

CUTTING TOOLS FOR

# MILLING



# A

## A - MILLING

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A - 318 | SCE - Choose by material

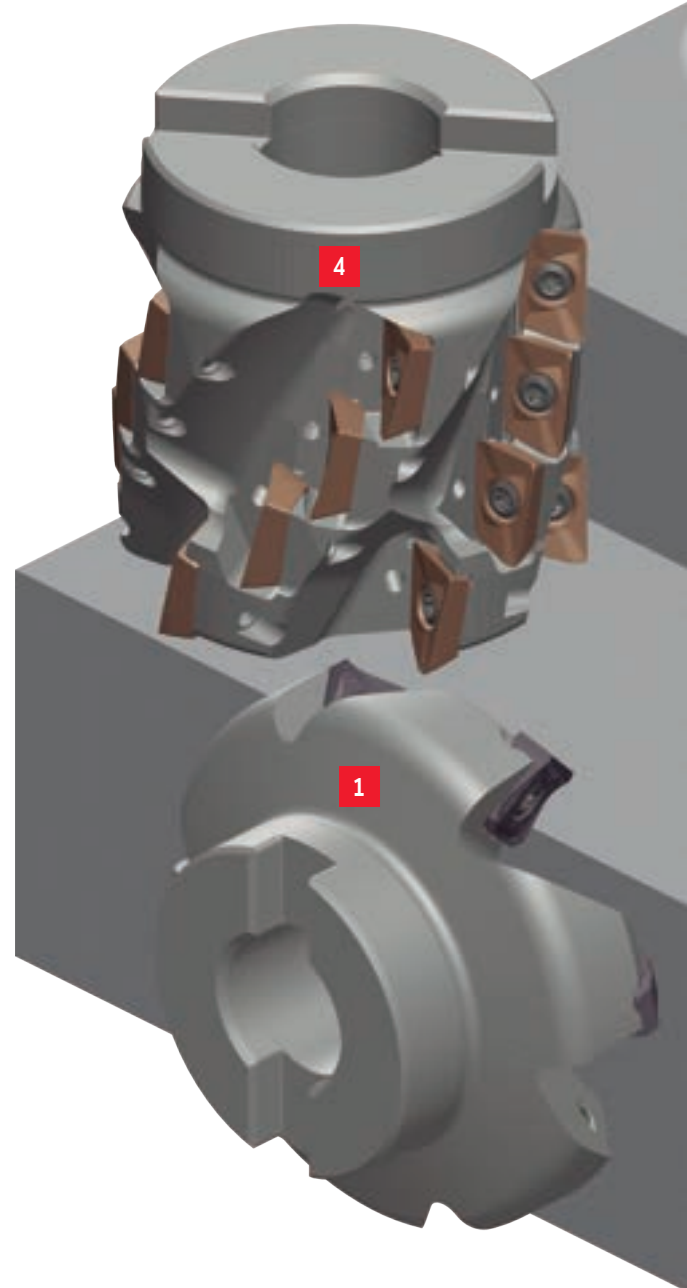
A - 336 | SCE - Choose by application

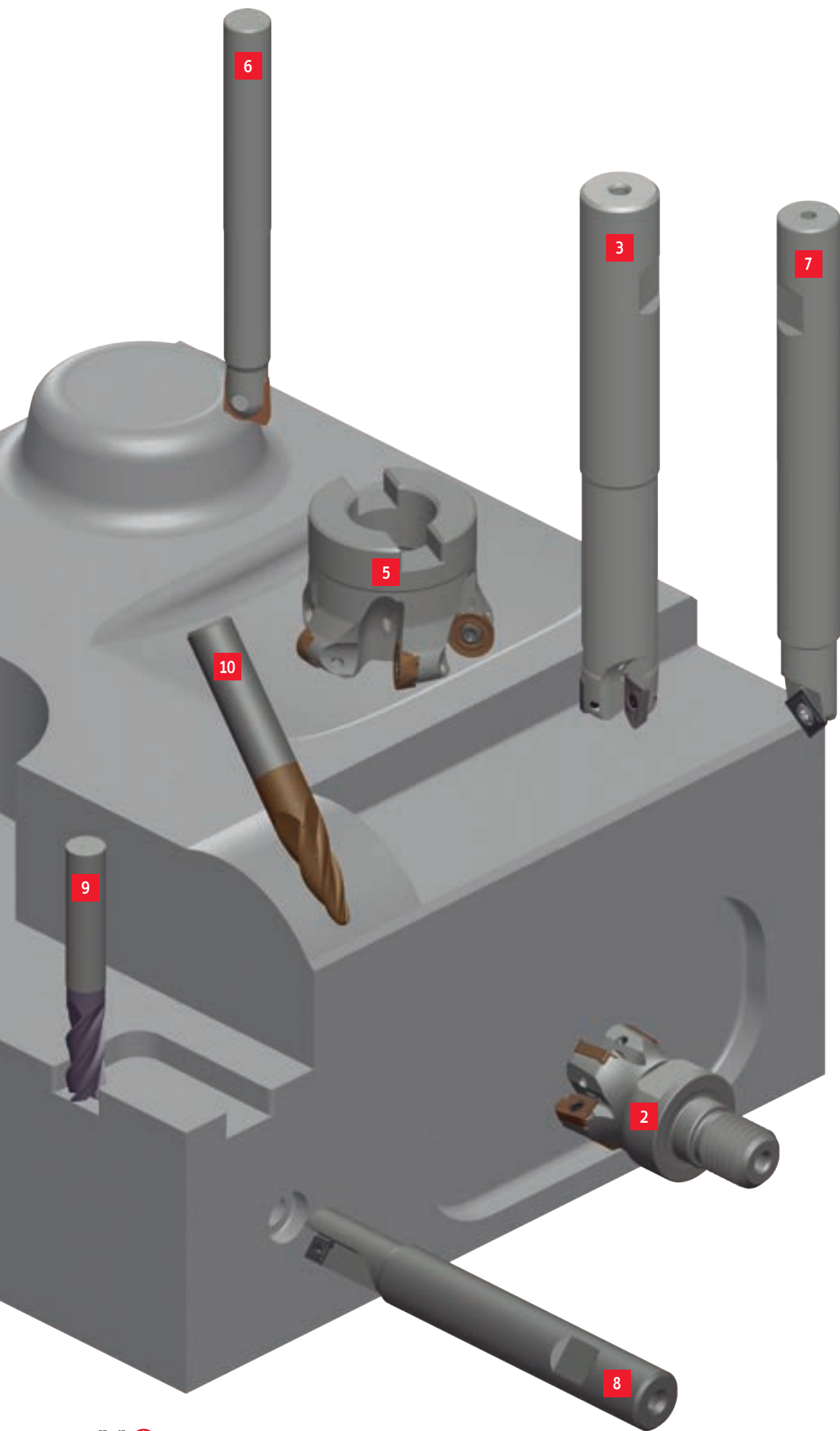
A - 352 | SCE - General INTEG

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## MILLING OPERATIONS

- 1 Face milling
- 2 High feed milling
- 3 Shoulder milling
- 4 Heavy milling
- 5 Profile milling
- 6 Finishing
- 7 Speciality
- 8 Spot face
- 9 Solid carbide end mills
- 10 5-Axis



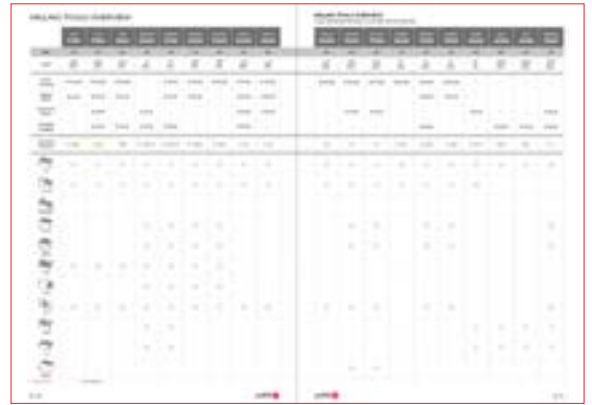


**1 - Define your operation type:**

- Face milling
- Highfeed milling
- Shoulder milling
- Profile milling
- Hardmill

Select your tool:

See page A - 12



**2 - Define your material according to ISO:**

- P Steel
- M Stainless Steel
- K Cast Iron
- N Aluminium & Non Ferrous Materials
- S Heat Resistant and Titanium Alloy
- H Hardened Material

See the last page for Palbit Selection Materials - PSM



**3 - Select your milling cutter.**

Choose the cutter pitch and mounting:

- Use a close pitch cutter as first choice
- Use a coarse pitch cutter for long overhang and unstable conditions
- Choose a mounting type
- The cutter marked as “stock available under request” has a minimum order quantity according to the following table:

Qty	* DC Size
10	≤ 100 mm
5	> 100 mm

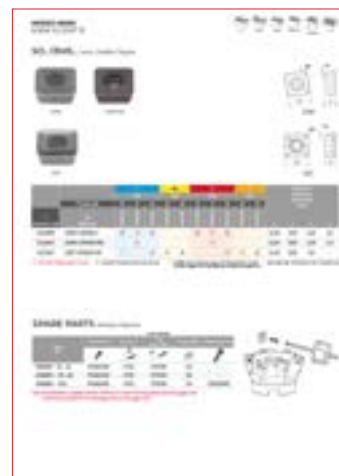


#### 4 - Select your insert.

Choose the chip breaker for your operation:

- Chip breaker L= Light (for light cuts when low forces/power are required)
- Chip breaker M = Medium (first choice for mixed production)
- Chip breaker H = Heavy (for rough operations, forging, cast skin and vibration)
- Select insert grade for optimum productivity
- The insert marked as "stock available under request" has a minimum order quantity according to the following table:

Qty	*IC Size
300	≤ IC 25 mm
150	> IC 25 mm



#### 5 - Define your starting cutting parameters.

Cutting speeds and feeds for different materials are given on the insert boxes and in the tables for each solution.

The values should be optimized according to the machine and conditions.



### INSERTS CODIFICATION FOR MILLING TOOLHOLDERS

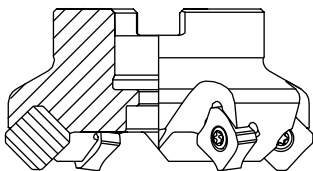
Codificação de pastilhas para fresas | Codificación de insertos para herramientas de fresado

Code	Inserts Description	Page	Code	Inserts Description	Page	Code	Inserts Description	Page
060	SE...T/W 1204	68	250	RD...T/W 1003 MO	260	494	WNXT   WOXT 0403...	126
062	SP..X 1204	210	251	RD...T/W 12T3MO	260	495	WNXT 0806...	132
063	POKT 0403	90	252	RD...T/W 1604MO	262	500	WNMW 1207	118
064	SOEW   SOET 0803...	96	253	RD...T/W 2006MO	262	505	WDET   WDMW 1204...	114
066	SOEW   SOET 13M...	102	280	SN...U 1206	40	570	SFHx 1004..   OFHX 0403..	62
068	SOEW   SOET 1605...	108	335	RD...0802	240	620	WCL(R)...	228   229
099	SE...T/W 13T3	70	336	RP..10T3	240	640	VPGT 0602...	282
163	XNKU 06T3	78	337	RP..1204	241	720	XNHw 1205...	278
164	XNKU 1205	84	338	RP..1605	242	760	XDGX 15M5	200
170	AP..T 1003	214	339	RP..2006	242	770	XDGX 22M7	204
171	ANHX 1004	142	341	RPHT 10T3-LS(4)	244	900	LNXT 0904	186
175	ANHX 1204	146	342	RPHT 1204-LS(4)	246	901	LNXT 1306	190
180	AP.. 1604	220	351	RN...1204	254	902	PN...X 1105	44
181	ANHX 1607	150	400	XDHW 060210	270	903	LNXT 1506	194
200	XP.. 0602	156	405	XDHW 10T310	270	908	SN...X 1206 & ON...X 0505	48
201	XP. 1003	162	410	XDHW 040110	270	909	SN...X 1206	52
202	XPET 1706	172   180	450	WNHU 060410	236	912	SN...X 1606 & ON...X 0606	56
245	RDHW 0702	260	490	WNHU 04T3...	138   234			

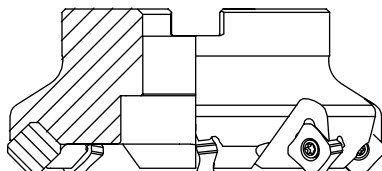
Symbol Símbolo Símbolo	Coupling type Tipo de acoplamiento Tipo de acoplamiento	Inserts fixation type Fixação de pastilhas Fijación de plaquitas	Standard Norma Norma
<b>A</b>	Arbor mounting Montagem tipo árvore Montaje con tornillo	Insert screw Parafuso pastilha Tornillo de la plaquita	ISO 6462
<b>B</b>		Wedge Cunha Cuña	ISO 6462
<b>C</b>		Insert screw and washer, Screw clamp or clamp Parafuso para pastilha e anilha, parafuso e grampo ou grampo Tornillo de la plaquita y arandela, tornillo y brida o brida	ISO 6462
<b>D</b>		Washer Anilha Arandela	ISO 6462
<b>E</b>	Cylindrical shank Haste cilíndrica Mango cilíndrico	Any type Qualquer tipo Cualquier tipo	DIN 1835 - A
<b>R</b>	Threaded coupling Acoplamiento roscado Acoplamiento roscado	Any type Qualquer tipo Cualquier tipo	Palbit internal standard Norma interna Palbit
<b>W</b>	Weldon shank Haste weldon Mango tipo weldon	Any type Qualquer tipo Cualquier tipo	DIN 1835 - B
<b>X</b>	Special coupling Acoplamiento especial Acoplamiento especial	Any type Qualquer tipo Cualquier tipo	

