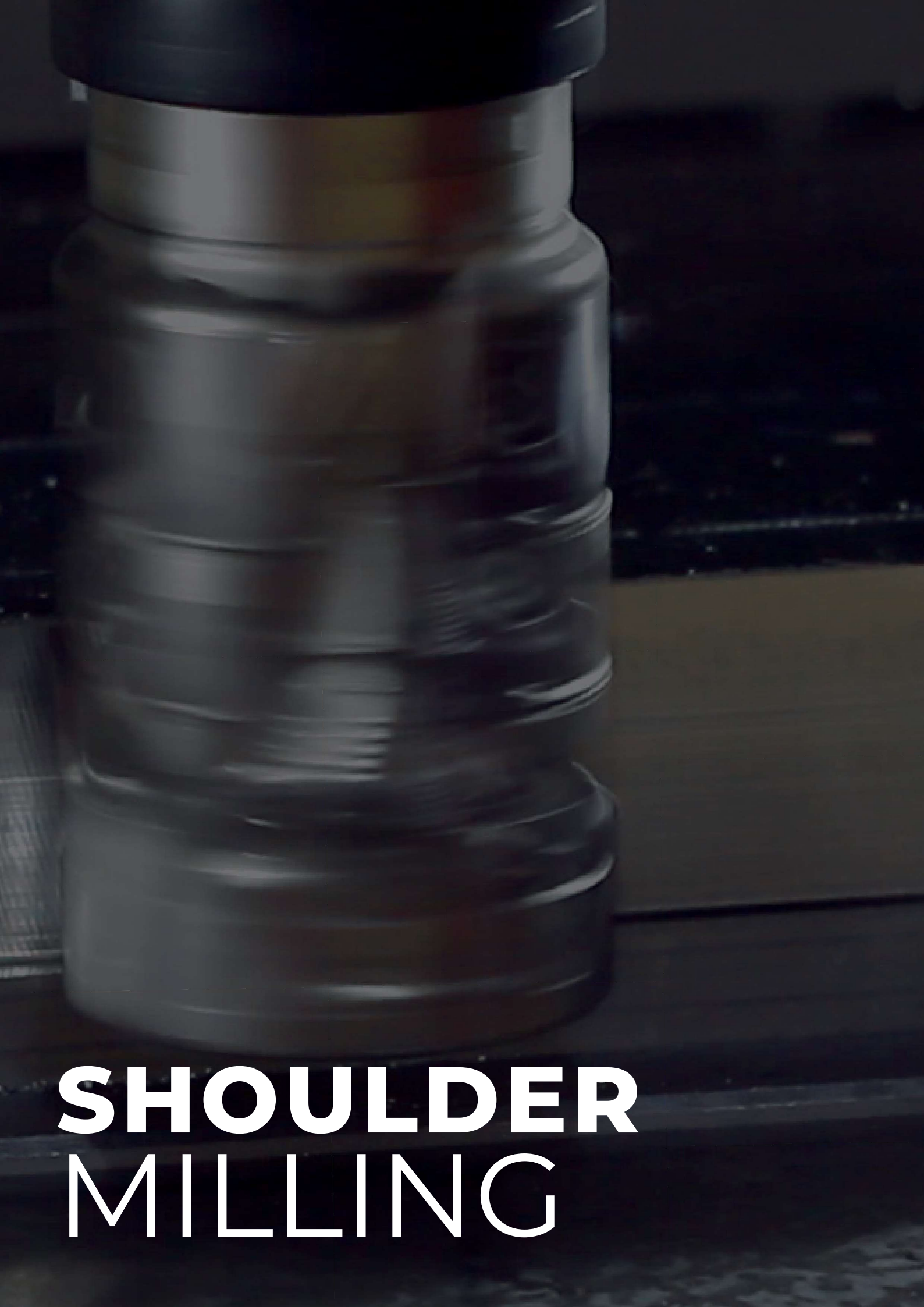




SHOULDER MILLING

1 HEXAPLUS 49490 | 49590

- > Suitable for machining **P K**
- > See page A - 124

2 PLUS 49090

- > Suitable for machining **P K**
- > See page A - 136

3 PLUS 17190 | 17590 | 18190

- > Suitable for machining **P M K N S**
- > See page A - 140

4 LINEPRO 20090 | 20190 | 20290

- > Suitable for machining **P M K N S H**
- > See page A - 154

5 HELIPRO 20290

- > Suitable for machining **P M K N S H**
- > See page A - 178

6 TGPLUS 90090 | 90190 | 90390

- > Suitable for machining **P M K S**
- > See page A - 154

7 ALUPRO 76090 | 77090

- > Suitable for machining **N**
- > See page A - 198

8 LINEPRO 06290

- > Suitable for machining **P M K S**
- > See page A - 208

9 LINEPRO 17090 | 18090

- > Suitable for machining **P M K N**
- > See page A - 212

49490 | 49590

HEXAPLUS



The HEXAPLUS line ensures a precise 90° square in a single milling operation, thus saving considerable production time by eliminating secondary operations. Additionally, it features a wiper edge on the secondary cutting edge, ensuring an excellent finish on the base surface. The new HEXAPLUS 49590 introduces expanded cutting diameters and a new geometry tailored for machining stainless steels and achieving ramps of up to 2.5°.

A linha HEXAPLUS garante um quadrado preciso de 90° em uma única operação de fresagem, economizando assim considerável tempo de produção ao eliminar operações secundárias. Além disso, apresenta uma aresta de limpeza na aresta de corte secundária, garantindo um acabamento excelente na superfície base. A nova HEXAPLUS 49590 introduz diâmetros de corte expandidos e uma nova geometria adaptada para fresagem de aços inoxidáveis e para alcançar rampas de até 2,5°.

La línea HEXAPLUS asegura un cuadrado preciso de 90° en una sola operación de fresado, ahorrando considerable tiempo de producción al eliminar operaciones secundarias. Además, presenta un filo limpiador en el filo de corte secundario, garantizando un excelente acabado en la superficie base. La nueva HEXAPLUS 49590 introduce diámetros de corte expandidos y una nueva geometría adaptada para el fresado de aceros inoxidables y para lograr rampas de hasta 2,5°.

NEW HEXAPLUS 49490 > page 126

- > From DC 18mm to 63mm
De DC 18mm a 63mm | Desde DC 18mm hasta 63mm
- > Available in arbor mounting, threaded coupling and weldon shank
Disponível em montagem tipo árvore, acoplamento roscado e haste weldon | Disponible en montaje tipo tornillo, fijación roscada y mango tipo weldon
- > Strong and high positive geometry
Geometria forte e altamente positiva | Geometría fuerte y altamente positiva
- > Suitable for ramp milling operations
Adequado para operações de fresagem em rampa | Adecuado para operaciones de fresado en rampa



HEXAPLUS 49590 > page 132

- > From DC 32mm to 160mm
De DC 32mm a 160mm | Desde DC 32mm hasta 160mm
- > Available in arbor mounting and weldon shank
Disponível em montagem tipo árvore e haste weldon | Disponible en fijación con tornillo central y mango tipo weldon
- > Negative inserts with 6 cutting-edges
Pastilhas negativas com 6 arestas de corte | Insertos negativos con 6 filos de corte
- > Full 90° main cutting edge
Aresta de corte a 90° | Filo de corte a 90°



MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

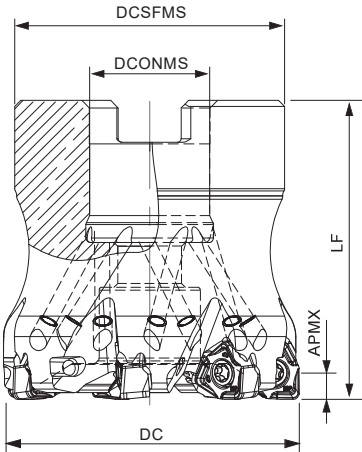
Spare Parts

Technical Data

End Mills



Arbor Mounting
KAPR=90° | GAMP=-5°

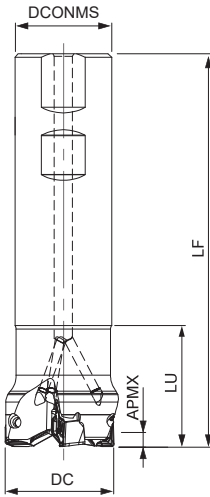


Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181192200	032A49490-06-05-016040	6	32	16	35	40	0,124	A	3,5	WNXT 04 WOXT 04	⊗
181192300	040A49490-07-05-016040	7	40	16	35	40	0,204	A	3,5	WNXT 04 WOXT 04	⊗
181192400	050A49490-08-05-022040	8	50	22	47	40	0,285	A	3,5	WNXT 04 WOXT 04	⊗
181192500	050A49490-09-05-022040	9	50	22	47	40	0,280	A	3,5	WNXT 04 WOXT 04	○
181192600	063A49490-10-05-022040	10	63	22	47	40	0,555	A	3,5	WNXT 04 WOXT 04	○

⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

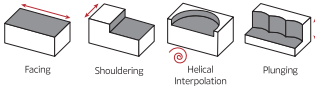


Weldon Shank
KAPR=90° | GAMP=-5°

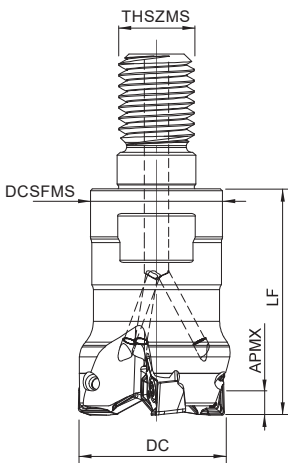


Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)			
181193300	020W49490-03-05-020150	3	20	18	150	29	0,310	3,5		WNXT 04 WOXT 04	⊗
181193400	025W49490-04-05-025170	3	20	20	150	29	0,565	3,5		WNXT 04 WOXT 04	⊗
181193500	025W49490-05-05-025170	4	25	25	170	29	0,591	3,5		WNXT 04 WOXT 04	○
181193600	032W49490-05-05-032195	5	25	25	170	29	1,185	3,5		WNXT 04 WOXT 04	○
181193700	032W49490-06-05-032195	5	32	32	195	31	1,132	3,5		WNXT 04 WOXT 04	○

⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Threaded Coupling
 KAPR=90° | GAMP=-5°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)		
181192700	018R49490-02-05-M10028	2	18	M10	18,3	28	0,050	3,5	WNXT 04 WOXT 04	○
181192800	020R49490-03-05-M10028	3	20	M10	18,3	28	0,045	3,5	WNXT 04 WOXT 04	○
181192900	025R49490-04-05-M12030	4	25	M12	23	30	0,078	3,5	WNXT 04 WOXT 04	○
181193000	025R49490-05-05-M12030	5	25	M12	23	30	0,070	3,5	WNXT 04 WOXT 04	○
181193100	032R49490-05-05-M16040	5	35	M16	30	40	0,160	3,5	WNXT 04 WOXT 04	○
181193200	032R49490-06-05-M16040	6	32	M16	30	40	0,150	3,5	WNXT 04 WOXT 04	○

Stock item | Produto de stock | Items de stock
 Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

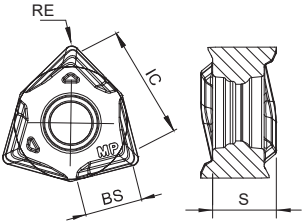
W..XT 0403... Inserts | Pastilhas | Plaquitas



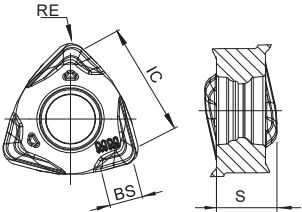
WNXT-MP



WOXT-MM



WNXT



WOXT

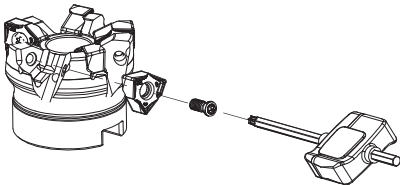
	(2) Grade code	P		M		K	S	Dimensions Dimensões Dimensiones (mm)			
		PVD		PVD		PVD	PVD				
		T1	P4	P4	4H	T1	4H				
(1) Geometry code	ISO Reference	PHP920	PHP930	PHP930	PHF530	PHP920	PHF530	IC	S	RE	BS
1113158	WNXT 040308 PNSR-MP	Ⓢ	Ⓢ			Ⓢ		6,70	3,36	0,80	1,80
1113494	WOXT 040308 PNSR-MM	Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ	6,70	3,36	0,80	0,80

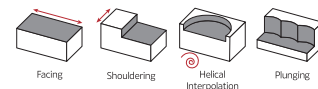
Ⓢ First choice | Primeira opção | 1ª opción Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9) Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS Acessórios | Repuestos

Cutter DC	Order separately			
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value
A49490 - 32-63	P0250503	XT08	DT0812	1,20
W49490 - 20-32	P0250503	XT08	DT0812	1,20
R49490 - 18-32	P0250503	XT08	DT0812	1,20

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.





GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades		
				← Wear Resistance	Toughness →	
				PHP920	PHP930	PHF530
P	1	Unalloyed Steel	125-220	✓	✓	
	2	Low-Alloyed Steel	220-280	✓	✓	
	3	High-Alloyed Steel	280-380	✓	✓	
M	4	SS - Ferritic / Martensitic	200-330		✓	✓
	5	SS - Austenitic	200-330		✓	✓
	6	SS - Austenitic-ferritic (Duplex)	220-260		✓	✓
K	7	Malleable Cast Iron	130-230	✓		
	8	Grey Cast Iron	180-245	✓		
	9	Nodular Cast iron	160-250	✓		
S	11	Heat Resistant Super Alloys	200-320			✓

Good Conditions Average Conditions Difficult Conditions

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)			Feed fz (mm/t)	
				← Wear Resistance	Toughness →			
				PHP920	PHP930	PHF530	WNXT 04	WOXT 04
P	1	Unalloyed Steel	125-220	180-250	160-230	-	0,08-0,25	0,05-0,25
	2	Low-Alloyed Steel	220-280	170-210	150-190	-	0,08-0,25	0,05-0,25
	3	High-Alloyed Steel	280-380	160-200	140-180	-	0,08-0,20	0,05-0,20
M	4	SS - Ferritic / Martensitic	200-330	-	130-170	170-280	-	0,05-0,20
	5	SS - Austenitic	200-330	-	100-160	160-280	-	0,05-0,20
	6	SS - Austenitic-ferritic (Duplex)	220-260	-	80-140	150-260	-	0,05-0,15
K	7	Malleable Cast Iron	130-230	170-300	-	-	0,08-0,25	0,05-0,25
	8	Grey Cast Iron	180-245	150-250	-	-	0,08-0,25	0,05-0,25
	9	Nodular Cast iron	160-250	90-210	-	-	0,08-0,20	0,05-0,20
S	11	Heat Resistant Super Alloys	200-320	-	-	30-150	-	0,05-0,15

CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

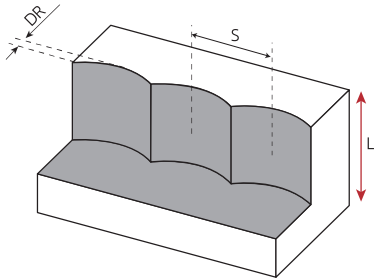
ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	
P	1	Unalloyed Steel	125-220	WNXT 04...	-MP
	2	Low-Alloyed Steel	220-280	WNXT 04...	-MP
	3	High-Alloyed Steel	280-380	WNXT 04...	-MP
M	4	SS - Ferritic / Martensitic	200-330	WOXT 04...	-MM
	5	SS - Austenitic	200-330	WOXT 04...	-MM
	6	SS - Austenitic-ferritic (Duplex)	230-260	WOXT 04...	-MM
K	7	Malleable Cast Iron	130-230	WNXT 04...	-MP
	8	Grey Cast Iron	180-245	WNXT 04...	-MP
	9	Nodular Cast iron	160-250	WNXT 04...	-MP
S	11	Heat Resistant Super Alloys	200-320	WOXT 04...	-MM

PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data		
	Insert radius (mm)	Wiper edge (mm)	APMX (mm)
WNXT 040308 PNSR-MP	0,8	1,8	3,5
WOXT 040308 PNSR-MM	0,8	0,8	3,5

PLUNGING Mergulho | Plunge

L≤3DC	L>3DC	S max.
f _z (mm/t)		
0,10-0,30	0,08-0,25	$S_{max} = \sqrt{DC \cdot Dr - Dr^2}$



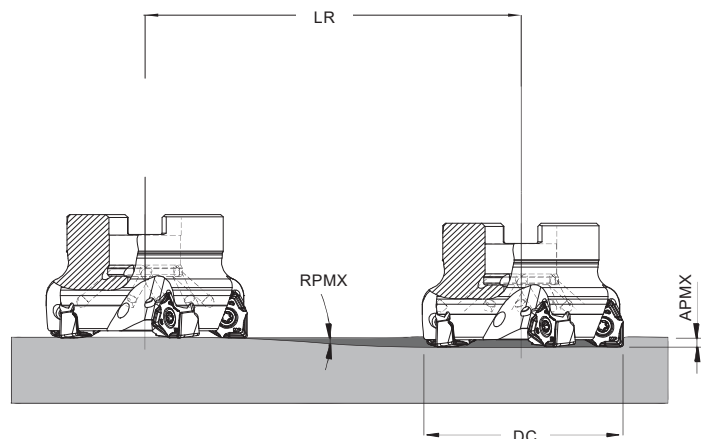
S max and DR corresponding cutting diameter DC (mm)							
DR (mm)	DC (mm)						
	18	20	25	32	40	50	60
1,0	4,1	4,4	4,9	5,6	6,2	7,0	7,9
1,5	5,0	5,3	5,9	6,8	7,6	8,5	9,6
2,0	5,7	6,0	6,8	7,7	8,7	9,8	11,0
2,5	6,2	6,6	7,5	8,6	9,7	10,9	12,3

Note: This values are only for WNXT inserts.

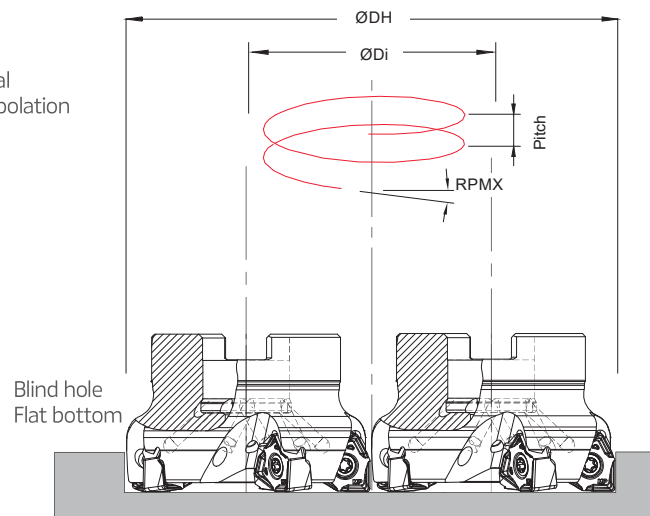
RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular

Ramping



Helical Interpolation



$$\text{ØDi} = \text{ØDH} - \text{DC}$$

DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
18	2,70	3,5	74,2	32,8	-	2,19
				-	34,4	2,42
20	2,30	3,5	87,1	36,8	-	2,11
				-	38,4	2,32
25	1,65	3,5	121,5	46,8	-	1,97
				-	48,4	2,11
32	1,15	3,5	174,4	60,8	-	1,81
				-	62,4	1,91
40	0,85	3,5	235,9	76,8	-	1,71
				-	78,4	1,78
50	0,65	3,5	308,5	96,8	-	1,66
				-	98,4	1,72
63	0,50	3,5	401,1	122,8	-	1,63
				-	124,4	1,68

Note: This values are only for WOXT inserts.

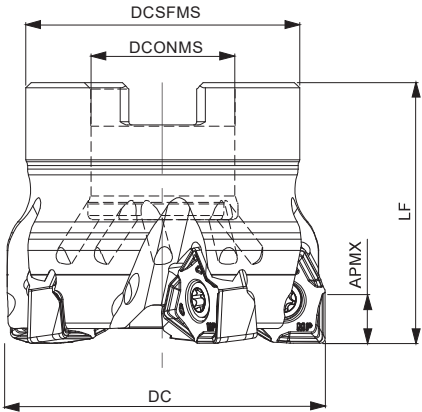
During helical interpolation do not exceed APMX.

(*) Down cutting is recommended, tool pass rotation should be counter-clockwise.

(*) In case of ramping and helical interpolation, apply 70% or less feed (fz) from recommended cutting conditions table.



Arbor Mounting
KAPR=90° | GAMP=-6°



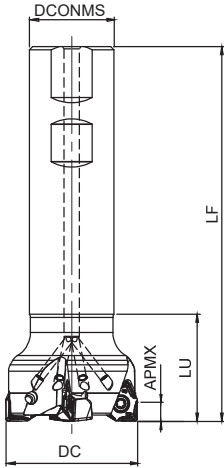
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181174900	040A49590-03-06-016040	3	40	16	32	40	0,150	A	7,5	WNXT 0806...	⊗
181175000	040A49590-04-06-016040	4	40	16	32	40	0,130	A	7,5	WNXT 0806...	○
181173400	050A49590-04-06-022040	4	50	22	42	40	0,390	A	7,5	WNXT 0806...	⊗
181165600	050A49590-05-06-022040	5	50	22	42	40	0,380	A	7,5	WNXT 0806...	⊗
181173500	063A49590-05-06-022040	5	63	22	52	40	0,500	A	7,5	WNXT 0806...	⊗
181173600	063A49590-06-06-022040	6	63	22	52	40	0,490	A	7,5	WNXT 0806...	⊗
181173700	080A49590-07-06-027050	7	80	27	60	50	1,180	B	7,5	WNXT 0806...	⊗
181173800	080A49590-09-06-027050	9	80	27	60	50	1,160	B	7,5	WNXT 0806...	○
181173900	100A49590-08-06-032050	8	100	32	80	50	1,620	B	7,5	WNXT 0806...	⊗
181174000	100A49590-11-06-032050	11	100	32	80	50	1,550	B	7,5	WNXT 0806...	○
181174100	125A49590-11-06-040063	11	125	40	90	63	2,820	B	7,5	WNXT 0806...	⊗
181174200	125A49590-14-06-040063	14	125	40	90	63	2,760	B	7,5	WNXT 0806...	○
181204200	160A49590-12-06-040063	12	160	40	90	63	3,800	B	7,5	WNXT 0806...	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



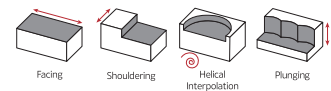
Weldon Shank
KAPR=90° | GAMP=-6°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181174300	032W49590-02-06-032125	2	32	32	125	40	0,650	7,5	WNXT 0806...	⊗
181174500	040W49590-03-06-032130	3	40	32	130	40	0,700	7,5	WNXT 0806...	⊗
181174600	040W49590-04-06-032130	4	40	32	130	40	0,650	7,5	WNXT 0806...	○
181174700	050W49590-04-06-032140	4	50	32	140	45	0,860	7,5	WNXT 0806...	○
181174800	050W49590-05-06-032140	5	50	32	140	45	0,810	7,5	WNXT 0806...	○

⊗ Stock item | Produto de stock | Itens de stock

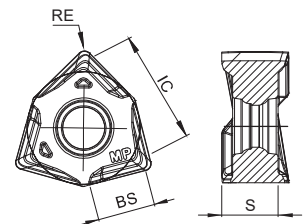
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



WNXT 0806... Inserts | Pastilhas | Plaquetas



WNXT



WNXT

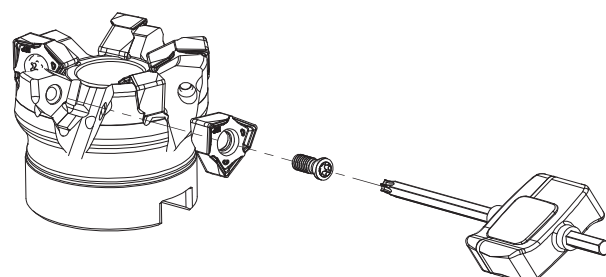
		P		K		Dimensions Dimensões Dimensiones (mm)			
		PVD		PVD					
		T1	P4	T1	P4				
⁽¹⁾ Geometry code	⁽²⁾ Grade code ISO Reference	PHP920	PHP930	PHP920	PHP930	IC	S	RE	BS
1113000	WNXT 080608 PNSR-MP					12,70	6,30	0,80	4,10

First choice | Primeira opção | 1ª opción
 Stock item | Produto de stock | Itens de stock
 Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)
 Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS Acessórios | Repuestos

Cutter DC	Order separately				Order separately		
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench	Retaining Screw
W49590 - 32 - 50	P0401200	XT15	DT1530	3,0	-	-	-
A49590 - 40	P0401200	XT15	DT1530	3,0	-	-	290087600
A49590 - 50 - 63	P0401200	XT15	DT1530	3,0	-	-	-
A49590 - 80	P0401200	XT15	DT1530	3,0	J0123510	SD6368-12	-
A49590 - 100	P0401200	PT15	DT1530	3,0	J0164110	SD6368-16	-
A49590 - 125 -160	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20	-

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
 Check the procedures for the clamping screws on the page A-301.



GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades	
				← Wear Resistance	Toughness →
				PHP920 	PHP930 
P	1	Unalloyed Steel	125-220	✓	✓
	2	Low-Alloyed Steel	220-280	✓	✓
	3	High-Alloyed Steel	280-380	✓	✓
K	7	Malleable Cast Iron	130-230	✓	✓
	8	Grey Cast Iron	180-245	✓	✓
	9	Nodular Cast iron	160-250	✓	✓

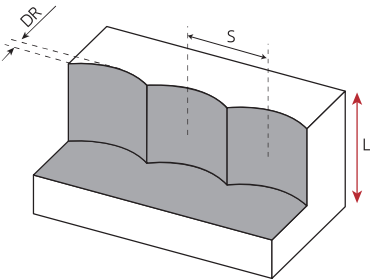
 Good Conditions  Average Conditions  Difficult Conditions

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)		Feed fz (mm/t)
				← Wear Resistance	Toughness →	
				PHP920	PHP930	WNXT 0806
P	1	Unalloyed Steel	125-220	180-250	160-230	0,08 - 0,25
	2	Low-Alloyed Steel	220-280	160-230	140-210	0,08 - 0,25
	3	High-Alloyed Steel	280-380	140-220	120-200	0,08 - 0,20
K	7	Malleable Cast Iron	130-230	130-230	150-250	0,08 - 0,25
	8	Grey Cast Iron	180-245	180-245	140-230	0,08 - 0,25
	9	Nodular Cast iron	160-250	120-210	100-200	0,08 - 0,20

PLUNGING Mergulho | Plunge

L≤3DC	L>3DC	S max.
f _z (mm/t)		
0,10-0,30	0,08-0,25	$S_{max} = \sqrt{DC \cdot Dr - Dr^2}$



S max and DR corresponding cutting diameter DC (mm)								
DR (mm)	DC (mm)							
	32	40	50	63	80	100	125	160
1	5,6	6,2	7,0	7,9	8,9	9,9	11,1	12,6
2	7,7	8,7	9,8	11,0	12,5	14,0	15,7	17,8
3	9,3	10,5	11,9	13,4	15,2	17,1	19,1	21,7
4	10,6	12,0	13,6	15,4	17,4	19,6	22,0	25,0

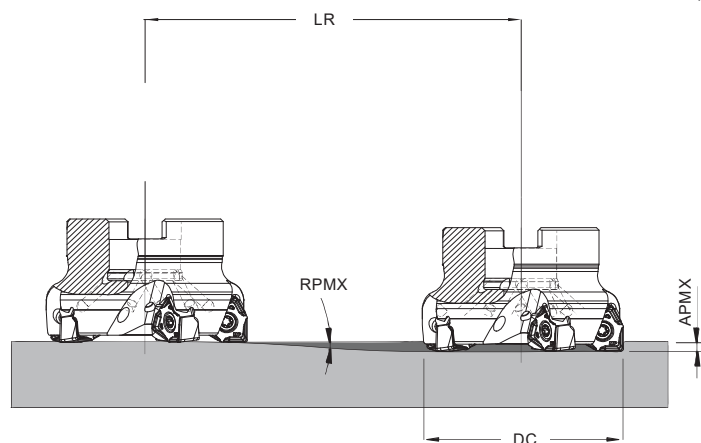
PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data		
	Insert radius (mm)	Wiper edge (mm)	APMX (mm)
WNXT 080308 PNSR-MM	0,8	4,1	7,5

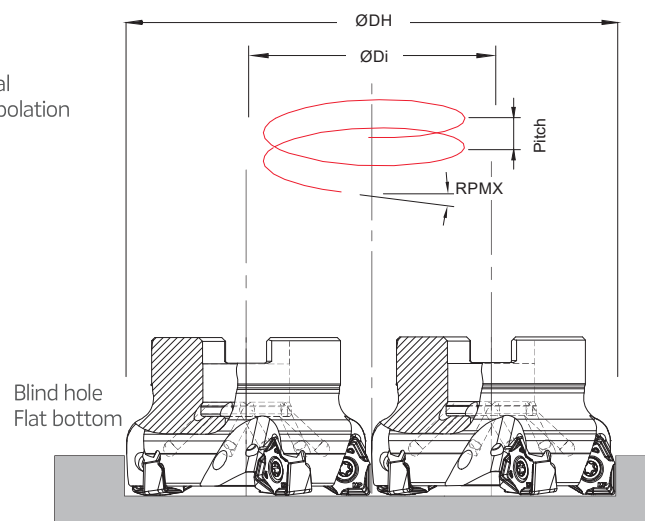
RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular

Ramping



Helical Interpolation



DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
32	0,45	7,5	954,9	54,2	-	0,54
				-	62,4	0,75
40	0,30	7,5	1432,4	70,2	-	0,49
				-	78,4	0,63
50	0,20	7,5	2148,6	90,2	-	0,44
				-	98,4	0,53
63	0,14	7,5	3069,4	116,2	-	0,40
				-	124,4	0,47
80	0,10	7,5	4297,2	150,2	-	0,38
				-	158,4	0,42
100	0,07	7,5	6138,8	190,2	-	0,34
				-	198,4	0,37
125	0,05	7,5	8594,4	240,2	-	0,31
				-	248,4	0,33
160	0,04	7,5	10743,0	310,2	-	0,32
				-	318,4	0,34

Note: During helical interpolation do not exceed APMX.

