40	6	6	476,50
CRP12-063A06RB	RP..1204..	63	51	48	22	40	6	6	476,50
CRP12-066A07R	RP..1204..	66	54	48	22	40	7	6	502,30
CRP12-066A07RB	RP..1204..	66	54	48	22	40	7	6	502,30
CRP12-080A05R	RP..1204..	80	68	58	27	50	5	6	434,90
CRP12-080A07R	RP..1204..	80	68	58	27	45	7	6	537,50
CRP12-080A07RB	RP..1204..	80	68	58	27	50	7	6	537,50
CRP12-100A06R	RP..1204..	100	88	78	32	50	6	6	485,30
CRP12-100A10R	RP..1204..	100	88	78	32	50	10	6	709,00

Tornillo de inserción *Insert screw*	€
11464141	2,50
11610311	3,05
165795	3,05
11610311	3,05
165795	3,05
11610311	3,05
165795	3,05
11610311	3,05
165795	3,05
11610311	3,05
165795	3,05
11610311	3,05
165795	3,05

RP16





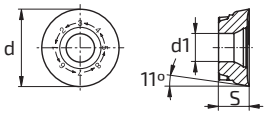
Ref.	Plaquita *Inserts*	d1	d2	d3	d4	L	z	ap	€
CRP16-050A04R	RP..1605..	50	34	48	22	40	4	8	385,90
CRP16-052A04R	RP..1605..	52	36	48	22	40	4	8	385,90
CRP16-063A05R	RP..1605..	63	47	48	22	40	5	8	486,50
CRP16-080A06R	RP..1605..	80	64	58	27	50	6	8	590,90
CRP16-100A07R	RP..1605..	100	84	78	32	50	7	8	690,30
CRP20-080A05R	RP..2006..	80	60	58	27	50	5	10	500,30
CRP20-100A06R	RP..2006..	100	80	78	32	50	6	10	598,40
CRP20-125A06R	RP..2006..	125	105	88	40	63	6	10	605,90

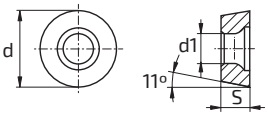
Tornillo de inserción *Insert screw*	€
106022	3,05
11107792	4,00

P	●	○	○
M	○	●	●
K			○
N			
S			●
H			

● Aplicación principal
Main use

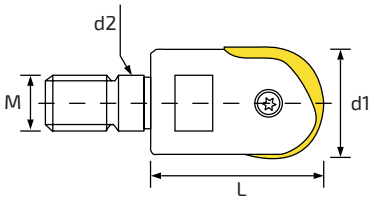
○ Aplicación complementaria
Complementary use





Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	S	d1	KS3100 €	KS4100 €	KS5100 €
RDHX0802MOSN-F50		✓		8	2,38	2,80	-	11,90	-
RPHX10T3MOSN-F50	✓	✓		10	3,97	3,4	12,35	12,35	-
RPHX1204MOSN-F50	✓	✓		12	4,76	4,4	13,55	13,55	-
RPHX1605MOSN-F50		✓		16	5,56	5,5	-	18,40	-
RPNX10T3MOSN-F50	✓			10	3,97	3,40	10,80	-	-
RPNX1204MOSN-F50	✓			12	4,76	4,4	10,80	-	-
RPNX1605MOSN-F50	✓			16	5,56	5,5	14,70	-	-
RPNX2006MOSN-F50		✓		20	6,35	6,0	-	19,10	-
RPHX10T3MOEN-M30	✓	✓		10	3,97	3,4	12,35	12,35	-
RPHX1204MOEN-M30		✓		12	4,76	4,4	-	13,55	-
RPHX1605MOEN-M30		✓		16	5,56	5,5	-	18,40	-
RPNX2006MOEN-M30	✓	✓		20	6,35	6,0	19,10	19,10	-
RDHX0501MOEN-M31			✓	5	1,59	2,50	-	-	10,70
RDHX0802MOEN-M31			✓	8	2,38	2,80	-	-	14,10
RDHX0802M4EN-M31			✓	8	2,38	2,80	-	-	14,10
RPHX10T3M4EN-M31			✓	10	3,97	3,4	-	-	15,60
RPHX10T3M8EN-M31			✓	10	3,97	3,4	-	-	15,60
RPHX1204M4EN-M31			✓	12	4,76	4,4	-	-	17,15
RPHX1204M6EN-M31			✓	12	4,76	4,4	-	-	17,15
RPHX1204M8EN-M31			✓	12	4,76	4,4	-	-	17,15
RPHX1605M8EN-M31			✓	16	5,56	5,5	-	-	23,40
RPNX10T3M8EN-M31			✓	10	3,97	3,4	-	-	12,95
RPNX1204M4EN-M31			✓	12	4,76	4,4	-	-	15,25
RPNX1204M8EN-M31			✓	12	4,76	4,4	-	-	15,25
RPNX2006M8EN-M31			✓	20	6,35	6,0	-	-	23,40
RPHX10T3M4EN-M32			✓	10	3,97	3,4	-	-	15,60
RPHX1204M4EN-M32			✓	12	4,76	4,4	-	-	17,15
RPHX10T3MOSN-M50	✓	✓	✓	10	3,97	3,4	12,35	12,35	15,60
RPHX1204MOSN-M50		✓	✓	12	4,76	4,4	-	13,55	17,15
RPNX10T3MOSN-M50	✓			10	3,97	3,4	9,40	-	-
RPNX1204MOSN-M50	✓			12	4,76	4,4	10,80	-	-
RPNX1605MOSN-M50	✓			16	5,56	5,5	14,70	-	-
RPHX10T3MOEN-R30			✓	10	3,97	3,4	-	-	15,60
RPHX1204MOEN-R30			✓	12	4,76	4,4	-	-	17,15
RPHX10T3MOSN	✓			10	3,97	3,4	12,35	-	-
RPHX1204MOSN	✓			12	4,76	4,4	13,55	-	-
RPHX1204M4EN			✓	12	4,76	4,4	-	-	17,15
RPHX1605MOSN	✓			16	5,56	5,5	18,40	-	-
RPNX1204MOSN	✓			12	4,76	4,4	10,80	-	-
RPNX1605MOSN	✓			16	5,56	5,5	14,70	-	-
RPNX2006MOSN	✓			20	6,35	6,0	19,10	-	-

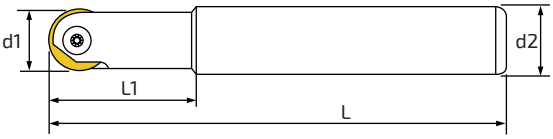
SPW



Ref.	Plaquita *Inserts*	d1	d2	L	M	€
SPW10-M05	SPWE100-50R	10	5,5	20	M5	**130,40**
SPW12-M06	SPWE120-60R	12	6,5	22	M6	**130,40**
SPW16-M08	SPWE160-80R	16	8,5	28	M8	**130,40**
SPW20-M10	SPWE200-100R	20	10,5	30	M10	**130,40**
SPW25-M12	SPWE250-125R	25	12,5	40	M12	**156,50**
SPW32-M16	SPWE320-160R	32	17,0	43	M16	**247,70**

Tornillo de inserción *Insert screw*	€
P03240	**4,90**
P03250	**4,90**
P03260	**4,90**
P03280	**4,90**

SPWC



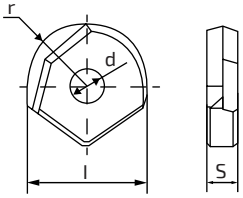
Ref.	Plaquita *Inserts*	d1	d2	L	L1	€
SPWC100-L130	SPWE100-50R	10	10	130	30	**56,50**
SPWC100-L160	SPWE100-50R	10	10	160	35	**56,50**
SPWC120-L130	SPWE120-60R	12	12	130	30	**56,50**
SPWC120-L160	SPWE120-60R	12	12	160	30	**56,50**
SPWC160-L120	SPWE160-80R	16	16	120	30	**71,70**
SPWC160-L160	SPWE160-80R	16	16	160	30	**71,70**
SPWC160-L200	SPWE160-80R	16	16	200	45	**78,20**
SPWC200-L160	SPWE200-100R	20	20	160	30	**78,20**
SPWC200-L200	SPWE200-100R	20	20	200	35	**86,95**
SPWC250-L160	SPWE250-125R	25	25	160	35	**117,35**
SPWC250-L200	SPWE250-125R	25	25	200	40	**134,70**
SPWC250-L250	SPWE250-125R	25	25	250	60	**156,50**
SPWC320-L200	SPWE320-160R	32	32	200	55	**156,50**
SPWC320-L250	SPWE320-160R	32	32	250	70	**182,50**
SPWC320-L300	SPWE320-160R	32	32	300	80	**208,60**

Tornillo de inserción *Insert screw*	€
P03240	**4,90**
P03250	**4,90**
P03260	**4,90**
P03280	**4,90**

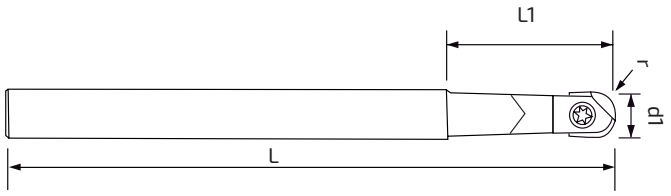
SPWE

P	●
M	●
K	●
N	
S	●
H	

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*

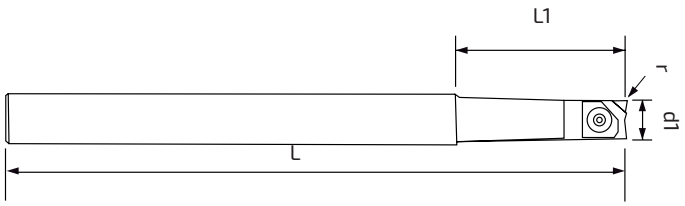


Ref.	KS3100	Medidas *Dimensions* d	l	S	r	€
SPWE100-50R	✓	4	10	3	5,0	**19,35**
SPWE120-60R	✓	4	12	3	6,0	**19,35**
SPWE160-80R	✓	5	16	4	8,0	**21,65**
SPWE200-100R	✓	5	20	5	10,0	**26,60**
SPWE250-125R	✓	6	25	6	12,5	**33,85**
SPWE320-160R	✓	6	32	7	16,0	**43,30**



	€		€
P581142	13,65	T-10	15,70
P581143	13,65	T-20	17,50
P581144	13,65	T-25S	17,55
P581145	13,65	T-30A	18,45
P581146	9,55	T-30A	18,45

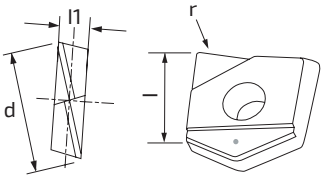
Ref.	Plaquita *Insert*	d1	L	L1	r	€
MD-ABPF-10-150	SPQ-SPW	10	150	20	5	273,60
MD-ABPF-12-150	SPQ-SPW	12	150	30	6	288,00
MD-ABPF-16-200	SPQ-SPW	16	200	70	8	471,00
MD-ABPF-20-220	SPQ-SPW	20	220	80	10	621,00
MD-ABPF-25-250	SPQ-SPW	25	250	80	12,5	909,00



	€		€
P581142	13,65	T-20	17,50
P581145	13,65	T-25S	17,55
P581146	9,55	T-30A	18,45

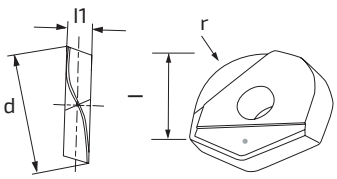
Ref.	Plaquita *Insert*	d1	L	L1	r	€
ABPF-16-220	SPQ-SPW	16	220	70	8	255,00
ABPF-20-220	SPQ-SPW	20	220	80	10	255,00
ABPF-25-250	SPQ-SPW	25	250	80	12,5	306,00

P	●
M	
K	●
N	
S	
H	



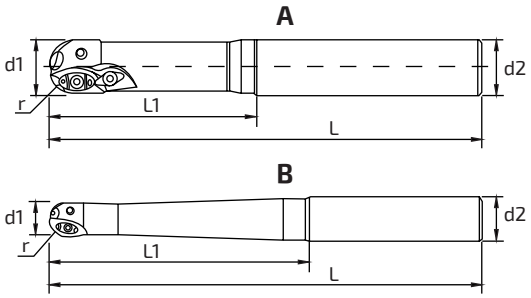
Ref.	KS2100	Medidas *Dimensions* d	l	l1	r	€
SPQ 100-05R	✓	10,0	11,6	2,7	0,5	50,95
SPQ 100-10R	✓				1,0	50,95
SPQ 120-05R	✓	12,0	14,3	3,2	0,5	50,95
SPQ 120-10R	✓				1,0	50,95
SPQ 120-20R	✓				2,0	50,95
SPQ 160-05R	✓	16,0	16,6	4,2	0,5	54,70
SPQ 160-10R	✓				1,0	54,70
SPQ 160-20R	✓				2,0	54,70
SPQ 200-05R	✓	20,0	19,9	5,2	0,5	60,35
SPQ 200-10R	✓				1,0	60,35
SPQ 200-20R	✓				2,0	60,35
SPQ 250-05R	✓	25,0	22,3	6,2	0,5	67,90
SPQ 250-10R	✓				1,0	67,90
SPQ 250-20R	✓				2,0	67,90

P	●
M	
K	●
N	
S	
H	



Ref.	KS2100	Medidas *Dimensions* d	l	l1	r	€
SPW 100-500R	✓	10,0	12,0	2,7	5,0	45,30
SPW 120-600R	✓	12,0	14,6	3,2	6,0	45,30
SPW 160-800R	✓	16,0	16,6	4,2	8,0	49,05
SPW 200-100R	✓	20,3	20,3	5,2	10,0	53,85
SPW 250-125R	✓	24,1	24,1	6,2	12,5	60,35

SPE

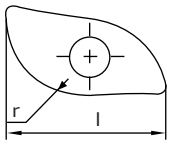


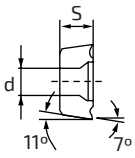
Ref.	Plaquita *Inserts*	Fig.	d1	d2	L	L1	r	€
SPE200-L150	SPE100CE/SPE100SE	A	20	20	150	70	10,0	**108,70**
SPE200-L200	SPE100CE/SPE100SE	B	20	25	200	100	10,0	**117,35**
SPE200-L250	SPE100CE/SPE100SE	B	20	25	250	150	10,0	**130,40**
SPE250-L150	SPE125CE/SPE125SE	A	25	25	150	80	12,5	**130,40**
SPE250-L200	SPE125CE/SPE125SE	A	25	25	200	100	12,5	**143,40**
SPE250-L250	SPE125CE/SPE125SE	A	25	25	250	110	12,5	**156,50**
SPE300-L200	SPE150CE/SPE150SE	B	30	32	200	100	15,0	**165,15**
SPE300-L250	SPE150CE/SPE150SE	B	30	32	250	120	15,0	**178,20**
SPE320-L200	SPE160CE/SPE160SE	A	32	32	200	100	16,0	**173,80**
SPE320-L250	SPE160CE/SPE160SE	A	32	32	250	120	16,0	**186,90**
SPE320-L300	SPE160CE/SPE160SE	A	32	32	300	150	16,0	**199,90**

Tornillo de inserción *Insert screw*	€
P02560 **P03080**	**4,90**
P04011	**4,90**
P04011 **P05013**	**4,90**

P	●
M	●
K	●
N	
S	●
H	

● Continuo *Continuous*
● Interrupción baja *Light interrupted*
● General
● Interrumpido *Interrupted*

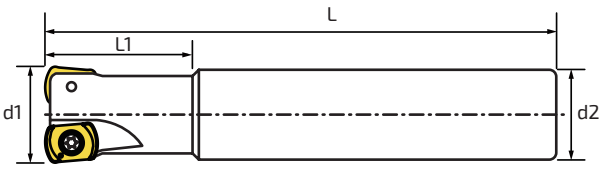




Ref.	KS3100	Medidas *Dimensions* l	S	r	d	€
SPE100CE	✓	20	3,97	10,0	4,0	**77,30**
SPE100SE	✓	20	3,97	10,0	4,0	**77,30**
SPE125CE	✓	25	4,76	12,5	4,7	**92,75**
SPE125SE	✓	25	4,76	12,5	4,7	**92,75**
SPE150CE	✓	30	6,35	15,0	5,8	**115,90**
SPE150SE	✓	30	6,35	15,0	5,8	**115,90**
SPE160CE	✓	32	6,35	16,0	5,8	**123,60**
SPE160SE	✓	32	6,35	16,0	5,8	**123,60**

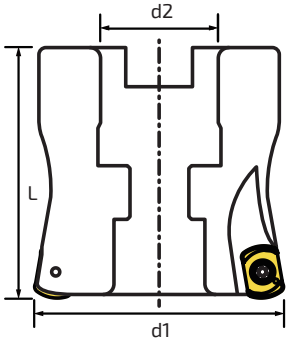
HERRAMIENTAS DE ALTO AVANCE

High feed milling



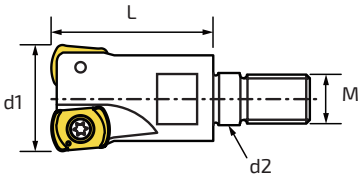
Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	€
BN06-015-M02R	BNMX0603	15	16	130	26	2	**135,60**
BN06-016-M02R	BNMX0603	16	16	130	26	2	**135,60**
BN06-017-M02R	BNMX0603	17	16	130	26	2	**135,60**
BN06-018-M02R	BNMX0603	18	20	130	25	2	**149,20**
BN06-020-M03R	BNMX0603	20	20	150	40	3	**169,55**
BN06-021-M03R	BNMX0603	21	20	150	40	3	**169,55**
BN06-025-M04R	BNMX0603	25	25	150	40	4	**183,10**
BN06-026-M04R	BNMX0603	26	25	150	30	4	**203,60**
BN06-032-M04R	BNMX0603	32	32	200	45	4	**224,10**
BN09-025-M03R	BNMX0904	25	25	150	40	3	**157,05**
BN09-032-M03R	BNMX0904	32	32	150	40	3	**170,80**

Tornillo de inserción *Insert screw*	€
P3004	**4,90**
P4009	**6,90**



Ref.	Plaquita *Inserts*	d1	d2	L	z	€
BN06-040-A06R	BNMX0603	40	22	50	6	**257,60**
BN06-050-A07R	BNMX0603	50	22	50	7	**251,10**
BN06-063-A07R	BNMX0603	63	22	50	7	**264,69**
BN09-063-A07R	BNMX0904	63	22	50	7	**264,60**

Tornillo de inserción *Insert screw*	€
P3004	**4,90**
P4009	**4,90**



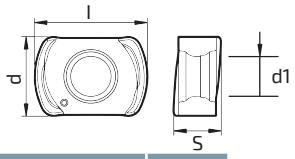
Ref.	Plaquita *Inserts*	d1	d2	L	M	z	Orificio de refrigeración *Coolant hole*	€
BN06-016-R02R	BNMX0603	16	8,5	26	M8	2		**135,60**
BN06-021-R03R	BNMX0603	21	10,8	30	M10	3		**169,60**
BN06-020-R03R	BNMX0603	20	10,8	30	M10	3		**154,75**
BN06-020-R03RR	BNMX0603	20	10,8	30	M10	3	●	**176,55**
BN06-025-R03R	BNMX0603	25	12,5	35	M12	3		**163,50**
BN06-025-R04R	BNMX0603	25	12,5	35	M12	4		**170,00**
BN06-026-R03R	BNMX0603	26	12,5	35	M12	3		**163,50**
BN06-032-R05R	BNMX0603	32	17,0	40	M16	5		**244,15**

Tornillo de inserción *Insert screw*	€
P3004	**4,90**

BNMX
De doble cara/ *Double sided*

P	◎	◎	○
M	○	◎	◎
K	◎	◎	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS2100	KS3100	KS4100	Medidas *Dimensions (mm)* l	d	S	d1	€
BNMX0603-SG	✓	✓		9	6,38	3,75	3,2	**12,15**
BNMX0603-MG	✓	✓		9	6,38	3,75	3,2	**12,15**
BNMX0603-RG	✓	✓	✓	9	6,38	3,75	3,2	**12,15**
BNMX0904-MG		✓	✓	11,9	9,18	4,80	4,2	**11,75**

Condiciones de corte
Cutting conditions

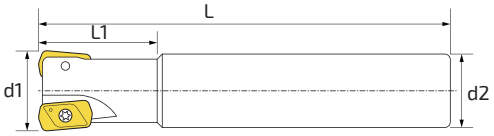
BNMX0603

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	120 ~ 220	0,4 ~ 1,6	0,3 ~ 0,9
Inoxidable *Stainless 300 series*	70 ~ 150	0,3 ~ 1,2	0,3 ~ 0,7
Hierro fundido *Cast iron (HB 140-220)*	120 ~ 220	0,4 ~ 1,6	0,3 ~ 0,9
Alta temperatura *High temp. & Titanium alloy*	40 ~ 80	0,3 ~ 0,8	0,3 ~ 0,6
Acero endurecido *Hardened steel*	50 ~ 100	0,3 ~ 1,0	0,3 ~ 0,6

BNMX0904

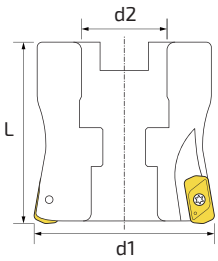
MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	120 ~ 220	0,4 ~ 2,0	0,3 ~ 1,4
Inoxidable *Stainless 300 series*	70 ~ 150	0,3 ~ 1,6	0,3 ~ 1,2
Hierro fundido *Cast iron (HB 140-220)*	120 ~ 220	0,4 ~ 2,0	0,3 ~ 1,4
Alta temperatura *High temp. & Titanium alloy*	40 ~ 80	0,3 ~ 1,2	0,3 ~ 1,2
Acero endurecido *Hardened steel*	50 ~ 100	0,3 ~ 1,4	0,3 ~ 1,2

LN



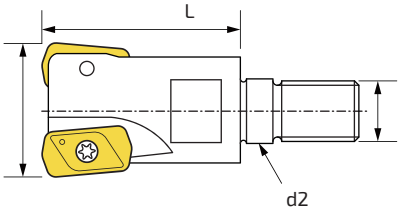
Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	€
LN03-016-M02R	LNMX0303	16	16	100	30	2	**132,90**
LN03-020-M04R	LNMX0303	20	20	130	50	4	**161,40**
LN03-025-M04R	LNMX0303	25	25	150	60	4	**170,95**
LN03-032-M06R	LNMX0303	32	32	150	70	6	**189,90**

Tornillo de inserción *Insert screw*	€
P2535	**4,90**



Ref.	Plaquita *Inserts*	d1	d2	L	z	€
LN03-050-A05R	LNMX0303	50	22	50	5	**295,40**

Tornillo de inserción *Insert screw*	€
P2535	**4,90**



Ref.	Plaquita *Inserts*	d1	d2	L	M	z	€
LN03-017-R02R	LNMX0303	17	8,5	26	M8	2	**157,50**
LN03-021-R03R	LNMX0303	21	10,5	32	M10	3	**173,35**
LN03-026-R04R	LNMX0303	26	12,5	38	M12	4	**198,60**
LN03-032-R04R	LNMX0303	32	17,0	41	M16	5	**218,00**

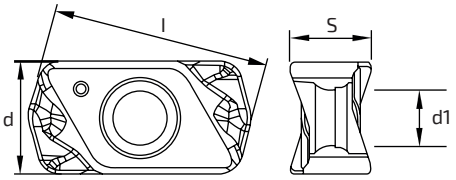
Tornillo de inserción *Insert screw*	€
P2535	**4,90**

LNMX

P	●
M	○
K	●
S	○
H	○

● Aplicación principal
Main use

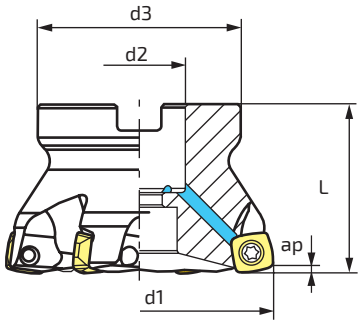
○ Aplicación complementaria
Complementary use



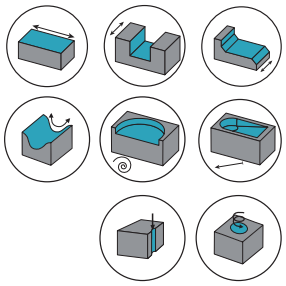
Ref.	KS100	Medidas *Dimensions (mm)*				€
		l	d	S	d1	
LNMX0303-MG	✓	11,59	6,0	4,29	2,85	**10,10**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	120 ~ 220	0,4 ~ 1,6	0,4 ~ 0,9
Inoxidable *Stainless 300 series*	70 ~ 150	0,3 ~ 0,8	0,4 ~ 0,7
Hierro fundido *Cast iron (HB 140-220)*	100 ~ 220	0,4 ~ 1,6	0,4 ~ 0,9
Alta temperatura *High temp. & Titanium alloy*	40 ~ 80	0,3 ~ 0,8	0,4 ~ 0,6
Acero endurecido *Hardened steel*	50 ~ 100	0,3 ~ 1,0	0,4 ~ 0,6

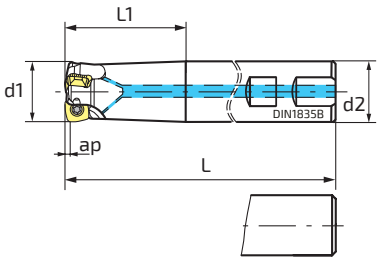


XD09/12

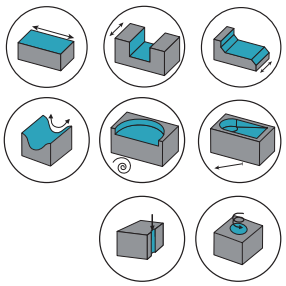


Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
XD09-032A03R	XD..09..	32	16	38	40	3	1	300,80
XD09-035A04R	XD..09..	35	16	38	40	4	1	320,40
XD09-040A04R	XD..09..	40	16	38	40	4	1	333,50
XD09-042A05R	XD..09..	42	16	38	40	5	1	353,10
XD09-050A05R	XD..09..	50	22	43	40	5	1	392,40
XD09-052A06R	XD..09..	52	22	43	40	6	1	412,00
XD09-063A06R	XD..09..	63	22	48	40	6	1	451,20
XD09-066A07R	XD..09..	66	22	48	40	7	1	470,80
XO12-040A03R	XO..12..	40	16	38	40	3	2	314,00
XO12-042A03R	XO..12..	42	16	38	40	4	2	333,50
XO12-050A04R	XO..12..	50	22	43	40	4	2	372,70
XO12-052A05R	XO..12..	52	22	43	40	5	2	392,40
XO12-063A05R	XO..12..	63	22	48	40	5	2	431,50
XO12-066A06R	XO..12..	66	22	48	40	6	2	451,20
XO12-080A07R	XO..12..	80	27	58	50	7	2	510,10
XO12-100A08R	XO..12..	100	32	78	50	8	2	569,10

Tornillo de inserción *Insert screw*	€
165795	4,10
106022	4,10



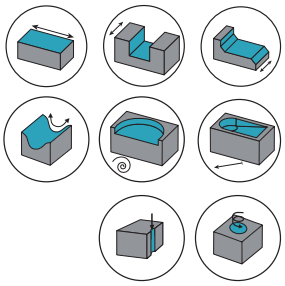
XP06/09/12

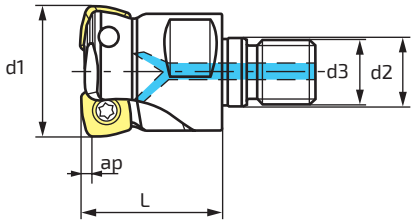


Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	ap	€
XP06-016M02RL	XP..06..	16	16	200	40	2	0,8	224,00
XP06-016M02RB	XP..06..	16	16	89	40	2	0,8	224,00
XP06-020M03RL	XP..06..	20	20	225	50	3	0,8	254,30
XP06-020M03RB	XP..06..	20	20	101	50	3	0,8	254,30
XP06-025M04RL	XP..06..	25	25	225	50	4	0,8	284,60
XP06-025M04RB	XP..06..	25	25	107	50	4	0,8	284,60
XP06-032M05RL	XP..06..	32	25	225	60	5	0,8	315,00
XP06-032M05RB	XP..06..	32	25	117	60	5	0,8	315,00
XD09-025M02RL	XD..09..	25	25	225	50	2	1,0	268,20
XD09-025M03RL	XD..09..	25	25	225	50	3	1,0	287,90
XD09-032M03RL	XD..09..	32	32	250	63	3	1,0	300,80
XO12-032M02RL	XO..12..	32	32	250	63	2	2,0	281,30
XO12-035M03RL	XO..12..	35	32	250	63	3	2,0	300,80

Tornillo de inserción *Insert screw*	€
76913	3,40
54976	4,10
165795	4,10
106022	4,10

XP06/09/12





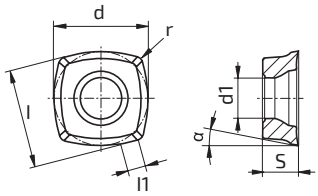
Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
XP06-016R02R	XP..06..	16	8,5	8	27	2	0,8	**224,00**
XP06-020R03R	XP..06..	20	10,5	10	33	3	0,8	**254,30**
XP06-025R04R	XP..06..	25	12,5	12	35	4	0,8	**284,60**
XP06-032R05R	XP..06..	32	17,0	16	35	5	0,8	**315,00**
XD09-025R02R	XD..09..	25	12,5	12	35	2	1,0	**268,20**
XD09-025R03R	XD..09..	25	12,5	12	35	3	1,0	**287,90**
XD09-032R03R	XD..09..	32	17,0	16	35	3	1,0	**300,80**
XO12-032R02R	XO..12..	32	17,0	16	35	2	2,0	**281,30**
XO12-035R03R	XO..12..	35	17,0	16	35	3	2,0	**300,80**

XDL / XOLX / XPLX

	KS3100	KS4100	KS5100
P	●	○	○
M	○	●	●
K			○
N			
S			●
H			

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use



Ref.	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	l1	r	d1	€
XDLX09T308ER-F40			✓	9,49	9	3,97	-	0,8	4,4	**14,80**
XOLX120410ER-F40			✓	12,70	12	4,76	-	1,0	5,5	**17,30**
XPLX060305ER-F40			✓	6,35	6	2,75	-	0,5	2,8	**14,50**
XDLX09T308SR-M50	✓	✓		9,60	9	3,97	1,5	0,8	4,4	**12,25**
XOLX120410SR-M50	✓	✓		12,70	12	4,76	2,2	1,0	5,5	**14,70**
XPLX060305ER-M50	✓	✓		6,35	6	2,75	1,0	0,5	2,8	**11,90**
XOLX120410SR-R50	✓			12,70	12	4,76	2,2	1,0	5,5	**14,70**

Condiciones de corte
Cutting conditions

XPLX06

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	180	0,7 ~ 1,3	0,25 ~ 0,80
Inoxidable *Stainless 300 series*	160	0,6 ~ 1,2	0,25 ~ 0,80
Hierro fundido *Cast iron (HB 140-220)*	250	0,7 ~ 1,3	0,25 ~ 0,80
Alta temperatura *High temp. & Titanium alloy*	35	0,3 ~ 0,6	0,25 ~ 0,80
Acero endurecido *Hardened steel*	50	0,3 ~ 0,6	0,25 ~ 0,80

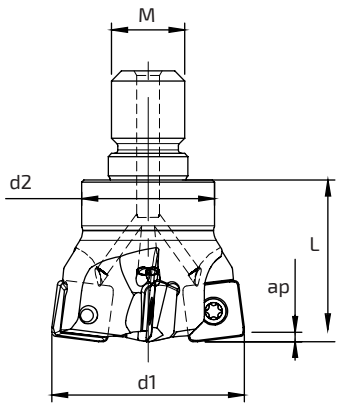
XDLX09

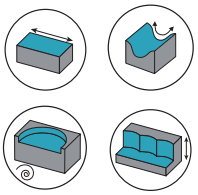
MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	180	1,3 ~ 2	0,25 ~ 1
Inoxidable *Stainless 300 series*	160	0,8 ~ 1,3	0,25 ~ 1
Hierro fundido *Cast iron (HB 140-220)*	250	1,25 ~ 1,75	0,25 ~ 1
Alta temperatura *High temp. & Titanium alloy*	35	0,40 ~ 1,20	0,25 ~ 1
Acero endurecido *Hardened steel*	50	0,40 ~ 1,20	0,25 ~ 1

XOLX12

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	180	1,10 ~ 2,70	0,25 ~ 2
Inoxidable *Stainless 300 series*	160	0,60 ~ 1,60	0,25 ~ 2
Hierro fundido *Cast iron (HB 140-220)*	250	0,90 ~ 2,20	0,25 ~ 2
Alta temperatura *High temp. & Titanium alloy*	35	0,25 ~ 1,25	0,25 ~ 2
Acero endurecido *Hardened steel*	50	0,25 ~ 1,25	0,25 ~ 2

SO13

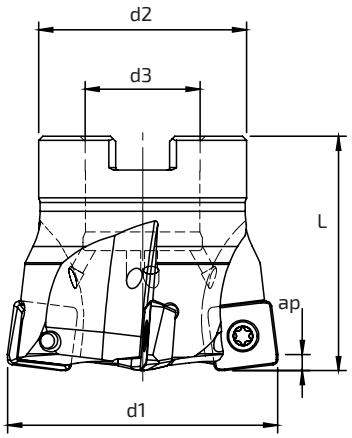




Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
SO13-032R03R	SO..13M5	32	29	35	3	1,5	**229,15**
SO13-035R03R	SO..13M5	35	29	35	3	1,5	**229,15**
SO13-042R04R	SO..13M5	42	29	35	4	1,5	**261,15**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P04012**		**6,00**

SO13



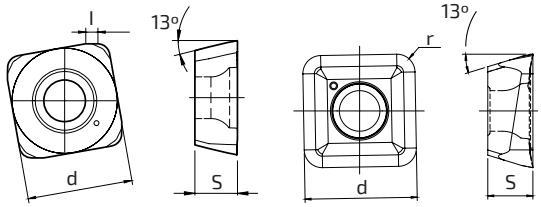
Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
SO13-050A04R	SO..13M5	50	40	22	45	4	1,5	**314,30**
SO13-052A04R	SO..13M5	52	40	22	45	4	1,5	**314,30**
SO13-063A05R	SO..13M5	63	48	27	50	5	1,5	**332,90**
SO13-066A05R	SO..13M5	66	48	27	50	5	1,5	**332,90**
SO13-080A06R	SO..13M5	80	60	27	50	6	1,5	**411,75**
SO13-100A08R	SO..13M5	100	70	32	50	8	1,5	**508,30**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P04012**		**6,00**

S013

P	●	◕	◕	✱
M				✱
K	●	◕		✱
N				
S			◕	✱
H				

● Continuo *Continuous*
◕ Interrupción baja *Light interrupted*
◕ General
✱ Interrumpido *Interrupted*

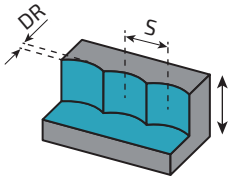


Ref.	KS2100	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	r	€
SOEW13M510 S	✓	✓		✓	12,43	1	5	1,2	**13,95**
SOET13M520-MS			✓	✓	12,43		5	2,0	**13,95**
SOKW13M510 S	✓	✓		✓	12,43	1	5	1,2	**11,40**

Condiciones de corte
Cutting conditions

MATERIAL	Vc (m/min) KS2100	KS3100	KS4100	KS5100	fz SOEW13...	SOET13...
Acero sin aleación *Unlloyed steel (HB125-220)*	160 - 280	150 - 230	140 - 220	100 - 180	0,5 - 2,2	0,50 - 2,00
Acero de baja aleación *Low-alloyed steel (HB220-280)*	150 - 230	140 - 220	130 - 180	90 - 170	0,5 - 2,2	0,50 - 2,00
Acero de alta aleación *High-alloyed steel (HB280-380)*	140 - 190	130-180	100 - 170	80 - 140	0,5 - 2,2	0,50 - 1,80
Ferrítico/Martensítico *Ferritic/Martensitic (HB200-330)*	-	-	130 - 220	100 - 180	-	0,50 - 1,80
Austenítico/Duplex *Austenitic/Duplex (HB 200-330)*	-	-	120 - 180	90 - 150	-	0,50 - 1,80
Dúplex *Duplex (HB230-260)*	-	-	70 - 140	70 - 120	-	0,50 - 1,50
Hierro fundido maleable *Malleable cast iron (HB130-230)*	160 - 350	150 - 310		120 - 140	0,5 - 2,2	0,50 - 2,00
Fundición de hierro gris *Grey cast iron (HB160-250)*	150 - 300	140 - 260		100 - 200	0,5 - 2,2	0,50 - 2,00
Fundición de hierro nodular *Nodular cast iron (HB180-245)*	120 - 260	100 - 220		80 - 150	0,5 - 2,2	0,50 - 1,80
Superaleaciones resistentes al calor *Heat resistant super alloys (HB200-320)*	-	-	35 - 65	25 - 60	-	0,40 - 1,30

Profundidad
Plunging

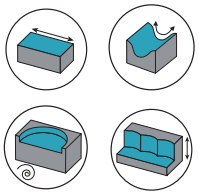


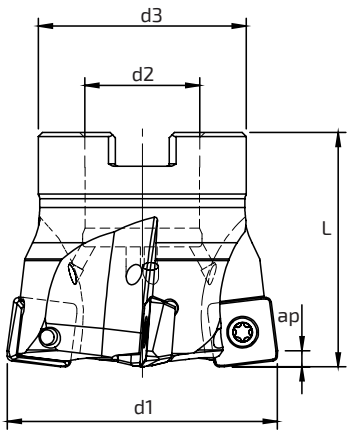
L<3Dc	L>3Dc	S max.
fz (mm/t)		
0,08 - 0,15	0,05-0,10	$Smax = \sqrt{DC.Dr - Dr^2}$

S máx. y DR diámetro de corte correspondiente Dc
S max and DR corresponding cutting diameter Dc

DR (mm)	Dc (mm) 20	25	32	35	42
1,0	4,4	4,9	5,6	5,8	6,4
2,0	6,0	6,8	7,7	8,1	8,9
3,0	7,1	8,1	9,3	9,8	10,8
4,0	8,0	9,2	10,6	11,1	12,3
5,0	8,7	10,0	11,6	12,2	13,6
6,0	9,2	10,7	12,5	13,2	14,7

SO16





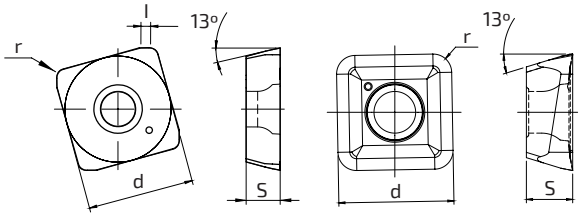
Ref.	Plaquita *Inserts*	d1	d2	d3	L	z	ap	€
SO16-063A05R	SO..1605..	63	27	48	50	5	3,5	**350,60**
SO16-066A05R	SO..1605..	66	27	48	50	5	3,5	**360,30**
SO16-080A06R	SO..1605..	80	27	60	50	6	3,5	**412,30**
SO16-100A08R	SO..1605..	100	32	80	50	8	3,5	**508,30**
SO16-125A10R	SO..1605..	125	40	90	63	10	3,5	**630,30**
SO16-160A12R	SO..1605..	160	40	110	63	12	3,5	**751,45**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P05013**		**4,90**

SO16

P	● ◐ ◐ ✱
M	◐ ✱
K	● ◐ ✱
N	
S	◐ ✱
H	

● Continuo *Continuous*
◐ Interrupción baja *Light interrupted*
◐ General
✱ Interrupido *Interrupted*



Ref.	KS2100	KS3100	KS4100	KS5100	Medidas *Dimensions* d	l	S	r	€
SOEW160512 S	✓	✓		✓	16,4	1,5	5,26	1,2	**16,30**
SOET160520-MS			✓	✓	16,4		5,26	2,0	**16,30**

Condiciones de corte
Cutting conditions

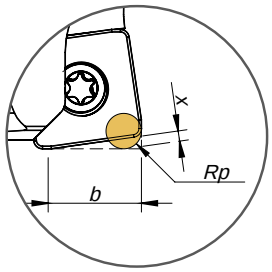
MATERIAL	Vc (m/min)				fz	
	KS2100	KS3100	KS4100	KS5100	SOEW16...	SOET16...
Acero sin aleación *Unlloyed steel (HB125-220)*	160 - 280	150 - 230	140 - 220	100 - 180	0,6 - 2,5	0,50 - 2,20
Acero de baja aleación *Low-alloyed steel (HB220-280)*	150 - 230	140 - 220	130 - 180	90 - 170	0,6 - 2,5	0,50 - 2,20
Acero de alta aleación *High-alloyed steel (HB280-380)*	140 - 190	130-180	100 - 170	80 - 140	0,6 - 2,0	0,50 - 1,80
Ferrítico/Martensítico *Ferritic/Martensitic (HB200-330)*	-	-	130 - 220	100 - 180	-	0,60 - 2,00
Austenítico/Duplex *Austenitic/Duplex (HB 200-330)*	-	-	120 - 180	90 - 150	-	0,60 - 2,20
Dúplex *Duplex (HB230-260)*	-	-	70 - 140	70 - 120	-	0,50 - 1,80
Hierro fundido maleable *Malleable cast iron (HB130-230)*	160 - 350	150 - 310		120 - 140	0,5 - 2,2	0,50 - 2,00
Fundición de hierro gris *Grey cast iron (HB160-250)*	150 - 300	140 - 260		100 - 200	0,5 - 2,2	0,50 - 2,00
Fundición de hierro nodular *Nodular cast iron (HB180-245)*	120 - 260	100 - 220		80 - 150	0,5 - 2,2	0,50 - 1,80
Superaleaciones resistentes al calor *Heat resistant super alloys (HB200-320)*	-	-	35 - 65	25 - 60	-	0,40 - 1,80

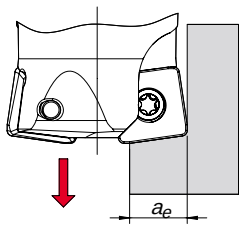
(1) Condiciones de corte ae/Dc=70%.
Cutting conditions a_e/Dc=70%.

(2) Es posible que ocurran vibraciones en ciertos casos. Por favor, reduzca la profundidad de corte y/o reduzca las condiciones de corte en los siguientes casos:
- Cuando se utiliza mango largo.
- Cuando se utiliza el voladizo largo de la herramienta con el tipo de mandril.
- Cuando la aplicación tiene una baja rigidez de sujeción o cuando se utiliza una máquina de baja rigidez.