## ISO ARBOR MOUNTING TYPES Estilos de montagem ISO tipo árvore | Estilos de montaje ISO tipo husillo

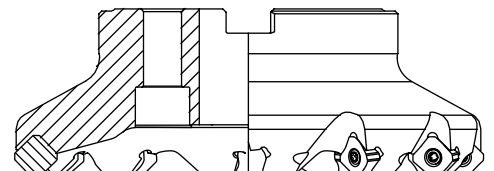
Arbor type A



Arbor type B



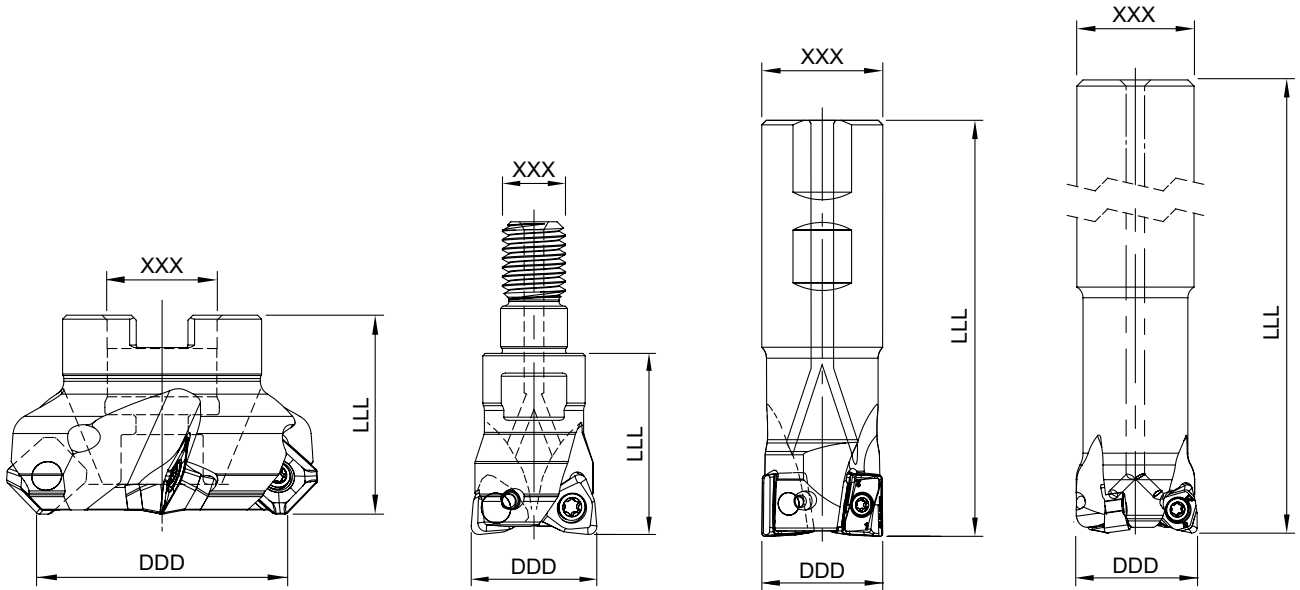
Arbor type C



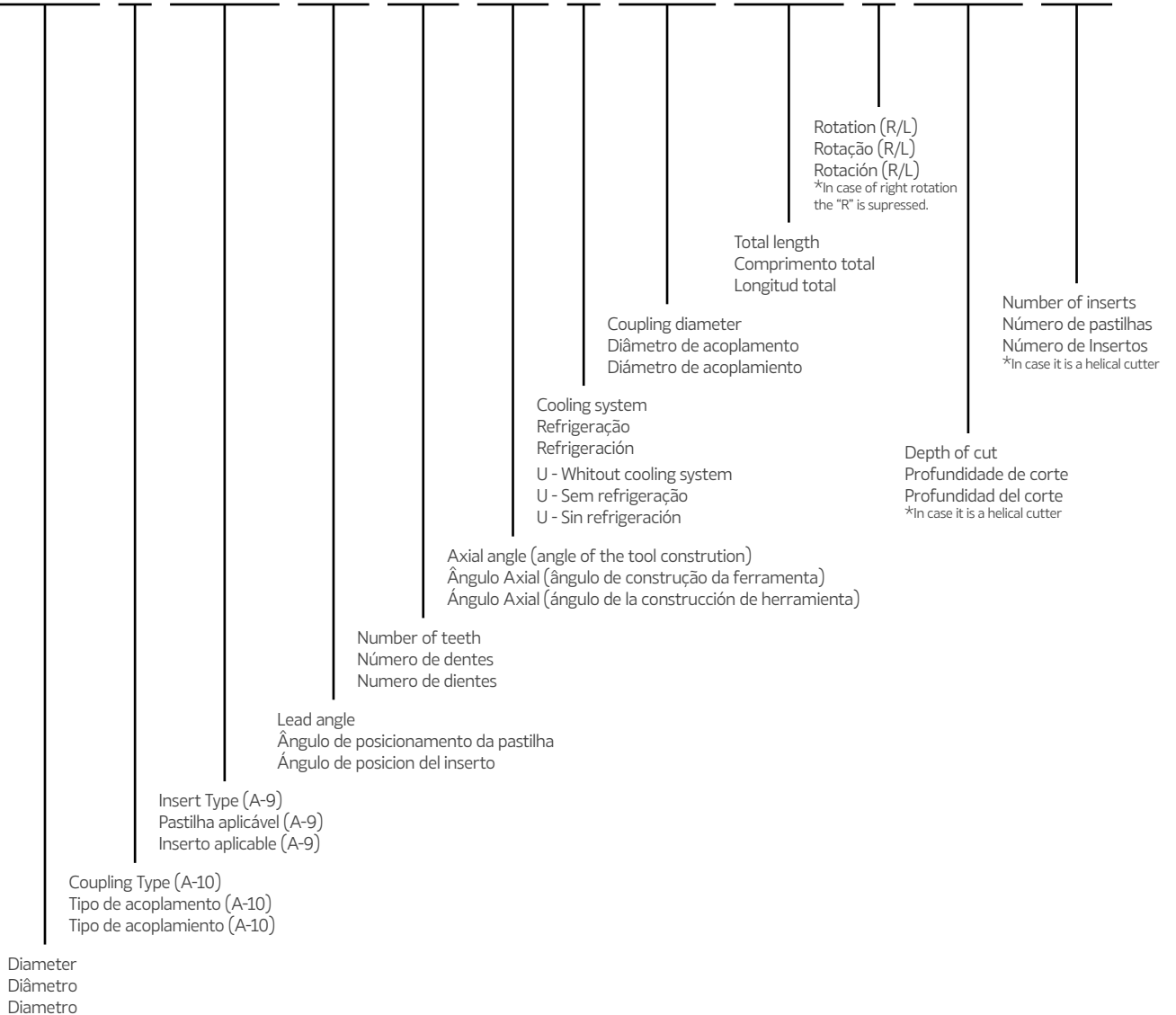
NOTE: For each type of arbor mounting (see previous table of coupling type on symbols A, B, C, D), we can have a different arbor types (see images above).

# MILLING TOOLS CODIFICATION

Codificação das ferramentas de fresagem | Codificación de heramientas de fresado



**DDD Y ZZZ T T - N N - L L - U XXX L L L - L - A A A # #**



# A MILLING TOOLS OVERVIEW

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

	PLUS 28088	PLUS 90260	PLUS 90845	PLUS 90945	PLUS 91245	NEW LINEPRO 57045	LINEPRO 06045	LINEPRO 09945	TETRAFEED 16320
Page	40	44	48	52	56	62	68	70	78
Insert	SN...J 1206...	PN...X 1105	SN... 1206 ON... 0505...	SN...X 1206	SN... 1606... ON... 0606...	SFHX 1004... OFHX 0403..	SE... 1204...	SE... 13T3...	XNKU... 06...
Arbor Mounting	Ø 50-200	Ø 50-160	Ø 50-250	Ø 50-250	Ø 63-250	Ø40-125	Ø 50-160	Ø 50-250	Ø 40-80
Weldon Shank	-	-	Ø 32-40	-	-	Ø20-32	-	-	Ø 16-32
Cylindrical Shank	-	-	-	-	-	Ø20-32	-	-	Ø 16-32
Threaded Coupling	-	-	-	-	-	Ø20-32	-	-	Ø 16-42
Workpiece Material	PMK	PK	PMKNS	PMKNS	PMKS	PMKS	PMKN	PMKN	PMKS
 Facing	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
 Shouldering	⊗								
 Slanted Shoulder & Chamfer			⊗	⊗	⊗	⊗	⊗	⊗	
 Ramp down									⊗
 Helical Interpolation									⊗
 Plunging									⊗
 Side milling									
 Slotting									
 Profiling									⊗
 Copying									⊗
 Plunging & Recessing									

⊗ Main Operation

⊗ Other Operations

# MILLING TOOLS OVERVIEW

Guia de ferramentas | Guía de herramientas

	<b>NEW</b> TETRAFEED <b>16420</b>	PENTA HIFEED <b>06320</b>	HIFEED <b>06410</b>	HIFEED <b>06690</b>	HIFEED <b>06815</b>	HIFEED <b>50560</b>	HIFEED <b>50060</b>	<b>NEW</b> HEXAPLUS <b>49490</b>	HEXAPLUS <b>49590</b>	PLUS <b>49090</b>
	84	90	96	102	108	114	118	126	132	138
	XNKU... 12...	POKT 0403...	SO... 0803...	SO... 13M5...	SO... 1605...	WD... 1204...	WN... 1207...	W..XT 0403..	WNXT 0806...	WNHU 04T308-LP
	Ø50-100	Ø 40-66	Ø 40-52	Ø 50-100	Ø 63-160	Ø 52-80	Ø 52-80	Ø32-63	Ø 40-160	-
	Ø32-40	-	Ø 20-32	-	-	-	-	Ø20-32	Ø 32-50	-
	-	Ø 20-40	-	-	-	-	-	-	-	Ø 16-25
	-	Ø 16-42	Ø 20-42	Ø 32-42	-	-	Ø 35	Ø18-32	-	Ø 16-32
	<b>PMKS</b>	<b>PK</b>	<b>PMKS</b>	<b>PMKS</b>	<b>PMKS</b>	<b>PMKS</b>	<b>PK</b>	<b>PK</b>	<b>PK</b>	<b>PK</b>

Face milling  
High feed milling  
Shoulder milling  
Profile milling  
Specialty  
Spare Parts  
Technical Data  
End Mills

# A MILLING TOOLS OVERVIEW

MILLING

Face milling

High feed milling

Shoulder milling




















































Profile milling

Specialty

Spare Parts

Technical Data

End Mills

	PLUS 17190	PLUS 17590	PLUS 18190	LINEPRO 20090	LINEPRO 20190	LINEPRO 20290	NEW HELIPRO 20290	TGPLUS 90090	TGPLUS 90190
Page	142	146	150	156	162	172	180	186	190
Insert	ANHX 1004...	ANHX 1206...	ANHX 1607...	XP. 0602...	XP. 1003...	XPET 1706...	XPET 1706...	LNXT 0904...	LNXT 1306...
Arbor Mounting	Ø 40-100	Ø 40-125	Ø 50-160	-	Ø 40-63	Ø 40-125	Ø 50-125	Ø 40-63	Ø 40-125
Weldon Shank	Ø 14-40	Ø 25-40	Ø 32-40	-	Ø 16-32	Ø 32-40	-	Ø 16-32	Ø 25-40
Cylindrical Shank	-	Ø 26-33	-	Ø 10-21	Ø 16-25	-	-	Ø 20-32	Ø 25-40
Threaded Coupling	-	Ø 25-42	Ø 32-40	Ø 10-32	Ø 16-40	-	-	Ø 25-32	-
Workpiece Material	PMKNS	PMKS	PKN	PMKNSH	PMKNSH	PMKNS	PMKNS	PMKS	PMK
 Facing									
 Shouldering									
 Slanted Shoulder & Chamfer									
 Ramp down									
 Helical Interpolation									
 Plunging									
 Side milling									
 Slotting									
 Profiling									
 Copying									
 Plunging & Recessing									

 Main Operation       Other Operations

# MILLING TOOLS OVERVIEW

Guia de ferramentas | Guía de herramientas

	TGPLUS 90390	ALUPRO 76090	ALUPRO 77090	LINEPRO 06290	LINEPRO 17090	LINEPRO 18090	W-PRO 62090	PLUS 49095	PLUS 45095	TOROMILL 33590
	194	200	204	210	214	220	228	234	236	240
	LNXT 1506...	XDGX 15M5...	XDGX 22M7...	SP. 1204...	AP. 1003...	AP. 1604...	WC... 08...	WNHU 04T3...	WNHU 0604...	RDHT 0802...
	Ø 50-160	Ø 40-100	Ø 50-125	Ø 40-160	Ø 40-63	Ø 40-125	-	-	-	-
	-	-	-	-	Ø 16-25	Ø 25-40	-	-	-	-
	-	Ø 20-40	Ø 32-40	-	-	-	Ø 8-20	-	-	Ø 16-25
	-	Ø 25-40	-	-	Ø 16-25	-	Ø 10-20	Ø 16-35	Ø 25-42	Ø 16-32
	<b>PK</b>	<b>N</b>	<b>N</b>	<b>PMKS</b>	<b>PMKN</b>	<b>PMKN</b>	<b>PMKSH</b>	<b>PKH</b>	<b>PKH</b>	<b>PMS</b>

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

# A MILLING TOOLS OVERVIEW

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty


Spare Parts

Technical Data

End Mills

	TOROMILL 33690	TOROMILL 33790	TOROMILL 33890	TOROMILL 33990	TURBOMILL 34190	TURBOMILL 34290	TOROMILL X2 35190	TOROMILL 24590	TOROMILL 25090
Page	240	241	242	242	244	246	254	260	260
Insert	RPHT 10T3...	RPHT 1204...	RPHT 1605...	RPHT 2006...	RPHT 10T3...LS(4)	RPHT 1204... LS(4)	RNHX 1204...	RD... 0702...	RD... 1003...
Arbor Mounting	Ø 42-52	Ø 40-80	Ø 50-125	Ø 80-125	Ø 42-52	Ø 40-80	Ø 40-100	-	Ø 42-52
Weldon Shank	-	-	-	-	-	-	Ø 32	Ø 15	Ø 20
Cylindrical Shank	Ø 20-32	-	-	-	Ø20-32	-	-	-	-
Threaded Coupling	Ø 20-35	-	-	-	Ø20-35	-	Ø 32-42	Ø 15-20	Ø 20-42
Workpiece Material	PMS	PMS	PMS	PMS	PMS	PMS	PMKS	PKH	PKH
 Facing									
 Shouldering									
 Slanted Shoulder & Chamfer									
 Ramp down									
 Helical Interpolation									
 Plunging									
 Side milling									
 Slotting									
 Profiling									
 Copying									
 Plunging & Recessing									

 Main Operation

 Other Operations

# MILLING TOOLS OVERVIEW

Guia de ferramentas | Guía de herramientas

TOROMILL 25190	TOROMILL 25290	TOROMILL 25390	LINEPRO 40095	LINEPRO 40595	LINEPRO 41095	HARDMILL 72090	CENTER & CHAMFER	NEW ENGRAVING 64067	SPOT FACE
260	262	262	270	270	270	278	282	286	290
RD... 12T3...	RD... 1604...	RD... 2006..	XD... 0602...	XD... 10T3...	XD... 0401...	XNHW 1205...	SOMT 11T3.. SOGT 11T3..	VPGT 0602..	SPKX
Ø 50-80	Ø 52-160	Ø 80-160	-	Ø 52-80	-	Ø 40-160	Depth of machining 1,00 to 6,50 mm	Depth of engraving 0,05 to 2,00 mm	-
Ø 25	-	-	-	-	-	-			Ø 10-25
-	-	-	-	-	-	-			-
Ø 24-42	Ø 32-35	-	Ø 16-25	Ø 25-42	Ø 10-12	-			-
PKH	PKH	PKH	PKNH	PKNH	PKNH	N	PMK	PMNS	PMKS

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

H		M	
O		V	
P		W	
S		L	
T		A	
C		B	
D		K	
E		R	
F		X	Special

1 - Insert shape symbol

Symbol	m (mm)	d (mm)	s (mm)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05~±0.13	±0.025
K*	±0.013	±0.05~±0.13	±0.025
L*	±0.025	±0.05~±0.13	±0.025
M*	±0.08~±0.20	±0.05~±0.13	±0.13
N*	±0.08~±0.20	±0.05~±0.13	±0.025
U*	±0.13~±0.38	±0.08~±0.25	±0.13

Triangular inserts with a facet (secondary cutting edge)

Detailed dimension of M class insert Insert height Tolerances (mm)					
Inscribed circle	T	S	C	D	V
6.35	±0.08	-	-	-	-
9.525	±0.08	±0.08	±0.11	±0.10	±0.13
12.70	±0.13	±0.13	±0.13	±0.15	-
15.875	±0.15	±0.15	±0.15	±0.18	-
19.05	±0.15	±0.15	±0.15	±0.18	-
25.40	-	±0.18	-	-	-
31.75	-	±0.25	-	-	-

Inscribed circle Tolerances (mm)					
Inscribed circle	T	S	C	D	V
6.35	±0.05	-	-	-	-
9.525	±0.05	±0.05	±0.05	±0.05	±0.05
12.70	±0.08	±0.08	±0.08	±0.08	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	±0.10
19.05	-	-	-	-	±0.10
25.40	-	±0.13	-	-	±0.10
31.75	-	±0.20	-	-	±0.12

3 - Tolerances symbol

\*As a rule, the sides of these inserts are as sintered. Tolerance differs with insert size, for the accuracy of class M, refer to the table on the right.