(*) Down cutting is recommended, tool pass rotation should be counter-clockwise.

(*) In case of ramping and helical interpolation, apply 70% or less feed (fz) from recommended cutting conditions table.

49090

PLUS



The PLUS 49090 is an ideal shoulder milling tool suited for small pieces or applications with high overhang. Additionally, a chip breaker is available for aluminum applications.

A PLUS 49090 é uma ferramenta de fresagem a 90° para peças pequenas ou aplicações com grande balanço. Além disso, tem um quebra-aparas disponível para aplicações em alumínio.

El PLUS 49090 es una herramienta de fresado de 90° ideal para piezas pequeñas o aplicaciones con gran voladizo. Además, hay disponible un rompevirutas para aplicaciones de aluminio.

PLUS 49090 > page 138

- > From DC 16mm to 32mm

De DC 16mm a 32mm | Desde DC 16mm hasta 32mm

- > Available in threaded coupling and cylindrical shank

Disponível em acoplamento roscado e haste cilíndrica | Disponible en fijación roscada y mango cilíndrico

- > Negative inserts with 6 cutting-edges

Pastilhas negativas com 6 arestas de corte | Insertos negativos con 6 filos de corte

- > Chip breaker for aluminium application

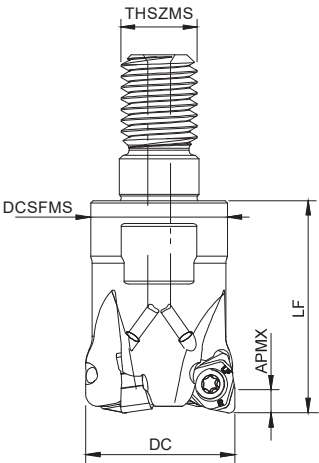
Quebra-aparas para aplicação em alumínio | Rompevirutas para aplicación en aluminio





Threaded Coupling

KAPR=90° | GAMP=-7°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specification	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)		
181136000	016R49090-02-07-M08023	2	16	M08	13	23	0,023	3,00	WNHU 04T3..	Ⓢ
181128300	020R49090-03-07-M10028	3	20	M10	18	28	0,052	3,00	WNHU 04T3..	Ⓢ
181110900	025R49090-04-07-M12030	4	25	M12	21	30	0,078	3,00	WNHU 04T3..	Ⓢ
181128400	032R49090-05-07-M16035	5	32	M16	29	35	0,150	3,00	WNHU 04T3..	Ⓢ

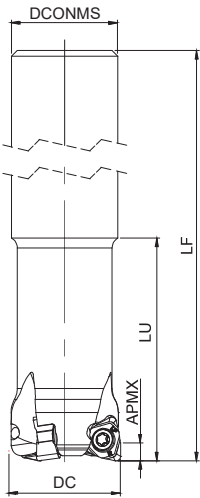
Ⓢ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Cylindrical Shank

KAPR=90° | GAMP=-7°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specification	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181136100	016E49090-02-07-U015150	2	16	15	150	32	0,185	3,00	WNHU 04T3..	Ⓢ
181136200	020E49090-03-07-U019150	3	20	19	150	40	0,292	3,00	WNHU 04T3..	Ⓢ
181136300	025E49090-04-07-U024150	4	25	24	150	50	0,471	3,00	WNHU 04T3..	Ⓢ

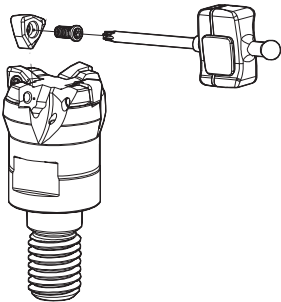
Ⓢ Stock item | Produto de stock | Itens de stock

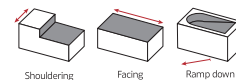
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

SPARE PARTS Acessórios | Repuestos

Cutter DC	Order separately			
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value
R49090 - 20-32	P0250704	XT08	DT0812	1,2
E49090 - 16-25	P0250704	XT08	DT0812	1,2

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.





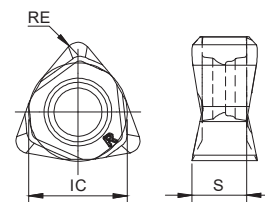
WNHU 04T3.. Inserts | Pastilhas | Plaquetas



WNHU-LP



WNHU-LN



WNHU-LP | LN

	(2) Grade code	P			K			N	Dimensions Dimensões Dimensiones (mm)		
		PVD			PVD			UNC			
		X5	T1	P4	X5	T1	P4	10			
(1) Geometry code	ISO Reference	PHP910	PHP920	PHP930	PHP910	PHP920	PHP930	PH0910	IC	S	RE
1112277	WNHU 04T308 PNER-LP	⊗	⊗	⊗	⊗	⊗	⊗		6,35	3,50	0,80
1113167	WNHU 04T316 PNER-LP		⊗			⊗			6,35	3,40	1,60
1112988	WNHU 04T308 PNFR-LN							⊗	6,35	3,50	0,80

⊗ First choice | Primeira opção | 1ª opción

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades			
				← Wear Resistance		Toughness →	
				PH0910	PHP910	PHP920	PHP930
P	1	Unalloyed Steel	125-220	⊗	✓	✓	✓
	2	Low-Alloyed Steel	220-280		✓	✓	✓
	3	High-Alloyed Steel	280-380		✓	✓	✓
K	7	Malleable Cast Iron	130-230		✓	✓	✓
	8	Grey Cast Iron	180-245		✓	✓	✓
	9	Nodular Cast iron	160-250		✓	✓	✓
N	10	Aluminium and Non Ferrous	30-130	✓			

⊗ Good Conditions

⊗ Average Conditions

⊗ Difficult Conditions

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)				Feed fz (mm/t)	
				← Wear Resistance		Toughness →		WNHU 04T3...LP	WNHU 04T3...LN
P	1	Unalloyed Steel	125-220	-	180-250	180-250	160-230	0,10-0,30	-
	2	Low-Alloyed Steel	220-280	-	160-240	160-230	140-210	0,10-0,30	-
	3	High-Alloyed Steel	280-380	-	140-230	140-220	120-200	0,10-0,25	-
K	7	Malleable Cast Iron	130-230	-	180-300	160-270	150-250	0,10-0,30	-
	8	Grey Cast Iron	180-245	-	160-250	140-250	140-230	0,10-0,30	-
	9	Nodular Cast iron	160-250	-	150-210	120-210	100-200	0,10-0,25	-
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	0,10-0,30

Insert	Feed fz (mm/t)		AP Rec.
	Roughing	Finishing	
WNHU 04T3..	0,15-0,30	0,10-0,25	0,50-3,00

17190 | 17590 | 18190

PLUS



The PLUS Line features strong and smooth cutting edges with exceptional wear resistance, ensuring longevity and consistent performance. Through optimized cutting edge integrity, it enhances productivity and sustains tool reliability. Committed to maximum machining efficiency and stability, this line stands as a guarantee for precision operations.

A Linha PLUS apresenta arestas de corte fortes e suaves com resistência excepcional ao desgaste, garantindo longevidade e desempenho consistente. Através da integridade otimizada da aresta de corte, ela melhora a produtividade e mantém a fiabilidade da ferramenta. Comprometida com a máxima eficiência e estabilidade na fresagem, esta linha se destaca como uma garantia para operações de precisão.

La línea PLUS presenta bordes de corte fuertes y suaves con resistencia excepcional al desgaste, garantizando longevidad y rendimiento consistente. A través de la integridad optimizada del borde de corte, mejora la productividad y mantiene la fiabilidad de la herramienta. Comprometida con la máxima eficiencia y estabilidad en el fresado, esta línea se destaca como una garantía para operaciones de precisión.

PLUS 17190 > page 142

- > From DC 14mm to 100mm

De DC 14mm a 100mm | Desde DC 14mm hasta 100mm

- > Available in arbor mounting and weldon shank

Disponível em montagem tipo árvore e haste weldon | Disponible en fijación con tornillo central y mango tipo weldon

- > Small negative insert with 4 cutting edges (ANHX 1004..)

Pastilha negativa pequena com 4 arestas de corte (ANHX 1004..) | Plaquita negativa pequeña con 4 filos de corte (ANHX 1004..)

- > Helical cutting edge for high wall accuracy

Aresta de corte helicoidal para alta precisão a 90° | Filo de corte helicoidal para alta precisión a 90°

PLUS 17590 > page 146

- > From DC 25mm to 125mm

De DC 25mm a 125mm | Desde DC 25mm hasta 125mm

- > Available in arbor, threaded, weldon and cylindrical shank

Disponível em montagem tipo árvore, acoplamento roscado, haste weldon e cilíndrica | Disponible en fijación con tornillo central, fijación roscada, mango tipo weldon y cilíndrico

- > Medium negative insert with 4 cutting edges (ANHX 1206..)

Pastilha negativa média com 4 arestas de corte (ANHX 1206..) | Plaquita negativa media con 4 filos de corte (ANHX 1206..)

- > Reinforced cutting edges

Arestas de corte reforçadas | Filos de corte reforzados

PLUS 18190 > page 150

- > From DC 32mm to 160mm

De DC 32mm a 160mm | Desde DC 32mm hasta 160mm

- > Available in arbor mounting, threaded coupling and weldon shank

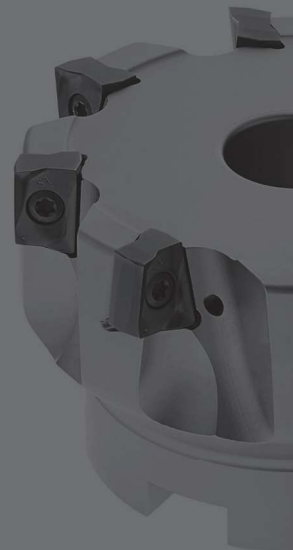
Disponível em montagem tipo árvore, acoplamento roscado e haste weldon | Disponible en fijación con tornillo central, fijación roscada y mango tipo weldon

- > Large negative insert with 4 cutting edges (ANHX 1607..)

Pastilha negativa grande com 4 arestas de corte (ANHX 1607..) | Plaquita negativa grande con 4 filos de corte (ANHX 1607..)

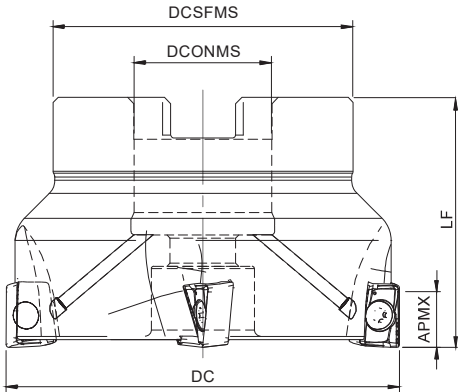
- > Resistant insert for high productivity and smooth cutting

Pastilha resistente para alta produtividade e corte suave | Pastilla resistente para alta productividad y corte suave





Arbor Mounting
KAPR=90° | GAMP=-7°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181075300	040A17190-04-07-016040	4	40	16	32	40	0,21	A	9,00	ANHX 1004...	⊗
181075400	040A17190-05-07-016040	5	40	16	32	40	0,21	A	9,00	ANHX 1004...	⊗
181075500	050A17190-05-07-022040	5	50	22	42	40	0,35	A	9,00	ANHX 1004...	⊗
181075600	050A17190-07-07-022040	7	50	22	42	40	0,34	A	9,00	ANHX 1004...	⊗
181075700	063A17190-07-07-022040	7	63	22	52	40	0,55	A	9,00	ANHX 1004...	⊗
181075800	063A17190-09-07-022040	9	63	22	52	40	0,54	A	9,00	ANHX 1004...	⊗
181075900	080A17190-08-07-027050	8	80	27	60	50	1,00	B	9,00	ANHX 1004...	⊗
181076000	080A17190-10-07-027050	10	80	27	60	50	1,00	B	9,00	ANHX 1004...	⊗
181076100	100A17190-09-07-032050	9	100	32	80	50	1,80	B	9,00	ANHX 1004...	⊗
181076200	100A17190-12-07-032050	12	100	32	80	50	1,80	B	9,00	ANHX 1004...	⊗

⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

ANHX 1004 Inserts | Pastilhas | Plaquetas



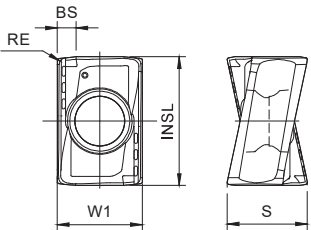
ANHX-LP



ANHX-LM



ANHX-LN



ANHX-LP | LM | LN

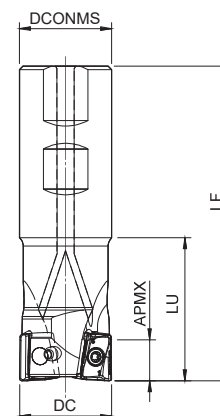
		P						M	K						N	S	Dimensions Dimensões Dimensiones (mm)						
		CVD	PVD					PVD	CVD	PVD					UNC	PVD							
		⁽²⁾ Grade code	T9	G1	X5	T1	P4	G6	X9	G6	T9	G1	X5	T1	P4	G6	10	X9	G6				
⁽¹⁾ Geometry code	ISO Reference	PHS740	PH7910	PHP910	PHP920	PHP930	PH7740	PHH930	PH7740	PHS740	PH7910	PHP910	PHP920	PHP930	PH7740	PH0910	PHH930	PH7740	W1	S	INSL	RE	BS
1111652	ANHX 100405 PNR-LP			⊗	⊗	⊗		○				⊗	⊗	⊗			○		6,60	6,20	10,00	0,50	0,85
1112106	ANHX 100408 PNR-LP				⊗	⊗	○		○				⊗	⊗	○		○		6,60	6,20	10,00	0,80	0,60
1111908	ANHX 100412 PNR-LP				⊗	⊗							⊗	⊗					6,60	6,20	10,00	1,20	0,30
1112021	ANHX 100416 PNER-LP				○								○						6,60	6,20	10,00	1,60	0,20
1112513	ANHX 100402 PNER-LM				○			○					○				○		6,60	6,20	10,00	0,20	1,10
1112005	ANHX 100405 PNER-LM				⊗	⊗	⊗	⊗	⊗				⊗	⊗	⊗		⊗	⊗	6,60	6,20	10,00	0,50	0,85
1112162	ANHX 100408 PNER-LM	○			⊗	⊗	⊗	⊗	⊗	○			⊗	⊗	⊗		⊗	⊗	6,60	6,20	10,00	0,80	0,60
1112103	ANHX 100412 PNER-LM				⊗	⊗	⊗	⊗	⊗				⊗	⊗	⊗		⊗	⊗	6,60	6,20	10,00	1,20	0,30
1111997	ANHX 100405 PNFR-LN															⊗			6,60	6,20	10,00	0,50	0,85
1112102	ANHX 100412 PNR-LN															⊗			6,60	6,20	10,00	1,20	0,30

⊗ First choice | Primeira opção | 1ª opción ⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

Insert order code = (1) Geometry Code + (2) Grade Code



Weldon Shank
KAPR=90° | GAMP=-7° (-6°*)



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181075000	014W17190-01-06-016090*	1	14	16	90	23	0,188	9,00	ANHX 1004...	⊗
181101400	016W17190-02-06-016090*	2	16	16	90	25	0,123	9,00	ANHX 1004...	⊗
181096800	016W17190-02-06-016150*	2	16	16	150	25	0,190	9,00	ANHX 1004...	⊗
181075200	018W17190-02-06-016090*	2	18	16	90	23	0,125	9,00	ANHX 1004...	⊗
181071400	020W17190-02-06-020100*	2	20	20	100	30	0,210	9,00	ANHX 1004...	⊗
181071500	020W17190-03-06-020100*	3	20	20	100	30	0,206	9,00	ANHX 1004...	⊗
181074400	025W17190-02-06-025115*	2	25	25	115	35	0,391	9,00	ANHX 1004...	⊗
181074500	025W17190-03-06-025115*	3	25	25	115	35	0,387	9,00	ANHX 1004...	⊗
181074600	032W17190-03-06-032125*	3	32	32	125	40	0,701	9,00	ANHX 1004...	⊗
181074700	032W17190-04-06-032125*	4	32	32	125	40	0,698	9,00	ANHX 1004...	⊗
181074800	040W17190-04-07-032130	4	40	32	130	40	0,780	9,00	ANHX 1004...	⊗
181074900	040W17190-05-07-032130	5	40	32	130	40	0,777	9,00	ANHX 1004...	⊗

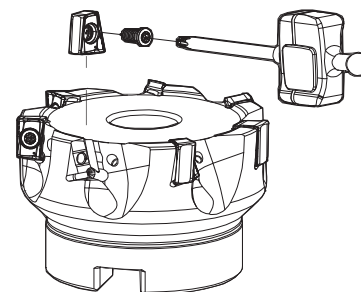
⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire página A-8)

SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
W17190 - 14 - 40	P0300800	XT09	DT0914	1,4	-	-
A17190 - 40 - 63	P0300800	XT09	DT0914	1,4	-	-
A17190 - 80	P0300800	XT09	DT0914	1,4	J0123510	SD6368-12
A17190 - 100	P0300800	XT09	DT0914	1,4	J0164110	SD6368-16

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.



GRADES SELECTION GUIDE

Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	← Wear Resistance							Toughness →	
				PH0910	PHP910	PHP920	PHP930	PHH930	PHS740	PH7740		
P	1	Unalloyed Steel	125-220	●	✓	✓	✓		✓	✓		
	2	Low-Alloyed Steel	220-280		✓	✓	✓		✓	✓		
	3	High-Alloyed Steel	280-380		✓	✓	✓		✓	✓		
M	4	SS - Ferritic / Martensitic	200-330					✓			✓	
	5	SS - Austenitic	200-330					✓			✓	
	6	SS - Austenitic-ferritic (Duplex)	230-260					✓			✓	
K	7	Malleable Cast Iron	130-230		✓	✓	✓		✓	✓		
	8	Grey Cast Iron	180-245		✓	✓	✓		✓	✓		
	9	Nodular Cast iron	160-250		✓	✓	✓		✓	✓		
N	10	Aluminium and Non Ferrous	30-130	✓								
S	11	Heat Resistant Super Alloys	200-320					✓			✓	

●

 Good Conditions

●

 Average Conditions

●

 Difficult Conditions

RECOMMENDED CUTTING CONDITIONS

Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)							Feed fz (mm/t)		
				← Wear Resistance				Toughness →					
				PH0910	PHP910	PHP920	PHP930	PHH930	PHS740	PH7740	ANH... LP	ANH... LM	ANH... LN
P	1	Unalloyed Steel	125-220	-	180-250	180-250	160-230	-	140-220	140-200	0,08-0,20	0,08-0,20	-
	2	Low-Alloyed Steel	220-280	-	160-240	160-230	140-210	-	120-200	130-180	0,08-0,20	0,08-0,15	-
	3	High-Alloyed Steel	280-380	-	140-230	140-220	120-200	-	100-190	100-170	0,08-0,15	0,08-0,15	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	140-210	-	130-180	-	0,08-0,20	-
	5	SS - Austenitic	200-330	-	-	-	-	120-170	-	110-160	-	0,08-0,15	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	100-150	-	90-150	-	0,08-0,15	-
K	7	Malleable Cast Iron	130-230	-	180-300	160-270	150-250	-	160-300	140-220	0,08-0,25	0,08-0,20	-
	8	Grey Cast Iron	180-245	-	160-250	140-250	140-230	-	150-260	120-210	0,08-0,20	0,08-0,20	-
	9	Nodular Cast iron	160-250	-	150-210	120-210	100-200	-	80-220	100-190	0,08-0,20	0,08-0,15	-
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-	-	-	-	0,08-0,20
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	30-110	-	30-100	-	0,08-0,15	-

(Note 1) Cutting conditions ae/Dc=70%.

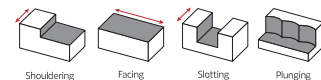
(Note 2)

Operation	ae	Vc & fz	AP (mm)
Slotting	100%	<20%	2,0-3,5
	<50%	>8%	3,0-6,0
Shouldering	≤25%	>12%	6,0-8,5

(Note 3)

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.

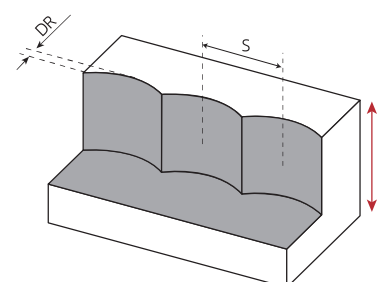


CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1 st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	ANHX 10... LM	ANHX 10... LP
	2	Low-Alloyed Steel	220-280	ANHX 10... LM	ANHX 10... LP
	3	High-Alloyed Steel	280-380	ANHX 10... LM	ANHX 10... LP
M	4	SS - Ferritic / Martensitic	200-330	ANHX 10... LM	-
	5	SS - Austenitic	200-330	ANHX 10... LM	-
	6	SS - Austenitic-ferritic (Duplex)	220-260	ANHX 10... LM	-
K	7	Malleable Cast Iron	130-230	ANHX 10... LM	ANHX 10... LP
	8	Grey Cast Iron	180-245	ANHX 10... LM	ANHX 10... LP
	9	Nodular Cast iron	160-250	ANHX 10... LP	-
N	10	Aluminium and Non Ferrous	30-130	ANHX 10... LN	-
S	11	Heat Resistant Super Alloys	200-320	ANHX 10... LM	-

PLUNGING Mergulho | Plunge

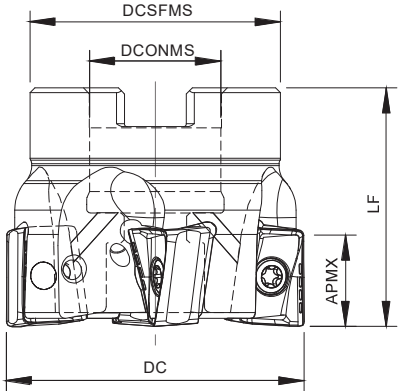
L≤3DC	L>3DC	S max.
f _z (mm/t)		
0,10-0,20	0,10-0,14	S _{max} = √DC·Dr - Dr ²



S max and DR corresponding cutting diameter DC (mm)											
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



Arbor Mounting
KAPR=90° | GAMP=-6°

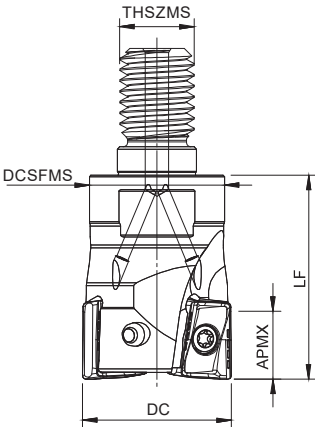


Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181116400	040A17590-04-06-016040	4	40	16	32	40	0,17	A	11,00	ANHX 1206...	⊗
181114500	050A17590-05-06-022040	5	50	22	42	40	0,30	A	11,00	ANHX 1206...	⊗
181115900	050A17590-06-06-022040	6	50	22	42	40	0,30	A	11,00	ANHX 1206...	⊗
181116500	063A17590-05-06-022040	5	63	22	52	40	0,55	A	11,00	ANHX 1206...	⊗
181116600	063A17590-07-06-022040	7	63	22	52	40	0,52	A	11,00	ANHX 1206...	⊗
181116700	080A17590-08-06-027050	8	80	27	60	50	1,10	A	11,00	ANHX 1206...	⊗
181116800	080A17590-10-06-027050	10	80	27	60	50	1,10	A	11,00	ANHX 1206...	○
181116900	100A17590-12-06-032050	12	100	32	80	50	1,65	B	11,00	ANHX 1206...	⊗
181117000	125A17590-14-06-040063	14	125	40	90	63	3,16	B	11,00	ANHX 1206...	⊗

⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Threaded Coupling
KAPR=90° | GAMP=-6°

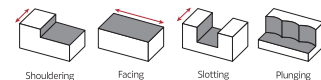


Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)			
181117100	025R17590-02-06-M12035	2	25	M12	21	35	0,09	11,00		ANHX 1206...	⊗
181117200	032R17590-03-06-M16043	3	32	M16	29	43	0,20	11,00		ANHX 1206...	⊗
181117300	042R17590-04-06-M16043	4	42	M16	29	43	0,26	11,00		ANHX 1206...	○

⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

PLUS 17590

ANHX 12



A

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

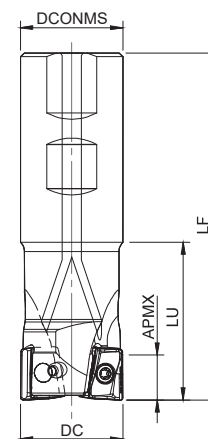
Spare Parts

Technical Data

End Mills



Weldon Shank
KAPR=90° | GAMP=-6°



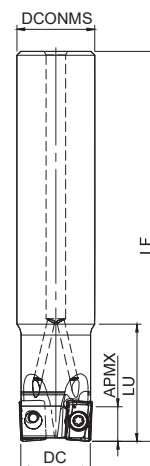
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181116000	025W17590-02-06-025110	2	25	25	110	35	0,37	11,00	ANHX 1206...	⊗
181120600	032W17590-03-06-032150	3	32	32	150	35	0,84	11,00	ANHX 1206...	⊗
181116100	040W17590-04-06-032150	4	40	32	150	40	0,88	11,00	ANHX 1206...	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Cylindrical Shank
KAPR=90° | GAMP=-6°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181116300	026E17590-02-06-025200	2	26	25	200	40	0,66	11,00	ANHX 1206...	⊗
181116200	033E17590-03-06-032250	3	33	32	250	40	1,40	11,00	ANHX 1206...	⊗

⊗ Stock item | Produto de stock | Itens de stock

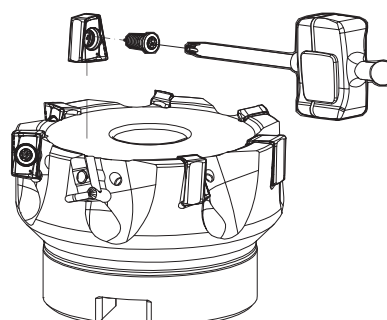
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

SPARE PARTS

Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A17590 - 40 - 100	P0350904	XT10	DT1020	2,0
A17590 - 125	P0350904	PT10	DT1020	2,0
R17590 - 25 - 42	P0350904	XT10	DT1020	2,0
W17590 - 25-40	P0350904	XT10	DT1020	2,0
E17590 - 26 - 33	P0350904	XT10	DT1020	2,0

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.



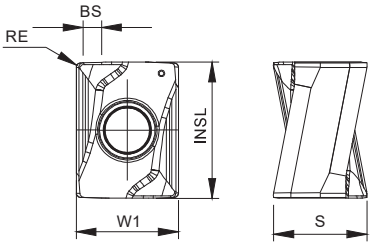
ANHX 1206... Inserts | Pastilhas | Plaquetas



ANHX-LS



ANHX-MP



ANHX-LS | MP

		P					M			K						S			Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD				PVD			CVD	PVD					PVD							
		⁽²⁾ Grade code					T9	T1	P3	P4	G6	P3	X9	G6	T9	L6	T1	P3					
⁽¹⁾ Geometry code	ISO Reference	PHS740	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740	PHS740	PH5320	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740	W1	S	INSL	RE	BS
1112474	ANHX 120604 PNER-LS		⊗		⊙	⊗		⊗	⊗			⊗		⊗	⊗		⊗	⊗	9,00	8,30	12,00	0,40	1,60
1112237	ANHX 120608 PNER-LS		⊗		⊗	⊗		⊗	⊗			⊗		⊗	⊗		⊗	⊗	9,00	8,30	12,00	0,80	1,20
1112429	ANHX 120616 PNER-LS		⊗		⊙	⊗		⊗	⊗			⊗		⊙	⊗		⊗	⊗	9,00	8,30	12,00	1,60	0,40
1112473	ANHX 120604 PNSR-MP		⊗			⊗			⊗		⊗	⊗			⊗			⊗	9,00	8,30	12,00	0,40	1,60
1112238	ANHX 120608 PNSR-MP	⊗	⊗			⊗			⊗	⊗	⊗	⊗			⊗			⊗	9,00	8,30	12,00	0,80	1,20
1112430	ANHX 120616 PNSR-MP		⊗			⊗			⊗		⊗	⊗			⊗			⊗	9,00	8,30	12,00	1,60	0,40
1113476	ANHX 120620 PNSR-MP		⊙									⊙							9,00	8,30	12,00	2,00	-

⊗ First choice | Primeira opção | 1ª opción ⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9) Insert order code = (1) Geometry Code + (2) Grade Code

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)							Feed fz (mm/t)	
				← Wear Resistance			Toughness →				ANHX 12... LS	ANHX 12... MP
P	1	Unalloyed Steel	125-220	-	180-250	-	160-220	160-220	140-220	140-200	0,08-0,20	0,08-0,30
	2	Low-Alloyed Steel	220-280	-	160-230	-	140-200	140-200	120-200	130-180	0,08-0,20	0,08-0,25
	3	High-Alloyed Steel	280-380	-	140-220	-	120-190	120-190	100-190	100-170	0,08-0,15	0,08-0,20
M	4	SS - Ferritic / Martensitic	200-330	-	-	140-210	-	140-200	-	130-180	0,08-0,20	-
	5	SS - Austenitic	200-330	-	-	120-170	-	120-160	-	110-160	0,08-0,15	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	100-150	-	100-140	-	90-150	0,08-0,15	-
K	7	Malleable Cast Iron	130-230	150-280	160-270	-	150-240	150-240	160-300	140-220	0,08-0,20	0,08-0,30
	8	Grey Cast Iron	180-245	160-320	140-250	-	140-230	140-230	150-260	120-210	0,08-0,20	0,08-0,25
	9	Nodular Cast iron	160-250	100-190	120-210	-	100-190	100-190	80-220	100-190	0,08-0,20	0,08-0,20
S	11	Heat Resistant Super Alloys	200-320	-	-	30-110	-	30-100	-	30-100	0,07-0,10	-

(Note 1)
Cutting conditions ae/Dc=70%.