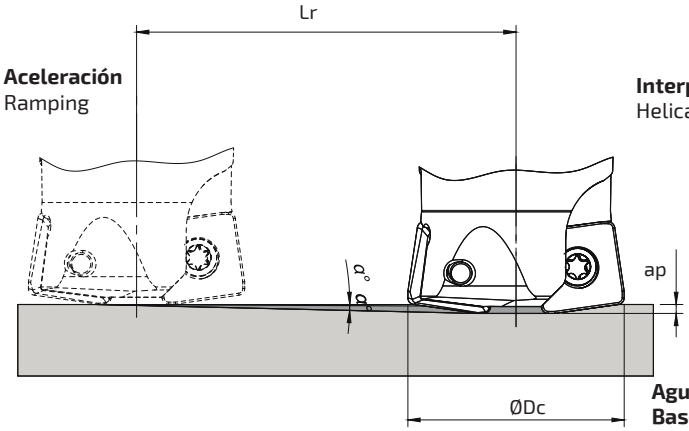
It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- *When using long shank.*
- *When using long tool overhang with arbor type.*
- *When application has poor clamping rigidity or when using a low rigidity machine.*

PLaquita *Insert*	Aceleración *Ramping*			
	Rp	X	b	ae
SO..1605..	4,5	2,3	13,5	12,8



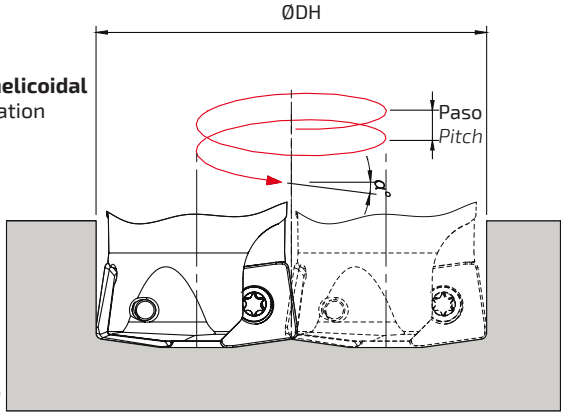


Aceleración
Ramping



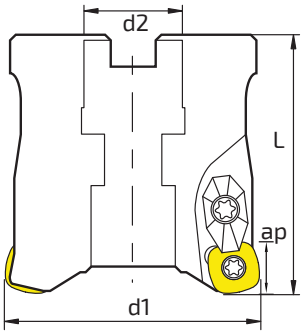
Agujero ciego
Base plana
Blind hole
Flat bottom

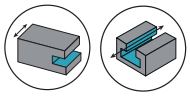
Interpolación helicoidal
Helical interpolation



Ødi = ØDH - ØDc

SD12



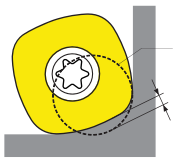


Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
SD12-050A03R	SDMT1205 / SDNW1205	50	50	22	3	2	**216,75**
SD12-050A04R	SDMT1205 / SDNW1205	50	50	22	4	2	**276,20**
SD12-063A03R	SDMT1205 / SDNW1205	63	50	22	3	2	**246,50**
SD12-063A04R	SDMT1205 / SDNW1205	63	50	22	4	2	**266,15**
SD12-080A04R	SDMT1205 / SDNW1205	80	55	32	4	2	**305,95**
SD12-080A05R	SDMT1205 / SDNW1205	80	55	32	5	2	**326,10**

Tornillo de inserción *Insert screw*	€	Tornillo de sujeción *Clamp screw*	€	Brida *Clamp*	€
P4011A	**4,90**	**P4008ES**	**4,90**	**YR-06**	**10,60**

Ángulo R
Corner R programming

Plaquita *Insert*	Approx. R (mm)	
	Entrada R *Input R*	Sin cortes R *Uncut R*
SDNW1205/SDMT1205	4,5	0,83



SD

P	◎
M	◎
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

Ref.	KS3100	Medidas *Dimensions (mm)*				€
		l	S	r	d1	
SDMT1205ZDEN-SG	✓	12,7	5,56	15	4,6	**6,90**
SDMT1205ZDTN-MG	✓	12,7	5,56	15	4,6	**6,90**
SDMT1205ZDTN-RG	✓	12,7	5,56	15	4,6	**6,90**
SDNW1205ZDTN-RG	✓	12,7	5,56	15	4,6	**6,90**

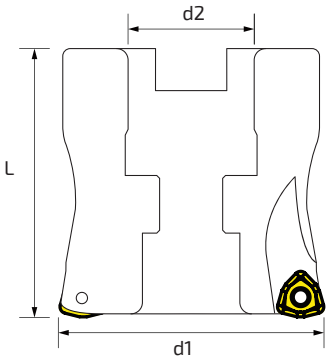
Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	100 ~ 220	0,8 ~ 1,8	~ 1,5
Inoxidable *Stainless 300 series*	70 ~ 150	0,6 ~ 1,2	~ 1,2
Hierro fundido *Cast iron (HB 140-220)*	100 ~ 220	0,8 ~ 1,8	~ 1,5

WN09/13

Ref.	Plaquita *Inserts*	d1	d2	L	L1	z	€
WN09-025M02R	WNMX09T3	25	25	150	25	2	**143,90**
WN09-032M03R	WNMX09T3	32	32	150	32	3	**189,90**

Tornillo de inserción *Insert screw*	€
P3006	**4,90**



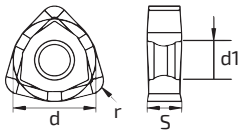
Ref.	Plaquita *Inserts*	d1	d2	L	z	€
WN09-050A05R	WNMX09T3	50	22	50	5	**257,60**
WN13-063A05R	WNMX1305	63	22	50	5	**271,15**
WN13-080A07R	WNMX1305	80	27	50	7	**377,85**

Tornillo de inserción *Insert screw*	€
P3006	**4,90**

WNMX
De doble cara/ *Double sided*

	KS200	KS3100
P	◎	◎
M	○	◎
K	◎	◎

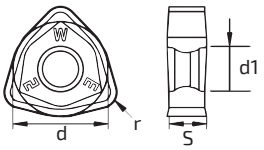
◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS200	KS3100	Medidas *Dimensions (mm)* d	S	r	d1	€
WNMX09T316-RG	✓	✓	9,525	3,97	1,6	3,6	**11,75**

	KS3100
P	◎
M	◎
K	◎

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*



Ref.	KS3100	Medidas *Dimensions (mm)* d	S	r	d1	€
WNMX130516-MG	✓	12,700	6,02	1,6	4,7	**13,95**

Condiciones de corte
Cutting conditions

WNMX09T3

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	120 ~ 220	0,4 ~ 1,5	0,4 ~ 1,35
Inoxidable *Stainless 300 series*	70 ~ 150	0,4 ~ 1,2	0,4 ~ 1,0
Hierro fundido *Cast iron (HB 140-220)*	120 ~ 220	0,4 ~ 1,5	0,4 ~ 1,35
Alta temperatura *High temp. & Titanium alloy*	40 ~ 80	0,4 ~ 1,0	0,4 ~ 1,0
Acero endurecido *Hardened steel*	50 ~ 100	0,4 ~ 1,1	0,4 ~ 1,0

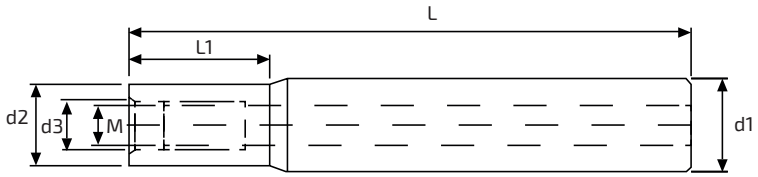
WNMX1305

MATERIAL	Vc	fz	ap
Acero al carbono *Carbon steel (HB85-225)*	120 ~ 220	0,4 ~ 3,0	0,4 ~ 1,7
Inoxidable *Stainless 300 series*	70 ~ 150	0,3 ~ 2,0	0,4 ~ 1,4
Hierro fundido *Cast iron (HB 140-220)*	120 ~ 220	0,4 ~ 3,0	0,4 ~ 1,7
Alta temperatura *High temp. & Titanium alloy*	40 ~ 80	0,3 ~ 1,6	0,4 ~ 1,3
Acero endurecido *Hardened steel*	50 ~ 100	0,3 ~ 2,0	0,4 ~ 1,3

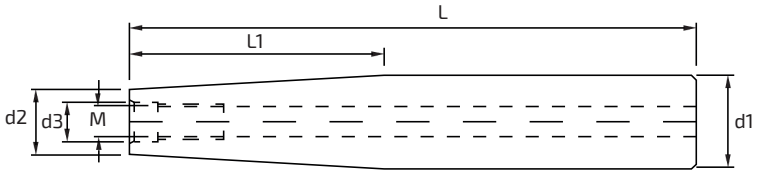
SISTEMA MODULAR HTAS. CHAFLANAR FRESAS EN T GRAN DESBASTE DISCOS

MODULAR SYSTEM
CHAMFERING TOOLS
T-MILLING CUTTER
ROUGH GRINDING
DISCS

Mango modular antivibratorio
Carbide extension adapter (anti-vibration)

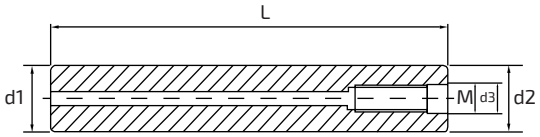


Ref.	d1	d2	d3	L	L1	M	€
M0612100	12	6,5	11,8	100	24	M6	**206,20**
M0612150	12	6,5	11,5	150	24	M6	**242,65**
M0816150	16	8,5	15,0	150	30	M8	**399,05**
M0816200	16	8,5	15,0	200	40	M8	**400,60**
M1020150	20	10,5	19,0	150	40	M10	**552,50**
M1020200	20	10,5	19,0	200	40	M10	**698,50**
M1225150	25	12,5	24,0	150	48	M12	**804,50**
M1225200	25	12,5	24,0	200	48	M12	**1.043,15**



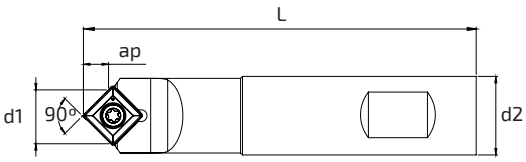
Ref.	d1	d2	d3	L	L1	M	€
CM0512150	12	5,5	9,8	150	60	M5	**269,15**
CM0616150	16	6,5	11,8	150	70	M6	**451,25**
CM0820200	20	8,5	15,5	200	90	M8	**812,25**
CM1025200	25	10,5	19,8	200	90	M10	**1.214,30**
CM1232200	32	12,5	24,5	200	90	M12	**1.887,05**

MMDR



Ref.	d1	d2	d3	L	M	€
MMDR10-10-100-M5	10	10	5,5	100	M5	**113,00**
MMDR10-10-150-M5	10	10	5,5	150	M5	**139,10**
MMDR12-12-100-M6	12	12	6,5	100	M6	**130,40**
MMDR12-12-150-M6	12	12	6,5	150	M6	**165,15**
MMDR12-12-200-M6	12	12	6,5	200	M6	**230,30**
MMDR16-16-100-M8	16	16	8,5	100	M8	**195,55**
MMDR16-16-150-M8	16	16	8,5	150	M8	**226,00**
MMDR16-16-200-M8	16	16	8,5	200	M8	**299,85**
MMDR20-20-150-M10	20	20	10,5	100	M10	**352,00**
MMDR20-20-200-M10	20	20	10,5	150	M10	**456,30**
MMDR20-20-250-M10	20	20	10,5	200	M10	**543,20**
MMDR25-25-150-M12	25	25	12,5	150	M12	**478,00**
MMDR25-25-200-M12	25	25	12,5	200	M12	**608,40**
MMDR25-25-250-M12	25	25	12,5	250	M12	**738,70**
MMDR25-25-300-M12	25	25	12,5	300	M12	**869,10**
MMDR32-32-200-M16	32	32	17,0	200	M16	**912,55**
MMDR32-32-250-M16	32	32	17,0	250	M16	**1173,25**
MMDR32-32-300-M16	32	32	17,0	300	M16	**1390,55**
MMDR32-32-400-M16	32	32	17,0	400	M16	**2042,35**

SO11



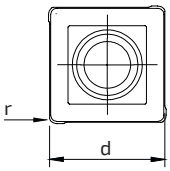
Ref.	Plaquita *Inserts*	d1	d2	L	z	ap	€
SO11-013M01R	SOMT11T308	13	16	100	1	6,5	**135,60**
SO11-013M01RL	SOMT11T308	13	16	150	1	6,5	**172,20**

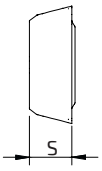
Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**P04008**	**6,90**

SOMT

P	●
M	●
K	●
N	
S	
H	

● Continuo *Continuous*
◗ Interrupción baja *Light interrupted*
◑ General
◖ Interrumpido *Interrupted*



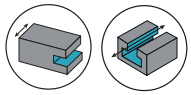


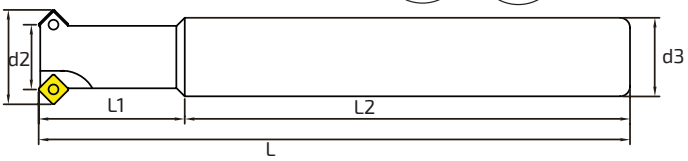
Ref.	KS3100	Medidas *Dimensions* d	S	r	€
SOMT11T308	✓	10,87	3,97	0,8	**8,95**

Condiciones de corte
Cutting conditions

MATERIAL	Vc (m/min) KS3100	fz SOMT11T308
Acero sin aleación *Unlloyed steel (HB125-220)*	150 - 230	0,04 - 0,08
Acero de baja aleación *Low-alloyed steel (HB220-280)*	140 - 220	0,03 - 0,07
Acero de alta aleación *High-alloyed steel (HB280-380)*	130 - 180	0,03 - 0,06
Ferrítico/Martensítico *Ferritic/Martensitic (HB200-330)*	-	0,04 - 0,07
Austenítico/Duplex *Austenitic/Duplex (HB 200-330)*	-	0,03 - 0,06
Dúplex *Duplex (HB230-260)*	-	0,03 - 0,06
Hierro fundido maleable *Malleable cast iron (HB130-230)*	150 - 280	0,05 - 0,10
Fundición de hierro gris *Grey cast iron (HB160-250)*	130 - 230	0,05 - 0,08
Fundición de hierro nodular *Nodular cast iron (HB180-245)*	80 - 190	0,04 - 0,08

SP05/06/07/09





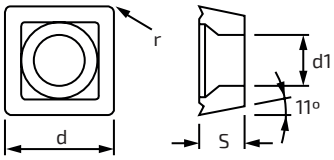
Ref.	Plaquita *Inserts*	d1	d2	d3	L	L1	L2	€
SP05-1520M02R	SPMG0502	15	10	12	120	20	100	**135,25**
SP05-1930M03R	SPMG0502	19	13	16	150	30	120	**194,20**
SP05-2435M04R	SPMG0502	24	18	20	150	35	115	**238,80**
SP06-2230M03R	SPMG0602	22	16	16	120	30	80	**201,40**
SP07-2730M03R	SPMG07T3	27	17	20	120	30	80	**209,10**
SP09-3040M02R	SPMG0904	30	19	20	150	40	110	**164,00**
SP09-4040M03R	SPMG0904	40	29	25	150	40	110	**223,95**
SP09-5040M04R	SPMG0904	50	39	25	150	40	110	**268,55**

Tornillo de inserción *Insert screw*	€
P2003	**4,90**
P2205	**4,90**
P2203	**4,90**
P2511	**4,90**

SPMG

P	◎	○
M	○	◎
K	○	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

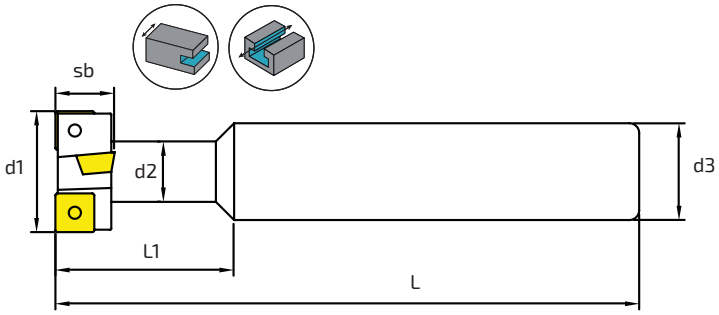


Ref.	KS3100	KS4100	Medidas *Dimensions (mm)* d	S	r	d1	€
SPMG050204-MG	✓		5,00	2,38	0,4	2,30	**6,30**
SPMG 060204-MG	✓		6,00	2,38	0,4	2,65	**6,75**
SPMG 07T308-MG	✓	✓	7,94	3,97	0,8	2,85	**10,05**
SPMG 090408-MG	✓	✓	9,80	4,3	0,8	4,05	**10,70**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz Ø13 ~ 15	Ø16 ~ 22	Ø23 ~ 33	Ø34 ~ 41	Ø42 ~ 50
Acero al carbono *Carbon steel (HB85-225)*	160 ~ 250	0,06 ~ 0,12	0,06 ~ 0,10	0,06 ~ 0,12	0,12 ~ 0,24	0,12 ~ 0,25
Inoxidable *Stainless 300 series*	120 ~ 180	0,05 ~ 0,10	0,06 ~ 0,12	0,08 ~ 0,15	0,10 ~ 0,17	0,12 ~ 0,20
Hierro fundido *Cast iron (HB 140-220)*	160 ~ 220	0,06 ~ 0,12	0,08 ~ 0,16	0,12 ~ 0,20	0,16 ~ 0,25	0,18 ~ 0,26

SP



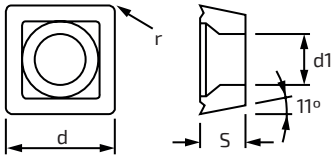
Ref.	Plaquita *Inserts*	d1	d2	d3	L	L1	sb	€
SP05-019080-M04R	SPMG0502	19,0	9,5	16	90	25	8,0	**268,55**
SP06-021000-M04R	SPMG0602	21,0	11,0	16	100	27	9,0	**268,55**
SP07-025011-M04R	SPMG07T3	25,0	12,0	20	110	31	11,0	**298,30**
SP09-032014-M04R	SPMG0904	32,0	17,0	25	110	39	14,0	**313,60**
SP11-040018-M04R	SPMG1104	40,0	21,0	25	125	49	18,0	**343,30**

Tornillo de inserción *Insert screw*	€
P2003	**4,90**
P2205	**4,90**
P2203	**4,90**
P2511	**4,90**
P3504	**4,90**

SPMG

P	◎	○
M	○	◎
K	○	○

◎ 1ª opción *1st choice*
○ 2ª opción *2nd choice*

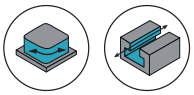


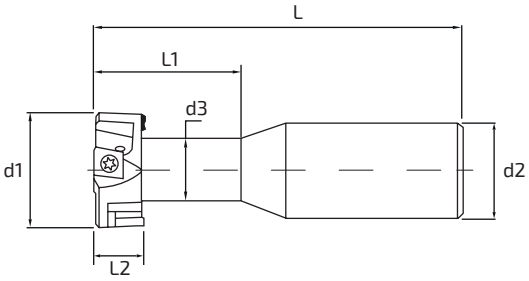
Ref.	KS3100	KS4100	Medidas *Dimensions (mm)* d	S	r	d1	€
SPMG050204-MG	✓		5,00	2,38	0,4	2,30	**6,30**
SPMG 060204-MG	✓		6,00	2,38	0,4	2,65	**6,75**
SPMG 07T308-MG	✓	✓	7,94	3,97	0,8	2,85	**10,05**
SPMG 090408-MG	✓	✓	9,80	4,3	0,8	4,05	**10,70**
SPMG 110408-MG	✓	✓	11,50	4,8	0,8	4,45	**11,30**

Condiciones de corte
Cutting conditions

MATERIAL	Vc	fz
Acero al carbono *Carbon steel (HB85-225)*	180 ~ 220	0,08 ~ 0,12
Inoxidable *Stainless 300 series*	100 ~ 120	0,07 ~ 0,10
Hierro fundido *Cast iron (HB 140-220)*	140 ~ 280	0,07 ~ 0,10

ET90

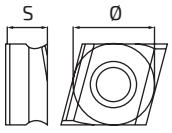




Ref.	Plaquita *Inserts*	d1	d2	d3	L	L1	L2	z	zz	€
15E.3213.010	EN..08T3.R/L	32	32	16,8	115	39	13	2	2*2	**442,00**
15E.4017.010	EN..0904.R/L	40	32	20,8	125	50	17	2	2*2	**517,70**
15E.4821.010	EN..08T3.R/L	48	32	26,0	135	60	21	2	2*3	**581,00**

Tornillo de inserción *Insert screw*	€
P03009	**3,20**
P35009	**3,20**
P03009	**3,20**

ENHQ



Diámetro de la circunferencia
Incircle diameter

Ø08=8,00
Ø09=9,52

Grosor de la plaquita
Insert thickness

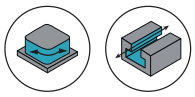
ST3=3,97
S04=4,76

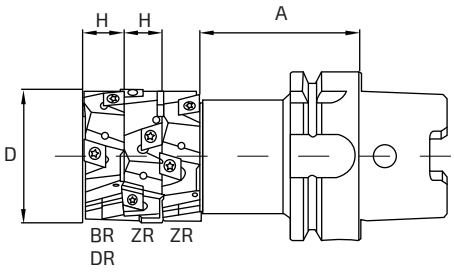
Ref.	SKY77	NERO26	€
ENHQ08T30601209SL28W	✓	✓	**15,67**
ENHQ08T30601409SR28W	✓	✓	**15,67**
ENHQ08T30601726SL28V	✓	✓	**15,67**
ENHQ08T30601626SR28V	✓	✓	**15,67**
ENHQ08T30600154SL30	✓		**15,67**
ENHQ08T30600254SR30	✓		**15,67**
ENHQ09040802312SL28W	✓	✓	**17,85**
ENHQ09040802212SR28W	✓	✓	**17,85**
ENHQ09040801726SL28V	✓	✓	**17,85**
ENHQ09040801626SR28V	✓	✓	**17,85**
ENHQ09040800354SL30	✓		**17,85**
ENHQ09040800254SR30	✓		**17,85**

Condiciones de corte
Cutting conditions

			Hierro fundido *Cast iron*			Acero *Steel*					
			D20	D18	D17	A22	A20	A18	A16	B15	B14
ENHQ08T30601209SL28W	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ08T30601409SR28W	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ08T30601726SL28V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ08T30601626SR28V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ08T30600154SL30	SKY77	h_{max}	0,1	0,09	0,08	0,1	0,1	0,09	0,08	-	-
		V_c	240	230	220	240	240	230	220	-	-
ENHQ08T30600254SR30	SKY77	h_{max}	0,1	0,09	0,08	0,1	0,1	0,09	0,08	-	-
		V_c	240	230	220	240	240	230	220	-	-
ENHQ09040802312SL28W	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ09040802212SR28W	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	240	230	220	240	240	230	220	-	
	NERO26	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ09040801726SL28V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ09040801626SR28V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ09040800354SL30	SKY77	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	180	160	130	100	90	80
ENHQ09040800254SR30	SKY77	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	180	160	130	100	90	80

CM90





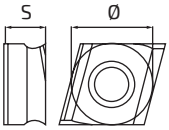
Mangos para sistema modular CM90
Shanks for multiring CM90

D	SK50 DIN69871	A	€	SK40 DIN69871	A	€	HSK-A63	A	€
32	-	-	-	**09A.4032.001**	39	**305,05**	**09E.6332.1050**	50	**536,40**
40	**09A.5004.001**	49	**391,15**	**09A.4004.001**	39	**305,05**	**09E.6304.1060**	60	**536,40**

ZR/BR/DR Anillos para sistema modular CM90
ZR/BR/DR Multiring CM90

D	ZR	H	z	€	BR	H	z	€	Plaquitas *Inserts*	DR	H	z	€	Plaquitas *Inserts*
32	**12C.3212.001**	11	2	**222,05**	**12C.3213.002**	13	2	**222,05**	2 CNHQ07T306.L 2 CNHQ07T300.R	-	-	-	-	-
40	**12C.4012.001**	11	3	**256,25**	**12C.4013.002**	13	3	**256,25**	3 CNHQ07T306.L 3 CNHQ07T300.R	**12C.4021.001**	21	3	**477,25**	3 CNHQ07T306.L 3 CNHQ07T300.R 3 MOGU100310.R

CN..07T3..



Diámetro de la circunferencia
Incircle diameter
Ø07=7,5

Grosor de la plaquita
Insert thickness
ST3(CN)=4,00

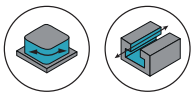
Ref.	SKY77	NERO26	€
CNHQ07T30600811SL28W	✓	✓	**16,81**
CNHQ07T30004301SR28V	✓	✓	**12,66**
MOGU100310O3104TR28	✓		**16,60**

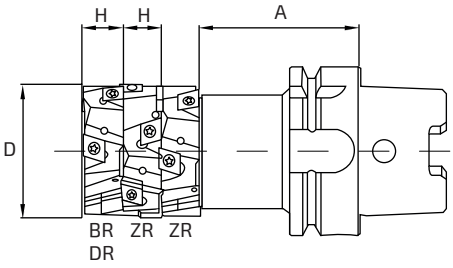
Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**P03705**		**3,20**

Condiciones de corte
Cutting conditions

		Hierro fundido *Cast iron*			Acero *Steel*			
		D20	D18	D17	A22	A20	A18	A16
SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1
	V_c	200	180	160	200	180	160	140
NERO26	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1
	V_c	240	220	200	240	220	200	180

EM90



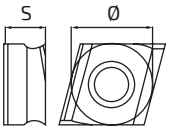


Mangos para sistema modular EM90
Shanks for multiring EM90

D	SK60 DIN69871	A	€	SK50 DIN69871	A	€	SK40 DIN69871	A	€	HSK-A63	A	€	HSK-A100	A	€
32	-	-	-	-	-	-	**09A.4032.001**	39	**305,05**	**09E.6332.1050**	50	**536,40**	-	-	-
40	-	-	-	**09A.5040.004**	49	**391,15**	**09A.4040.002**	39	**305,05**	**09E.6340.1060**	60	**536,40**	-	-	-
63	-	-	-	**09A.5063.008**	49	**391,15**	-	-	-	**09E.6363.1060**	60	**643,25**	**09E.1063.1080**	80	**658,80**
63	-	-	-	**09A.5063.031**	100	**408,80**	-	-	-	-	-	-	-	-	-
63	-	-	-	**09A.5063.021**	150	**445,10**	-	-	-	-	-	-	-	-	-
80	-	-	-	**09A.5080.006**	49	**391,15**	-	-	-	-	-	-	**09E.1080.1080**	80	**658,80**
80	-	-	-	**09A.5080.025**	100	**408,80**	-	-	-	-	-	-	-	-	-
100	-	-	-	**09A.5010.002**	49	**411,90**	-	-	-	-	-	-	**09E.1010.1100**	110	**658,80**
100	09A.6010.002	75	**1.065,50**	**09A.5010.023**	100	**431,60**	-	-	-	-	-	-	-	-	-
125	09A.6012.001	75	**1.067,60**	-	-	-	-	-	-	-	-	-	-	-	-

ZR/BR/DR Anillos para sistema modular EM90
ZR/BR/DR Multiring EM90

D	article ZR	H	z	€	article BR	H	z	€	number of inserts	article DR	H	z	€	number of inserts
32	**12E.3210.001**	10	2	**202,30**	**12C.3213.002**	11,5	2	**222,05**	2 ENHQ060300.R 2 ENHQ060304.L	-	-	-	-	-
40	**12E.4010.001**	10	2	**209,60**	**12C.4013.002**	11,5	2	**256,25**	2 ENHQ060300.R 2 ENHQ060304.L	**12E.4018.001**	18	4	**357,95**	2 ENHQ060300.R 4 ENHQ060304.L 2 ENHQ08T306.L
63	**12E.6317.001**	16	3	**339,25**	**12C.3213.002**	16,5	3	**222,05**	3 ENHQ090400.R 3 ENHQ090408.L	**12E.6322.002**	22	3	**568,55**	3 ENHQ090400.R 3 ENHQ120610.L 3 LNEX200710.R
	12E.6318.001	18	3	**406,70**	**12C.4013.002**	19,5	3	**256,25**	3 ENHQ100500.R 3 ENHQ100508.L	-	-	-	-	-
80	**12E.8023.001**	22	3	**486,60**	**12C.3213.002**	23,2	3	**222,05**	3 ENHQ120600.R 3 ENHQ120610.L	**12E.8025.002**	25	3	**669,20**	3 ENHQ120600.R 3 ENHQ120610.L 3 LNEX200710.R
100	**12C.4012.001**	22	4	**256,25**	**12C.4013.002**	23,2	4	**256,25**	4 ENHQ120600.R 4 ENHQ120610.L	**12E.1026.001**	21	3	**809,25**	4 ENHQ120600.R 4 ENHQ120610.L 4 LNEX25062500405TR25
125	**12E.1229.003**	29	5	**786,45**	**12C.3213.002**	31	5	**222,05**	5 ENHQ160900.R 5 ENHQ160915.L	-	-	-	-	-



Diámetro de la circunferencia
Incircle diameter

Ø06=6,35
Ø08=8,00
Ø09=9,52
Ø10=10,00
Ø12=12,70
Ø16=16,00
Ø20(LN)=9,52
Ø25(LN)=12,7

Grosor de la plaquita
Insert thickness

S03=3,18
ST3=3,97
S04=4,76
S05=5,6
S06=6,35
S07=7,20
S08=8,00
S09=9,00

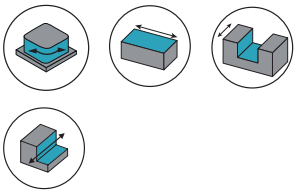
Ref.	SKY77	NERO26	€
ENHQ06030402721SL28V	✓		12,66
ENHQ06030002620SR28V	✓		12,66
ENHQ06030400254SL30	✓		12,66
ENHQ06030000355SR30	✓		12,66
ENHQ08T30601726SL28V	✓	✓	15,67
ENHQ08T30001625SR28V	✓		15,67
ENHQ08T30600154SL30	✓		15,67
ENHQ08T30000255SR30	✓		15,67
ENHQ09040801726SL28V	✓	✓	17,85
ENHQ09040001625SR28V	✓	✓	17,85
ENHQ09040800354SL30	✓		17,85
ENHQ09040000255SR30	✓		17,85
ENHQ10050801740SL25V	✓		19,19
ENHQ10050801742SL28V	✓		19,19
ENHQ10050001641SR25V	✓		19,19
ENHQ10050001643SR28V	✓		19,19
ENHQ12061002718SL25V	✓	✓	20,44
ENHQ12060002619SR25V	✓	✓	20,44
ENHQ12061002913SL28W	✓	✓	20,44
ENHQ12060002620SR28V	✓	✓	20,44
ENHQ12061000352SL28	✓		20,44
ENHQ12060000253SR28	✓		20,44
ENHQ12061000354SL30	✓		20,44
ENHQ12060000255SR30	✓		20,44
ENHQ16091502713TL25V	✓		25,52
ENHQ16090002614TR25V	✓		25,52
LNEX20071000903TR25	✓		18,26
LNEX25062500405TR25	✓		26,77

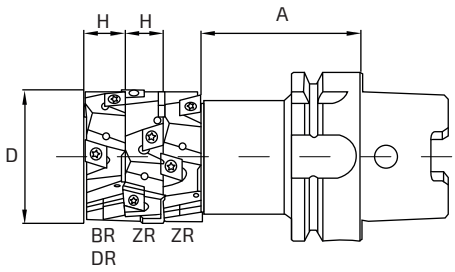
Tornillo de inserción *Insert screw*	€
P25006	3,20
P35011	3,40
P05013	4,05
P06017	4,55
P35011	3,40
P45011	3,65

Condiciones de corte
Cutting conditions

			Hierro fundido *Cast iron*			Acero *Steel*					
			D20	D18	D17	A22	A20	A18	A16	B15	B14
ENHQ08T30601726SL28V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	200	180	160	200	180	160	140	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	220	200	180	-	-	-	-	-	-
ENHQ08T30001625SR28V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ08T30600154SL30	SKY77	h_{max}	0,1	0,09	0,08	0,1	0,1	0,09	0,08	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ08T30000255SR30	SKY77	h_{max}	0,1	0,09	0,08	0,1	0,1	0,09	0,08	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ09040801726SL28V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
	NERO26	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	220	180	160	200	180	160	140	-	-
ENHQ09040001625SR28V	SKY77	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	220	200	180	-	-	-	-	-	-
	NERO26	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	150	135	115	80	70	65
ENHQ09040800354SL30	SKY77	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	150	135	115	80	70	65
ENHQ09040000255SR30	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ10050801740SL25V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ10050801742SL28V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ10050001641SR25V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ10050001643SR28V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ12061002718SL25V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	200	180	160	200	180	160	140	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	220	200	180	-	-	-	-	-	-
ENHQ12060002619SR25V	SKY77	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	220	200	180	-	-	-	-	-	-
	NERO26	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	150	135	115	80	70	65
ENHQ12061002913SL28W	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	200	180	160	200	180	160	140	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	220	200	180	-	-	-	-	-	-
ENHQ12060002620SR28V	SKY77	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	220	200	180	-	-	-	-	-	-
	NERO26	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	150	135	115	80	70	65
ENHQ12061000352SL28	SKY77	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	150	135	115	80	70	65
ENHQ12060000253SR28	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ12061000354SL30	SKY77	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	150	135	115	80	70	65
ENHQ12060000255SR30	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
ENHQ16091502713TL25V	SKY77	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	150	135	115	80	70	65
ENHQ16090002614TR25V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-
LNEX20071000903TR25	SKY77	h_{max}	-	-	-	0,13	0,12	0,1	0,08	0,08	0,07
		V_c	-	-	-	150	135	115	80	70	65
LNEX25062500405TR25	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	200	180	160	200	180	160	140	-	-

FM90





Mangos para sistema modular FM90
Shanks for multiring FM90

SK50 DIN69871	A	€	SK40 DIN69871	A	€	HSK-A63	A	€	HSK-A100	A	€
09A.5045.001	39	**391,15**	09E.6345.1060	60	**536,40**	09E.6345.1060	60	**536,40**	**09E.1045.001**	85	**751,15**
09A.5045.016	90	**408,80**	-	-	-	-	-	-	-	-	-
09A.5063.008	49	**391,15**	09E.6363.1060	60	**643,25**	09E.6363.1060	60	**643,25**	**09E.1063.1080**	80	**658,80**
09A.5063.031	100	**408,80**	-	-	-	-	-	-	-	-	-
09A.5063.021	150	**445,10**	-	-	-	-	-	-	-	-	-
09A.5092.001	49	**411,90**	-	-	-	-	-	-	**09E.1092.001**	80	**658,80**

ZR/BR/DR Anillos para sistema modular FM90
ZR/BR/DR Multiring FM90

D	article ZR	H	z	€	article BR	H	z	€	number of inserts	article DR	H	z	€	number of inserts
45	**12F.4513.021**	13	3	**326,80**	**12F.4513.022**	13,5	2	**326,80**	3 FNHQ08T300.R 3 FNHQ08T306.L	-	-	-	-	-
50	**12F.5015.021**	14,2	3	**326,80**	**12F.5015.022**	15,5	3	**326,80**	3 FNHQ08T300.R 3 FNHQ08T306.L	**12F.5015.024**	15	3	**459,60**	3 MOGT100308.R 3 FNHQ08T300.R
66	**12F.6619.031**	19,5	3	**486,60**	**12F.6620.032**	20	2	**486,60**	3 FNHQ110608.R 3 FNHQ110608.L	-	-	-	-	-
92	**12F.9218.003**	18,5	4	**536,40**	**12F.9220.004**	20	3	**536,40**	4 FNHQ110608.R 4 FNHQ110608.L	**12F.9225.001**	25	4	**1.088,35**	4 FNHQ110608.R 4 FNHQ110608.L 4 LNHX25082500201TR25

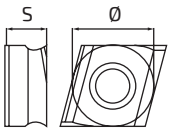
FNHQ/LNHX/MOGU

Diámetro de la circunferencia
Incircle diameter

Ø08=8,00
Ø10=10,00
Ø11=11,00
Ø25(LN)=12,70

Grosor de la plaquita
Insert thickness

S03 (MO)=3,60
S T3=3,97
S 06=6,35
S 08=8,00



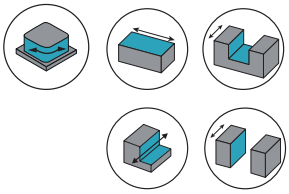
Tornillo de inserción *Insert screw*	€
P03009	3,20
P35011	3,40
P05013	4,05
P03075	3,20

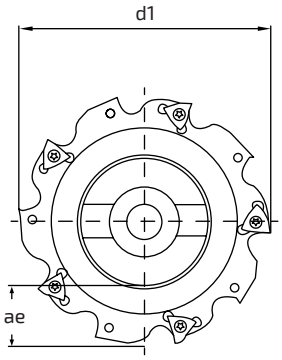
Ref.	SKY77	NERO26	€
FNHQ08T30600409SL28V	✓	✓	15,67
FNHQ08T30000510SR28V	✓	✓	15,67
FNHQ11060801801TL25V	✓		21,17
FNHQ11060801802SL28V	✓		21,17
FNHQ11060801901TR25V	✓		21,17
FNHQ11060801902SR28V	✓		21,17
LNHX25082500201TR25	✓		31,85
MOGU10031003104TR28	✓		16,60

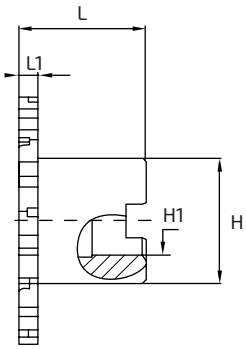
Condiciones de corte
Cutting conditions

			Hierro fundido *Cast iron*			Acero *Steel*			
			D20	D18	D17	A22	A20	A18	A16
FNHQ08T30600409SL28V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1
		V_c	200	180	160	200	180	160	140
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-
		V_c	220	200	180	-	-	-	-
FNHQ08T30000510SR28V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1
		V_c	200	180	160	200	180	160	140
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-
		V_c	220	200	180	-	-	-	-
FNHQ11060801801TL25V	SKY77	h_{max}	0,24	0,2	0,18	0,22	0,2	0,18	-
		V_c	200	180	160	200	180	160	-
FNHQ11060801802SL28V	SKY77	h_{max}	0,2	0,18	0,16	0,2	0,18	0,16	-
		V_c	200	180	160	200	180	160	-
FNHQ11060801901TR25V	SKY77	h_{max}	0,24	0,2	0,18	0,22	0,2	0,18	-
		V_c	200	180	160	200	180	160	-
FNHQ11060801902SR28V	SKY77	h_{max}	0,2	0,18	0,16	0,2	0,18	0,16	-
		V_c	200	180	160	200	180	160	-
LNHX25082500201TR25	SKY77	h_{max}	0,2	0,18	0,16	0,2	0,18	0,16	-
		V_c	200	180	160	200	180	160	-
MOGU10031003104TR28	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1
		V_c	240	230	220	240	240	230	220

TB18

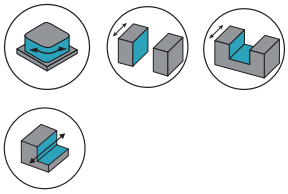


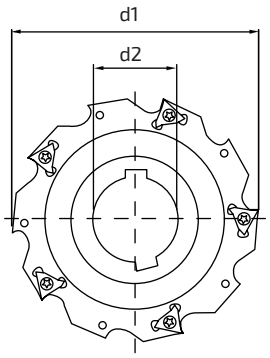




Ref.	Plaquita *Inserts*	d1	L	L1	H	H1	z	zz	ae	€
01T.0605.001	TC..1102.R/L	63	32	5	32	16	4	4*2	13	**651,55**
01T.0606.001	TC..1103.R/L	63	32	6	32	16	4	4*2	13	**651,55**
01T.0610.001	TN..1606.R/L	63	32	10	32	16	3	3*2	13	**651,55**
01T.0805.001	TC..1102.R/L	80	40	5	40	22	5	5*2	18	**745,95**
01T.0806.001	TC..1103.R/L	80	40	6	40	22	5	5*2	18	**745,95**
01T.0808.001	TN..1604.R/L	80	40	8	40	22	4	4*2	18	**745,95**
01T.0810.001	TN..1606.R/L	80	40	10	40	22	4	4*2	18	**745,95**
01T.0812.001	TN..1606.R/L	80	40	12	40	22	4	4*2	18	**745,95**
01T.1005.001	TC..1102.R/L	100	45	5	45	27	7	7*2	25	**832,10**
01T.1006.001	TC..1103.R/L	100	45	6	45	27	7	7*2	25	**832,10**
01T.1008.001	TN..1604.R/L	100	45	8	45	27	5	5*2	25	**832,10**
01T.1010.001	TN..1606.R/L	100	45	10	45	27	5	5*2	25	**832,10**
01T.1012.001	TN..1606.R/L	100	45	12	45	27	5	5*2	25	**832,10**
01T.1205.001	TC..1102.R/L	125	50	5	58	32	9	9*2	32	**1103,90**
01T.1206.001	TC..1103.R/L	125	50	6	58	32	9	9*2	32	**1103,90**
01T.1208.001	TN..1604.R/L	125	50	8	58	32	6	6*2	32	**1103,90**
01T.1210.001	TN..1606.R/L	125	50	10	58	32	6	6*2	32	**1103,90**
01T.1212.001	TN..1606.R/L	125	50	12	58	32	6	6*2	32	**1103,90**
01T.1606.001	TC..1103.R/L	160	63	6	68	40	11	11*2	44	**1260,55**
01T.1607.001	TN..16T3.R/L	160	63	7	68	40	8	8*2	44	**1260,55**
01T.1608.001	TN..1604.R/L	160	63	8	68	40	8	8*2	44	**1260,55**
01T.1609.001	TN..1604.R/L	160	63	9	68	40	8	8*2	44	**1260,55**
01T.1610.001	TN..1606.R/L	160	63	10	68	40	8	8*2	44	**1260,55**
01T.1612.001	TN..1606.R/L	160	63	12	68	40	8	8*2	44	**1260,55**

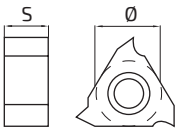
TN18





Ref.	Plaquita *Inserts*	d1	d2	L	H	z	zz	ae	€
14T.0605.001	TC..1102.R/L	63	22	5	34	4	4*2	12	**588,25**
14T.0606.001	TC..1103.R/L	63	22	6	34	4	4*2	12	**588,25**
14T.0805.001	TC..1102.R/L	80	27	5	40	5	5*2	18	**669,20**
14T.0806.001	TC..1103.R/L	80	27	6	40	5	5*2	18	**669,20**
14T.0810.001	TN..1606.R/L	80	27	10	40	4	4*2	18	**669,20**
14T.1005.001	TC..1102.R/L	100	32	5	46	7	7*2	25	**753,25**
14T.1006.001	TC..1103.R/L	100	32	6	46	7	7*2	25	**753,25**
14T.1007.001	TN..16T3.R/L	100	32	7	46	5	5*2	25	**753,25**
14T.1008.001	TN..1604.R/L	100	32	8	46	5	5*2	25	**753,25**
14T.1009.001	TN..1604.R/L	100	32	9	46	5	5*2	25	**753,25**
14T.1010.001	TN..1606.R/L	100	32	10	46	5	5*2	25	**753,25**
14T.1012.001	TN..1606.R/L	100	32	12	46	9	5*2	25	**753,25**
14T.1205.001	TC..1102.R/L	125	32	5	46	9	9*2	37	**997,05**
14T.1206.001	TC..1103.R/L	125	32	6	46	6	9*2	37	**997,05**
14T.1207.001	TN..16T3.R/L	125	32	7	46	6	6*2	37	**997,05**
14T.1208.001	TN..1604.R/L	125	32	8	46	6	6*2	37	**997,05**
14T.1209.001	TN..1604.R/L	125	32	9	46	6	6*2	37	**997,05**
14T.1210.001	TN..1606.R/L	125	32	10	46	6	6*2	37	**997,05**
14T.1212.001	TN..1606.R/L	125	32	12	46	11	6*2	37	**997,05**
14T.1606.001	TC..1103.R/L	160	40	6	55	8	11*2	50	**1131,90**
14T.1607.001	TN..16T3.R/L	160	40	7	55	8	8*2	50	**1131,90**
14T.1608.001	TN..1604.R/L	160	40	8	55	8	8*2	50	**1131,90**
14T.1609.001	TN..1604.R/L	160	40	9	55	8	8*2	50	**1131,90**
14T.1610.001	TN..1606.R/L	160	40	10	55	8	8*2	50	**1131,90**
14T.1612.001	TN..1606.R/L	160	40	12	55	10	8*2	50	**1131,90**
14T.2007.001	TN..16T3.R/L	200	40	7	55	10	10*2	70	**1436,95**
14T.2008.001	TN..1604.R/L	200	40	8	55	10	10*2	70	**1436,95**
14T.2009.001	TN..1604.R/L	200	40	9	55	10	10*2	70	**1436,95**
14T.2010.001	TN..1606.R/L	200	40	10	55	10	10*2	70	**1436,95**
14T.2012.001	TN..1606.R/L	200	40	12	55	12	10*2	70	**1436,95**
14T.2508.001	TN..1604.R/L	250	50	8	68	12	12*2	89	**1755,45**
14T.2510.001	TN..1606.R/L	250	50	10	68	12	12*2	89	**1755,45**
14T.2512.001	TN..1606.R/L	250	50	12	68	12	12*2	89	**1755,45**

TCAW/TNAW



Diámetro de la circunferencia
Incircle diameter

Ø11=6,35
Ø16=9,52

Grosor de la plaquita
Insert thickness

S02=2,60
S03=3,20
ST3=3,97
S 04=4,76
S 06=6,40

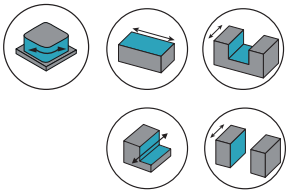
Ref.	SKY77	NERO26	€
TCAW1102ZZ00435TL28	✓		14,32
TCAW1102ZZ00435TR28	✓		14,32
TCAW1103ZZ00727TL28	✓		14,32
TCAW1103ZZ00627TR28	✓		14,32
TNAW16T3ZZ00414TL28	✓		15,15
TNAW16T3ZZ00314TR28	✓		15,15
TNAW1604ZZ00441TL28	✓	✓	15,15
TNAW1604ZZ00341TR28	✓	✓	15,15
TNAW1606ZZ00449TL28	✓	✓	15,77
TNAW1606ZZ00349TL28	✓	✓	15,77

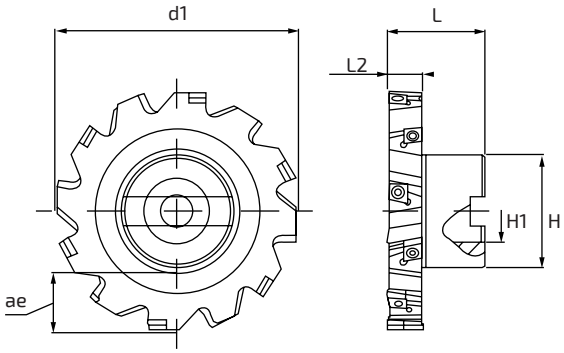
Tornillo de inserción *Insert screw*	€
P25038	3,20
P25052	3,20
P03054	3,20
P03064	3,20
P03075	3,20
P35085	3,20
P35009	3,20

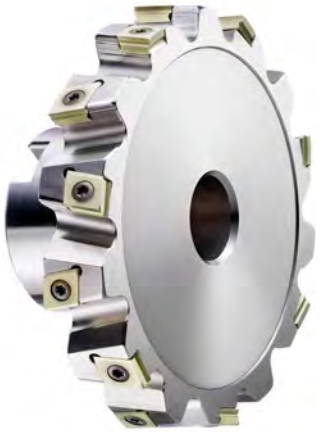
Condiciones de corte
Cutting conditions

			Hierro fundido *Cast iron*			Acero *Steel*			
			D20	D18	D17	A22	A20	A18	A16
TCAW1102ZZ00435TL28	SKY77	h_{max}	0,1	0,08	0,07	0,1	0,1	0,08	0,06
		V_c	240	230	220	240	240	230	220
TCAW1102ZZ00435TR28	SKY77	h_{max}	0,1	0,08	0,07	0,1	0,1	0,08	0,06
		V_c	240	230	220	240	240	230	220
TCAW1103ZZ00727TL28	SKY77	h_{max}	0,1	0,08	0,07	0,1	0,1	0,08	0,06
		V_c	240	230	220	240	240	230	220
TCAW1103ZZ00627TR28	SKY77	h_{max}	0,1	0,08	0,07	0,1	0,1	0,08	0,06
		V_c	240	230	230	240	240	230	220
TNAW16T3ZZ00414TL28	SKY77	h_{max}	0,15	0,12	0,15	0,15	0,15	0,12	0,1
		V_c	240	230	240	240	240	230	220
TNAW16T3ZZ00314TR28	SKY77	h_{max}	0,15	0,12	0,15	0,15	0,15	0,12	0,1
		V_c	240	230	240	240	240	230	220
TNAW1604ZZ00441TL28	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	-
		V_c	240	230	220	240	240	230	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-
		V_c	280	270	260	-	-	-	-
TNAW1604ZZ00341TR28	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	-
		V_c	240	230	220	240	240	230	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-
		V_c	280	270	260	-	-	-	-
TNAW1606ZZ00449TL28	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	-
		V_c	240	230	220	240	240	230	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-
		V_c	280	270	260	-	-	-	-
TNAW1606ZZ00349TL28	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	-
		V_c	240	230	220	240	240	230	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-
		V_c	280	270	260	-	-	-	-