A	B	C	D	E
F	G	N	P	O
				Other clearance angle

2 - Normal clearance symbol



4 - Insert symbol															
symbol	Type	Hole type	Chip breaker	Shape	symbol	Type	Hole type	Chip breaker	Shape	symbol	Type	Hole type	Chip breaker	Shape	
W	with hole	Round hole / one countersink (40°-60°)	Without chip breaker		H	with hole	Round hole / one countersink (70°-90°)	Chip breaker on one side		G	with hole	Round hole	Chip breaker on both sides		
T			Chip breaker on one side		C		Round hole / double countersink (70°-90°)	Without chip breaker		N		-	Without chip breaker		
Q		Round hole / double countersink (40°-60°)	Without chip breaker		J		Round hole	Round hole	Chip breaker on both sides		R	without hole	-	Chip breaker on one side	
U			Chip breaker on both sides		A				Without chip breaker		F		-	Chip breaker on both sides	
B		Round hole / one countersink (70°-90°)	Without chip breaker		M		Chip breaker on one side		X	-	-	-	-	On request	

# MILLING INSERTS ISO IDENTIFICATION SYSTEM

Sistema de identificação ISO para pastilhas de fixação mecânica | Codificação ISO para plaquetas indexáveis

R's	35° V's	55° D's	80° C's	90° S's	60° T's	80° W's	IC		ANSI
							mm	inch	Symbol
-	06	04	-	03	06	02	3,97	5/32	1,20
-	08	05	04	04	08	L3	4,76	3/16	1,50
-	09	06	05	05	09	03	5,56	7/32	1,80
06**	-	-	-	-	-	-	6,00	0,236	
06*	11	07	06	06	11	04	6,35	1/4	2,00
07*	13	09	08	07	13	05	7,94	5/16	2,50
08*	-	-	-	-	-	-	8,00	0,315	
09*	16	11	09	09	16	06	9,525	3/8	3,00
10**	-	-	-	-	-	-	10,00	0,394	
12**	-	-	-	-	-	-	12,00	0,472	
12*	22	15	12	12	22	08	12,70	1/2	4,00
15*	27	19	16	15	27	10	15,875	5/8	5,00
16**	-	-	-	-	-	-	16,00	0,63	
19*	33	23	19	19	33	13	19,05	3/4	6,00
20**	-	-	-	-	-	-	20,00	0,787	
25**	-	-	-	-	-	-	25,00	0,984	
25*	44	31	25	25	44	17	25,40	1,00	8,00
31*	54	38	32	31	54	21	31,75	1 1/4	10,00
32**	-	-	-	-	-	-	32,00	1,26	

\* ANSI designation only (Radius Designation is 00)

\*\* Metric designation only (Radius Designation is M0)

According to International Standard ISO 1832 - 2012(E)

"Indexable inserts for cutting tools - Designation"

ISO	mm	ANSI	inch
01	1.59	1	0.062
T1	1.98	1.2	0.078
02	2.38	1.5	0.094
03	3.18	2	0.125
T3	3.97	2.5	0.156
04	4.76	3	0.188
05	5.56	3.5	0.219
06	6.35	4	0.250
07	7.94	5	0.312
09	9.52	6	0.375
12	12.70	8	0.500

5 - Insert size symbol

6 - Insert thickness symbol

**12 06 00 AN S N - MP**

10* - Chip breaker geometries	
Cutting Condition	Main Application
1st letter	2nd letter
L - Light	<b>P</b> - Steel
M - Medium	<b>M</b> - Stainless Steel
H - Heavy	<b>K</b> - Cast Iron
W - Wiper	<b>N</b> - Aluminium
*only when required.	<b>S</b> - HRSA Titanium Alloys
	<b>H</b> - Hardened Materials

Ex.: ANHX 160708 PNER - **MP**

7* - Insert corner symbol			
ISO	mm	inch	ANSI
00	Sharp nose		0
01	0.10	.004	0.2
02	0.20	.008	0.5
04	0.40	.015	1
08	0.80	.032	2
12	1.2	.047	3
16	1.6	.062	4
20	2.0	.078	5
24	2.4	.094	6
28	2.8	.109	7
32	3.2	.125	8
00 (inch or M0/metric)	Round insert		0

\*only when required.

7.1* - Insert edges symbol			
For inserts having secondary edges two digits are used:			
1st digit is secondary edge		2nd digit is secondary edges relief angle	
A	45°	A	3°
D	60°	B	5°
E	75°	C	7°
F	85°	D	15°
P	90°	E	20°
Z	special	F	25°
*only when required.		G	30°
		N	0°
		P	11°
		Z	special

8* - Cutting edge information		
Shape	Honing	Symbol
	No honing	F
	With honing	E
	Chamfered No honing	T
	Chamfered with honing	S

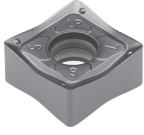
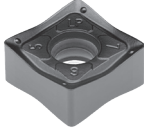

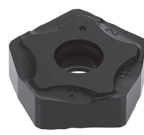
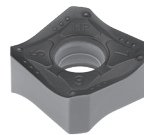
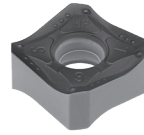

\*only when required.

9 - Cutting direction		
Shape	Hand	Symbol
	Right	R
	Left	L
	None	N

# A MILLING INSERTS OVERVIEW


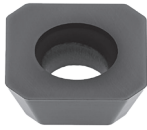

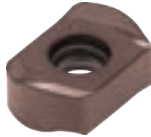
MILLING

## FACE MILLING INSERTS

Reference	SNHU	SNKU	PNHX	PNKX	SNHX	SNKX	ONHX
							
Size	12	12	11	11	12   16	12   16	05   06
Material	<b>P M K</b>	<b>P M K</b>	<b>P K</b>	<b>P K</b>	<b>P M K N S</b>	<b>P K</b>	<b>P M K S</b>
Page	41	41	44	44	49   53   57	49   53   57	49   57

Face milling




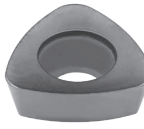

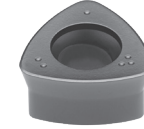
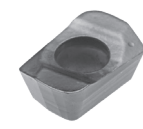
## HIGH FEED MILLING INSERTS

Reference	ONKX	SEHW	SEHT	Reference	XNKU
					
Size	05   06	12   13	12   13		06   12
Material	<b>P M K S</b>	<b>P M K</b>	<b>P M K N</b>		<b>P M K S</b>
Page	49   57	68   71	68   71		80   85

High feed milling

Shoulder milling

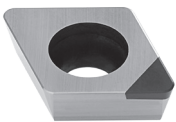
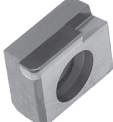




## HIGH FEED MILLING INSERTS

Reference	POKT	SOEW	SOET	WDET	WDMW	WNMW	XPET...HF
							
Size	04	08   13   16	08   13   16	12	12	12	06   10
Material	<b>P K</b>	<b>P K</b>	<b>P M S</b>	<b>P M S</b>	<b>P K</b>	<b>P K</b>	<b>P M K S</b>
Page	91	97   103   108	97   103   108	114	114	119	157   166

Profile milling

Specialty

## SPECIAL MILLING INSERTS

	HARDMILL		CENTER & CHAMFER		ENGRAVING	SPOT FACE
Reference	XDHW	XNHW	SOMT	SOGT	VPGT	SPKX
						
Size	04   06   10	12	11	11	06	05   06   07   09   11
Material	<b>N H</b>	<b>K N</b>	<b>P M K</b>	<b>P M K</b>	<b>P M N S</b>	<b>P M K S</b>
Page	271	279	282	282	286	290

Spare Parts



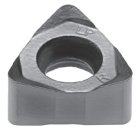

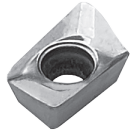
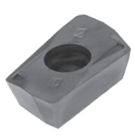

Technical Data

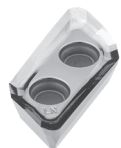


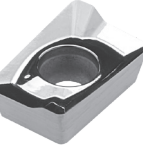
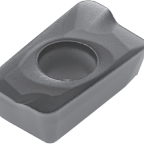

End Mills

## MILLING INSERTS OVERVIEW







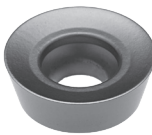
Visão genérica de pastilhas para fresagem | Visión general de plaquitas para fresado


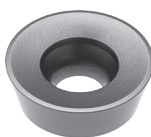
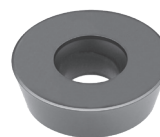

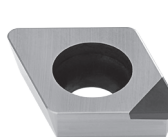
### SHOULDER MILLING INSERTS

Reference	WOXT	WNXT	WNHU	ANHX	XPET	XPHW	LNXT
							
Size	04	04   08	04	10   12   16	06   10   17	06   10	09   13   15
Material	<b>P</b> <b>K</b>	<b>P</b> <b>K</b>	<b>P</b> <b>K</b>	<b>P</b> <b>M</b> <b>K</b> <b>N</b> <b>S</b>	<b>P</b> <b>M</b> <b>K</b> <b>N</b> <b>S</b>	<b>P</b> <b>H</b>	<b>P</b> <b>M</b> <b>K</b>
Page	128	128   133	139	142   148   151	157   166   173	157   167	188   191   195

Reference	XDGX	SPGX	SPMX	APET	APKT	APHT
						
Size	15   22	12	12	10	10   16	16
Material	<b>N</b>	<b>P</b> <b>M</b> <b>K</b> <b>S</b>	<b>P</b> <b>M</b> <b>K</b> <b>S</b>	<b>N</b>	<b>P</b> <b>M</b> <b>K</b>	<b>N</b>
Page	201   205	210	210	216	216   221	221

### PROFILE MILLING INSERTS

Reference	WCR	WCL	WNHU	RDHT	RPHT	RNHX	RDHT
							
Size	08   10   12   16   20	08   10   12   16   20	04   06	08	10   12   16   20	12	10   12   16   20
Material	<b>P</b> <b>M</b> <b>K</b> <b>N</b> <b>S</b> <b>H</b>	<b>P</b> <b>M</b> <b>K</b> <b>N</b> <b>S</b> <b>H</b>	<b>P</b> <b>K</b> <b>H</b>	<b>P</b> <b>M</b> <b>S</b>	<b>P</b> <b>M</b> <b>S</b>	<b>P</b> <b>M</b> <b>K</b> <b>S</b>	<b>P</b> <b>K</b>
Page	229	230	234   236	243	243   247	255	263

Reference	RDHW	RDMT	RDMW	XDHW	XDHW
					
Size	07   10   12   16   20	10   12   20	10   12   16   20	04   06   10	04   06   10
Material	<b>P</b> <b>K</b> <b>H</b>	<b>P</b>	<b>P</b> <b>K</b>	<b>P</b> <b>K</b> <b>N</b> <b>H</b>	<b>N</b> <b>H</b>
Page	263	263	263	271	271

# A OTHER MILLING INSERTS

MILLING

Face milling

High feed milling

Shoulder milling

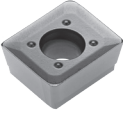
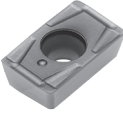
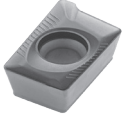
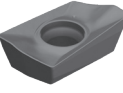
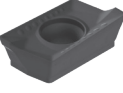


Profile milling

Specialty

Spare Parts

Technical Data

End Mills

Inserts Pastilhas Plaquetas	(1) Geometry code	(2) Grade code ISO Reference	P							M			K					N	
			PVD							PVD			CVD		PVD			UNC	
			M6	54	68	66	78	86	I5	68	66	I5	L5	L9	D2	54	68	67	66
PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5705	PH5740	PH6705	PH6910	PH6920	PH6325	PH6930	PH6740	PH0910	
	1111423	ACET 150612 TR			⊗			⊗							⊗				
	1110014	APFT 1604 PDFR			○										○				
	1110015	APFT 1604 PDSR			⊗										⊗				
	1110557	APFT 1604 PDTR			○										○				
	1110006	ADKT 1505 PDR			⊗	○			⊗	○					⊗		○		
	1111218	ADKT 1505 PDSR			⊗	⊗			⊗	⊗					⊗		⊗		
	1111209	ADKT 1505 PDTR			⊗	○			⊗	○					⊗		○		
	1112192	BOMT 130408R			○										○				
	1110038	BCKT 1304 PDR						○											
	1110922	HNGF 090520 - V										⊗			⊗	⊗			
	1110957	HNGF 090520 - W										⊗		⊗	⊗				

⊗ First choice | 1ª Escolha | 1ª Opción  
 ⊗ Stock Items | Itens de stock

⊗ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el 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: <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code

# OTHER MILLING INSERTS

Outras pastilhas para fresagem | Otras plaquitas para fresado

Dimensions (mm)   Dimensões (mm)   Dimensiones (mm)						Drawing
IC   W1	S	INSL   LE	RE	BCH	BS	
12,7	6,35	15,00	1,20	-	1,70	
9,53	4,76	16,00	0,80	-	2,00	
9,53	4,76	16,00	0,80	-	2,00	
9,53	4,76	16,00	0,80	-	2,00	
9,54	5,63	15,70	-	-	1,60	
9,54	5,63	15,70	-	-	1,60	
9,54	5,63	15,70	-	-	1,60	
8,13	4,85	11,50	1,20	-	1,40	
8,41	4,90	12,80	0,61	-	1,40	
16,20	5,56	9,16	2,00	-	-	
16,20	5,56	9,16	2,00	-	-	

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

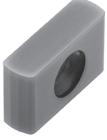
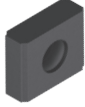
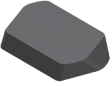

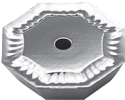




Spare Parts

Technical Data

End Mills

# A OTHER MILLING INSERTS

## MILLING

Inserts Pastilhas Plaquetas	(1) Geometry code	(2) Grade code ISO Reference	P						M			K					N				
			PVD						PVD			CVD		PVD			UNC				
			54	68	G4	66	78	86	I5	68	66	I5	L5	L9	D2	54	68	67	I5	10	
			PH6910	PH6920	PH7920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5705	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0910	
	1111876	LNE 323-02																			
	1111877	LNE 323-10																			
	1110952	LNE 323-02 SP																			
	1113037	LNE 434 R08-SP																			
	1113038	LNE 434 R16-SP																			
	1111420	LNE 434-02																			
	1111894	LNE 434-05																			
	1111416	LNJN 2205 DDSR-A1																			
	1111518	OFEN 070405 TN	⊗	⊗					⊗							⊗	⊗		⊗		
	1111569	OFKR 070408 FN-LN																			⊗
	1111568	OFKR 070408 SN-MP	⊗	⊗				⊗	⊗			⊗				⊗	⊗		⊗		
	1110555	PDMW 120420 T																			
	1110554	PDHW 120420 T		⊗					⊗	⊗									⊗		
	1112133	RPEW 1204 M0																			
	1121742	RPMT 1003 M0T																			
	1120448	RPMT 1204 M0T																			