Operation	ae	Vc & fz	AP (mm)
Slotting	100%	<20%	2,5-4,0
Shouldering	<50%	>8%	4,0-7,0
	<25%	>12%	7,0-10,0

(Note 3)
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.

GRADES SELECTION GUIDE

Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades					
				← Wear Resistance			Toughness →		
				PH5320	PHP920	PHH930	PH7930	PHS740	PH7740
P	1	Unalloyed Steel	125-220	●	✓		✓	✓	✓
	2	Low-Alloyed Steel	220-280		✓		✓	✓	✓
	3	High-Alloyed Steel	280-380		✓		✓	✓	✓
M	4	SS - Ferritic / Martensitic	200-330			✓	✓		✓
	5	SS - Austenitic	200-330			✓	✓		✓
	6	SS - Austenitic-ferritic (Duplex)	230-260			✓	✓		✓
K	7	Malleable Cast Iron	130-230	✓	✓		✓	✓	✓
	8	Grey Cast Iron	180-245	✓	✓		✓	✓	✓
	9	Nodular Cast iron	160-250	✓	✓		✓	✓	✓
S	11	Heat Resistant Super Alloys	200-320				✓		✓



Good Conditions



Average Conditions



Difficult Conditions

CHIP BREAKER SELECTION GUIDE

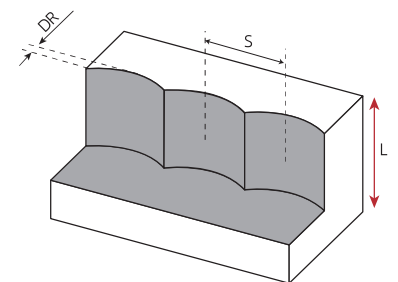
Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1 st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	ANH 12... LS	ANH 12... MP
	2	Low-Alloyed Steel	220-280	ANH 12... MP	-
	3	High-Alloyed Steel	280-380	ANH 12... MP	-
M	4	SS - Ferritic / Martensitic	200-330	ANH 12... LS	-
	5	SS - Austenitic	200-330	ANH 12... LS	-
	6	SS - Austenitic-ferritic (Duplex)	220-260	ANH 12... LS	-
K	7	Malleable Cast Iron	130-230	ANH 12... LS	ANH 12... MP
	8	Grey Cast Iron	180-245	ANH 12... MP	-
	9	Nodular Cast iron	160-250	ANH 12... MP	-
S	11	Heat Resistant Super Alloys	200-320	ANH 12... LS	-

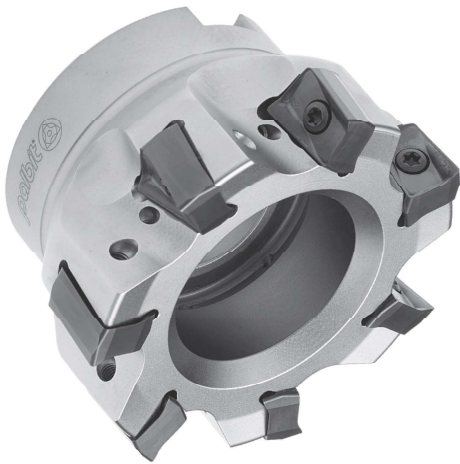
PLUNGING

Mergulho | Plunge

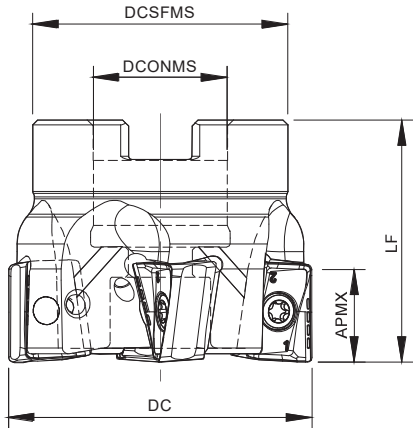
L≤3DC	L>3DC	S max.
f _z (mm/t)		
0,10-0,20	0,10-0,14	S _{max} = √DC·Dr - Dr²



S max and DR corresponding cutting diameter DC (mm)							
DR (mm)	DC (mm)						
	32	40	50	63	80	100	125
1,0	5,6	6,2	7,0	7,9	8,9	9,9	11,1
2,0	7,7	8,7	9,8	11,0	12,5	14,0	15,7
3,0	9,3	10,5	11,9	13,4	15,2	17,1	19,1



Arbor Mounting
KAPR=90° | GAMP=-4°



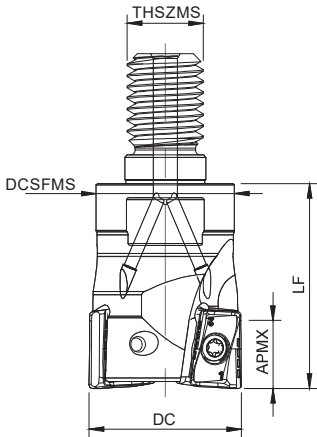
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181067600	050A18190-03-04-022040	3	50	22	42	40	0,28	A	15,0	ANHX 1607...	⊗
181067700	050A18190-04-04-022040	4	50	22	42	40	0,27	A	15,0	ANHX 1607...	⊗
181067800	063A18190-04-04-022040	4	63	22	52	40	0,51	A	15,0	ANHX 1607...	⊗
181067900	063A18190-06-04-022040	6	63	22	52	40	0,48	A	15,0	ANHX 1607...	⊗
181068000	080A18190-05-04-027050	5	80	27	60	50	0,88	B	15,0	ANHX 1607...	⊗
181051800	080A18190-07-04-027050	7	80	27	60	50	0,36	B	15,0	ANHX 1607...	⊗
181068100	100A18190-05-04-032050	5	100	32	80	50	1,60	B	15,0	ANHX 1607...	⊗
181068200	100A18190-08-04-032050	8	100	32	80	50	1,59	B	15,0	ANHX 1607...	⊗
181068300	125A18190-07-04-040063	7	125	40	90	63	2,93	B	15,0	ANHX 1607...	⊗
181068400	125A18190-10-04-040063	10	125	40	90	63	2,89	B	15,0	ANHX 1607...	⊗
181068500	160A18190-08-04-U040063	8	160	40	110	63	4,29	C	15,0	ANHX 1607...	⊗
181068600	160A18190-12-04-U040063	12	160	40	110	63	4,29	C	15,0	ANHX 1607...	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



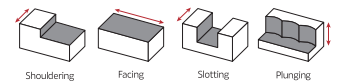
Threaded Coupling
KAPR=90° | GAMP=-4°



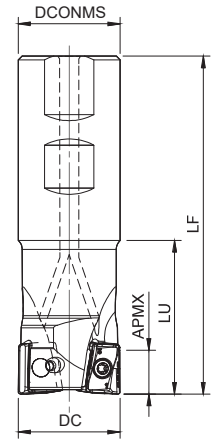
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)			
181082800	032R18190-02-04-M16043	2	32	M16	29	43	0,20	15,0		ANHX 1607...	⊗
181082900	040R18190-03-04-M16043	3	40	M16	29	43	0,24	15,0		ANHX 1607...	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Weldon Shank
KAPR=90° | GAMP=-4°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181051600	032W18190-02-04-032110	2	32	32	110	50	0,66	15,0	ANHX 1607...	Ⓢ
181067500	040W18190-03-04-032115	3	40	32	115	40	0,66	15,0	ANHX 1607...	Ⓢ

Ⓢ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

ANHX 1607... Inserts | Pastilhas | Plaquitas



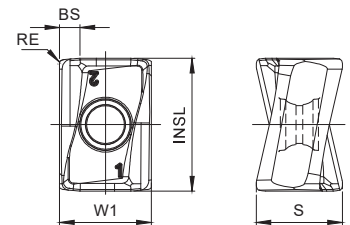
ANHX-LP



ANHX-MP



ANHX-LN



ANHX-LP | MP | LN

		P							K							N	Dimensions Dimensões Dimensiones (mm)						
		CVD	PVD							CVD	PVD											UNC	
			T9	G1	X5	G4	T1	P3	P4		T9	G1	X5	G4	T1	P3							P4
⁽¹⁾ Geometry code	ISO Reference	PHS740	PH7910	PHP910	PH7920	PHP920	PH7930	PHP930	PHS740	PH7910	PHP910	PH7920	PHP920	PH7930	PHP930	PH0910	W1	S	INSL	RE	BS		
1111519	ANHX 160708 PNR-LP																11,20	10,80	16,00	0,80	1,40		
1111596	ANHX 160712 PNER-LP																11,20	10,50	16,00	1,20	1,20		
1111595	ANHX 160708 PNER-MP																11,20	10,80	16,00	0,80	1,40		
1111598	ANHX 160712 PNER-MP																11,20	10,50	16,00	1,20	1,20		
1111659	ANHX 160708 PNFR-LN																11,20	10,80	16,00	0,80	1,40		
1111597	ANHX 160712 PNFR-LN																11,20	10,50	16,00	1,20	1,20		

Ⓢ First choice | Primeira opção | 1ª opción

Ⓢ Stock item | Produto de stock | Itens de stock

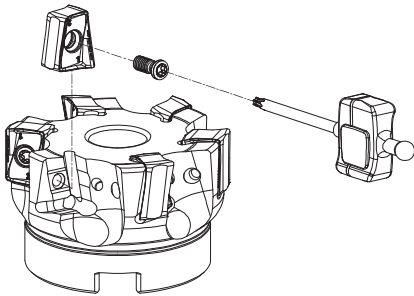
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

Ⓢ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock

SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
						
W18190 - 32 - 40	P0401200	XT15	DT1530	3,0	-	-
R18190 - 32 - 40	P0401200	XT15	DT1530	3,0	-	-
A18190 - 50 - 63	P0401200	XT15	DT1530	3,0	-	-
A18190 - 80	P0401200	XT15	DT1530	3,0	J0123510	SD6368-12
A18190 - 100	P0401200	XT15	DT1530	3,0	J0164110	SD6368-16
A18190 - 125	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20
A18190 - 160	P0401200	PT15	DT1530	3,0	-	-



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.

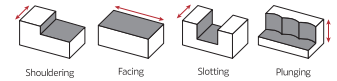
RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)								Feed fz (mm/t)		
				← Wear Resistance				Toughness →						
				PH0910	PH7910	PHP920	PH7920	PHP930	PH7930	PHS740		ANHX 12.. LP	ANHX 12.. MP	ANHX 12.. LN
P	1	Unalloyed Steel	125-220	-	180-250	180-250	180-240	160-230	160-220	140-220	0,10-0,25	0,10-0,25	-	-
	2	Low-Alloyed Steel	220-280	-	160-230	160-230	160-220	140-210	140-200	120-200	0,10-0,25	0,10-0,25	-	-
	3	High-Alloyed Steel	280-380	-	140-220	140-220	140-210	120-200	120-190	100-190	0,10-0,20	0,10-0,20	-	-
K	7	Malleable Cast Iron	130-230	-	180-300	160-270	160-260	150-250	150-240	160-300	0,10-0,25	0,10-0,25	-	-
	8	Grey Cast Iron	180-245	-	160-250	140-250	140-240	140-230	140-230	150-260	0,10-0,25	0,10-0,25	-	-
	9	Nodular Cast iron	160-250	-	150-200	120-210	120-200	100-200	100-190	80-220	0,10-0,20	0,10-0,25	-	-
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-	-	-	-	-	0,10-0,40

(Note 1)
Cutting conditions $a_e/D_c=70\%$.

(Note 2)			
Operation	a_e	Vc & fz	AP (mm)
Slotting	100%	<20%	2,5-4,5
Shouldering	<50%	>8%	6,0-8,0
	≤25%	>12%	8,0-15,0

(Note 3)
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.



GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades						
				← Wear Resistance				Toughness →		
				PH0910	PH7910	PHP920	PH7920	PHP930	PH7930	PHS740
P	1	Unalloyed Steel	125-220	●	✓	✓	✓	✓	✓	✓
	2	Low-Alloyed Steel	220-280		✓	✓	✓	✓	✓	✓
	3	High-Alloyed Steel	280-380		✓	✓	✓	✓	✓	✓
K	7	Malleable Cast Iron	130-230		✓	✓	✓	✓	✓	✓
	8	Grey Cast Iron	180-245		✓	✓	✓	✓	✓	✓
	9	Nodular Cast iron	160-250		✓	✓	✓	✓	✓	✓
N	10	Aluminium and Non Ferrous	30-130	✓						

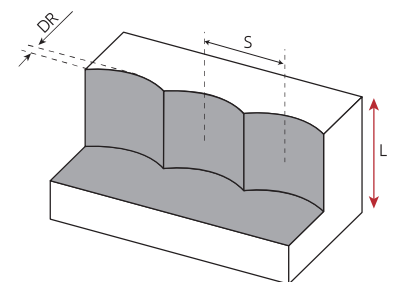
● Good Conditions ● Average Conditions ● Difficult Conditions

CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-apanas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1 st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	ANHX 16... LP	ANHX 16... MP
	2	Low-Alloyed Steel	220-280	ANHX 16... LP	ANHX 16... MP
	3	High-Alloyed Steel	280-380	ANHX 16... LP	ANHX 16... MP
K	7	Malleable Cast Iron	130-230	ANHX 16... LP	ANHX 16... MP
	8	Grey Cast Iron	180-245	ANHX 16... LP	ANHX 16... MP
	9	Nodular Cast iron	160-250	ANHX 16... LP	ANHX 16... MP
N	10	Aluminium and Non Ferrous	30-130	ANHX 16... LN	-

PLUNGING Mergulho | Plunge

L≤3DC	L>3DC	S max.
f _z (mm/t)		
0,10-0,20	0,10-0,14	$S_{max} = \sqrt{DC \cdot DR - DR^2}$



S max and DR corresponding cutting diameter DC (mm)								
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

20090 | 20190 | 20290

LINEPRO



The LINEPRO series comprises highly versatile tools designed for roughing, semi-finishing, and finishing operations, boasting extended tool life and high performance machining capabilities. Their design ensures efficient chip evacuation, while a wide array of chip breaker options, carbide grades, and corner radii enhance their adaptability and reliability across various materials.

A série LINEPRO é composta por ferramentas altamente versáteis projetadas para operações de desbaste, semi-acabamento e acabamento, proporcionando uma vida útil prolongada e capacidades de fresagem de alto desempenho. O seu design garante uma evacuação eficiente de aparas, enquanto uma ampla variedade de opções de quebra-aparas, graus de metal duro e raios de canto aumentam sua adaptabilidade e fiabilidade em diversos materiais.

La serie LINEPRO está compuesta por herramientas altamente versátiles diseñadas para operaciones de desbaste, semiacabado y acabado, proporcionando una vida útil prolongada y capacidades de fresado de alto rendimiento. Su diseño garantiza una evacuación eficiente de virutas, mientras que una amplia variedad de opciones de rompevirutas, grados de carburo y radios de esquina aumentan su adaptabilidad y fiabilidad en diversos materiales.

LINEPRO 20090 > page 156

- > From DC 10mm to 32mm
De DC 10mm a 32mm | Desde DC 10mm hasta 32mm
- > Available in threaded coupling and cylindrical shank
Disponível em acoplamento roscado e haste cilíndrica | Disponible en fijación roscada y mango cilíndrico
- > Small positive insert with 2 cutting edges (XP.. 0602..)
Pastilha positiva pequena com 2 arestas de corte (XP.. 0602..) | Plaquita positiva pequena con 2 filos de corte (XP.. 0602..)
- > Wiper edge for excellent surface finish
Face alisadora para excelente acabamento superficial | Faceta alisadora para un excelente acabado superficial



LINEPRO 20190 > page 162

- > From DC 16mm to 63mm
De DC 16mm a 63mm | Desde DC 16mm hasta 63mm
- > Available in arbor, threaded, weldon and cylindrical shank
Disponível em montagem tipo árvore, acoplamento roscado, haste weldon e cilíndrica | Disponible en fijación con tornillo central, fijación roscada, mango tipo weldon y cilíndrico
- > Medium positive insert with 2 cutting edges (XP.. 1003..)
Pastilha positiva média com 2 arestas de corte (XP.. 1003..) | Plaquita positiva media con 2 filos de corte (XP.. 1003..)
- > Radius from 0,8mm to 3,2mm
Raio de 0,8mm a 3,2mm | Radio de 0,8 mm a 3,2mm



LINEPRO 20290 > page 172

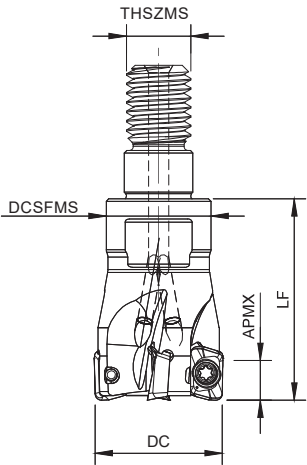
- > From DC 32mm to 125mm
De DC 32mm a 125mm | Desde DC 32mm hasta 125mm
- > Available in arbor mounting and weldon shank
Disponível em montagem tipo árvore e haste weldon | Disponible en fijación con tornillo central y mango tipo weldon
- > Large positive insert with 2 cutting edges (XP.. 1706..)
Pastilha positiva grande com 2 arestas de corte (XP.. 1706..) | Plaquita positiva grande con 2 filos de corte (XP.. 1706..)
- > Radius from 0,2mm to 4,0mm
Raio de 0,8mm a 4,0mm | Radio de 0,2mm a 4,0mm





Threaded Coupling

KAPR=90° | GAMP=+4°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	APMX (mm)			Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		LP LN	HF	MH		
181120400	010R20090-02-04-M06020	2	10	M6	9,8	20	0,01	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181112800	011R20090-02-04-M06020	2	11	M6	9,8	20	0,01	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181120500	012R20090-03-04-M06020	3	12	M6	9,8	20	0,02	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181112900	013R20090-03-04-M06020	3	13	M6	9,8	20	0,02	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181087500	016R20090-04-04-M08025	4	16	M8	13,0	25	0,03	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181113000	017R20090-04-04-M08025	4	17	M8	13,0	25	0,04	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181087600	020R20090-05-04-M10030	5	20	M10	18,0	30	0,06	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181087700	025R20090-07-04-M12030	7	25	M12	21,0	30	0,09	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181087800	032R20090-08-04-M16035	8	32	M16	29,0	35	0,19	4,00	0,30	2,00	XP.. 0602...	Ⓢ

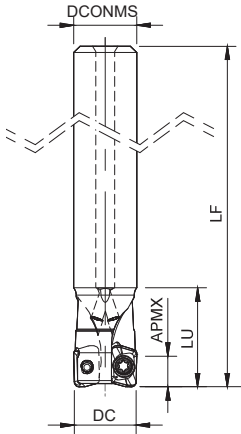
Ⓢ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Cylindrical Shank

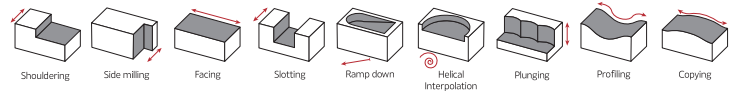
KAPR=90° | GAMP=+4°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	APMX (mm)			Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		LP LN	HF	MH		
181087100	010E20090-02-04-010055	2	10	10	55	16	0,03	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181108300	010E20090-02-04-010100	2	10	10	100	25	0,03	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181087200	012E20090-02-04-012080	2	12	12	80	17	0,06	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181109900	012E20090-03-04-012120	3	12	12	120	30	0,06	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181087300	016E20090-03-04-016090	3	16	16	90	20	0,12	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181087400	016E20090-04-04-016090	4	16	16	90	20	0,11	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181097100	017E20090-05-04-016090	5	17	16	90	35	0,11	4,00	0,30	2,00	XP.. 0602...	Ⓢ
181097200	021E20090-05-04-020090	5	21	20	90	35	0,13	4,00	0,30	2,00	XP.. 0602...	Ⓢ

Ⓢ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



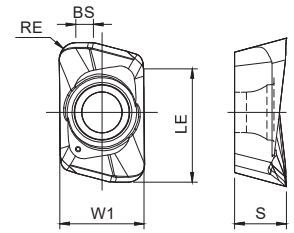
XP.. 0602... Inserts | Pastilhas | Plaquetas



XPET-LP



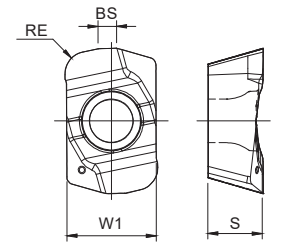
XPET-LN



XPET-LP | LN



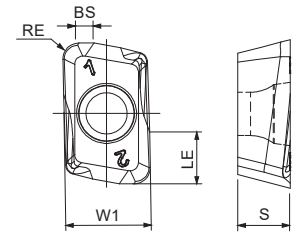
XPET-HF
(HiFeed geometry)



XPET-HF



XPHW-MH
(finishing geometry)



XPHW-MH

		P				M	K		N	S	H		Dimensions Dimensões Dimensiones (mm)				
		PVD				PVD	PVD		UNC	PVD	PVD						
		(2) Grade code	X4	X6	T1	P4	X9	T1	P4	10	X9	X4					
(1) Geometry code	ISO Reference	PHH603	PHH910	PHP920	PHP930	PHH930	PHP920	PHP930	PH0910	PHH930	PHH603	PHH910	W1	S	LE	RE	BS
1112520	XPET 060202 PDER-LP			○		○	○			○			3,90	2,40	5,10	0,20	1,00
1112002	XPET 060204 PDER-LP			⊗	⊗	⊗	⊗	⊗		⊗			3,90	2,40	5,30	0,40	0,80
1112003	XPET 060208 PDER-LP			⊗	⊗	⊗	⊗	⊗		⊗			3,90	2,40	5,30	0,80	0,60
1112004	XPET 060216 PDER-LP			⊗	⊗		⊗	⊗					3,90	2,40	5,30	1,60	0,50
1112579	XPET 060202 PDFR-LN								⊗				3,90	2,40	5,10	0,20	0,95
1112580	XPET 060204 PDFR-LN								⊗				3,90	2,40	5,10	0,40	0,80
1112581	XPET 060208 PDFR-LN								○				3,90	2,40	5,10	0,80	0,92
1112716	XPET 060212 PDFR-LN								○				3,90	2,40	5,10	1,20	0,58
1112049	XPET 060210 ZER-HF			⊗	⊗	⊗	⊗	⊗		⊗			3,90	2,40	-	1,00	0,80
1112259	XPHW 060208 ZER-MH	⊗	⊗								⊗	⊗	3,90	2,40	2,40	0,80	0,70

⊗ First choice | Primeira opção | 1ª opción ⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)

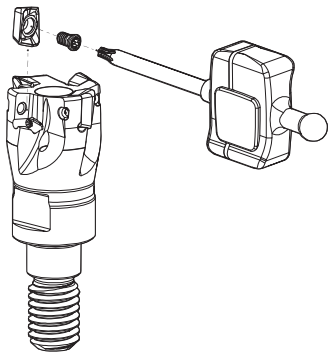
Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS

Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately Key (Torx - Nm)	Torque Value
				
E20090 - 10	P0180300	XT06IP	DT0606IP	0,6
E20090 - 12-21	P0180400	XT06IP	DT0606IP	0,6
R20090 - 10	P0180300	XT06IP	DT0606IP	0,6
R20090 - 12-32	P0180400	XT06IP	DT0606IP	0,6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.



GRADES SELECTION GUIDE

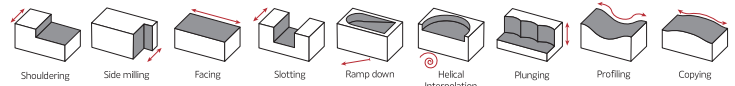
Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades					
				← Wear Resistance			Toughness →		
				PH0910	PHH603	PHH910	PHP920	PHP930	PHH930
P	1	Unalloyed Steel	125-220	●			✓	✓	
	2	Low-Alloyed Steel	220-280			✓	✓	✓	
	3	High-Alloyed Steel	280-380		✓	✓	✓	✓	
M	4	SS - Ferritic / Martensitic	200-330						✓
	5	SS - Austenitic	200-330						✓
	6	SS - Austenitic-ferritic (Duplex)	230-260						✓
K	7	Malleable Cast Iron	130-230				✓	✓	
	8	Grey Cast Iron	180-245				✓	✓	
	9	Nodular Cast iron	160-250				✓	✓	
N	10	Aluminium and Non Ferrous	30-130	✓					
S	11	Heat Resistant Super Alloys	200-320						✓
H	12	Hardened Steels	40-55 HRC		✓	✓			

● Good Conditions

● Average Conditions

● Difficult Conditions



RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)					
				← Wear Resistance				Toughness →	
				PH0910	PHH603	PHH910	PHP920	PHP930	PHH930
P	1	Unalloyed Steel	125-220	-	-	-	180-250	160-230	-
	2	Low-Alloyed Steel	220-280	-	-	160-270	160-230	140-210	-
	3	High-Alloyed Steel	280-380	-	180-310	140-230	140-220	120-200	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	-	140-210
	5	SS - Austenitic	200-330	-	-	-	-	-	120-170
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	100-150
K	7	Malleable Cast Iron	130-230	-	-	-	160-270	150-250	-
	8	Grey Cast Iron	180-245	-	-	-	140-250	140-230	-
	9	Nodular Cast iron	160-250	-	-	-	120-210	100-200	-
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	30-110
H	12	Hardened Steels	40-55 HRC	-	70-270	70-260	-	-	-

ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)			
				XPET 06...LP	XPET 06...LN	XPET 06...HF	XPHW 06...MH
P	1	Unalloyed Steel	125-220	0,05-0,07	-	0,40-0,80	-
	2	Low-Alloyed Steel	220-280	0,05-0,07	-	0,40-0,80	0,05-0,12
	3	High-Alloyed Steel	280-380	0,05-0,07	-	0,40-0,60	0,05-0,12
M	4	SS - Ferritic / Martensitic	200-330	0,05-0,07	-	0,40-0,80	-
	5	SS - Austenitic	200-330	0,05-0,07	-	0,40-0,60	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	0,05-0,07	-	0,40-0,60	-
K	7	Malleable Cast Iron	130-230	0,05-0,07	-	0,40-0,80	-
	8	Grey Cast Iron	180-245	0,05-0,07	-	0,40-0,80	-
	9	Nodular Cast iron	160-250	0,05-0,07	-	0,40-0,80	-
N	10	Aluminium and Non Ferrous	30-130	-	0,05-0,07	-	-
S	11	Heat Resistant Super Alloys	200-320	0,05-0,07	-	0,40-0,60	-
H	12	Hardened Steels	40-55 HRC	-	-	-	0,03-0,10

(Note 1) Cutting conditions $a_e/D_c=70\%$.