EB18

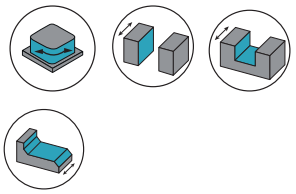


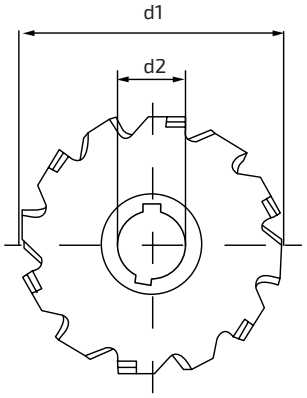


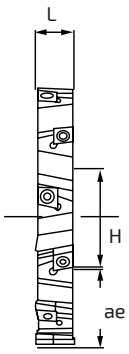


Ref.	Plaquita *Inserts*	d1	L	L1	H	H1	z	zz	ae	€
01E.1214.001	EN..08T3.R/L	125	50	14	58	32	7	7*2	32	**1104,95**
01E.1216.001	EN..0904.R/L	125	50	16	58	32	6	6*2	32	**1104,95**
01E.1218.001	EN..0904.R/L	125	50	18	58	32	6	6*2	32	**1104,95**
01E.1614.001	EN..08T3.R/L	160	63	14	70	40	9	9*2	43	**1260,55**
01E.1616.001	EN..0904.R/L	160	63	16	70	40	8	8*2	43	**1260,55**
01E.1618.001	EN..0904.R/L	160	63	18	70	40	8	8*2	43	**1260,55**
01E.1620.001	EN..1206.R/L	160	63	20	70	40	7	7*2	43	**1260,55**
01E.1622.001	EN..1206.R/L	160	63	22	70	40	7	7*2	43	**1260,55**
01E.1624.001	EN..1206.R/L	160	63	24	70	40	7	7*2	43	**1260,55**
01E.2018.003	EN..0904.R/L	200	63	18	70	40	9	9*2	63	**1618,50**
01E.2020.007	EN..1206.R/L	200	63	20	70	40	9	9*2	63	**1618,50**
01E.2022.002	EN..1206.R/L	200	63	22	70	40	9	9*2	63	**1618,50**
01E.2520.004	EN..1206.R/L	250	68	20	90	50	11	11*2	78	**1978,50**
01E.2524.004	EN..1206.R/L	250	68	24	90	50	11	11*2	78	**1978,50**

EN18







Ref.	Plaquita *Inserts*	d1	d2	L	H	z	zz	ae	€
14E.1214.001	EN..08T3.R/L	125	32	14	46	7	7*2	37	**997,05**
14E.1216.001	EN..0904.R/L	125	32	16	46	6	6*2	37	**997,05**
14E.1218.001	EN..0904.R/L	125	32	18	46	6	6*2	37	**997,05**
14E.1614.003	EN..08T3.R/L	160	40	14	55	9	9*2	50	**1131,90**
14E.1616.001	EN..0904.R/L	160	40	16	55	8	8*2	50	**1131,90**
14E.1618.001	EN..0904.R/L	160	40	18	55	8	8*2	50	**1131,90**
14E.1620.005	EN..1206.R/L	160	40	20	55	7	7*2	50	**1131,90**
14E.1622.001	EN..1206.R/L	160	40	22	55	7	7*2	50	**1131,90**
14E.1624.001	EN..1206.R/L	160	40	24	55	7	7*2	50	**1131,90**
14E.2020.001	EN..0904.R/L	200	50	20	68	9	9*2	63	**1416,20**

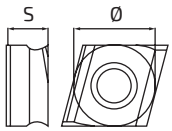
ENHQ

Diámetro de la circunferencia
Incircle diameter

Ø08=8,00
Ø09=9,52
Ø12=12,70

Grosor de la plaquita
Insert thickness

ST3=3,97
S04=4,76
S06=6,35



Tornillo de inserción *Insert screw*	€
P03009	3,20
P35011	3,40
P05013	4,05

Ref.	SKY77	NERO26	€
ENHQ08T30601209SL28W	✓	✓	15,67
ENHQ08T30601409SR28W	✓	✓	15,67
ENHQ08T30601726SL28V	✓	✓	15,67
ENHQ08T30601626SR28V	✓	✓	15,67
ENHQ08T30600154SL30	✓		15,67
ENHQ08T30600254SR30	✓		15,67
ENHQ09040802312SL28W	✓	✓	17,85
ENHQ09040802212SR28W	✓	✓	17,85
ENHQ09040801726SL28V	✓	✓	17,85
ENHQ09040801626SR28V	✓	✓	17,85
ENHQ09040800354SL30	✓		17,85
ENHQ09040800254SR30	✓		17,85
ENHQ12061002718SL25V	✓	✓	20,44
ENHQ12061002618SR25V	✓	✓	20,44
ENHQ12061002913SL28W	✓	✓	20,44
ENHQ12061003013SR28W	✓		20,44
ENHQ12061000354SL30	✓		20,44
ENHQ12061000254SR30	✓		20,44

Condiciones de corte
Cutting conditions

			Hierro fundido *Cast iron*			Acero *Steel*					
			D20	D18	D17	A22	A20	A18	A16	B15	B14
ENHQ08T30601209SL28W	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ08T30601409SR28W	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ08T30601726SL28V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ08T30601626SR28V	SKY77	h_{max}	0,15	0,12	0,1	0,15	0,15	0,12	0,1	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,15	0,12	0,1	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ08T30600154SL30	SKY77	h_{max}	0,1	0,09	0,08	0,1	0,1	0,09	0,08	-	-
		V_c	240	230	220	240	240	230	220	-	-
ENHQ08T30600254SR30	SKY77	h_{max}	0,1	0,09	0,08	0,1	0,1	0,09	0,08	-	-
		V_c	240	230	220	240	240	230	220	-	-
ENHQ09040802312SL28W	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ09040802212SR28W	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ09040801726SL28V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ09040801626SR28V	SKY77	h_{max}	0,18	0,15	0,12	0,18	0,15	0,13	0,11	-	-
		V_c	240	230	220	240	240	230	220	-	-
	NERO26	h_{max}	0,18	0,15	0,12	-	-	-	-	-	-
		V_c	280	270	260	-	-	-	-	-	-
ENHQ09040800354SL30	SKY77	h_{max}	-	-	-	-	-	0,1	0,08	0,08	0,07
		V_c	-	-	-	-	-	130	100	90	80
ENHQ09040800254SR30	SKY77	h_{max}	-	-	-	-	-	0,1	0,08	0,08	0,07
		V_c	-	-	-	-	-	130	100	90	80
ENHQ12061002718SL25V	SKY77	h_{max}	0,25	0,2	0,25	0,22	0,2	0,18	-	-	-
		V_c	240	230	240	240	230	220	-	-	-
	NERO26	h_{max}	0,25	0,2	0,25	-	-	-	-	-	-
		V_c	280	270	280	-	-	-	-	-	-
ENHQ12061002618SR25V	SKY77	h_{max}	0,25	0,2	0,25	0,22	0,2	0,18	-	-	-
		V_c	240	230	240	240	230	220	-	-	-
	NERO26	h_{max}	0,25	0,2	0,25	-	-	-	-	-	-
		V_c	280	270	280	-	-	-	-	-	-
ENHQ12061002913SL28W	SKY77	h_{max}	0,22	0,2	0,22	0,22	0,2	0,18	-	-	-
		V_c	240	230	240	240	230	220	-	-	-
	NERO26	h_{max}	0,22	0,2	0,22	-	-	-	-	-	-
		V_c	280	270	280	-	-	-	-	-	-
ENHQ12061002913SR28W	SKY77	h_{max}	0,22	0,2	0,22	0,22	0,2	0,18	-	-	-
		V_c	240	230	240	240	230	220	-	-	-
ENHQ12061000354SL30	SKY77	h_{max}	-	-	-	0,18	0,16	0,15	0,13	-	-
		V_c	-	-	-	240	240	230	220	-	-
ENHQ12061000254SR30	SKY77	h_{max}	-	-	-	0,18	0,16	0,15	0,15	-	-
		V_c	-	-	-	240	240	230	220	-	-

TORNEADO

Turning

Descripción del grado de torneado

Turning grade description

Tipo de grado Grade type	**Propiedades** Properties	**Aplicación de mecanizado** Machining Application	**Aplicación material** Material application	**Ámbito industrial** Industry area
KP115	P10/P15	Aceros en general, corte continuo. *Steel in general, continuous cutting.*	P ★ ★ ★ M ★ K ★ S H ★	Mecanizado en general y líneas de producción. *General machining and production lines.*
KP125	P20/P25	Aceros en general, corte continuo. *Steel in general, continuous cutting.*	P ★ ★ ★ M ★ ★ K ★ S H	Mecanizado en general y líneas de producción. *General machining and production lines.*
KP135	P35/P40	Aceros en general, corte interrumpido. *Steel in general, interrupted cutting.*	P ★ ★ ★ M ★ K S H	Mecanizado en general y líneas de producción. *General machining and production lines.*
KM135	P35/P40	Gama de inoxidables y exóticos. *Stainless and exotic range.*	P M ★ ★ ★ K S ★ H	Aeroespacial e industria petroquímica. *Aerospace and petrochemical industry.*
KM145	P40/P45	Gama de inoxidables y exóticos. *Stainless and exotic range.*	P M ★ ★ ★ K S ★ ★ H	Aeroespacial. *Aerospace.*

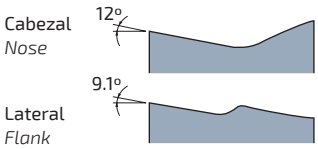
	Símbolo *Symbol*	P	M	K	S
KP115		●	●	●	
KP125		●	●	●	
KP135		●	●	●	
KM135			●		●
KM145			●		●

PLAQUITAS Y PORTAHERRAMIENTAS DE TORNEADO

Turning inserts

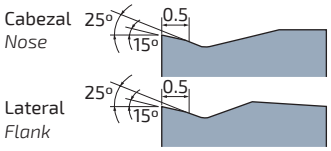
Tipo negativo
Negative type

SM Corte semiacabado
SM Semi-finishing cutting



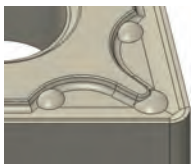
- Excelente control de chip 3D para el mecanizado de acabado.
- Excelente evacuación de virutas al realizar profundidades de corte pequeñas y medianas.
- El bor educe las fuerzas de corte y la incidencia de rebabas.
- *Excellent 3D chip control for finish machining.*
- *Outstanding chip evacuation when turning at small to medium depths of cut.*
- *Sharp edge reduces cutting forces and incidence burrs.*

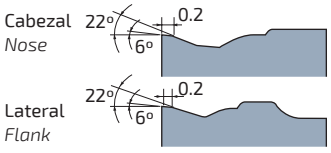
MM Corte medio
MM Medium cutting



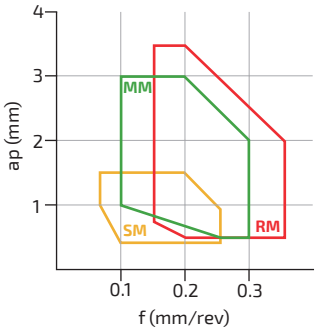
- Diseño versátil del rompe virutas aplicable a una amplia gama de condiciones de corte.
- Gran ángulo de inclinación y diseño profundo del rompe virutas para un mejor control de las virutas.
- Excelente nitidez en el borde que ofrece un semiacabado estable y un mecanizado medio.
- *Versatile chip breaker design applicable to a wide range of cutting conditions.*
- *Large rake angle and deep chip breaker design for best chip control.*
- *Excellent sharpneMG edge offers stable semi-finishing to medium machining.*

RM Corte de desbaste
RM Roughing cutting





- Alta estabilidad del orte en una amplia gama de operaciones de desbaste.
- La protrusión en forma de arco permite la rotura estable de la viruta y el control de la viruta.
- El ángulo del terreno y el orte optimizados aumentan la resistencia a la rotura.
- *High cutting edge stability at wide range of medium to roughing operations.*
- *Arc shaped protrusion allows stable chip break and chip control.*
- *Optimized land angle and cutting edgeincrease the fracture resistance.*



Condiciones de corte *Cutting conditions*	Longitud de corte *Length cutting*	Corte medio *Medium cutting*	Corte basto *Rough cutting*
General	**SM** KM135	**MM** KM135	**RM** KM135
Interrumpido *Interrupted*	**SM** KM145	**MM** KM145	**RM** KM145

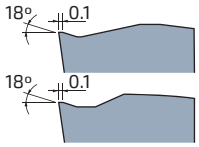
Tipo positivo
Positive type

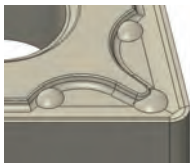
MG Semiacabado a corte medio
MG Semi-finishing to medium cutting

- La protrusión de diseño exclusivo permite un control estable de la viruta y crea un curvado suave de la viruta.
- Mecanizado estable con baja fuerza de corte.
- El go del orte, evitando que se astille.
- *Unique designed protrusion allows stable chip control and creates smooth chip curling.*
- *Stable machining with low cutting force.*
- *Flexible land width along the cutting edge prevents chipping.*

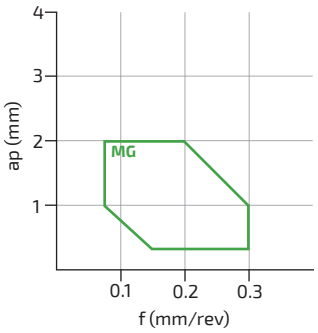
Cabezal
Nose

Lateral
Flank





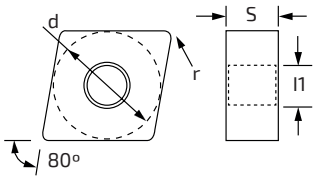
Condiciones de corte *Cutting conditions*	Longitud media *Length to medium*
General	**MG** KM135
Interrumpido *Interrupted*	**MG** KM145



Microtorneado

- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	●
K	
N	
S	●
H	

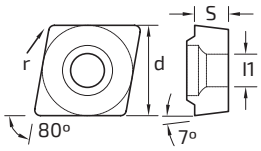


Ref.	KM145	Medidas *Dimensions (mm)* d	S	r	l1	€
CCGT030102L-F	✓	3,500	1,40	0,2	1,9	**10,90**
CCGT030104L-F	✓	3,500	1,40	0,4	1,9	**10,90**
CCGT040102L-F	✓	4,300	1,80	0,2	2,3	**10,90**
CCGT040104L-F	✓	4,300	1,80	0,4	2,3	**10,90**
CCGT060602L-F	✓	6,350	2,38	0,2	2,8	**8,90**
CCGT060604L-F	✓	6,350	2,38	0,4	2,8	**8,90**
CCGT09T302L-F	✓	9,525	3,97	0,2	4,4	**8,90**
CCGT09T304L-F	✓	9,525	3,97	0,4	4,4	**8,90**

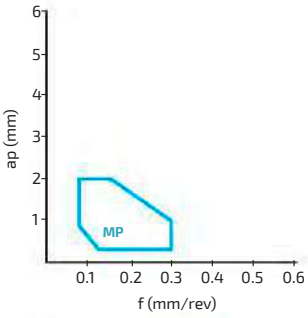
CCMT

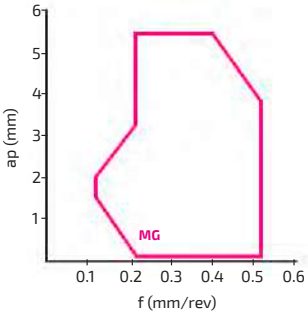
- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	●	●		
M		●	■	
K		●		●
N				
S				
H				●

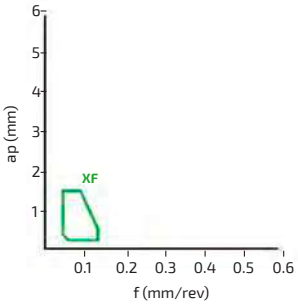


Ref.	KP125	KP135	KM135	KM145	Medidas *Dimensions (mm)* d	S	r	l1	€
CCMT 060204-MP	✓	✓			6,35	2,38	0,4	2,8	**6,20**
CCMT 09T304-MP	✓	✓			9,53	3,97	0,4	4,4	**6,50**
CCMT 09T308-MP	✓	✓			9,53	3,97	0,8	4,4	**6,50**
CCMT 060202-MG	✓	✓	✓	✓	6,35	2,38	0,4	2,8	**6,20**
CCMT 060204-MG	✓	✓	✓	✓	6,35	2,38	0,4	2,8	**6,20**
CCMT 09T304-MG	✓	✓	✓	✓	9,53	3,97	0,4	4,4	**6,50**
CCMT 09T308-MG	✓	✓	✓	✓	9,53	3,97	0,4	4,4	**6,50**
CCMT 120408-MG	✓	✓	✓	✓	12,7	4,76	0,8	5,5	**7,60**



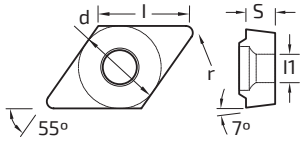


DCGT



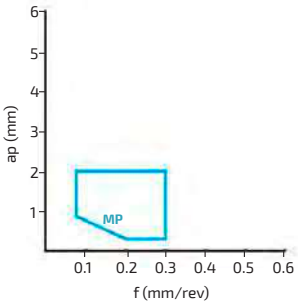
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

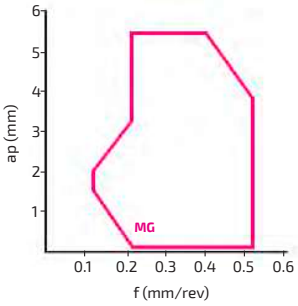
P	●
M	●
K	●



Ref.	KP115	Medidas *Dimensions (mm)* d	l	S	r	l1	€
DCGT11T301R-XF	✓	9,53	11,6	3,97	0,1	4,4	**12,10**
DCGT11T302R-XF	✓	9,53	11,6	3,97	0,2	4,4	**12,10**
DCGT11T304R-XF	✓	9,53	11,6	3,97	0,4	4,4	**12,10**
DCGT11T301L-XF	✓	9,53	11,6	3,97	0,1	4,4	**12,10**
DCGT11T302L-XF	✓	9,53	11,6	3,97	0,2	4,4	**12,10**
DCGT11T304L-XF	✓	9,53	11,6	3,97	0,4	4,4	**12,10**

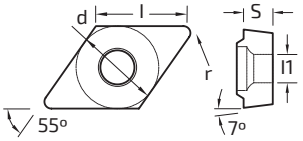
DCMT





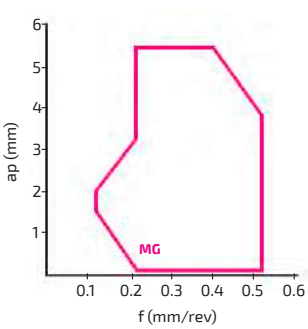
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	●	●	
M		●	●
K		●	



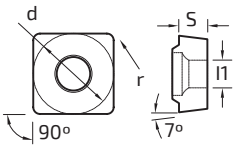
Ref.	KP125	KP135	KM135	Medidas *Dimensions (mm)* d	l	S	r	l1	€
DCMT 11T304-MP	✓	✓		9,53	11,6	3,97	0,4	4,4	**7,60**
DCMT 11T308-MP	✓	✓		9,53	11,6	3,97	0,8	4,4	**7,60**
DCMT 070202-MG	✓	✓		6,35	7,75	2,38	0,2	2,8	**7,05**
DCMT 070204-MG	✓	✓	✓	6,35	7,75	2,38	0,4	2,8	**7,05**
DCMT 11T304-MG	✓	✓	✓	9,53	11,6	3,97	0,4	4,4	**7,60**
DCMT 11T308-MG	✓	✓	✓	9,53	11,6	3,97	0,8	4,4	**7,60**

SCMT



- General
- Interrumpido *Interrupted*

P	●	●	
M		●	●
K		●	

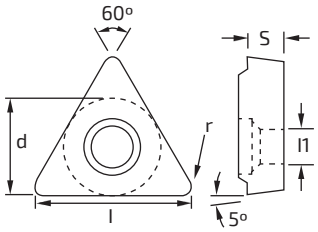


Ref.	KP125	KP135	KM135	Medidas *Dimensions (mm)* d	S	r	l1	€
SCMT 09T304-MG	✓	✓	✓	9,53	3,97	0,4	4,4	**6,50**
SCMT 09T308-MG	✓	✓	✓	9,53	3,97	0,8	4,4	**6,50**

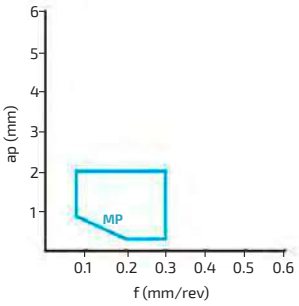
TCMT

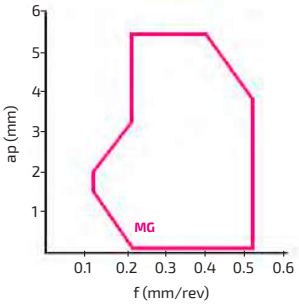
Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

P	●	●	
M		●	●
K		●	



Ref.	KP125	KP135	KM135	Medidas *Dimensions (mm)* d	S	r	l1	€
TCMT 110204-MP	✓	✓		6,35	2,38	0,4	2,8	7,05
TCMT 110204-MG	✓	✓	✓	6,35	2,38	0,4	2,8	7,05
TCMT 16T304-MG	✓	✓	✓	9,53	3,97	0,4	4,4	7,60
TCMT 16T308-MG	✓	✓	✓	9,53	3,97	0,8	4,4	7,60
TCMT 16T312-MG			✓	9,525	3,97	1,2	4,4	6,20

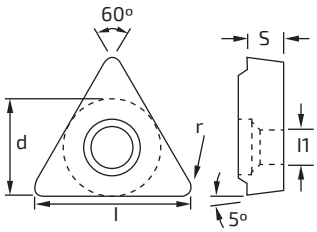




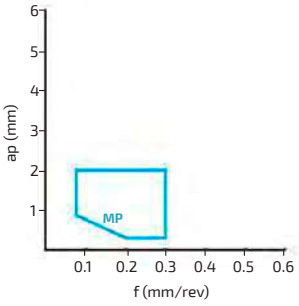
TPMH

Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

P	●	●
M		●
K		●



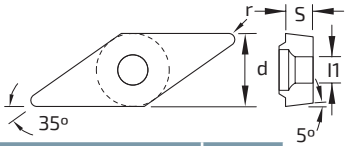
Ref.	KP125	KP135	Medidas *Dimensions (mm)* d	l	S	r	l1	€
TPMH 160304-MP	✓	✓	9,53	16,5	3,18	0,4	4,4	7,60



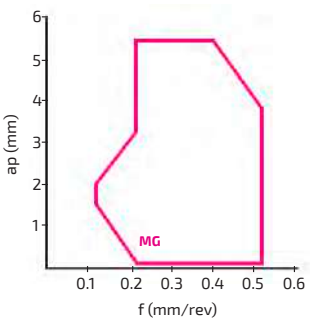
VBMT

General
Interrumpido *Interrupted*

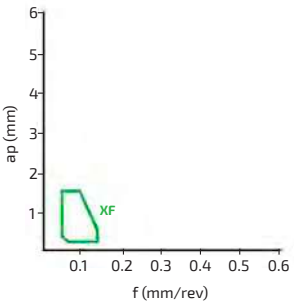
P	●		●
M	●	●	●
K	●		●



Ref.	KP125	KP135	KM135	Medidas *Dimensions (mm)* d	S	r	l1	€
VBMT 160404-MG	✓	✓	✓	9,53	4,76	0,4	4,4	9,30
VBMT 160408-MG			✓	9,53	4,76	0,8	4,4	9,30

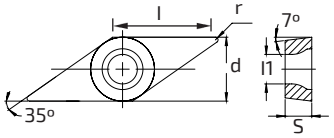


VCGT



General
Interrumpido
Interrupted

P	
M	
K	

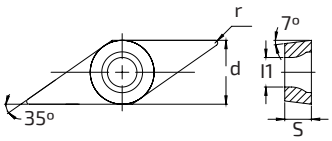


Ref.	KP15	Medidas *Dimensions (mm)*					€
		d	l	S	r	l1	
VCGT110301R-XF	✓	11,1	6,35	3,18	0,1	2,8	12,10
VCGT110302R-XF	✓	11,1	6,35	3,18	0,2	2,8	12,10
VCGT110304R-XF	✓	11,1	6,35	3,18	0,4	2,8	12,10
VCGT110301L-XF	✓	11,1	6,35	3,18	0,1	2,8	12,10
VCGT110302L-XF	✓	11,1	6,35	3,18	0,2	2,8	12,10
VCGT110304L-XF	✓	11,1	6,35	3,18	0,4	2,8	12,10
VCGT110304-FG	✓	11,1	6,35	3,18	0,4	2,8	12,10

VCMT

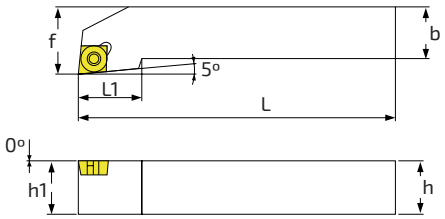
General
Interrumpido
Interrupted

P	
M	
K	



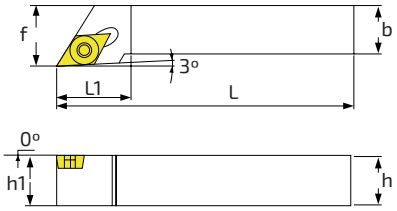
Ref.	KP25	KM45	Medidas *Dimensions (mm)*				€
			d	S	r	l1	
VCMT 160402-FP	✓		9,525	4,76	0,2	4,4	9,75
VCMT 160404-FP	✓		9,525	4,76	0,4	4,4	9,75
VCMT 160408-FP	✓		9,525	4,76	0,8	4,4	9,75
VCMT 160404-MM		✓	9,525	4,76	0,4	4,4	9,75
VCMT 160408-MM		✓	9,525	4,76	0,8	4,4	9,75
VCMT 160412-MM		✓	9,525	4,76	1,2	4,4	9,75

SCLCR/L



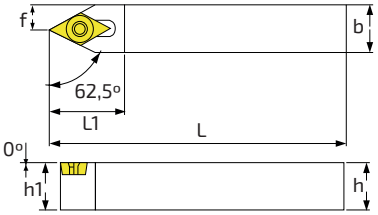
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
SCLCR/L1010H06	CC..0602	10	10	100	15	10	12	**71,50**
SCLCR/L1212H06	CC..0602	12	12	100	15	12	16	**77,00**
SCLCR/L1212H09	CC..09T3	12	12	100	20	12	16	**77,00**
SCLCR/L1616H09	CC..09T3	16	16	100	20	16	20	**79,50**
SCLCR/L2020K09	CC..09T3	20	20	125	22	20	25	**85,00**
SCLCR/L2525M09	CC..09T3	25	25	150	22	25	32	**93,00**
SCLCR/L2020K12	CC..1204	20	20	125	28	20	25	**85,00**
SCLCR/L2525M12	CC..1204	25	25	170	28	25	32	**93,00**

SDJCR/L



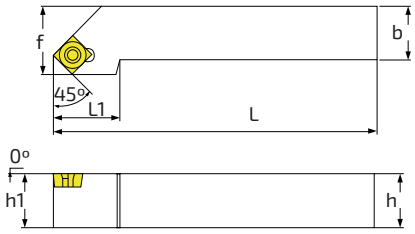
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
SDJCR/L1010H07	DC..0702	10	10	100	16	10	12	**71,50**
SDJCR/L1212H07	DC..0702	12	12	100	16	12	16	**77,00**
SDJCR/L1616H07	DC..0702	16	16	100	20	16	20	**79,50**
SDJCR/L1212H11	DC..11T3	12	12	100	22	12	16	**77,00**
SDJCR/L1616H11	DC..11T3	16	16	100	22	16	20	**79,50**
SDJCR/L2020K11	DC..11T3	20	20	125	25	20	25	**85,00**
SDJCR/L2525M11	DC..11T3	25	25	150	32	25	32	**93,00**
SDJCR/L3232P11	DC..11T3	32	32	170	32	32	40	**120,50**

SDNCN



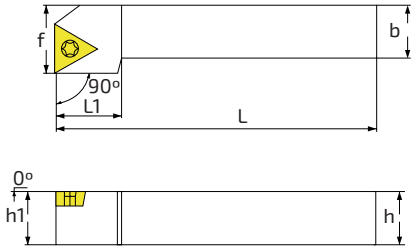
Ref.	Plaquita *Insert*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
SDNCN0808H07	DC..0702	8	8	100	16	8	8	**71,50**
SDNCN1010H07	DC..0702	10	10	100	16	10	12	**71,50**
SDNCN1212H07	DC..0702	12	12	100	18	12	16	**77,00**
SDNCN1616H07	DC..0702	16	16	100	22	16	20	**79,50**
SDNCN1212H11	DC..11T3	12	12	100	22	12	16	**77,00**
SDNCN1616H11	DC..11T3	16	16	100	27	16	20	**79,50**
SDNCN2020K11	DC..11T3	20	20	125	27	20	25	**85,00**
SDNCN2525M11	DC..11T3	25	25	150	27	25	32	**93,00**

SSSCR/L



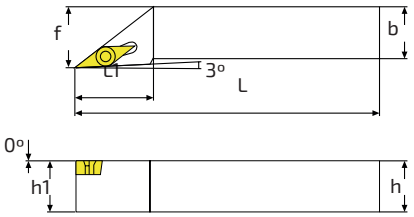
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
SSSCR/L1212H09	SC..09T3	12	12	100	16	12	16	**77,00**
SSSCR/L1616H09	SC..09T3	16	16	100	18	16	20	**79,50**
SSSCR/L2020K09	SC..09T3	20	20	125	22	20	25	**85,00**
SSSCR/L2020K12	SC..1204	20	20	125	22	20	25	**85,00**
SSSCR/L2525M12	SC..1204	25	25	150	30	25	32	**93,00**

STFCR/L



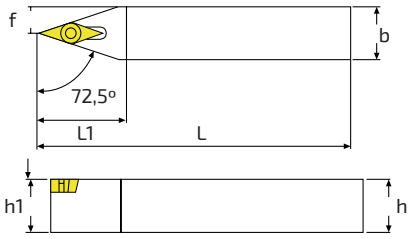
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
STFCR/L1212H11	TC..1102	12	12	100	18	12	16	**77,00**
STFCR/L1616H11	TC..1102	16	16	100	20	16	20	**79,50**
STFCR/L2020K16	TC..16T3	20	20	125	30	20	25	**85,00**
STFCR/L2525M16	TC..16T3	25	25	150	30	25	32	**93,00**

SVJBR/L



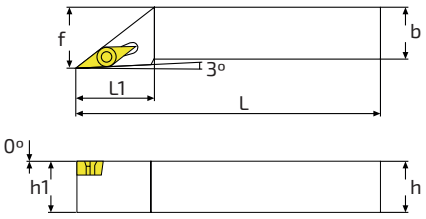
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
SVJBR/L1616H16	VB..1604	16	16	100	32	16	20	**88,50**
SVJBR/L2020K16	VB..1604	20	20	125	35	20	25	**99,50**
SVJBR/L2525M16	VB..1604	25	25	150	38	25	32	**106,50**
SVJBR/L3232P16	VB..1604	32	32	170	45	32	40	**126,50**

SVVC(B)N



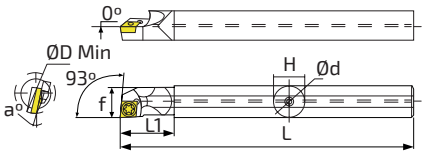
Ref.	Plaquita *Insert*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
SVVCN1616H11	VC..1103	16	16	100	28	16	20	**88,50**
SVVCN2020K11	VC..1103	20	20	125	35	20	25	**99,50**
SVVCN1616H16	VC..1604	16	16	100	32	16	20	**88,50**
SVVCN2020K16	VC..1604	20	20	125	35	20	25	**99,50**
SVVCN2525M16	VC..1604	25	25	150	38	25	32	**106,50**
SVVBN1616H16	VB..1604	16	16	100	32	16	20	**88,50**
SVVBN2020K16	VB..1604	20	20	125	35	20	25	**99,50**
SVVBN2525M16	VB..1604	25	25	150	38	25	32	**106,50**

SVJCR/L



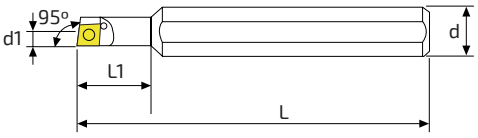
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
SVJCR/L1212H11	VC..1103	12	12	100	25	12	16	**85,00**
SVJCR/L1616H11	VC..1103	16	16	100	28	16	20	**88,50**
SVJCR/L2020K11	VC..1103	20	20	125	35	20	25	**99,50**
SVJCR/L2525M11	VC..1103	25	25	150	32	25	32	**106,50**
SVJCR/L1616H16	VC..1604	16	16	100	32	16	20	**88,50**
SVJCR/L2020K16	VC..1604	20	20	125	35	20	25	**99,50**
SVJCR/L2525M16	VC..1604	25	25	150	38	25	32	**106,50**
SVJCR/L3232P16	VC..1604	32	32	170	45	32	40	**126,50**

SCLCR/L-A
Soporte de metal duro
Carbide holder



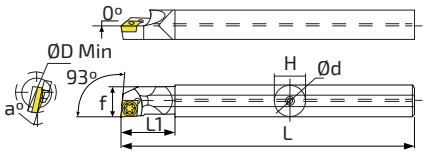
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
C0604G-SCLCR/L03-A	CCGT0301	5	4	2,5	3,8	90	15	15	**228,15**
C0605H-SCLCR/L03-A	CCGT0301	6	5	3,0	4,4	100	15	13	**228,15**
C06H-SCLCR/L04-A	CC..0401	7	6	3,5	5,4	100	15	13	**228,15**
C07K-SCLCR/L04-A	CC..0401	8	7	4,0	6,4	125	20	15	**255,50**
C08K-SCLCR/L06-A	CC..0602	10	8	5,0	7,0	125	20	13	**255,50**
C10K-SCLCR/L06-A	CC..0602	13	10	6,5	9,0	125	22	12	**282,90**
C12M-SCLCR/L06-A	CC..0602	16	12	8,0	11,0	150	25	10	**401,50**
C12Q-SCLCR/L06-A	CC..0602	16	12	8,0	11,0	180	25	12	**501,90**
C16Q-SCLCR/L09-A	CC..09T3	20	16	10,0	15,0	180	28	10	**730,05**
C20-SCLCR/L09-A	CC..09T3	25	20	12,5	18,0	250	33	8	**912,55**

SCLCR/L



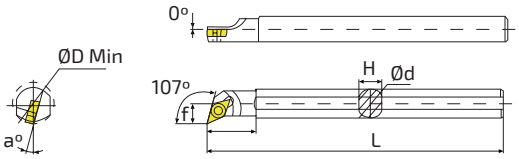
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*								€
		D	d	d1	L	L1	H	f	a	
S0612K-SCLCR/L04	CC..0401	7	12	6	125	18	11	3,5	10	**45,60**
S0812K-SCLCR/L06	CC..0602	10	12	8	125	24	11	5,0	10	**45,60**
S0616M-SCLCR/L04	CC..0401	7	16	6	150	18	11	3,5	10	**54,75**
S0816M-SCLCR/L06	CC..0602	10	16	8	150	24	15	5,0	10	**54,75**
S1016M-SCLCR/L06	CC..0602	13	16	10	150	30	15	6,0	10	**54,75**
S1216M-SCLCR/L06	CC..0602	16	16	12	150	36	15	7,0	10	**54,75**
S1020M-SCLCR/L06	CC..0602	13	20	10	150	30	18	6,0	8	**73,05**
S1220M-SCLCR/L06	CC..0602	16	20	12	150	36	18	7,0	8	**73,05**
S1220M-SCLCR/L09	CC..09T3	16	20	12	150	36	18	7,5	8	**73,05**

SCLCR/L
Soporte de acero rápido
HSS holder



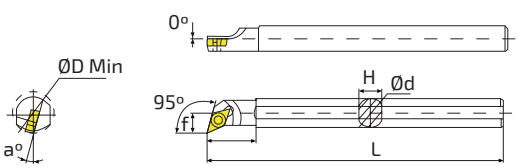
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
H04H-SCLCR/L03	CCGT0301	5	4	2,5	3,8	100	15	15	**100,45**
H05H-SCLCR/L03	CCGT0301	6	5	3,0	4,4	100	15	13	**100,45**
H1004H-SCLCR/L03	CCGT0301	5	10	2,5	3,8	100	15	15	**100,45**
H1005H-SCLCR/L03	CCGT0301	6	10	3,0	4,4	100	15	13	**100,45**
H06H-SCLCR/L04	CCGT0401	7	6	3,5	5,4	100	15	13	**100,45**
H07K-SCLCR/L04	CCGT0401	8	7	4,0	6,4	125	20	15	**100,45**
H08K-SCLCR/L06	CC..0602	10	8	5,0	7,0	125	20	13	**100,45**
H10K-SCLCR/L06	CC..0602	13	10	6,5	9,0	125	22	12	**100,45**
H12K-SCLCR/L06	CC..0602	16	12	8,0	11,0	125	25	10	**136,90**

SDQCR/L
Soporte de metal duro
Carbide holder



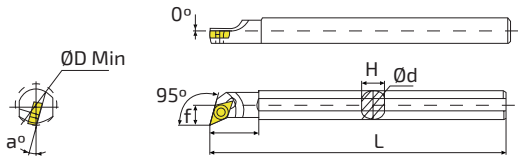
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
C08K-SDQCR/L07	DC..0702	13	8	6	7	125	20	12	**164,25**
C10K-SDQCR/L07	DC..0702	16	10	7	9	125	23	10	**191,65**
C12M-SDQCR/L07	DC..0702	20	12	9	11	150	30	8	**273,80**
C12Q-SDQCR/L07	DC..0702	20	12	9	11	150	30	8	**365,05**
C16Q-SDQCR/L07	DC..0702	25	16	10,5	15	180	30	6	**547,50**
C16Q-SDQCR/L11	DC..11T3	25	16	11	15	180	30	6	**547,50**
C16R-SDQCR/L11	DC..11T3	25	16	11	15	200	30	6	**638,80**
C20S-SDQCR/L11	DC..11T3	28	20	12,5	18	250	39	6	**1.049,40**

SDUCR/L
Soporte de metal duro
Carbide holder



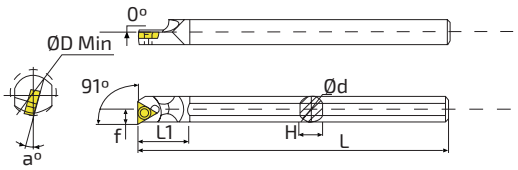
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
C08K-SDUCR/L07	DC..0702	10	8	7,0	13	125	25	12	**164,25**
C10K-SDUCR/L07	DC..0702	13	10	8,0	12	125	25	10	**191,65**
C12M-SDUCR/L07	DC..0702	16	12	9,0	10	150	28	8	**273,80**
C12Q-SDUCR/L07	DC..0702	16	12	9,0	12	150	28	8	**365,05**
C16Q-SDUCR/L07	DC..0702	20	16	11,0	10	180	30	6	**547,50**
C16Q-SDUCR/L11	DC..11T3	20	16	11,5	10	180	35	6	**547,50**
C16R-SDUCR/L11	DC..11T3	20	16	11,5	10	200	35	6	**638,80**
C20S-SDUCR/L11	DC..11T3	25	20	13,0	8	250	40	6	**1.049,40**

SDUCR/L
Soporte de acero rápido
HSS holder



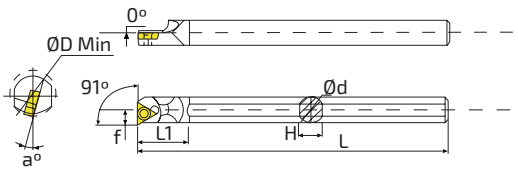
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
H08K-SDUCR/L07	DC..0702	10	8	7	13	125	25	12	**100,45**
H10K-SDUCR/L07	DC..0702	13	10	8	12	125	25	10	**100,45**
H12M-SDUCR/L07	DC..0702	16	12	9	10	150	28	8	**136,90**
H16Q-SDUCR/L07	DC..0702	20	16	11	10	180	30	6	**182,55**
H16Q-SDUCR/L11	DC..11T3	20	16	11,5	10	180	35	6	**182,55**
H20R-SDUCR/L11	DC..11T3	25	20	13	8	200	40	6	**273,80**

STFB(C)R/L
Soporte de metal duro
Carbide holder



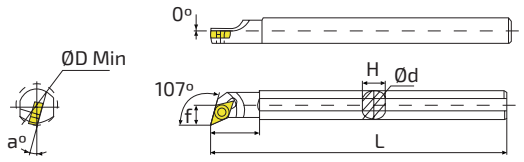
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
C06J-STFBR/L06-A	TB..0601	7	6	100	5,4	15	3,5	13	**164,25**
C08K-STFCR/L09-A	TC..0902	10	8	125	7,0	20	5,0	13	**164,25**
C10K-STFCR/L09-A	TC..0902	13	10	125	9,0	22	6,5	12	**191,65**
C10K-STFCR/L11-A	TC..1102	13	10	125	9,0	22	6,5	12	**191,65**
C12M-STFCR/L11-A	TC..1102	16	12	150	11,0	25	8,0	10	**273,80**
C12Q-STFCR/L11-A	TC..1102	16	12	180	11,0	25	8,0	12	**365,05**
C16Q-STFCR/L11-A	TC..1102	20	16	180	15,0	28	10,0	10	**547,50**
C16R-STFCR/L11-A	TC..1102	20	16	200	15,0	28	10,0	10	**638,80**
C20S-STFCR/L16-A	TC..16T3	25	20	250	18,0	33	12,5	8	**1049,40**

STUPR/L-A
Soporte de metal duro
Refrigeración en el centro
Carbide holder
Coolant through center



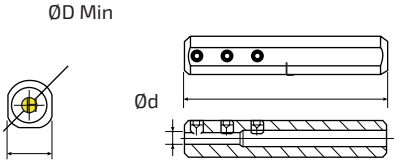
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
C08K-STUPR/L09-A	TP..0903	10	8	125	7	20	5,0	13	**255,50**
C10K-STUPR/L09-A	TP..0903	13	10	125	9	22	6,5	12	**282,90**
C10K-STUPR/L11-A	TP..1103	13	10	125	9	22	6,5	12	**282,90**
C12M-STUPR/L11-A	TP..1103	16	12	150	11	25	8,0	10	**401,50**
C12Q-STUPR/L11-A	TP..1103	16	12	180	11	25	8,0	12	**501,90**
C16Q-STUPR/L11-A	TP..1103	20	16	180	15	28	10,0	10	**730,05**
C16R-STUPR/L11-A	TP..1103	20	16	200	15	28	10,0	10	**912,55**
C20R-STUPR/L16-A	TP..1603	25	20	200	18	33	13,0	8	**1.140,65**
C20S-STUPR/L16-A	TP..1603	25	20	250	18	33	13,0	8	**1.323,20**

SVUCR/L



Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S20R-SVUBR/L16	VB..1604	27	20	200	50	18	14,0	12	**53,95**
S25S-SVUBR/L16	VB..1604	32	25	250	50	23	16,5	8	**64,35**
S32T-SVUBR/L16	VB..1604	41	32	300	55	29	22,5	8	**124,45**
S20R-SVUCR/L16	VC..1604	27	20	200	50	18	14,0	8	**53,95**
S25S-SVUCR/L16	VC..1604	32	25	250	50	23	16,5	6	**64,35**
S32T-SVUCR/L16	VC..1604	41	32	300	55	29	22,5	8	**124,45**

SHB
Cutter

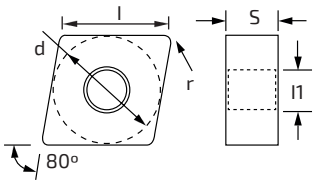


Ref.	Medidas *Dimensions (mm)*				€
	D	d	L	H	
SHB 0416-100	16	4	100	15	**109,50**
SHB 0516-100	16	5	100	15	**109,50**
SHB 0616-100	16	6	100	15	**109,50**
SHB 0716-100	16	7	100	15	**109,50**
SHB 0816-100	16	8	100	15	**109,50**
SHB 0420-100	20	4	100	15	**109,50**
SHB 0520-100	20	5	100	15	**109,50**
SHB 0620-100	20	6	100	15	**109,50**
SHB 0820-100	20	8	100	15	**109,50**
SHB 1020-100	20	10	100	15	**109,50**

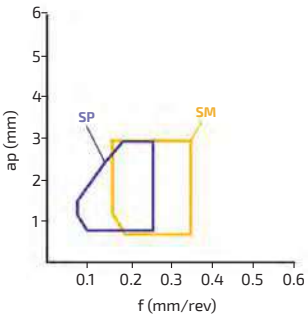
CNMG - CNMM

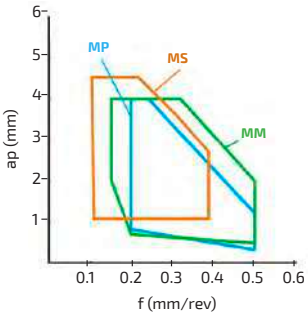
Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

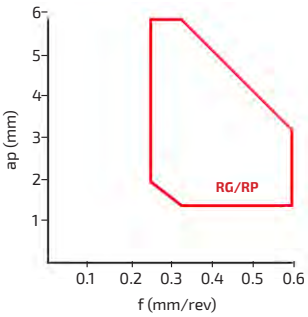
	KP115	KP125	KP135	KM135	KM145
P	●	●	●		●
M	●		●	●	●
K	●		●		●



Ref.	KP115	KP125	KP135	KM135	KM145	Medidas *Dimensions (mm)* d	l	S	r	l1	€
CNMG 120404-SP		✓	✓			12,700	12,90	4,76	0,4	5,16	**7,65**
CNMG 120408-SP		✓	✓			12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120404-MM		✓	✓			12,700	12,90	4,76	0,4	5,16	**7,65**
CNMG 120408-MM		✓	✓			12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120408-MS		✓	✓	✓	✓	12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120404-MP		✓	✓			12,700	12,90	4,76	0,4	5,16	**7,65**
CNMG 120408-MP		✓	✓	✓	✓	12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120412-MP		✓	✓			12,700	12,90	4,76	1,2	5,16	**7,65**
CNMG 120408-MK		✓	✓			12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120408-MG		✓	✓	✓	✓	12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120408-RG		✓	✓	✓	✓	12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120408-RP		✓	✓	✓	✓	12,700	12,90	4,76	0,4	5,16	**7,65**
CNMG 120412-RP		✓	✓			12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120404-SM	✓	✓				12,700	12,90	4,76	0,4	5,16	**7,65**
CNMG 120408-SM	✓	✓				12,700	12,90	4,76	0,8	5,16	**7,65**
CNMG 120412-SM	✓	✓				12,700	12,90	4,76	1,2	5,16	**7,65**
CNMG 120416-SM	✓	✓				12,700	12,90	4,76	1,6	5,16	**7,65**
CNMG 160608-HR	✓	✓	✓		✓	15,875	12,90	6,35	0,8	6,35	**13,95**
CNMG 160612-HR	✓	✓	✓		✓	15,875	12,90	6,35	1,2	6,35	**13,95**
CNMG 160616-HR	✓	✓	✓		✓	15,875	12,90	6,35	1,6	6,35	**13,95**
CNMG 190612-HR	✓	✓	✓		✓	19,050	12,90	6,35	1,2	7,94	**17,70**
CNMG 190616-HR	✓	✓	✓		✓	19,050	12,90	6,35	1,6	7,94	**17,70**
CNMG 250924-HR		✓	✓		✓	25,400	12,90	9,52	2,4	9,12	**36,70**
CNMM 190612-RP		✓				19,050	12,90	6,35	1,2	7,94	**17,70**
CNMM 190616-RP		✓				19,050	12,90	6,35	1,6	7,94	**17,70**
CNMM 190624-RP		✓				19,050	12,90	6,35	2,4	7,94	**17,70**
CNMM 190612-HY		✓	✓			19,050	12,90	6,35	1,2	7,94	**17,70**
CNMM 190616-HY		✓	✓			19,050	12,90	6,35	1,6	7,94	**17,70**
CNMM 190624-HY		✓	✓			19,050	12,90	6,35	2,4	7,94	**17,70**
CNMM 250924-HY		✓			✓	25,400	12,90	9,52	2,4	9,12	**36,70**