⊗ First choice | 1ª Escolha | 1ª Opción

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

Insert Order Code: <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code

⊗ Stock Items | 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)

# OTHER MILLING INSERTS

Outras pastilhas para fresagem | Otras plaquitas para fresado

Dimensions (mm)   Dimensões (mm)   Dimensiones (mm)						Drawing
IC   W1	S	INSL   LE	RE	BCH	BS	
9,53	4,76	15,88	-	-	0,40	
9,53	4,76	15,88	1,27	-	-	
9,53	4,76	15,88	0,80	-	1,20	
14,25	5,85	18,55	0,80	-	-	
14,25	5,85	18,55	1,60	-	-	
14,25	6,35	19,05	-	-	0,80	
14,25	6,35	19,05	1,60	-	-	
14,00	5,00	22,00	-	2,00	-	
18,00	4,76	7,40	0,60	-	2,20	
18,00	4,76	7,40	0,60	-	2,20	
18,00	4,76	7,40	0,60	-	1,60	
16,52	4,76	12,0	2,00	-	-	
16,52	4,76	12,0	2,00	-	-	
12,00	4,76	-	-	-	-	
10,00	3,18	-	-	-	-	
12,00	4,76	-	-	-	-	

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty



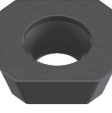

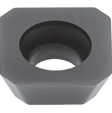



Spare Parts

Technical Data

End Mills

# A OTHER MILLING INSERTS

## MILLING

Inserts Pastilhas Plaquetas	(1) Geometry code	(2) Grade code ISO Reference	P						M			K					N		
			PVD						PVD			CVD		PVD			UNC		
			M6	54	68	66	78	86	I5	68	66	I5	L5	L9	D2	54	68	67	I5
PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5705	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0910		
	1110200	SDHT 1204 AEEN			○														
	1110693	SDHT 1204 AFFN		○															
	1110201	SDHT 1204 AESN-PL			○		○												
	1110818	SDHW 09T3 AEEN			○														
	1110743	SDHW 09T3 AEFN			○														
	1110781	SDHW 1204 AEEN			○														
	1110782	SDHW 1204 AETN			○														
	1112339	SDHW 150412			○														
	1110206	SEAN 1203 AFEN			○														
	1110207	SEAN 1203 AFFN			○														
	1110208	SEAN 1203 AFSN			⊗														
	1110209	SEAN 1203 AFTN			○														
	1110211	SEAN 1504 AFFN			○														
	1110212	SEAN 1504 AFTN			○														
	1110219	SEHW 1204 AFEN			⊗				⊗		⊗					⊗		⊗	
	1110222	SEHW 1204 AFTN			⊗				⊗		⊗					⊗		⊗	
	1111146	SEHW 13T3 AGFN			⊗											⊗		⊗	
	1110224	SEHW 1504 AFSN			○											○		○	
	1110225	SEHW 1504 AFTN			○											○		○	
	1110226	SEKN 1203 AFEN			○														
	1110227	SEKN 1203 AFFN			○														
	1110228	SEKN 1203 AFSN			⊗											⊗		⊗	
	1110230	SEKN 1203 AFTN			○											○		○	
	1110794	SEKN 1204 AFFN			○											○		○	
	1110232	SEKN 1204 AFSN			⊗											⊗		⊗	
	1110233	SEKN 1204 AFTN			○											○		○	
	1110235	SEKN 1504 AFEN		⊗	⊗				⊗		⊗				⊗	⊗		⊗	
	1110238	SEKN 1504 AFTN			⊗				⊗		⊗				⊗	⊗		⊗	
	1110239	SEKR 1203 AFEN			⊗											⊗		⊗	
	1110240	SEKR 1203 AFSN			⊗											⊗		⊗	
	1110241	SEKR 1204 AFSN			○											○		○	
	1110759	SEKR 1504 AFSN			⊗				⊗							⊗		⊗	
	1111921	SEXT 14M4 AGSN-M		⊗	○											○		○	

⊗ First choice | 1ª Escolha | 1ª Opción

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

Insert Order Code: <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code

⊗ Stock Items | 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)

# OTHER MILLING INSERTS

Outras pastilhas para fresagem | Otras plaquitas para fresado

Dimensions (mm)   Dimensões (mm)   Dimensiones (mm)						Drawing
IC   W1	S	INSL   LE	RE	BCH	BS	
12,70	4,76	10,00	-	-	1,80	
12,70	4,76	10,00	-	-	1,80	
12,70	4,76	10,00	-	-	1,80	
12,70	4,76	10,00	-	-	1,80	
9,53	3,97	7,30	0,30	-	1,50	
9,53	3,97	7,30	0,30	-	1,50	
12,70	4,76	9,00	-	-	2,50	
12,70	4,76	9,00	-	-	2,50	
15,88	4,76	-	1,20	-	-	
12,70	3,18	9,20	0,80	-	2,40	
12,70	3,18	9,20	0,80	-	2,40	
12,70	3,18	9,20	1,20	-	2,40	
12,70	3,18	9,20	1,20	-	2,40	
15,88	4,76	11,60	1,00	-	2,40	
15,88	4,76	11,60	1,00	-	2,40	
12,70	4,76	12,70	-	-	2,80	
12,70	4,76	12,70	-	-	2,80	
13,36	3,96	10,00	-	-	2,00	
15,88	4,76	11,60	0,20	-	2,80	
15,88	4,76	11,60	0,20	-	2,80	
12,70	3,18	9,20	1,20	-	2,40	
12,70	3,18	9,20	1,20	-	2,40	
12,70	3,18	9,20	1,20	-	2,40	
12,70	3,18	9,20	1,20	-	2,40	
12,70	3,18	9,20	1,20	-	2,40	
12,70	4,76	9,20	1,20	-	2,40	
12,70	4,76	9,20	1,20	-	2,40	
12,70	4,76	9,20	1,20	-	2,40	
12,70	4,76	9,20	1,20	-	2,40	
15,88	4,76	12,30	1,00	-	2,40	
15,88	4,76	12,30	1,00	-	2,40	
12,70	3,18	9,20	1,20	-	2,40	
12,70	3,18	9,20	1,20	-	2,40	
12,70	4,76	9,20	1,20	-	2,40	
15,88	4,76	12,30	1,00	-	2,40	
14,00	4,00	9,20	1,00	-	2,80	
14,00	4,00	9,20	1,00	-	2,80	

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty







Spare Parts

Technical Data

End Mills

# A OTHER MILLING INSERTS

## MILLING

Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P						M			K					N			
			PVD						PVD			CVD		PVD			UNC			
			(2) Grade code	M6	54	68	66	78	86	I5	68	66	I5	L5	L9	D2	54	68	67	I5
			PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5705	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0910
	1110266	SNGN 120408			○												○			
	1110267	SNGN 120412			○												○			
	1110597	SNGN 190412			○												○			
	1110598	SNGN 190416			○												○			
	1110271	SNKN 1204 ENEN			⊗												⊗			
	1110273	SNKN 1204 ENSN			⊗												⊗			
	1120541	SNUN 120404			○												○			
	1120542	SNUN 120408			○												○			
	1120544	SNUN 120412			○												○			
	1121880	SNUN 190612T				○														
	1110765	SPGN 090312			○												○			
	1111173	SPGN 090316			○												○			
	1110300	SPGN 120308			○												○			
	1110301	SPGN 120312			○												○			
	1110303	SPGN 120408			○												○			
	1110588	SPGN 120412			○												○			
	1110590	SPGN 150408			○												○			
	1110304	SPGN 150412			○												○			
	1110328	SPKN 1203 EDSR			○		⊗	⊗									○			
	1110330	SPKN 1203 EDTR			⊗		⊗	⊗									⊗		⊗	
	1110331	SPKN 1204 EDER			⊗															⊗
	1110332	SPKN 1204 EDSR			⊗				⊗								⊗		⊗	
	1110333	SPKN 1204 EDTR			○												○			
	1110336	SPKN 1504 EDER			⊗		⊗										⊗			
	1110337	SPKN 1504 EDFR			○												○			
	1110339	SPKN 1504 EDSR			⊗				⊗								⊗		⊗	
	1110340	SPKN 1504 EDTR			⊗		⊗		⊗								⊗		⊗	
	1110335	SPKN 1504 EDEL			○												○			
1110338	SPKN 1504 EDLS			○												○				

⊗ First choice | 1ª Escolha | 1ª Opción    
 ⊗ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock    
 ⊗ Stock Items | 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: <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code




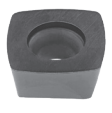



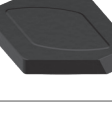


## OTHER MILLING INSERTS

Outras pastilhas para fresagem | Otras plaquitas para fresado

Dimensions (mm)   Dimensões (mm)   Dimensiones (mm)						Drawing
IC   W1	S	INSL   LE	RE	BCH	BS	
12,70	4,76	-	0,80	-	-	
12,70	4,76	-	1,20	-	-	
19,05	4,76	-	1,20	-	-	
19,05	4,76	-	1,60	-	-	
12,70	4,76	-	-	1,50	0,80	
12,70	4,76	-	-	1,50	0,80	
12,70	4,76	11,10	0,40	-	-	
12,70	4,76	11,10	0,80	-	-	
12,70	4,76	11,10	1,20	-	-	
19,05	6,35	-	1,20	-	-	
9,53	3,18	-	1,20	-	-	
9,53	3,18	-	1,60	-	-	
12,70	3,18	-	0,80	-	-	
12,70	3,18	-	1,20	-	-	
12,70	4,76	-	0,80	-	-	
12,70	4,76	-	1,20	-	-	
15,88	4,76	-	0,80	-	-	
15,88	4,76	-	1,20	-	-	
12,70	3,18	12,70	-	1,00	1,50	
12,70	3,18	12,70	-	1,00	1,50	
12,70	4,76	12,70	-	1,00	1,50	
12,70	4,76	12,70	-	1,00	1,50	
12,70	4,76	12,70	-	1,00	1,50	
15,88	4,76	15,88	-	1,00	1,50	
15,88	4,76	15,88	-	1,00	1,50	
15,88	4,76	15,88	-	1,00	1,50	
15,88	4,76	15,88	-	1,00	1,50	
15,88	4,76	15,88	-	1,00	1,50	
15,88	4,76	15,88	-	1,00	1,50	

# A OTHER MILLING INSERTS

## MILLING

Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P						M		K				N	S			
			PVD						PVD		CVD		PVD				UNC	PVD	
			(2) Grade code	54	68	G4	78	86	I5	G6	68	I5	L5	L9	D2	54	68	67	I5
	PH6910	PH6920	PH7920	PH6125	PH6135	PH6740	PH7740	PH6920	PH6740	PH5705	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0910	PH6740	
	1111976	SPKR 1203 EDTR																	
	1110564	SPKR 1504 EDFR		○															
	1111449	SPKR 1504 EDSR		○															
	1111107	SPKR 1906		○															
	1111314	SPKT 08T308-E		○					○										
	1111195	SPKT 130510-E		○															
	1111364	SPKW 08T308-E		○															
	1121227	SPKW 08T308-S		○															
	1111153	SPKW 130510 F										○							
	1111355	SPKW 130510-E		⊗			○		⊗						⊗				
	1110888	SPKW 130510-S		⊗			△	△							⊗				
	1111609	SPMT 120408-MP		⊗				⊗		⊗	⊗				⊗		⊗		⊗
	1120572	SPMW 120408		○				⊗		⊗			○		○		⊗		
	1191186	SPXN 1906		○			○	○					○						
	1112384	SPXN 1906-W		○															
	1112134	SPXR 1203 EDSR-MP		⊗	○			⊗	○						⊗	○	⊗		
	1110393	TNHF 1204 AN-CA									⊗	⊗	⊗	⊗	○				
	1111333	TNHF 1204 AN-K									⊗	⊗		○	○				

⊗ First choice | 1ª Escala | 1ª Opción   
 △ Stock available until sold out | Stock disponible até acabar o stock | Stock disponible hasta acabar el stock   
 Insert Order Code: <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code  
⊗ Stock Items | 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)

# OTHER MILLING INSERTS

Outras pastilhas para fresagem | Otras plaquitas para fresado

Dimensions (mm)   Dimensões (mm)   Dimensiones (mm)						Drawing
IC   W1	S	INSL   LE	RE	BCH	BS	
12,70	3,18	12,70	-	1,00	1,40	
15,88	4,76	15,88	-	1,00	1,40	
15,88	4,76	15,88	-	1,00	1,40	
19,05	6,35	19,05	-	1,00	1,40	
8,51	4,04	-	0,80	-	-	
13,00	5,56	-	1,00	-	-	
8,51	3,96	-	0,80	-	-	
8,51	3,96	-	0,80	-	-	
13,00	5,56	-	1,00	-	-	
13,00	5,56	-	1,00	-	-	
13,00	5,56	-	1,00	-	-	
12,70	4,76	-	0,80	-	-	
12,70	4,76	-	0,80	-	-	
19,05	6,35	19,05	-	1,00	1,40	
19,05	6,35	-	-	-	12,00	
12,70	3,18	12,70	1,00	1,00	1,37	
12,70	4,76	12,00	2,00	-	1,70	
12,70	4,76	12,00	3,00	-	1,30	

# A OTHER MILLING INSERTS

MILLING

Face milling

High feed milling

Shoulder milling





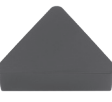

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P						M			K				N			
			PVD						CVD			PVD		CVD		UNC			
			(2) Grade code	54	68	G4	66	I5	G6	L8	L9	68	66	I5	L5	L9	54	68	67
	PH6910	PH6920	PH7920	PH6930	PH6740	PH7740	PH5125	PH5740	PH6920	PH6930	PH6740	PH5705	PH5740	PH6910	PH6920	PH6325	PH6740	PH0910	
	1111911	TNUN 1204 ANEN		○															
	1110422	TPGN 110304														○			
	1110423	TPGN 110308		○												○			
	1110425	TPGN 160304		⊗												⊗			
	1110426	TPGN 160308		⊗												⊗			
	1110431	TPGN 220408		○												○			
	1110432	TPGN 220412		○												○			
	1110450	TPKN 1603 PDEL		○												○			
	1110451	TPKN 1603 PDER		⊗			⊗									⊗		⊗	
	1110671	TPKN 1603 PDSR		○												○			
	1110455	TPKN 1603 PDTR		⊗			⊗									⊗		⊗	
	1110459	TPKN 1603 PPFN		○												○			
	1110463	TPKN 1603 PPTR		○												○			
	1110465	TPKN 2204 PDER		⊗			⊗									⊗		⊗	
	1110466	TPKN 2204 PDFR		○												○			⊗
	1110609	TPKN 2204 PDSR		⊗			⊗									⊗		⊗	
	1110471	TPKN 2204 PPSR		○												○			
	1110468	TPKN 2204 PDTR		○												○			
	1110476	TPKR 1603 PDSR		⊗			⊗									⊗		⊗	
	1110921	TPKR 1603 PDTR		○												○			
	1110477	TPKR 2204 PDSR		⊗			⊗									⊗		⊗	
	1120761	TPUN 110304			○														
	1120762	TPUN 110308			○														
	1120765	TPUN 160304			⊗			○	⊗	⊗									
	1120766	TPUN 160308			⊗			⊗	⊗	⊗									
	1120770	TPUN 160312			○			○	⊗	⊗									
	1120777	TPUN 220404			○			○	⊗	⊗									
	1120779	TPUN 220408			○			⊗	⊗	⊗									
	1120783	TPUN 220412			⊗			⊗	⊗	⊗									
	1120791	TPUN 270616						○											
	1112135	TPXR 2204 PDSR-MP		⊗			⊗									⊗		⊗	