(Note 2)

Operation	a_e	Vc & fz	AP (mm)
Slotting	100%	<20%	1,0-3,0
Shouldering	<50%	>8%	1,0-4,0
	≤25%	>12%	1,0-4,0

(Note 3) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:

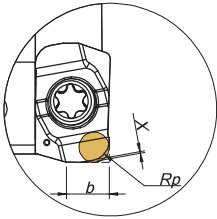
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	XPET 06... LP/HF	-
	2	Low-Alloyed Steel	220-280	XPET 06... LP/HF	XPHW 06... MH
	3	High-Alloyed Steel	280-380	XPET 06... LP/HF	XPHW 06... MH
M	4	SS - Ferritic / Martensitic	200-330	XPET 06... LP/HF	-
	5	SS - Austenitic	200-330	XPET 06... LP/HF	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	XPET 06... LP/HF	-
K	7	Malleable Cast Iron	130-230	XPET 06... LP/HF	-
	8	Grey Cast Iron	180-245	XPET 06... LP/HF	-
	9	Nodular Cast iron	160-250	XPET 06... LP/HF	-
N	10	Aluminium and Non Ferrous	30-130	XPET 06... LN	-
S	11	Heat Resistant Super Alloys	200-320	XPET 06... LP/HF	-
H	12	Hardened Steels	40-55 HRC	XPHW 06... MH	-

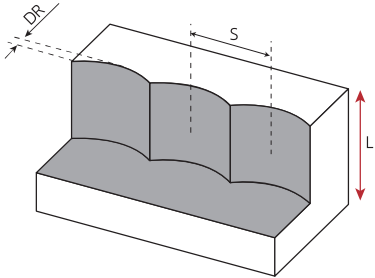
PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data		
	Rp	X	b
XPET 06 HF	1,1	0,84	2,3



PLUNGING Mergulho | Plunge

L≤3DC	L>3DC	S max.
f _z (mm/t)		
0,04-0,07	0,03-0,05	S _{max} = √DC.DR - DR ²

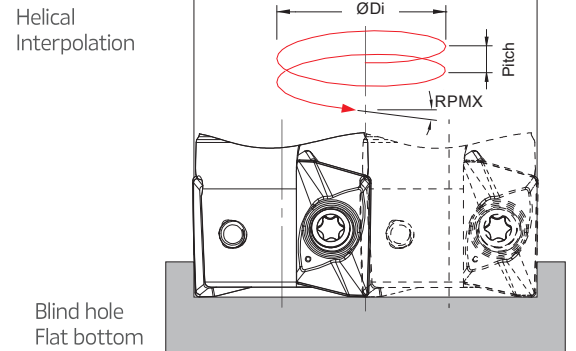
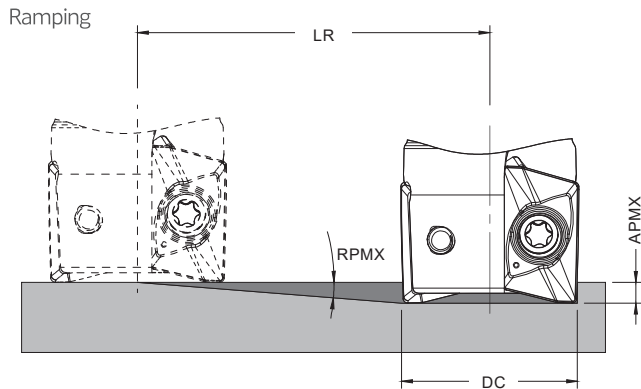


S max and DR corresponding cutting diameter DC (mm)								
DR (mm)	DC (mm)							
	10	12	16	17	20	21	25	32
0,5	2,2	2,4	2,8	2,9	3,1	3,2	3,5	4,0
1	3,0	3,3	3,9	4,0	4,4	4,5	4,9	5,6
2*	4,0	4,5	5,3	5,5	6,0	6,2	6,8	7,7

* only for radius above 1,6mm

RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular



$$\text{ØDi} = \text{ØDH} - \text{DC}$$

DC	Ramping			Helical Interpolation		
				Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	
10	5,5	4,0	41,5	17,2	-	2,2
				-	18,4	2,5
12	4,0	4,0	57,2	21,2	-	2,0
				-	22,4	2,3
16	2,5	4,0	91,6	29,2	-	1,8
				-	30,4	2,0
17	2,2	4,0	104,1	31,2	-	1,7
				-	32,4	1,9
20	1,9	4,0	120,6	37,2	-	1,8
				-	38,4	1,9
21	1,6	4,0	143,2	39,2	-	1,6
				-	40,4	1,7
25	1,3	4,0	171,0	47,2	-	1,6
				-	48,4	1,7
32	1,0	4,0	229,2	61,2	-	1,6
				-	62,4	1,7

(1) using LP insert with radius 0,8 mm

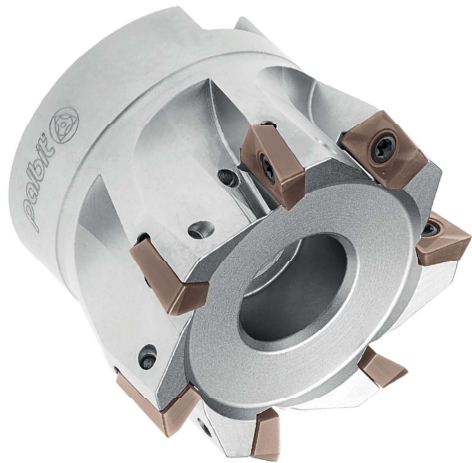
Note: During helical interpolation do not exceed maximum pitch

When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

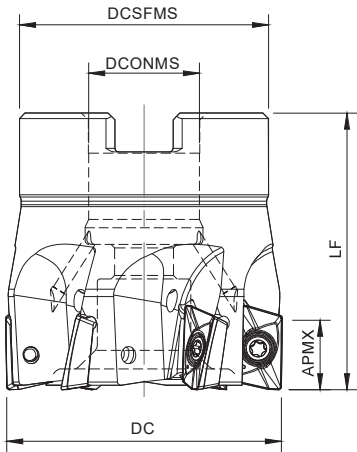
- Minimum Diameter: $\text{ØDHmin} = 2 \times (\text{DC} - (\text{R corner radius} + \text{F width of edge wiper}))$

- Maximum Diameter: $\text{ØDHmax} = 2 \times (\text{DC} - \text{R corner radius})$

(On HF insert the corner radius should be corner radius programming)



Arbor Mounting
KAPR=90° | GAMP=+8°



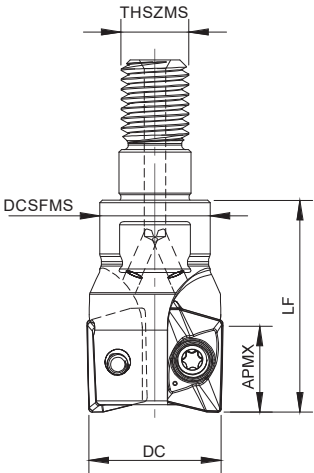
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Arbor Type	APMX (mm)				Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF			LP/MP/LN	LS	HF	MH		
181088600	040A20190-06-08-016040	6	40	16	36	40	0,22	A	10,0	10,0	0,80	3,00	XP.. 1003...	Ⓢ
181088700	050A20190-07-08-022040	7	50	22	42	40	0,31	A	10,0	10,0	0,80	3,00	XP.. 1003...	Ⓢ
181088800	063A20190-08-08-022040	8	63	22	52	40	0,43	A	10,0	10,0	0,80	3,00	XP.. 1003...	Ⓢ
181201900	040A20190-06-08-016040-B*	6	40	16	36	40	0,22	A	-	10,0	-	3,00	XP.. 1003...	Ⓢ
181202100	050A20190-07-08-022040-B*	7	50	22	42	40	0,31	A	-	10,0	-	3,00	XP.. 1003...	Ⓢ
181202300	060A20190-08-08-022040-B*	8	60	22	52	40	0,48	A	-	10,0	-	3,00	XP.. 1003...	Ⓢ
181202200	063A20190-08-08-022040-B*	8	63	22	52	40	0,43	A	-	10,0	-	3,00	XP.. 1003...	Ⓢ

Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type -B* cutters can only assemble inserts with a radius between 2,0 and 4,0.



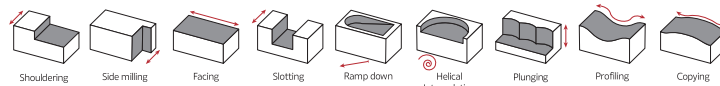
Threaded Coupling
KAPR=90° | GAMP=+5°~+6°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	APMX (mm)				Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		LP/MP/LN	LS	HF	MH		
181088200	016R20190-02-05-M08025	2	16	M8	14	25	0,03	10,0	10,0	0,80	3,00	XP.. 1003...	Ⓢ
181088300	020R20190-03-05-M10030	3	20	M10	18	30	0,06	10,0	10,0	0,80	3,00	XP.. 1003...	Ⓢ
181088400	025R20190-04-05-M12035	4	25	M12	21	35	0,12	10,0	10,0	0,80	3,00	XP.. 1003...	Ⓢ
181088500	032R20190-05-06-M16035	5	32	M16	29	35	0,15	10,0	10,0	0,80	3,00	XP.. 1003...	Ⓢ
181149100	040R20190-06-08-M16043	6	40	M16	29	43	0,25	10,0	10,0	0,80	3,00	XP.. 1003...	Ⓢ
181200100	016R20190-02-05-M08025-B*	2	16	M8	14	25	0,03	-	10,0	-	3,00	XP.. 1003...	Ⓢ
181200700	020R20190-03-05-M10030-B*	3	20	M10	18	30	0,06	-	10,0	-	3,00	XP.. 1003...	Ⓢ
181201300	025R20190-04-05-M12035-B*	4	25	M12	21	35	0,12	-	10,0	-	3,00	XP.. 1003...	Ⓢ
181201700	032R20190-05-06-M16035-B*	5	32	M16	29	35	0,15	-	10,0	-	3,00	XP.. 1003...	Ⓢ
181202000	040R20190-06-08-M16043-B*	6	40	M16	29	43	0,25	-	10,0	-	3,00	XP.. 1003...	Ⓢ

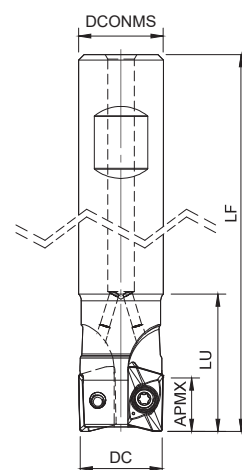
Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type -B* cutters can only assemble inserts with a radius between 2,0 and 4,0.



Weldon Shank

KAPR=90° | GAMP=+5°~+8°



Order code Código	Reference Referência Referencia	CIC	Dimensions Dimensões Dimensiones (mm)				WT	APMX (mm)				Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		LP/MP/LN	LS	HF	MH		
181087900	016W20190-02-05-016085	2	16	16	85	32	0,10	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181100600	016W20190-02-05-016150	2	16	16	150	70	0,13	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181108600	017W20190-02-05-016150	2	17	16	150	36	0,14	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181088000	020W20190-03-05-020090	3	20	20	90	28	0,21	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181100700	020W20190-03-05-020150	3	20	20	150	70	0,26	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181108700	022W20190-03-05-020150	3	22	20	150	70	0,30	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181088100	025W20190-04-05-025095	4	25	25	95	30	0,33	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181100800	025W20190-04-05-025150	4	25	25	150	80	0,36	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181108800	027W20190-04-05-025150	4	27	25	150	80	0,38	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181085400	032W20190-04-08-032110	4	32	32	110	50	0,55	10,0	10,0	0,80	3,00	XP.. 1003...	⊗
181200200	016W20190-02-05-016085-B*	2	16	16	85	32	0,10	-	10,0	-	3,00	XP.. 1003...	⊗
181200300	016W20190-02-05-016150-B*	2	16	16	150	70	0,13	-	10,0	-	3,00	XP.. 1003...	⊗
181200400	017W20190-02-05-016150-B*	2	17	16	150	36	0,14	-	10,0	-	3,00	XP.. 1003...	○
181200800	020W20190-03-05-020090-B*	3	20	20	90	28	0,21	-	10,0	-	3,00	XP.. 1003...	⊗
181200900	020W20190-03-05-020150-B*	3	20	20	150	70	0,26	-	10,0	-	3,00	XP.. 1003...	⊗
181201000	022W20190-03-05-020150-B*	3	22	20	150	70	0,30	-	10,0	-	3,00	XP.. 1003...	⊗
181201400	025W20190-04-05-025095-B*	4	25	25	95	30	0,33	-	10,0	-	3,00	XP.. 1003...	○
181201500	025W20190-04-05-025150-B*	4	25	25	150	80	0,36	-	10,0	-	3,00	XP.. 1003...	⊗
181201600	027W20190-04-05-025150-B*	4	27	25	150	80	0,38	-	10,0	-	3,00	XP.. 1003...	○
181201800	032W20190-04-08-032110-B*	4	32	32	110	50	0,55	-	10,0	-	3,00	XP.. 1003...	⊗

⊗ Stock item | Produto de stock | Itens de stock

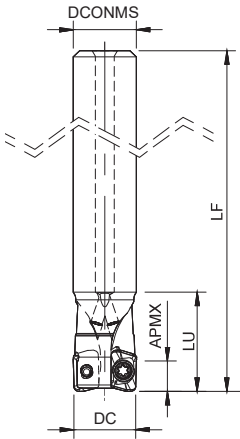
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type -B* cutters can only assemble inserts with a radius between 2,0 and 4,0.



Cylindrical Shank

KAPR=90° | GAMP=+4°



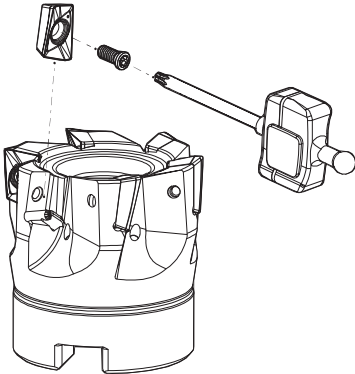
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	APMX (mm)				Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		LP/MP/LN	LS	HF	MH		
181171700	016E20190-02-05-016085	2	16	16	85	32	0,10	10,0	10,0	0,80	3,00	XP.. 1003...	📦
181173000	016E20190-02-05-016150	2	16	16	150	70	0,13	10,0	10,0	0,80	3,00	XP.. 1003...	📦
181171600	020E20190-03-05-020090	3	20	20	90	28	0,14	10,0	10,0	0,80	3,00	XP.. 1003...	📦
181171800	020E20190-03-05-020150	3	20	20	150	70	0,21	10,0	10,0	0,80	3,00	XP.. 1003...	📦
181171400	025E20190-04-05-025095	4	25	25	95	30	0,26	10,0	10,0	0,80	3,00	XP.. 1003...	📦
181172900	025E20190-04-05-025150	4	25	25	150	80	0,30	10,0	10,0	0,80	3,00	XP.. 1003...	📦
181199900	016E20190-02-05-016085-B*	2	16	16	85	32	0,10	-	10,0	-	3,00	XP.. 1003...	📦
181200000	016E20190-02-05-016150-B*	2	16	16	150	70	0,13	-	10,0	-	3,00	XP.. 1003...	📦
181200500	020E20190-03-05-020090-B*	3	20	20	90	28	0,14	-	10,0	-	3,00	XP.. 1003...	📦
181200600	020E20190-03-05-020150-B*	3	20	20	150	70	0,21	-	10,0	-	3,00	XP.. 1003...	📦
181201100	025E20190-04-05-025095-B*	4	25	25	95	30	0,26	-	10,0	-	3,00	XP.. 1003...	📦
181201200	025E20190-04-05-025150-B*	4	25	25	150	80	0,30	-	10,0	-	3,00	XP.. 1003...	📦

📦 Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type -B* cutters can only assemble inserts with a radius between 2,0 and 4,0.

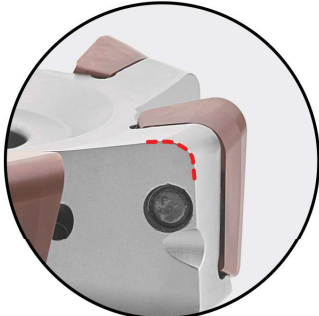
SPARE PARTS Acessórios | Repuestos

Cutter DC	Order separately			
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value
A20190 - 40-63	P0250704	XT08	DT0812	1,2
R20190 - 16	P0250503	XT08	DT0812	1,2
R20190 - 20-40	P0250704	XT08	DT0812	1,2
W20190 - 16-17	P0250503	XT08	DT0812	1,2
W20190 - 20-32	P0250704	XT08	DT0812	1,2
E20190 - 16	P0250503	XT08	DT0812	1,2
E20190 - 20-25	P0250704	XT08	DT0812	1,2



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.

TOOLHOLDER TYPES: A VS. B

Radius		
0,4	Type A (the reference "-A" is hidden by default)	
0,8		
1,2		
1,6		
2,0	Type B	
3,2		
4,0		

Toolholders are designed to accommodate inserts with various radius.

On the LinePro 20190 toolholders, there are two types that can be distinguished by their specific features.

Toolholder Types: A vs. B

- > **Type A Toolholders**, denoted by the "-A" reference, are tailored for inserts with radius of 0.4, 0.8, 1.2, and 1.6 mm. It's important to note that the "-A" reference is hidden by default. These toolholders are characterized by a more streamlined and less pronounced radius support, making them suitable for smaller insert radius.
- > **Type B Toolholders**, denoted by the "-B" reference, are intended for inserts with larger radius of 2.0, 3.2, and 4.0 mm. They stand out with a pronounced radius support, which allows for a more secure fit and excellent performance when used with inserts of these sizes.

When distinguishing between the two, look for the degree of rounding in the supports; Type B toolholders, indicated by the "-B" reference, feature more substantial radius supports, making them easily identifiable.

XPET 1003... Inserts | Pastilhas | Plaquetas



XPET-LP



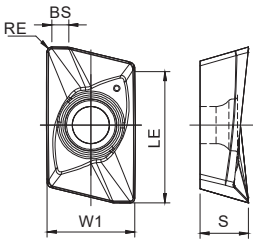
XPET-LS



XPET-MP



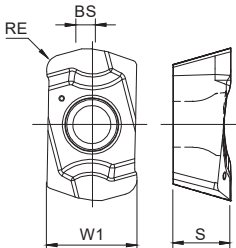
XPET-LN



XPET-LP | LS | MP | LN



XPET-HF
(HiFeed geometry)

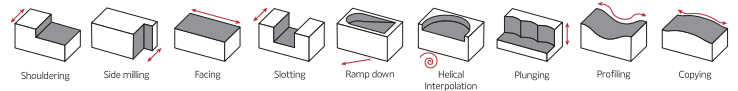


XPET-HF

		P					M	K					N		S	H	Dimensions Dimensões Dimensiones (mm)					
		CVD	PVD				PVD	CVD		PVD			UNC	PCD	PVD	PVD						
	⁽²⁾ Grade code	T9	G1	X5	T1	P4	X9	L5	L9	X5	T1	P4	10	D6	X9	X4						X6
⁽¹⁾ Geometry code	ISO Reference	PHS740	PH7910	PHP910	PHP920	PHP930	PHH930	PH5705	PH5740	PHP910	PHP920	PHP930	PH0910	PDP410	PHH930	PHH603	PHH910	W1	S	LE	RE	BS
1113132	XPET 100302 PDER-LP						Ⓢ								Ⓢ			6,95	3,96	10,50	0,20	1,50
1111980	XPET 100304 PDER-LP				Ⓢ	Ⓢ	Ⓢ				Ⓢ	Ⓢ			Ⓢ			6,95	3,96	10,50	0,40	1,30
1111981	XPET 100308 PDER-LP	Ⓢ			Ⓢ	Ⓢ	Ⓢ				Ⓢ	Ⓢ			Ⓢ			6,95	3,96	10,50	0,80	1,40
1112022	XPET 100316 PDER-LP				Ⓢ	Ⓢ	Ⓢ				Ⓢ	Ⓢ			Ⓢ			6,95	3,96	10,50	1,60	0,80
1113365	XPET 100304 PDER-LS				Ⓢ		Ⓢ				Ⓢ				Ⓢ			6,95	3,96	10,50	0,40	1,90
1112197	XPET 100308 PDER-LS				Ⓢ		Ⓢ				Ⓢ				Ⓢ			6,95	3,96	10,50	0,80	1,50
1113358	XPET 100312 PDER-LS				Ⓢ		Ⓢ				Ⓢ				Ⓢ			6,95	3,96	10,50	1,20	1,00
1113366	XPET 100316 PDER-LS				Ⓢ		Ⓢ				Ⓢ				Ⓢ			6,95	3,96	10,50	1,60	0,80
1113359	XPET 100320 PDER-LS				Ⓢ		Ⓢ				Ⓢ				Ⓢ			6,95	3,96	10,50	2,00	1,60
1113360	XPET 100332 PDER-LS				Ⓢ		Ⓢ				Ⓢ				Ⓢ			6,95	3,96	10,50	3,20	0,50
1113394	XPET 100340 PDER-LS				○		○				○				○			6,95	3,96	10,50	4,00	0,20
1111982	XPET 100304 PDSR-MP			○	Ⓢ	Ⓢ		Ⓢ	Ⓢ	○	Ⓢ	Ⓢ						6,95	3,96	10,50	0,40	1,10
1111983	XPET 100308 PDSR-MP	Ⓢ		Ⓢ	Ⓢ	Ⓢ		Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ						6,95	3,96	10,50	0,80	1,35
1111984	XPET 100304 PDFR-LN												Ⓢ					6,95	3,96	10,50	0,40	0,75
1112906	XPET 100308 PDFR-LN												Ⓢ					6,95	3,96	10,50	0,80	1,05
1111985	XPET 100312 PDFR-LN												Ⓢ					6,95	3,96	10,50	1,20	0,75
1112376	XPET 100312 ZDR-HF			Ⓢ	Ⓢ	Ⓢ	Ⓢ			Ⓢ	Ⓢ	Ⓢ			Ⓢ			6,95	3,96	-	1,20	1,50

Ⓢ First choice | Primeira opção | 1ª opción Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

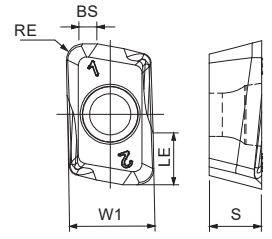
Insert order code = (1) Geometry Code + (2) Grade Code



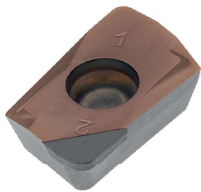
XPHW 1003... Inserts | Pastilhas | Plaquitas



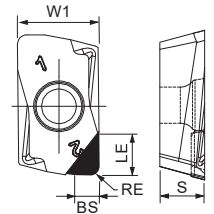
XPHW-MH
(finishing geometry)



XPHW-MH



XPHW-R Z1



XPHW-R Z1

		P					M	K					N		S	H		Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD				PVD	CVD		PVD			UNC	PCD	PVD	PVD						
		T9	G1	X5	T1	P4	X9	L5	L9	X5	T1	P4	10	D6	X9	X4	X6					
(1) Geometry code	ISO Reference	PH5740	PH7910	PHP910	PHP920	PHP930	PHH930	PH5705	PH5740	PHP910	PHP920	PHP930	PH0910	PDP410	PHH930	PHH603	PHH910	W1	S	LE	RE	BS
1112500	XPHW 100308 ZER-MH																	6,95	3,60	3,00	0,80	1,30
1112736	XPHW 100310 ZER-MH																	6,95	3,60	3,00	1,00	0,35
1112735	XPHW 100320 ZER-MH																	6,95	3,60	3,00	1,20	1,10
1112556	XPHW 100308 R Z1																	6,95	3,60	3,80	0,80	2,30

Ⓐ First choice | Primeira opção | 1ª opción

Ⓐ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)									PCD
				← Wear Resistance			Toughness →						
				PH0910	PH5705	PHH603	PHP910	PHP920	PHP930	PHH930	PH5740	PHS740	PDP410
P	1	Unalloyed Steel	125-220	-	-	-	180-250	180-250	160-230	-	-	140-220	-
	2	Low-Alloyed Steel	220-280	-	-	-	160-240	160-230	140-210	-	-	120-200	-
	3	High-Alloyed Steel	280-380	-	-	180-310	140-230	140-220	120-200	-	-	100-190	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	-	-	140-210	-	-	-
	5	SS - Austenitic	200-330	-	-	-	-	-	-	120-170	-	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	-	100-150	-	-	-
K	7	Malleable Cast Iron	130-230	-	160-290	-	180-300	160-270	150-250	-	160-260	-	-
	8	Grey Cast Iron	180-245	-	170-320	-	160-250	140-250	140-230	-	140-240	-	-
	9	Nodular Cast iron	160-250	-	140-200	-	150-210	120-210	100-200	-	120-200	-	-
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-	-	-	-	800-3000
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	-	30-110	-	-	-
H	12	Hardened Steels	40-55 HRC	-	-	70-270	-	-	-	-	-	-	-

ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)						
				XPET 10... LP	XPET 10... LS	XPET 10... MP	XPET 10... LN	XPET 10... HF	XPHW 10... R Z1	XPHW 10... MH
P	1	Unalloyed Steel	125-220	0,08-0,20	-	0,10-0,25	-	0,40-0,80	-	0,10-0,25
	2	Low-Alloyed Steel	220-280	0,08-0,20	-	0,10-0,20	-	0,40-0,80	-	0,10-0,25
	3	High-Alloyed Steel	280-380	0,08-0,15	-	0,10-0,20	-	0,40-0,60	-	0,10-0,25
M	4	SS - Ferritic / Martensitic	200-330	0,08-0,20	0,08-0,20	0,10-0,20	-	0,40-0,70	-	-
	5	SS - Austenitic	200-330	0,08-0,20	0,08-0,20	0,10-0,20	-	0,40-0,70	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	0,08-0,15	0,08-0,15	0,10-0,20	-	0,40-0,60	-	-
K	7	Malleable Cast Iron	130-230	0,08-0,20	-	0,10-0,25	-	0,50-0,80	-	-
	8	Grey Cast Iron	180-245	0,08-0,20	-	0,10-0,25	-	0,50-0,80	-	-
	9	Nodular Cast iron	160-250	0,08-0,20	-	0,10-0,20	-	0,50-0,60	-	-
N	10	Aluminium and Non Ferrous	30-130	-	-	-	0,07-0,25	-	0,10-0,25	-
S	11	Heat Resistant Super Alloys	200-320	0,05-0,07	0,05-0,07	-	-	0,40-0,60	-	-
H	12	Hardened Steels	40-55 HRC	-	-	-	-	-	-	0,08-0,15

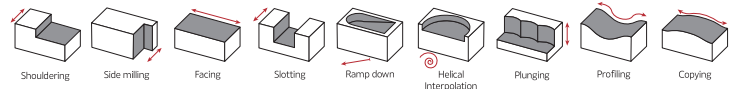
(Note 1) Cutting conditions ae/Dc=70%.

(Note 2)

Operation	ae	Vc & fz	AP (mm)
Slotting	100%	<20%	2,0-4,0
Shouldering	<50%	>8%	3,0-6,0
	≤25%	>12%	7,0-9,0

(Note 3) 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.



CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	XPET 10 ... LP/HF	XPET 10 ... MP
	2	Low-Alloyed Steel	220-280	XPET 10 ... LP/HF	XPET 10 ... MP
	3	High-Alloyed Steel	280-380	XPET 10 ... MP/HF	-
M	4	SS - Ferritic / Martensitic	200-330	XPET 10 ... LS	XPET 10 ... LP/HF
	5	SS - Austenitic	200-330	XPET 10 ... LS	XPET 10 ... LP/HF
	6	SS - Austenitic-ferritic (Duplex)	230-260	XPET 10 ... LS	XPET 10 ... LP/HF
K	7	Malleable Cast Iron	130-230	XPET 10 ... LP/HF	XPET 10 ... MP
	8	Grey Cast Iron	180-245	XPET 10 ... MP/HF	-
	9	Nodular Cast iron	160-250	XPET 10 ... MP/HF	-
N	10	Aluminium and Non Ferrous	30-130	XPET 10 ... LN/R Z1	-
S	11	Heat Resistant Super Alloys	200-320	XPET 10 ... LS	XPET 10 ... LP/HF
H	12	Hardened Steels	40-55 HRC	XPHW 10 ... MH	-

GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades								PCD
				← Wear Resistance				Toughness →				
				PH0910 	PH5705 	PHH603 	PHP910 	PHP920 	PHP930 	PHH930 	PH5740 	PHS740 
P	1	Unalloyed Steel	125-220				✓	✓	✓			✓
	2	Low-Alloyed Steel	220-280				✓	✓	✓			✓
	3	High-Alloyed Steel	280-380			✓	✓	✓	✓			✓
M	4	SS - Ferritic / Martensitic	200-330							✓		
	5	SS - Austenitic	200-330							✓		
	6	SS - Austenitic-ferritic (Duplex)	230-260							✓		
K	7	Malleable Cast Iron	130-230		✓		✓	✓	✓		✓	
	8	Grey Cast Iron	180-245		✓		✓	✓	✓		✓	
	9	Nodular Cast iron	160-250		✓		✓	✓	✓		✓	
N	10	Aluminium and Non Ferrous	30-130	✓								✓
S	11	Heat Resistant Super Alloys	200-320							✓		
H	12	Hardened Steels	40-55 HRC			✓						



Good Conditions



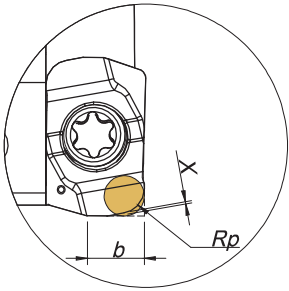
Average Conditions



Difficult Conditions

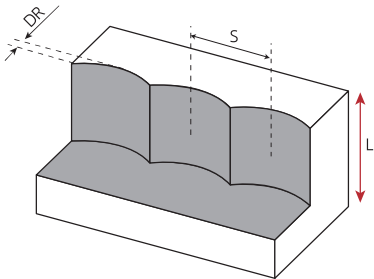
PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data		
	Rp	X	b
XPET 10 HF	1,6	0,33	3,45



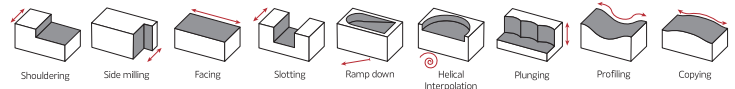
PLUNGING Mergulho | Plunge

L≤3DC	L>3DC	S max.
f _z (mm/t)		
0,08-0,20	0,06-0,15	S _{max} = √DC.DR - DR ²



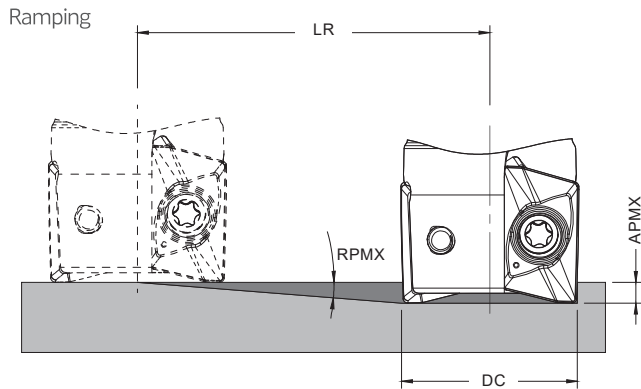
S max and DR corresponding cutting diameter DC (mm)										
DR (mm)	DC (mm)									
	16	17	20	22	25	27	32	40	50	63
1	3,9	4,0	4,4	4,6	4,9	5,1	5,6	6,2	7,0	7,9
2	5,3	5,3	6,0	8,8	6,8	10,2	7,7	8,7	9,8	17,0
3*	6,2	6,2	7,1	9,3	8,1	10,8	9,3	10,5	11,9	18,3
4**	6,9	6,9	8,0	9,5	9,2	11,2	10,6	12,0	13,6	19,2

* only for radius above 2,0mm
** only for radius 4,0mm

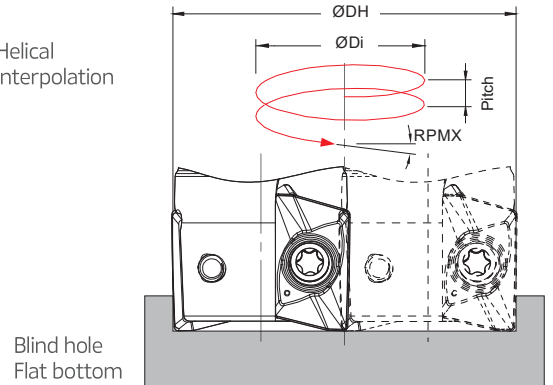


RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular



Helical Interpolation



$$\text{ØDi} = \text{ØDH} - \text{DC}$$

DC	Ramping			Helical Interpolation		
				Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	
16	7,5	10,0	76,0	27,6	-	4,8
				-	30,4	6,0
17	7,0	10,0	81,4	29,6	-	4,9
				-	32,4	5,9
20	5,0	10,0	114,3	35,6	-	4,3
				-	38,4	5,1
22	4,5	10,0	127,1	39,6	-	4,3
				-	42,4	5,0
25	3,5	10,0	163,5	45,6	-	4,0
				-	48,4	4,5
27	3,0	10,0	190,8	49,6	-	3,7
				-	52,4	4,2
32	2,5	10,0	229,0	59,6	-	3,8
				-	62,4	4,2
40	1,7	10,0	336,9	75,6	-	3,3
				-	78,4	3,6
50	1,3	10,0	440,7	95,6	-	3,2
				-	98,4	3,4
63	1,0	10,0	572,9	121,6	-	3,2
				-	124,4	3,4