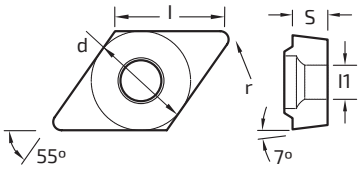




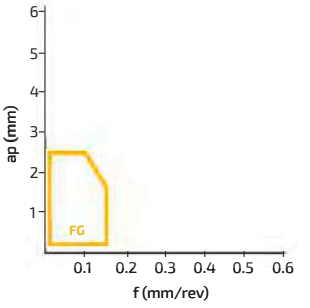
DNGX

Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

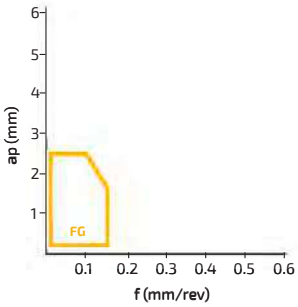
	KP115
P	●
M	●
K	●



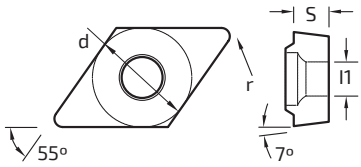
Ref.	KP115	Medidas *Dimensions (mm)* d	l	S	r	l1	€
DNGX 110401-FG	✓	9,525	11,60	4,76	0,1	4,50	**12,10**



DNMG



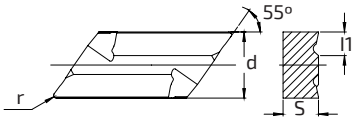
Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*



Ref.	KP115	KP125	KP135	Medidas *Dimensions (mm)* d	S	r	l1	€
DNMG 110408-MG		✓	✓	9,530	4,76	0,8	3,81	**7,90**
DNMG 150408-MG		✓	✓	12,700	4,76	0,8	5,16	**9,00**
DNMG 150404-SM	✓	✓		12,700	4,76	0,4	5,16	**10,95**
DNMG 150408-SM	✓	✓		12,700	4,76	0,8	5,16	**10,95**
DNMG 150412-SM	✓	✓		12,700	4,76	1,2	5,16	**10,95**
DNMG 150416-SM	✓	✓		12,700	4,76	1,6	5,16	**10,95**
DNMG 150604-SM	✓	✓		12,700	6,35	0,4	5,16	**11,40**
DNMG 150608-SM	✓	✓		12,700	6,35	0,8	5,16	**11,40**
DNMG 150612-SM	✓	✓		12,700	6,35	1,2	5,16	**11,40**

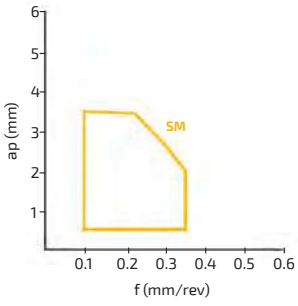
KNUX

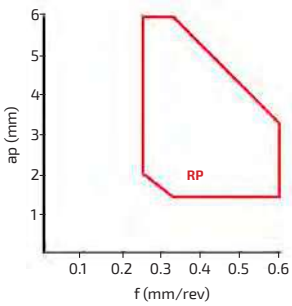
Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*



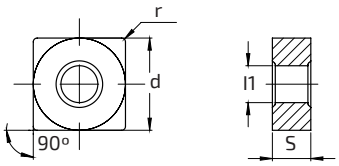
Ref.	KP115	KP125	Medidas *Dimensions (mm)* d	S	r	l1	€
KNUX 160405-L01	✓	✓	9,525	4,76	0,5	2,5	**9,25**
KNUX 160405-R01	✓	✓	9,525	4,76	0,5	2,5	**9,25**
KNUX 160410-L02	✓	✓	9,525	4,76	1,0	3,2	**9,25**
KNUX 160410-R02	✓	✓	9,525	4,76	1,0	3,2	**9,25**

SNMG





Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

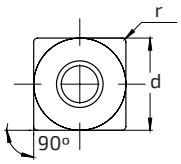


Ref.	KP115	KP125	KP135	KM135	KM145	Medidas *Dimensions (mm)* d	S	r	l1	€
SNMG 120404-SM		✓	✓			12,700	4,76	0,4	5,16	**7,00**
SNMG 120408-MG		✓	✓			12,700	4,76	0,8	5,16	**7,00**
SNMG 120408-RP		✓	✓			12,700	4,76	0,8	5,16	**7,00**
SNMG 120412-RP		✓	✓			12,700	4,76	1,2	5,16	**7,00**
SNMG 120404-RM	✓	✓	✓			12,700	4,76	0,4	5,16	**7,00**
SNMG 120408-RM	✓	✓	✓			12,700	4,76	0,8	5,16	**7,00**
SNMG 120412-RM	✓	✓	✓			12,700	4,76	1,2	5,16	**7,00**
SNMG 120416-RM		✓	✓			12,700	4,76	1,6	5,16	**7,00**
SNMG 150608-RM	✓	✓	✓			15,875	6,35	0,8	6,35	**13,95**
SNMG 150612-RM	✓	✓	✓			15,875	6,35	1,2	6,35	**13,95**
SNMG 190612-RM	✓	✓	✓			19,050	6,35	1,2	7,94	**17,70**
SNMG 190616-RM	✓	✓	✓			19,050	6,35	1,6	7,94	**17,70**

SNMM

Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

P	●	●
M	●	
K	●	

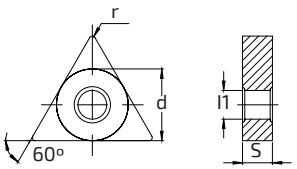


Ref.	KP115	KP125	Medidas *Dimensions (mm)* d	S	r	l1	€
SNMM 190612-RP	✓	✓	19,050	6,35	1,2	7,94	**17,70**
SNMM 190616-RP	✓	✓	19,050	6,35	1,6	7,94	**17,70**
SNMM 190624-RP	✓	✓	19,050	6,35	2,4	7,94	**17,70**
SNMM 250724-HY	✓	✓	25,400	7,94	2,4	9,12	**33,70**
SNMM 250924-HY	✓	✓	25,400	9,52	2,4	9,12	**36,70**

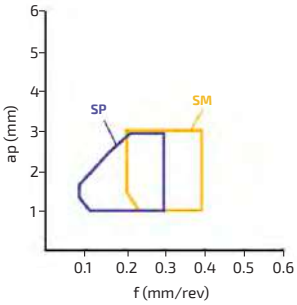
TNMG

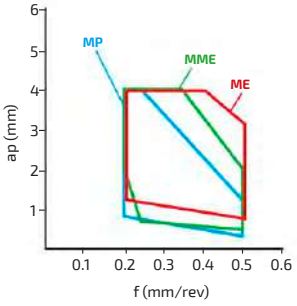
Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

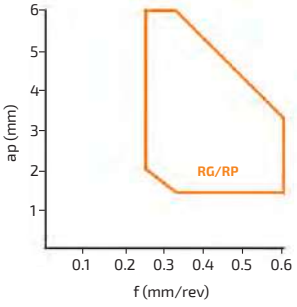
P	●	●	●		●
M	●		●	●	●
K	●		●		●



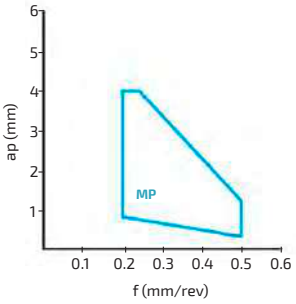
Ref.	KP115	KP125	KP135	KM135	KM145	Medidas *Dimensions (mm)* d	S	r	l1	€
TNMG 160408-SM	✓	✓		✓	✓	9,53	4,76	0,8	3,81	**7,65**
TNMG 160404-SP		✓	✓			9,53	4,76	0,4	3,81	**7,65**
TNMG 160408-SP		✓	✓	✓	✓	9,53	4,76	0,8	3,81	**7,65**
TNMG 160408-MM		✓	✓	✓	✓	9,53	4,76	0,8	3,81	**7,65**
TNMG 160404R-ME		✓	✓			9,53	4,76	0,4	3,81	**7,65**
TNMG 160408R-ME		✓	✓			9,53	4,76	0,8	3,81	**7,65**
TNMG 160404L-ME		✓	✓			9,53	4,76	0,4	3,81	**7,65**
TNMG 160408L-ME		✓	✓			9,53	4,76	0,8	3,81	**7,65**
TNMG 160404-MP		✓	✓			9,53	4,76	0,4	3,81	**7,65**
TNMG 160408-MP		✓	✓	✓	✓	9,53	4,76	0,8	3,81	**7,65**
TNMG 160412-MP		✓	✓	✓	✓	9,53	4,76	1,2	3,81	**7,65**
TNMG 220408-MP		✓	✓	✓	✓	9,53	4,76	0,8	3,81	**7,65**
TNMG 160404-MG			✓			9,53	4,76	0,4	3,81	**7,65**
TNMG 160408-RG		✓	✓	✓	✓	9,53	4,76	0,8	3,81	**7,65**
TNMG 160408-RP		✓	✓	✓	✓	9,53	4,76	0,8	3,81	**7,65**
TNMG 160412-RP		✓	✓			9,53	4,76	1,2	3,81	**7,65**
TNMG 160404-RM				✓	✓	9,53	4,76	0,4	3,81	**7,65**
TNMG 160408-RM				✓	✓	9,53	4,76	0,8	3,81	**7,65**
TNMG 160412-RM				✓	✓	9,53	4,76	1,2	3,81	**7,65**
TNMG 220408-RM				✓	✓	9,53	4,76	0,8	3,81	**11,40**
TNMG 160404-SM	✓	✓				9,525	4,76	0,4	3,81	**7,65**
TNMG 160412-SM	✓	✓				9,525	4,76	1,2	3,81	**7,65**
TNMG 160416-SM	✓	✓				9,525	4,76	1,6	3,81	**7,65**
TNMG 220404-SM	✓	✓				12,700	4,76	0,4	3,81	**11,40**
TNMG 220408-SM	✓	✓				12,700	4,76	0,8	3,81	**11,40**
TNMG 220412-SM	✓	✓				12,700	4,76	1,2	3,81	**11,40**
TNMG 220416-SM	✓	✓				12,700	4,76	1,6	3,81	**11,40**



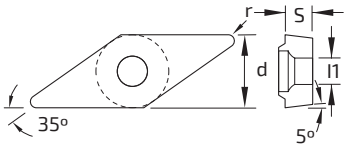




VNMG

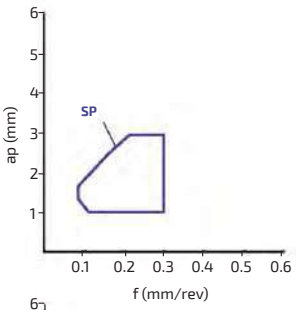


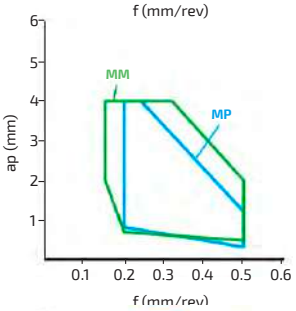
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

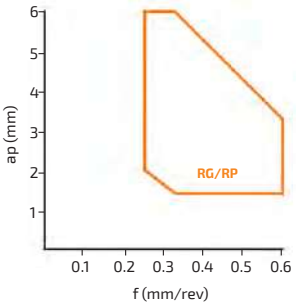


	Ref.	KP115	KP125	KP135	KM135	KM145	Medidas *Dimensions (mm)* d	S	r	l1	€
P	VNMG 160404-MP		✓	✓			9,53	16,5	0,8	3,81	**9,30**
M	VNMG 160408-MG		✓	✓	✓	✓	9,53	16,5	0,8	3,81	**9,30**
K	VNMG 160404-RM				✓	✓	9,53	16,5	0,8	3,81	**9,30**

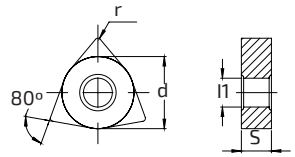
WNMG





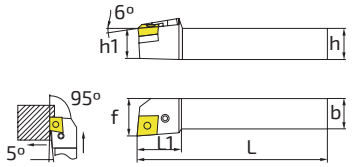


- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*



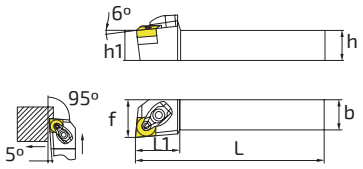
	Ref.	KP115	KP125	KP135	KM135	KM145	Medidas *Dimensions (mm)* d	S	r	l1	€
P	WNMG 080404-SP		✓	✓			12,700	4,76	0,4	5,16	**8,80**
P	WNMG 080408-SP		✓	✓			12,700	4,76	0,8	5,16	**8,80**
P	WNMG 080408-MM		✓	✓	✓	✓	12,700	4,76	0,8	5,16	**8,80**
P	WNMG 080404-MP		✓	✓			12,700	4,76	0,4	5,16	**8,80**
P	WNMG 080408-MP		✓	✓	✓	✓	12,700	4,76	0,8	5,16	**8,80**
P	WNMG 080412-MP		✓	✓			12,700	4,76	1,2	5,16	**8,80**
P	WNMG 080408-RG		✓	✓	✓	✓	12,700	4,76	0,8	5,16	**8,80**
P	WNMG 080408-RP		✓	✓	✓	✓	12,700	4,76	0,8	5,16	**8,80**
P	WNMG 080412-RP		✓	✓			12,700	4,76	1,2	5,16	**8,80**
M	WNMG 080404-RM				✓	✓	12,700	4,76	0,4	5,16	**8,80**
M	WNMG 080408-RM				✓	✓	12,700	4,76	0,8	5,16	**8,80**
M	WNMG 080412-RM				✓	✓	12,700	4,76	1,2	5,16	**8,80**
K	WNMG 06T312-RM	✓	✓				9,525	3,97	1,2	3,81	**6,20**
K	WNMG 080404-SM	✓	✓				12,700	4,76	0,4	5,16	**8,80**
K	WNMG 080408-SM	✓	✓				12,700	4,76	0,8	5,16	**8,80**
K	WNMG 080412-SM	✓	✓				12,700	4,76	1,2	5,16	**8,80**
K	WNMG 080416-SM	✓	✓				12,700	4,76	1,6	5,16	**8,80**

PCLNR/L



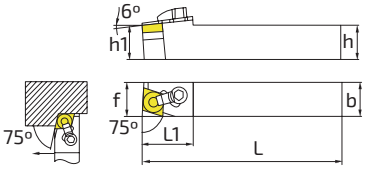
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PCLNR/L2020K12	CN..1204	20	20	125	28	20	25	**88,00**
PCLNR/L2525M12	CN..1204	25	25	150	28	25	32	**93,00**
PCLNR/L3232P12	CN..1204	32	32	170	30	32	40	**120,50**
PCLNR/L2525M16	CN..1606	25	25	150	33	25	32	**93,00**
PCLNR/L3232P16	CN..1606	32	32	170	33	32	40	**120,50**
PCLNR/L3232P19	CN..1906	32	32	170	36	32	40	**120,50**
PCLNR/L4040S19	CN..1906	40	40	250	40	40	50	**162,50**
PCLNR/L4040S25	CN..2509	40	40	250	47	40	50	**162,50**
PCLNR/L5050T25	CN..2509	50	50	300	47	50	60	**250,50**

DCLNR/L



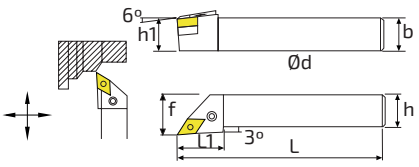
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
DCLNR/L2020K12	CN..1204	20	20	125	32	20	25	**90,50**
DCLNR/L2525M12	CN..1204	25	25	150	32	25	32	**95,50**
DCLNR/L3232P12	CN..1204	32	32	170	35	32	40	**128,00**

MCBNR/L



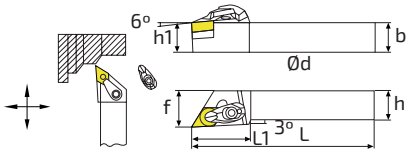
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
MCBNR/L1616H12	CN..1204	16	16	100	34	16	20	**90,50**
MCBNR/L2020K12	CN..1204	20	20	125	34	20	25	**90,50**
MCBNR/L2525M12	CN..1204	25	25	150	34	25	32	**95,50**
MCBNR/L3232P12	CN..1204	32	32	170	40	32	40	**128,00**

PDJNR/L



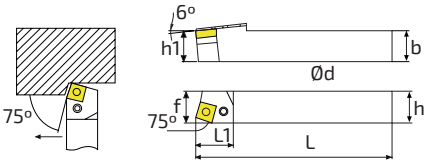
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PDJNR/L1616H11	DN..1104	16	16	100	32	16	20	**80,50**
PDJNR/L2020K11	DN..1104	20	20	125	32	20	25	**88,00**
PDJNR/L2525M11	DN..1104	25	25	150	32	25	32	**93,00**
PDJNR/L2020K1504	DN..1504	20	20	125	38	20	25	**88,00**
PDJNR/L2525M1504	DN..1504	25	25	150	38	25	32	**93,00**
PDJNR/L3232P1504	DN..1504	32	32	170	38	32	40	**120,50**
PDJNR/L2020K1506	DN..1506	20	20	125	28	20	25	**88,00**
PDJNR/L2525M1506	DN..1506	25	25	150	38	25	32	**93,00**
PDJNR/L 3232P1506	DN..1506	32	32	170	38	32	40	**120,50**

DDJNR/L



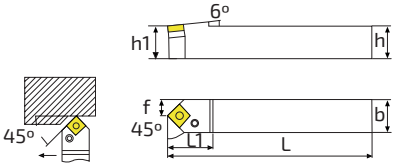
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
DDJNR/L2020K1504	DN..1504	20	20	125	38	20	25	**90,50**
DDJNR/L2525M1504	DN..1504	25	25	150	38	25	32	**95,50**
DDJNR/L3232P1504	DN..1504	32	32	170	38	32	40	**128,00**
DDJNR/L2020K1506	DN..1506	20	20	125	38	20	25	**90,50**
DDJNR/L2525M1506	DN..1506	25	25	150	38	25	32	**95,50**
DDJNR/L3232K1506	DN..1506	32	32	170	38	32	40	**128,00**

PSBNR/L



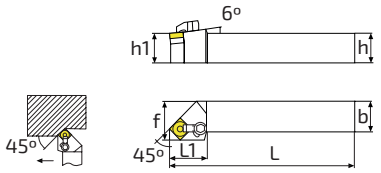
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PSBNR/L2020K12	SN..1204	20	20	125	28	25	25	**88,00**
PSBNR/L2525M12	SN..1204	25	25	150	28	32	32	**93,00**
PSBNR/L3232P12	SN..1204	32	32	170	30	40	40	**120,50**
PSBNR/L2525M15	SN..1506	25	25	150	33	32	32	**93,00**
PSBNR/L3232P15	SN..1506	32	32	170	33	40	40	**120,50**
PSBNR/L3232P19	SN..1906	32	32	170	36	40	40	**120,50**
PSBNR/L4040S19	SN..1906	40	40	250	40	50	50	**162,50**
PSBNR/L4040S25	SN..2509	40	40	250	47	50	50	**162,50**
PSBNR/L5050T25	SN..2509	50	50	300	47	60	60	**250,50**

PSDNN



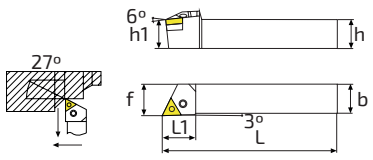
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PSDNN2020K12	SN..1204	20	20	125	28	20	25	**88,00**
PSDNN2525M12	SN..1204	25	25	150	28	25	32	**93,00**
PSDNN3232P12	SN..1204	32	32	170	30	32	40	**120,50**
PSDNN2525M15	SN..1506	25	25	150	33	25	32	**93,00**
PSDNN3232P15	SN..1506	32	32	170	33	32	40	**120,50**
PSDNN3232P19	SN..1906	32	32	170	36	32	40	**120,50**
PSDNN4040S19	SN..1906	40	40	250	40	40	50	**162,50**
PSDNN4040S25	SN..2509	40	40	250	47	40	50	**162,50**
PSDNN5050T25	SN..2509	50	50	300	47	50	60	**250,50**

PSSNR/L



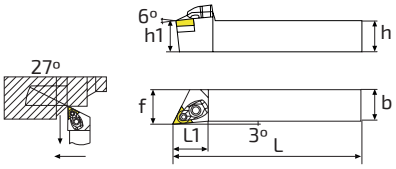
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PSSNR/L2020K12	SN..1204	20	20	125	28	20	25	**88,00**
PSSNR/L2525M12	SN..1204	25	25	150	28	25	32	**93,00**
PSSNR/L3232P12	SN..1204	32	32	170	30	32	40	**120,50**
PSSNR/L2525M15	SN..1506	25	25	150	33	25	32	**93,00**
PSSNR/L3232P15	SN..1506	32	32	170	33	32	40	**120,50**
PSSNR/L3232P19	SN..1906	32	32	170	36	32	40	**120,50**
PSSNR/L4040S19	SN..1906	40	40	250	40	40	50	**162,50**
PSSNR/L4040S25	SN..2509	40	40	250	47	40	50	**162,50**
PSSNR/L5050T25	SN..2509	50	50	300	47	50	60	**250,50**

PTJNR/L



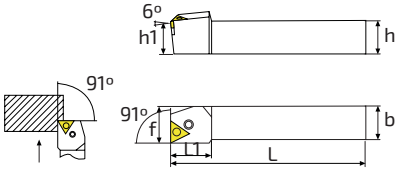
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PTJNR/L2020K16	TN..1604	20	20	125	22	25	25	**88,00**
PTJNR/L2525M16	TN..1604	25	25	150	28	32	32	**93,00**
PTJNR/L3232P16	TN..1604	32	32	170	32	40	40	**120,50**

DTJNR/L



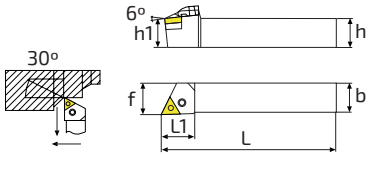
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
DTJNR/L2020K16	TN..1604	20	20	125	32	20	25	**90,50**
DTJNR/L2525M16	TN..1604	25	25	150	32	25	32	**95,50**
DTJNR/L3232P16	TN..1604	32	32	170	35	32	40	**128,00**

PTFNR/L



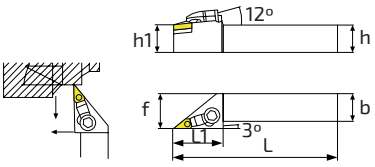
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PTFNR/L2020K16	TN..1604	20	20	125	22	20	25	**88,00**
PTFNR/L2525M16	TN..1604	25	25	150	28	25	32	**93,00**
PTFNR/L3232P16	TN..1604	32	32	170	32	32	40	**101,50**

PTGNR/L



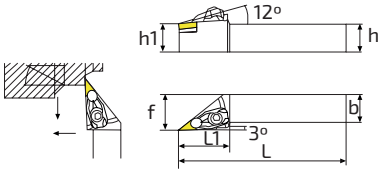
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PTGNR/L2020K16	TN..1604	20	20	125	22	20	25	**88,00**
PTGNR/L2525M16	TN..1604	25	25	150	28	25	32	**93,00**
PTGNR/L3232P16	TN..1604	32	32	170	32	32	40	**101,50**

MVJNR/L



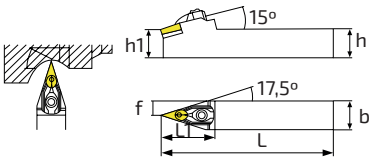
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
MVJNR/L1616H16	VN..1604	16	16	100	36	16	20	**93,00**
MVJNR/L2020K16	VN..1604	20	20	125	36	20	25	**100,00**
MVJNR/L2525M16	VN..1604	25	25	150	42	25	32	**108,00**
MVJNR/L3232P16	VN..1604	32	32	170	45	32	40	**115,50**

DVJNR/L



Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
DVJNR/L2020K16	VN..1604	20	20	125	45	20	25	**100,00**
DVJNR/L2525M16	VN..1604	25	25	150	45	25	32	**108,00**
DVJNR/L3232P16	VN..1604	32	32	170	48	32	40	**115,50**

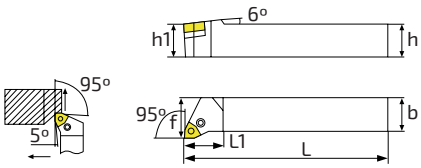
DVVNN



● Stock
○ Bajo pedido

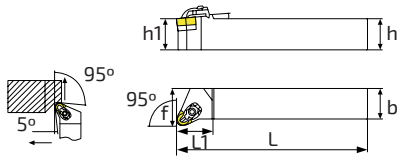
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
DVVNN1616H16	VN..1604	16	16	100	48	16	20	**90,50**
DVVNN2020K16	VN..1604	20	20	125	48	20	25	**90,50**
DVVNN2525M16	VN..1604	25	25	150	48	25	32	**95,50**
DVVNN3232P16	VN..1604	32	32	170	48	32	40	**128,00**

PWLNR/L



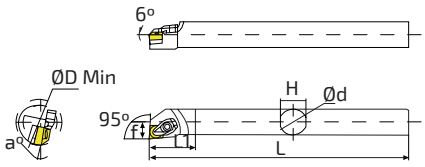
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
PWLNR/L1616H06	WN..0604	16	16	100	20	16	20	**80,50**
PWLNR/L2020K06	WN..0604	20	20	125	25	20	25	**88,00**
PWLNR/L2525M06	WN..0604	25	25	150	25	25	32	**93,00**
PWLNR/L1616H08	WN..0804	16	16	100	26	16	20	**80,50**
PWLNR/L2020K08	WN..0804	20	20	125	26	20	25	**88,00**
PWLNR/L2525M08	WN..0804	25	25	150	26	25	32	**93,00**
PWLNR/L3232P08	WN..0804	32	32	170	30	32	40	**120,50**

DWLNR/L



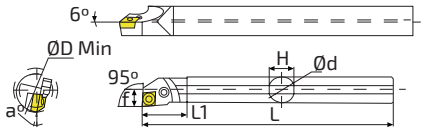
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
DWLNR/L1616H06	WN..0604	16	16	100	28	16	20	**90,50**
DWLNR/L2020K06	WN..0604	20	20	125	28	20	25	**90,50**
DWLNR/L2525M06	WN..0604	25	25	150	30	25	32	**95,50**
DWLNR/L1616H08	WN..0804	16	16	100	30	16	20	**90,50**
DWLNR/L2020K08	WN..0804	20	20	125	32	20	25	**90,50**
DWLNR/L2525M08	WN..0804	25	25	150	32	25	32	**95,50**
DWLNR/L3232P08	WN..0804	32	32	170	35	32	40	**128,00**

DCLNR/L



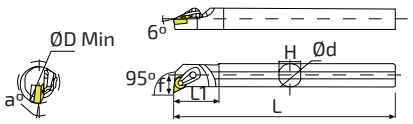
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S20R-DCLNR/L12	CN..1204	25	20	200	32	16	13	15	**62,25**
S25S-DCLNR/L12	CN..1204	32	25	250	40	20	17	12	**82,15**
S32T-DCLNR/L12	CN..1204	40	32	300	50	32	22	17	**146,05**
S40U-DCLNR/L12	CN..1204	50	40	350	55	40	27	15	**273,80**

PCLNR/L



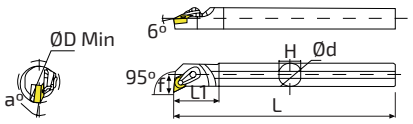
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S25S-PCLNR/L12	CN..1204	32	25	250	40	20	17	12	**155,15**
S32T-PCLNR/L12	CN..1204	40	32	300	50	32	22	17	**182,55**
S40U-PCLNR/L12	CN..1204	50	40	350	55	40	27	15	**273,80**

DDUNR/L



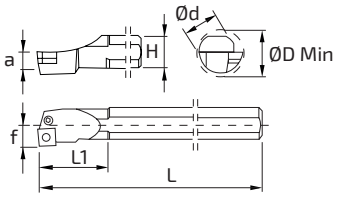
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S25S-DDUNR/L1504	DN..1504	32	25	250	40	23	17	12	**82,15**
S32T-DDUNR/L1504	DN..1504	40	32	300	50	29	22,5	17	**146,05**
S40U-DDUNR/L1504	DN..1504	50	40	350	55	37	26	15	**273,80**
S32T-DDUNR/L1506	DN..1506	42	32	300	50	29	22,5	17	**146,05**
S40U-DDUNR/L1506	DN..1506	50	40	350	55	37	26	15	**273,80**

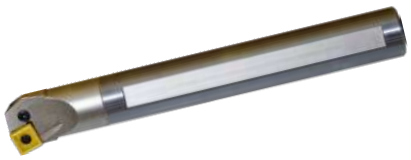
PDUNR/L



Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S25S-PDUNR/L1506	DN..1506	32	25	250	35	23	17	12	**155,15**
S32T-PDUNR/L1506	DN..1506	40	32	300	40	30	22	17	**182,55**
S40U-PDUNR/L1506	DN..1506	50	40	350	50	37	27	15	**273,80**

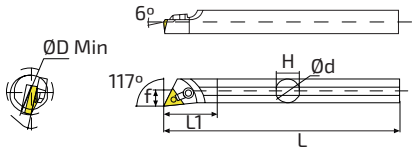
PSKNR/L





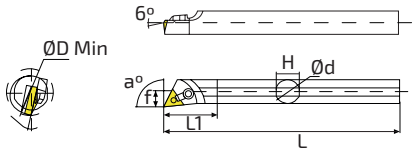
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
A25R-PSKNR/L11	DN..1104	31	25	200	40	23	17	11,5	**307,60**
A32S-PSKNR/L15	DN..1506	39	32	250	50	30	22	15,0	**360,00**
A40T-PSKNR/L15	DN..1506	48	40	300	60	37	27	18,5	**407,90**

MTJNR/L



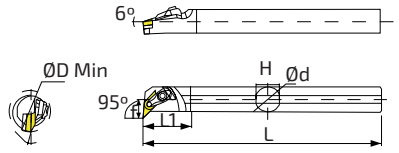
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S20Q-MTJNR/L16	TN..1604	25	20	180	40	18	13	15	**62,25**
S20R-MTJNR/L16	TN..1604	25	20	200	40	18	13	15	**62,25**
S25R-MTJNR/L16	TN..1604	32	25	200	45	23	16,5	12	**82,15**
S25S-MTJNR/L16	TN..1604	32	25	250	45	23	16,5	12	**82,15**
S32S-MTJNR/L16	TN..1604	41	32	250	54	29	22,5	17	**146,05**
S32T-MTJNR/L16	TN..1604	41	32	300	54	29	22,5	17	**146,05**

MTFNR/L



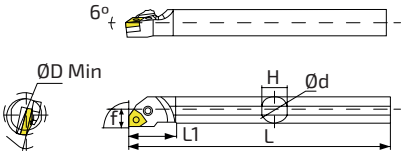
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S16Q-MTFNR/L16	TN..1604	20	16	180	38	15	11	15	**62,25**
S20Q-MTFNR/L16	TN..1604	25	20	180	45	18	13	15	**62,25**
S20R-MTFNR/L16	TN..1604	25	20	200	45	18	13	15	**62,25**
S25R-MTFNR/L16	TN..1604	32	25	200	45	23	16,5	12	**82,15**
S25S-MTFNR/L16	TN..1604	32	25	250	45	23	16,5	12	**82,15**
S32S-MTFNR/L16	TN..1604	41	32	250	50	29	22,5	17	**146,05**
S32T-MTFNR/L16	TN..1604	41	32	300	50	29	22,5	17	**146,05**

DVUNR/L



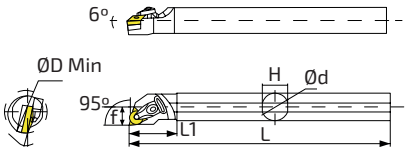
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S25S-DVUNR/L16	VN..1604	32	25	250	45	23	17	12	**82,15**
S32T-DVUNR/L16	VN..1604	42	32	300	50	29	23	17	**146,05**
S40U-DVUNR/L16	VN..1604	50	40	350	55	37	27	15	**273,80**

PWLNR/L



Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S20R-PWLNR/L06	WN..0604	25	20	200	45	18	13	15	**136,90**
S25S-PWLNR/L08	WN..0804	32	25	250	45	23	16,5	12	**155,15**
S32T-PWLNR/L08	WN..0804	44	32	300	50	29	22,5	17	**182,55**
S40T-PWLNR/L08	WN..0804	54	40	300	55	37	26	15	**273,80**

DWLNR/L



Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	L	L1	H	f	a	
S20R-DWLNR/L08	WN..0804	25	20	200	45	18	13,0	15	**62,25**
S25S-DWLNR/L08	WN..0804	32	25	250	45	23	16,5	12	**82,15**
S32T-DWLNR/L08	WN..0804	42	32	300	50	29	22,5	17	**146,05**
S40U-DWLNR/L08	WN..0804	50	40	350	55	37	26,0	15	**273,80**

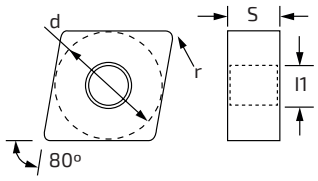
TORNEADO CBN Y CERMET

CBN & CERMET Turning

Microtorneado

- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	●
M	●
K	●
N	
S	
H	

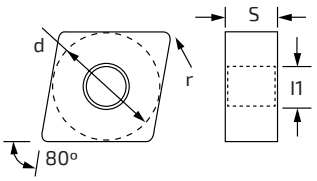


Ref.	Cermet KC115	Medidas *Dimensions (mm)* d	S	r	l1	€
CCGT030102L-F	✓	3,500	1,40	0,2	1,9	**10,90**
CCGT030104L-F	✓	3,500	1,40	0,4	1,9	**10,90**
CCGT040102L-F	✓	4,300	1,80	0,2	2,3	**10,90**
CCGT040104L-F	✓	4,300	1,80	0,4	2,3	**10,90**
CCGT060602L-F	✓	6,350	2,38	0,2	2,8	**8,90**
CCGT060604L-F	✓	6,350	2,38	0,4	2,8	**8,90**
CCGT09T302L-F	✓	9,525	3,97	0,2	4,4	**8,90**
CCGT09T304L-F	✓	9,525	3,97	0,4	4,4	**8,90**

CNGA

- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	●
N	
S	
H	●

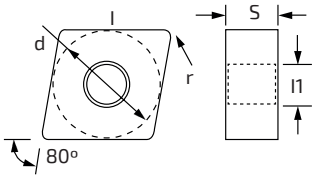


Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	l1	€
CNGA 120404-Z2	✓	12,7	4,76	0,4	5,16	**63,25**
CNGA 120408-Z2	✓	12,7	4,76	0,8	5,16	**63,25**
CNGA 120412-Z2	✓	12,7	4,76	1,2	5,16	**63,25**

CCGW

- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	●
N	
S	
H	●

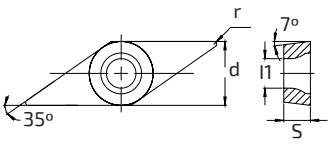


Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	l1	€
CCGW 060202-Z2	✓	6,35	2,38	0,2	2,8	**63,25**
CCGW 060204-Z2	✓	6,35	2,38	0,4	2,8	**63,25**
CCGW 09T304-Z2	✓	9,52	3,97	0,4	4,4	**63,25**
CCGW 09T308-Z2	✓	9,52	3,97	0,8	4,4	**63,25**

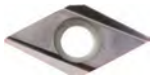
DCGT - DCGW

- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

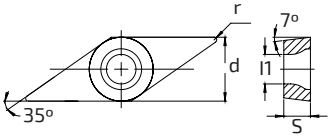
P	
M	
K	●
N	
S	
H	●



Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	l1	€
DCGW070202-Z2	✓	6,35	2,38	0,2	2,8	63,25
DCGW070204-Z2	✓	9,25	3,97	0,2	4,4	63,25
DCGW11T302-Z2	✓	9,25	3,97	0,4	4,4	63,25
DCGW11T304-Z2	✓	9,25	3,97	0,8	4,4	63,25

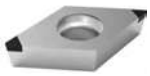


P	●
M	●
K	●
N	
S	
H	



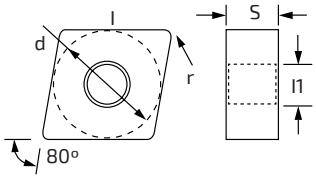
Ref.	Cermet KC115	Medidas *Dimensions (mm)* d	S	r	l1	€
DCGT11T302L-F	✓	9,25	3,97	0,2	4,4	8,90
DCGT11T304L-F	✓	9,25	3,97	0,4	4,4	8,90
DCGT11T302R-F	✓	9,25	3,97	0,2	4,4	8,90
DCGT11T304R-F	✓	9,25	3,97	0,4	4,4	8,90

DNGA



- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	●
N	
S	
H	●

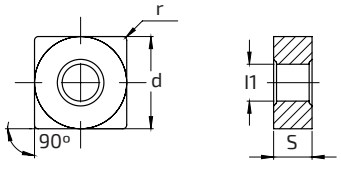


Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	l1	€
DNGA150404-Z2	✓	12,7	4,76	0,4	5,16	63,25
DNGA150408-Z2	✓	12,7	4,76	0,8	5,16	63,25
DNGA150412-Z2	✓	12,7	4,76	1,2	5,16	63,25

SNGA

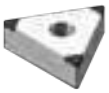
- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	●
N	
S	
H	●



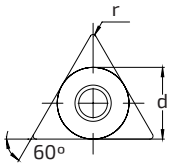
Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	l1	€
SNGA120404-Z4	✓	12,7	4,76	0,4	5,16	83,00
SNGA120408-Z4	✓	12,7	4,76	0,8	5,16	83,00
SNGA120412-Z4	✓	12,7	4,76	1,2	5,16	83,00

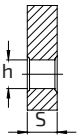
TNGA



- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	●
N	
S	
H	●



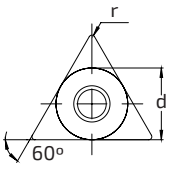


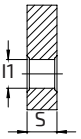
Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	h	€
TNGA160404-Z3	✓	9,52	4,76	0,4	5,16	**73,10**
TNGA160408-Z3	✓	9,52	4,76	0,8	5,16	**73,10**
TNGA160412-Z3	✓	9,52	4,76	1,2	5,16	**73,10**

TNMG

- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

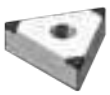
P	●
M	●
K	●
N	
S	
H	





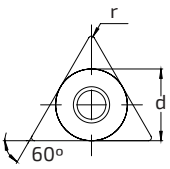
Ref.	Cermet KC115	Medidas *Dimensions (mm)* d	S	r	l1	€
TNMG 160404R	✓	9,52	4,76	0,4	3,18	**5,35**
TNMG 160408R	✓	9,52	4,76	0,8	3,18	**5,35**
TNMG 160404L	✓	9,52	4,76	0,4	3,18	**5,35**
TNMG 160408L	✓	9,52	4,76	0,8	3,18	**5,35**

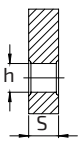
TCGW



- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	●
N	
S	
H	●



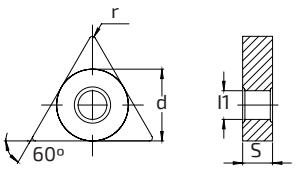


Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	h	€
TCGW110204-Z3	✓	6,35	2,38	0,4	2,8	**73,10**
TCGW110208-Z3	✓	6,35	2,38	0,8	2,8	**73,10**
TCGW16T304-Z3	✓	9,52	3,97	0,4	4,4	**73,10**
TCGW16T308-Z3	✓	9,52	3,97	0,8	4,4	**73,10**

TBGT - TPGH

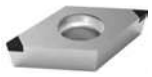
- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	●
M	●
K	●
N	
S	
H	



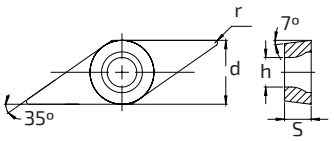
Ref.	Cermet KC115	Medidas *Dimensions (mm)* d	S	r	l1	€
TBGT060102L-F	✓	3,97	1,59	0,2	2,3	**10,90**
TBGT060104L-F	✓	3,97	1,59	0,4	2,3	**10,90**
TPGH080202L-F	✓	4,76	2,38	0,2	2,3	**8,90**
TPGH080204L-F	✓	4,76	2,38	0,4	2,3	**8,90**
TPGH090202L-F	✓	5,56	2,38	0,2	3,0	**8,90**
TPGH090204L-F	✓	5,56	2,38	0,4	3,0	**8,90**
TPGH110302L-F	✓	6,35	3,18	0,2	3,3	**8,90**
TPGH110304L-F	✓	6,35	3,18	0,4	3,3	**8,90**

VNGA



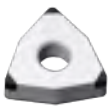
- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	●
N	
S	
H	●



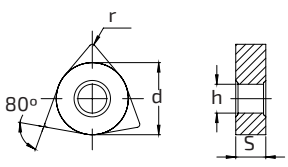
Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	h	€
VNGA 160404-Z2	✓	9,52	4,76	0,4	3,81	**63,25**
VNGA 160408-Z2	✓	9,52	4,76	0,8	3,81	**63,25**

WNGA

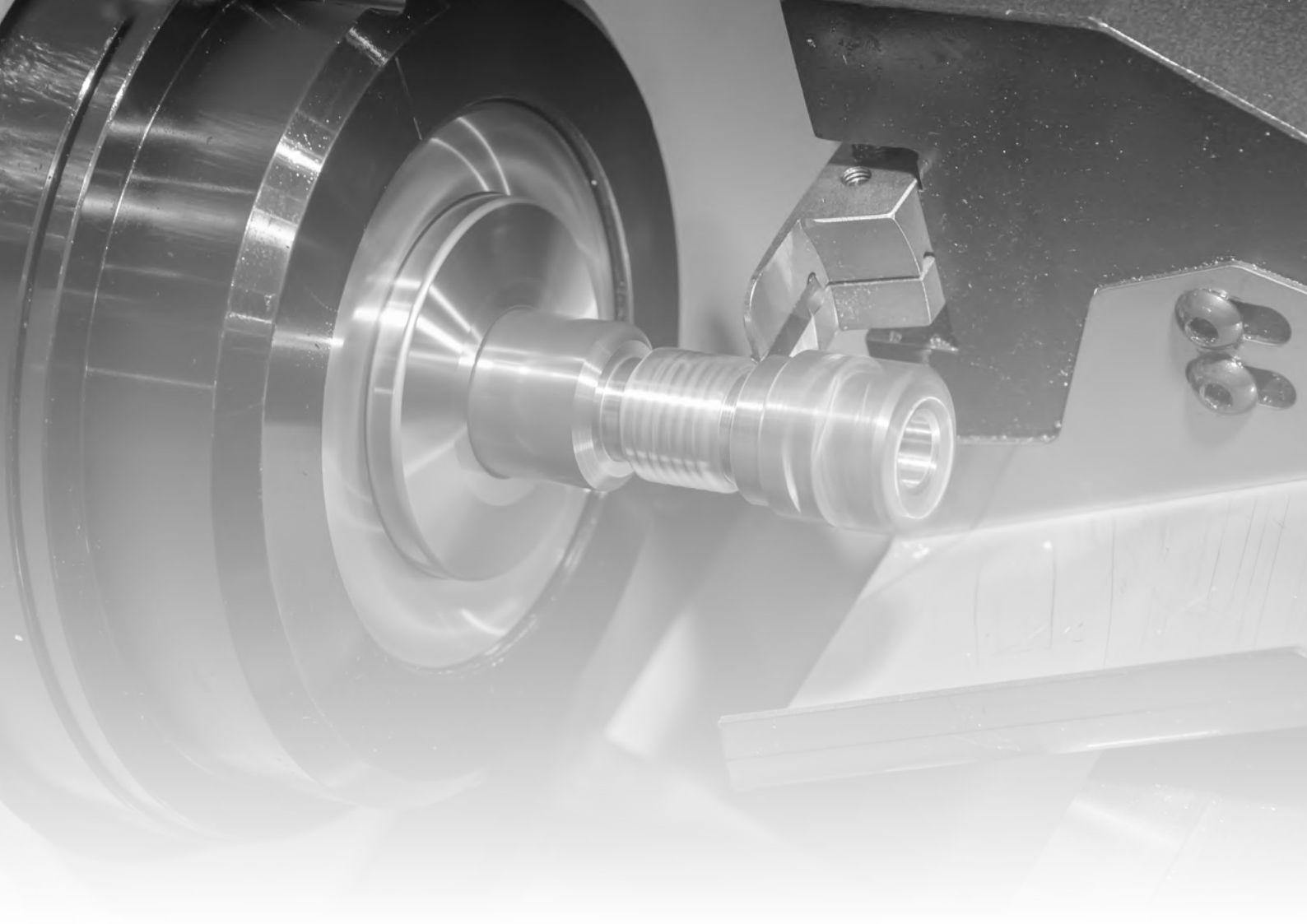


- Continuo *Continuous*
- Interrupción baja *Light interrupted*
- General
- Interrumpido *Interrupted*

P	
M	
K	●
N	
S	
H	●



Ref.	CBN	Medidas *Dimensions (mm)* d	S	r	h	€
WNGA 080404-Z3	✓	9,52	4,76	0,4	3,18	**73,10**
WNGA 080408-Z3	✓	9,52	4,76	0,8	3,18	**73,10**
WNGA 080412-Z3	✓	9,52	4,76	1,2	3,18	**73,10**

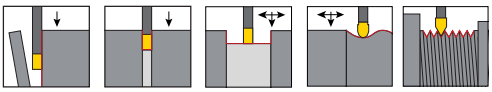


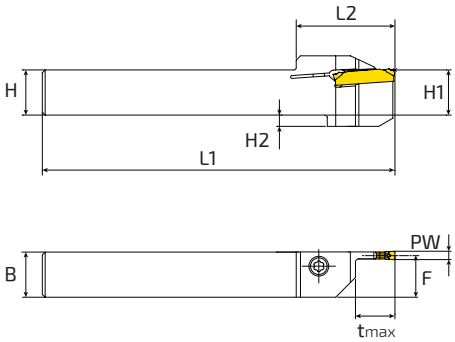
TRONZADO

Parting

VGER
VGIR

Herramienta externa - Ranurado, tronzado, torneado y roscado
External tools - Grooving, parting off, turning and threading