⊗ First choice | 1ª Escolha | 1ª Opción     ⊗ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock     **Insert Order Code:** <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code  
⊗ Stock Items | 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)

# OTHER MILLING INSERTS

Outras pastilhas para fresagem | Otras plaquitas para fresado

Dimensions (mm)   Dimensões (mm)   Dimensiones (mm)						Drawing
IC   W1	S	INSL   LE	RE	BCH	BS	
12,70	4,76	12,00	-	-	2,50	
6,35	3,18	-	0,40	-	-	
6,35	3,18	-	0,40	-	-	
9,53	3,18	-	0,40	-	-	
9,53	3,18	-	0,80	-	-	
12,70	4,76	-	0,80	-	-	
12,70	4,76	-	1,20	-	-	
9,53	3,18	16,50	0,70	-	1,20	
9,53	3,18	16,50	0,70	-	1,40	
9,53	3,18	16,50	0,70	-	1,20	
9,53	3,18	16,50	0,70	-	1,40	
9,53	3,18	16,50	-	-	1,10	
9,53	3,18	16,50	-	-	1,10	
12,70	4,76	22,00	0,50	-	1,70	
12,70	4,76	22,00	0,50	-	1,70	
12,70	4,76	22,00	0,50	-	1,70	
12,70	4,76	22,00	-	-	1,40	
12,70	4,76	22,00	-	-	1,40	
9,53	3,18	16,50	0,60	-	1,20	
9,53	3,18	16,50	0,60	-	1,20	
12,70	4,76	22,00	0,50	-	1,70	
6,35	3,18	11,00	0,40	-	-	
6,35	3,18	11,00	0,80	-	-	
9,53	3,18	16,50	0,40	-	-	
9,53	3,18	16,50	0,80	-	-	
9,53	3,18	16,50	1,20	-	-	
12,70	4,76	22,00	0,40	-	-	
12,70	4,76	22,00	0,80	-	-	
12,70	4,76	22,00	1,20	-	-	
15,88	6,35	27,00	1,60	-	-	
12,70	4,76	22,00	1,00	-	1,70	

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty


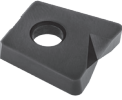

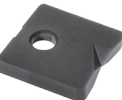

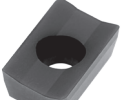
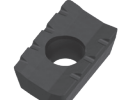
Spare Parts

Technical Data

End Mills

# A OTHER MILLING INSERTS

MILLING

Inserts Pastilhas Plaquitas	(1) Geometry code	(2) Grade code ISO Reference	P					M			K					N		
			PVD					PVD			CVD		PVD			UNC	UNC	
			M6	54	68	66	78	I5	68	66	I5	L5	L9	D2	54	68	67	I5
PH6103	PH6910	PH6920	PH6930	PH6125	PH6740	PH6920	PH6930	PH6740	PH5705	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0325	PH0910	
	1121907	VCGX 220530 LN																○
	1110851	WPB 08	○	○	○							○	○					
	1110852	WPB 10	○	○	○							○	○					
	1110853	WPB 12	○	○	○							○	○					
	1110923	WPB 16	○	○	○							○	○					
	1111019	WPB 20	○	○	○							○	○					
	1111554	WPRX-2 08		○	○							○	○					
	1111331	WPRX-2 10		⊗	⊗							⊗	⊗					
	1111555	WPRX-2 12		⊗	⊗							⊗	⊗					
	1111329	WPRX-2 16		⊗	⊗							⊗	⊗					
	1111330	WPRX-2 20		⊗	⊗							⊗	⊗					
1111556	WPRX-2 25		⊗	⊗							⊗	⊗						
1111557	WPRX-2 32		⊗	⊗							⊗	⊗						
	1110820	WPV 08	⊗	⊗	○		○					○	○					
	1110821	WPV 10	⊗	⊗	○		○					○	○					
	1110822	WPV 12	⊗	⊗	○		○					○	○					
	1110948	WPV 16	⊗	⊗	○		○					○	○					
	1111020	WPV 20	○	○	○		○					○	○					
	1110543	WPZ 08	⊗	○	○							○	○					
	1110551	WPZ 10	⊗	○	○							○	○					
	1110552	WPZ 12	⊗	○	○							○	○					
	1110544	WPZ 16	⊗	○	○							○	○					
	1110553	WPZ 20	⊗	⊗	○							⊗	○					
	1110661	WPZ 25	⊗	⊗	○							⊗	○					
1110662	WPZ 32	⊗	⊗	○							⊗	○						
	1110910	XPHT 1604 PDTR			○													
	1111206	XPHT 160420 PPTR			○													
	1110926	XPHT 160432 PDSR			○													
	1110958	XPHT 160412-MR			○													

⊗ First choice | 1ª Escolha | 1ª Opción  
 ⊗ Stock items | Itens de stock

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

# OTHER MILLING INSERTS

Outras pastilhas para fresagem | Otras plaquitas para fresado

Dimensions (mm)   Dimensões (mm)   Dimensiones (mm)						Drawing
IC   W1	S	INSL   LE	RE	BCH	BS	
12,70	5,60	12,70	3,00	-	-	
8,00	2,00	9,50	0,60	4,00	-	
10,00	2,50	11,50	0,80	5,00	-	
12,00	2,50	14,00	1,00	6,00	-	
16,00	3,00	16,00	1,30	6,00	-	
20,00	3,00	20,00	1,60	6,00	-	
8,00	2,00	9,50	-	2,50	-	
10,00	2,50	11,50	-	5,00	-	
12,00	2,50	11,90	-	6,00	-	
16,00	3,00	13,90	-	6,00	-	
20,00	3,00	15,90	-	6,00	-	
25,00	4,00	21,30	-	9,00	-	
32,00	5,00	25,80	-	10,00	-	
8,00	2,00	9,50	0,60	4,00	-	
10,00	2,50	11,50	0,80	5,00	-	
12,00	2,50	14,00	1,00	6,00	-	
16,00	3,00	16,00	1,30	6,00	-	
20,00	3,00	20,00	1,60	6,00	-	
8,00	2,40	7,00	-	3,00	-	
10,00	2,60	8,50	-	3,50	-	
12,00	3,00	10,00	-	4,00	-	
16,00	4,00	12,00	-	4,00	-	
20,00	5,00	15,00	-	5,00	-	
25,00	6,00	18,50	-	6,00	-	
32,00	7,00	23,50	-	7,50	-	
9,53	4,75	16,00	1,20	-	1,70	
9,53	4,75	16,00	2,00	-	0,70	
9,53	4,75	16,00	3,20	-	-	
9,53	4,75	16,00	1,20	-	1,70	

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills



# FACE MILLING

**1 PLUS 28088**

- > Suitable for machining **P M K**
- > See page A - 38

**2 PLUS 90260**

- > Suitable for machining **P K**
- > See page A - 42

**3 PLUS 90845 | 90945 | 91245**

- > Suitable for machining **P M K N S**
- > See page A - 46

**4 LINEPRO 57045**

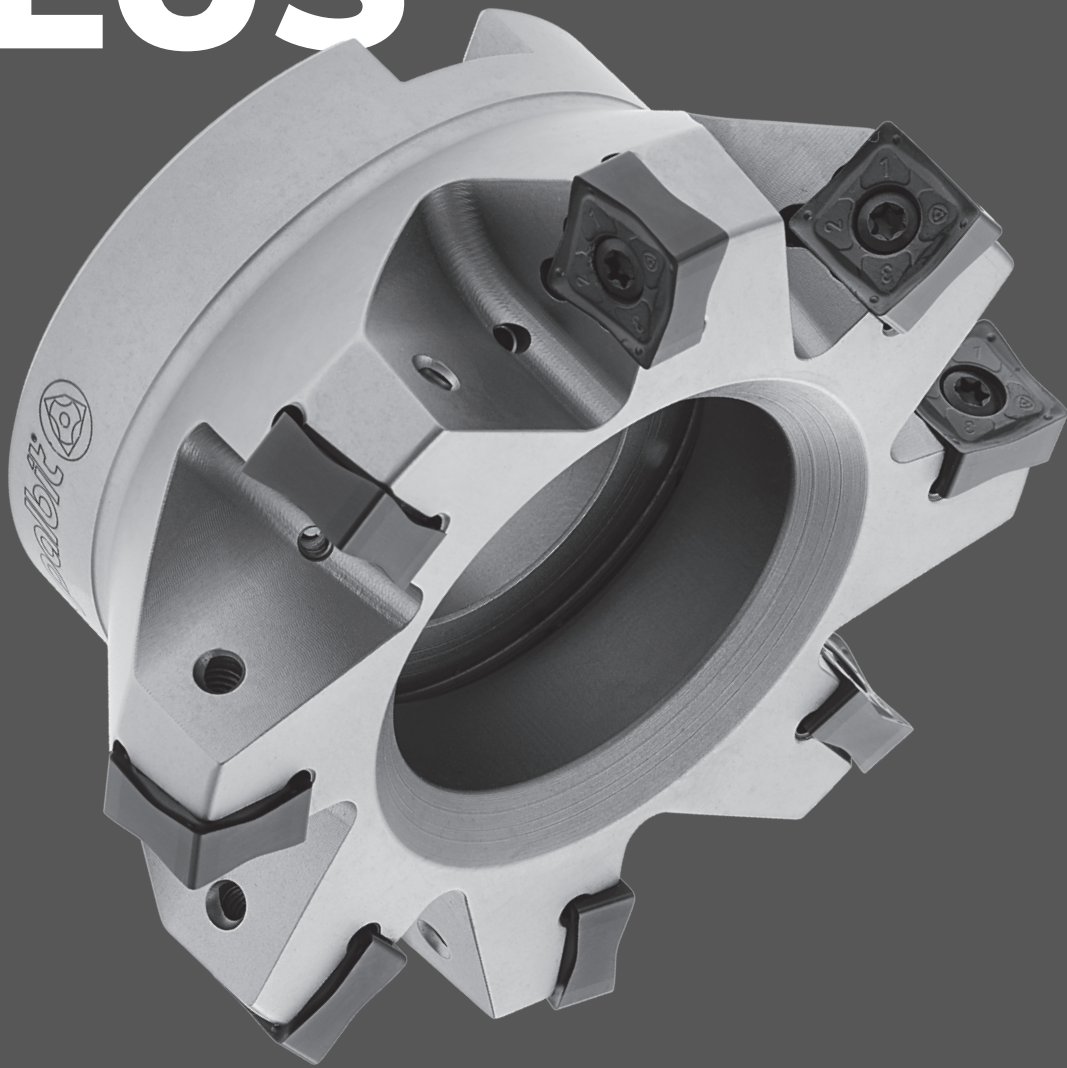
- > Suitable for machining **P M K N S**
- > See page A - 60

**5 LINEPRO 06045 | 09945**

- > Suitable for machining **P M K S**
- > See page A - 66

28088

# PLUS



The PLUS 28088 presents 8 cutting edges designed for rough to semi-finish face milling operations, providing high efficiency. The cutting edge angle ( $88^{\circ}$ ) of these mills enables them to perform face milling very close to the sidewall.

A linha PLUS 28088 apresenta 8 arestas de corte projetadas para operações de facejamento de desbaste a semi-acabamento, proporcionando alta eficiência. O ângulo da aresta de corte ( $88^{\circ}$ ) dessas fresas permite realizar facejamento muito próximo à parede lateral.

La línea PLUS 28088 presenta 8 filos de corte diseñados para operaciones de fresado de cara de desbaste a semiacabado, proporcionando alta eficiencia. El ángulo del filo de corte ( $88^{\circ}$ ) de estas fresas permite realizar el fresado de cara muy cerca de la pared lateral.

## PLUS 28088 > page 40

> From DC 50mm to 200mm

De DC 50mm a 200mm | Desde DC 50mm hasta 200mm

> Available in arbor mounting

Disponível em montagem tipo árvore | Disponible en fijación con tornillo central

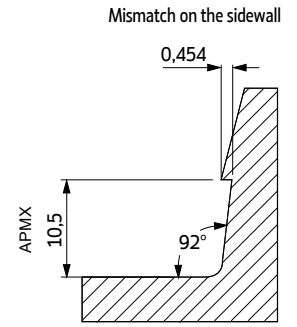
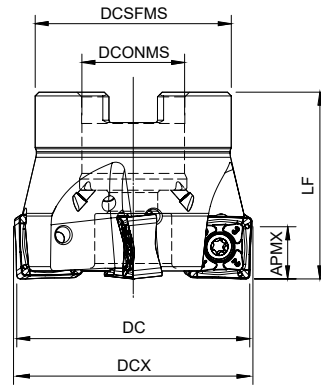
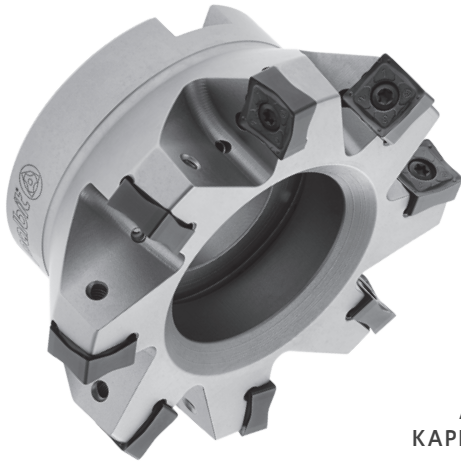
> Negative inserts with 8 cutting-edges

Pastilhas negativas com 8 arestas de corte | Insertos negativos con 8 filos de corte

> For higher depths of cut

Para altas taxas de remoção em peças pequenas | Para una alta tasa de remoción en piezas pequeñas





Arbor Mounting  
KAPR=88° | GAMP=-6°

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181084300	050A28088-05-06-022040	5	50	50,9	22	42	40	0,4	A	10,5	SN... 1206...	☉
181091600	063A28088-06-06-022040	6	63	63,9	22	48	40	0,5	A	10,5	SN... 1206...	☉
181091700	080A28088-07-06-027050	7	80	80,9	27	60	50	1,0	A	10,5	SN... 1206...	☉
181091800	080A28088-09-06-027050	9	80	80,9	27	60	50	0,9	A	10,5	SN... 1206...	☉
181091900	100A28088-08-06-032050	8	100	100,9	32	73	50	1,6	B	10,5	SN... 1206...	☉
181092000	100A28088-11-06-032050	11	100	100,9	32	73	50	1,5	B	10,5	SN... 1206...	☉
181092100	125A28088-10-06-040063	10	125	125,9	40	90	63	3,1	B	10,5	SN... 1206...	☉
181092200	125A28088-14-06-040063	14	125	125,9	40	90	63	3,0	B	10,5	SN... 1206...	☉
181092300	160A28088-12-06-U040063	12	160	160,9	40	110	63	3,7	C	10,5	SN... 1206...	☉
181092700	160A28088-18-06-U040063	18	160	160,9	40	110	63	3,5	C	10,5	SN... 1206...	○
181092800	200A28088-14-06-U060063	14	200	200,9	60	172	63	6,3	C	10,5	SN... 1206...	☉
181092900	200A28088-22-06-U060063	22	200	200,9	60	172	63	6,1	C	10,5	SN... 1206...	☉

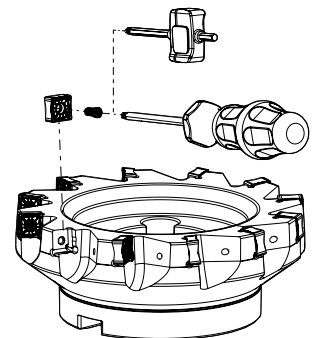
☉ Stock item | Produto de stock | Itens de stock

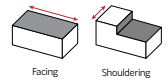
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

## SPARE PARTS Acessórios | Repuestos

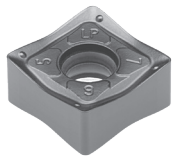
Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A28088 - 50 - 80	P0401200	XT15	DT1530	3,0	-	-
A28088 - 100	P0401200	PT15	DT1530	3,0	J0164110	SD6368-16
A28088 - 125	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20
A28088 - 160 - 200	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.