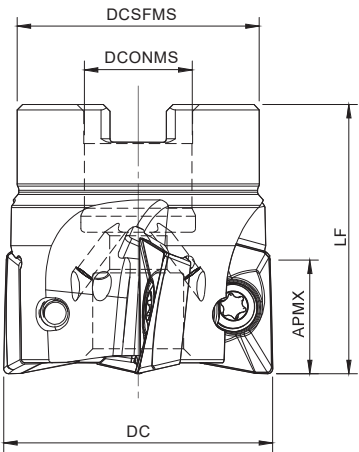
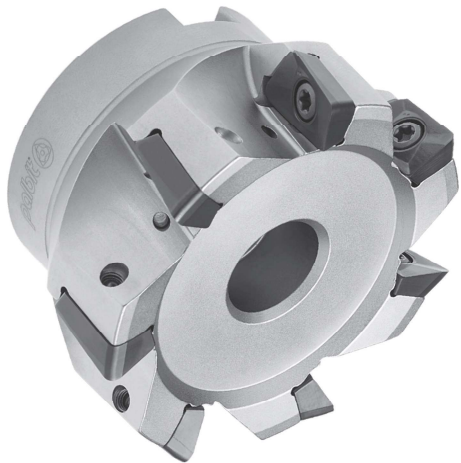
(1) using LP insert with radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch

When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

- Minimum Diameter: $\text{ØDHmin} = 2 \times (\text{DC} - (\text{R corner radius} + \text{F width of edge wiper}))$

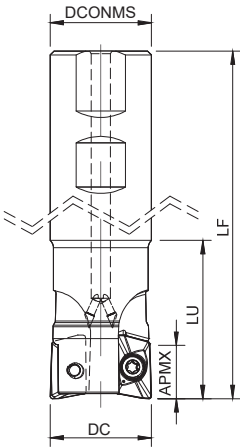
- Maximum Diameter: $\text{ØDHmax} = 2 \times (\text{DC} - \text{R corner radius})$



Arbor Mounting
KAPR=90° | GAMP=+7°~+8°

Order code Código	Reference Referência Referencia	CIC	Dimensions Dimensões Dimensiones (mm)				WT	Arbor Type	APMX (mm)		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF			LP MP LS LN	LN Z1 Z1W		
181090900	040A20290-04-07-016040	4	40	16	32	40	0,18	A	17,0	8,0	XPET 1706...	Ⓢ
181091000	050A20290-05-08-022040	5	50	22	42	40	0,29	A	17,0	8,0	XPET 1706...	Ⓢ
181196800	063A20290-06-08-022040	6	63	22	48	40	0,44	A	17,0	8,0	XPET 1706...	Ⓢ
181091200	080A20290-07-08-027050	7	80	27	60	50	0,92	A	17,0	8,0	XPET 1706...	Ⓢ
181091300	100A20290-08-08-032050	8	100	32	80	50	1,68	A	17,0	8,0	XPET 1706...	Ⓢ
181091400	125A20290-09-08-040063	9	125	40	90	63	3,01	A	17,0	8,0	XPET 1706...	Ⓢ

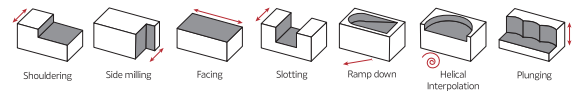
Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Weldon Shank
KAPR=90° | GAMP=+6°~+7°

Order code Código	Reference Referência Referencia	CIC	Dimensions Dimensões Dimensiones (mm)				WT	APMX (mm)		Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		LP MP LS LN	LN Z1 Z1W		
181090500	032W20290-02-06-032110	2	32	32	110	50	0,56	17,0	8,0	XPET 1706...	Ⓢ
181090600	032W20290-02-06-032200	2	32	32	200	60	1,10	17,0	8,0	XPET 1706...	Ⓢ
181090700	040W20290-03-07-032115	3	40	32	115	50	0,67	17,0	8,0	XPET 1706...	Ⓢ
181090800	040W20290-03-07-032200	3	40	32	200	60	1,19	17,0	8,0	XPET 1706...	Ⓢ

Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



XPET 1706... Inserts | Pastilhas | Plaquetas



XPET-LP



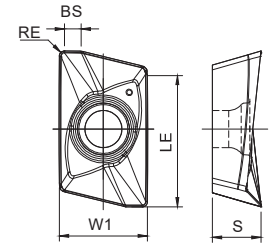
XPET-LS



XPET-MP



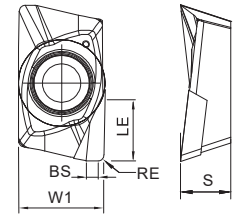
XPET-LN



XPET-LP | LS | MP | LN



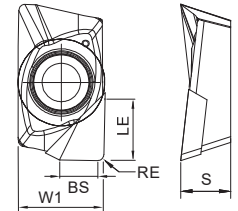
XPET-LN Z1



XPET-LN Z1



XPET-LN Z1W



XPET-LN Z1W

		P			M		K				N		S		Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD		PVD		CVD		PVD		UNC	PCD	PVD						
		T9	T1	G6	X9	G6	L5	L9	T1	G6	10	D6	X9	G6					
(1) Geometry code	ISO Reference	PHS740	PHP920	PH7740	PHH930	PH7740	PH5705	PH5740	PHP920	PH7740	PH0910	PDP410	PHH930	PH7740	W1	S	LE	RE	BS
1111986	XPET 170608 PDER-LP		Ⓢ	Ⓢ		Ⓢ			Ⓢ	Ⓢ				Ⓢ	11,30	6,35	17,50	0,80	1,80
1111987	XPET 170616 PDER-LP		Ⓢ	Ⓢ		Ⓢ			Ⓢ	Ⓢ				Ⓢ	11,30	6,35	17,50	1,60	1,20
1112223	XPET 170608 PDER-LS				Ⓢ	Ⓢ							Ⓢ	Ⓢ	11,30	6,35	17,50	0,80	1,80
1113373	XPET 170612 PDER-LS				○								○		11,30	6,35	17,50	1,20	1,56
1113361	XPET 170616 PDER-LS				Ⓢ								Ⓢ		11,30	6,35	17,50	1,60	1,19
1113362	XPET 170620 PDER-LS				Ⓢ								Ⓢ		11,30	6,35	17,50	2,00	2,10
1113363	XPET 170632 PDER-LS				Ⓢ								Ⓢ		11,30	6,35	17,50	3,20	0,96
1111988	XPET 170608 PDSR-MP	Ⓢ	Ⓢ	Ⓢ			Ⓢ	Ⓢ	Ⓢ	Ⓢ					11,30	6,35	17,50	0,80	1,80
1111989	XPET 170616 PDSR-MP		Ⓢ	Ⓢ			Ⓢ	Ⓢ	Ⓢ	Ⓢ					11,30	6,35	17,50	1,60	1,00
1111990	XPET 170608 PDFR-LN										Ⓢ				11,30	6,35	17,50	0,80	1,20
1111991	XPET 170620 PDFR-LN										Ⓢ				11,30	6,35	17,50	2,00	1,00
1111992	XPET 170632 PDFR-LN										Ⓢ				11,30	6,35	17,50	3,20	0,80
1113085	XPET 170608 PDFR-LN Z1											Ⓢ			11,20	6,50	8,00	0,80	1,51
1113086	XPET 170608 PDFR-LN Z1W											Ⓢ			11,20	6,50	8,00	0,80	4,91

Ⓢ First choice | Primeira opção | 1ª opción Ⓢ Stock item | Produto de stock | Itens de stock

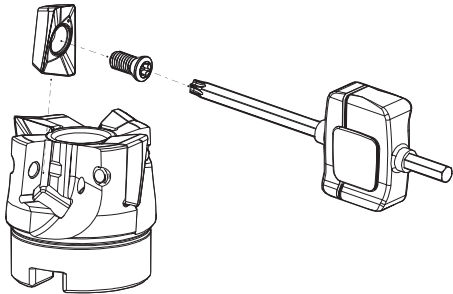
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS

Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately Key (Torx - Nm)	Torque Value	Retaining Screw
					
A20290 - 40-80	P0451001	XT20	DT2050	5	-
A20290 - 100	P0451001	PT20	DT2050	5	D1603500
A20290 - 125	P0451001	PT20	DT2050	5	D2004000
W20290 - 32-40	P0451001	XT20	DT2050	5	-



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.

GRADES SELECTION GUIDE

Guia para selecção de graus | Tabla para selección de calidades

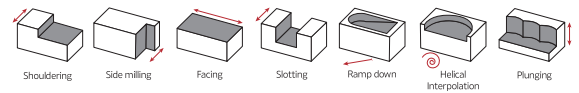
ISO	PSM	Material	HB (Brinell)	Grades								PCD
				← Wear Resistance				Toughness →				
				PH0910 	PH5705 	PHP920 	PHP930 	PHH930 	PH5740 	PHS740 	PH7740 	PDP410
P	1	Unalloyed Steel	125-220			✓	✓			✓	✓	
	2	Low-Alloyed Steel	220-280			✓	✓			✓	✓	
	3	High-Alloyed Steel	280-380			✓	✓			✓	✓	
M	4	SS - Ferritic / Martensitic	200-330					✓			✓	
	5	SS - Austenitic	200-330					✓			✓	
	6	SS - Austenitic-ferritic (Duplex)	230-260					✓			✓	
K	7	Malleable Cast Iron	130-230		✓	✓	✓		✓		✓	
	8	Grey Cast Iron	180-245		✓	✓	✓		✓		✓	
	9	Nodular Cast iron	160-250		✓	✓	✓		✓		✓	
N	10	Aluminium and Non Ferrous	30-130	✓								✓
S	11	Heat Resistant Super Alloys	200-320					✓			✓	

● Good Conditions ● Average Conditions ● Difficult Conditions

CHIP BREAKER SELECTION GUIDE

Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	XPET 17... LP	XPET 17... MP
	2	Low-Alloyed Steel	220-280	XPET 17... LP	XPET 17... MP
	3	High-Alloyed Steel	280-380	XPET 17... MP	-
M	4	SS - Ferritic / Martensitic	200-330	XPET 17... LS	XPET 17... LP
	5	SS - Austenitic	200-330	XPET 17... LS	XPET 17... LP
	6	SS - Austenitic-ferritic (Duplex)	230-260	XPET 17... LS	XPET 17... LP
K	7	Malleable Cast Iron	130-230	XPET 17... LP	XPET 17... MP
	8	Grey Cast Iron	180-245	XPET 17... MP	-
	9	Nodular Cast iron	160-250	XPET 17... MP	-
N	10	Aluminium and Non Ferrous	30-130	XPET 17... LN LN Z1 LN Z1W	-
S	11	Heat Resistant Super Alloys	200-320	XPET 17... LS	XPET 17... LP



RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)								PCD
				← Wear Resistance				Toughness →				
				PH0910	PH5705	PHP920	PHP930	PHH930	PH5740	PHS740	PH7740	PDP410
P	1	Unalloyed Steel	125-220	-	-	180-250	160-230	-	-	140-220	140-200	-
	2	Low-Alloyed Steel	220-280	-	-	160-230	140-210	-	-	120-200	130-180	-
	3	High-Alloyed Steel	280-380	-	-	140-220	120-200	-	-	100-190	100-170	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	140-210	-	-	130-180	-
	5	SS - Austenitic	200-330	-	-	-	-	120-170	-	-	110-160	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	100-150	-	-	90-150	-
K	7	Malleable Cast Iron	130-230	-	160-290	160-270	-	-	160-260	-	140-220	-
	8	Grey Cast Iron	180-245	-	170-320	140-250	-	-	140-240	-	120-210	-
	9	Nodular Cast iron	160-250	-	140-200	120-210	-	-	120-200	-	100-190	-
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-	-	-	800-3000
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	30-110	-	-	30-100	-

ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)					
				XPET 17... LP	XPET 17... LS	XPET 17... MP	XPET 17... LN	XPET 17... LN Z1	XPET 17... LN Z1W
P	1	Unalloyed Steel	125-220	0,10-0,35	-	0,10-0,35	-	-	-
	2	Low-Alloyed Steel	220-280	0,10-0,35	-	0,10-0,35	-	-	-
	3	High-Alloyed Steel	280-380	0,10-0,30	-	0,10-0,30	-	-	-
M	4	SS - Ferritic / Martensitic	200-330	0,10-0,30	0,10-0,35	-	-	-	-
	5	SS - Austenitic	200-330	0,10-0,30	0,10-0,30	-	-	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	0,10-0,25	0,10-0,25	-	-	-	-
K	7	Malleable Cast Iron	130-230	0,10-0,35	-	0,10-0,35	-	-	-
	8	Grey Cast Iron	180-245	0,10-0,35	-	0,10-0,35	-	-	-
	9	Nodular Cast iron	160-250	0,10-0,30	-	0,10-0,30	-	-	-
N	10	Aluminium and Non Ferrous	30-130	-	-	-	0,10-0,35	0,10-0,35	0,10-0,35
S	11	Heat Resistant Super Alloys	200-320	0,10-0,20	0,10-0,20	-	-	-	-

(Note 1) Cutting conditions $a_e/D_c=70\%$.

(Note 2)

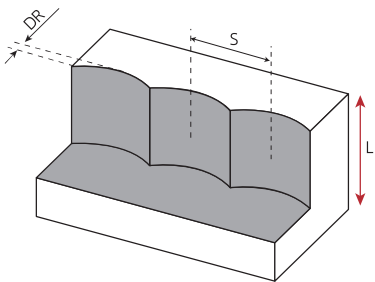
Operation	a_e	Vc & fz	AP (mm)
Slotting	100%	<20%	2,0-6,0
Shouldering	<50%	>8%	7,0-13,0
	≤25%	>12%	13,0-16,0

(Note 3) 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.

MILLING PLUNGING Mergulho | Plunge

L≤3DC	L>3DC	S max.
f _z (mm/t)		
0,10-0,30	0,08-0,25	S _{max} = √DC·DR - DR ²

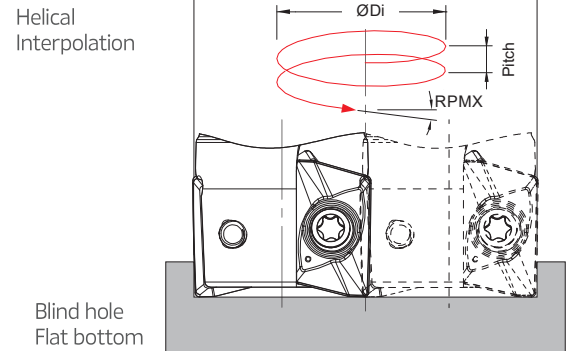
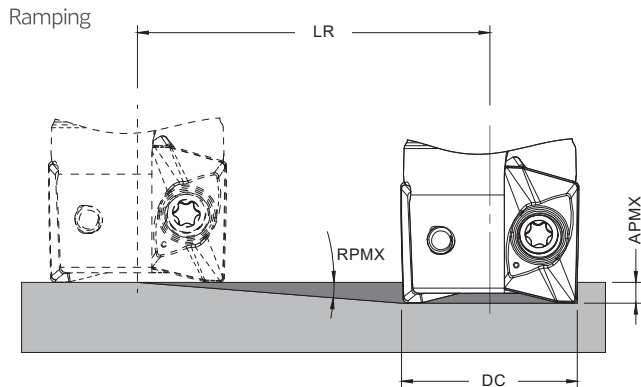


S max and DR corresponding cutting diameter DC (mm)							
DR (mm)	DC (mm)						
	32	40	50	63	80	100	125
1	5,6	6,2	7,0	7,9	8,9	9,9	11,1
2	7,7	8,7	9,8	11,0	12,5	14,0	15,7
3*	9,3	10,5	11,9	13,4	15,2	17,1	19,1
4*	10,6	12,0	13,6	15,4	17,4	19,6	22,0

* only for radius above 2,0mm

RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular



$$\text{ØDi} = \text{ØDH} - \text{DC}$$

DC	Ramping			Helical Interpolation		
				Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	
32	3,8	17,0	255,9	58,8	-	5,6
				-	62,4	6,3
40	2,7	17,0	360,5	74,8	-	5,2
				-	78,4	5,7
50	2,0	17,0	486,8	94,8	-	4,9
				-	98,4	5,3
63	1,5	17,0	649,2	120,8	-	4,8
				-	124,4	5,0
80	1,0	17,0	973,9	154,8	-	4,1
				-	158,4	4,3
100	0,8	17,0	1217,5	194,8	-	4,2
				-	198,4	4,3
125	0,7	17,0	1498,4	244,8	-	4,3
				-	248,4	4,4

(1) using LP insert with radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch

When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

- Minimum Diameter: $\text{ØDHmin} = 2 \times (\text{DC} - (\text{R corner radius} + \text{F width of edge wiper}))$

- Maximum Diameter: $\text{ØDHmax} = 2 \times (\text{DC} - \text{R corner radius})$

NEW 20290

HELIPRO



The HELIPRO 20290 delivers high feed rates, large depths of cut, and high metal removal rates in shouldering and profiling applications. Engineered to outperform in large and heavy machining operations, due to high durability and cutting stability.

A HELIPRO 20290 proporciona altas taxas de avanço, grandes profundidades de corte e altas taxas de remoção de metal em aplicações de desbaste e perfil. Projetada para superar em operações de fresagem grandes e pesadas, devido à alta durabilidade e estabilidade de corte.

La HELIPRO 20290 ofrece altas tasas de avance, grandes profundidades de corte y altas tasas de remoción de metal en aplicaciones de desbaste y perfilado. Diseñada para destacarse en operaciones de fresado grandes y pesadas, gracias a su alta durabilidad y estabilidad de corte.

NEW HELIPRO 20290 > page 180

- > From DC 12mm to 30mm
De DC 12mm a 30mm | Desde DC 12mm hasta 30mm
- > Available in arbor mounting
Disponível em montagem tipo árvore | Disponible en fijación con tornillo central
- > High material removal rate
Alta taxa de remoção de material | Alta tasa de remoción de material
- > Superior stability
Estabilidade superior | Estabilidad superior



MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

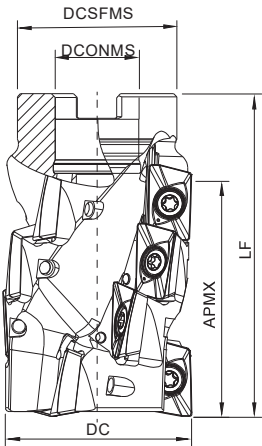
Spare Parts

Technical Data

End Mills



Arbor Mounting
KAPR=90° | GAMP=+8°

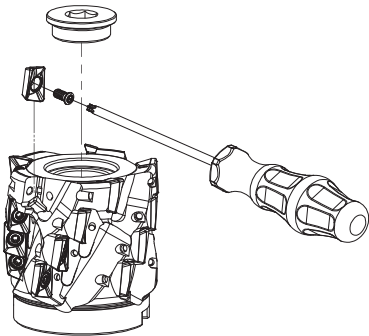


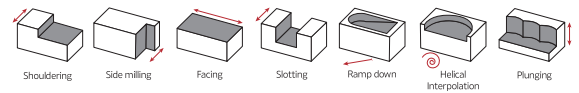
Order code Código	Reference Referência Referencia	CICT	Nº Stages	Nº Flutes	Dimensions Dimensões Dimensiones (mm)					WT	Insert Pastilha Inserto	Stock
					DC	DCONMS	DCSFMS	LF	APMX			
181100100	050A20290-03-08-022085-063-12	12	4	3	50	22	42	85	63	0,465	XP.. 1706...	⊗
181133000	063A20290-04-08-027085-063-16	16	4	4	63	27	60	85	63	0,930	XP.. 1706...	⊗
181126500	080A20290-05-08-032085-063-20	20	4	5	80	32	70	85	63	1,723	XP.. 1706...	⊗
181126600	100A20290-06-08-040085-063-24	24	4	6	100	40	90	85	63	3,011	XP.. 1706...	⊗
181133100	125A20290-06-08-040105-079-30	30	5	6	125	40	90	105	79	4,800	XP.. 1706...	○

⊗ Stock item | Produto de stock | Itens de stock ○ Available under request | Disponível sobre consulta | Disponible bajo consulta

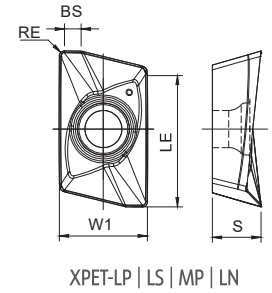
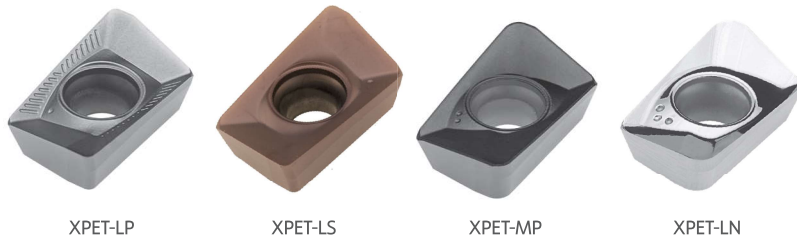
SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Sealing Cap
			Key (Torx - Nm)	Torque Value	
A20290 - 50	P0451001	PT20	DT2050	5,0	TRM2009S8
A20290 - 63	P0451001	PT20	DT2050	5,0	TRM2411S10
A20290 - 80	P0451001	PT20	DT2050	5,0	TRM3012S14
A20290 - 100-125	P0451001	PT20	DT2050	5,0	TRM3615S17





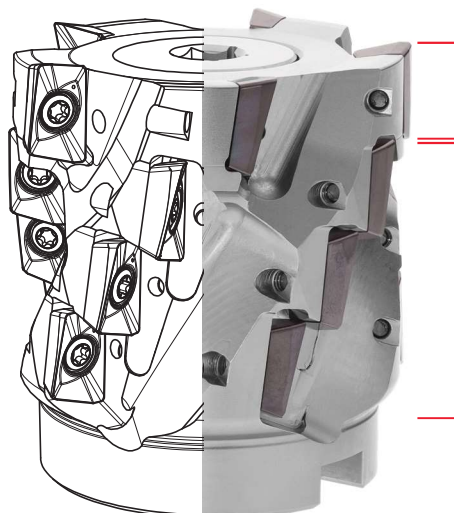
XPET 1706... Inserts | Pastilhas | Plaquetas



		P			M		K				N	S		Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD		PVD		CVD	PVD		PVD	UNC	PVD						
(1) Geometry code	(2) Grade code	T9	T1	G6	X9	G6	L5	L9	T1	G6	10	X9	G6	W1	S	LE	RE	BS
1111986	XPET 170608 PDER-LP		Ⓜ	Ⓜ		Ⓜ			Ⓜ	Ⓜ			Ⓜ	11,30	6,35	17,50	0,80	1,80
1111987	XPET 170616 PDER-LP		Ⓜ	Ⓜ		Ⓜ			Ⓜ	Ⓜ			Ⓜ	11,30	6,35	17,50	1,60	1,20
1112223	XPET 170608 PDER-LS				Ⓜ	Ⓜ						Ⓜ	Ⓜ	11,30	6,35	17,50	0,80	1,94
1113373	XPET 170612 PDER-LS				○							○		11,30	6,35	17,50	1,20	1,56
1113361	XPET 170616 PDER-LS				Ⓜ							Ⓜ		11,30	6,35	17,50	1,60	1,19
1113362	XPET 170620 PDER-LS				Ⓜ							Ⓜ		11,30	6,35	17,50	2,00	2,10
1113363	XPET 170632 PDER-LS				Ⓜ							Ⓜ		11,30	6,35	17,50	3,20	0,96
1111988	XPET 170608 PDSR-MP	Ⓜ	Ⓜ	Ⓜ			Ⓜ	Ⓜ	Ⓜ	Ⓜ				11,30	6,35	17,50	0,80	1,80
1111989	XPET 170616 PDSR-MP		Ⓜ	Ⓜ			Ⓜ	Ⓜ	Ⓜ	Ⓜ				11,30	6,35	17,50	1,60	1,00
1111990	XPET 170608 PDFR-LN										Ⓜ			11,30	6,35	17,50	0,80	1,20
1111991	XPET 170620 PDFR-LN										Ⓜ			11,30	6,35	17,50	2,00	1,00
1111992	XPET 170632 PDFR-LN										Ⓜ			11,30	6,35	17,50	3,20	0,80

⊗ First choice | Primeira opção | 1ª opción
 ⊗ Stock item | Produto de stock | Itens de stock
 ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)
 Insert order code = (1) Geometry Code + (2) Grade Code

PROCEDURES FOR MOUNTING INSERTS Procedimentos para pastilhas | Procedimientos para plaquetas



Radius from 0,8 to 3,2 mm

To minimize scallop only radius 0,8mm can be applied

GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades							
				← Wear Resistance						Toughness →	
				PH0910	PH5705	PHP920	PHP930	PHH930	PH5740	PHS740	PH7740
P	1	Unalloyed Steel	125-220			✓	✓			✓	✓
	2	Low-Alloyed Steel	220-280			✓	✓			✓	✓
	3	High-Alloyed Steel	280-380			✓	✓			✓	✓
M	4	SS - Ferritic / Martensitic	200-330					✓			✓
	5	SS - Austenitic	200-330					✓			✓
	6	SS - Austenitic-ferritic (Duplex)	230-260					✓			✓
K	7	Malleable Cast Iron	130-230		✓	✓	✓		✓		✓
	8	Grey Cast Iron	180-245		✓	✓	✓		✓		✓
	9	Nodular Cast iron	160-250		✓	✓	✓		✓		✓
N	10	Aluminium and Non Ferrous	30-130	✓							
S	11	Heat Resistant Super Alloys	200-320					✓			✓

Good Conditions

Average Conditions

Difficult Conditions

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)							
				← Wear Resistance						Toughness →	
				PH0910	PH5705	PHP920	PHP930	PHH930	PH5740	PHS740	PH7740
P	1	Unalloyed Steel	125-220	-	-	180-250	160-230	-	-	140-220	140-200
	2	Low-Alloyed Steel	220-280	-	-	160-230	140-210	-	-	120-200	130-180
	3	High-Alloyed Steel	280-380	-	-	140-220	120-200	-	-	100-190	100-170
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	140-210	-	-	130-180
	5	SS - Austenitic	200-330	-	-	-	-	120-170	-	-	110-160
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	100-150	-	-	90-150
K	7	Malleable Cast Iron	130-230	-	160-290	160-270	-	-	160-260	-	140-220
	8	Grey Cast Iron	180-245	-	170-320	140-250	-	-	140-240	-	120-210
	9	Nodular Cast iron	160-250	-	140-200	120-210	-	-	120-200	-	100-190
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	30-110	-	-	30-100

ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)			
				XPET 17... LP	XPET 17... MP	XPET 17... LN	XPET 17... LS
P	1	Unalloyed Steel	125-220	0,10-0,35	0,10-0,35	-	-
	2	Low-Alloyed Steel	220-280	0,10-0,35	0,10-0,35	-	-
	3	High-Alloyed Steel	280-380	0,10-0,30	0,10-0,30	-	-
M	4	SS - Ferritic / Martensitic	200-330	0,10-0,30	-	-	0,10-0,35
	5	SS - Austenitic	200-330	0,10-0,30	-	-	0,10-0,30
	6	SS - Austenitic-ferritic (Duplex)	230-260	0,10-0,25	-	-	010-0,25
K	7	Malleable Cast Iron	130-230	0,10-0,35	0,10-0,35	-	-
	8	Grey Cast Iron	180-245	0,10-0,35	0,10-0,35	-	-
	9	Nodular Cast iron	160-250	0,10-0,30	0,10-0,30	-	-
N	10	Aluminium and Non Ferrous	30-130	-	-	0,10-0,35	-
S	11	Heat Resistant Super Alloys	200-320	0,10-0,20	-	-	0,10-0,20

(Note 1) Cutting conditions ae/DC=70%

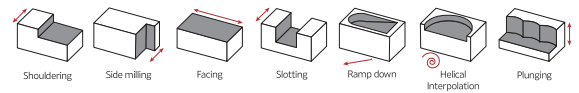
(Note 2) Cutting conditions should be ajusted according to the machine and work rigidity.

(Note 3):

Operation	ae	Vc & fz	AP (mm)
Slotting	100%	<20%	13,0-42,0
Shouldering	<50%	>8%	30,0-63,0
	≤25%	>12%	42,0-79,0

(Note 4) 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.

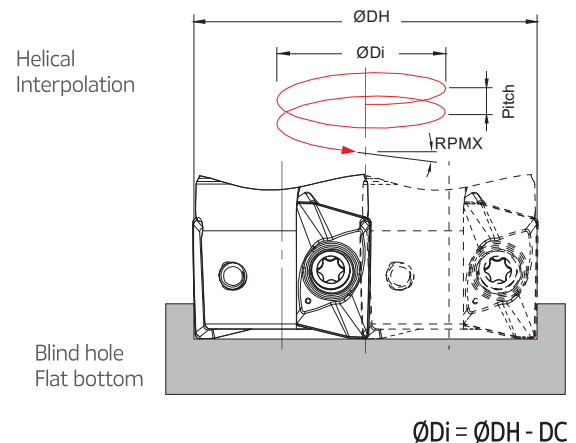
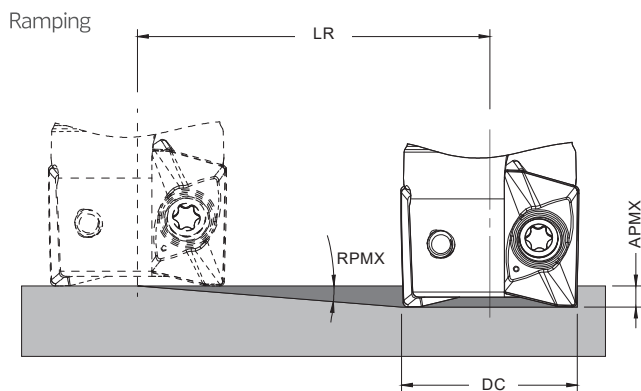


CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	XPET 17... LP	XPET 17... MP
	2	Low-Alloyed Steel	220-280	XPET 17... LP	XPET 17... MP
	3	High-Alloyed Steel	280-380	XPET 17... MP	-
M	4	SS - Ferritic / Martensitic	200-330	XPET 17... LS	XPET 17... LP
	5	SS - Austenitic	200-330	XPET 17... LS	XPET 17... LP
	6	SS - Austenitic-ferritic (Duplex)	230-260	XPET 17... LS	XPET 17... LP
K	7	Malleable Cast Iron	130-230	XPET 17... LP	XPET 17... MP
	8	Grey Cast Iron	180-245	XPET 17... MP	-
	9	Nodular Cast iron	160-250	XPET 17... MP	-
N	10	Aluminium and Non Ferrous	30-130	XPET 17... LN	-
S	11	Heat Resistant Super Alloys	200-320	XPET 17... LS	XPET 17... LP

RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular



$$\text{ØDi} = \text{ØDH} - \text{DC}$$

DC	Ramping			Helical Interpolation		
				Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	
50	2,0	8,5	243,4	94,8 -	- 98,4	4,9 5,3
63	1,5	8,5	324,6	120,8 -	- 124,4	4,7 5,0
80	1,0	8,5	487,0	154,8 -	- 158,4	4,1 4,2
100	0,8	8,5	608,7	194,8 -	- 198,4	4,1 4,3
125	0,7	8,5	695,7	244,8 -	- 248,4	4,5 4,7

(1) using LP insert with radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch

When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

- Minimum Diameter: $\text{ØDHmin} = 2 \times (\text{DC} - (\text{R corner radius} + \text{F width of edge wiper}))$

- Maximum Diameter: $\text{ØDHmax} = 2 \times (\text{DC} - \text{R corner radius})$

90090 | 90190 | 90390

TGPLUS



The TGPLUS series offers unparalleled reliability in rough shoulder milling, thanks to robust cutting edges and thicker cross-sections, complemented by a highly rigid cutter featuring a thicker core. The TGPLUS series design optimizes stability and surface area contact between the insert and the cutter body, promoting excellent surface finishes and clean 90-degree walls.