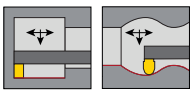


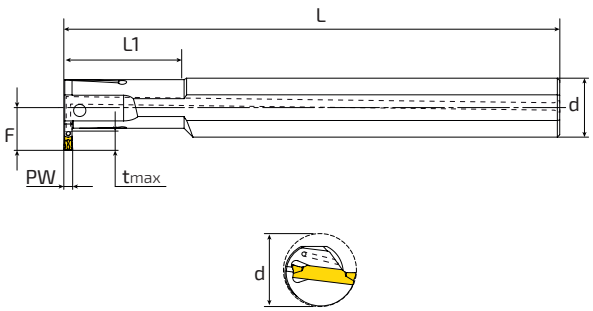


Ref.	Medidas *Dimensions (mm)*									€
	PW	tmax	H*B	H1	F	L1	L2	a	H2	
VGER/L1616-2T12	2	12	16*16	16	15,30	125	35	1,40	4,0	**103,90**
VGER/L2020-2T12	2	12	20*20	20	19,30	125	35	1,40	-	**119,55**
VGER/L2525-2T08	2	8	25*25	25	24,30	125	35	1,40	-	**141,05**
VGER/L1212-3T12	3	12	12*12	12	10,80	125	35	2,40	4,0	**102,20**
VGER/L1616-3T12	3	12	16*16	16	14,80	125	35	2,40	4,0	**108,70**
VGER/L1616-3T21	3	21	16*16	16	14,80	125	35	2,40	4,0	**132,95**
VGER/L2020-3T08	3	8	20*20	20	18,80	125	35	2,40	-	**125,10**
VGER/L2020-3T12	3	12	20*20	20	18,80	125	35	2,40	-	**125,10**
VGER/L2020-3T21	3	21	20*20	20	18,80	125	35	2,40	-	**134,50**
VGER/L2525-3T08	3	8	25*25	25	23,80	125	35	2,40	-	**132,95**
VGER/L2525-3T12	3	12	25*25	25	23,80	125	35	2,40	-	**132,95**
VGER/L2525-3T21	3	21	25*25	25	23,80	125	35	2,40	-	**143,85**
VGER/L1616-4T21	4	21	16*16	16	14,50	125	35	3,00	4,0	**116,75**
VGER/L2020-4T21	4	21	20*20	20	18,50	125	35	3,00	-	**134,50**
VGER/L2525-4T08	4	8	25*25	25	23,52	125	35	2,95	-	**132,90**
VGER/L2525-4T12	4	12	25*25	25	23,50	125	35	3,00	-	**141,15**
VGER/L2525-4T21	4	21	25*25	25	23,50	125	35	3,00	-	**143,85**
VGER/L3232-4T21	4	21	32*32	32	32,52	125	35	2,95	-	**153,90**
VGER/L2525-5T22	5	22	25*25	25	23,00	150	43	4,00	-	**169,45**
VGER/L3232-5T22	5	22	32*32	32	30,00	170	43	4,00	-	**205,75**
VGER/L2525-6T24	6	24	25*25	25	22,50	150	45	5,00	-	**169,45**
VGER/L3232-6T24	6	24	32*32	32	29,50	170	45	5,00	-	**205,75**

TRONZADO

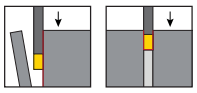
Ranurado y torneado interior
Internal grooving and turning



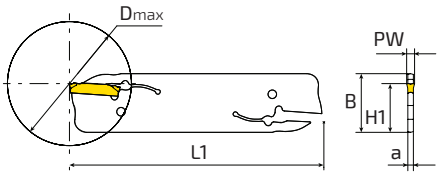


Ref.	Medidas *Dimensions (mm)*							€
	PW	tmax	L1	Dmin	d	F	L	
VGIR/L-20-25-2C	2	7	40,5	25	20	14,5	180	**338,60**
VGIR/L-25-32-2C	2	9	50,5	32	25	18,0	200	**394,40**
VGIR/L-20-25-3C	3	7	40,5	25	20	14,4	180	**338,60**
VGIR/L-25-32-3C	3	9	50,5	32	25	18,0	200	**394,40**
VGIR/L-32-40-3C	3	11	64,0	40	32	22,0	250	**457,55**
VGIR/L-20-28-4C	4	9	41,0	28	20	16,5	180	**338,60**
VGIR/L-25-32-4C	4	9	51,0	32	25	18,0	200	**394,40**
VGIR/L-32-40-4C	4	11	64,0	40	32	22,0	250	**457,55**
VGIR-32-40-5C	5	11	64,0	40	32	22,0	250	**457,55**
VGIR-40-53-6C	6	10	80,0	51	40	30,0	295	**537,10**

Lamas para ranurar y separar
Blades for grooving and parting off

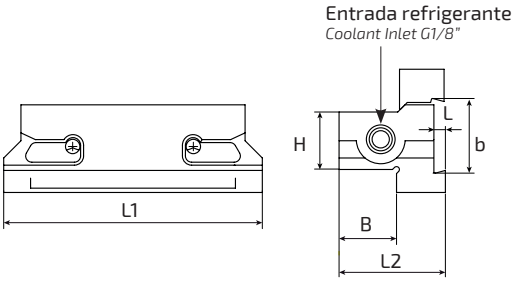


Ref.	Medidas *Dimensions (mm)*						€
	B	PW	Dmax	H1	L1	a	
VGP26-2D	26	2	50	21,4	110	1,40	**111,65**
VGP32-2D	32	2	50	24,8	150	1,80	**111,65**
VGP26-3D	26	3	70	21,4	110	2,40	**118,60**
VGP32-3D	32	3	100	24,8	150	2,40	**118,60**
VGP35-3S	35	3	100	33,5	150	2,40	**148,80**
VGP32-4D	32	4	100	24,8	150	3,00	**118,60**
VGP32-5D	32	5	100	24,8	150	4,00	**141,20**
VGP32-6D	32	6	100	24,8	150	5,00	**141,20**



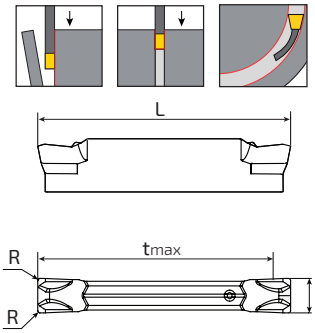
Soporte para lamas
Blades holer

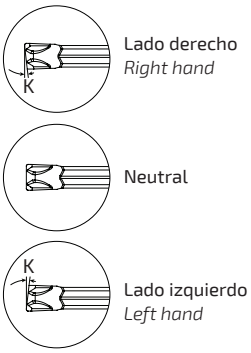
Ref.	Medidas *Dimensions (mm)*						€
	b	H	B	L	L1	L2	
VBA 2020-26	26	20	20	4	90	37	**327,30**
VBA 2520-32	32	25	20	5,2	110	37	**331,65**



Tronzado y ranurado profundo
Parting Off & Deep Grooving

Plaquitas de dos cortes
Double Sided Inserts



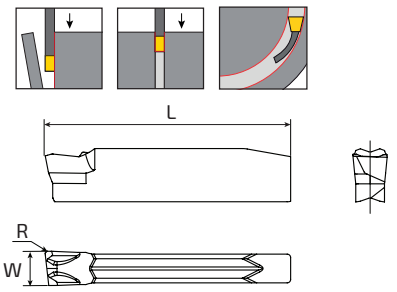


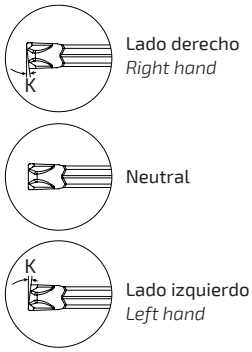
P	● ●
M	● ●
K	●
N	●
S	● ●
H	●

Ref.	KP125	KM135	W±0.04	Medidas *Dimensions (mm)* R	t_{max}	K	L	Rango de avance *Feed range (mm/rev)*	€
VGD2.00-020-GF	✓	✓	2.00	0,20	20	0	22	0,03-0,10	**16,95**
VGD2.00-015-6R-GF	✓		2.00	0,15	20	6	22	0,03-0,10	**16,95**
VGD2.00-015-6L-GF	✓		2.00	0,15	20	6	22	0,03-0,10	**16,95**
VGD2.00-020-15R-GF	✓		2.00	0,20	20	15	22	0,03-0,08	**16,95**
VGD2.00-020-15L-GF	✓		2.00	0,20	20	15	22	0,03-0,08	**16,95**
VGD3.00-015-GM	✓		3.00	0,15	20	0	22	0,06-0,16	**17,30**
VGD3.00-030-GM	✓	✓	3.00	0,30	20	0	22	0,08-0,22	**17,25**
VGD3.00-020-6R-GM	✓	✓	3.00	0,20	20	6	22	0,05-0,16	**17,25**
VGD3.00-020-6L-GM		✓	3.00	0,20	20	6	22	0,05-0,16	**17,25**
VGD4.00-040-GM	✓	✓	4.00	0,40	23	0	22	0,08-0,25	**21,60**
VGD2.00-020-GT	✓		2.00	0,20	20	0	22	0,05-0,10	**16,95**
VGD3.00-030-GT	✓		3.00	0,30	20	0	22	0,05-0,25	**17,25**
VGD4.00-020-GT	✓		4.00	0,20	23	0	25	0,05-0,18	**21,60**
VGD4.00-040-GT	✓		4.00	0,40	23	0	25	0,08-0,28	**21,60**
VGD5.00-040-GT	✓		5.00	0,40	23	0	25	0,08-0,25	**25,20**
VGD6.00-040-GT	✓		6.00	0,40	23	0	25	0,10-0,28	**27,65**
VGD2.00-100-GR	✓		2.00	1,00	18	0	22	0,06-0,12	**16,95**
VGD3.00-150-GR	✓		3.00	1,50	18	0	22	0,06-0,18	**17,25**
VGD4.00-200-GR	✓		4.00	2,00	20	0	25	0,06-0,20	**21,60**
VGD6.00-300-GR	✓		6.00	3,00	20,0	0	25	0,06-020	**27,75**

Plaquitas de un corte
Single Sided Inserts

P	●	●
M	●	●
K	●	
N		●
S	●	●
H	●	





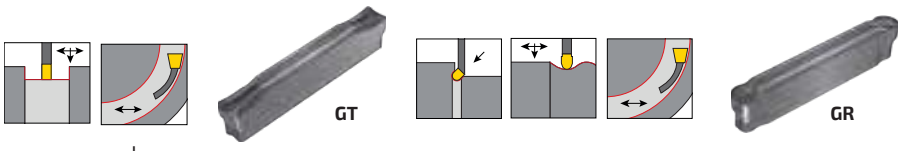
Lado derecho
Right hand

Neutral

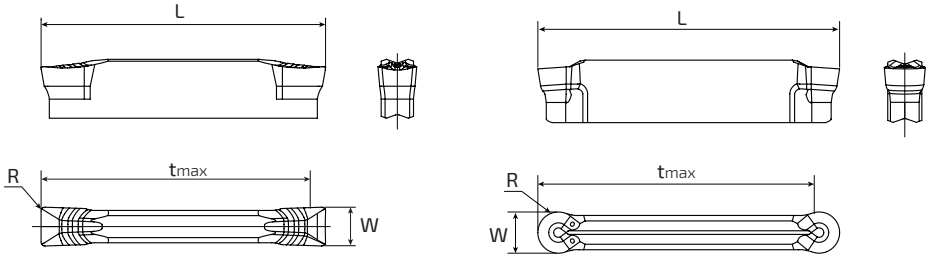
Lado izquierdo
Left hand

Ref.	KP125	KM135	W±0.04	Medidas *Dimensions (mm)* R	t_{max}	K	L	Rango de avance *Feed range (mm/rev)*	€
VGS2.00-015-6R-GF		✓	2.00	0,15	∞	6	21,3	0,03-0,10	**16,95**
VGS2.00-015-6L-GF		✓	2.00	0,15	∞	6	21,3	0,03-0,10	**16,95**
VGS3.00-020-GM	✓	✓	3.00	0,20	∞	0	22,0	0,08-0,22	**15,40**
VGS3.00-020-6R-GM		✓	3.00	0,20	∞	6	21,3	0,05-0,16	**18,25**
VGS3.00-020-6L-GM		✓	3.00	0,20	∞	6	21,3	0,05-0,16	**18,25**
VGS4.00-040-GM	✓	✓	4.00	0,40	∞	0	25,0	0,08-0,25	**19,35**
VGS4.00-040-4R-GM		✓	4.00	0,40	∞	4	24,3	0,06-0,18	**22,30**
VGS4.00-040-4L-GM		✓	4.00	0,40	∞	4	24,3	0,06-0,18	**22,30**

Torneado y perfilado
Turning & Profiling

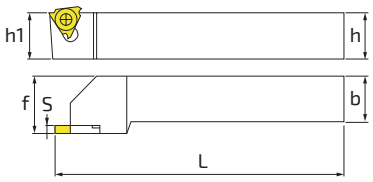


P	●
M	●
K	●
N	
S	●
H	●



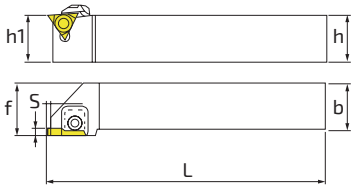
Ref.	KP125	W±0.04	Medidas *Dimensions (mm)* R	t_{max}	K	L	Rango de avance *Feed range (mm/rev)*	€
VGD2.00-020-GT	✓	2.00	0,20	20	-	22	0,05-0,10	**16,95**
VGD3.00-030-GT	✓	3.00	0,30	20	-	22	0,05-0,25	**17,25**
VGD4.00-020-GT	✓	4.00	0,20	23	-	25	0,05-0,18	**21,60**
VGD4.00-040-GT	✓	4.00	0,40	23	-	25	0,08-0,28	**21,60**
VGD5.00-040-GT	✓	5.00	0,40	23	-	25	0,08-0,25	**25,20**
VGD6.00-040-GT	✓	6.00	0,40	23	-	25	0,10-0,28	**27,65**
VGD2.00-100-GR	✓	4.00	1,00	18	-	22	0,06-0,12	**16,95**
VGD3.00-150-GR	✓	4.00	1,50	18	-	22	0,06-0,18	**17,25**
VGD4.00-200-GR	✓	4.00	2,00	20	-	25	0,06-0,20	**21,60**
VGD6.00-300-GR	✓	4.00	3,00	20	-	25	0,06-0,20	**27,75**

SGWHR/L



Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	f	S	h1	
SGWHR/L1212H3200	GBA32...	12	12	100	16	0,5-1,8	12	**59,30**
SGWHR/L1212H3215	GBA32...	12	12	100	16	1,8-2,3	12	**59,30**
SGWHR/L1616H3200	GBA32...	16	16	100	20	0,5-1,8	16	**59,30**
SGWHR/L1616H3215	GBA32...	16	16	100	20	1,8-2,3	16	**59,30**
SGWHR/L2020K3200	GBA32...	20	20	125	25	0,5-1,8	20	**68,45**
SGWHR/L2020K3215	GBA32...	20	20	125	25	1,8-2,3	20	**68,45**
SGWHR/L2020K3223	GBA32...	20	20	125	25	2,3-3,3	20	**68,45**
SGWHR/L2525M3200	GBA32...	25	25	150	32	0,5-1,8	25	**77,60**
SGWHR/L2525M3215	GBA32...	25	25	150	32	1,8-2,3	25	**77,60**
SGWHR/L2525M3223	GBA32...	25	25	150	32	2,3-3,3	25	**77,60**

MGWHR/L



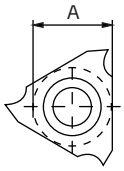
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	f	S	h1	
MGWHR/L1616H4315A	GBA43...	16	16	100	20	1,25-1,5	16	**56,50**
MGWHR/L1616H4315	GBA43...	16	16	100	20	1,5-2,3	16	**56,50**
MGWHR/L1616H4325	GBA43...	16	16	100	20	2,3-3,3	16	**56,50**
MGWHR/L2020K4315A	GBA43...	20	20	125	25	1,25-1,5	20	**60,85**
MGWHR/L2020K4315	GBA43...	20	20	125	25	1,5-2,3	20	**60,85**
MGWHR/L2020K4323	GBA43...	20	20	125	25	2,3-3,3	20	**60,85**
MGWHR/L2525K4315A	GBA43...	25	25	150	32	1,25-1,5	25	**65,20**
MGWHR/L2525K4315	GBA43...	25	25	150	32	1,5-2,3	25	**65,20**
MGWHR/L2525K4323	GBA43...	25	25	150	32	2,3-3,3	25	**65,20**
MGWHR/L2525K4333	GBA43...	25	25	150	32	3,3-4,7	25	**65,20**

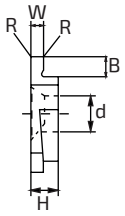
Herramientas para ranurar y cortar
Grooving and parting tools

GBA

Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

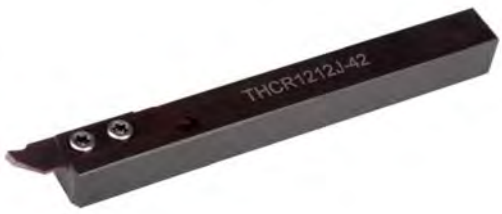
P	●
M	●
K	●
N	
S	●

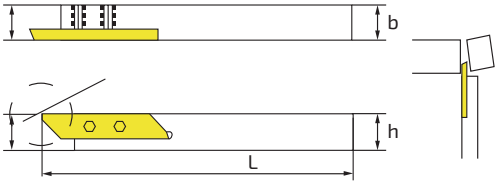




Ref.	KP125	Stock R	Stock L	Medidas *Dimensions (mm)* W	R	B	d	H	A	€
GBA32050R	✓	✓		0,50	0,05	1,30	4,50	3,18	9,52	**11,90**
GBA32075R/L	✓	✓	✓	0,75	0,10	2,10	4,50	3,18	9,52	**11,90**
GBA32080R/L	✓	✓	✓	0,80	0,10	2,10	4,50	3,18	9,52	**11,90**
GBA32090R	✓	✓		0,85	0,10	2,10	4,50	3,18	9,52	**11,90**
GBA32100R/L	✓	✓	✓	1,00	0,10	2,30	4,50	3,18	9,52	**11,90**
GBA32125R/L	✓	✓	✓	1,25	0,10	2,30	4,50	3,18	9,52	**11,90**
GBA32150R/L	✓	✓	✓	1,50	0,10	2,30	4,50	3,18	9,52	**11,90**
GBA32175R	✓	✓		1,75	0,10	2,30	4,50	3,18	9,52	**11,90**
GBA32200R/L	✓	✓	✓	2,00	0,10	2,80	4,50	3,18	9,52	**11,90**
GBA32250R/L	✓	✓	✓	2,50	0,10	2,80	4,50	3,18	9,52	**11,90**
GBA32300R	✓	✓		3,00	0,20	2,80	4,50	3,18	9,52	**11,90**
GBA43125R	✓	✓		1,25	0,20	2,00	5,40	4,76	12,70	**19,75**
GBA43150R	✓	✓		1,50	0,20	3,50	5,40	4,76	12,70	**19,75**
GBA43175R	✓	✓		1,75	0,20	3,50	5,40	4,76	12,70	**19,75**
GBA43200R	✓	✓		2,00	0,20	3,50	5,40	4,76	12,70	**19,75**
GBA43250R	✓	✓		2,50	0,30	4,00	5,40	4,76	12,70	**19,75**
GBA43300R	✓	✓		3,00	0,30	4,00	5,40	4,76	12,70	**19,75**

THCR/L





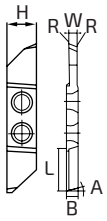
Ref.	Plaquita *Inserts*	Stock		Medidas *Dimensions (mm)*						€
		R	L	D	h	b	H	F	L	
THCR/L1010J42	THC42...	○	○	21	10	10	10	12	85	**109,50**
THCR/L1212J42	THC42...	○	○	21	12	12	12	16	100	**109,50**
THCR/L1616J42	THC42...	○	○	21	16	16	150	20	100	**127,80**
THCR/L2020K42	THC42...	○	○	21	20	20	125	25	125	**146,05**
THCR/L2525M42	THC42...	○	○	21	25	25	150	32	150	**165,95**

● Stock ○ Bajo pedido
Under delivery

THC

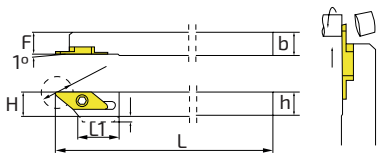
Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

P	●
M	●
K	●
N	
S	●



Ref.	KP125	Medidas *Dimensions (mm)*						€
		W	R	B	L	H	A	
THC42R100-CE	✓	1,0	0,06	3,04	5,0	7,94	0	**28,65**
THC42R100-CE15R	✓	1,0	0,06	3,04	5,0	7,94	15	**28,65**
THC42R150-CE	✓	1,5	0,06	3,04	8,5	7,94	0	**28,65**
THC42R150-CE15R	✓	1,5	0,06	3,04	8,5	7,94	15	**28,65**
THC42R200-CE	✓	2,0	0,10	3,04	11,5	7,94	0	**28,65**
THC42R200-CE15R	✓	2,0	0,10	3,04	11,5	7,94	15	**28,65**
THC42R250-CE	✓	2,5	0,10	3,04	11,5	7,94	0	**28,65**
THC42R250-CE15R	✓	2,5	0,10	3,04	11,5	7,94	15	**28,65**
THC42R300-CE	✓	3,0	0,20	3,04	11,5	7,94	0	**28,65**
THC42R300-CE15R	✓	3,0	0,20	3,04	11,5	7,94	15	**28,65**
THC42R200-CN	✓	2,0	0,10	3,04	11,5	7,94	0	**28,65**
THC42R200-CU15R	✓	2,0	0,10	3,04	11,5	7,94	15	**28,65**
THC42R250-CN	✓	2,5	0,10	3,04	11,5	7,94	0	**28,65**
THC42R250-CU15R	✓	2,5	0,10	3,04	11,5	7,94	15	**28,65**
THC42R300-CN	✓	3,0	0,20	3,04	11,5	7,94	0	**28,65**
THC42R300-CU15R	✓	3,0	0,20	3,04	11,5	7,94	15	**28,65**

KTKFR/L

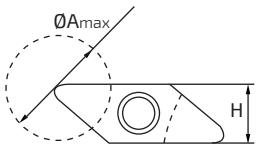


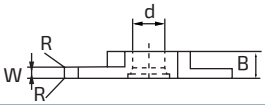
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	h	b	L	L1	f	H	
KTKFR/L1010K12	TKFT12...	12	10	10	125	15	10	10	**109,50**
KTKFR/L1212M12	TKFT12...	12	12	12	150	15	12	12	**109,50**
KTKFR/L1616M12	TKFT12...	12	16	16	150	15	16	16	**109,50**
KTKFR/L1010K16	TKFT16...	16	10	10	125	20	10	10	**109,50**
KTKFR/L1212M16	TKFT16...	16	12	12	150	20	12	12	**109,50**
KTKFR/L1616M16	TKFT16...	16	16	16	150	20	16	16	**109,50**

TKF

Interrupción baja *Light interrupted*
General
Interrumpido *Interrupted*

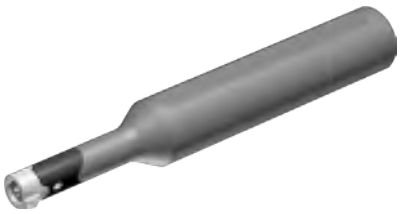
P	●
M	●
K	●
N	
S	●

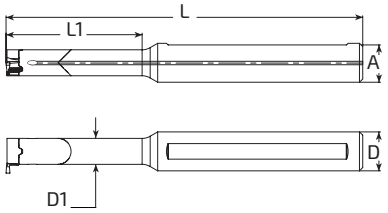




Ref.	KP125	Medidas *Dimensions (mm)*							€
		W	R	B	d	L	H	A	
TKF12R/L050-S	✓	0,5	0,03	3	5	0	8,7	5	**23,75**
TKF12R/L070-S	✓	0,7	0,03	3	5	0	8,7	8	**23,75**
TKF12R/L100-S	✓	1,0	0,03	3	5	0	8,7	12	**23,75**
TKF12R/L150-S	✓	1,5	0,03	3	5	0	8,7	12	**23,75**
TKF12R/L200-S	✓	2,0	0,03	3	5	0	8,7	12	**23,75**
TKF12R/L050-S16R	✓	0,5	0,05	3	5	16	8,7	5	**23,75**
TKF12R/L070-S16R	✓	0,7	0,05	3	5	16	8,7	8	**23,75**
TKF12R/L100-S16R	✓	1,0	0,05	3	5	16	8,7	12	**23,75**
TKF12R/L150-S16R	✓	1,5	0,05	3	5	16	8,7	12	**23,75**
TKF12R/L200-S16R	✓	2,0	0,05	3	5	16	8,7	12	**23,75**
TKF16R/L150-S	✓	0,5	0,05	4	5	0	9,5	16	**23,75**
TKF16R/L200-S	✓	0,7	0,05	4	5	0	9,5	16	**23,75**
TKF16R/L250-S	✓	1,0	0,05	4	5	0	9,5	16	**23,75**
TKF16R/L300-S	✓	3,0	0,05	4	5	0	9,5	16	**23,75**
TKF16R/L150-S16R	✓	1,5	0,05	4	5	16	9,5	16	**23,75**
TKF16R/L200-S16R	✓	2,0	0,05	4	5	16	9,5	16	**23,75**
TKF16R/L250-S16R	✓	2,5	0,05	4	5	16	9,5	16	**23,75**
TKF16R/L300-S16R	✓	3,0	0,05	4	5	16	9,5	16	**23,75**

Perforación
Mango de metal duro

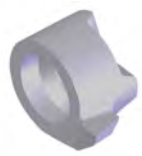


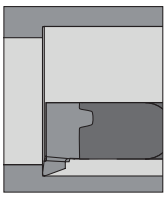


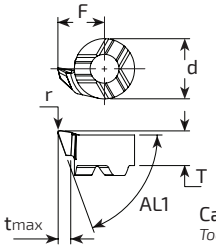
Ref.	Medidas *Dimensions (mm)*					€
	A	L	L1	D	D1	
CV08-1221	11,5	80,5	21	12	6	**154,20**
CV08-1230	11,5	90,5	30	12	6	**176,85**
CV08-1242	11,5	100,5	42	12	6	**211,60**
CV08-1250	11,5	115	50	12	6	**238,80**
CV11-1229	11,5	95	29	12	8	**163,25**
CV11-1242	11,5	110	42	12	8	**178,35**
CV11-1256	11,5	120	56	12	8	**210,10**
CV11-1264	11,5	130	64	12	8	**240,30**
CV16-1240	11,0	130	40	12	11	**255,00**
CV16-1256	11,0	130	56	12	11	**272,25**
CV16-1280	11,0	130	80	12	11	**325,65**

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	**Ref. SNV08**		**9,25**
Tornillo de inserción *Insert screw*	**Ref. SNV11**		**9,25**
Tornillo de inserción *Insert screw*	**Ref. SNV16**		**11,00**

Perforación
Boring



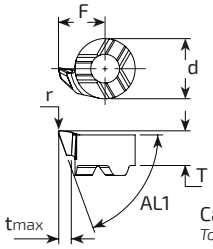




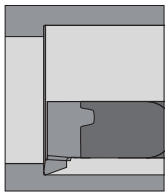
Cara del portaherramientas
Toolholder face

Ref.	Grades *Calidades*		Medidas *Dimensions (mm)*						Min. Dia. Perforación *Min. Bore Dia. (mm)*	€
	VBX	VTX	r	d	T	tmax	AL1	F		
V08BCR	✓	✓	0,2	6	3,65	1,3	69,8º	4,65	7,8	**20,70**
V11BCR	✓	✓	0,2	8	4,00	2,3	69,8º	6,70	11,0	**20,70**
V14BCR	✓	✓	0,2	9	5,60	4,0	69,8º	8,70	13,8	**21,00**
V16BCR	✓	✓	0,2	11	560	4,3	69,8º	9,70	15,5	**29,10**

Perforación con fresa de viruta
Boring with chip former

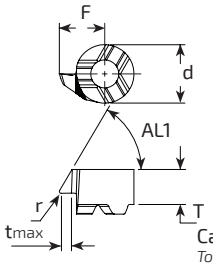


Cara del portaherramientas
Toolholder face

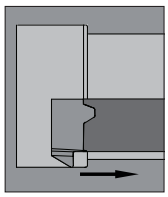


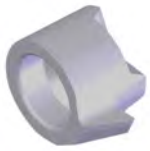
Ref.	Grades *Calidades*		Medidas *Dimensions (mm)*						Min. Dia. Perforación *Min. Bore Dia. (mm)*	€
	VBX	VTX	r	d	T	tmax	AL1	F		
V08BCFR	✓	✓	0,2	6	3,65	1,3	69,8º	4,65	7,8	**22,80**
V11BCFR	✓	✓	0,2	8	4,00	2,2	69,8º	6,70	11,0	**23,55**

Perforación posterior
Back boring



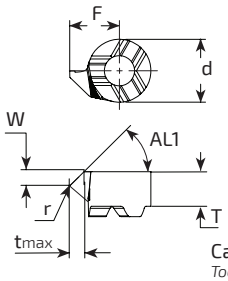
Cara del portaherramientas
Toolholder face



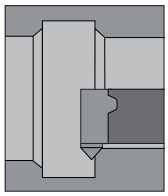


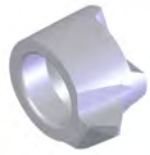
Ref.	Grades *Calidades*		Medidas *Dimensions (mm)*						Min. Dia. Perforación *Min. Bore Dia. (mm)*	€
	VBX	VTX	r	d	T	tmax	AL1	F		
V08BBR	✓	✓	0,2	6	3,8	1,2	59,5º	4,65	7,8	**25,90**
V11BBR	✓	✓	0,2	8	4,0	2,2	59,5º	6,70	11,0	**25,90**
V14BBR	✓	✓	0,2	9	5,6	3,5	59,5º	8,70	13,8	**29,90**

Chaflanar
Chamfering



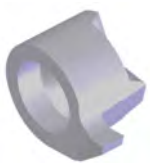
Cara del portaherramientas
Toolholder face

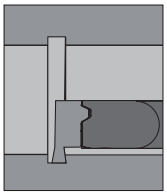


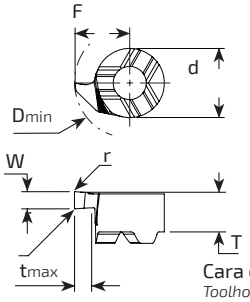


Ref.	Grades *Calidades*		Medidas *Dimensions (mm)*							Min. Dia. Perforación *Min. Bore Dia. (mm)*	€
	VBX	VTX	r	d	W	T	tmax	AL1	F		
V08CH45R	✓	✓	0,2	6	1,3	3,8	1,0	45º	4,65	8,0	**25,35**
V14CH45R	✓	✓	0,2	9	2,7	5,6	2,6	45º	9,00	14,0	**29,90**

Ranurado
Grooving







Cara del portaherramientas
Toolholder face

Ref.	Grades *Calidades*		Medidas *Dimensions (mm)*						Min. Dia. Perforación *Min. Bore Dia. (mm)*	€
	VBX	VTX	d	W+0,03	tmax	T	F	r		
V08GSW078T100R	✓	✓	6	0,78	1,0	3,6	4,8	0,05	8	**19,85**
V08GSW086T100R	✓	✓	6	0,86	1,0	3,6	4,8	0,05	8	**19,85**
V08GSW100T100R	✓	✓	6	1,00	1,0	3,6	4,8	0,05	8	**19,85**
V08GSW117T100R	✓	✓	6	1,17	1,0	3,6	4,8	0,05	8	**19,85**
V08GSW150T100R	✓	✓	6	1,5	1,0	3,6	4,8	0,05	8	**19,85**
V08GSW157T100R	✓	✓	6	1,57	1,0	3,6	4,8	0,05	8	**19,85**
V08GSW198T100R	✓	✓	6	1,98	1,0	3,6	4,8	0,05	8	**19,85**
V08GSW200T100R	✓	✓	6	2,00	1,0	3,6	4,8	0,05	8	**19,85**
V11GSW100T230R	✓	✓	8	1,00	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW117T230R	✓	✓	8	1,17	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW120T230R	✓	✓	8	1,20	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW142T230R	✓	✓	8	1,42	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW150T230R	✓	✓	8	1,50	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW157T230R	✓	✓	8	1,57	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW198T230R	✓	✓	8	1,98	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW200T230R	✓	✓	8	2,00	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW238T230R	✓	✓	8	2,38	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW250T230R	✓	✓	8	2,50	2,3	4,0	6,7	0,05	11	**19,85**
V11GSW318T230R	✓	✓	8	3,18	2,3	4,0	6,7	0,05	11	**19,85**
V14GSW117T400R	✓	✓	9	1,17	4,0	5,6	9,0	0,05	14	**22,90**
V14GSW150T400R	✓	✓	9	1,50	4,0	5,6	9,0	0,05	14	**22,90**
V14GSW157T400R	✓	✓	9	1,57	4,0	5,6	9,0	0,05	14	**22,90**
V14GSW198T400R	✓	✓	9	1,98	4,0	5,6	9,0	0,05	14	**22,90**
V14GSW200T400R	✓	✓	9	2,00	4,0	5,6	9,0	0,05	14	**22,90**
V14GSW238T400R	✓	✓	9	2,38	4,0	5,6	9,0	0,05	14	**22,90**
V14GSW250T400R	✓	✓	9	2,50	4,0	5,6	9,0	0,05	14	**22,90**
V14GSW300T400R	✓	✓	9	3,00	4,0	5,6	9,0	0,05	14	**22,90**
V14GSW318T400R	✓	✓	9	3,18	4,0	5,6	9,0	0,05	14	**22,90**
V16GSW117T430R	✓	✓	11	1,17	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW142T430R	✓	✓	11	1,42	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW157T430R	✓	✓	11	1,57	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW198T430R	✓	✓	11	4,00	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW200T430R	✓	✓	11	1,98	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW238T430R	✓	✓	11	2,00	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW250T430R	✓	✓	11	2,38	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW300T430R	✓	✓	11	3,00	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW318T430R	✓	✓	11	3,18	4,3	5,6	10,2	0,05	16	**23,95**
V16GSW350T430R	✓	✓	11	3,50	4,3	5,6	10,2	0,05	16	**23,95**

ROSCADO INTERIOR Y EXTERIOR

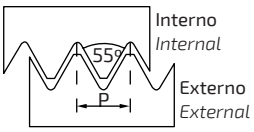
Internal and external threading

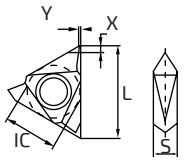
Características
Threading insert features

-Nuevo tipo de rompevirutas, buen control de virutas; tratamiento especial de bordes con uniformidad.
-La calidad KP125, es adecuada para acero (P), acero inoxidable (M), hierro fundido (K) y otros materiales.
-Rango de paso cubierto: 1.0-3.0mm.
- New type of pressing groove, chip processing is good; special edge treatment, edge uniformity.
-With KP125 grade, suitable for steel (P), stainless steel (M), cast iron (K) and other materials.
-Covered pitch range 1.0-3.0mm.

Plaquitas de perfil parcial en V de 55º
Partial profile 55º V-style inserts

P	●
M	●
K	●
N	
S	
H	●

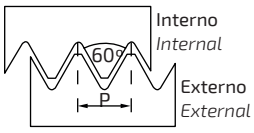


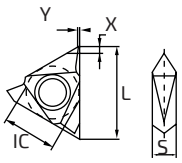


Ref. ER	KP125	Inclinación *Pitch* mm	Inclinación *Pitch* TPI	Medidas *Dimensions* IC	S	L	X	Y	€
MTT43R5501	✓	1,0-1,75	24-14	1/2"	4,76	22	1,70	0,29	**16,80**
MTT43R5502	✓	2,0-2,5	13-10	1/2"	4,76	22	1,70	0,29	**16,80**
MTT43R5503	✓	3,0-3,5	9-7	1/2"	4,76	22	1,70	0,29	**16,80**
MTT43R5504	✓	4,0-4,5	6-5	1/2"	4,76	22	1,70	0,29	**16,80**

Plaquitas de perfil parcial en V de 60º
Partial profile 60º V-style inserts

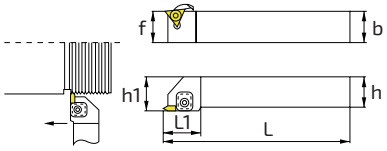
P	●
M	●
K	●
N	
S	
H	●





Ref. ER	KP125	Inclinación Pitch mm	Inclinación Pitch TPI	Medidas Dimensions IC	S	L	X	Y	€
MTT43R6001	✓	1,0-1,75	24-14	1/2"	4,76	22	1,70	0,29	**16,80**
MTT43R6002	✓	2,0-2,5	13-10	1/2"	4,76	22	1,70	0,29	**16,80**
MTT43R6003	✓	3,0-3,5	9-7	1/2"	4,76	22	1,70	0,29	**16,80**
MTT43R6004	✓	4,0-4,5	6-5	1/2"	4,76	22	1,70	0,29	**16,80**

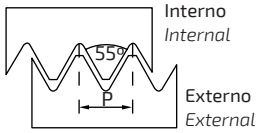
MTWHR/L

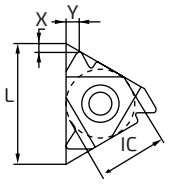


Ref.	Plaquita Inserts	Medidas Dimensions (mm) h	b	L	L1	h1	f	€
MTWHR/L 1616H16	TT43	16	16	100	22	16	20	**120,30**
MTWHR/L 2020K16	TT43	20	20	125	25	20	25	**120,30**
MTWHR/L 2525M16	TT43	25	25	150	30	25	32	**130,70**
MTWHR/L 3232P16	TT43	32	32	170	35	32	40	**161,80**

Plaquitas de perfil parcial en V de 55º
Partial profile 55º V-style inserts

P	●
M	●
K	●
N	
S	
H	●

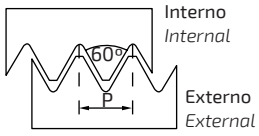


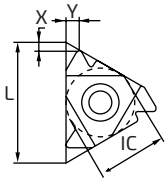


Ref. ER	Ref. IR	KP125	Inclinación Pitch mm	Inclinación Pitch TPI	Medidas Dimensions IC	S	L	X	Y	€
16ER A55-B	**16IR A55-B**	✓	0,5-1,5	48-16	9,525	3,97	16	0,8	0,9	**6,95**
16ER G55-B	**16IR G55-B**	✓	1,75-3,0	14-8	9,525	3,97	16	1,2	1,7	**6,95**
22ER N55	**22IR N55**	✓	3,5-5,0	7-5	12,700	5,56	22	1,7	2,5	**15,05**

Plaquitas de perfil parcial en V de 60º
Partial profile 60º V-style inserts

P	●
M	●
K	●
N	
S	
H	●

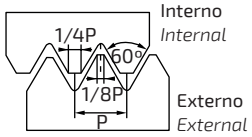


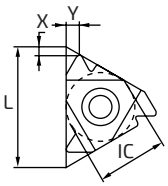


Ref. ER	Ref. IR	KP125	Inclinación Pitch mm	Inclinación Pitch TPI	Medidas Dimensions IC	S	L	X	Y	€
16ER A60-B	**16IR A60-B**	✓	0,5-1,5	48-16	9,525	3,97	16	0,8	0,9	**6,95**
16ER G60-B	**16IR G60-B**	✓	1,75-3,0	14-8	9,525	3,97	16	1,2	1,7	**6,95**
22ER N60	**22IR N60**	✓	3,5-5,0	7-5	12,700	5,56	22	1,7	2,5	**15,05**

Métrica ISO
ISO Metric

P	●
M	●
K	●
N	
S	
H	●

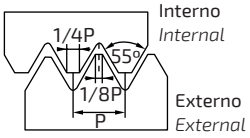


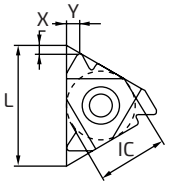


Ref. ER	Ref. IR	KP125	Inclinación Pitch mm	Inclinación Pitch TPI	Medidas Dimensions IC	S	L	X	Y	€
	11IR0.50 ISO-B	✓	0,50	0,50	6,350	3,18	11	0,6	0,6	**6,95**
	11IR0.75 ISO-B	✓	0,75	0,75	6,350	3,18	11	0,6	0,6	**6,95**
	11IR1.00 ISO-B	✓	1,00	1,00	6,350	3,18	11	0,7	0,7	**6,95**
	11IR1.25 ISO-B	✓	1,25	1,25	6,350	3,18	11	0,8	0,9	**6,95**
	11IR1.50 ISO-B	✓	1,50	1,50	6,350	3,18	11	0,8	1,0	**6,95**
	11IR1.75 ISO-B	✓	1,75	1,75	6,350	3,18	11	0,8	1,1	**6,95**
	11IR2.00 ISO-B	✓	2,00	2,00	6,350	3,18	11	-	-	**6,95**
16ER1.00 ISO-B	**16IR1.00 ISO-B**	✓	1,00	1,00	9,525	3,97	16	0,7	0,7	**6,95**
16ER1.25 ISO-B	**16IR1.25 ISO-B**	✓	1,25	1,25	9,525	3,97	16	0,8	0,9	**6,95**
16ER1.50 ISO-B	**16IR1.50 ISO-B**	✓	1,50	1,50	9,525	3,97	16	0,8	1,0	**6,95**
16ER1.75 ISO-B	**16IR1.75 ISO-B**	✓	1,75	1,75	9,525	3,97	16	0,9	1,2	**6,95**
16ER2.00 ISO-B	**16IR2.00 ISO-B**	✓	2,00	2,00	9,525	3,97	16	1,0	1,3	**6,95**
16ER2.50 ISO-B	**16IR2.50 ISO-B**	✓	2,50	2,50	9,525	3,97	16	1,1	1,5	**6,95**
16ER3.00 ISO-B	**16IR3.00 ISO-B**	✓	3,00	3,00	9,525	3,97	16	1,2	1,6	**6,95**

Plaquitas Whitworth de 55º
55º Whitworth inserts

P	●
M	●
K	●
N	
S	
H	●

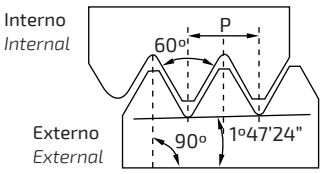


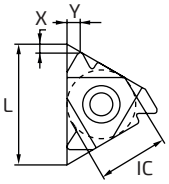


Ref. ER	Ref. IR	KP125	Inclinación Pitch mm	Inclinación Pitch TPI	Medidas Dimensions IC	S	L	X	Y	€
16ER 19W-B	**16IR 19W-B**	✓	19	19	9,525	3,97	16	0,8	1,0	**6,95**
16ER 14W-B	**16IR 14W-B**	✓	14	14	9,525	3,97	16	0,9	1,2	**6,95**
16ER 11W-B	**16IR 11W-B**	✓	11	11	9,525	3,97	16	1,1	1,5	**6,95**

Plaquitas NPT de 60º
60º NPT

P	●
M	●
K	●
N	
S	
H	●

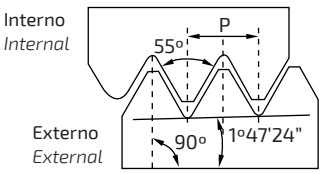


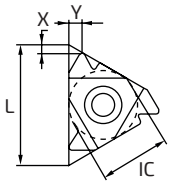


Ref. ER	Ref. IR	KP125	Inclinación Pitch mm	Inclinación Pitch TPI	Medidas Dimensions IC	S	L	X	Y	€
16ER14NPT-B	**16IR14NPT-B**	✓	14	14	9,525	3,97	16	0,9	1,2	**6,95**
16ER11.5NPT-B	**16IR11.5NPT-B**	✓	11,5	11,5	9,525	3,97	16	1,1	1,5	**6,95**

Plaquitas BSPT de 55º
BSPT 55º inserts

P	●
M	●
K	●
N	
S	
H	●

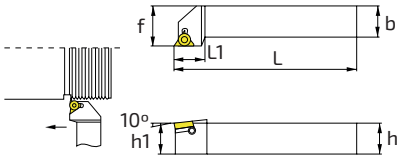




Ref. ER	Ref. IR	KP125	Inclinación Pitch mm	Inclinación Pitch TPI	Medidas Dimensions IC	S	L	X	Y	€
16ER28 BSPT-B	**16IR28 BSPT-B**	✓	28	28	9,525	3,97	16	0,6	0,6	**6,95**
16ER19 BSPT-B	**116IR19 BSPT-B**	✓	19	19	9,525	3,97	16	0,8	0,9	**6,95**
16ER14 BSPT-B	**16IR14 BSPT-B**	✓	14	14	9,525	3,97	16	1,0	1,2	**6,95**
16ER11 BSPT-B	**16IR11 BSPT-B**	✓	11	11	9,525	3,97	16	1,0	1,5	**6,95**

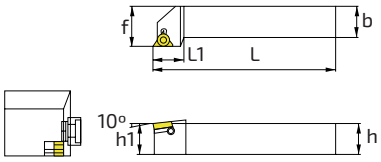
Portaherramientas para roscar
Threading tools

KSER/L



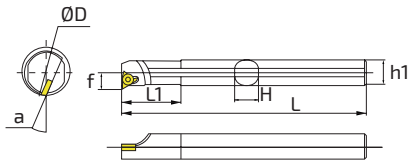
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
KSER/L 1212K16	16ER/L	12	12	100	20	12	16	**49,80**
KSER/L 1616H16	16ER/L	16	16	100	22	16	20	**49,80**
KSER/L 2020K16	16ER/L	20	20	125	25	20	25	**49,80**
KSER/L 2525M16	16ER/L	25	25	150	30	25	32	**60,20**
KSER/L 3232P16	16ER/L	32	32	170	35	32	40	**101,65**

KCER/L



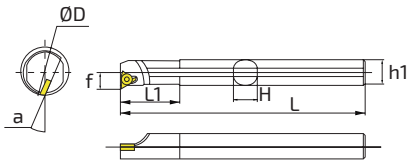
Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*						€
		h	b	L	L1	h1	f	
KCER/L 2525M22	22ER/L	25	25	150	30	25	32	**91,30**
KCER/L 3232P22	22ER/L	32	32	170	35	32	40	**130,70**

KSNR/L



Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	H	L	L1	f	a	
KSNR/L 1016M11	11IR/L	13	16	15	150	22	7,7	15	**60,20**
KSNR/L 1316M11	11IR/L	16	16	15	150	32	8,7	15	**60,20**
KSNR/L 1020M11	11IR/L	13	20	18	150	32	7,7	21	**60,20**
KSNR/L 1316M16	16IR/L	16	16	15	150	32	8,7	21	**60,20**
KSNR/L 1620M16	16IR/L	20	32	18	150	40	11,7	15	**66,40**