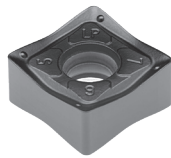




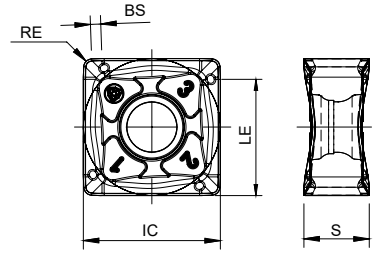
**SNH(K)U 1206** Inserts | Pastilhas | Plaquetas



SNHU-LP



SNKU-LP



Geometry code	ISO Reference	P					M		K							Dimensions Dimensões Dimensiones (mm)				
		CVD		PVD			PVD		CVD			PVD								
		T9	G4	T1	P3	G6	P3	G6	L5	L6	L9	T9	G4	T1	P3	G6	IC	S	LE	RE
1112020	SNHU 120608 ZNER-LP	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	13,30	6,35	11,60	0,80	1,00
1112278	SNKU 120608 ZNER-LP	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	13,30	6,35	11,60	0,80	1,00

⊗ 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

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

ISO	PSM	Material	HB (Brinell)	Grades									
				← Wear Resistance				Toughness →					
				PH5705	PH5320	PHP920	PH7920	PH7930	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	○	○	○	○	○	○	○	○	○	○

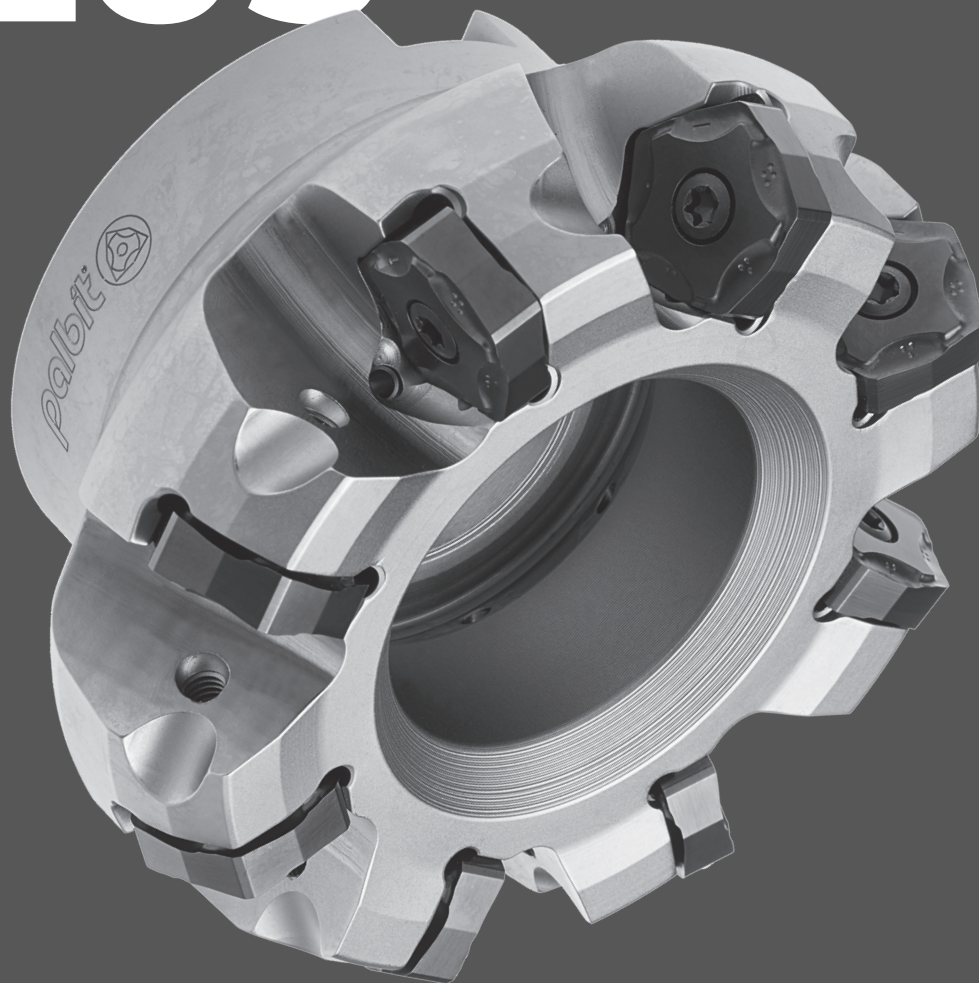
○ Good Conditions    ○ Average Conditions    ○ Difficult Conditions

**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 →					
				PH5705	PH5320	PHP920	PH7920	PH7930	PH5740	PHS740	PH7740		SNH(K)U 1206
P	1	Unalloyed Steel	125-220	-	-	180-250	180-240	160-220	-	140-220	140-200	0,10 (0,25)	0,35
	2	Low-Alloyed Steel	220-280	-	-	160-230	160-220	140-200	-	120-200	130-180	0,10 (0,25)	0,35
	3	High-Alloyed Steel	280-380	-	-	140-220	140-210	120-190	-	100-190	100-170	0,10 (0,25)	0,35
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	140-200	-	-	130-180	0,10 (0,25)	0,35
	5	SS - Austenitic	200-330	-	-	-	-	120-160	-	-	110-160	0,10 (0,25)	0,35
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	100-140	-	-	90-150	0,10 (0,25)	0,35
K	7	Malleable Cast Iron	130-230	160-290	150-280	160-270	160-260	150-240	160-260	-	140-220	0,10 (0,25)	0,35
	8	Grey Cast Iron	180-245	170-320	160-320	140-250	140-240	140-230	140-240	-	120-210	0,10 (0,25)	0,35
	9	Nodular Cast iron	160-250	140-200	100-190	120-210	120-200	100-190	120-200	-	100-190	0,10 (0,25)	0,35

90260

# PLUS



PNK(H)X is an economical negative insert with 10 cutting edges, offering an improved insert design that effectively distributes cutting forces, making it an ideal solution for cast iron applications.

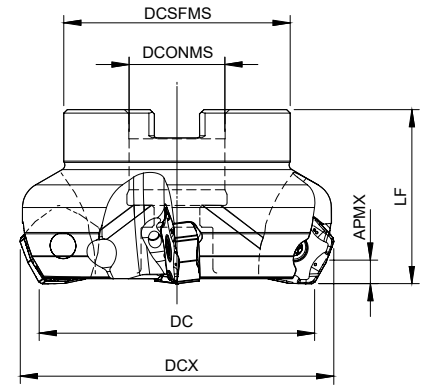
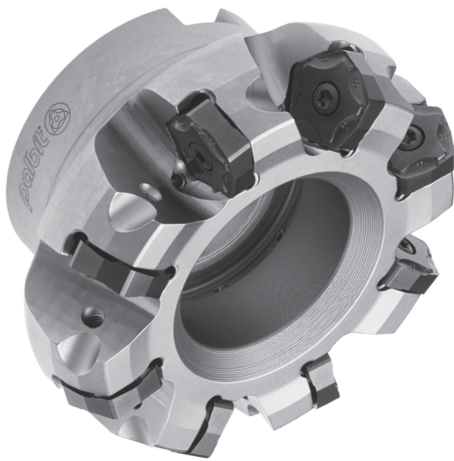
PNK(H)X é uma pastilha negativa económica com 10 arestas de corte, oferecendo um design de pastilha aprimorada que distribui efetivamente as forças de corte, tornando-a uma solução ideal para aplicações em ferro fundido.

PNK(H)X é uma plaqueta negativa económica com 10 arestas de corte, oferecendo um design de plaqueta aprimorada que distribui efetivamente as forças de corte, tornando-a uma solução ideal para aplicações em ferro fundido.

## **PLUS 90260** > page 44

- > **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
- > **Negative inserts with 10 cutting edges**  
Pastilhas negativas com 10 arestas de corte | Insertos negativos con 10 filos de corte
- > **Excellent solution for cast iron**  
Excelente solução para ferro fundido | Excelente solución para hierro fundido





Arbor Mounting  
KAPR=60° | GAMP=-7°

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181050200	050A90260-05-07-022040	5	50	59,05	22	48	40	0,388	A	5,0	PN... 1105...	☉
181050300	063A90260-06-07-022040	6	63	72,05	22	52	40	0,597	A	5,0	PN... 1105...	☉
181050400	080A90260-08-07-027050	8	80	89,05	27	60	50	1,072	B	5,0	PN... 1105...	☉
181045900	100A90260-10-07-032050	10	100	109,05	32	80	50	1,745	B	5,0	PN... 1105...	☉
181050500	125A90260-12-07-040063	12	125	134,05	40	90	63	3,047	B	5,0	PN... 1105...	☉
181050600	160A90260-14-07-U040063	14	160	169,05	40	110	63	4,397	C	5,0	PN... 1105...	☉

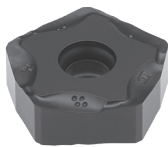
☉ Stock item | Produto de stock | Itens de stock

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

## PNH(K)X 1105 Inserts | Pastilhas | Plaquetas



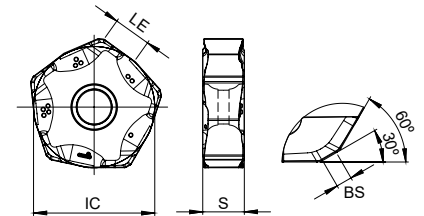
PNHX-MK



PNHX-HK



PNKX-MK



(1) Geometry code	(2) Grade code ISO Reference	P		K				Dimensions Dimensões Dimensiones (mm)				
		PVD		CVD		PVD		IC	S	LE	RE	BS
		G1	G4	L5	L9	G1	G4					
1111374	PNHX 1105 ZNER-MK	☉	☉	☉	☉	☉	☉	16,50	5,66	5,70	-	1,30
1111998	PNHX 1105 ZNER-HK			☉	○			16,50	5,66	5,70	-	1,30
1112294	PNKX 1105 ZNER-MK	☉	☉	☉	○	☉	☉	16,50	5,66	5,70	-	1,30

☉ First choice | Primeira opção | 1ª opción

☉ Stock item | Produto de stock | Itens de stock

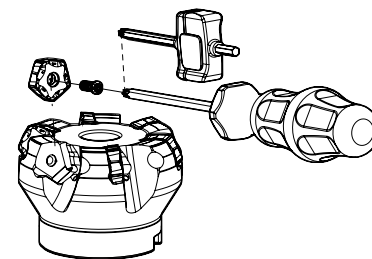
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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



## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A90260 – 50 - 63	P0401200	XT15	DT1530	3,0	-	-
A90260 – 80	P0401200	XT15	DT1530	3,0	J0123510	SD6368-12
A90260 – 100	P0401200	PT15	DT1530	3,0	J0164110	SD6368-16
A90260 – 125	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20
A90260 – 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.

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

ISO	PSM	Material	HB (brinell)	Grades				
				← Wear Resistance			Toughness →	
				PH5705	PH7910	PH7920	PH5740	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

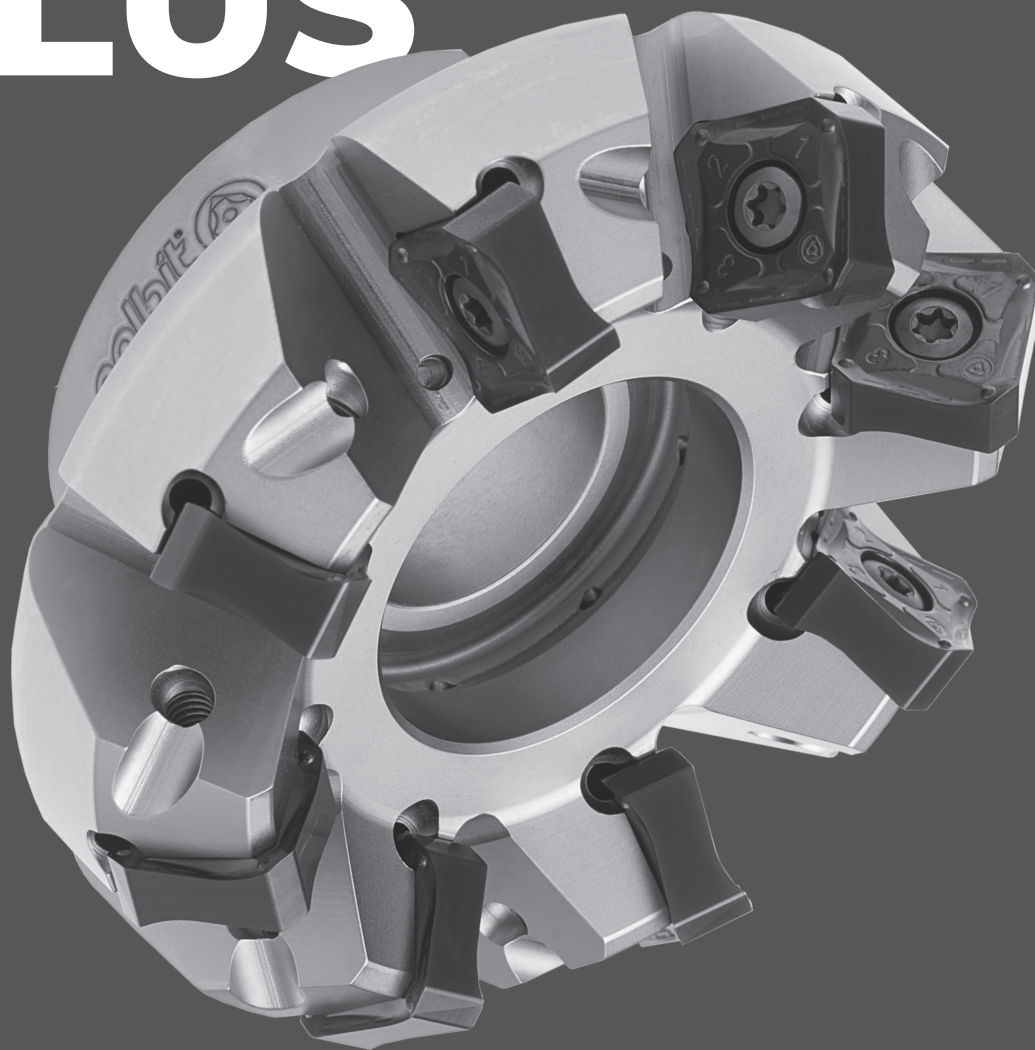
ISO	PSM	Material	HB (Brinell)	Vc (m/min)				Feed fz (mm/t)
				← Wear Resistance			Toughness →	
				PH5705	PH7910	PH7920	PH5740	
P	1	Unalloyed Steel	125-220	-	180-250	180-240	-	0,15-0,30
	2	Low-Alloyed Steel	220-280	-	160-230	160-220	-	0,15-0,30
	3	High-Alloyed Steel	280-380	-	140-220	140-210	-	0,15-0,25
K	7	Malleable Cast Iron	130-230	160-290	180-300	160-260	160-260	0,12-0,35
	8	Grey Cast Iron	180-245	170-320	160-250	140-240	140-240	0,12-0,35
	9	Nodular Cast iron	160-250	140-200	150-200	120-200	120-200	0,12-0,30