A série TGPLUS oferece uma fiabilidade incomparável no desbaste em fresagem a 90°, graças a arestas de corte robustas e seções transversais mais espessas, complementadas por uma ferramenta altamente rígida com núcleo mais espesso. O design da série TGPLUS otimiza a estabilidade e a área de contato superficial entre a pastilha e o corpo da ferramenta, promovendo excelentes acabamentos de superfície e paredes a 90°.

La serie TGPLUS ofrece una fiabilidad incomparable en el desbaste en fresado a 90°, gracias a sus robustos filos de corte y secciones transversales más gruesas, complementadas por una herramienta altamente rígida con un núcleo más grueso. El diseño de la serie TGPLUS optimiza la estabilidad y el área de contacto superficial entre la plaquita y el cuerpo de la herramienta, promoviendo excelentes acabados de superficie y paredes a 90°.

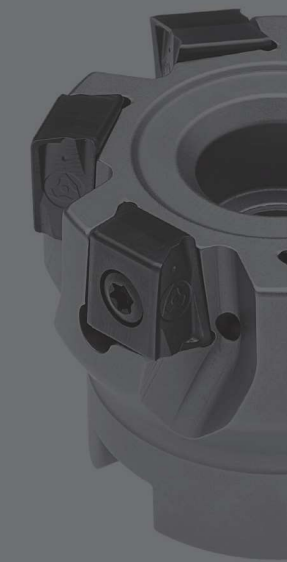
TGPLUS 90090 > page 186

- > From DC 16mm to 63mm
De DC 16mm a 63mm | Desde DC 16mm hasta 63mm
- > Available in arbor, threaded, weldon and cylindrical shank
Disponível em montagem tipo árvore, acoplamento roscado, haste weldon e cilíndrica | Disponible en fijación con tornillo central, fijación roscada, mango tipo weldon y cilíndrico
- > Small tangential insert with 4 cutting edges (LNXT 0904..)
Pastilha tangencial pequena com 4 arestas de corte (LNXT 0904..) | Plaquita tangencial pequeña con 4 filos de corte (LNXT 0904..)
- > Excellent machining stability
Excelente estabilidade de maquinação | Excelente estabilidad de mecanizado



TGPLUS 90190 > page 190

- > From DC 25mm to 125mm
De DC 25mm a 125mm | Desde DC 25mm hasta 125mm
- > Available in arbor mounting, weldon and cylindrical shank
Disponível em montagem tipo árvore, haste weldon e cilíndrica | Disponible en fijación con tornillo central, mango tipo weldon y cilíndrico
- > Medium tangential insert with 4 cutting edges (LNXT 1306..)
Pastilha tangencial média com 4 arestas de corte (LNXT 1306..) | Plaquita tangencial media con 4 filos de corte (LNXT 1306..)
- > High rake angle insert reduces cutting force
Pastilha de alto ângulo de inclinação que reduz a força de corte | Plaquita de alto ángulo de incidencia que reduce la fuerza de corte



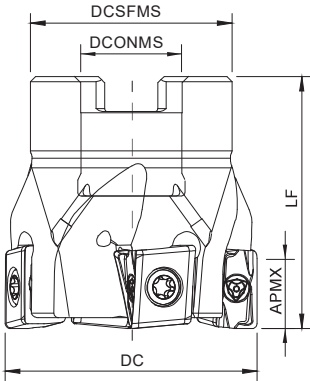
TGPLUS 90390 > page 194

- > From DC 50mm to 160mm
De DC 50mm a 160mm | Desde DC 50mm hasta 160mm
- > Available in arbor mounting
Disponível em montagem tipo árvore | Disponible en fijación con tornillo central
- > Large tangential insert with 2 cutting edges (LNXT 1506..)
Pastilha tangencial grande com 4 arestas de corte (LNXT 1506..) | Plaquita tangencial grande con 4 filos de corte (LNXT 1506..)
- > Heavy duty milling
Fresagem pesada | Fresado pesado





Arbor Mounting
KAPR=90° | GAMP=-4°



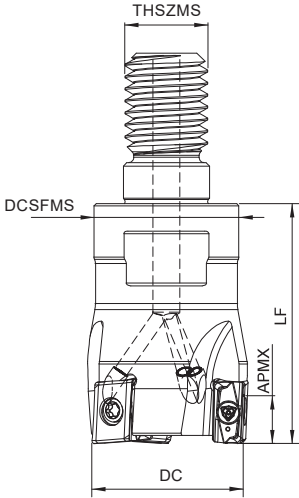
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181144400	040A90090-04-04-016040	4	40	16	36	40	0,24	A	7,0	LNXT 0904...	
181144500	050A90090-05-04-022040	5	50	22	40	40	0,32	A	7,0	LNXT 0904...	
181144600	063A90090-07-04-022040	7	63	22	48	40	0,54	A	7,0	LNXT 0904...	
181146600	063A90090-10-04-022040	10	63	22	48	40	0,54	A	7,0	LNXT 0904...	

Stock item | Produto de stock | Itens de stock

Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Threaded Coupling
KAPR=90° | GAMP=-4°



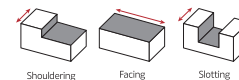
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)		
181144200	025R90090-03-04-M12035	3	25	12	21	35	0,10	7,0	LNXT 0904...	
181144300	032R90090-04-04-M16040	4	32	16	29	40	0,21	7,0	LNXT 0904...	

Stock item | Produto de stock | Itens de stock

Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

TGPLUS 90090

LNXT 09



A

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

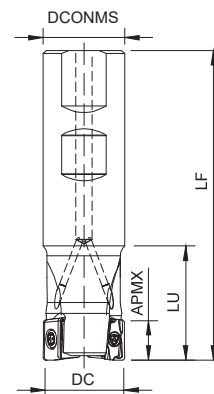
Spare Parts

Technical Data

End Mills



Weldon Shank
KAPR=90° | GAMP=-4°(*-6°)



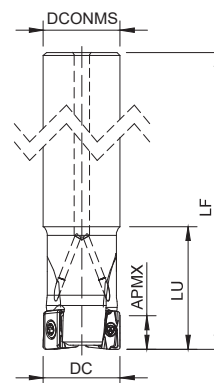
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181109400	016W90090-02-06-016090*	2	16	16	90	25	0,12	7,0	LNXT 0904...	⊗
181109500	025W90090-03-04-025095	3	25	25	95	30	0,31	7,0	LNXT 0904...	⊗
181144100	032W90090-04-04-032110	4	32	32	110	30	0,61	7,0	LNXT 0904...	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Cylindrical Shank
KAPR=90° | GAMP=-4°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181158800	020E90090-02-04-020150	2	20	20	150	30	0,15	7,0	LNXT 0904...	⊗
181148100	025E90090-03-04-025200	3	25	25	200	30	0,31	7,0	LNXT 0904...	○
181148200	032E90090-04-04-032250	4	32	32	250	30	0,78	7,0	LNXT 0904...	○

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

TGPLUS 90090

Proprietary milling line

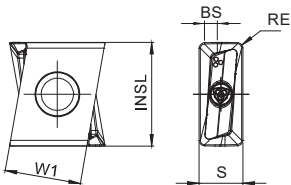
LNXT 0904... Inserts | Pastilhas | Plaquitas



LNXT-MP



LNXT-LS



LNXT-MP | LS

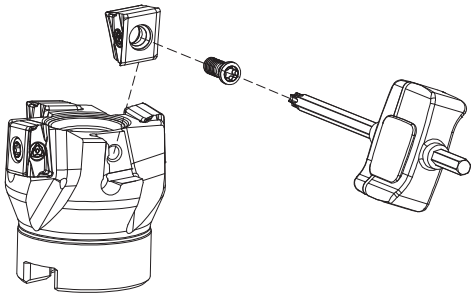
	(2) Grade code	P			M	K			S	Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD		PVD	CVD	PVD		PVD					
		T9	T1	G6	X9	L6	T1	G6	X9					
(1) Geometry code	ISO Reference	PHS740	PHP920	PH7740	PHH930	PH5320	PHP920	PH7740	PHH930	W1	S	INSL	RE	BS
1112225	LNXT 090404 PNER-MP									9,40	4,50	9,00	0,40	-
1112226	LNXT 090408 PNER-MP									9,40	4,50	9,00	0,80	-
1112868	LNXT 090404 PNER-LS									9,40	4,50	9,00	0,80	-

First choice | Primeira opção | 1ª opción Stock item | Produto de stock | Itens de stock Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value
A90090 - 40-63	P0250700	XT07	DT0709	1,2
R90090 - 25-32	P0250700	XT07	DT0709	1,2
W90090 - 16-32	P0250700	XT07	DT0709	1,2
E90090 - 25-32	P0250700	XT07	DT0709	1,2

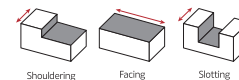


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.

GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades				
				← Wear Resistance		Toughness →		
				PH5320	PHP920	PHH930	PHS740	PH7740
P	1	Unalloyed Steel	125-220		✓		✓	✓
	2	Low-Alloyed Steel	220-280		✓		✓	✓
	3	High-Alloyed Steel	280-380		✓		✓	✓
M	4	SS - Ferritic / Martensitic	200-330			✓		
	5	SS - Austenitic	200-330			✓		
	6	SS - Austenitic-ferritic (Duplex)	230-260			✓		
K	7	Malleable Cast Iron	130-230	✓	✓			✓
	8	Grey Cast Iron	180-245	✓	✓			✓
	9	Nodular Cast iron	160-250	✓	✓			✓
S	11	Heat Resistant Super Alloys	200-320			✓		

Good Conditions Average Conditions Difficult Conditions

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)					Feed fz (mm/t)	
				← Wear Resistance		PHH930	Toughness →		LNXT 09... MP	LNXT 09... LS
				PH5320	PHP920		PHS740	PH7740		
P	1	Unalloyed Steel	125-220	-	180-250	-	140-220	140-200	0,08-0,25	-
	2	Low-Alloyed Steel	220-280	-	160-230	-	120-200	130-180	0,08-0,25	-
	3	High-Alloyed Steel	280-380	-	140-220	-	100-190	100-170	0,08-0,15	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	140-210	-	-	0,08-0,25	0,08-0,25
	5	SS - Austenitic	200-330	-	-	120-170	-	-	0,08-0,20	0,08-0,20
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	100-150	-	-	0,08-0,15	0,08-0,20
K	7	Malleable Cast Iron	130-230	150-280	160-270	-	-	140-220	0,08-0,30	-
	8	Grey Cast Iron	180-245	160-320	140-250	-	-	120-210	0,08-0,25	-
	9	Nodular Cast iron	160-250	100-190	120-210	-	-	100-190	0,08-0,20	-
S	11	Heat Resistant Super Alloys	200-320	-	-	30-110	-	-	-	-

(Note 1) Cutting conditions $a_e/D_c=70\%$.

(Note 2) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:

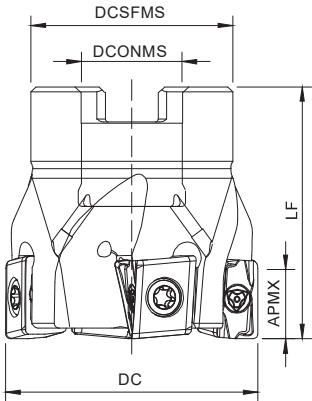
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	
P	1	Unalloyed Steel	125-220	MP	
	2	Low-Alloyed Steel	220-280	MP	
	3	High-Alloyed Steel	280-380	MP	
M	4	SS - Ferritic / Martensitic	200-330	LS	
	5	SS - Austenitic	200-330	LS	
	6	SS - Austenitic-ferritic (Duplex)	230-260	LS	
K	7	Malleable Cast Iron	130-230	MP	
	8	Grey Cast Iron	180-245	MP	
	9	Nodular Cast iron	160-250	MP	
S	11	Heat Resistant Super Alloys	200-320	LS	



Arbor Mounting
KAPR=90° | GAMP=-4°

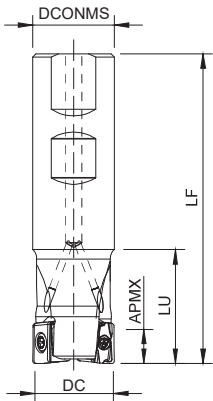


Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181118800	040A90190-04-04-016040	4	40	16	32	40	0,17	A	11	LNXT 1306...	
181118900	040A90190-05-04-016040	5	40	16	32	40	0,18	A	11	LNXT 1306...	
181111200	050A90190-05-04-022040	5	50	22	42	40	0,27	A	11	LNXT 1306...	
181111300	050A90190-06-04-022040	6	50	22	42	40	0,28	A	11	LNXT 1306...	
181119000	063A90190-06-04-022040	6	63	22	52	40	0,52	A	11	LNXT 1306...	
181119100	063A90190-08-04-022040	8	63	22	52	40	0,52	A	11	LNXT 1306...	
181119200	080A90190-07-04-027050	7	80	27	60	50	0,88	B	11	LNXT 1306...	
181119300	080A90190-10-04-027050	10	80	27	60	50	0,86	B	11	LNXT 1306...	
181119400	100A90190-09-04-032050	9	100	32	80	50	1,56	B	11	LNXT 1306...	
181119500	100A90190-13-04-032050	13	100	32	80	50	1,56	B	11	LNXT 1306...	
181119600	125A90190-11-04-040063	11	125	40	90	63	2,87	B	11	LNXT 1306...	
181119700	125A90190-16-04-040063	16	125	40	90	63	2,86	B	11	LNXT 1306...	

Stock item | Produto de stock | Itens de stock Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Weldon Shank
KAPR=90° | GAMP=-4°

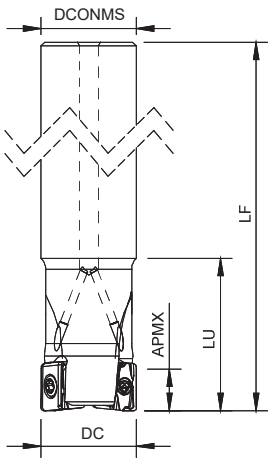


Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)			
181118300	025W90190-02-04-025095	2	25	25	95	45	0,29	11		LNXT 1306...	
181109800	032W90190-03-04-032110	3	32	32	110	50	0,55	11		LNXT 1306...	
181118400	040W90190-04-04-032110	4	40	32	110	50	0,60	11		LNXT 1306...	

Stock item | Produto de stock | Itens de stock Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Cylindrical Shank
KAPR=90° | GAMP=-4°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181118500	025E90190-02-04-025200	2	25	25	200	40	0,66	11	LNXT 1306...	Ⓢ
181118600	032E90190-03-04-032250	3	32	32	250	50	1,37	11	LNXT 1306...	Ⓢ
181118700	040E90190-04-04-032250	4	40	32	250	50	1,42	11	LNXT 1306...	Ⓢ

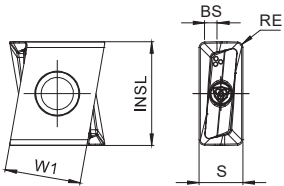
Ⓢ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

LNXT 1306... Inserts | Pastilhas | Plaquetas



LNXT-MP



LNXT-MP

		P			M	K			Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD		PVD	CVD	PVD						
		⁽²⁾ Grade code	T9	T1	G6	G6	L6	T1					
⁽¹⁾ Geometry code	ISO Reference	PHS740	PHP920	PH7740	PH7740	PH5320	PHP920	PH7740	W1	S	INSL	RE	BS
1112242	LNXT 130604 PNER-MP	Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ	9,80	6,80	13,00	0,40	0,90
1112243	LNXT 130608 PNER-MP	Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ	Ⓢ	9,80	6,80	13,00	0,80	0,90

Ⓢ First choice | Primeira opção | 1ª opción

Ⓢ Stock item | Produto de stock | Itens de stock

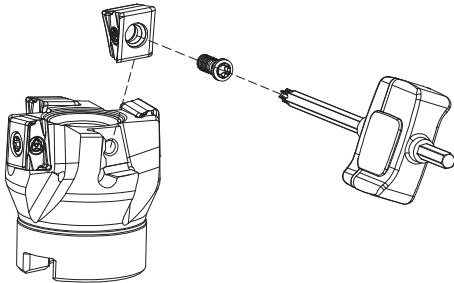
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS

Acessórios | Repuestos

Cutter DC	Order separately				Order separately	
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
						
E90190 - 25	P0400900	XT15	DT1530	3,0	-	-
E90190 - 32-40	P0401200	XT15	DT1530	3,0	-	-
W90190 - 25	P0400900	XT15	DT1530	3,0	-	-
W90190 - 32-40	P0401200	XT15	DT1530	3,0	-	-
A90190 - 40-63	P0401200	XT15	DT1530	3,0	-	-
A90190 - 80	P0401200	XT15	DT1530	3,0	J0123510	SD6368-12
A90190 - 100	P0401200	XT15	DT1530	3,0	J0164110	SD6368-16
A90190 -125	P0401200	XT15	DT1530	3,0	J0204610	SD6368-20



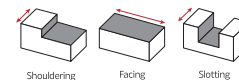
Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.

GRADES SELECTION GUIDE

Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades			
				← Wear Resistance	Toughness →		
				PH5320	PHP920	PHS740	PH7740
P	1	Unalloyed Steel	125-220				
	2	Low-Alloyed Steel	220-280				
	3	High-Alloyed Steel	280-380				
M	4	SS - Ferritic / Martensitic	200-330				
	5	SS - Austenitic	200-330				
	6	SS - Austenitic-ferritic (Duplex)	230-260				
K	7	Malleable Cast Iron	130-230				
	8	Grey Cast Iron	180-245				
	9	Nodular Cast iron	160-250				

 Good Conditions  Average Conditions  Difficult Conditions



RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)				Feed fz (mm/t)
				← Wear Resistance		Toughness →		
				PH5320	PHP920	PHS740	PH7740	LNXT 09... MP
P	1	Unalloyed Steel	125-220	-	180-250	140-220	140-200	0,08-0,25
	2	Low-Alloyed Steel	220-280	-	160-230	120-200	130-180	0,08-0,25
	3	High-Alloyed Steel	280-380	-	140-220	100-190	100-170	0,08-0,15
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	0,08-0,25
	5	SS - Austenitic	200-330	-	-	-	-	0,08-0,20
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	0,08-0,15
K	7	Malleable Cast Iron	130-230	150-280	160-270	-	140-220	0,08-0,30
	8	Grey Cast Iron	180-245	160-320	140-250	-	120-210	0,08-0,25
	9	Nodular Cast iron	160-250	100-190	120-210	-	100-190	0,08-0,20

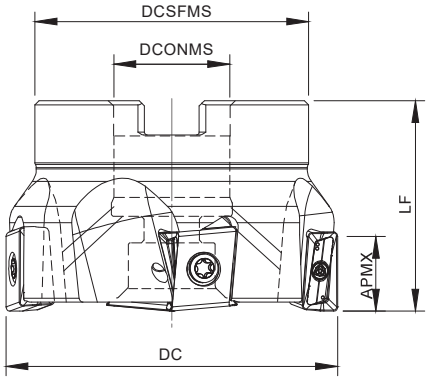
(Note 1) Cutting conditions $a_e/D_c=70\%$.

(Note 2) 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.



Arbor Mounting
KAPR=90° | GAMP=-5°



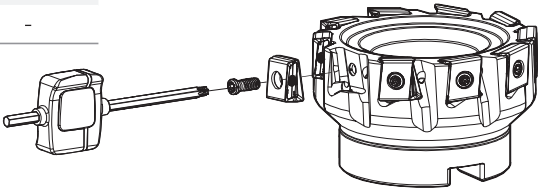
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181069200	050A90390-05-05-022040	5	50	22	42	40	0,315	A	14,0	LNXT 1506...	Ⓢ
181066400	063A90390-05-05-022040	5	63	22	52	40	0,524	A	14,0	LNXT 1506...	Ⓢ
181051000	063A90390-08-05-022040	8	63	22	52	40	0,550	A	14,0	LNXT 1506...	Ⓢ
181066500	080A90390-07-05-027050	7	80	27	60	50	0,936	A	14,0	LNXT 1506...	Ⓢ
181052000	080A90390-10-05-027050	10	80	27	60	50	0,939	B	14,0	LNXT 1506...	Ⓢ
181066600	100A90390-08-05-032050	8	100	32	80	50	1,586	B	14,0	LNXT 1506...	Ⓢ
181051100	100A90390-12-05-032050	12	100	32	80	50	1,690	B	14,0	LNXT 1506...	Ⓢ
181066700	125A90390-09-05-040063	9	125	40	90	63	3,001	B	14,0	LNXT 1506...	Ⓢ
181051200	125A90390-15-05-040063	15	125	40	90	63	3,113	B	14,0	LNXT 1506...	Ⓢ
181051300	160A90390-10-05-U040063	10	160	40	110	63	4,470	C	14,0	LNXT 1506...	Ⓢ
181066800	160A90390-20-05-U040063	20	160	40	110	63	4,580	C	14,0	LNXT 1506...	Ⓢ

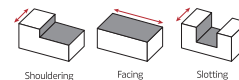
Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A90390 – 50 - 80	P0401200	XT15	DT1530	3,0	-	-
A90390 – 80	P0401200	XT15	DT1530	3,0	J0123510	SD6368-12
A90390 – 100	P0401200	XT15	DT1530	3,0	J0164110	SD6368-16
A90390 – 125	P0401200	XT15	DT1530	3,0	J0204610	SD6368-20
A90390 – 160	P0401200	XT15	DT1530	3,0	-	-

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.





LNXT 1506... Inserts | Pastilhas | Plaquitas



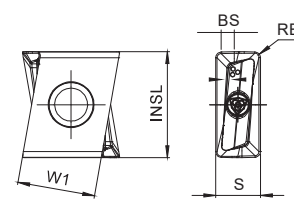
LNXT-HP



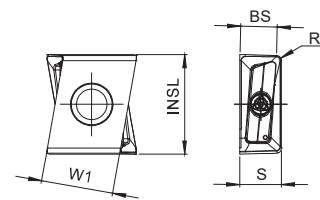
LNXT-MP



LNXT-W



LNXT-MP | HP



LNXT-W

		P					K						Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD				CVD		PVD								
	⁽²⁾ Grade code	T9	G1	G4	T1	G6	L5	L9	G1	G4	T1	G6					
⁽¹⁾ Geometry code	ISO Reference	PH5740	PH7910	PH7920	PHP920	PH7740	PH5705	PH5740	PH7910	PH7920	PHP920	PH7740	W1	S	INSL	RE	BS
1111313	LNXT 150608 PNER-MP												11,00	6,35	15,00	0,80	1,80
1111590	LNXT 150612 PNER-MP												11,00	6,35	15,00	1,20	1,80
1111591	LNXT 150608 PNSR-HP												11,00	6,35	15,00	0,80	1,80
1111524	LNXT 150608 PNER-W												11,00	6,35	15,20	0,80	5,50

⊗ First choice | Primeira opção | 1ª opción

⊗ Stock item | Produto de stock | Ítems de stock

○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades						
				← Wear Resistance				Toughness →		
				PH5705	PH7910	PHP920	PH7920	PH5740	PHS740	PH7740
P	1	Unalloyed Steel	125-220		✓	✓	✓		✓	✓
	2	Low-Alloyed Steel	220-280		✓	✓	✓		✓	✓
	3	High-Alloyed Steel	280-380		✓	✓	✓		✓	✓
K	7	Malleable Cast Iron	130-230	✓	✓	✓	✓	✓		✓
	8	Grey Cast Iron	180-245	✓	✓	✓	✓	✓		✓
	9	Nodular Cast iron	160-250	✓	✓	✓	✓	✓		✓

● Good Conditions

● Average Conditions

● Difficult Conditions

RECOMMENDED CUTTING CONDITIONS

Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)						
				← Wear Resistance					Toughness →	
				PH5705	PH7910	PHP920	PH7920	PH5740	PH5740	PH7740
P	1	Unalloyed Steel	125-220	-	180-250	180-250	180-240	-	140-220	140-200
	2	Low-Alloyed Steel	220-280	-	160-230	160-230	160-220	-	120-200	130-180
	3	High-Alloyed Steel	280-380	-	140-220	140-220	140-210	-	100-190	100-170
K	7	Malleable Cast Iron	130-230	160-290	180-300	160-270	160-260	160-260	-	140-220
	8	Grey Cast Iron	180-245	170-320	160-250	140-250	140-240	140-240	-	120-210
	9	Nodular Cast iron	160-250	140-200	150-200	120-210	120-200	120-200	-	100-190

ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)		
				LNXT 15... MP	LNXT 15... HP	LNXT 15... W
P	1	Unalloyed Steel	125-220	0,10-0,30	0,10-0,30	0,10-0,35
	2	Low-Alloyed Steel	220-280	0,10-0,30	0,10-0,30	0,10-0,35
	3	High-Alloyed Steel	280-380	0,10-0,25	0,10-0,25	0,10-0,35
K	7	Malleable Cast Iron	130-230	0,10-0,40	0,10-0,40	0,10-0,50
	8	Grey Cast Iron	180-245	0,10-0,35	0,10-0,35	0,10-0,50
	9	Nodular Cast iron	160-250	0,10-0,30	0,10-0,30	0,10-0,50

- (Note 1) Cutting conditions $a_e/D_c=70\%$.
- (Note 2) 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.

CHIP BREAKER SELECTION GUIDE

Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	LNXT 15... MP	LNXT 15... HP
	2	Low-Alloyed Steel	220-280	LNXT 15... MP	LNXT 15... HP
	3	High-Alloyed Steel	280-380	LNXT 15... MP	LNXT 15... HP
K	7	Malleable Cast Iron	130-230	LNXT 15... MP	LNXT 15... HP
	8	Grey Cast Iron	180-245	LNXT 15... MP	LNXT 15... HP
	9	Nodular Cast iron	160-250	LNXT 15... MP	LNXT 15... HP

WIPER INSERTS

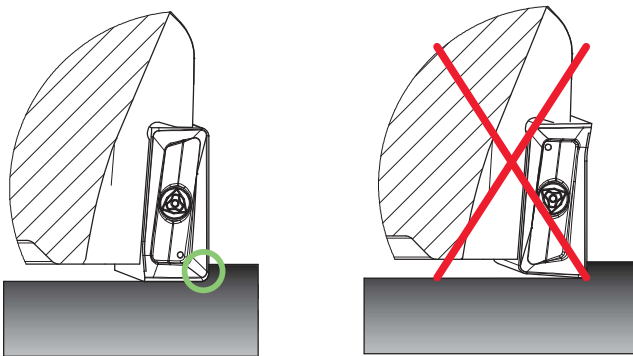
Rec. Cutting Conditions

- F_w at least 40% larger than f_n ($f_n - f_2 \times Z$);
- Axial depth of cut is 0,5 - 0,8mm.

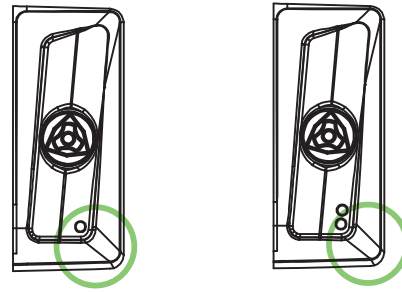
Example:

- The width of the parallel land (F) of the insert is 1,8mm
- With a cutter of 10 inserts and using a feed per tooth (f_z) of 0,3mm, the feed per revolution (f_n) will be 3mm, i.e. 40% bigger than the parallel land.
- To obtain a good surface finish, the feed per revolution should be a maximum of 80% of 1,8mm = 1,44mm.
- The wiper insert will have a parallel land (F_w) with a width of approximately 5,5mm.
- Result: Feed per revolution (f_n) could be increased from 0,8mm to 60% of 5,5mm = 3,3mm.

Note: Other limitations, such as machine power, must be taken into consideration.



The points on the insert indicates the side that should be parallel to the workspace material.



Wiper insert with 2 Right-hand cutting edges.
The side work of the insert it's indicated by points.

76090 | 77090

ALUPRO



The ALUPRO lines are precision-engineered tools designed specifically for machining aluminum components. These tools feature specialized geometries optimized for the unique properties of aluminum, allowing for efficient material removal and extended tool life. With sharp cutting edges and low cutting forces, these tools deliver high-performance results in milling operations on aluminum workpieces.

As linhas ALUPRO são ferramentas de precisão projetadas especificamente para fresagem de componentes de alumínio. Essas ferramentas apresentam geometrias especializadas otimizadas para as propriedades únicas do alumínio, permitindo remoção eficiente de material e vida útil prolongada da ferramenta. Com arestas de corte afiadas e baixas forças de corte, essas ferramentas oferecem resultados de alto desempenho em operações de fresagem em peças de alumínio.

As linhas ALUPRO son herramientas de precisión diseñadas específicamente para el fresado de componentes de aluminio. Estas herramientas cuentan con geometrías especializadas optimizadas para las propiedades únicas del aluminio, lo que permite una remoción eficiente de material y una vida útil prolongada de la herramienta. Con bordes de corte afilados y bajas fuerzas de corte, estas herramientas ofrecen resultados de alto rendimiento en operaciones de fresado en piezas de aluminio.