KSNR/L



Ref.	Plaquita *Inserts*	Medidas *Dimensions (mm)*							€
		D	d	H	L	L1	f	a	
KSNR/L 0016M16	16IR/L	19	16	15	150	40	11,7	15	**49,80**
KSNR/L 0016Q16	16IR/L	19	16	15	180	40	11,7	15	**49,80**
KSNR/L 0020Q16	16IR/L	24	20	18	180	40	13,7	21	**56,00**
KSNR/L 0025R16	16IR/L	29	25	23	200	45	16,2	21	**66,40**
KSNR/L 0032S16	16IR/L	36	32	29	250	50	19,7	15	**116,20**

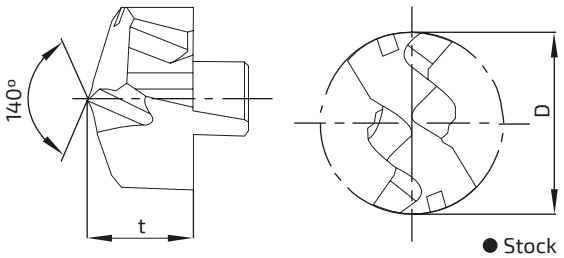
TALADRADO

Drilling

Cabeza de broca indexable
Indexibel drill head

PM recomendado para menos de 5D
PM recommended for less than 5D

PR recomendado para más de 5D
PR recommended for more than 5D



● Stock
○ Bajo pedido

Ref.	Dimensiones *Dimensions (mm)*		€	KP125	KP115	Mango *Holder*
	D	t				
PBR-080-PM/PR	8,0	5,4	47,45	●	●	
PBR-081-PM/PR	8,1	5,4	47,45	○	○	
PBR-082-PM/PR	8,2	5,4	47,45	○	○	
PBR-083-PM/PR	8,3	5,4	47,45	○	○	
PBR-084-PM/PR	8,4	5,4	47,45	○	○	
PBR-085-PM/PR	8,5	5,4	47,45	●	●	KBR-080-12
PBR-086-PM/PR	8,6	5,4	47,45	○	○	
PBR-087-PM/PR	8,7	5,4	47,45	○	○	
PBR-088-PM/PR	8,8	5,4	47,45	○	○	
PBR-089-PM/PR	8,9	5,4	47,45	○	○	
PBR-090-PM/PR	9,0	5,8	53,35	●	●	
PBR-091-PM/PR	9,1	5,8	53,35	○	○	
PBR-092-PM/PR	9,2	5,8	53,35	○	○	
PBR-093-PM/PR	9,3	5,8	53,35	○	○	
PBR-094-PM/PR	9,4	5,8	53,35	○	○	
PBR-095-PM/PR	9,5	5,8	53,35	●	●	KBR-090-12
PBR-096-PM/PR	9,6	5,8	53,35	○	○	
PBR-097-PM/PR	9,7	5,8	53,35	○	○	
PBR-098-PM/PR	9,8	5,8	53,35	○	○	
PBR-099-PM/PR	9,9	5,8	53,35	○	○	
PBR-100-PM/PR	10,0	6,2	61,25	●	●	
PBR-101-PM/PR	10,1	6,2	61,25	○	○	
PBR-102-PM/PR	10,2	6,2	61,25	○	○	
PBR-103-PM/PR	10,3	6,2	61,25	○	○	
PBR-104-PM/PR	10,4	6,2	61,25	○	○	
PBR-105-PM/PR	10,5	6,2	61,25	●	●	KBR-100-16
PBR-106-PM/PR	10,6	6,2	61,25	○	○	
PBR-107-PM/PR	10,7	6,2	61,25	○	○	
PBR-108-PM/PR	10,8	6,2	61,25	○	○	
PBR-109-PM/PR	10,9	6,2	61,25	○	○	
PBR-110-PM/PR	11,0	6,6	69,15	●	●	
PBR-111-PM/PR	11,1	6,6	69,15	○	○	
PBR-112-PM/PR	11,2	6,6	69,15	○	○	
PBR-113-PM/PR	11,3	6,6	69,15	○	○	
PBR-114-PM/PR	11,4	6,6	69,15	○	○	
PBR-115-PM/PR	11,5	6,6	69,15	●	●	KBR-110-16
PBR-116-PM/PR	11,6	6,6	69,15	○	○	
PBR-117-PM/PR	11,7	6,6	69,15	○	○	
PBR-118-PM/PR	11,8	6,6	69,15	○	○	
PBR-119-PM/PR	11,9	6,6	69,15	○	○	
PBR-120-PM/PR	12,0	7,0	75,10	●	●	
PBR-121-PM/PR	12,1	7,0	75,10	○	○	
PBR-122-PM/PR	12,2	7,0	75,10	○	○	
PBR-123-PM/PR	12,3	7,0	75,10	○	○	
PBR-124-PM/PR	12,4	7,0	75,10	○	○	
PBR-125-PM/PR	12,5	7,0	75,10	●	●	KBR-120-16
PBR-126-PM/PR	12,6	7,0	75,10	○	○	
PBR-127-PM/PR	12,7	7,0	75,10	○	○	
PBR-128-PM/PR	12,8	7,0	75,10	○	○	
PBR-129-PM/PR	12,9	7,0	75,10	○	○	

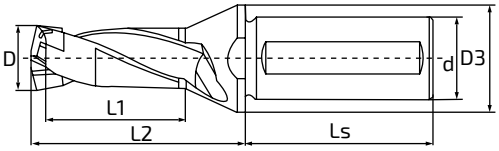
Ref.	Dimensiones *Dimensions (mm)*		€	KP125	KP115	Mango *Holder*
	D	t				
PBR-130-PM/PR	13,0	7,6	83,00	●	●	
PBR-131-PM/PR	13,1	7,6	83,00	○	○	
PBR-132-PM/PR	13,2	7,6	83,00	○	○	
PBR-133-PM/PR	13,3	7,6	83,00	○	○	
PBR-134-PM/PR	13,4	7,6	83,00	○	○	
PBR-135-PM/PR	13,5	7,6	83,00	●	●	KBR-130-16
PBR-136-PM/PR	13,6	7,6	83,00	○	○	
PBR-137-PM/PR	13,7	7,6	83,00	○	○	
PBR-138-PM/PR	13,8	7,6	83,00	○	○	
PBR-139-PM/PR	13,9	7,6	83,00	○	○	
PBR-140-PM/PR	14,0	8,1	90,90	●	●	
PBR-141-PM/PR	14,1	8,1	90,90	○	○	
PBR-142-PM/PR	14,2	8,1	90,90	○	○	
PBR-143-PM/PR	14,3	8,1	90,90	○	○	
PBR-144-PM/PR	14,4	8,1	90,90	○	○	
PBR-145-PM/PR	14,5	8,1	90,90	●	●	KBR-140-16
PBR-146-PM/PR	14,6	8,1	90,90	○	○	
PBR-147-PM/PR	14,7	8,1	90,90	○	○	
PBR-148-PM/PR	14,8	8,1	90,90	○	○	
PBR-149-PM/PR	14,9	8,1	90,90	○	○	
PBR-150-PM/PR	15,0	8,7	98,80	●	●	
PBR-151-PM/PR	15,1	8,7	98,80	○	○	
PBR-152-PM/PR	15,2	8,7	98,80	○	○	
PBR-153-PM/PR	15,3	8,7	98,80	○	○	
PBR-154-PM/PR	15,4	8,7	98,80	○	○	
PBR-155-PM/PR	15,5	8,7	98,80	●	●	KBR-150-20
PBR-156-PM/PR	15,6	8,7	98,80	○	○	
PBR-157-PM/PR	15,7	8,7	98,80	○	○	
PBR-158-PM/PR	15,8	8,7	98,80	○	○	
PBR-159-PM/PR	15,9	8,7	98,80	○	○	
PBR-160-PM/PR	16,0	9,3	106,70	●	●	
PBR-161-PM/PR	16,1	9,3	106,70	○	○	
PBR-162-PM/PR	16,2	9,3	106,70	○	○	
PBR-163-PM/PR	16,3	9,3	106,70	○	○	
PBR-164-PM/PR	16,4	9,3	106,70	○	○	
PBR-165-PM/PR	16,5	9,3	106,70	●	●	KBR-160-20
PBR-166-PM/PR	16,6	9,3	106,70	○	○	
PBR-167-PM/PR	16,7	9,3	106,70	○	○	
PBR-168-PM/PR	16,8	9,3	106,70	○	○	
PBR-169-PM/PR	16,9	9,3	106,70	○	○	
PBR-170-PM/PR	17,0	9,9	114,60	●	●	
PBR-171-PM/PR	17,1	9,9	114,60	○	○	
PBR-172-PM/PR	17,2	9,9	114,60	○	○	
PBR-173-PM/PR	17,3	9,9	114,60	○	○	
PBR-174-PM/PR	17,4	9,9	114,60	○	○	
PBR-175-PM/PR	17,5	9,9	114,60	●	●	KBR-170-20
PBR-176-PM/PR	17,6	9,9	114,60	○	○	
PBR-177-PM/PR	17,7	9,9	114,60	○	○	
PBR-178-PM/PR	17,8	9,9	114,60	○	○	
PBR-179-PM/PR	17,9	9,9	114,60	○	○	

Ref.	Dimensiones *Dimensions (mm)*		€	KP125	KP115	Mango *Holder*
	D	t				
PBR-180-PM/PR	18,0	10,5	**122,50**	●	●	
PBR-181-PM/PR	18,1	10,5	**122,50**	○	○	
PBR-182-PM/PR	18,2	10,5	**122,50**	○	○	
PBR-183-PM/PR	18,3	10,5	**122,50**	○	○	
PBR-184-PM/PR	18,4	10,5	**122,50**	○	○	
PBR-185-PM/PR	18,5	10,5	**122,50**	●	●	KBR-180-25
PBR-186-PM/PR	18,6	10,5	**122,50**	○	○	
PBR-187-PM/PR	18,7	10,5	**122,50**	○	○	
PBR-188-PM/PR	18,8	10,5	**122,50**	○	○	
PBR-189-PM/PR	18,9	10,5	**122,50**	○	○	
PBR-190-PM/PR	19,0	11,0	**130,40**	●	●	
PBR-191-PM/PR	19,1	11,0	**130,40**	○	○	
PBR-192-PM/PR	19,2	11,0	**130,40**	○	○	
PBR-193-PM/PR	19,3	11,0	**130,40**	○	○	
PBR-194-PM/PR	19,4	11,0	**130,40**	○	○	
PBR-195-PM/PR	19,5	11,0	**130,40**	●	●	KBR-190-25
PBR-196-PM/PR	19,6	11,0	**130,40**	○	○	
PBR-197-PM/PR	19,7	11,0	**130,40**	○	○	
PBR-198-PM/PR	19,8	11,0	**130,40**	○	○	
PBR-199-PM/PR	19,9	11,0	**130,40**	○	○	
PBR-200-PM/PR	20,0	11,6	**138,30**	●	●	
PBR-201-PM/PR	20,1	11,6	**138,30**	○	○	
PBR-202-PM/PR	20,2	11,6	**138,30**	○	○	
PBR-203-PM/PR	20,3	11,6	**138,30**	○	○	
PBR-204-PM/PR	20,4	11,6	**138,30**	○	○	
PBR-205-PM/PR	20,5	11,6	**138,30**	●	●	KBR-200-25
PBR-206-PM/PR	20,6	11,6	**138,30**	○	○	
PBR-207-PM/PR	20,7	11,6	**138,30**	○	○	
PBR-208-PM/PR	20,8	11,6	**138,30**	○	○	
PBR-209-PM/PR	20,9	11,6	**138,30**	○	○	
PBR-210-PM/PR	21,0	12,1	**146,20**	●	●	
PBR-211-PM/PR	21,1	12,1	**146,20**	○	○	
PBR-212-PM/PR	21,2	12,1	**146,20**	○	○	
PBR-213-PM/PR	21,3	12,1	**146,20**	○	○	
PBR-214-PM/PR	21,4	12,1	**146,20**	○	○	
PBR-215-PM/PR	21,5	12,1	**146,20**	●	●	KBR-210-25
PBR-216-PM/PR	21,6	12,1	**146,20**	○	○	
PBR-217-PM/PR	21,7	12,1	**146,20**	○	○	
PBR-218-PM/PR	21,8	12,1	**146,20**	○	○	
PBR-219-PM/PR	21,9	12,1	**146,20**	○	○	
PBR-220-PM/PR	22,0	12,7	**154,10**	●	●	
PBR-221-PM/PR	22,1	12,7	**154,10**	○	○	
PBR-222-PM/PR	22,2	12,7	**154,10**	○	○	
PBR-223-PM/PR	22,3	12,7	**154,10**	○	○	
PBR-224-PM/PR	22,4	12,7	**154,10**	○	○	
PBR-225-PM/PR	22,5	12,7	**154,10**	●	●	KBR-220-25
PBR-226-PM/PR	22,6	12,7	**154,10**	○	○	
PBR-227-PM/PR	22,7	12,7	**154,10**	○	○	
PBR-228-PM/PR	22,8	12,7	**154,10**	○	○	
PBR-229-PM/PR	22,9	12,7	**154,10**	○	○	

Ref.	Dimensiones *Dimensions (mm)*		€	KP125	KP115	Mango *Holder*
	D	t				
PBR-230-PM/PR	23,0	13,3	**162,00**	●	●	
PBR-231-PM/PR	23,1	13,3	**162,00**	○	○	
PBR-232-PM/PR	23,2	13,3	**162,00**	○	○	
PBR-233-PM/PR	23,3	13,3	**162,00**	○	○	
PBR-234-PM/PR	23,4	13,3	**162,00**	○	○	
PBR-235-PM/PR	23,5	13,3	**162,00**	●	●	KBR-230-32
PBR-236-PM/PR	23,6	13,3	**162,00**	○	○	
PBR-237-PM/PR	23,7	13,3	**162,00**	○	○	
PBR-238-PM/PR	23,8	13,3	**162,00**	○	○	
PBR-239-PM/PR	23,9	13,3	**162,00**	○	○	
PBR-240-PM/PR	24,0	13,9	**169,90**	●	●	
PBR-241-PM/PR	24,1	13,9	**169,90**	○	○	
PBR-242-PM/PR	24,2	13,9	**169,90**	○	○	
PBR-243-PM/PR	24,3	13,9	**169,90**	○	○	
PBR-244-PM/PR	24,4	13,9	**169,90**	○	○	
PBR-245-PM/PR	24,5	13,9	**169,90**	●	●	KBR-240-32
PBR-246-PM/PR	24,6	13,9	**169,90**	○	○	
PBR-247-PM/PR	24,7	13,9	**169,90**	○	○	
PBR-248-PM/PR	24,8	13,9	**169,90**	○	○	
PBR-249-PM/PR	24,9	13,9	**169,90**	○	○	
PBR-250-PM/PR	25,0	14,5	**177,80**	●	●	
PBR-251-PM/PR	25,1	14,5	**177,80**	○	○	
PBR-252-PM/PR	25,2	14,5	**177,80**	○	○	
PBR-253-PM/PR	25,3	14,5	**177,80**	○	○	
PBR-254-PM/PR	25,4	14,5	**177,80**	○	○	
PBR-255-PM/PR	25,5	14,5	**177,80**	●	●	KBR-250-32
PBR-256-PM/PR	25,6	14,5	**177,80**	○	○	
PBR-257-PM/PR	25,7	14,5	**177,80**	○	○	
PBR-258-PM/PR	25,8	14,5	**177,80**	○	○	
PBR-259-PM/PR	25,9	14,5	**177,80**	○	○	
PBR-260-PM/PR	26,0	14,5	**177,80**	●	●	

● Stock
○ Bajo pedido

Brocas (refrigeración interior)
Drills (coolant through center)



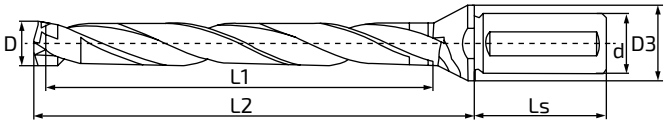
1,5xD

Ref.	Cabezal de corte aplicable *Applicable cutting head Dia. (mm)*	Dimensiones *Dimensions (mm)*					€
		d	D3	L1	Ls	D	
KBR-1,5D-080/089-12	8,0~8,9	12	16	16	45	7,8	118,55
KBR-1,5D-090/099-12	9,0~9,9	12	16	18	45	8,8	123,50
KBR-1,5D-100/109-16	10,0~10,9	16	20	20	48	9,8	128,40
KBR-1,5D-110/119-16	11,0~11,9	16	20	22	48	10,8	136,30
KBR-1,5D-120/129-16	12,0~12,9	16	20	24	48	11,8	141,25
KBR-1,5D-130/139-16	13,0~13,9	16	20	25	48	12,8	146,20
KBR-1,5D-140/149-16	14,0~14,9	16	20	27	48	13,8	151,15
KBR-1,5D-150/159-20	15,0~15,9	20	25	29	50	14,8	156,05
KBR-1,5D-160/169-20	16,0~16,9	20	25	30	50	15,8	161,00
KBR-1,5D-170/179-20	17,0~17,9	20	25	32	50	16,8	165,95
KBR-1,5D-180/189-25	18,0~18,9	25	32	34	56	17,8	170,85
KBR-1,5D-190/199-25	19,0~19,9	25	32	36	56	18,8	175,80
KBR-1,5D-200/209-25	20,0~20,9	25	32	38	56	19,8	185,70
KBR-1,5D-210/219-25	21,0~21,9	25	32	40	56	20,8	195,55
KBR-1,5D-220/229-25	22,0~22,9	25	32	42	56	21,8	210,35
KBR-1,5D-230/239-32	23,0~23,9	32	42	43	60	22,8	225,20
KBR-1,5D-240/249-32	24,0~24,9	32	42	45	60	23,8	240,00
KBR-1,5D-250/259-32	25,0~25,9	32	42	47	60	24,8	254,80

3xD

Ref.	Cabezal de corte aplicable *Applicable cutting head Dia. (mm)*	Dimensiones *Dimensions (mm)*					€
		d	D3	L1	Ls	D	
KBR-3D-080/089-12	8,0~8,9	12	16	32	45	7,8	142,25
KBR-3D-090/099-12	9,0~9,9	12	16	35	45	8,8	148,15
KBR-3D-100/109-16	10,0~10,9	16	20	39	48	9,8	154,10
KBR-3D-110/119-16	11,0~11,9	16	20	42	48	10,8	163,00
KBR-3D-120/129-16	12,0~12,9	16	20	45	48	11,8	168,90
KBR-3D-130/139-16	13,0~13,9	16	20	49	48	12,8	175,80
KBR-3D-140/149-16	14,0~14,9	16	20	53	48	13,8	180,75
KBR-3D-150/159-20	15,0~15,9	20	25	56	50	14,8	187,65
KBR-3D-160/169-20	16,0~16,9	20	25	60	50	15,8	192,60
KBR-3D-170/179-20	17,0~17,9	20	25	63	50	16,8	199,55
KBR-3D-180/189-25	18,0~18,9	25	32	66	56	17,8	204,45
KBR-3D-190/199-25	19,0~19,9	25	32	70	56	18,8	211,35
KBR-3D-200/209-25	20,0~20,9	25	32	73	56	19,8	223,20
KBR-3D-210/219-25	21,0~21,9	25	32	77	56	20,8	234,10
KBR-3D-220/229-25	22,0~22,9	25	32	80	56	21,8	252,85
KBR-3D-230/239-32	23,0~23,9	32	42	84	60	22,8	269,65
KBR-3D-240/249-32	24,0~24,9	32	42	88	60	23,8	288,4
KBR-3D-250/259-32	25,0~25,9	32	42	91	60	24,8	306,15

Brocas (refrigeración interior)
Drills (coolant through center)



5xD

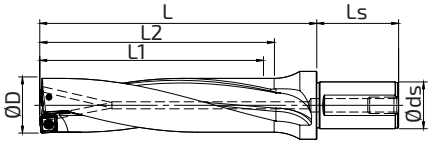
Ref.	Cabezal de corte aplicable *Applicable cutting head Dia. (mm)*	Dimensiones *Dimensions (mm)*					€
		d	D3	L1	Ls	D	
KBR-5D-080/089-12	8,0~8,9	12	16	50	45	7,8	**169,90**
KBR-5D-090/099-12	9,0~9,9	12	16	55	45	8,8	**177,80**
KBR-5D-100/109-16	10,0~10,9	16	20	60	48	9,8	**184,70**
KBR-5D-110/119-16	11,0~11,9	16	20	66	48	10,8	**195,55**
KBR-5D-120/129-16	12,0~12,9	16	20	71	48	11,8	**202,50**
KBR-5D-130/139-16	13,0~13,9	16	20	77	48	12,8	**210,35**
KBR-5D-140/149-16	14,0~14,9	16	20	82	48	13,8	**217,30**
KBR-5D-150/159-20	15,0~15,9	20	25	88	50	14,8	**224,20**
KBR-5D-160/169-20	16,0~16,9	20	25	93	50	15,8	**231,15**
KBR-5D-170/179-20	17,0~17,9	20	25	99	50	16,8	**238,05**
KBR-5D-180/189-25	18,0~18,9	25	32	104	56	17,8	**245,95**
KBR-5D-190/199-25	19,0~19,9	25	32	110	56	18,8	**252,85**
KBR-5D-200/209-25	20,0~20,9	25	32	115	56	19,8	**266,65**
KBR-5D-210/219-25	21,0~21,9	25	32	121	56	20,8	**281,50**
KBR-5D-220/229-25	22,0~22,9	25	32	126	56	21,8	**302,25**
KBR-5D-230/239-32	23,0~23,9	32	42	132	60	22,8	**323,95**
KBR-5D-240/249-32	24,0~24,9	32	42	137	60	23,8	**345,70**
KBR-5D-250/259-32	25,0~25,9	32	42	143	60	24,8	**366,40**

8xD

Ref.	Cabezal de corte aplicable *Applicable cutting head Dia. (mm)*	Dimensiones *Dimensions (mm)*					€
		d	D3	L1	Ls	D	
KBR-8D-080/089-12	8,0~8,9	12	16	76	45	7,8	**221,25**
KBR-8D-090/099-12	9,0~9,9	12	16	85	45	8,8	**231,15**
KBR-8D-100/109-16	10,0~10,9	16	20	93	48	9,8	**240,00**
KBR-8D-110/119-16	11,0~11,9	16	20	102	48	10,8	**254,80**
KBR-8D-120/129-16	12,0~12,9	16	20	110	48	11,8	**263,70**
KBR-8D-130/139-16	13,0~13,9	16	20	119	48	12,8	**272,60**
KBR-8D-140/149-16	14,0~14,9	16	20	127	48	13,8	**282,50**
KBR-8D-150/159-20	15,0~15,9	20	25	136	50	14,8	**291,35**
KBR-8D-160/169-20	16,0~16,9	20	25	144	50	15,8	**300,25**
KBR-8D-170/179-20	17,0~17,9	20	25	153	50	16,8	**309,15**
KBR-8D-180/189-25	18,0~18,9	25	32	161	56	17,8	**319,00**
KBR-8D-190/199-25	19,0~19,9	25	32	170	56	18,8	**327,90**
KBR-8D-200/209-25	20,0~20,9	25	32	178	56	19,8	**346,65**
KBR-8D-210/219-25	21,0~21,9	25	32	187	56	20,8	**365,45**
KBR-8D-220/229-25	22,0~22,9	25	32	195	56	21,8	**393,05**
KBR-8D-230/239-32	23,0~23,9	32	42	204	60	22,8	**420,75**
KBR-8D-240/249-32	24,0~24,9	32	42	212	60	23,8	**448,4**
KBR-8D-250/259-32	25,0~25,9	32	42	221	60	24,8	**476,05**

KMB 3D

Broca de refrigeración interior 3D
Internal cooling 3D drill



-0,10 +0,15 Ø13-Ø21,5

-0,12 +0,20 Ø22-Ø50

Complementos *Spare parts*			€
Tornillo de inserción *Insert screw*	Ref. P020050		6,90

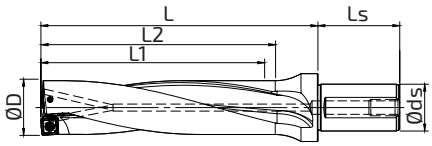
Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*					€
		ØD	Øds	L1	L2	L	
KMB-3D-13020	SPKX050204	13,0	20	39	42	62	274,90
KMB-3D-13520	SPKX050204	13,5	20	41	44	64	274,90
KMB-3D-14020	SPKX050204	14,0	20	42	45	65	274,90
KMB-3D-14520	SPKX050204	14,5	20	44	47	67	274,90
KMB-3D-15020	SPKX050204	15,0	20	45	48	68	274,90
KMB-3D-15525	SPKX060204	15,5	25	47	50	75	274,90
KMB-3D-16025	SPKX060204	16,0	25	48	51	76	274,90
KMB-3D-16525	SPKX060204	16,5	25	50	53	78	274,90
KMB-3D-17025	SPKX060204	17,0	25	51	54	79	274,90
KMB-3D-17525	SPKX060204	17,5	25	53	56	81	274,90
KMB-3D-18025	SPKX060204	18,0	25	54	57	82	274,90
KMB-3D-18525	SPKX060204	18,5	25	56	59	84	274,90
KMB-3D-19025	SPKX060204	19,0	25	57	60	85	274,90
KMB-3D-19525	SPKX060204	19,5	25	59	62	87	274,90
KMB-3D-20025	SPKX060204	20,0	25	60	63	88	274,90
KMB-3D-20525	SPKX060204	20,5	25	62	65	90	274,90
KMB-3D-21025	SPKX060204	21,0	25	63	66	91	274,90
KMB-3D-21525	SPKX060204	21,5	25	65	68	93	278,65
KMB-3D-22032	SPKX07T308	22,0	32	66	69	99	278,65
KMB-3D-22532	SPKX07T308	22,5	32	68	71	101	278,65
KMB-3D-23032	SPKX07T308	23,0	32	69	72	102	278,65
KMB-3D-23532	SPKX07T308	23,5	32	71	74	104	278,65
KMB-3D-24032	SPKX07T308	24,0	32	72	75	105	278,65
KMB-3D-24532	SPKX07T308	24,5	32	74	77	107	278,65
KMB-3D-25032	SPKX07T308	25,0	32	75	78	108	278,65
KMB-3D-25532	SPKX07T308	25,5	32	77	80	110	297,00
KMB-3D-26032	SPKX07T308	26,0	32	78	81	111	297,00
KMB-3D-26532	SPKX07T308	26,5	32	80	83	113	297,00
KMB-3D-27032	SPKX07T308	27,0	32	81	84	114	297,00
KMB-3D-27532	SPKX07T308	27,5	32	83	86	116	297,00
KMB-3D-28032	SPKX090408	28,0	32	84	87	117	297,00
KMB-3D-28532	SPKX090408	28,5	32	86	89	119	297,00
KMB-3D-29032	SPKX090408	29,0	32	87	90	120	297,00
KMB-3D-29532	SPKX090408	29,5	32	89	93	123	297,00
KMB-3D-30032	SPKX090408	30,0	32	90	95	125	297,00
KMB-3D-31032	SPKX090408	31,0	32	93	98	128	336,75
KMB-3D-32032	SPKX090408	32,0	32	96	101	131	342,75
KMB-3D-33032	SPKX090408	33,0	32	99	104	134	342,75
KMB-3D-34040	SPKX110408	34,0	40	102	107	142	342,75
KMB-3D-35040	SPKX110408	35,0	40	105	110	145	342,75
KMB-3D-36040	SPKX110408	36,0	40	108	113	148	342,75
KMB-3D-37040	SPKX110408	37,0	40	111	116	151	353,65
KMB-3D-38040	SPKX110408	38,0	40	114	119	154	353,65
KMB-3D-39040	SPKX110408	39,0	40	117	122	157	353,65
KMB-3D-40040	SPKX110408	40,0	40	120	125	160	353,65
KMB-3D-41040	SPKX110408	41,0	40	123	128	163	389,65
KMB-3D-42040	SPKX140512	42,0	40	126	131	166	389,65
KMB-3D-43040	SPKX140512	43,0	40	129	134	169	389,65
KMB-3D-44040	SPKX140512	44,0	40	132	137	172	389,65
KMB-3D-45040	SPKX140512	45,0	40	135	140	175	389,65
KMB-3D-46040	SPKX140512	46,0	40	138	143	178	408,00
KMB-3D-47040	SPKX140512	47,0	40	141	146	181	408,00
KMB-3D-48040	SPKX140512	48,0	40	144	149	184	408,00
KMB-3D-49040	SPKX140512	49,0	40	147	152	187	408,00
KMB-3D-50040	SPKX140512	50,0	40	150	155	190	408,00

Brocas (refrigeración interior 4D)
Drills (coolant through center 4D)

KMB 4D

-0,15 +0,25 Ø13-Ø21,5

-0,15 +0,20 Ø22-Ø50



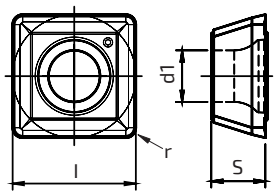
Complementos *Spare parts*		€
Tornillo de inserción *Insert screw*	**Ref. P020050**	**6,90**

Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*					€
		ØD	Øds	L1	L2	L	
KMB-4D-13020	SPKX050204	13,0	20	52	55	75	**302,30**
KMB-4D-13520	SPKX050204	13,5	20	54	57	77	**302,30**
KMB-4D-14020	SPKX050204	14,0	20	56	59	79	**302,30**
KMB-4D-14520	SPKX050204	14,5	20	58	61	81	**302,30**
KMB-4D-15020	SPKX050204	15,0	20	60	63	83	**302,30**
KMB-4D-15525	SPKX060204	15,5	25	62	65	90	**302,30**
KMB-4D-16025	SPKX060204	16,0	25	64	67	92	**302,30**
KMB-4D-16525	SPKX060204	16,5	25	66	69	94	**302,30**
KMB-4D-17025	SPKX060204	17,0	25	68	71	96	**302,30**
KMB-4D-17525	SPKX060204	17,5	25	70	73	98	**302,30**
KMB-4D-18025	SPKX060204	18,0	25	72	75	100	**302,30**
KMB-4D-18525	SPKX060204	18,5	25	74	77	102	**302,30**
KMB-4D-19025	SPKX060204	19,0	25	76	79	104	**302,30**
KMB-4D-19525	SPKX060204	19,5	25	78	81	106	**302,30**
KMB-4D-20025	SPKX060204	20,0	25	80	83	108	**302,30**
KMB-4D-20525	SPKX060204	20,5	25	82	85	110	**302,30**
KMB-4D-21025	SPKX060204	21,0	25	84	87	112	**302,30**
KMB-4D-21525	SPKX060204	21,5	25	86	89	114	**307,90**
KMB-4D-22032	SPKX07T308	22,0	32	88	91	121	**307,90**
KMB-4D-22532	SPKX07T308	22,5	32	90	93	123	**307,90**
KMB-4D-23032	SPKX07T308	23,0	32	92	95	125	**307,90**
KMB-4D-23532	SPKX07T308	23,5	32	94	97	127	**307,90**
KMB-4D-24032	SPKX07T308	24,0	32	96	99	129	**307,90**
KMB-4D-24532	SPKX07T308	24,5	32	98	101	131	**307,90**
KMB-4D-25032	SPKX07T308	25,0	32	100	103	133	**307,90**
KMB-4D-25532	SPKX07T308	25,5	32	102	105	135	**324,40**
KMB-4D-26032	SPKX07T308	26,0	32	104	107	137	**324,40**
KMB-4D-26532	SPKX07T308	26,5	32	106	109	139	**324,40**

Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*					€
		ØD	Øds	L1	L2	L	
KMB-4D-27032	SPKX07T308	27,0	32	108	111	141	**324,40**
KMB-4D-27532	SPKX07T308	27,5	32	110	113	143	**324,40**
KMB-4D-28032	SPKX090408	28,0	32	112	115	145	**324,40**
KMB-4D-28532	SPKX090408	28,5	32	114	117	147	**324,40**
KMB-4D-29032	SPKX090408	29,0	32	116	120	150	**324,40**
KMB-4D-29532	SPKX090408	29,5	32	118	123	153	**324,40**
KMB-4D-30032	SPKX090408	30,0	32	120	125	155	**324,40**
KMB-4D-31032	SPKX090408	31,0	32	124	129	159	**367,55**
KMB-4D-32032	SPKX090408	32,0	32	128	133	163	**367,55**
KMB-4D-33032	SPKX090408	33,0	32	132	137	167	**375,75**
KMB-4D-34040	SPKX110408	34,0	40	136	141	176	**375,75**
KMB-4D-35040	SPKX110408	35,0	40	140	145	180	**375,75**
KMB-4D-36040	SPKX110408	36,0	40	144	149	184	**375,75**
KMB-4D-37040	SPKX110408	37,0	40	148	153	188	**389,65**
KMB-4D-38040	SPKX110408	38,0	40	152	157	192	**389,65**
KMB-4D-39040	SPKX110408	39,0	40	156	161	196	**389,65**
KMB-4D-40040	SPKX110408	40,0	40	160	165	200	**389,65**
KMB-4D-41040	SPKX110408	41,0	40	164	169	204	**429,40**
KMB-4D-42040	SPKX140512	42,0	40	168	173	208	**429,40**
KMB-4D-43040	SPKX140512	43,0	40	172	177	212	**429,40**
KMB-4D-44040	SPKX140512	44,0	40	176	181	216	**429,40**
KMB-4D-45040	SPKX140512	45,0	40	180	185	220	**429,40**
KMB-4D-46040	SPKX140512	46,0	40	184	189	224	**453,00**
KMB-4D-47040	SPKX140512	47,0	40	188	193	228	**453,00**
KMB-4D-48040	SPKX140512	48,0	40	192	197	232	**453,00**
KMB-4D-49040	SPKX140512	49,0	40	196	201	236	**453,00**
KMB-4D-50040	SPKX140512	50,0	40	200	205	240	**453,00**

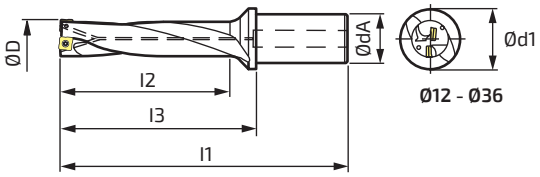
Plaquita
Insert

P	●	●
M	●	●
K	●	●
N		
S	●	●
H		



Ref.	KP125	KP135	Medidas *Dimensions*				€
			l	S	d1	r	
SPKX 050204	✓	✓	5,00	2,38	2,20	0,4	**9,90**
SPKX 060204	✓	✓	6,00	2,38	2,55	0,4	**11,00**
SPKX 07T308	✓	✓	7,94	3,97	2,85	0,8	**11,00**
SPKX 090408	✓	✓	9,80	4,30	4,10	0,8	**11,55**
SPKX 110408	✓	✓	11,50	4,80	4,40	0,8	**12,60**
SPKX 140512	✓	✓	14,30	5,20	5,75	1,2	**13,15**

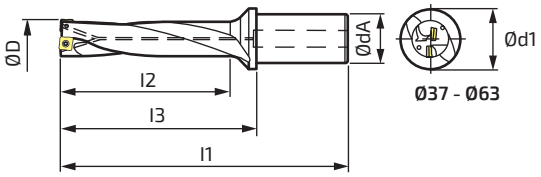
MaxiBroca 900 - 2D
MaxiDrill 900 - 2D



Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*						€
		D	dA	d1	l1	l2	l3	
C900.2D.120.R.03	SONT03...	12,0	20	28	90	24	40	**239,10**
C900.2D.125.R.03	SONT03...	12,5	20	28	91	25	41	**239,10**
C900.2D.130.R.03	SONT03...	13,0	20	28	92	26	42	**239,10**
C900.2D.135.R.03	SONT03...	13,5	20	28	93	27	43	**239,10**
C900.2D.140.R.04	SONT04...	14,0	20	30	96	28	46	**254,50**
C900.2D.145.R.04	SONT04...	14,5	20	30	97	29	47	**254,50**
C900.2D.150.R.04	SONT04...	15,0	20	30	98	30	48	**254,50**
C900.2D.155.R.04	SONT04...	15,5	20	30	99	31	49	**254,50**
C900.2D.160.R.05	SONT05...	16,0	20	30	100	32	50	**254,50**
C900.2D.165.R.05	SONT05...	16,5	20	30	101	33	51	**254,50**
C900.2D.170.R.05	SONT05...	17,0	20	30	102	34	52	**270,95**
C900.2D.175.R.05	SONT05...	17,5	20	30	103	35	53	**270,95**
C900.2D.180.R.06	SONT06...	18,0	25	32	111	36	55	**270,95**
C900.2D.185.R.06	SONT06...	18,5	25	32	112	37	56	**270,95**
C900.2D.190.R.06	SONT06...	19,0	25	32	113	38	57	**291,10**
C900.2D.195.R.06	SONT06...	19,5	25	32	114	39	58	**291,10**
C900.2D.200.R.06	SONT06...	20,0	25	32	115	40	59	**291,10**
C900.2D.205.R.06	SONT06...	20,5	25	32	116	41	60	**291,10**
C900.2D.210.R.07	SONT07...	21,0	25	32	118	42	62	**291,10**
C900.2D.220.R.07	SONT07...	22,0	25	32	120	44	64	**291,10**
C900.2D.230.R.07	SONT07...	23,0	32	32	122	46	66	**300,20**
C900.2D.240.R.08	SONT08...	24,0	32	40	132	48	72	**300,20**
C900.2D.250.R.08	SONT08...	25,0	32	40	134	50	74	**300,20**
C900.2D.260.R.08	SONT08...	26,0	32	40	136	52	76	**332,45**
C900.2D.270.R.08	SONT08...	27,0	32	40	138	54	78	**332,45**
C900.2D.280.R.09	SONT09...	28,0	32	40	140	56	80	**332,45**
C900.2D.290.R.09	SONT09...	29,0	32	40	142	58	82	**332,45**
C900.2D.300.R.09	SONT09...	30,0	32	40	144	60	84	**332,45**
C900.2D.310.R.09	SONT09...	31,0	32	40	146	62	86	**360,60**
C900.2D.320.R.09	SONT09...	32,0	32	40	148	64	88	**360,60**
C900.2D.330.R.10	SONT10...	33,0	40	50	163	66	93	**360,60**
C900.2D.340.R.10	SONT10...	34,0	40	50	165	68	95	**360,60**
C900.2D.350.R.10	SONT10...	35,0	40	50	167	70	97	**368,65**
C900.2D.360.R.10	SONT10...	36,0	40	50	169	72	99	**368,65**

Tornillo de inserción *Insert screw*	€
11807484	**4,80**
12087080	**5,00**
11684214	**4,15**
11684216	**5,35**
11227305	**4,10**
11610311	**4,10**

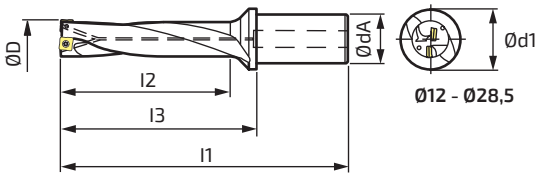
MaxiBroca 900 - 2D
MaxiDrill 900 - 2D



Tornillo de inserción *Insert screw*	€
11610311	4,10
11807484	4,80

Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*						€
		D	dA	d1	l1	l2	l3	
C900.2D.370.R.12	SONT12...	37	40	56	174	74	104	380,70
C900.2D.380.R.12	SONT12...	38	40	56	174	76	106	380,70
C900.2D.390.R.12	SONT12...	39	40	56	176	78	108	380,70
C900.2D.400.R.12	SONT12...	40	40	56	178	80	110	380,70
C900.2D.410.R.12	SONT12...	41	40	56	180	82	112	380,70
C900.2D.420.R.13	SONT13...	42	40	60	182	84	117	399,85
C900.2D.430.R.13	SONT13...	43	40	60	187	86	119	399,85
C900.2D.440.R.13	SONT13...	44	40	60	189	88	121	399,85
C900.2D.450.R.13	SONT13...	45	40	60	191	90	123	399,85
C900.2D.460.R.13	SONT13...	46	40	60	193	92	125	399,85
C900.2D.470.R.15	SONT15...	47	40	60	195	94	128	420,05
C900.2D.480.R.15	SONT15...	48	40	60	198	96	130	420,05
C900.2D.490.R.15	SONT15...	49	40	60	200	98	132	453,20
C900.2D.500.R.15	SONT15...	50	40	60	202	100	134	453,20
C900.2D.510.R.15	SONT15...	51	40	60	204	102	136	465,35
C900.2D.520.R.15	SONT15...	52	40	60	206	104	138	465,35
C900.2D.530.R.15	SONT15...	53	40	60	208	106	140	465,35
C900.2D.540.R.15	SONT15...	54	40	60	210	108	142	465,35
C900.2D.550.R.17	SONT17...	55	40	60	212	110	145	465,35
C900.2D.560.R.17	SONT17...	56	40	60	215	112	147	482,50
C900.2D.570.R.17	SONT17...	57	40	60	217	114	149	482,50
C900.2D.580.R.17	SONT17...	58	40	60	219	116	151	482,50
C900.2D.590.R.17	SONT17...	59	40	60	221	118	153	482,50
C900.2D.600.R.17	SONT17...	60	40	62	223	120	155	482,50
C900.2D.610.R.17	SONT17...	61	40	62	225	122	157	482,50
C900.2D.620.R.17	SONT17...	62	40	64	229	124	159	482,50
C900.2D.630.R.17	SONT17...	63	40	64	231	126	161	482,50

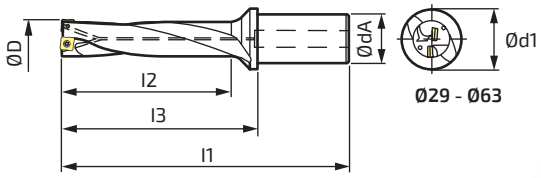
MaxiBroca 900 - 3D
MaxiDrill 900 - 3D



Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*						€
		D	dA	d1	l1	l2	l3	
C900.3D.120.R.03	SONT03...	12,0	20	28	102	36,0	52	**254,70**
C900.3D.125.R.03	SONT03...	12,5	20	28	104	37,5	54	**254,70**
C900.3D.130.R.03	SONT03...	13,0	20	28	105	39,0	55	**254,70**
C900.3D.135.R.03	SONT03...	13,5	20	28	107	40,5	57	**254,70**
C900.3D.140.R.04	SONT04...	14,0	20	30	109	42,0	59	**268,30**
C900.3D.145.R.04	SONT04...	14,5	20	30	111	44,0	61	**268,30**
C900.3D.150.R.04	SONT04...	15,0	20	30	112	45,0	62	**268,30**
C900.3D.155.R.04	SONT04...	15,5	20	30	114	47,0	64	**274,60**
C900.3D.160.R.05	SONT05...	16,0	20	30	115	48,0	65	**274,60**
C900.3D.165.R.05	SONT05...	16,5	20	30	117	50,0	67	**274,60**
C900.3D.170.R.05	SONT05...	17,0	20	30	118	51,0	68	**285,20**
C900.3D.175.R.05	SONT05...	17,5	20	30	120	53,0	70	**285,20**
C900.3D.180.R.06	SONT06...	18,0	25	32	128	54,0	72	**285,20**
C900.3D.185.R.06	SONT06...	18,5	25	32	130	56,0	74	**285,20**
C900.3D.190.R.06	SONT06...	19,0	25	32	131	57,0	75	**306,40**
C900.3D.195.R.06	SONT06...	19,5	25	32	133	59,0	77	**306,40**
C900.3D.200.R.06	SONT06...	20,0	25	32	134	60,0	78	**306,40**
C900.3D.205.R.06	SONT06...	20,5	25	32	136	62,0	80	**306,40**
C900.3D.210.R.07	SONT07...	21,0	25	32	138	63,0	82	**306,40**
C900.3D.215.R.07	SONT07...	21,5	25	32	140	65,0	84	**306,40**
C900.3D.220.R.07	SONT07...	22,0	25	32	141	66,0	85	**306,40**
C900.3D.225.R.07	SONT07...	22,5	25	32	143	68,0	87	**315,90**
C900.3D.230.R.07	SONT07...	23,0	25	32	144	69,0	88	**315,90**
C900.3D.235.R.07	SONT07...	23,5	25	32	146	71,0	90	**315,90**
C900.3D.240.R.08	SONT08...	24,0	32	40	155	72,0	95	**315,90**
C900.3D.245.R.08	SONT08...	24,5	32	40	157	74,0	97	**315,90**
C900.3D.250.R.08	SONT08...	25,0	32	40	158	75,0	98	**315,90**
C900.3D.255.R.08	SONT08...	25,5	32	40	160	77,0	100	**315,90**
C900.3D.260.R.08	SONT08...	26,0	32	40	161	78,0	101	**349,90**
C900.3D.265.R.08	SONT08...	26,5	32	40	163	80,0	103	**349,90**
C900.3D.270.R.08	SONT08...	27,0	32	40	164	81,0	104	**349,90**
C900.3D.275.R.08	SONT08...	27,5	32	40	166	83,0	106	**349,90**
C900.3D.280.R.09	SONT09...	28,0	32	40	167	84,0	107	**349,90**
C900.3D.285.R.09	SONT09...	28,5	32	40	169	86,0	109	**349,90**

Tornillo de inserción *Insert screw*	€
11807484	**4,80**
11807480	**5,00**
11684214	**4,15**
11684216	**5,35**
11227305	**4,10**