## 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
2	Low-Alloyed Steel	220-280	PNH(K)X 11... MK		-
3	High-Alloyed Steel	280-380	PNH(K)X 11... MK		-
K	7	Malleable Cast Iron	130-230	PNH(K)X 11... MK	PNH(K)X 11... HK
	8	Grey Cast Iron	180-245	PNH(K)X 11... MK	PNH(K)X 11... HK
	9	Nodular Cast iron	160-250	PNH(K)X 11... MK	PNH(K)X 11... HK

90845 | 90945 | 91245

# PLUS



The PLUS line provides high-performance face milling suitable for a wide range of materials. It combines stability and process security with low power consumption. Featuring a negative insert, it ensures high productivity and low cost per edge, leading to significant cost-effectiveness.

A linha PLUS oferece facejamento de alta performance adequado para uma ampla gama de materiais. Combina estabilidade e segurança do processo com baixo consumo de energia. Apresentando uma pastilha negativa, garante alta produtividade e baixo custo por aresta, resultando em significativa economia de custos.

La línea PLUS ofrece fresado de alta rendimiento adecuado para una amplia gama de materiales. Combina estabilidad y seguridad del proceso con bajo consumo de energía. Al presentar una plaquita negativa, asegura alta productividad y bajo costo por filo, lo que resulta en una significativa economía de costos.

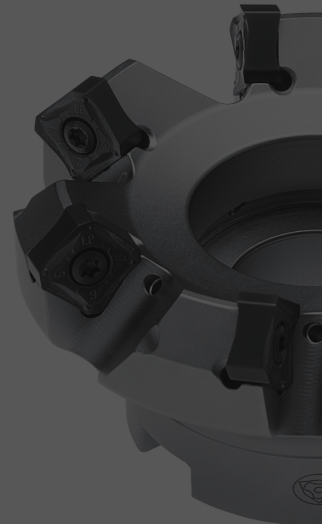
## PLUS 90845 > page 48

- > From DC 32mm to 250mm  
De DC 32mm a 250mm | Desde DC 32mm hasta 250mm
- > 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
- > Two different geometries for same pocket (ON.. 0505.. and SN.. 1206..)  
Duas geometrias diferentes para o mesmo alojamento (ON.. 0505.. e SN.. 1206..) | Dos geometrías diferentes para el mismo alojamiento (ON.. 0505.. y SN.. 1206..)
- > For high productivity and low cost per edge  
Para alta produtividade e baixo custo por aresta | Para alta productividad y bajo costo por filo



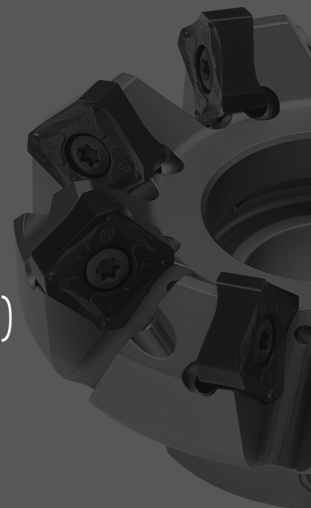
## PLUS 90945 > page 52

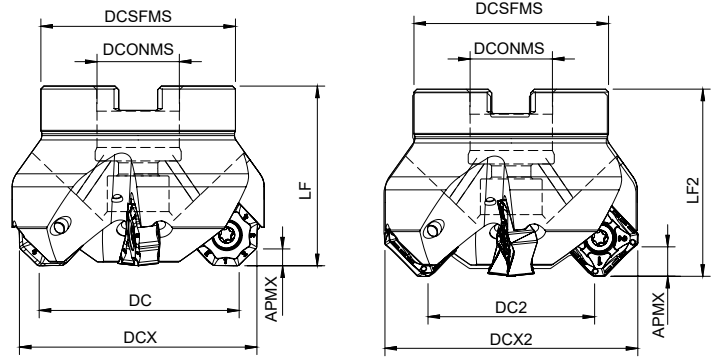
- > From DC 50mm to 250mm  
De DC 50mm a 250mm | Desde DC 50mm hasta 250mm
- > Available in arbor mounting  
Disponível em montagem tipo árvore | Disponible en fijación con tornillo central
- > Optimized line for SN.. 1206 Inserts  
Linha otimizada para pastilhas SN.. 1206 / Línea optimizada para pastillas SN.. 1206
- > Designed for high stability and safety  
Projetada para alta estabilidade e segurança | Diseñada para alta estabilidad y seguridad



## PLUS 91245 > page 56

- > From DC 63mm to 250mm  
De DC 63mm a 250mm | Desde DC 63mm hasta 250mm
- > Available in arbor mounting  
Disponível em montagem tipo árvore | Disponible en fijación con tornillo central
- > Two different geometries for same pocket (ON.. 0606.. and SN.. 1606..)  
Duas geometrias diferentes para o mesmo alojamento (ON.. 0606.. e SN.. 1606..) | Dos geometrías diferentes para el mismo alojamiento (ON.. 0606.. y SN.. 1606..)
- > Excellent surface finishing  
Excelente acabamento de superfície | Excelente acabado superficial





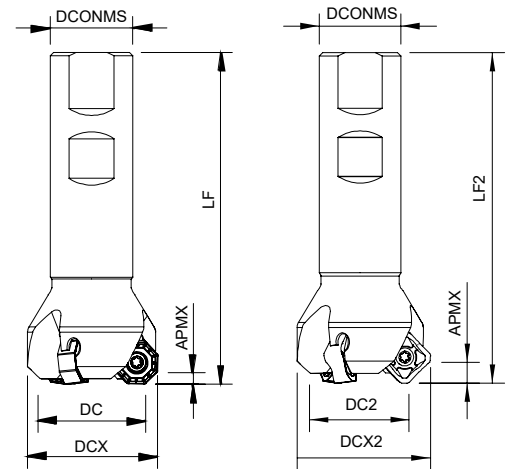
### Arbor Mounting

KAPR=44,5°~46° | GAMP=-6°

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)								WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DC2	DCX2	DCONMS	DCSFMS	LF	LF2		Arbor Type	APMX (mm)		
181111400	050A90845-04-06-022040	4	50	57,6	47,1	62	22	48	40	41,5	0,383	A	3,5   6,0	ON...05   SN...12	☉
181117400	050A90845-06-06-022040	6	50	57,6	47,1	62	22	48	40	41,5	0,374	A	3,5   6,0	ON...05   SN...12	☉
181117500	063A90845-06-06-022040	6	63	70,6	60,1	75	22	52	40	41,5	0,525	A	3,5   6,0	ON...05   SN...12	☉
181117600	063A90845-08-06-022040	8	63	70,6	60,1	75	22	52	40	41,5	0,517	A	3,5   6,0	ON...05   SN...12	☉
181117700	080A90845-07-06-027050	7	80	87,6	77,1	92	27	60	50	51,5	0,846	B	3,5   6,0	ON...05   SN...12	☉
181117800	080A90845-10-06-027050	10	80	87,6	77,1	92	27	60	50	51,5	0,842	B	3,5   6,0	ON...05   SN...12	☉
181117900	100A90845-08-06-032050	8	100	107,6	97,1	112	32	80	50	51,5	1,559	B	3,5   6,0	ON...05   SN...12	☉
181120900	100A90845-12-06-032050	12	100	107,6	97,1	112	32	80	50	51,5	1,54	B	3,5   6,0	ON...05   SN...12	☉
181121000	125A90845-10-06-040063	10	125	132,6	122,1	137	40	90	63	64,5	2,89	B	3,5   6,0	ON...05   SN...12	☉
181121100	160A90845-12-06-U040063	12	160	167,6	157,1	172	40	110	63	64,5	4,36	C	3,5   6,0	ON...05   SN...12	☉
181121200	200A90845-14-06-U060063	14	200	207,6	197,1	212	60	172	63	64,5	8,89	C	3,5   6,0	ON...05   SN...12	☉
181121300	250A90845-16-06-U060063	16	250	257,6	247,1	262	60	172	63	64,5	11,49	C	3,5   6,0	ON...05   SN...12	☉

☉ 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=44,5°~46° | GAMP=-6°

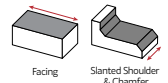
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)								WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DC2	DCX2	DCONMS	LF	LF2	APMX (mm)					
181118000	032W90845-03-06-025100	3	32	39,6	29,1	44	25	100	101,5	0,375	3,5   6,0	ON...05   SN...12	☉		
181118100	040W90845-04-06-032110	4	40	47,6	37,1	52	32	110	111,5	0,653	3,5   6,0	ON...05   SN...12	☉		

☉ 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 90845**

ONHX 05 | ONKX 05 | SNHX 12 | SNKX 12



**A**

**ONH(K)X 05 | SNH(K)X 12** Inserts | Pastilhas | Plaquetas



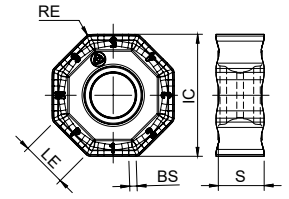
ONH(K)X-LP



ONH(K)X-MP



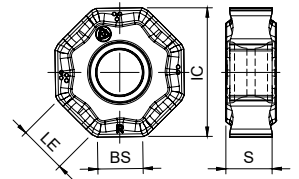
ONH(K)X-MK



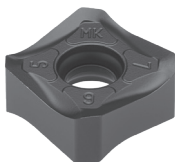
ONH(K)X-LP | MP | MK



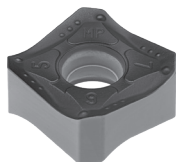
ONHX-W  
8 Cutting Edges (8R)



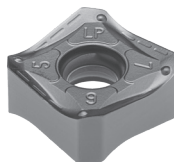
ONHX-W



SNH(K)X-MK



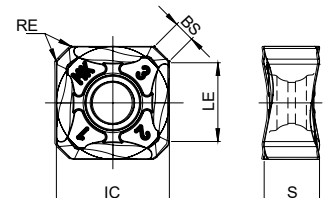
SNH(K)X-MP



SNHX-LP



SNHX-LN



SNH(K)X-MK | MP | LP | LN

Geometry code	ISO Reference	Material																		Dimensions									
		P						M		K						N		S		Dimensions									
		CVD		PVD				PVD		CVD			PVD			UNC		PVD		IC	S	LE	RE	BS					
(1)	(2) Grade code	T9	X5	G4	T1	P3	P4	G6	X9	G6	L5	L6	L9	T9	X5	G4	T1	P3	P4	G6	10	X9	G6	IC	S	LE	RE	BS	
1112302	ONHX 050505 ANEN-LP				⊗		⊗	⊗	⊗									⊗	⊗	⊗			⊗		12,70	5,20	5,30	0,50	-
1112304	ONHX 050505 ANSN-MP				⊗		⊗										⊗	⊗							12,70	5,20	5,30	0,50	-
1112301	ONKX 050505 ANEN-LP	○	⊗	⊗	⊗	⊗	⊗	○	⊗					○	⊗	⊗	⊗	⊗	⊗	⊗	○		⊗	○	12,70	5,20	5,30	0,50	-
1112303	ONKX 050505 ANSN-MP	⊗	⊗	⊗	⊗	⊗	⊗							⊗	⊗	⊗	⊗	⊗	⊗	⊗					12,70	5,20	5,30	0,50	-
1112305	ONKX 050500 ANEN-MK										○	⊗	⊗					⊗							12,70	5,20	5,30	-	-
1112307	ONHX 050500 ANER-W			⊗	⊗						⊗						⊗	⊗							12,70	5,20	5,30	-	4,30
1111452	SNHX 1206 ANEN-LP*				⊗		⊗		⊗								⊗	⊗	⊗	⊗	○		⊗	○	12,70	6,35	9,30	0,80	2,00
1111502	SNHX 1206 ANSN-MP*	⊗	⊗	⊗	⊗	⊗	⊗							⊗	⊗	⊗	⊗	⊗	⊗	⊗	○		○	○	12,70	6,35	9,30	0,80	2,00
1111503	SNHX 1206 ANEN-MK*										⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗					12,70	6,35	9,30	0,80	2,00
1111504	SNHX 1206 ANFN-LN*																					⊗			12,70	6,35	9,30	0,80	2,00
1112293	SNKX 1206 ANSN-MP*	⊗	⊗	⊗	⊗		⊗						○	⊗	⊗	⊗	⊗	⊗	⊗	⊗			⊗		12,70	6,35	9,30	0,80	2,00
1112249	SNKX 1206 ANEN-MK*										⊗	⊗	⊗												12,70	6,35	9,30	0,80	2,00

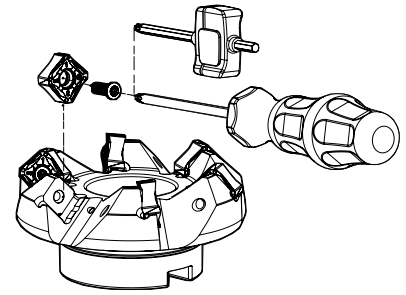
⊗ First choice | 1ª Escolha | 1ª Opción    ⊗ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock    Insert Order Code: (1) Geometry code + (2) Grade code  
 ⊗ Stock items | Itens de stock    ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

\* Right hand insert.

MILLING  
Face milling  
High feed milling  
Shoulder milling  
Profile milling  
Specialty  
Spare Parts  
Technical Data  
End Mills

## SPARE PARTS Accessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A90845 - 50 - 63	P0401200	XT15	DT1530	3,0	-	-
A90845 - 80	P0401200	XT15	DT1530	3,0	J0123510	SD6368-12
A90845 - 100	P0401200	PT15	DT1530	3,0	J0164110	SD6368-16
A90845 - 125	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20
A90845 - 160 - 250	P0401200	PT15	DT1530	3,0	-	-
W90845 - 32 - 40	P0401200	XT15	DT1530	3,0	-	-

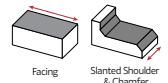


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.  
Check the procedures for the clamping screws on the page A-301.