ALUPRO 76090 > page 200

- > **From DC 20mm to 100mm**
De DC 20mm a 100mm | Desde DC 20mm hasta 100mm
- > **Available in arbor mounting, threaded coupling and cylindrical shank**
Disponível em montagem tipo árvore, acoplamento roscado e haste cilíndrica | Disponible en fijación con tornillo central, fijación roscada y mango cilíndrico
- > **Small positive XDGX 15M5 insert with 2 cutting edges**
Pastilha positiva pequena XDGX 15M5 com 2 arestas de corte | Plaquita positiva pequeña XDGX 15M5 con 2 filos de corte
- > **Stable clamping conditions (Anti-fly)**
Condições de fixação estáveis (anti-voo) | Condiciones de sujeción estables (antivuelo)



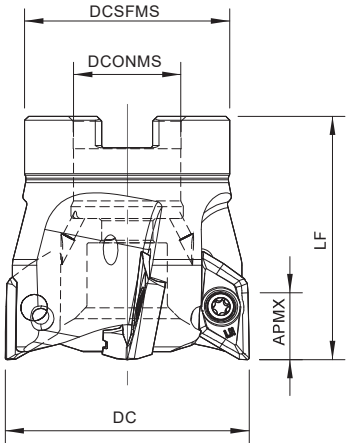
ALUPRO 77090 > page 204

- > **From DC 32mm to 125mm**
De DC 32mm a 125mm | Desde DC 32mm hasta 125mm
- > **Available in arbor mounting and cylindrical shank**
Disponível em montagem tipo árvore e haste cilíndrica | Disponible en fijación con tornillo central y mango cilíndrico
- > **Large positive XDGX 22M7 insert with 2 cutting edges**
Pastilha positiva pequena XDGX 22M7 com 2 arestas de corte | Plaquita positiva pequeña XDGX 22M7 con 2 filos de corte
- > **High speed conditions with high metal remove rate**
Condições de alta velocidade com alta taxa de remoção de metal | Condiciones de alta velocidad con alta tasa de remoción de metal





Arbor Mounting
KAPR=90° | GAMP=+11°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Cutter Type	APMX (mm)	RPM max		
181094200	040A76090-03-11-016050-A	3	40	16	32	50	0,3	A	14,0	29 000	0,4~3,2	⊗
181083400	050A76090-04-11-022050-A	4	50	22	42	50	0,4	A	14,0	24 000	0,4~3,2	⊗
181085300	063A76090-05-11-022050-A	5	63	22	48	50	0,7	A	14,0	21 000	0,4~3,2	⊗
181094300	080A76090-05-11-027050-A	5	80	27	60	50	1,1	A	14,0	19 000	0,4~3,2	⊗
181094400	100A76090-06-11-032063-A	6	100	32	73	63	2,0	A	14,0	16 000	0,4~3,2	⊗
181094500	040A76090-03-11-016050-B	3	40	16	32	50	0,3	B	14,0	29 000	4,0~5,0	⊗
181094600	050A76090-04-11-022050-B	4	50	22	42	50	0,4	B	14,0	24 000	4,0~5,0	⊗
181094700	063A76090-05-11-022050-B	5	63	22	48	50	0,7	B	14,0	21 000	4,0~5,0	⊗
181094800	080A76090-05-11-027050-B	5	80	27	60	50	1,1	B	14,0	19 000	4,0~5,0	⊗
181094900	100A76090-06-11-032063-B	6	100	32	73	63	2,0	B	14,0	16 000	4,0~5,0	⊗

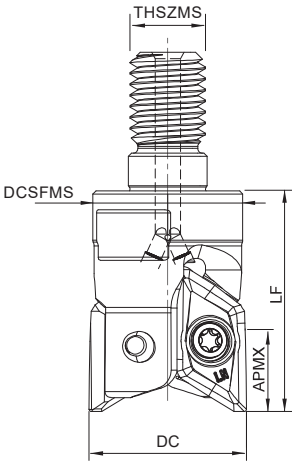
⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type A cutters can only assemble inserts with a radius between 0,4 and 3,2. Type B cutters can only assemble inserts with a radius between 4,0 and 5,0.

NEW



Threaded Coupling
KAPR=90° | GAMP=+6°~+11°



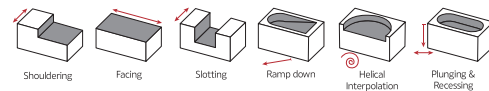
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			DC	THSZMS	DCSFMS	LF		Cutter Type	APMX (mm)	rpm max		
181202400	025R76090-02-06-M12035-A	2	25	M12	21	35	0,07	A	14,0	38 000	0,4~3,2	⊗
181202500	032R76090-03-09-M16040-A	3	32	M16	29	40	0,14	A	14,0	33 000	0,4~3,2	⊗
181202600	040R76090-03-11-M16045-A	3	40	M16	29	45	0,20	A	14,0	29 000	0,4~3,2	⊗
181202700	025R76090-02-06-M12035-B	2	25	M12	21	35	0,07	B	14,0	38 000	4,0~5,0	○
181202800	032R76090-03-09-M16040-B	3	32	M16	29	40	0,14	B	14,0	33 000	4,0~5,0	○
181202900	040R76090-03-11-M16045-B	3	40	M16	29	45	0,20	B	14,0	29 000	4,0~5,0	○

⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type A cutters can only assemble inserts with a radius between 0,4 and 3,2. Type B cutters can only assemble inserts with a radius between 4,0 and 5,0.

ALUPRO 76090

XDGX 15



A

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

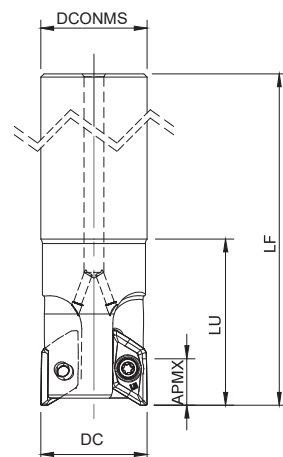
Technical Data

End Mills



Cylindrical Shank

KAPR=90° | GAMP=+6°~+11°



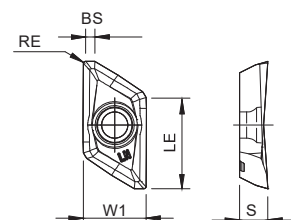
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			DC	DCONMS	LF	LU		Cutter Type	APMX (mm)	rpm max		
181095000	020E76090-01-06-020150-A	1	20	20	150	60	0,2	A	14,0	40 000	0,4~3,2	⊗
181095100	025E76090-02-09-025180-A	2	25	25	180	90	0,4	A	14,0	38 000	0,4~3,2	⊗
181095200	032E76090-02-09-032200-A	2	32	32	200	120	0,7	A	14,0	33 000	0,4~3,2	⊗
181095300	040E76090-03-11-032250-A	3	40	32	250	65	1,4	A	14,0	29 000	0,4~3,2	⊗
181095400	020E76090-01-06-020150-B	1	20	20	150	60	0,2	B	14,0	40 000	4,0~5,0	⊗
181095500	025E76090-02-09-025180-B	2	25	25	180	90	0,4	B	14,0	38 000	4,0~5,0	⊗
181095600	032E76090-02-09-032200-B	2	32	32	200	120	0,7	B	14,0	33 000	4,0~5,0	○
181095700	040E76090-03-11-032250-B	3	40	32	250	65	1,4	B	14,0	29 000	4,0~5,0	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type A cutters can only assemble inserts with a radius between 0,4 and 3,2. Type B cutters can only assemble inserts with a radius between 4,0 and 5,0.

XDGX 15M5... Inserts | Pastilhas | Plaquetas



		N	Dimensions Dimensões Dimensiones (mm)					Cutter Type
		UNC						
		10						
(1) Geometry code	(2) Grade code	PH0910	W1	S	LE	RE	BS	
1111624	XDGX 15M504 PDFR-LN	⊗	11,20	5,00	16,0	0,40	1,70	A
1111625	XDGX 15M508 PDFR-LN	⊗	11,20	5,00	16,0	0,80	1,10	A
1111626	XDGX 15M512 PDFR-LN	⊗	11,20	5,00	16,0	1,20	0,70	A
1111627	XDGX 15M516 PDFR-LN	⊗	11,20	5,00	16,0	1,60	0,40	A
1111628	XDGX 15M520 PDFR-LN	⊗	11,20	5,00	16,0	2,00	0,20	A
1112154	XDGX 15M530 PDFR-LN	⊗	11,20	5,00	16,0	3,00	0,60	A
1111629	XDGX 15M532 PDFR-LN	⊗	11,20	5,00	16,0	3,20	0,60	A
1111630	XDGX 15M540 PDFR-LN	⊗	11,20	5,00	16,0	4,00	0,50	B
1111631	XDGX 15M550 PDFR-LN	⊗	11,20	5,00	16,0	5,00	0,40	B

⊗ First choice | Primeira opção | 1ª opción

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

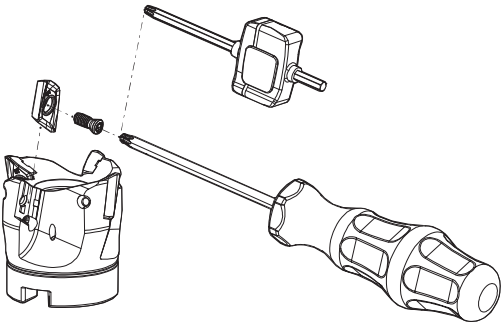
Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS

Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A76090- 40-80	P0400900	XT15	DT1530	3,0
A76090 - 100	P0400900	PT15	DT1530	3,0
R76090 - 25	P0400803	XT15	DT1530	3,0
R76090 - 32-40	P0400900	XT15	DT1530	3,0
E76090 - 20-25	P0400803	XT15	DT1530	3,0
E76090 - 32-40	P0400900	XT15	DT1530	3,0

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.



RECOMMENDED CUTTING CONDITIONS

Condições de corte recomendadas | Condiciones de corte recomendables

SHOULDERING

ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Width of Cut ae (mm)	Depth of Cut AP (mm)	Feed fz (mm/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	350-3000	≤ 25% DC	≤5,0	0,35 - 0,40
						5,0 - 10,0	0,30 - 0,35
						10,0 - 15,0	0,25 - 0,30
					< 50% DC	≤5,0	0,35 - 0,40
						5,0 - 10,0	0,30 - 0,35
						10,0 - 15,0	0,25 - 0,30
					≤ 75% DC	≤5,0	0,30 - 0,35
						5,0 - 10,0	0,25 - 0,30
						10,0 - 15,0	0,20 - 0,25

SLOTING

ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Width of Cut ae (mm)	Depth of Cut AP (mm)	Feed fz (mm/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	350-3000	100% DC	≤5,0	0,25 - 0,35
						5,0 - 10,0	0,20 - 0,30
						10,0 - 15,0	0,15 - 0,25

(Note 1) Cutting conditions $a_e/DC=70\%$.
(Note 2) 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.
(Note 3) Use internal coolant supply

OPERATIONAL GUIDE

Guia operacional | Guía operativa

- 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).

Table 1 - Maximum allowable revolutions:

DC	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
RPM (min ⁻¹)	40000	38000	33000	29000	24000	21000	19000	16000

- 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.

Table 2 - Maximum revolutions when balancing with the arbor or chuck has not been achieved:

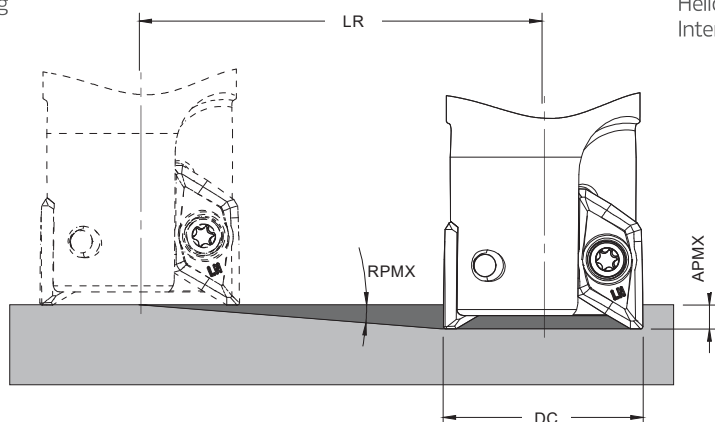
DC	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
RPM (min ⁻¹)	15000	12000	9500	8500	7600	6800	6000	5400

- 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.

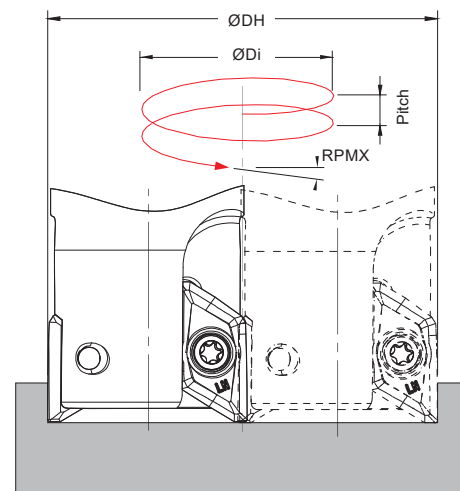
RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular

Ramping



Helical Interpolation



$$\text{ØDi} = \text{ØDH} - \text{DC}$$

Cutter Type	DC	Ramping			Helical Interpolation		
					Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
		RPMX	APMX	Min LR	ØDHmin	ØDHmax	
A	20	23	15,0	35,3	36,2	-	21,6
					-	38,4	24,5
	25	21	15,0	39,1	46,2	-	25,6
					-	48,4	28,2
	32	15	15,0	56,0	60,2	-	23,7
					-	62,4	25,6
	40	10	15,0	85,1	76,2	-	20,0
					-	78,4	21,3
B	50	8	15,0	106,7	96,2	-	20,4
					-	98,4	21,4
	63	6	15,0	142,7	122,2	-	19,5
					-	124,4	20,3
	80	4	15,0	214,5	156,2	-	16,7
					-	158,4	17,2
	100	2,5	15,0	343,6	196,2	-	13,2
					-	198,4	13,5
	20	20	13,5	37,1	36,2	-	18,5
					-	38,4	21,0
	25	18,5	13,5	40,3	46,2	-	22,3
					-	48,4	24,6
	32	13,5	13,5	56,2	60,2	-	21,3
					-	62,4	22,9
	40	8,5	13,5	90,3	76,2	-	17,0
					-	78,4	18,0
	50	7	13,5	109,9	96,2	-	17,8
					-	98,4	18,7
	63	5,5	13,5	140,2	122,2	-	17,9
					-	124,4	18,6
	80	3,5	13,5	220,7	156,2	-	14,6
					-	158,4	15,1
	100	2,5	13,5	309,2	196,2	-	13,2
					-	198,4	13,5

(1) using insert radius 0,8 mm

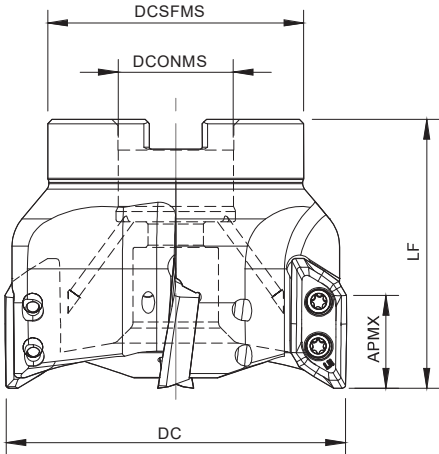
Note: During helical interpolation do not exceed maximum pitch.

When using different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

- Minimum Diameter: $\text{ØDHmin} = 2 \times (\text{DC} - (\text{R corner radius} + \text{F width of edge wiper}))$ - Maximum Diameter: $\text{ØDHmax} = 2 \times (\text{DC} - \text{R corner radius})$



Arbor Mounting
KAPR=90° | GAMP=+7°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Cutter Type	APMX (mm)	rpm max		
181093000	050A77090-03-07-022050-A	3	50	22	42	50	0,4	A	21,5	30 000	0,8~3,2	
181093100	063A77090-03-07-022050-A	3	63	22	42	50	0,5	A	21,5	25 000	0,8~3,2	
181071600	080A77090-04-07-027063-A	4	80	27	60	63	1,2	A	21,5	23 000	0,8~3,2	
181093200	100A77090-05-07-032063-A	5	100	32	70	63	1,8	A	21,5	19 000	0,8~3,2	
181093300	125A77090-06-07-040063-A	6	125	40	100	63	2,7	A	21,5	16 000	0,8~3,2	
181093400	050A77090-03-07-022050-B	3	50	22	42	50	0,4	B	21,0	30 000	4,0~5,0	
181093500	063A77090-03-07-022050-B	3	63	22	42	50	0,5	B	21,0	25 000	4,0~5,0	
181093600	080A77090-04-07-027063-B	4	80	27	60	63	1,2	B	21,0	23 000	4,0~5,0	
181093700	100A77090-05-07-032063-B	5	100	32	70	63	1,8	B	21,0	19 000	4,0~5,0	
181093800	125A77090-06-07-040063-B	6	125	40	100	63	2,7	B	21,0	16 000	4,0~5,0	

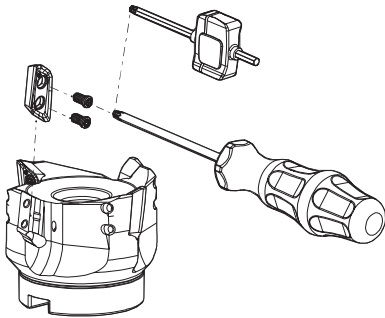
Stock item | Produto de stock | Itens de stock Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type A cutters can only assemble inserts with a radius between 0,4 and 3,2. Type B cutters can only assemble inserts with a radius between 4,0 and 5,0.

SPARE PARTS Acessórios | Repuestos

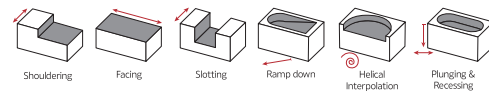
Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm) 	Torque Value 	Screw 	DIN 6368 Wrench
A77090 - 50-80	P0401200	XT15	DT1530	3,0	-	-
A77090 - 100	P0401200	PT15	DT1530	3,0	J0164110	SD6368-16
A77090 - 125	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20
E77090 - 32-40	P0401200	XT15	DT1530	3,0	-	-

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.

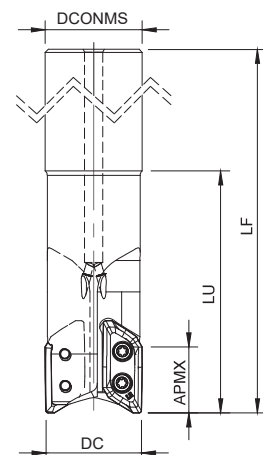


ALUPRO 77090

XDGX 22



Cylindrical Shank
KAPR=90° | GAMP=+6°



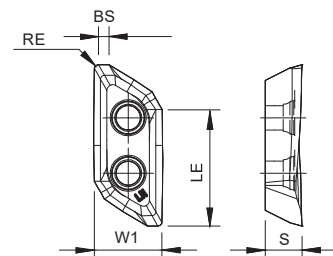
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			DC	DCONMS	LF	LU		Cutter Type	APMX (mm)	rpm max		
181069800	032E77090-02-06-032170-A	2	32	32	170	80	0,8	A	21.5	41 000	0,8~3,2	⊗
181093900	040E77090-02-06-040170-A	2	40	40	170	80	0,9	A	21.5	36 000	0,8~3,2	⊗
181094000	032E77090-02-06-032170-B	2	32	32	170	80	0,8	B	21.0	41 000	4,0~5,0	○
181094100	040E77090-02-06-040170-B	2	40	40	170	80	0,9	B	21.0	36 000	4,0~5,0	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

Note: Type A cutters can only assemble inserts with a radius between 0,4 and 3,2. Type B cutters can only assemble inserts with a radius between 4,0 and 5,0.

XDGX 22M7... Inserts | Pastilhas | Plaquititas



(1) Geometry code	(2) Grade code ISO Reference	N	Dimensions Dimensões Dimensiones (mm)					Cutter Type
		UNC						
		10						
PH0910	XDGX 22M708 PDFR-LN	⊗	W1	S	LE	RE	BS	A
		⊗	13,00	7,00	22,0	0,80	2,00	A
		⊗	13,00	7,00	22,0	2,00	0,80	A
		⊗	13,00	7,00	22,0	3,20	0,60	A
		⊗	13,00	7,00	22,0	4,00	0,90	B
		⊗	13,00	7,00	22,0	5,00	0,40	B
		⊗	13,00	7,00	22,0	5,00	0,40	B

⊗ First choice | Primeira opção | 1ª opción

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

SHOULDERING

ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Width of Cut ae (mm)	Depth of Cut AP (mm)	Feed fz(mm/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	350-3000	≤ 25% DC	≤5,0	0,35 - 0,40
						5,0 - 10,0	0,30 - 0,35
						10,0 - 15,0	0,25 - 0,30
					< 50% DC	≤5,0	0,35 - 0,40
						5,0 - 10,0	0,30 - 0,35
						10,0 - 15,0	0,25 - 0,30
					≤ 75% DC	≤5,0	0,30 - 0,35
						5,0 - 10,0	0,25 - 0,30
						10,0 - 15,0	0,20 - 0,25

SLOTING

ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Width of Cut ae (mm)	Depth of Cut AP (mm)	Feed fz(mm/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	350-3000	100% DC	≤5,0	0,25 - 0,35
						5,0 - 10,0	0,20 - 0,30
						10,0 - 15,0	0,15 - 0,25

(Note 1) Cutting conditions $a_e/DC=70\%$.
(Note 2) 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.
(Note 3) Use internal coolant supply.

OPERATIONAL GUIDE Guia operacional | Guía operativa

- Only use the inserts and parts provided by Palbit 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 Figure 1. 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).

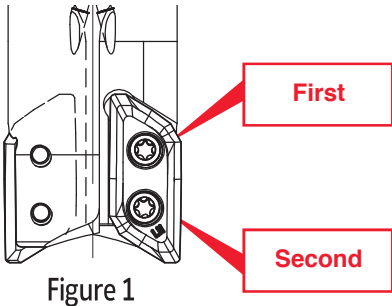


Table 1 - Maximum allowable revolutions:

DC	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125
RPM (min ⁻¹)	41000	36000	30000	25000	23000	19000	16000

- 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.

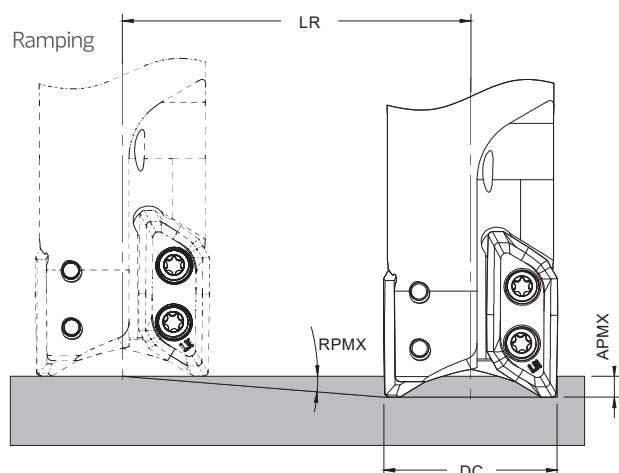
Table 2 - Maximum revolutions when balancing with the arbor or chuck has not been achieved:

DC	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125
RPM (min ⁻¹)	9500	7600	6000	4800	3800	3000	2400

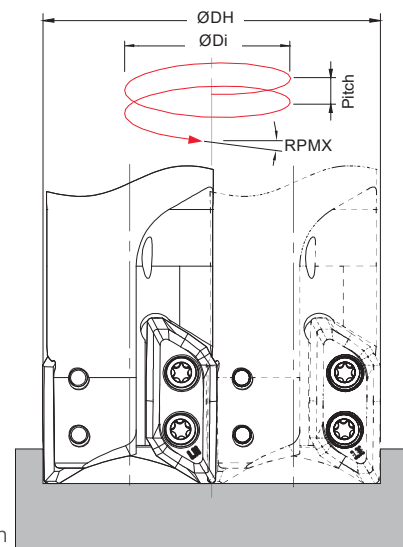
- When setting the spindle speed, take into consideration the maximum allowable revolutions of arbor or chuck.
- Use the specified set bolt when using the arbor type with internal coolant supply.

RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular



Helical Interpolation



Blind hole
Flat bottom

$$\text{ØDi} = \text{ØDH} - \text{DC}$$

Cutter Type	DC	Ramping			Helical Interpolation		
					Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
		RPMX	APMX	Min LR	ØDHmin	ØDHmax	
A	32	19	21,5	62,4	60,0	-	30,3
	40	13	21,5	93,1	76,0	-	26,1
	50	9	21,5	135,7	96,0	-	22,9
	63	7	21,5	175,1	122,0	-	22,7
	80	5	21,5	245,7	156,0	-	20,9
	100	4	21,5	307,5	196,0	-	21,1
	125	3	21,5	410,2	246,0	-	19,9
B	32	18	21,0	64,6	60,0	-	28,6
	40	11	21,0	108,0	76,0	-	22,0
	50	8	21,0	149,4	96,0	-	20,3
	63	6	21,0	199,8	122,0	-	19,5
	80	4	21,0	300,3	156,0	-	16,7
	100	3	21,0	400,7	196,0	-	15,8
	125	2	21,0	601,4	246,0	-	13,3

(1) using insert radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch.

When using different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

- Minimum Diameter: ØDHmin = 2 x (DC - (R corner radius + F width of edge wiper))

- Maximum Diameter: ØDHmax = 2 x (DC + R corner radius)

06290

LINEPRO



The LINEPRO 06290 is designed for general-purpose shoulder milling operations. Featuring a positive insert with four cutting edges, it ensures versatile and efficient performance across diverse material applications.

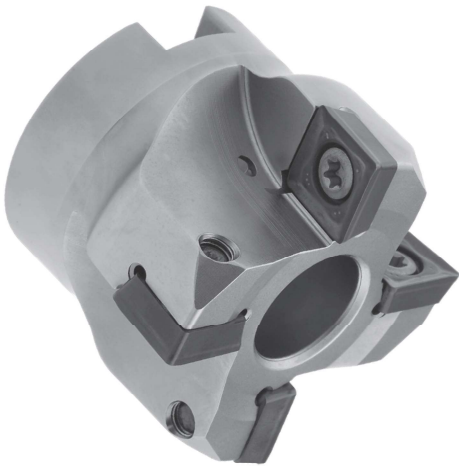
A LINEPRO 06290 é projetada para operações de fresagem a 90° de aplicação geral. Apresentando uma pastilha positiva com quatro arestas de corte, garante um desempenho versátil e eficiente em diversas aplicações de materiais.

La LINEPRO 06290 está diseñada para operaciones de fresado a 90° de aplicación general. Presentando una plaquita positiva con cuatro filos de corte, garantiza un rendimiento versátil y eficiente en diversas aplicaciones de materiales.

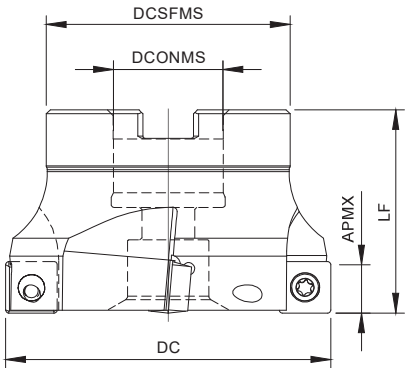
LINEPRO 06290 > page 210

- > From DC 40mm to 160mm
De DC 40mm a 160mm | Desde DC 40mm hasta 160mm
- > Available in arbor mounting
Disponível em montagem tipo árvore | Disponible en fijación con tornillo central
- > Positive inserts with 4 cutting edges
Pastilhas positivas com 4 arestas de corte | Palquitas positivas con 4 filos de corte
- > General application
Aplicação geral | Aplicación general





Arbor Mounting
KAPR=90° | GAMP=+6°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181167700	040A06290-03-06-016040	3	40	16	39	40	0,2	A	11	SP... 1204	⊗
181167800	050A06290-04-06-022040	4	50	22	49	40	0,35	A	11	SP... 1204	⊗
181167900	063A06290-05-06-027050	5	63	27	60	50	0,7	A	11	SP... 1204	⊗
181168000	080A06290-06-06-027050	6	80	27	60	50	1,15	A	11	SP... 1204	⊗
181168100	100A06290-08-06-032050	8	100	32	80	50	1,75	A	11	SP... 1204	⊗
181168200	125A06290-08-06-040063	8	125	40	96	63	3,05	B	11	SP... 1204	⊗
181065600	160A06290-10-06-U040063	10	160	40	100	63	4,2	C	11	SP... 1204	⊗

⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

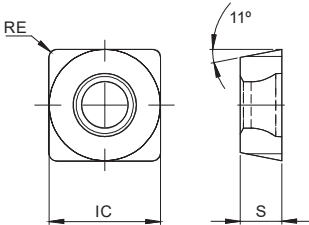
SP.. 1204... Inserts | Pastilhas | Plaquitas



SPG(M)X-MP



SPG(M)X-MS



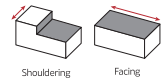
SPG(M)X-MP | MS

		P	M	K	S	Dimensions Dimensões Dimensiones (mm)		
		PVD	PVD	PVD	PVD			
		T1	X9	T1	X9			
(1) Geometry code	ISO Reference	PHP920	PHH930	PHP920	PHH930	IC	S	RE
1113002	SPGX 120408 PDSR-MP	⊗		⊗		12,70	4,76	0,80
1113003	SPGX 120408 PDSR-MS		⊗		⊗	12,70	4,76	0,80
1112916	SPMX 120408 PDSR-MP	⊗		⊗		12,70	4,76	0,80
1112999	SPMX 120408 PDSR-MS		⊗		⊗	12,70	4,76	0,80

⊗ First choice | Primeira opção | 1ª opción ⊗ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9) Insert order code = (1) Geometry Code + (2) Grade Code

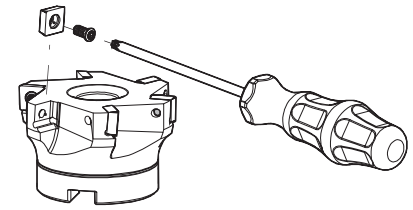
Note: It is possible to use other inserts - Page A - 30

SPMT 120408-MP	SPMW 120408
Page A - 30	



SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A06290 - 40 - 160	P0501100	PT20	DT2050	5,00	J0204610	SD6368-20



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.

GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades	
				← Wear Resistance	Toughness →
				PHP920 	PHH930
P	1	Unalloyed Steel	125-220	✓	
	2	Low-Alloyed Steel	220-280	✓	
	3	High-Alloyed Steel	280-380	✓	
M	4	SS - Ferritic / Martensitic	200-330		✓
	5	SS - Austenitic	200-330		✓
	6	SS - Austenitic-ferritic (Duplex)	230-260		✓
K	7	Malleable Cast Iron	130-230	✓	
	8	Grey Cast Iron	180-245	✓	
	9	Nodular Cast iron	160-250	✓	
S	11	Heat Resistant Super Alloys	200-320		✓

Good Conditions
 Average Conditions
 Difficult Conditions

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)		Feed fz (mm/t)	
				← Wear Resistance	Toughness →		
				PHP920	PHH930	SPG(M)X...MP	SPM(M)X...MS
P	1	Unalloyed Steel	125-220	180-250	-	0,08-0,20	-
	2	Low-Alloyed Steel	220-280	170-210	-	0,08-0,20	-
	3	High-Alloyed Steel	280-380	160-200	-	0,08-0,20	-
M	4	SS - Ferritic / Martensitic	200-330	-	120-180	-	0,08-0,20
	5	SS - Austenitic	200-330	-	100-160	-	0,08-0,20
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	70-140	-	0,08-0,20
K	7	Malleable Cast Iron	130-230	170-300	-	0,10-0,30	-
	8	Grey Cast Iron	180-245	150-250	-	0,10-0,30	-
	9	Nodular Cast iron	160-250	90-210	-	0,10-0,30	-
S	11	Heat Resistant Super Alloys	200-320	-	30-75	-	0,08-0,15

(Note 1) Cutting conditions ae/DC=70%

(Note 2) Cutting conditions should be adjusted according to the machine and work rigidity.

(Note 3) If chattering occurs, reduce ap and Vc by 30% and keep the same fz per tooth.

CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	
P	1	Unalloyed Steel	125-220	... MP	
	2	Low-Alloyed Steel	220-280	... MP	
	3	High-Alloyed Steel	280-380	... MP	
M	4	SS - Ferritic / Martensitic	200-330	... MS	
	5	SS - Austenitic	200-330	... MS	
	6	SS - Austenitic-ferritic (Duplex)	230-260	... MS	
K	7	Malleable Cast Iron	130-230	... MP	
	8	Grey Cast Iron	180-245	... MP	
	9	Nodular Cast iron	160-250	... MP	
S	11	Heat Resistant Super Alloys	200-320	... MS	

17090 | 18090

LINEPRO



The LINEPRO excels in shoulder milling, featuring thicker inserts with reinforced cutting edges for enhanced tool longevity. Its high helix angle reduces cutting load, ensuring stable, smooth cutting performance, delivering consistent results in machining operations.

A LINEPRO destaca-se na fresagem a 90°, apresentando pastilhas mais espessas com arestas de corte reforçadas para uma vida útil da ferramenta prolongada. A sua elevada inclinação da hélice reduz o esforço de corte, garantindo um desempenho de corte estável e suave, proporcionando resultados consistentes em operações de fresagem.

La LINEPRO destaca en el fresado a 90°, presentando plaquitas más gruesas con filos de corte reforzados para una vida útil de la herramienta prolongada. Su alta inclinación de hélice reduce el esfuerzo de corte, garantizando un rendimiento de corte estable y suave, proporcionando resultados consistentes en operaciones de fresado.

LINEPRO 17090 > page 214

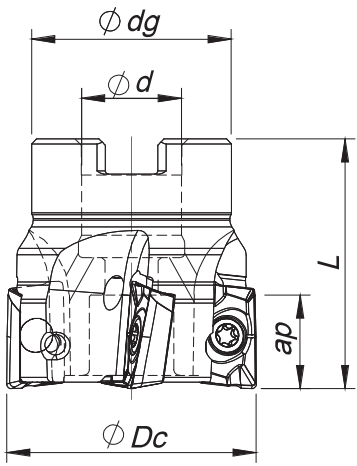
- > From DC 16mm to 63mm
De DC 16mm a 63mm | Desde DC 16mm hasta 63mm
- > Available in arbor mounting, threaded coupling and weldon shank
Disponível em montagem tipo árvore, acoplamento roscado e haste weldon | Disponible en fijación con tornillo central, fijación roscada y mango tipo weldon
- > Small positive insert with 2 cutting edges (AP.. 1003..)
Pastilha positiva pequena com 2 arestas de corte (AP.. 1003..) | Plaquita positiva pequena con 2 filos de corte (AP.. 1003..)
- > Low cutting force
Baixas forças de corte | Bajas fuerza de corte



LINEPRO 18090 > page 220

- > From DC 25mm to 125mm
De DC 25mm a 125mm | Desde DC 25mm hasta 125mm
- > Available in arbor mounting and weldon shank
Disponível em montagem tipo árvore e haste weldon | Disponible en fijación con tornillo central y mango tipo weldon
- > Large positive insert with 2 cutting edges (AP.. 1604..)
Pastilha positiva grande com 2 arestas de corte (AP.. 1604..) | Plaquita positiva grande con 2 filos de corte (AP.. 1604..)
- > Strong insert
Pastilha forte | Plaquita fuerte

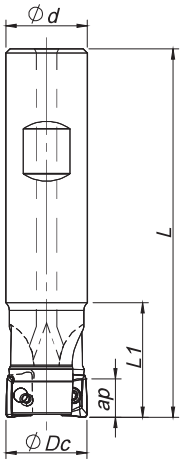




Arbor Mounting
KAPR=90° | GAMP=+9°

Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	Ød	DCSFMS	L		Arbor Type	APMX (mm)		
181010200	040A17090-06-09-022040	6	40	22	39	40	0,210	A	9,0	AP.. 1003...	Ⓢ
181010300	050A17090-07-09-022040	7	50	22	40	40	0,320	A	9,0	AP.. 1003...	Ⓢ
181014300	063A17090-08-09-022040	8	63	22	48	40	0,560	A	9,0	AP.. 1003...	Ⓢ

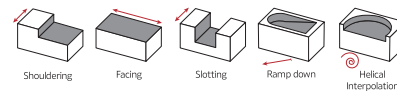
Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Weldon Shank
KAPR=90° | GAMP=+7°~+9°

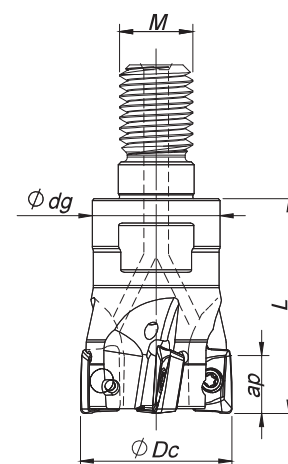
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	Ød	L	LU		APMX (mm)			
181041300	016W17090-02-07-016085	2	16	16	85	26	0,110	9,0		AP.. 1003...	Ⓢ
181031700	016W17090-02-07-016150	2	16	16	150	26	0,210	9,0		AP.. 1003...	Ⓢ
181041400	020W17090-03-09-020090	3	20	20	90	28	0,190	9,0		AP.. 1003...	Ⓢ
181041600	020W17090-03-09-020150	3	20	20	150	28	0,320	9,0		AP.. 1003...	Ⓢ
181041700	025W17090-04-09-020150	4	25	20	150	26	0,340	9,0		AP.. 1003...	Ⓢ
181041500	025W17090-04-09-025095	4	25	25	95	30	0,310	9,0		AP.. 1003...	Ⓢ

Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



Threaded Coupling

KAPR=90° | GAMP=+7°~+9°



Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	L		APMX (mm)		
181015100	016R17090-02-07-M08025	2	16	M8	13	25	0,030	9,0	AP.. 1003...	⊗
181015200	020R17090-03-09-M10030	3	20	M10	18	30	0,058	9,0	AP.. 1003...	⊗
181015300	025R17090-04-09-M12035	4	25	M12	21	35	0,110	9,0	AP.. 1003...	⊗

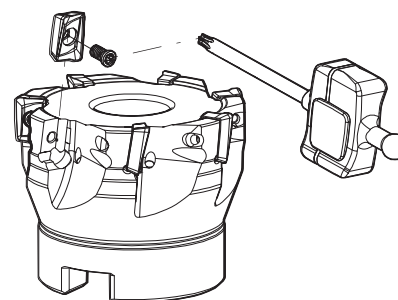
⊗ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A17090 - 40-63	P0250503	XT08	DT0812	1,2
W17090 - 16-25	P0250503	XT08	DT0812	1,2
R17090 - 16-25	P0250503	XT08	DT0812	1,2

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.



AP.. 1003... Inserts | Pastilhas | Plaquitas



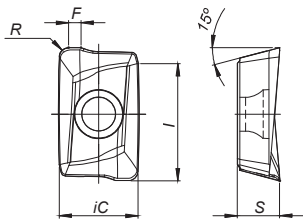
APET - LN



APKT - X



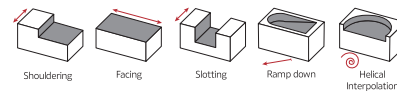
APKT - X1



APET-LN | APKT-X | APKT-X1

		P		M	K		N	Dimensions Dimensões Dimensiones (mm)				
		PVD		PVD	PVD		UNC					
	(2) Grade code	68	66	66	68	66	10					
(1)	ISO Reference	PH6920	PH6930	PH6930	PH6920	PH6930	PH0910	iC	S	I	R	F
1112043	APET 100305 PDJR-LN							6,70	3,50	10,00	0,50	1,20
1112168	APKT 100305 PDER-X1							6,70	3,50	10,00	0,50	1,20
1112167	APKT 100305 PDSR-X1							6,70	3,50	10,00	0,50	1,20
1111071	APKT 100308 PDER-X							6,70	3,50	10,00	0,80	0,90
1111044	APKT 100308 PDSR-X							6,70	3,50	10,00	0,80	0,90
1111042	APKT 100308 PDTR-X							6,70	3,50	10,00	0,80	0,90
1111072	APKT 100312 PDER-X							6,70	3,50	10,00	1,20	-
1110987	APKT 100312 PDSR-X							6,70	3,50	10,00	1,20	-
1111045	APKT 100312 PDTR-X							6,70	3,50	10,00	1,20	-

First choice | Primeira opção | 1ª opción Stock item | Produto de stock | Itens de stock Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9) Insert order code = (1) Geometry Code + (2) Grade Code



GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades		
				← Wear Resistance PH0910 	PH6920 	Toughness → PH6930 
P	1	Unalloyed Steel	125-220		✓	✓
	2	Low-Alloyed Steel	220-280		✓	✓
	3	High-Alloyed Steel	280-380		✓	✓
M	4	SS - Ferritic / Martensitic	200-330			✓
	5	SS - Austenitic	200-330			✓
	6	SS - Austenitic-ferritic (Duplex)	230-260			✓
K	7	Malleable Cast Iron	130-230		✓	✓
	8	Grey Cast Iron	180-245		✓	✓
	9	Nodular Cast iron	160-250		✓	✓
N	10	Aluminium and Non Ferrous	30-130	✓		



Good Conditions



Average Conditions



Difficult Conditions

CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-aperas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	APKT 10... PDER-X	APKT 10... PDTR-X
	2	Low-Alloyed Steel	220-280	APKT 10... PDSR-X	APKT 10... PDSR-X
	3	High-Alloyed Steel	280-380	APKT 10... PDSR-X	-
M	4	SS - Ferritic / Martensitic	200-330	APKT 10... PDER-X	-
	5	SS - Austenitic	200-330	APKT 10... PDER-X	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	APKT 10... PDER-X	-
K	7	Malleable Cast Iron	130-230	APKT 10... PDER-X	APKT 10... PDSR-X
	8	Grey Cast Iron	180-245	APKT 10... PDSR-X	-
	9	Nodular Cast iron	160-250	APKT 10... PDSR-X	-
N	10	Aluminium and Non Ferrous	30-130	APET 10... PDPR-LN	-

RECOMMENDED CUTTING CONDITIONS

Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)		
				← Wear Resistance PH0910	PH6920	Toughness → PH6930
P	1	Unalloyed Steel	125-220	-	180-240	160-220
	2	Low-Alloyed Steel	220-280	-	160-220	140-200
	3	High-Alloyed Steel	280-380	-	140-210	120-190
M	4	SS - Ferritic / Martensitic	200-330	-	140-220	140-200
	5	SS - Austenitic	200-330	-	130-180	120-160
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	120-160	100-140
K	7	Malleable Cast Iron	130-230	-	160-260	150-240
	8	Grey Cast Iron	180-245	-	140-240	140-230
	9	Nodular Cast iron	160-250	-	120-200	100-190
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-

ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)		
				APKT 10... PDER-X/X1	APKT 10... PDS(T)R-X/X1	APET 10... PDFR-LN
P	1	Unalloyed Steel	125-220	0,07-0,15	0,10-0,25	-
	2	Low-Alloyed Steel	220-280	0,07-0,10	0,10-0,20	-
	3	High-Alloyed Steel	280-380	0,07-0,10	0,10-0,20	-
M	4	SS - Ferritic / Martensitic	200-330	0,07-0,10	-	-
	5	SS - Austenitic	200-330	0,07-0,10	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	0,07-0,10	-	-
K	7	Malleable Cast Iron	130-230	0,07-0,15	0,10-0,25	-
	8	Grey Cast Iron	180-245	0,07-0,15	0,10-0,25	-
	9	Nodular Cast iron	160-250	-	0,10-0,20	-
N	10	Aluminium and Non Ferrous	30-130	-	-	0,07-0,20

(Note 1) Cutting conditions $a_e/D_c=70\%$.
(Note 2) Cutting conditions for slotting and shouldering operations:

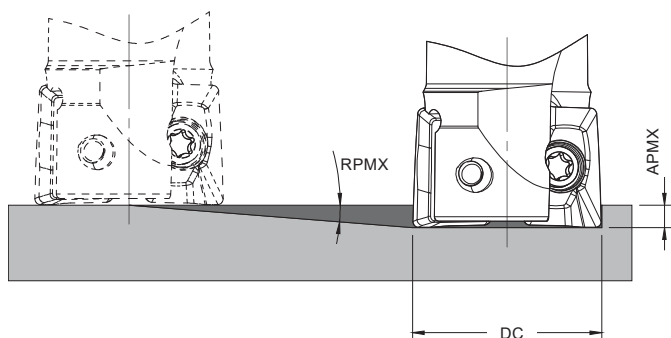
Operation	a_e	Vc & fz	AP (mm)
Slotting	100%	<20%	3,0-4,0
Shouldering	<50%	>8%	5,0-6,0
	≤25%	>12%	7,0-8,0

(Note 3) Cutting conditions should be adjusted according to the machine and work rigidity.
(Note 4) 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.
(Note 5) If chattering occurs, reduce ap and Vc by 30% and keep the same fz per tooth.

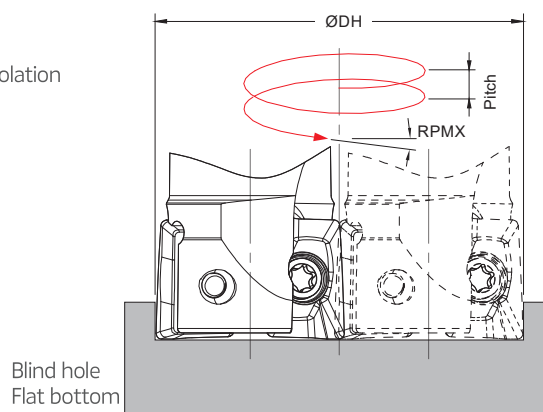
RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular

Ramping



Helical Interpolation



$$\text{ØDi} = \text{ØDH} - \text{DC}$$

DC	Ramping			Helical Interpolation		
				Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	
16	1,3	9,0	396,6	29,2	-	0,9
				-	31,0	1,1
20	0,9	9,0	572,9	37,2	-	0,8
				-	39,0	0,9
25	0,6	9,0	859,4	47,2	-	0,7
				-	49,0	0,8
40	0,4	9,0	1289,1	77,2	-	0,8
				-	79,0	0,9
50	0,25	9,0	2062,6	97,2	-	0,6
				-	99,0	0,7
63	0,2	9,0	2578,3	123,2	-	0,7
				-	125,0	0,7

(1) using LP insert with radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch

When using HF insert or other different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

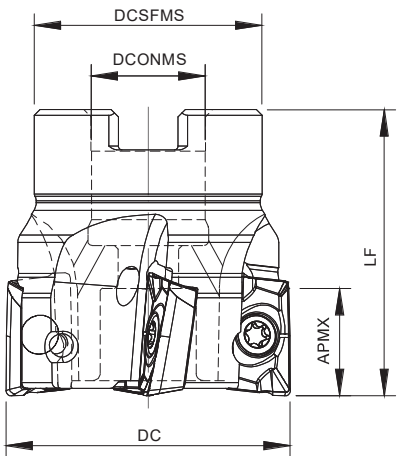
- Minimum Diameter: $\text{ØDHmin} = 2 \times (\text{DC} - (\text{R corner radius} + \text{F width of edge wiper}))$

- Maximum Diameter: $\text{ØDHmax} = 2 \times (\text{DC} - \text{R corner radius})$



Arbor Mounting

KAPR=90° | GAMP=+8°~+10°



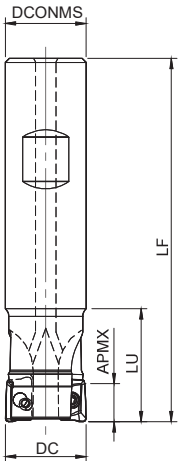
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181031200	040A18090-04-08-016040	4	40	16	32	40	0,180	A	14,5	AP.. 1604	Ⓢ
181030900	050A18090-05-08-022040	5	50	22	42	40	0,290	A	14,5	AP.. 1604	Ⓢ
181031300	063A18090-06-09-022040	6	63	22	52	40	0,530	A	14,5	AP.. 1604	Ⓢ
181031400	080A18090-07-10-027050	7	80	27	60	50	0,920	B	14,5	AP.. 1604	Ⓢ
181031500	100A18090-08-10-032050	8	100	32	80	50	1,680	B	14,5	AP.. 1604	Ⓢ
181031600	125A18090-09-10-040063	9	125	40	90	63	3,010	B	14,5	AP.. 1604	Ⓢ

Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



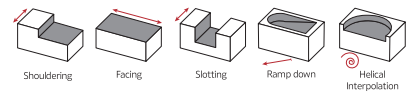
Weldon Shank

KAPR=90° | GAMP=+6°~+8°



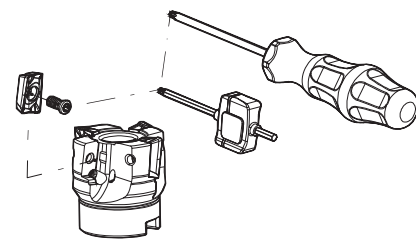
Order code Código	Reference Referência Referencia	CICT	Dimensions Dimensões Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181041800	025W18090-02-06-025100	2	25	25	100	44	0,310	14,5	AP.. 1604	Ⓢ
181042100	025W18090-02-06-025200	2	25	25	200	60	0,670	14,5	AP.. 1604	Ⓢ
181041900	032W18090-03-07-032110	3	32	32	110	50	0,560	14,5	AP.. 1604	Ⓢ
181042200	032W18090-03-07-032200	3	32	32	200	60	1,100	14,5	AP.. 1604	Ⓢ
181042000	040W18090-04-08-032115	4	40	32	115	40	0,670	14,5	AP.. 1604	Ⓢ
181042300	040W18090-04-08-032200	4	40	32	200	40	1,190	14,5	AP.. 1604	Ⓢ

Ⓢ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Screw	DIN 6368 Wrench
			Key (Torx - Nm)	Torque Value		
A18090 - 40-63	P0400900	XT15	DT1530	3,0	-	-
A18090 - 80	P0400900	XT15	DT1530	3,0	J0123510	SD6368-12
A18090 - 100	P0400900	PT15	DT1530	3,0	J0164110	SD6368-16
A18090 - 125	P0400900	PT15	DT1530	3,0	J0204610	SD6368-20
W18090 - 25-40	P0400900	XT15	DT1530	3,0	-	-



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.
Check the procedures for the clamping screws on the page A-301.

AP.. 1604... Inserts | Pastilhas | Plaquitas



APKT - X



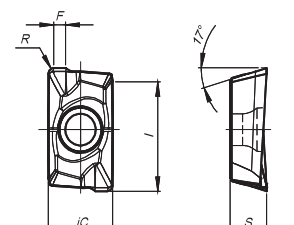
APKT - X1



APKT - X2



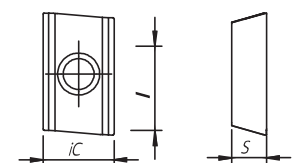
APKT - LN



APKT-X | X1 | X2 | LN



APHT - LN



APHT-LN

		P				M		K				N	Dimensions Dimensões Dimensiones (mm)				
		PVD				PVD		PVD				UNC					
		68	G4	66	P3	66	P3	68	G4	66	P3	10					
(1) Geometry code	(2) Grade code ISO Reference	PH6920	PH7920	PH6930	PH7930	PH6930	PH7930	PH6920	PH7920	PH6930	PH7930	PH0910	iC	S	I	R	F
1112159	APKT 160408 PDER-X1	Ⓢ		Ⓢ		Ⓢ		Ⓢ		Ⓢ			9,45	5,35	16,00	0,80	1,80
1112464	APKT 160408 PDER-X2		Ⓢ		Ⓢ		Ⓢ		Ⓢ		Ⓢ		9,45	5,35	16,00	0,80	1,80
1112158	APKT 160408 PDSR-X1	Ⓢ		Ⓢ				Ⓢ		Ⓢ			9,45	5,35	16,00	0,80	1,80
1112367	APKT 160408 PDSR-X2		Ⓢ		Ⓢ				Ⓢ		Ⓢ		9,45	5,35	16,00	0,80	1,80
1111923	APKT 160408 PDFR-LN											Ⓢ	9,45	5,35	16,00	0,80	0,80
1111074	APKT 160416 PDER-X	Ⓢ						Ⓢ					9,45	5,35	16,00	1,60	1,20
1111050	APKT 160416 PDSR-X	Ⓢ		Ⓢ				Ⓢ		Ⓢ			9,45	5,35	16,00	1,60	1,20
1111075	APKT 160432 PDER-X	Ⓢ						Ⓢ					9,45	5,35	16,00	3,20	-
1111052	APKT 160432 PDSR-X	Ⓢ						Ⓢ					9,45	5,35	16,00	3,20	-
1111924	APHT 1604 PDFR-LN											Ⓢ	9,45	5,35	16,00	-	-

Ⓢ First choice | Primeira opção | 1ª opción Ⓢ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)

Insert order code = (1) Geometry Code + (2) Grade Code

*For inserts with radius above 2.0 mm, the cutter must be adjusted

LINEPRO 18090

GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades		
				← Wear Resistance		Toughness →
				PH0910 	PH7(6)920 	PH7 (6)30 
P	1	Unalloyed Steel	125-220		✓	✓
	2	Low-Alloyed Steel	220-280		✓	✓
	3	High-Alloyed Steel	280-380		✓	✓
M	4	SS - Ferritic / Martensitic	200-330			✓
	5	SS - Austenitic	200-330			✓
	6	SS - Austenitic-ferritic (Duplex)	230-260			✓
K	7	Malleable Cast Iron	130-230		✓	✓
	8	Grey Cast Iron	180-245		✓	✓
	9	Nodular Cast iron	160-250		✓	✓
N	10	Aluminium and Non Ferrous	30-130	✓		

 Good Conditions  Average Conditions  Difficult Conditions

RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

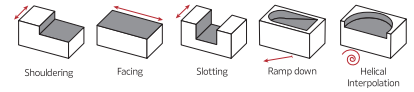
ISO	PSM	Material	HB (Brinell)	Vc (m/min)		
				← Wear Resistance		Toughness →
				PH0910	PH7(6)920	PH7(6)930
P	1	Unalloyed Steel	125-220	-	180-240	160-220
	2	Low-Alloyed Steel	220-280	-	160-220	140-200
	3	High-Alloyed Steel	280-380	-	140-210	120-190
M	4	SS - Ferritic / Martensitic	200-330	-	-	140-200
	5	SS - Austenitic	200-330	-	-	120-160
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	100-140
K	7	Malleable Cast Iron	130-230	-	160-260	150-240
	8	Grey Cast Iron	180-245	-	140-240	140-230
	9	Nodular Cast iron	160-250	-	120-200	100-190
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-

ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)		
				APKT 16... PDER-X/X2		
				APKT 16... PDS(T)R-X/X2	AP.T 16... PDER-LN	
P	1	Unalloyed Steel	125-220	0,07-0,15	0,10-0,25	-
	2	Low-Alloyed Steel	220-280	0,07-0,10	0,10-0,20	-
	3	High-Alloyed Steel	280-380	0,07-0,10	0,10-0,20	-
M	4	SS - Ferritic / Martensitic	200-330	0,07-0,10	-	-
	5	SS - Austenitic	200-330	0,07-0,10	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	0,07-0,10	-	-
K	7	Malleable Cast Iron	130-230	0,07-0,15	0,10-0,25	-
	8	Grey Cast Iron	180-245	0,07-0,15	0,10-0,25	-
	9	Nodular Cast iron	160-250	-	0,10-0,20	-
N	10	Aluminium and Non Ferrous	30-130	-	-	0,07-0,20

(Note 1) Cutting conditions $a_e/D_c=70\%$.
(Note 2) Cutting conditions for slotting and shouldering operations:

Operation	a_e	Vc & fz	AP (mm)
Slotting	100%	<20%	5,0-6,0
Shouldering	<50%	>8%	6,0-9,0
	≤25%	>12%	10,0-12,5

(Note 3) Cutting conditions should be adjusted according to the machine and work rigidity.
(Note 4) 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.

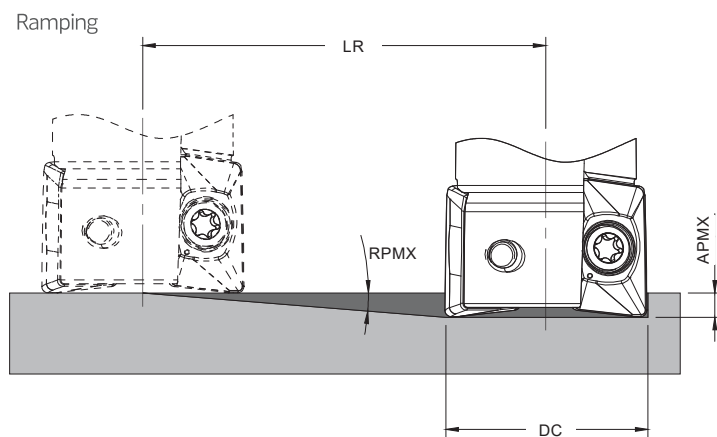


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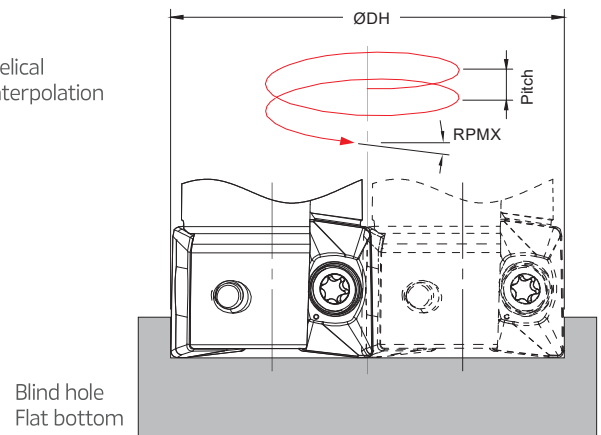
ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	APKT 16... PDSR-X(X2)	APKT 16... PDSR-X(-X2)
	2	Low-Alloyed Steel	220-280	APKT 16... PDSR-X(X2)	-
	3	High-Alloyed Steel	280-380	APKT 16... PDSR-X(X2)	-
M	4	SS - Ferritic / Martensitic	200-330	APKT 16... PDSR-X(X2)	-
	5	SS - Austenitic	200-330	APKT 16... PDSR-X(X2)	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	APKT 16... PDSR-X(X2)	-
K	7	Malleable Cast Iron	130-230	APKT 16... PDSR-X(X2)	APKT 16... PDSR-X(X2)
	8	Grey Cast Iron	180-245	APKT 16... PDSR-X(X2)	-
	9	Nodular Cast iron	160-250	APKT 16... PDSR-X(X2)	-
N	10	Aluminium and Non Ferrous	30-130	AP.T 16... PDFR-LN	APHT 16... PDFR-LN

RAMPING AND HELICAL INTERPOLATION

Descida em rampa e interpolação helicoidal | Bajada en rampa e interpolación circular



Helical Interpolation



$$\text{ØDi} = \text{ØDH} - \text{DC}$$

DC	Ramping			Helical Interpolation		
				Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	
25	3	14,5	276,7	46,1 -	- 48,4	3,5 3,9
32	2	14,5	415,2	60,1 -	- 62,4	3,1 3,3
40	1,5	14,5	553,7	76,1 -	- 78,4	3,0 3,2
50	1,1	14,5	755,2	96,1 -	- 98,4	2,8 2,9
63	0,85	14,5	977,3	122,1 -	- 124,4	2,8 2,9
80	0,64	14,5	1298,1	156,1 -	- 158,4	2,7 2,7
100	0,5	14,5	1661,5	196,1 -	- 198,4	2,6 2,7
125	0,38	14,5	2186,3	246,1 -	- 248,4	2,5 2,6

(1) Using insert radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch

When using different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

- Minimum Diameter: $\text{ØDHmin} = 2 \times (\text{DC} - (\text{R corner radius} + \text{F width of edge wiper}))$

- Maximum Diameter: $\text{ØDHmax} = 2 \times (\text{DC} - \text{R corner radius})$