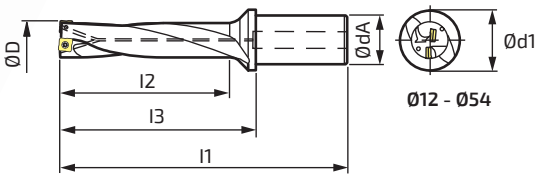
MaxiBroca 900 - 3D
MaxiDrill 900 - 3D



Tornillo de inserción *Insert screw*	€
11227305	4,10
11610311	4,10
11801441	4,10

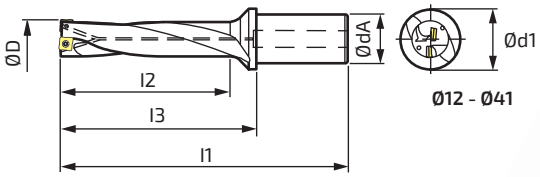
Ref.	Plaquita *Insert*	Dimensiones *Dimensions(mm)*						€
		D	dA	d1	l1	l2	l3	
C900.3D.290.R.09	SONT09...	29,0	32	40	170	87	110	349,90
C900.3D.295.R.09	SONT09...	29,5	32	40	172	89	112	349,90
C900.3D.300.R.09	SONT09...	30,0	32	40	173	90	113	349,90
C900.3D.305.R.09	SONT09...	30,5	32	40	175	92	115	349,90
C900.3D.310.R.09	SONT09...	31,0	32	40	176	93	116	379,55
C900.3D.315.R.09	SONT09...	31,5	32	40	178	95	118	379,55
C900.3D.320.R.09	SONT09...	32,0	32	40	179	96	119	379,55
C900.3D.325.R.10	SONT10...	32,5	40	50	192	98	124	379,55
C900.3D.330.R.10	SONT10...	33,0	40	50	193	99	125	379,55
C900.3D.335.R.10	SONT10...	33,5	40	50	195	101	127	379,55
C900.3D.340.R.10	SONT10...	34,0	40	50	196	102	128	379,55
C900.3D.345.R.10	SONT10...	34,5	40	50	198	103	130	379,55
C900.3D.350.R.10	SONT10...	35,0	40	50	199	105	131	388,00
C900.3D.355.R.10	SONT10...	35,5	40	50	201	107	133	388,00
C900.3D.360.R.10	SONT10...	36,0	40	50	202	108	134	388,00
C900.3D.365.R.10	SONT10...	36,5	40	50	204	110	136	388,00
C900.3D.370.R.12	SONT12...	37,0	40	56	211	111	141	400,80
C900.3D.380.R.12	SONT12...	38,0	40	56	214	114	144	400,80
C900.3D.390.R.12	SONT12...	39,0	40	56	217	117	147	400,80
C900.3D.400.R.12	SONT12...	40,0	40	56	220	120	150	400,80
C900.3D.410.R.12	SONT12...	41,0	40	56	223	123	153	400,80
C900.3D.420.R.13	SONT13...	42,0	40	60	229	126	159	420,90
C900.3D.430.R.13	SONT13...	43,0	40	60	232	129	162	420,90
C900.3D.440.R.13	SONT13...	44,0	40	60	235	132	165	420,90
C900.3D.450.R.13	SONT13...	45,0	40	60	238	135	168	420,90
C900.3D.460.R.13	SONT13...	46,0	40	60	241	138	171	420,90
C900.3D.470.R.15	SONT15...	47,0	40	60	245	141	175	442,10
C900.3D.480.R.15	SONT15...	48,0	40	60	248	144	178	442,10
C900.3D.490.R.15	SONT15...	49,0	40	60	251	147	181	477,10
C900.3D.500.R.15	SONT15...	50,0	40	60	254	150	184	477,10
C900.3D.510.R.15	SONT15...	51,0	40	60	257	153	187	489,80
C900.3D.520.R.15	SONT15...	52,0	40	60	260	156	190	489,80
C900.3D.530.R.15	SONT15...	53,0	40	60	263	159	193	489,80
C900.3D.540.R.15	SONT15...	54,0	40	60	266	162	196	489,80
C900.3D.550.R.17	SONT17...	55,0	40	60	270	165	200	489,80
C900.3D.560.R.17	SONT17...	56,0	40	60	273	168	203	507,90
C900.3D.570.R.17	SONT17...	57,0	40	60	276	171	206	507,90
C900.3D.580.R.17	SONT17...	58,0	40	60	279	174	209	507,90
C900.3D.590.R.17	SONT17...	59,0	40	60	282	177	212	507,90
C900.3D.600.R.17	SONT17...	60,0	40	62	285	180	215	507,90
C900.3D.610.R.17	SONT17...	61,0	40	62	288	183	218	507,90
C900.3D.620.R.17	SONT17...	62,0	40	64	291	186	221	507,90
C900.3D.630.R.17	SONT17...	63,0	40	64	294	189	224	507,90

MaxiBroca 900 - 4D
MaxiDrill 900 - 4D



Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*						€	Tornillo de inserción *Insert screw*	€
		D	dA	d1	l1	l2	l3			
C900.4D.120.R.03	SONT03...	12,0	20	28	114	48	64	**351,30**	**11807484**	**4,80**
C900.4D.130.R.03	SONT03...	13,0	20	28	118	52	68	**351,30**		
C900.4D.140.R.04	SONT04...	14,0	20	30	123	56	73	**361,50**	**11807480**	**4,30**
C900.4D.150.R.04	SONT04...	15,0	20	30	127	60	77	**361,50**		
C900.4D.160.R.05	SONT05...	16,0	20	30	131	64	81	**370,00**		
C900.4D.170.R.05	SONT05...	17,0	20	32	135	68	85	**383,85**		
C900.4D.180.R.06	SONT06...	18,0	25	32	146	72	90	**383,85**		
C900.4D.190.R.06	SONT06...	19,0	25	32	150	76	94	**412,40**		
C900.4D.200.R.06	SONT06...	20,0	25	40	154	80	98	**412,40**	**11684214**	**4,15**
C900.4D.210.R.07	SONT07...	21,0	25	40	159	84	103	**412,40**		
C900.4D.220.R.07	SONT07...	22,0	25	40	163	88	107	**412,40**		
C900.4D.230.R.07	SONT07...	23,0	25	40	167	92	111	**426,20**		
C900.4D.240.R.08	SONT08...	24,0	32	40	179	96	119	**426,20**		
C900.4D.250.R.08	SONT08...	25,0	32	40	183	100	123	**426,20**	**11684216**	**5,35**
C900.4D.260.R.08	SONT08...	26,0	32	40	187	104	127	**470,75**		
C900.4D.270.R.08	SONT08...	27,0	32	40	191	108	131	**470,75**		
C900.4D.280.R.09	SONT09...	28,0	32	40	195	112	135	**470,75**		
C900.4D.290.R.09	SONT09...	29,0	32	40	199	116	139	**470,75**		
C900.4D.300.R.09	SONT09...	30,0	32	40	203	120	143	**470,75**	**11227305**	**4,10**
C900.4D.310.R.09	SONT09...	31,0	32	40	207	124	147	**511,05**		
C900.4D.320.R.09	SONT09...	32,0	32	40	211	128	151	**511,05**		
C900.4D.330.R.10	SONT10...	33,0	40	50	226	132	159	**511,05**		
C900.4D.340.R.10	SONT10...	34,0	40	50	230	136	162	**511,05**		
C900.4D.350.R.10	SONT10...	35,0	40	50	234	140	166	**521,65**		
C900.4D.360.R.10	SONT10...	36,0	40	50	238	144	170	**521,65**		
C900.4D.370.R.12	SONT12...	37,0	40	56	248	148	178	**539,60**	**11610311**	**4,10**
C900.4D.380.R.12	SONT12...	38,0	40	56	252	152	182	**539,60**		
C900.4D.390.R.12	SONT12...	39,0	40	56	256	156	186	**539,60**		
C900.4D.400.R.12	SONT12...	40,0	40	56	260	160	190	**539,60**		
C900.4D.410.R.12	SONT12...	41,0	40	56	264	164	194	**539,60**		
C900.4D.420.R.13	SONT13...	42,0	40	60	271	168	201	**566,10**		
C900.4D.430.R.13	SONT13...	43,0	40	60	275	172	205	**566,10**		
C900.4D.440.R.13	SONT13...	44,0	40	60	279	176	209	**566,10**		
C900.4D.450.R.13	SONT13...	45,0	40	60	283	180	213	**566,10**		
C900.4D.460.R.13	SONT13...	46,0	40	60	287	184	217	**566,10**		
C900.4D.470.R.15	SONT15...	47,0	40	60	292	188	222	**596,90**		
C900.4D.480.R.15	SONT15...	48,0	40	60	296	192	226	**596,90**	**11801441**	**4,10**
C900.4D.490.R.15	SONT15...	49,0	40	60	300	196	230	**596,90**		
C900.4D.500.R.15	SONT15...	50,0	40	60	304	200	234	**596,90**		
C900.4D.510.R.15	SONT15...	51,0	40	60	308	204	238	**596,90**		
C900.4D.520.R.15	SONT15...	52,0	40	60	312	208	242	**596,90**		
C900.4D.530.R.15	SONT15...	53,0	40	60	316	212	246	**596,90**		
C900.4D.540.R.15	SONT15...	54,0	40	60	320	216	250	**596,90**		

MaxiBroca 900 - 5D
MaxiDrill 900 - 5D



Tornillo de inserción *Insert screw*	€
11807484	4,80
11807480	4,30
11684214	4,15
11684216	5,35
11227305	4,10
11610311	4,10

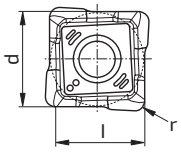
Ref.	Plaquita *Insert*	Dimensiones *Dimensions(mm)*						€
		D	dA	d1	l1	l2	l3	
C900.5D.120.R.03	SONT03...	12,0	20	28	126	60	76	419,95
C900.5D.130.R.03	SONT03...	13,0	20	28	131	65	81	419,95
C900.5D.140.R.04	SONT04...	14,0	20	30	137	70	87	429,45
C900.5D.150.R.04	SONT04...	15,0	20	30	142	75	92	429,45
C900.5D.160.R.05	SONT05...	16,0	20	30	147	80	97	439,95
C900.5D.170.R.05	SONT05...	17,0	20	30	152	85	102	455,85
C900.5D.180.R.06	SONT06...	18,0	25	32	164	90	108	455,85
C900.5D.190.R.06	SONT06...	19,0	25	32	169	95	113	489,80
C900.5D.200.R.06	SONT06...	20,0	25	32	174	100	118	489,80
C900.5D.210.R.07	SONT07...	21,0	25	32	180	105	124	489,80
C900.5D.220.R.07	SONT07...	22,0	25	32	184	110	128	489,80
C900.5D.230.R.07	SONT07...	23,0	25	32	189	115	133	507,25
C900.5D.240.R.08	SONT08...	24,0	32	40	203	120	143	507,25
C900.5D.250.R.08	SONT08...	25,0	32	40	208	125	148	507,25
C900.5D.260.R.08	SONT08...	26,0	32	40	212	130	152	559,80
C900.5D.270.R.08	SONT08...	27,0	32	40	217	135	157	559,80
C900.5D.280.R.09	SONT09...	28,0	32	40	221	140	161	559,80
C900.5D.290.R.09	SONT09...	29,0	32	40	226	145	166	559,80
C900.5D.300.R.09	SONT09...	30,0	32	40	230	150	170	559,80
C900.5D.310.R.09	SONT09...	31,0	32	40	235	155	175	606,40
C900.5D.320.R.09	SONT09...	32,0	32	40	239	160	179	606,40
C900.5D.330.R.10	SONT10...	33,0	40	50	259	165	191	606,40
C900.5D.340.R.10	SONT10...	34,0	40	50	264	170	196	606,40
C900.5D.350.R.10	SONT10...	35,0	40	50	269	175	201	620,20
C900.5D.360.R.10	SONT10...	36,0	40	50	274	180	206	620,20
C900.5D.370.R.12	SONT12...	37,0	40	56	285	185	215	641,40
C900.5D.380.R.12	SONT12...	38,0	40	56	290	190	220	641,40
C900.5D.390.R.12	SONT12...	39,0	40	56	295	195	225	641,40
C900.5D.400.R.12	SONT12...	40,0	40	56	300	200	230	641,40
C900.5D.410.R.12	SONT12...	41,0	40	56	305	205	235	641,40

Plaquita
Insert

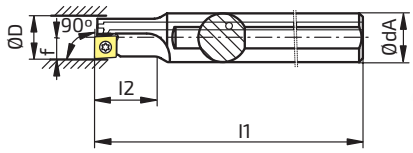
P	●	●
M		●
K	●	○
N		○
S		●
H		

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use

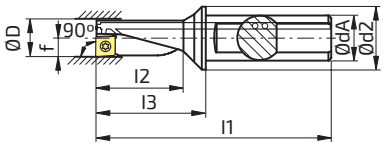


Ref.	KP125	KP135	Medidas *Dimensions* d	l	s	r	d1	€
SONT 031804ER-M30	✓	✓	5,4	4,3	1,8	0,4	2,10	**12,35**
SONT 042105ER-M30	✓	✓	4,6	4,2	2,1	0,5	2,25	**14,15**
SONT 052306ER-M30	✓	✓	5,3	4,8	2,3	0,6	2,25	**14,35**
SONT 062506ER-M30	✓	✓	5,9	5,5	2,5	0,6	2,50	**14,55**
SONT 072907ER-M30	✓	✓	6,5	6,1	2,9	0,7	2,50	**14,90**
SONT 083308ER-M30	✓	✓	7,7	7,3	3,3	0,8	2,90	**15,20**
SONT 093808ER-M30	✓	✓	8,9	8,5	3,8	0,8	3,50	**15,55**
SONT 104408ER-M30	✓	✓	10,1	9,6	4,4	0,8	4,10	**16,30**
SONT 124810ER-M30	✓	✓	11,6	11,0	4,8	1,0	4,10	**17,30**
SONT 135012ER-M30	✓	✓	13,0	12,2	5,0	1,2	5,30	**18,30**
SONT 155312ER-M30	✓	✓	15,2	14,4	5,3	1,2	5,30	**20,75**
SONT 175612ER-M30	✓	✓	17,5	16,7	5,6	1,2	5,30	**22,00**



Tornillo de inserción *Insert screw*	€
11807484	4,80
11807480	4,30
11684214	4,15
11684216	5,35
11227305	4,10
11610311	4,10
11801441	4,10

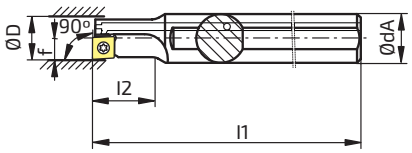
Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*					Nm	€
		Dmin	dA	l1	l2	f		
ECC 08L-1.5D 04	XC...0401...	8	12	80	12,0	4,0	0,4	225,30
ECC 08R-1.5D 04	XC...0401...	8	12	80	12,0	4,0	0,4	225,30
ECC 10L-1.5D 05	XC...0502...	10	12	90	15,0	5,0	0,7	225,30
ECC 10R-1.5D 05	XC...0502...	10	12	90	15,0	5,0	0,7	225,30
ECC 12L-1.5D 06	XC...0602...	12	16	100	18,0	6,0	1,0	228,95
ECC 12R-1.5D 06	XC...0602...	12	16	100	18,0	6,0	1,0	228,95
ECC 14L-1.5D 07	XC...0703...	14	16	110	21,0	7,0	1,2	234,50
ECC 14R-1.5D 07	XC...0703...	14	16	110	21,0	7,0	1,2	234,50
ECC 16L-1.5D 08	XC...0803...	16	20	125	24,0	8,0	2,2	238,30
ECC 16R-1.5D 08	XC...0803...	16	20	125	24,0	8,0	2,2	238,30
ECC 18L-1.5D 09	XC...09T3...	18	25	135	27,0	9,0	2,2	274,70
ECC 18R-1.5D 09	XC...09T3...	18	25	135	27,0	9,0	2,2	274,70
ECC 20L-1.5D 10	XC...10T3...	20	25	150	30,0	10,0	3,2	309,70
ECC 20R-1.5D 10	XC...10T3...	20	25	150	30,0	10,0	3,2	309,70
ECC 25L-1.5D 13	XC...1304...	25	32	180	37,5	12,5	5,0	357,15
ECC 25R-1.5D 13	XC...1304...	25	32	180	37,5	12,5	5,0	357,15
ECC 32L-1.5D 17	XC...1705...	32	40	200	48,0	16,0	5,0	404,80
ECC 32R-1.5D 17	XC...1705...	32	40	200	48,0	16,0	5,0	404,80



Tornillo de inserción *Insert screw*	€
11807484	4,80
11807480	4,30
11684214	4,15
11684216	5,35
11227305	4,10
11610311	4,10
11801441	4,10

Ref.	Plaquita *Insert*	Dimensiones *Dimensions(mm)*							Nm	€
		Dmin	dA	d2	l1	l2	l3	f		
ECC08L-2.25D04	XC...0401...	8	10	15	60,0	18,0	22,0	4	0,4	335,15
ECC08R-2.25D04	XC...0401...	8	10	15	60,0	18,0	22,0	4	0,4	335,15
ECC10L-2.25D05	XC...0502...	10	12	18	69,5	22,5	27,5	5	0,7	335,15
ECC10R-2.25D05	XC...0502...	10	12	18	69,5	22,5	27,5	5	0,7	335,15
ECC12L-2.25D06	XC...0602...	12	16	22	78,0	27,0	33,0	6	1,0	344,35
ECC12R-2.25D06	XC...0602...	12	16	22	78,0	27,0	33,0	6	1,0	344,35
ECC14L-2.25D07	XC...0703...	14	16	23	83,5	31,5	38,5	7	1,2	351,95
ECC14R-2.25D07	XC...0703...	14	16	23	83,5	31,5	38,5	7	1,2	351,95
ECC16L-2.25D08	XC...0803...	16	20	28	94,0	36,0	44,0	8	2,2	359,20
ECC16R-2.25D08	XC...0803...	16	20	28	94,0	36,0	44,0	8	2,2	359,20
ECC18L-2.25D09	XC...09T3...	18	25	36	109,5	40,5	53,5	9	2,2	395,80
ECC18R-2.25D09	XC...09T3...	18	25	36	109,5	40,5	53,5	9	2,2	395,80
ECC20L-2.25D10	XC...10T3....	20	25	35	111,0	45,0	55,0	10	3,2	430,75
ECC20R-2.25D10	XC...10T3....	20	25	35	111,0	45,0	55,0	10	3,2	430,75
ECC25L-2.25D13	XC...1304...	25	32	44	129,0	56,5	69,0	12,5	5,0	500,10
ECC25R-2.25D13	XC...1304...	25	32	44	129,0	56,5	69,0	12,5	5,0	500,10
ECC32L-2.25D17	XC...1705...	32	40	54	158,0	72,0	88,0	16	5,0	562,35
ECC32R-2.25D17	XC...1705...	32	40	54	158,0	72,0	88,0	16	5,0	562,35

3.0D XCET



Ref.	Plaquita *Insert*	Dimensiones *Dimensions (mm)*					Nm	€
		Dmin	dA	l1	l2	f		
ECC 08L-3.0D 04 H	XC...0401...	8	12	80	24	4,0	0,4	826,50
ECC 08R-3.0D 04 H	XC...0401...	8	12	80	24	4,0	0,4	826,50
ECC 10L-3.0D 05 H	XC...0502...	10	12	85	30	5,0	0,7	830,30
ECC 10R-3.0D 05 H	XC...0502...	10	12	85	30	5,0	0,7	830,30
ECC 12L-3.0D 06 H	XC...0602...	12	16	95	36	6,0	1,0	896,15
ECC 12R-3.0D 06 H	XC...0602...	12	16	95	36	6,0	1,0	896,15
ECC 14L-3.0D 07 H	XC...0703...	14	16	100	42	7,0	1,2	916,85
ECC 14R-3.0D 07 H	XC...0703...	14	16	100	42	7,0	1,2	916,85
ECC 16L-3.0D 08 H	XC...0803...	16	20	110	48	8,0	2,2	1.005,40
ECC 16R-3.0D 08 H	XC...0803...	16	20	110	48	8,0	2,2	1.005,40
ECC 18L-3.0D 09 H	XC...09T3...	18	25	125	54	9,0	2,2	1.217,15
ECC 18R-3.0D 09 H	XC...09T3...	18	25	125	54	9,0	2,2	1.217,15
ECC 20L-3.0D 10 H	XC...10T3...	20	25	130	60	10,0	3,2	1.241,80
ECC 20R-3.0D 10 H	XC...10T3...	20	25	130	60	10,0	3,2	1.241,80
ECC 25L-3.0D 13 H	XC...1304...	25	32	150	75	12,5	5,0	1.582,50
ECC 25R-3.0D 13 H	XC...1304...	25	32	150	75	12,5	5,0	1.582,50
ECC 32L-3.0D 17 H	XC...1705...	32	40	185	96	16,0	5,0	2.070,60
ECC 32R-3.0D 17 H	XC...1705...	32	40	185	96	16,0	5,0	2.070,60

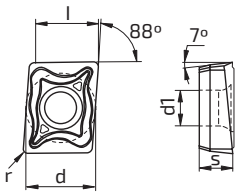
Tornillo de inserción *Insert screw*	€
11807484	4,80
11807480	4,30
11684214	4,15
11684216	5,35
11227305	4,10
11610311	4,10
11801441	4,10

Plaquitas *Inserts*

	KP125	KP135	KM145	H10T
P	●	●	●	
M	●	○	●	
K	●	○	●	○
N		○		●
S		●		●
H				

● Aplicación principal *Main use*

○ Aplicación complementaria *Complementary use*

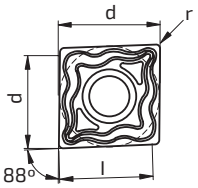


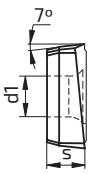
Ref.	KP125	KP135	KM145	H10T	Medidas *Dimensions* d	l	s	r	d1	€
XCET 040102FL-27Q				✓	5,4	4,3	1,8	0,4	2,10	18,35
XCET 040102FR-27Q				✓	4,6	4,2	2,1	0,5	2,25	18,35
XCET 040104FL-27Q				✓	5,3	4,8	2,3	0,6	2,25	18,35
XCET 040104FR-27Q				✓	5,9	5,5	2,5	0,6	2,50	18,35
XCNT 040102EL	✓	✓	✓		6,5	6,1	2,9	0,7	2,50	15,75
XCNT 040102ER	✓	✓	✓		7,7	7,3	3,3	0,8	2,90	15,75
XCNT 040104EL	✓	✓	✓		8,9	8,5	3,8	0,8	3,50	15,75
XCNT 040104ER	✓	✓	✓		10,1	9,6	4,4	0,8	4,10	15,75

	KP125	KP135	KM145	H10T
P	●	●	●	
M	●	○	●	
K	●	○	●	○
N		○		●
S		●		●
H				

● Aplicación principal
Main use

○ Aplicación complementaria
Complementary use





Ref.	KP125	KP135	KM145	H10T	Medidas *Dimensions* l	d	s	r	d1	€
XCET 050202FN-27Q				✓	5,80	5,00	2,10	0,20	2,25	**18,35**
XCET 050204FN-27Q				✓	5,80	5,00	2,10	0,40	2,25	**18,35**
XCET 060202FN-27Q				✓	6,50	6,00	2,38	0,20	2,50	**18,35**
XCET 060204FN-27Q				✓	6,50	6,00	2,38	0,40	2,50	**18,35**
XCET 070304FN-27Q				✓	7,60	7,00	3,18	0,40	2,80	**18,35**
XCET 080304FN-27Q				✓	8,50	8,00	3,18	0,40	3,40	**18,55**
XCET 09T304FN-27Q				✓	9,60	9,00	3,97	0,40	3,40	**18,70**
XCET 10T304FN-27Q				✓	10,60	10,00	3,97	0,40	4,40	**19,25**
XCET 10T308FN-27Q				✓	10,60	10,00	3,97	0,80	4,40	**19,25**
XCET 130404FN-27Q				✓	13,50	12,50	4,76	0,40	5,30	**23,35**
XCET 130408FN-27Q				✓	13,50	12,50	4,76	0,80	5,30	**23,35**
XCET 170508FN-27Q				✓	17,50	16,00	5,56	0,80	5,30	**23,90**
XCNT 050202EN	✓	✓	✓		5,80	5,00	2,10	0,20	2,25	**15,75**
XCNT 050204EN	✓	✓	✓		5,80	5,00	2,10	0,40	2,25	**15,75**
XCNT 060202EN	✓	✓	✓		6,50	6,00	2,38	0,20	2,50	**15,75**
XCNT 060204EN	✓	✓	✓		6,50	6,00	2,38	0,40	2,50	**15,75**
XCNT 070304EN	✓	✓	✓		7,60	7,00	3,18	0,40	2,80	**15,75**
XCNT 080304EN	✓	✓	✓		8,50	8,00	3,18	0,40	3,40	**16,00**
XCNT 09T304EN	✓	✓	✓		9,60	9,00	3,97	0,40	3,40	**16,20**
XCNT 10T304EN	✓	✓	✓		10,60	10,00	3,97	0,40	4,40	**17,05**
XCNT 10T308EN	✓	✓	✓		10,60	10,00	3,97	0,80	4,40	**17,05**
XCNT 130404EN	✓	✓	✓		13,50	12,50	4,76	0,40	5,30	**19,50**
XCNT 130408EN	✓	✓	✓		13,50	12,50	4,76	0,80	5,30	**19,50**
XCNT 170508EN	✓	✓	✓		17,50	16,00	5,56	0,80	5,30	**20,55**

BROCHADO

Broaching tools

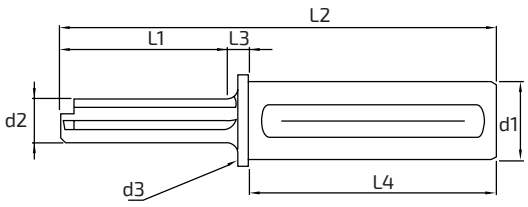
BROCHADO

Herrramientas de interiores

Tools for internal

Las herramientas KLK están fabricadas con acero templado. La herramienta dispone de orificios de 4 mm para el suministro forzado de líquido refrigerante que, además de lubricar y enfriar la plaquita, se utilizan para extraer las virutas producidas mediante el ranurado del orificio ciego.
La herramienta está disponible en dos diámetros de encaje (25 y 32). Dos líneas de herramientas están disponibles para cada diámetro de encaje: estándar y larga (identificadas por el sufijo "L" en el código).
La herramienta garantiza un bajo impacto en los rodamientos de la máquina.
La fuerza de corte para la ejecución de carcasas de llaves de 20 mmm de ancho, para una muestra, es comparable a la fuerza de corte requerida para un orificio común con un diámetro de 14 mm.

The KLK tools are made with tempered steel. The tool feature 4 mm holes for the forced supply of coolant liquid which, in addition to lubricating and cooling the insert, are used to extract the chips, produced through slotting, out of the blind hole.
The tool is available in two socket diameters (25 and 32). Two tool lines are available for each socket diameter: standard and long (identified by the suffix "L" in the code).
The tool guarantees low impact on the machine tool bearings.
The cutting force for executting force key housings with a 20 mmm width, for a expample, is comparable to the cutting force required for a common hole with a 14 mm diameter.



Ref.	L1	L2	L3	L4	d1	d2	d3	Orificio min. *Min. hole* (mm)	€
UT-02-25*	25,0	124,0	9	90	25	6	30	7,0	**200,00**
UT-02-25-L*	34,5	133,5	9	90	25	6	30	7,0	**200,00**
UT-02-32*	25,0	134,0	9	100	32	6	37	7,0	**200,00**
UT-02-32-L*	34,5	143,5	9	100	32	6	37	7,0	**200,00**
UT-03-25*	30,0	129,0	9	90	25	8	30	8,7	**200,00**
UT-03-25-L*	40,0	139,0	9	90	25	8	30	8,7	**200,00**
UT-03-32*	30,0	139,0	9	100	32	8	37	8,7	**200,00**
UT-03-32-L*	40,0	149,0	9	100	32	8	37	8,7	**200,00**
UT-04-25*	40,0	139,0	9	90	25	10	30	11,0	**200,00**
UT-04-25-L*	56,0	155,0	9	90	25	10	30	11,0	**200,00**
UT-04-32*	40,0	149,0	9	100	32	10	37	11,0	**200,00**
UT-04-32-L*	56,0	165,0	9	100	32	10	37	11,0	**200,00**
UT-05-25*	46,0	145,0	9	90	25	12	30	13,0	**200,00**
UT-05-25-L*	66,0	165,0	9	90	25	12	30	13,0	**200,00**
UT-05-32*	46,0	155,0	9	100	32	12	37	13,0	**200,00**
UT-05-32-L*	66,0	175,0	9	100	32	12	37	13,0	**200,00**
UT-06-25*	56,0	155,0	9	90	25	16	30	17,0	**200,00**
UT-06-25-L*	81,0	180,0	9	90	25	16	30	17,0	**200,00**
UT-06-32*	56,0	165,0	9	100	32	16	37	17,0	**200,00**

Ref.	L1	L2	L3	L4	d1	d2	d3	Orificio min. *Min. hole* (mm)	€
UT-06-32-L*	81	190	9	100	32	16	37	17,0	**200,00**
UT-08-25*	68	167	9	90	25	20	30	21,5	**200,00**
UT-08-25-L*	100	199	9	90	25	20	30	21,5	**200,00**
UT-08-32*	68	177	9	100	32	20	37	21,5	**200,00**
UT-08-32-L*	100	209	9	100	32	20	37	21,5	**200,00**
UT-10-25	86	185	9	90	25	25	32	28,0	**220,00**
UT-10-25-L	126	225	9	90	25	25	32	28,0	**220,00**
UT-10-32*	86	195	9	100	32	25	37	28,0	**220,00**
UT-10-32-L*	126	235	9	100	32	25	37	28,0	**220,00**
UT-12-25	104	203	9	90	25	30	35	32,0	**220,00**
UT-12-25-L	161	260,00	9	90	25	30	35	32,0	**220,00**
UT-12-32*	104	213	9	100	32	30	37	32,0	**220,00**
UT-12-32-L*	161	270	9	100	32	30	37	32,0	**220,00**
UT-14/16-25	104	225	9	90	25	35	37	37,0	**220,00**
UT-14/16-25-L	161	279	9	90	25	35	37	37,0	**220,00**
UT-14/16-32	126	235	9	100	32	35	37	37,0	**220,00**
UT-14/16-32-L	180	289	9	100	32	35	37	37,0	**220,00**
UT-18/25-32	140	249	9	100	32	40	45	45,0	**260,00**
UT-18/25-32-L	200	309	9	100	32	40	45	45,0	**260,00**

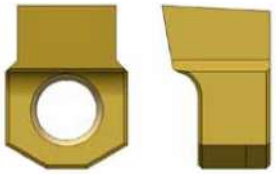
* En estas herramientas hay forzada refrigerante.
* On these tools there is a 4mm hole forced coolant adduction.

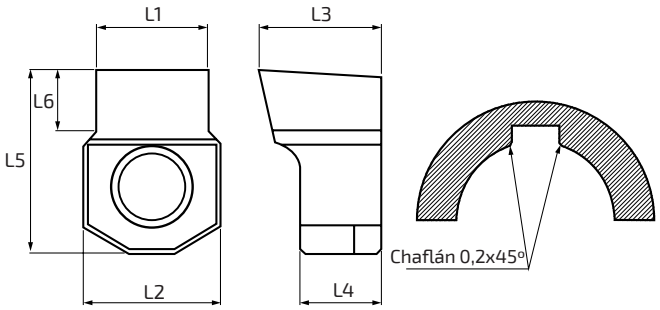
Plaquitas

Inserts

Las plaquitas de ranurado se fabrican con una aleación que, tras el tratamiento térmico, alcanza una dureza de 70-71 HRC. Este material confiere a las plaquitas una gran resistencia y, por lo tanto, puede soportar fuertes presiones. Las plaquitas también están sujetas a tratamiento de superficie, recubrimiento de TiN, con propiedades antidesgaste y antiagarrotamiento.
Las plaquitas se afilan de nuevo afilando sus lados. Este proceso elimina cualquier gubia que pudiera impedir que la plaquita corte perpendicular al eje de referencia de la pieza durante la fase de ranurado. La forma sobresaliente de las plaquitas permite afilarlos varias veces. Todas estas características hacen que las plaquitas sean extraordinariamente duraderas.
Las plaquitas identificadas por su código con "SM" ejecutan un chaflán de 0,2x45º en el punto de intersección entre el agujero y las paredes de la ranura, dejando el agujero libre de rebabas. Este tipo de biselado sólo se puede realizar en llaves UNI.

The slotting inserts are made with alloy which, following heat treatment, reaches a hardness of 70-71 HRC. This material gives the inserts high toughness, and can accordingly withstand strong pressures. The inserts are also subject to surface treatment, TiN coating, with anti wear and seize properties.
The inserts are re-sharpened by tapering their sides. This process eliminates any gouges that would prevent the insert from cutting perpendicular to the reference axis of the workpiece during the broaching phase. The protruding shape of the inserts makes it possible to re-sharpen them numerous times. All of these characteristics make inserts extraordinarily long-lasting.
The inserts identified by their code ending with "SM" execute a 0.2x45º chamfering on the intersection point between the hole and the walls of the broached slot, leaving the hole burr-free. This type of chamfering can only be carried out on UNI keays.





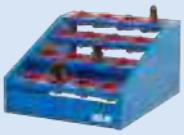
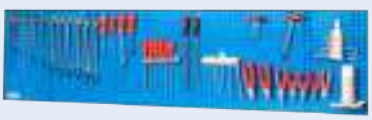
Ref.	L1	L2	L3	L4	L5	L6	€
IN-02 P9	1,994	5,00	6,5	5	6,0	1,30	**40,00**
IN-02 P9-SM	1,994	5,00	6,5	5	6,0	1,09	**40,00**
IN-02 H7	2,010	5,00	6,5	5	6,0	1,30	**40,00**
IN-02 H7-SM	2,010	5,00	6,5	5	6,0	1,09	**40,00**
IN-02 D10	2,060	5,00	6,5	5	6,0	1,30	**40,00**
IN-02 C11	2,120	5,00	6,5	5	6,0	1,30	**40,00**
IN-03 P9	2,994	6,08	6,5	5	7,5	2,00	**40,00**
IN-03 P9-SM	2,994	6,08	6,5	5	7,5	1,42	**40,00**
IN-03 H7	3,010	6,08	6,5	5	7,5	2,00	**40,00**
IN-03 H7-SM	3,010	6,08	6,5	5	7,5	1,42	**40,00**
IN-03 D10	3,060	6,08	6,5	5	7,5	2,00	**40,00**
IN-03 C11	3,120	6,08	6,5	5	7,5	2,00	**40,00**
IN-04 P9	3,988	6,08	7,0	5	8,0	2,60	**40,00**
IN-04 P9-SM	3,988	6,08	7,0	5	8,0	2,07	**40,00**
IN-04 H7	4,012	6,08	7,0	5	8,0	2,60	**40,00**
IN-04 H7-SM	4,012	6,08	7,0	5	8,0	2,07	**40,00**
IN-04 D10	4,078	6,08	7,0	5	8,0	2,60	**40,00**
IN-04 C11	4,145	6,08	7,0	5	8,0	2,60	**40,00**
IN-05 P9	4,988	6,08	7,0	5	8,0	3,00	**40,00**

Ref.	L1	L2	L3	L4	L5	L6	€
IN-05 P9-SM	4,988	6,08	7	5	8,0	2,74	**40,00**
IN-05 H7	5,012	6,08	7	5	8,0	3,00	**40,00**
IN-05 H7-SM	5,012	6,08	7	5	8,0	2,74	**40,00**
IN-05 D10	5,078	6,08	7	5	8,0	3,00	**40,00**
IN-05 C11	5,145	6,08	7	5	8,0	3,00	**40,00**
IN-06 P9	5,988	10,08	9	6	13,5	4,00	**48,00**
IN-06 P9-SM	5,988	10,08	9	6	13,5	3,00	**48,00**
IN-06 H7	6,012	10,08	9	6	13,5	4,00	**48,00**
IN-06 H7-SM	6,012	10,08	9	6	13,5	3,00	**48,00**
IN-06 D10	6,078	10,08	9	6	13,5	4,00	**48,00**
IN-06 C11	6,145	10,08	9	6	13,5	4,00	**48,00**
IN-08 P9	7,985	10,08	9	6	13,5	4,50	**48,00**
IN-08 P9-SM	7,985	10,08	9	6	13,5	3,78	**48,00**
IN-08 H7	8,015	10,08	9	6	13,5	4,50	**48,00**
IN-08 H7-SM	8,015	10,08	9	6	13,5	3,78	**48,00**
IN-08 D10	8,098	10,08	9	6	13,5	4,50	**48,00**
IN-08 C11	8,170,00	10,08	9	6	13,5	4,50	**48,00**
IN-10 P9	9,985	13,10	14	10	18,5	6,00	**60,00**
IN-10 P9-SM	9,985	13,10	14	10	18,5	3,88	**60,00**
IN-10 H7	10,015	13,10	14	10	18,5	6,00	**60,00**
IN-10 H7-SM	10,015	13,10	14	10	18,5	3,88	**60,00**
IN-10 D10	10,098	13,10	14	10	18,5	6,00	**60,00**
IN-10 C11	10,170,00	13,10	14	10	18,5	6,00	**60,00**
IN-12 P9	11,982	13,10	14	10	18,5	6,50	**60,00**
IN-12 P9-SM	11,982	13,10	14	10	18,5	3,89	**60,00**
IN-12 H7	12,018	13,10	14	10	18,5	6,50	**60,00**
IN-12 H7-SM	12,018	13,10	14	10	18,5	3,89	**60,00**
IN-12 D10	12,120	13,10	14	10	18,5	6,50	**60,00**
IN-12 C11	12,205	13,10	14	10	18,5	6,50	**60,00**
IN-14 P9	13,982	18,00	14	10	22,0	7,00	**70,00**
IN-14 P9-SM	13,982	18,00	14	10	22,0	4,71	**70,00**
IN-14 H7	14,018	18,00	14	10	22,0	7,00	**70,00**
IN-14 H7-SM	14,018	18,00	14	10	22,0	4,71	**70,00**
IN-14 D10	14,120	18,00	14	10	22,0	7,00	**70,00**
IN-14 C11	14,205	18,00	14	10	22,0	7,00	**70,00**
IN-16 P9	15,982	18,00	14	10	22,0	8,00	**70,00**
IN-16 P9-SM	15,982	18,00	14	10	22,0	5,53	**70,00**
IN-16 H7	16,018	18,00	14	10	22,0	8,00	**70,00**
IN-16 H7-SM	16,018	18,00	14	10	22,0	5,53	**70,00**
IN-16 D10	16,120	18,00	14	10	22,0	8,00	**70,00**
IN-16 C11	16,205	18,00	14	10	22,0	8,00	**70,00**
IN-18 P9**	17,982	26,00	18	10	30,0	9,00	**120,00**
IN-18 P9-SM**	17,982	26,00	18	10	30,0	5,67	**120,00**
IN-18 H7**	18,018	26,00	18	10	30,0	9,00	**120,00**
IN-18 H7-SM**	18,018	26,00	18	10	30,0	5,67	**120,00**
IN-18 D10**	18,120	26,00	18	10	30,0	9,00	**120,00**
IN-18 C11**	18,205	26,00	18	10	30,0	9,00	**120,00**
IN-20 P9**	19,978	26,00	18	10	30,0	10,00	**120,00**
IN-20 P9-SM**	19,978	26,00	18	10	30,0	6,29	**120,00**
IN-20 H7**	20,021	26,00	18	10	30,0	10,00	**120,00**
IN-20 H7-SM**	20,021	26,00	18	10	30,0	6,29	**120,00**
IN-20 D10**	20,149	26,00	18	10	30,0	10,00	**120,00**
IN-20 C11**	20,240	26,00	18	10	30,0	10,00	**120,00**
IN-22 P9**	21,978	26,00	18	10	30,0	11,00	**120,00**
IN-22 P9-SM**	21,978	26,00	18	10	30,0	6,79	**120,00**
IN-22 H7**	22,021	26,00	18	10	30,0	11,00	**120,00**
IN-22 H7-SM**	22,021	26,00	18	10	30,0	6,79	**120,00**
IN-22 D10**	22,149	26,00	18	10	30,0	11,00	**120,00**
IN-22 C11**	22,240	26,00	18	10	30,0	11,00	**120,00**
IN-25 P9**	24,978	26,00	18	10	30,0	12,00	**120,00**
IN-25 P9-SM**	24,978	26,00	18	10	30,0	7,02	**120,00**
IN-25 H7**	25,021	26,00	18	10	30,0	12,00	**120,00**
IN-25 H7-SM**	25,021	26,00	18	10	30,0	7,02	**120,00**
IN-25 D10**	25,149	26,00	18	10	30,0	12,00	**120,00**
IN-25 C11**	25,240	26,00	18	10	30,0	12,00	**120,00**

** Para estas medidas recomendamos el mecanizado en dos pasos: desbaste y acabado
** For these sizes we recommend machining in two steps: roughing and finishing

ESPACIO DE TRABAJO

WORKSPACE

FOTO PHOTO	SECCIÓN SECTION	PÁGINA PAGE
	**Portaconos** Cone holder	**496**
	Armarios/Herramientas Cabinets/Tools	**499**
	Armarios/Industrial Cabinets/Industrial	**502**
	Armarios/Archivador Cabinets/File cabinet	**504**
	Armarios/Vitrina Cabinets/Cabinets	**505**
	Armarios/Ordenador Cabinets/Computer	**506**
	Carro de herramientas Tools trolley	**508**
	Banco de trabajo Workbench	**513**
	**Paneles perforados** Perforated Tools board	**514**
	Ganchos Hooks	**515**

WS-2755 Soporte de sobremesa para 16 conos
16 cone table stand

Soporte de acero soldado de alta calidad recubierto con polvo electrostático. Se puede utilizar para conos morse SK 30-40-50 y para conos HSK 16-32-40-50-63-80-100. Tiene tres posiciones ajustables en cada dirección. La primera posición es a 2º 34', adecuada para mangos HSK. La segunda posición es a 8º 17' 50" para conos SK y BT. Utilizado por moldistas y mecanizadores para el almacenamiento de conos CNC. Anchura: 500 mm / Profundidad: 570 mm /Altura: 300 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

High quality welded steel support coated with electrostatic powder. Can be used for morse cones SK 30-40-50 and for HSK 16-32-40-50-50-63-80-100 cones. It has three adjustable positions in each direction. The first position is at 2º 34', suitable for HSK handles. The second position is at 8º 17' 50" for SK and BT cones. Used by moulders and machinists for the storage of CNC cones. Width: 500 mm / Depth: 570 mm /Height: 300 mm / Colour: RAL 5015 with electrostatic powder coating.

106 €

WS-2200 Carro portaconos para 35 conos
Cone trolley for 35 cones

Carro de alta calidad, apropiado para el almacenamiento de material pequeño al cual facilita el fácil acceso Se puede utilizar para conos morse SK 30-40-50 y para conos HSK 16-32-40-50-63-80-100. Tiene tres posiciones ajustables en cada dirección. La primera posición es a 2º 34', adecuada para mangos HSK. La segunda posición es a 8º 17' 50" para conos SK y BT. Capacidad para 35 conos. Anchura: 650 mm / Profundidad: 450 mm /Altura: 820 + 130 mm

High quality trolley, suitable for the storage of small material which facilitates easy access. Can be used for Morse cones SK 30-40-50 and for HSK 16-32-40-50-50-63-80-100 cones. It has three adjustable positions in each direction. The first position is at 2º 34', suitable for HSK handles. The second position is at 8º 17' 50" for SK and BT cones. Capacity for 35 cones. Width: 650 mm / Depth: 450 mm /Height: 820 + 130 mm

299 €

Carro de cajones + portaconos para 16 conos WS-2700
Drawer trolley
+ cone holder for 16 cones

5 cajones 5 drawers

Anchura: 560 mm / Profundidad: 570 mm / Altura: 1.000 mm / Altura ruedas: 130 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 560 mm / Depth: 570 mm / Height: 1,000 mm / Wheel height: 130 mm / Colour: RAL 5015 with electrostatic powder coating.

643 €

SOPORTE PARA CONOS

Carro de cajones + portaconos para 16 conos WS-2750
Drawer trolley
+ cone holder for 16 cones

4 cajones 4 drawers

Anchura: 560 mm / Profundidad: 570 mm / Altura: 1.000 mm / Altura ruedas: 130 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 560 mm / Depth: 570 mm / Height: 1,000 mm / Wheel height: 130 mm / Colour: RAL 5015 with electrostatic powder coating.

636 €

SOPORTE PARA CONOS

Carro portaconos WS-2740
Cone trolley

3 cajones y 1 cajón con portaconos
3 drawers and 1 coneholder drawer

Anchura: 560 mm / Profundidad: 570 mm / Altura: 700 mm / Altura ruedas: 130 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 560 mm / Depth: 570 mm / Height: 700 mm / Wheel height: 130 mm / Colour: RAL 5015 with electrostatic powder coating.

532 €

SOPORTE PARA CONOS

WS-2550 Armario portaconos
Cone trolley

2 estantes para conos extraibles y 2 cajones
2 pull-out shelves for cones and 2 drawers

Armario de acero soldado de alta calidad, perforado y reforzado para 4x guías y recubierto con polvo electrostático. Sistema central de cierre. Se puede utilizar para conos morse SK 30-40-50 y para conos HSK 16-32-40-50-63-80-100. Tiene tres posiciones ajustables en cada dirección. La primera posición es a 2º 34', adecuada para mangos HSK. La segunda posición es a 8º 17' 50" para conos SK y BT. Utilizado por moldistas y mecanizadores para el almacenamiento de conos CNC. Anchura: 710 mm / Profundidad: 725 mm / Altura: 1.000 mm / Altura patas: 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

High quality welded steel cabinet, perforated and reinforced for 4x guides and coated with electrostatic powder. Central locking system. It can be used for Morse cones SK 30-40-50 and for HSK 16-32-40-50-50-63-80-100 cones. It has three adjustable positions in each direction. The first position is 2º 34', suitable for HSK handles. The second position is at 8º 17' 50" for SK and BT cones. Used by moulders and machinists for the storage of CNC cones. Width: 710 mm / Depth: 725 mm / Height: 1.000 mm / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

784 €

WS-2650 Armario portaconos
Cone trolley

4 cajones y 1 cajón portaconos
4 drawers and 1 coneholder drawer

Anchura: 560 mm / Profundidad: 570 m / Altura: 800 mm / Altura patas: 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 560 mm / Depth: 570 m / Height: 800 mm / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

560 €

Armario de herramientas WS-10100
Tools cabinet

7 cajones 7 drawers

Anchura: 1.010 mm / Profundidad: 570 mm / Altura: 1.000 mm / Altura patas: 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 1.010 mm / Depth: 570 mm / Height: 1.000 mm / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

965 €

Armario de herramientas WS-1080
Tools cabinet

7 cajones 7 drawers

Anchura: 410 mm / Profundidad: 570 mm / Altura: 800 mm / Altura patas: 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 410 mm / Depth: 570 mm / Height: 800 mm / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

521 €

WS-5030 Armario de herramientas
Tools cabinet

2 cajones 2 drawers

Anchura: 560 mm / Profundidad: 570 mm / Altura: 300 m / Altura patas: 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 560 mm / Depth: 570 mm / Height: 300 m / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

237 €

WS-5080 Armario de herramientas
Tools cabinet

6 cajones 6 drawers

Armario portaherramientas de acero soldado de alta calidad, perforado y reforzado para 4 guías y recubierto con polvo electrostático. Seis cajones con apertura fácil y silenciosa del 97% del mismo. Permite solo la apertura de un cajón al mismo tiempo. Cajones con área para etiquetado frontal y ranuras en los laterales del interior para las divisiones interiores. Sistema central de cierre. Usado para proteger y almacenar material pequeño, para moldistas, mecanizadores, fabricantes de electrónica, logística, máquinas textiles, joyería, etc. Anchura: 560 mm / Profundidad: 570 mm / Altura: 800 mm / Altura patas: 30 mm / Color: RAL 5015.

High quality welded steel Tools cabinet, perforated and reinforced for 4 guides and coated with electrostatic powder. Six drawers with easy and silent opening of 97% of it. Only one drawer can be opened at a time. Drawers with area for front labeling and slots on the sides of the interior for interior divisions. Central locking system. Used to protect and store small material, for moulders, mechanisers, electronics manufacturers, logistics, textile machines, jewellery, etc. Width: 560 mm / Depth: 570 mm / Height: 800 mm / Height of feet: 30 mm / Colour: RAL 5015.

578 €

Armario de herramientas Tools cabinet WS-6140

3 cajones y 3 baldas de altura ajustable
3 drawers and 3 height-adjustable shelves

Anchura 920 mm / Profundidad 450 mm / Altura 1.200 mm / Altura patas 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width 920 mm / Depth 450 mm / Height 1,200 mm / Height of feet 30 mm / Colour: RAL 5015 with electrostatic powder coating.

519 €

Armario de herramientas Tools cabinet WS-7100

7 cajones 7 drawers

Anchura: 710 mm / Profundidad: 725 mm / Altura: 1.000 mm / Altura patas: 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 710 mm / Depth: 725 mm / Height: 1.000 mm / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

920 €

WS-5110 Armario industrial
Industrial cabinet

2 cajones y 2 baldas extraibles
2 drawers and 2 pull-out shelves

Anchura: 560 mm / Profundidad: 600 mm / Altura: 1.000 mm / Altura patas: 30 mm / Color: RAL 5015-9002 con recubrimiento de polvo electrostático.

Width: 560 mm / Depth: 600 mm / Height: 1.000 mm / Height of feet: 30 mm / Colour: RAL 5015-9002 with electrostatic powder coating.

512 €

WS-6800 Armario industrial
Industrial cabinet

1 cajón 1 drawer

Anchura: 560 mm / Profundidad: 570 mm / Altura: 800 mm / Altura patas: 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 560 mm / Depth: 570 mm / Height: 800 mm / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

308 €

Armario industrial WS-7110
Industrial cabinet

2 cajones y 3 baldas extraibles
2 drawers and 3 pull-out shelves

Anchura: 710 mm / Profundidad: 750 mm / Altura: 1.000 mm / Altura patas: 30 mm / Color: RAL 5015-9002 con recubrimiento de polvo electrostático.

Width: 710 mm / Depth: 750 mm / Height: 1.000 mm / Height of feet: 30 mm / Colour: RAL 5015-9002 with electrostatic powder coating.

750 €

75
100

Armario industrial WS-7215
Industrial cabinet

3 cajones y 3 baldas extraibles
3 drawers and 3 pull-out shelves

Anchura: 710 mm / Profundidad: 750 mm / Altura: 1.200 mm / Altura patas: 30 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 710 mm / Depth: 750 mm / Height: 1,200 mm / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

907 €

75
100
125

WS-6233 Armario archivador
File cabinet

4 baldas de altura ajustable
4 height-adjustable shelves

Anchura: 920 mm / Profundidad: 400 mm / Altura: 2.000 mm / Color: RAL 9002 con recubrimiento de polvo electrostático.

Width: 710 mm / Depth: 750 mm / Height: 1,200 mm / Height of feet: 30 mm / Colour: RAL 5015 with electrostatic powder coating.

229 €

WS-6246 Armario archivador con vitrina
Glass

2 baldas 2 shelves

Anchura: 920 mm / Profundidad: 450 mm / Altura: 1.200 mm / Color: RAL 5015-9002 con recubrimiento de polvo electrostático.

Width: 920 mm / Depth: 450 mm / Height: 1,200 mm / Colour: RAL 5015-9002 with electrostatic powder coating.

374 €

Armario archivador con vitrina
Cabinet with showcase and sliding doors

WS-6555

2 baldas 2 shelves

Anchura: 1.200 mm / Profundidad: 400 mm / Altura: 1.200 mm / Color: RAL 9002 con recubrimiento de polvo electrostático.

Width: 1,200 mm / Depth: 400 mm / Height: 1,200 mm / Colour: RAL 9002 with electrostatic powder coating.

355 €

Armario archivador con vitrina
Cabinet with showcase and sliding doors

WS-6565

3 baldas 3 shelves

Anchura: 1.200 mm / Profundidad: 400 mm / Altura: 1.200 mm / Color: RAL 5015-9002 con recubrimiento de polvo electrostático.

Width: 1.200 mm / Depth: 400 mm / Height: 1.200 mm / Colour: RAL 5015-9002 with electrostatic powder coating.

373 €

WS-7440 Armario ordenador
Glass

Adecuado para uso multifuncional. La parte frontal se cierra con una única llave. Láminas de aireación en la parte posterior. Cable de alimentación 1x4x dentro del armario. Protege los ordenadores de los posibles daños en el entorno del taller. Anchura: 560 mm / Profundidad: 570 mm / Altura: 1.000 mm /

Color: RAL 5015 recubierto.

Suitable for multifunctional use. The front part is closed with a single key. Ventilation holes for air circulation at the back cover. Power cable 1x4x inside the cabinet. Protects computers from possible damage in the workshop environment. Width: 560 mm / Depth: 570 mm / Height: 1000 mm / Colour: coated RAL 5015.

501 €

WS-7441 Armario ordenador
Glass

Adecuado para uso multifuncional. La parte frontal se cierra con una única llave. Láminas de aireación en la parte posterior. Cable de alimentación 1x4x dentro del armario. Protege los ordenadores de los posibles daños en el entorno del taller. Anchura: 560 mm / Profundidad: 570 mm / Altura: 1.000 mm /

Color: RAL 5015 recubierto.

Suitable for multifunctional use. The front part is closed with a single key. Ventilation holes for air circulation at the back cover. Power cable 1x4x inside the cabinet. Protects computers from possible damage in the workshop environment. Width: 560 mm / Depth: 570 mm / Height: 1000 mm / Colour: coated RAL 5015.

489 €

Armario de ordenador WS-7425
Computer cabinet

Adecuado para uso multifuncional. La parte frontal se cierra con una única llave. Láminas de aireación en la parte posterior. Cable de alimentación 1x4x dentro de la cabina. La parte del monitor cuenta con un marco metálico y una pantalla de 2 mm de plexiglás transparente que se desliza hacia atrás. Protege los ordenadores de los posibles daños en el entorno del taller. Anchura: 560 mm / Profundidad: 600 mm / Altura: 1.400 mm / Color: RAL 5015 recubierto.

Suitable for multifunctional use. The front part is closed with a single key. Ventilation holes for air circulation at the back cover. Power cable 1x4x inside the cabin. The monitor part has a metal frame and a 2 mm transparent Plexiglas screen that slides backwards. It protects computers from possible damage in the workshop environment.
Width: 560 mm / Depth: 600 mm / Height: 1400 mm / Color: RAL 5015 coated.

546 €

Carro de herramientas WS-5070
Tools trolley

5 cajones 5 drawers

Carro portaherramientas de acero soldado de alta calidad y recubierto con polvo electrostático. Cinco cajones, sistema central de cierre de dos llaves. Comúnmente usado en servicios automovilísticos para el almacenamiento de equipamiento y herramientas. Anchura: 560 mm / Profundidad: 570 mm / Altura: 720 mm / Altura ruedas: 130 mm / Dos ruedas una móvil y una rueda con freno de 125 mm de diámetro.

Tools trolley made of high quality welded steel coated with electrostatic powder. Five drawers, central locking system with two keys. Commonly used in automotive services for the storage of equipment and Toolss. Width: 560 mm / Depth: 570 mm / Height: 720 mm / Wheel height: 130 mm / Two fixed wheels, one mobile and one wheel with brake of 125 mm diameter.

559 €

WS-8075 Carro de herramientas
Tools trolley

5 cajones 5 drawers

Carro portaherramientas de acero soldado de alta calidad y recubierto con polvo electrostático. Cinco cajones, sistema central de cierre de dos llaves. Comúnmente usado en servicios automovilísticos para el almacenamiento de equipamiento y herramientas. Anchura: 600 mm / Profundidad: 450 mm / Altura: 700 mm / Altura bandeja: 30 mm / Altura ruedas: 130 mm / Dos ruedas una móvil y una rueda con freno de 125 mm de diámetro.

Tools trolley made of high quality welded steel coated with electrostatic powder. Five drawers, central locking system with two keys. Commonly used in automotive services for the storage of equipment and Toolss. Width: 600 mm / Depth: 450 mm / Height: 700 mm / Height of tray: 30 mm / Height of wheels: 130 mm / Two fixed wheels, one mobile and one wheel with 125 mm diameter brake.

446 €

WS-8076 Carro de herramientas
Tools trolley

6 cajones 6 drawers

Soldado de alta calidad y recubierto con polvo electrostático. Seis cajones. Sistema central de cierre centralizado de dos llaves. Comúnmente usado en servicios automovilísticos para el almacenamiento de equipamiento y herramientas. Permite minimizar la pérdida de equipamiento y herramientas en las zonas de trabajo. Anchura: 600 mm / Profundidad: 450 mm / Altura: 700 mm Altura bandeja: 30 mm / Altura ruedas: 130 mm / Dos ruedas una móvil y una rueda con freno de 125 mm de diámetro.

High quality welded with electrostatic powder. Six drawers. Central locking system with two keys. Commonly used in automotive services for the storage of equipment and Toolss. It minimizes the loss of equipment and Toolss in the work areas. Width: 600 mm / Depth: 450 mm / Height: 700 mm Height of tray: 30 mm / Height of wheels: 130 mm / Two fixed wheels, one mobile and one wheel with a 125 mm diameter brake.

489 €

Carro de herramientas Tools trolley WS-8106

6 cajones 6 drawers

Carro de herramientas de acero soldado de alta calidad y recubierto con polvo electrostático. Seis cajones. Sistema central de cierre centralizado de dos llaves.Comúnmente usado en servicios automovilísticos para el almacenamiento de equipamiento y herramientas. Permite minimizar la pérdida de equipamiento y herramientas en las zonas de trabajo. Anchura: 830 mm / Profundidad: 450 mm / Altura: 800 mm Altura bandeja: 30 mm / Altura ruedas: 160 mm / Dos ruedas una móvil y una rueda con freno de 125 mm de diámetro.

High quality welded steel tools trolley coated with electrostatic powder. Six drawers. Central locking system of two keys. Commonly used in automotive services for the storage of equipment and Toolss. It minimizes the loss of equipment and Toolss in the work areas. Width: 830 mm / Depth: 450 mm / Height: 800 mm Height of tray: 30 mm / Height of wheels: 160 mm / Two fixed wheels, one mobile and one wheel with 125 mm diameter brake.

600 €

Banco de trabajo móvil Trolley/Workbench WS-2325

2 estantes fijos, 3 cajones, 1 cajón con portaconos
2 ed shelves, 3 drawers, 1 drawer with cone holder

Banco de acero soldado de alta calidad, perforado y reforzado para 4x guías y recubierto con polvo electrostático. Sistema central de cierre. Se puede utilizar para conos morse SK 30-40-50 y para conos HSK 16-32-40-50-63-80-100. 4 cajones.

Tiene tres posiciones ajustables en cada dirección. La primera posición es a 2º 34', adecuada para mangos HSK. La segunda posición es a 8º 17' 50" para conos SK y BT.

Utilizado por moldistas y mecanizadores para el almacenamiento de conos CNC. Anchura: 1.120 mm / Profundidad: 570 mm / Altura: 725 mm / Altura ruedas: 160 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

High quality welded steel bench, perforated and reinforced for 4x guides and coated with electrostatic powder. Central locking system. It can be used for Morse cones SK 30-40-50 and for HSK 16-32-40-50-50-63-80-100 cones. 4 drawers.
It has three adjustable positions in each direction. The first position is 2º 34', suitable for HSK handles. The second position is at 8º 17' 50" for SK and BT cones.
Used by moulders and machinists for the storage of CNC cones. Width: 1.120 mm / Depth: 570 mm / Height: 725 mm / Wheel height: 160 mm / Colour: RAL 5015 with electrostatic powder coating.

813 €

WS-8021 Banco de trabajo móvil
Trolley/Workbench

5 cajones y 2 baldas 5 drawers and 2 shelves

Anchura: 1.120 mm / Profundidad: 570 mm / Altura: 785 mm / Altura ruedas: 160 mm /

Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 1.120 mm / Depth: 570 mm / Height: 785 mm / Height of wheels: 160 mm /
Colour: RAL 5015 with electrostatic powder coating.

766 €

WS-8052 Banco de trabajo móvil
Trolley/Workbench

2 cajones y 2 armarios 2 drawers and 2 cabinets

Banco de trabajo móvil de acero soldado de alta calidad y recubierto con polvo electrostático. Dos armarios y dos cajones. Sistema central de cierre centralizado de dos llaves. Comúnmente usado en servicios automovilísticos para el almacenamiento de equipamiento y herramientas.

Permite minimizar la pérdida de equipamiento y herramientas en las zonas de trabajo. Anchura: 1.120 mm Profundidad: 570 mm / Altura: 785 mm / Altura ruedas: 160 mm /Dos ruedas una móvil y una rueda con freno de 125 mm de diámetro.

Mobile workbench made of high quality welded steel coated with electrostatic powder. Two cabinets and two drawers. Central locking system with two keys. Commonly used in automotive services for the storage of equipment and Toolss.
It minimizes the loss of equipment and Toolss in the work areas. Width: 1,120 mm Depth: 570 mm / Height: 785 mm / Wheel height: 160 mm / Two fixed wheels, one mobile and one wheel with a 125 mm diameter brake.

727 €

Banco de trabajo móvil WS-8023
Trolley/Workbench

5 cajones y 1 armario 5 drawers and 1 cabinet

Carro de trabajo móvil de acero soldado de alta calidad y recubierto con polvo electrostático. Cinco cajones y un armario. Sistema central de cierre centralizado de dos llaves. Comúnmente usado en servicios automovilísticos para el almacenamiento de equipamiento y herramientas. Anchura: 1.120 mm Profundidad: 570 mm / Altura: 755 mm / Altura ruedas: 160 mm / Dos ruedas una móvil y una rueda con freno de 125 mm de diámetro.

Mobile working trolley made of high quality welded steel coated with electrostatic powder. Five drawers and a wardrobe. Central locking system with two keys. Commonly used in automotive services for the storage of equipment and Toolss. Width: 1,120 mm Depth: 570 mm / Height: 755 mm / Wheel height: 160 mm / Two fixed wheels, one mobile and one wheel with a 125 mm diameter brake.

888 €

Carro de herramientas - Banco de trabajo WS-2350
Tools trolley - Workspace

Panel perforado, 2 estantes fijos, 3 cajones
1 cajón con portacono
Perforated tools board, 2 ed shelves, 3 drawers
1 drawer with cone holder

Cuatro cajones y dos baldas. Anchura: 1.120 mm / Profundidad: 570 mm / Altura: 1.270 mm / Altura ruedas: 160 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Four drawers and two shelves. Width: 1,120 mm / Depth: 570 mm / Height: 1,270 mm / Wheel height: 160 mm / Colour: RAL 5015 with electrostatic powder coating.

881 €

WS-2326

Banco de trabajo móvil
Trolley/Workbench

1 armario, 4 cajones, 1 cajón con portaconos
1 wardrobe, 4 drawers, 1 cone holder drawer

Carro de acero soldado de alta calidad, perforado y reforzado para 4x guías y recubierto con polvo electrostático. Sistema central de cierre. Se puede utilizar para conos morse SK 30-40-50 y para conos HSK 16-32-40-50-63-80-100. Cinco cajones y un armario.

Tiene tres posiciones ajustables en cada dirección. La primera posición es a 2º 34', adecuada para mangos HSK. La segunda posición es a 8º 17' 50" para conos SK y BT. Utilizado por moldistas y mecanizadores para el almacenamiento de conos CNC.

Anchura: 1.120 mm / Profundidad: 570 mm / Altura: 725 mm / Altura ruedas: 160 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

High quality welded steel trolley, perforated and reinforced for 4x guides and coated with electrostatic powder. Central locking system. It can be used for Morse cones SK 30-40-50 and for HSK 16-32-40-50-50-63-80-100 cones. Five drawers and a wardrobe.
It has three adjustable positions in each direction. The first position is 2º 34', suitable for HSK handles. The second position is 8º 17' 50" for SK and BT cones. Used by moulders and machinists for the storage of CNC cones.
Width: 1.120 mm / Depth: 570 mm / Height: 725 mm / Wheel height: 160 mm / Colour: RAL 5015 with electrostatic powder coating.

952 €

Banco de trabajo para empaquetar WS-3405
Workbench for packaging

Incluye portabobinas y estantes para gavetas. Capacidad máxima de 500 Kg.

Anchura: 1.700 mm / Profundidad: 700 mm / Altura: 2.000 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Includes reelstands and drawer shelves. Maximum capacity of 500 Kg.
Width: 1.700 mm / Depth: 700 mm / Height: 2.000 mm / Colour: RAL 5015 with electrostatic powder coating.

643 €

Banco de trabajo WS-2176
Workbench

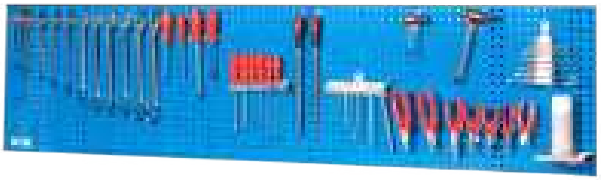
SOPORTE PARA CONOS

5 cajones y estante inferior
5 drawers and lower shelf

Anchura: 1.700 mm / Profundidad: 600 mm / Altura: 850 mm / Color: RAL 5015 con recubrimiento de polvo electrostático.

Width: 1.700 mm / Depth: 600 mm / Height: 850 mm / Colour: RAL 5015 with electrostatic powder coating.

854 €



WS-3035 **Panel perforado**
Perforated Tools board

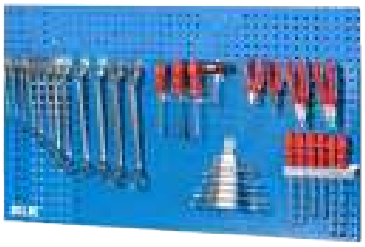
2.200 x 550 x 20 mm

99 €

WS-3000 **Panel perforado**
Perforated Tools board

1.700 x 550 x 20 mm

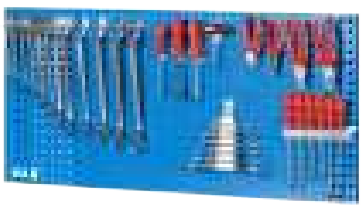
76 €



WS-3010 **Panel perforado**
Perforated Tools board

1.150 x 700 x 20 mm

68 €



WS-3015 **Panel perforado**
Perforated Tools board

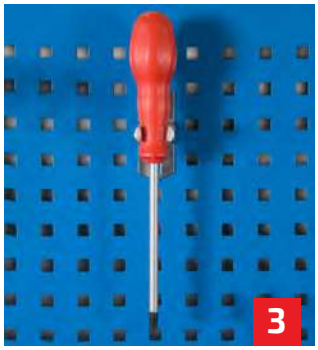
1.110 x 550 x 20 mm

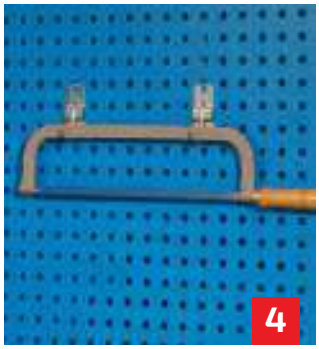
58 €

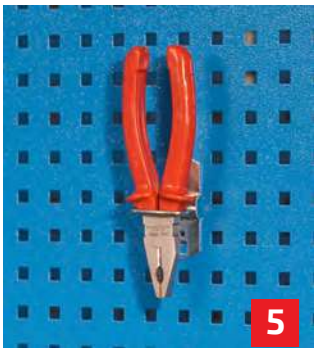
WS-3025 **Panel perforado**
Perforated Tools board

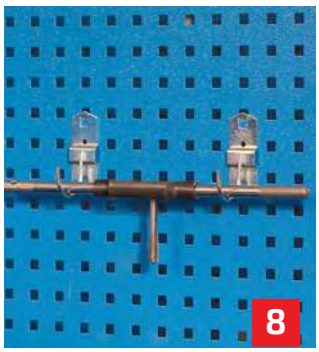
700 x 550 x 20 mm

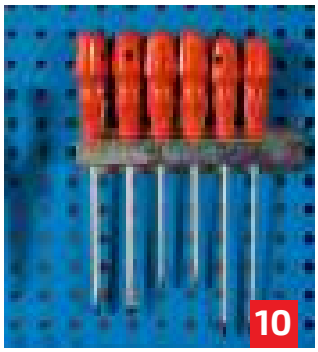
36 €











Ganchos sujetaherramientas

1	WS-K1	1,30 €	7	WS-K7	2,50 €
2	WS-K2	2,00 €	8	WS-K8	1,40 €
3	WS-K3	1,40 €	9	WS-K9	3,20 €
4	WS-K4	1,40 €	10	WS-K10	3,20 €
5	WS-K5	1,70 €	11	WS-K11	6,40 €
6	WS-K6	2,60 €	12	WS-K12	3,35 €

Gancho sujetabrocas

13	WS-K13	5,05 €

Gancho bandeja

14	WS-K14	4,25 €

OTROS PRODUCTOS

OTHER PRODUCTS

Aflojatodo multiusos super lubricante y protector

Multiuse loosener, lubricating and protecting oil

A de máxima calidad que rinde de forma excepcional abarcando desde las aplicaciones domésticas más
sencillas hasta las aplicaciones industriales más severas. Cumple con los tres cometidos principales, siendo éstos,
desincrustar óxido y suciedad, penetrar y lubricar. Gracias a su alta concentración de materia activa, conseguimos
resultados óptimos con la mínima cantidad de producto. Una vez que el producto esté aplicado, nos permite calentar
el mecanismo para facilitar la penetración.

Maximum quality loosener with exceptional performance for all applications, from strightforward DIY through to the
harshest industrial conditions. Performs three main tasks: descaling rust and dirt, penetrating and lubricating. Thanks
to its high concentration of active material, optimal results are achieved with a minimum amount of product. Once
the product has been applied, the mechanism can be heated for better penetration.

400 ml

21,95 €

Grasa lubricante

Lubricating film

Tratamiento antifricción en spray, con componentes lubricantes, que permite proteger cualquier mecanismo que
esté sometido a fricción, evitando así problemas de oxidaciones y desgastes innecesarios. Gracias al tratamiento
antifricción que cubre incluso las irregularidades microscópicas, se logra una gran protección contra el óxido y la
corrosión, por un largo periodo de tiempo, siendo además un excelente amigo de las labores de montaje de
cualquier mecanismo por delicado que sea. Gran protección contra la corrosión en ambientes marinos e industriales.
Excelente lubricante para utilizar como aceite de corte en las labores de roscado.

Lubricating treatment in a spray, with anti-friction ingredients that help protect any mechanism subject to friction,
thus avoiding problems with rust and unnecesary wear. Thanks to the lubricating treatment, which works even at the
microscopic level, it gives excellent protection againnst rust and corrosion over long periods of time, as well as being
handy to have in the work place when assembling any mechanism, no matter how delicate. Gives very good
anti-rust protection in marine environments and industrial applications. Excellent for use as a cutting oil for
threading work.

400 ml

21,50 €

Aceite universal

Universal oil

Aceite universal biodegradable.
Cuidado de vehículos: piezas de aluminio, cromadas, gomas y materiales sintéticos. Evita el congelamiento. Ideal también para bicicletas y motocicletas.
Cuidado del cuero: suaviza y aporta elasticidad, protege contra el agua, desinfecta y da brillo. Ideal para muebles, botas y sillas de montar.
Hogar: en cerraduras, bisagras, limpieza de aluminio, acero inoxidable, madera y material sintético. Conserva, desinfecta y protege contra la corrosión
Jardín: cuida los utensilios como cortacésped, tijeras…
Industria: mantenimiento de máquinas, herramientas, elementos de precisión y conexiones atascadas. Protege del óxido y la corrosión y tiene efecto desinfectante.
Cuidado de animales: limpieza de orejas, pelo y patas de los perros y de la melena, cola y cascos de caballos.
Cuidado de armas: Protege de la corrosión, lubrica y limpia. Elimina restos de pólvora, plomo y cobre.

400 ml

10,60 €

Universal biodegradable oil.
Vehicle care: aluminum and chrome parts, rubber goods and synthetic material. It will prevent locks freezing. Ideally suited for bikes and motorcycles.
Leather care: makes hard and dry leather soft and supple, protects against water. It disinfects and imparts a silky sheen. Perfect for furniture, boots and saddlery.
Household: acts against unwieldy doorlocks and squealing hinges. It cleans and preserves aluminum, stainless steel and synthetic surfaces. It preserves, disinfects and provides long-lasting rust protection.
Garden: Maintains gardening tools, lawn mowers, shears…
Industry: used for the maintenance of machines, tools, precision instruments and for loosening screwed joints. It prevents rust and corrosion and also disinfects.
Animal care: ideally suited for the care of dog's coats and paws and for cleaning their outer ears. It's useful for the manes, tail hairs and hooves of horses.
Weapons: forms a protective film on the metal and inhibits corrosion, it cleans and lubricates. It acts against residues of powder, lead and copper.

Protec

Protec

Cuidado, mantenimiento y protección de maquinaria industrial y equipamiento de talleres y herramientas de precisión.
Lubrica las operaciones de fresado, torneado, roscado y taladrado.
Ideal para conservación de larga duración, incluso con mucha humedad.
No contiene ceras
Elimina los chirridos
Uso para uniones de tornillos, juntas y conexiones.
Temperatura de aplicación e -40ºC a 150ºC

400 ml

14,10 €

Care, maintenance and protection of industrial machinery, workshop equipment and precision tools.
For lubricating milling, turning, threading and drilling operations.
Ideal for long-term preservation, even at high air humidity.
Contains no waxes
Eliminates squeaking and creaking
Use to free tight fittings, plugs and joint connections
Operating temperature from -40°C to +150°C

Magnaslot: Plato magnético electropermanente

Magnaslot: Electropermanent magnet plate

Sistema full metallic patentado
Nº EP1874504

Los platos magnéticos electropermanentes patentados "full metallic" EPM son la más y segura solución de amarre de piezas para todo tipo de centros o fresados.

La posibilidad de uso de espesores y moviles permite crear una zona de apoyo magnética y la cual se ajusta a la forma de la pieza a mecanizar, amarrandola y eliminando todo tipo de deformaciones.

- Amarre de piezas pequeñas y grandes en centros de mecanizado.
- Mecanizado sin vibraciones ni deformaciones.
- Mecanizado de 5 caras en un solo amarre.
- Dimensión del polo 50*50 mm
- Fuerza de amarre 380 daN por polo
- Profundidad del campo magnético en el nivel más elevado de adhesión 12 mm

The patented electro-permanent magnetic plates "full metallic" EPM are the most efficient and safe solution for clamping parts for all types of centers or milling.

The possibility of using fixed and movable thicknesses allows the creation of a magnetic and flexible support zone which adjusts to the shape of the part to be machined, firmly clamping it and eliminating all types of deformations.

- Clamping of small and large parts in machining centres.
- Machining without vibrations or deformations.
- 5-sided machining in a single clamping operation.
- Pole dimension 50*50 mm.
- Clamping force 380 daN per pole.
- Depth of magnetic field at highest adhesion level 12 mm.

Fija *Fixed*

Flexible *Flexible*

Prolongación Extension

Ref.	Prod.	Dimensiones *Measurements* [mm]	Polo *Polsize*	€
38010	PVF50 Prolongación	50x50x32	50	12,00
38011	PVB50 Prolongación	50x50x32	50	28,00

Magnaslot Polo 50

Ref.	Prod.	Dimensiones *Measurements* [mm]	Polo *Polsize*	Cantidad de polos *Number of poles*	Fuerza por polo *Force per pol* [Kg]	Unidad de control *Control device*	€
38335	magnaslot 304HD50	300x430x55	50	24	400	D50	1.728,00
49812	magnaslot 404HD50	420x430x55	50	36	400	D50	2.592,00
56130	magnaslot 406HD50	420x590x55	50	48	400	D50	3.456,00
48641	magnaslot 408HD50	420x750x55	50	60	400	D50	4.320,00
50615	magnaslot508HD50	480x750x55	50	70	400	D50	5.040,00
49574	magnaslot 608HD50	600x750x55	50	90	400	D100	6.840,00
49787	magnaslot 410HD50	420x990x55	50	84	400	D100	6.480,00
50249	magnaslot 510HD50	480x990x55	50	98	400	D100	7.056,00
49319	magnaslot 610HD50	600x990x55	50	126	400	D100	9.072,00

Magnaslot Polo ECO 50

Ref.	Prod.	Dimensiones *Measurements* [mm]	Polo *Polsize*	Cantidad de polos *Number of poles*	Fuerza por polo *Force per pol* [Kg]	Unidad de control *Control device*	€
58261	magnaslot 304ECO50	325x370x55	50	20	400	D50	1.440,00
63276	magnaslot 404ECO50	360x360x55	50	25	400	D50	1.800,00
63277	magnaslot 406ECO50	370x635x55	50	40	400	D50	2.880,00
64066	magnaslot 408ECO50	360x790x55	50	50	400	D50	3.600,00
64072	magnaslot 508ECO50	445x790x55	50	60	400	D50	4.320,00
63278	magnaslot 608ECO50	580x790x55	50	80	400	D50	5.760,00
61382	magnaslot 410ECO50	360x950x55	50	60	400	D50	4.320,00
65976	magnaslot510ECO50	465x965x55	50	72	400	D50	5.184,00
63279	magnaslot 610ECO50	580x940x55	50	96	400	D100	6.912,00

Unidad de control Control device

Ref.	Prod.	€
13070	Unidad Control D50	900,00
52950	Unidad Control D100	1.100,00
58088	Unidad Control D100-4 cuatro canales	2.200,00

Magnaslot: Plato magnético electropermanente

Magnaslot: Electropermanent magnet plate

- Mecanizado de 5 caras en un solo amarre.
- Sin deformaciones de la pieza de amarrar.
- Rapidez de posicionamiento de la pieza.
- Óptima duración de la herramienta por vibraciones.

- 5-sided machining in a single clamping operation.
- No deformation of the clamping piece.
- Fast positioning of the part.
- Optimum tool life due to vibrations.

Sistema full metallic patentado
Nº EP1874504

Prolongación *Extension*

Ref.	Prod.	Dimensiones *Measurements* [mm]	Polo *Polsize*	€
40127	PVF70 Prolongacion	70x70x45	75	28,00
40128	PVB70 Prolongacion	70x70x45	75	56,00

Fija *Fixed*

Flexible *Flexible*

Magnaslot Polo 75

Ref.	Prod.	Dimensiones *Measurements* [mm]	Polo *Polsize*	Cantidad de polos *Number of poles*	Fuerza por polo *Force per pol* [Kg]	Unidad de control *Control device*	€
48900	magnaslot 304HD75	327x425x60	75	12	900	D50	1.776,00
52546	magnaslot 404HD75	415x425x60	75	16	900	D50	2.400,00
49011	magnaslot 406HD75	415x600x60	75	24	900	D50	3.600,00
49012	magnaslot 408HD75	415x815x60	75	32	900	D50	4.800,00
52542	magnaslot 508HD75	503x815x60	75	40	900	D50	6.000,00
49833	magnaslot 510HD75	503x1030x60	75	50	900	D100	7.500,00
49985	magnaslot 610HD75	591x1030x60	75	60	900	D100	9.000,00

Unidad de control *Control device*

Ref.	Prod.	€
13070	Unidad Control D50	900,00
52950	Unidad Control D100	1.100,00
58088	Unidad Control D100-4 cuatro canales	2.200,00

Magnaslot con ranuras: Plato magnético electropermanente

Magnaslot: Electropermanent magnet plate

Sistema full metallic patentado Nº EP1874504

Los platos magnéticos electropermanentes patentados "full metallic" EPM con ranuras engloba las ventajas de amarre magnético y el amarre mecánico en un único plato.

Es la más perfecta y segura solución de amarre de piezas magnéticas y no magnéticas de

Los tres espesores combinados junto a un set de espesores móviles generan una base magnética y consiguiendo un ajuste de forma de la pieza a amarrar dotando al sistema de un amarre y con ausencia de deformaciones.

- Amarre de piezas pequeñas y grandes.

- Amarre de piezas magnéticas y no magnéticas.

- Mecanizado sin vibraciones ni deformaciones.

- Rapidez de posicionamiento de la pieza.

- Mecanizado de 5 caras en un solo amarre.

- Dimensión del polo 75*75 mm.

- Ranuras para el amarre mecánico.

- Fuerza de amarre 800 DaN por polo.

- Profundidad del campo magń etico en el nivel más elevado de adhesión 20 mm.

- completa de acero resistente contra virutas calientes y refrigerante.

- Esporización automática para un amarre uniforme.

- Una combinación de varios platos EPM permite el mecanizado de piezas largas y grandes.

The patented electro-permanent magnetic plates "full metallic" EPM with slots include the advantages of magnetic clamping and mechanical clamping in a single plate.

It is the most perfect and safe solution for clamping magnetic and non-magnetic parts in an efficient way.

The three fixed thicknesses combined with a set of movable thicknesses generate a magnetic and flexible base, achieving an adjustment of the shape of the piece to be clamped, giving the system a firm clamp and with no deformation.

- Mooring of small and large parts.

- Magnetic and non-magnetic part clamping.

- Machining without vibrations or deformations.

- Fast positioning of the part.

- 5-sided machining in a single mooring.

- Pole dimension 75*75 mm.

- Slits for mechanical clamping.

- Mooring force 800 DaN per pole.

- Depth of field magń etico at highest adhesion level 20 mm.

- Complete surface made of steel resistant to hot chips and coolant.

- Automatic spreading for uniform clamping.

- A combination of several EPM chucks allows the machining of long and large parts.

Fija *Fixed*

Flexible *Flexible*

Prolongación Extension

Ref.	Prod.	Dimensiones *Measurements* [mm]	Polo *Polsize*	€
40127	PVF70 Prolongacion	70x70x45	75	28,00
40128	PVB70 Prolongacion	70x70x45	75	56,00

Magnaslot Polo 75

Ref.	Prod.	Dimensiones *Measurements* [mm]	Polo *Polsize*	Cantidad de polos *Number of poles*	Fuerza por polo *Force per pol* [Kg]	Unidad de control *Control device*	€
49010	magnaslot 406HD75 T-Slot	415x600x93	75	24	900	D50	4.800,00
51290	magnaslot 508HD75 T-Slot	503x815x93	75	48	900	D100	9.600,00
61383	magnaslot 610HD75 T-slot	591x1030x93	75	60	900	D100	12.000,00

Unidad de control Control device

Ref.	Prod.	€
13070	Unidad Control D50	900,00
52950	Unidad Control D100	1.100,00
58088	Unidad Control D100-4 cuatro canales	2.200,00

Elevador magnético permanente

Permanent magnetic lifter

- El elevador magnético permanente puede ser utilizado en diversas industrias para el transporte y elevación de acero, piezas de motor y

- La fuerza de tracción más alta del elevador magnético es 3,5 veces mayor que la capacidad de elevación nominal.

- Peso ligero: entre 10 y 125 kg.

- No se necesita electricidad para usar el elevador magnético, una vez que se ha usado hay menos de 1% de magnetismo residual.

- El diseño sencillo del accionador y del pestillo de seguridad permite su uso con una sola mano.

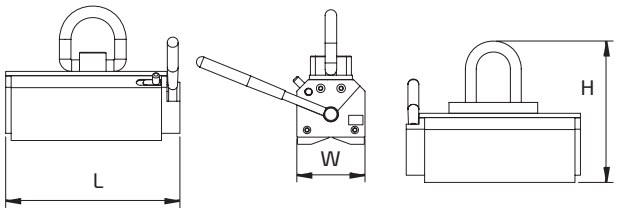
- The permanent magnetic lifter can be used in variety industries for the transportation and lifting of steel, engine parts and molds, due to its magnetic surface.

- The magnetic lifter's highest pulling force is 3.5times greater than the rated lifting capability.

- Light weight: ranging from 10-125kgs.

- No electricity is needed to use the magnetic lifter, once it's been used there is less than 1% residual magnetism.

- The simple switch and safety button design allows for one handed operation.



Ref.	Dimensiones *Measurements* [mm]				Carga *Load*	Carga *Load*	Temp.	Peso *Weight*	€
	L	W	H	R	[Kg]	[Kg]	[ºC]	[kg]	
EMP0100	92	64	70	145	100	30	<80	3	**286,00**
EMP0200	114	72	86	145	200	60	<80	5	**299,20**
EMP0500	210	88	96	203	500	150	<80	12,5	**638,00**
EMP1000	264	148	138	266	1000	300	<80	37	**1.232,00**
EMP2000	397	168	168	380	2000	500	<80	80	**2.481,00**
EMP5000	582	290	265	627	5000	1500	<80	320	**6.754,00**

Elift: Elevador magnético

Magnetic lift

- Elevación totalmente segura,
c

- Amarre y seguridad en el amarre de piezas con todo tipo de rugosidades.

- Se activa y desactiva fácilmente mediante una palanca de mano.

- Se cuelga fácilmente de la grúa lo que conlleva una optimización de la capacidad de la grúa y una mejora de su manejo en espacios reducidos.

- La palanca del interruptor no salta hacia atrás, evitando todo tipo de impacto en la acción de DEMAG o desaccionamiento del imán hacia atrás.

- Temperatura máxima de funcionamiento: 80ºC.

- Sistema "bimanual" para accionamiento desaccionamiento de la palanca con gatillo de bloqueo.

- Totally safe lifting,
safety coefficient 1:3.

- Mooring and safety in the clamping of parts with all types of roughness.

- No damage to part surfaces.

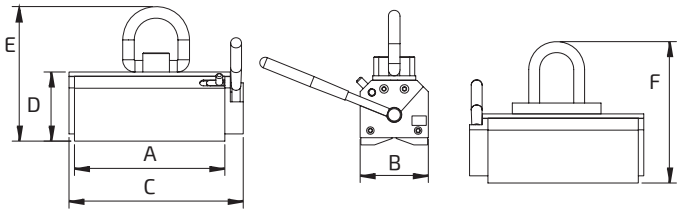
- It is easily activated and deactivated by means of
a hand lever.

- Easy to hang from the crane, which optimises the crane's capacity and improves its handling in confined spaces.

- The switch lever does not jump backwards, avoiding any kind of impact on the action of DEMAG or backwards activation of the magnet.

- Maximum operating temperature: 80ºC.

- Two-hand" system for activating the lever with locking trigger.



Prod.	Dimensiones *Measurements* [mm]						Carga *Load*	Grosor mín *Min width*	Carga *Load*	máx. Ø	Peso *Weight*	Ref.	€
	A	B	C	D	E	F	[Kg]	[mm]	[Kg]	[mm]	[kg]		
Elift 100	105	70	132	71	-	138	100	15	45	100	4	50871	**240,00**
Elift 300	160	90	193	87	167	-	300	25	125	160	9	34858	**400,00**
Elift 500	220	100	255	101	181	-	500	30	215	220	18	34589	**600,00**
Elift 1000	310	122	355	126	243	-	1.000	50	450	350	42	34860	**1.000,00**
Elift 2000	390	182	442	176	-	365	2.000	50	900	400	88	34862	**2.000,00**
Elift 3000	480	182	529	176	-	365	3.000	60	1.350	400	175	43161	**3.000,00**
Elift 5000	520	370	564	321	-	625	5.000	80	2.250	450	350	42037	**5.900,00**

Elevador magnético con batería SB 200

Electropermanent battery lifter SB 200

Los imánes electropermanentes con bateria estan hechos para elevación de cargas hasta 200/500kg en material plano y 80/200kg en redondo. Los SB 200 y SB 500 combinan la seguridad de los imanes permanentes y la facilidad de uso de los electroimanes. ON / OFF ciclos de accionamientos son posibles hasta que las baterías tengan que ser recargadas.

- Pequeño, robusto y fácil de manejar.

- Seleccionable el funcionamiento en modo manual o automatic.

- Electro permanente, intrinsecamente seguros.

- Hasta 1.000 ciclos de accionamientos.

- Pila recagable (Lithium-Ionen) en 2h.

- Consume muy poca energía.

- Para material plano y Redondo.

- Se puede utilizar en un balancin con varios imanes.

- Manipulacion de cargas ferricas en almanc xicorte, plasma, laser, centros de mecanizado, un de aplicaciones de utilizacion en su empresa ayudándole a ser mas en los tiempos de trabajo.

The electro-permanent magnets with battery are made for lifting of loads up to 200/500kg in flat material and 80/200kg in round. The SB 200 and SB 500 combine the safety of permanent magnets with the ease of use of electromagnets. Approximately 1,000 ON/OFF cycles of drives are possible until the batteries have to be recharged.

- Small, robust and easy to handle.

- Selectable operation in manual or automatic mode.

- Permanent electro, intrinsically insurance.

- Up to 1,000 drive cycles.

- Rechargeable battery (Lithium-Ionen) in 2h.

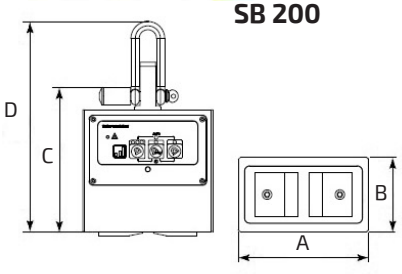
- It consumes very little energy.

- For flat and round material.

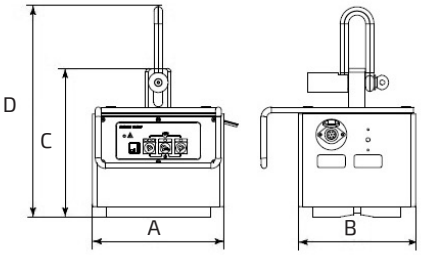
- Can be used on a rocker arm several magnets.

- Handling of ferrous loads in profile storage, oxy-cutting, plasma, laser, machining centres, an endless number of applications of use in your company helping you to be more effective in working times.

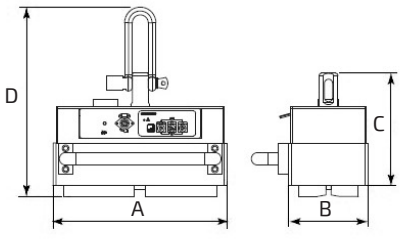
SB 200



SB 500



SB 950



Prod.	Dimensiones *Measurements* [mm]				Carga *Load*	Grosor mín *Min width*	● Carga *Load*	máx. Ø	Peso *Weight*	Ref.	€
	A	B	C	D	[Kg]	[mm]	[Kg]	[mm]	[kg]		
SB 200	180	160	202	290	200	4	50	150	10	65697	**2.250,00**
SB 500	180	160	221	304	500	4	200	200	24	62666	**2.400,00**
SB 950	350	160	225	380	950	4	400	200	39,5	60643	**3.600,00**

Gancho pesador

Electric crane scale

- Este gancho pesador tiene muchas funciones, como acumulación de peso, visualización de peso bruto/neto convertible, cierre automático, calibración por control remoto.

- Adaptador de alimentación AC/DC: salida DC9V/1.5A.

- Batería recargable 6V/10Ah.

- Distancia remota: 10m

- Múltiples unidades de medición.

- Batería recargable de alta capacidad.

- Este producto es utilizado en puertos, transporte, industria metalúrgica, acererías, industrias de materiales de construcción, almacenamiento, carbón, fabricación de papel, empresas mineras y otras áreas de medición de carga y descarga.

- This crane scale has many functions, like weight accumulation, gross/net weight display convertible, auto shut, remote control calibration.

- AC/DC power adaptor: output DC9V/1.5A.

-6V/10Ah rechargeable battery.

- Remote distance: min.10m

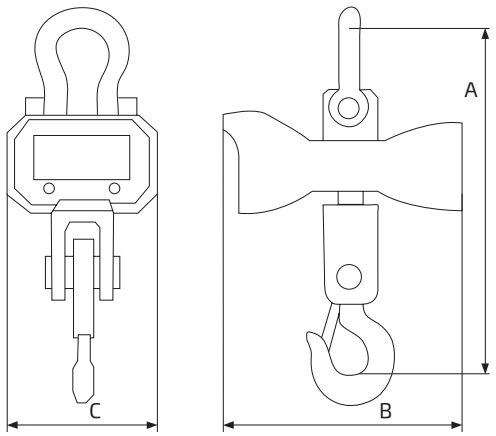
- Multi-weighing units.

- Multi-function operation.

- High capacity rechargeable battery.

- This product is widely used in ports, transportation, metallurgy industry, steel market, building materials market, storage, coal, paper making, mining enterprises and other areas of loading and unloading cargo measurement.

Ref.	Dimensiones [mm]			Max. capacidad	Min. division	Peso	€
	A	B	C	[Kg]	[Kg]	[kg]	
GP03	600	80	45	3000	1	12	**660,00**
GP05	730	100	55	5000	2	14	**748,00**
GP10	850	120	70	10000	5	44	**1.078,00**
GP15	900	140	70	15000	5	60	**2.200,00**
GP20	900	140	70	20000	10	60	**2.596,00**



Separador de aceite

Oil skimmer

- Separa el aceite de la taladrina.

- La circulación del aceite, gracias al ventilador, permite eliminar el propio aceite y otros materiales flotantes.

- Se instala fácilmente en centros de mecanizado, tornos CNC y otras máquinas.

- Elimina malos olores y previene la descomposición de la taladrina.

- Mejora la eficiencia y reduce los costes de aceite malgastado.

- Aumenta la vida de la maquinaria y mejora la superficie de lubricación de la pieza de trabajo ya que elimina los pequeños restos de viruta.

- Reduce el coste de cambio de mangueras de aceite de corte.

- Previene la decoloración del material, especialmente trabajando con acero inoxidable o aluminio.

- Todos los componentes están estandarizados con tecnología patentada.

- Separate the oil from the coolant.

- The circulation of the oil, thanks to the fan, allows to eliminate the oil and other floating materials.

- Easily installed on machining centers, CNC lathes and other machines.

- Eliminates bad smells and prevents the decomposition of the emulsion.

- Improves efficiency and reduces wasted oil costs.

- Increases the life of the machinery and improves the lubricating surface of the workpiece by eliminating small chips.

- Reduces the cost of changing cutting oil hoses.

- Prevents discoloration of the material, especially when working with stainless steel or aluminium.

- All components are standardized with patented technology.

Modelo	A	B	Anchura correa	Capacidad	€
MOS-3500S	370	150-200	34	400cc/10min	**575,00**
MOS-5500N	350	150	54	1000cc/10mm	**830,00**

5500

3500

KLK®
CUTTING TOOLS

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