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

ISO	PSM	Material	HB (Brinell)	Grades									
				← Wear Resistance					Toughness →				
				PH0910	PH5705	PH5320	PHP910	PHP920	PH7920	PHP930	PHH930	PH7930	PH5740
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	PH5320	PHP910	PHP920	PH7920	PHP930
P	1	Unalloyed Steel	125-220	-	-	-	180-250	180-250	180-240	160-220
	2	Low-Alloyed Steel	220-280	-	-	-	160-240	160-230	160-220	140-200
	3	High-Alloyed Steel	280-380	-	-	-	140-230	140-220	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	-	160-290	150-280	180-300	160-270	160-260	150-240
	8	Grey Cast Iron	180-245	-	170-320	160-320	160-250	140-250	140-240	140-230
	9	Nodular Cast iron	160-250	-	140-200	100-190	150-210	120-210	120-200	100-190
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	-	30-100

ISO	PSM	Material	HB (Brinell)	Vc (m/min)					Feed fz (mm/t)	
				← Wear Resistance			Toughness →			
				PHH930	PH7930	PH5740	PHS740	PH7740	SNH(K)X 12...	ONH(K)X 05...
P	1	Unalloyed Steel	125-220	-	160-220	-	140-220	140-200	0,10-0,35	0,10-0,35
	2	Low-Alloyed Steel	220-280	-	140-200	-	120-200	130-180	0,10-0,35	0,10-0,35
	3	High-Alloyed Steel	280-380	-	120-190	-	100-190	100-170	0,10-0,30	0,10-0,30
M	4	SS - Ferritic / Martensitic	200-330	140-210	140-200	-	-	130-180	0,10-0,30	0,10-0,30
	5	SS - Austenitic	200-330	120-170	120-160	-	-	110-160	0,10-0,30	0,10-0,30
	6	SS - Austenitic-ferritic (Duplex)	230-260	100-150	100-140	-	-	90-150	0,10-0,25	0,10-0,25
K	7	Malleable Cast Iron	130-230	-	150-240	160-260	-	140-220	0,10-0,35	0,10-0,35
	8	Grey Cast Iron	180-245	-	140-230	140-240	-	120-210	0,10-0,35	0,10-0,35
	9	Nodular Cast iron	160-250	-	100-190	120-200	-	100-190	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	30-110	30-100	-	-	30-100	0,07-0,20	0,07-0,18

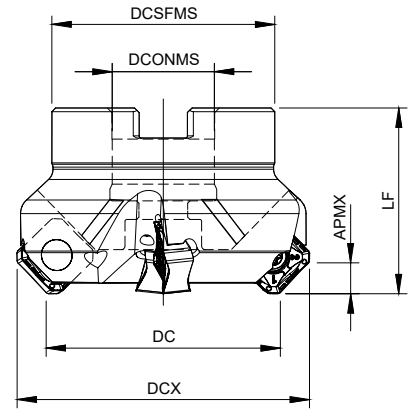
(Note 1) Cutting conditions  $a_e/D_c=70\%$ .

(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	LP	MP
	2	Low-Alloyed Steel	220-280	LP	MP
	3	High-Alloyed Steel	280-380	MP	-
M	4	SS - Ferritic / Martensitic	200-330	LP	MP
	5	SS - Austenitic	200-330	LP	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	LP	-
K	7	Malleable Cast Iron	130-230	MK	-
	8	Grey Cast Iron	180-245	MK	-
	9	Nodular Cast iron	160-250	MK	-
N	10	Aluminium and Non Ferrous	30-130	LN	-
S	11	Heat Resistant Super Alloys	200-320	LP	-



### Arbor Mounting

KAPR=44,5°~46° | GAMP=-6°

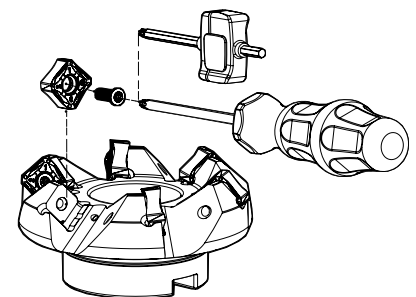
Order code Código	Reference Referência Referencia	CICIT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181048200	050A90945-04-06-022040	4	50	63	22	48	40	0,424	A	6,0	SN... 1206	☺
181067000	050A90945-06-06-022040	6	50	63	22	48	40	0,415	A	6,0	SN... 1206	☺
181048300	063A90945-06-06-022040	6	63	76	22	52	40	0,575	A	6,0	SN... 1206	☺
181067100	063A90945-08-06-022040	8	63	76	22	52	40	0,577	A	6,0	SN... 1206	☺
181048400	080A90945-07-06-027050	7	80	93	27	60	50	0,966	B	6,0	SN... 1206	☺
181067200	080A90945-10-06-027050	10	80	93	27	60	50	0,950	B	6,0	SN... 1206	☺
181048500	100A90945-08-06-032050	8	100	113	32	80	50	1,667	B	6,0	SN... 1206	☺
181067300	100A90945-12-06-032050	12	100	113	32	80	50	1,650	B	6,0	SN... 1206	☺
181048600	125A90945-10-06-040063	10	125	138	40	90	63	2,890	B	6,0	SN... 1206	☺
181048700	160A90945-12-06-U040063	12	160	173	40	110	63	4,360	C	6,0	SN... 1206	☺
181052800	200A90945-14-06-U060063	14	200	213	60	172	63	8,890	C	6,0	SN... 1206	☺
181064700	250A90945-16-06-U060063	16	250	263	60	172	63	11,490	C	6,0	SN... 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)

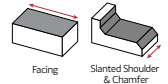
## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A90945 - 50 - 63	P0401200	XT15	DT1530	3,0	-	-
A90945 - 80	P0401200	XT15	DT1530	3,0	J0123510	SD6368-12
A90945 - 100	P0401200	PT15	DT1530	3,0	J0164110	SD6368-16
A90945 - 125	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20
A90945 - 160 - 250	P0401200	PT15	DT1530	3,0	-	-

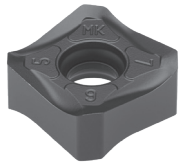


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.

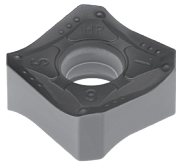
Check the procedures for the clamping screws on the page A-301.



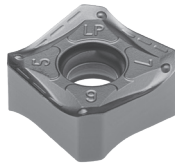
**SNH(K)X 12** Inserts | Pastilhas | Plaquitas



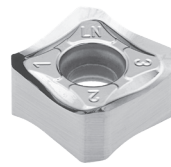
SNH(K)X-MK



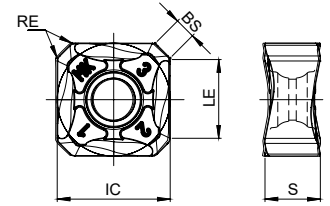
SNH(K)X-MP



SNHX-LP



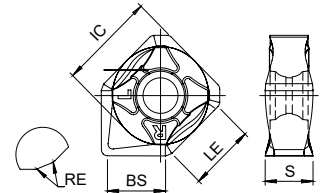
SNHX-LN



SNH(K)X- MK | LP | MP | LN



SNHX-W  
4 Cutting edges (2R + 2L)



SNHX-W

(1) Geometry code	ISO Reference	P						M		K						N		S		Dimensions Dimensões Dimensiones (mm)									
		CVD		PVD				PVD		CVD			PVD			UNC	PVD												
		T9	X5	G4	T1	P3	P4	G6	X9	G6	L5	L6	L9	T9	X5	G4	T1	P3	P4						G6	10	X9	G6	
1112293	SNKX 1206 ANSN-MP*	⊗		⊗	⊗			⊗					○	⊗		⊗	⊗			⊗			⊗		12,70	6,35	9,30	0,80	2,00
1112249	SNKX 1206 ANEN-MK*												⊗	⊗	⊗										12,70	6,35	9,30	0,80	2,00
1111452	SNHX 1206 ANEN-LP*				⊗		⊗		⊗								⊗	⊗	○		⊗	○		12,70	6,35	9,30	0,80	2,00	
1111502	SNHX 1206 ANSN-MP*	⊗	⊗	⊗	⊗		⊗							⊗	⊗		⊗	⊗	○		○	○		12,70	6,35	9,30	0,80	2,00	
1111503	SNHX 1206 ANEN-MK*												⊗	⊗	⊗	⊗	⊗							12,70	6,35	9,30	0,80	2,00	
1111504	SNHX 1206 ANFN-LN*																					⊗		12,70	6,35	9,30	0,80	2,00	
1111899	SNHX 1206 ANFN-W**		⊗		⊗											⊗		⊗						12,70	6,30	9,30	0,40	7,60	

⊗ First choice | 1ª Escolha | 1ª Opción    ⊗ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock  
 ⊗ Stock Items | 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)

\* Right hand insert.  
 \*\* Wiper insert with 2 rights and 2 left-hand cutting edges.

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)									
				← Wear Resistance								Toughness →	
				PH0910	PH5705	PH5320	PHP910	PHP920	PH7920	PHP930	PHH930	PH7930	PH5740
P	1	Unalloyed Steel	125-220	-	-	-	180-250	180-250	180-240	160-220	-	160-220	-
	2	Low-Alloyed Steel	220-280	-	-	-	160-240	160-230	160-220	140-200	-	140-200	-
	3	High-Alloyed Steel	280-380	-	-	-	140-230	140-220	140-210	120-190	-	120-190	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	-	140-220	140-200	140-210	140-200	-
	5	SS - Austenitic	200-330	-	-	-	-	-	130-180	120-160	120-170	120-160	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	120-160	100-140	100-150	100-140	-
K	7	Malleable Cast Iron	130-230	-	160-290	150-280	180-300	160-270	160-260	150-240	-	150-240	160-260
	8	Grey Cast Iron	180-245	-	170-320	160-320	160-250	140-250	140-240	140-230	-	140-230	140-240
	9	Nodular Cast iron	160-250	-	140-200	100-190	150-210	120-210	120-200	100-190	-	100-190	120-200
N	10	Aluminium and Non Ferrous	30-130	100-2000	-	-	-	-	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	-	30-100	30-110	30-100	-

ISO	PSM	Material	HB (Brinell)	Vc (m/min)		Feed fz (mm/t)					
				Toughness →							
				PH5740	PH7740	SNHX 12... LP	SNH(K)X 12... MP	SNH(K)X 12... MK	SNHX 12... LN	SNHX 12... W	
P	1	Unalloyed Steel	125-220	140-220	140-200	0,10-0,35	0,10-0,35	-	-	-	0,10-0,35
	2	Low-Alloyed Steel	220-280	120-200	130-180	0,10-0,35	0,10-0,35	-	-	-	0,10-0,35
	3	High-Alloyed Steel	280-380	100-190	100-170	0,10-0,30	0,10-0,30	-	-	-	0,10-0,30
M	4	SS - Ferritic / Martensitic	200-330	-	130-180	0,10-0,30	-	-	-	-	-
	5	SS - Austenitic	200-330	-	110-160	0,10-0,30	-	-	-	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	90-150	0,10-0,25	-	-	-	-	-
K	7	Malleable Cast Iron	130-230	-	140-220	0,10-0,35	-	0,10-0,35	-	-	0,10-0,40
	8	Grey Cast Iron	180-245	-	120-210	0,10-0,35	-	0,10-0,35	-	-	0,10-0,40
	9	Nodular Cast iron	160-250	-	100-190	0,10-0,30	-	0,10-0,30	-	-	0,10-0,40
N	10	Aluminium and Non Ferrous	30-130	-	-	-	-	-	0,10-0,35	-	-
S	11	Heat Resistant Super Alloys	200-320	-	30-100	0,07-0,20	-	-	-	-	-

(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.

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

ISO	PSM	Material	HB (Brinell)	Grades										
				← Wear Resistance								Toughness →		
				PH0910	PH5705	PH5320	PHP910	PHP920	PH7920	PHP930	PHH930	PH7930	PH5740	PH5740
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

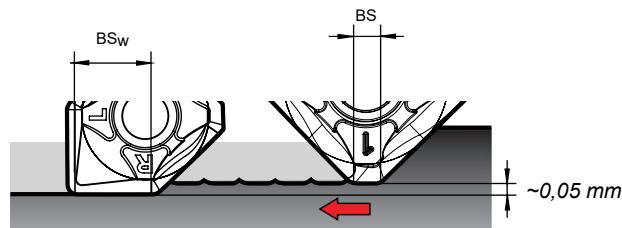
# CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

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

## WIPER INSERTS

### Recommended Cutting Conditions:

- $f_n$  should be equal to  $0,8 \times BS_W$
- Axial depth of cut is 0,5 to 0,8mm.



### Example:

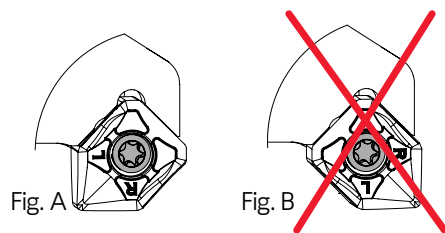
- The width of the parallel land (BS) of the insert is 2mm.
- To obtain a good surface finishing, the feed per revolution should be a maximum of 80% of 2mm = 1,6mm.
- The wiper insert will have a parallel land (BS<sub>W</sub>) with a width of 7,6mm.
- Result: Feed per revolution ( $f_n$ ) could be increased from 1,6mm to 6,1mm (80% of 7,6mm).

### Note:

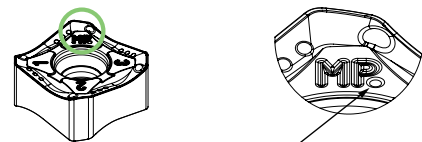
- Other limitations, such as machine power, must be taken into consideration.
- $f_n \leq 0,8 \times BS_W = f_z \leq 0,8 \times BS_W / Z$

### How to use a wiper insert:

- Since wiper is one corner use to standard cutters, please attach the insert with the parallel land down to the workpiece cutting surface.

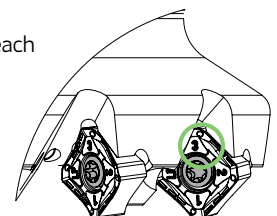


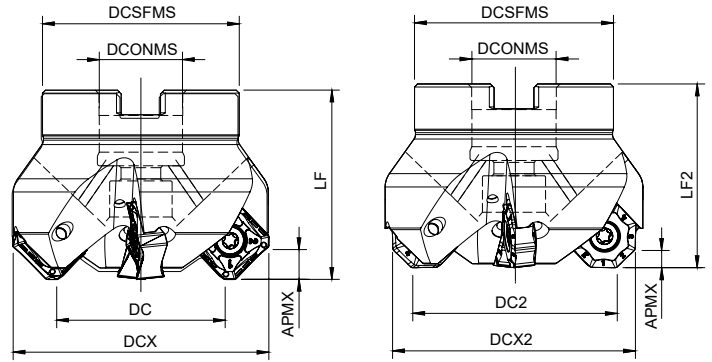
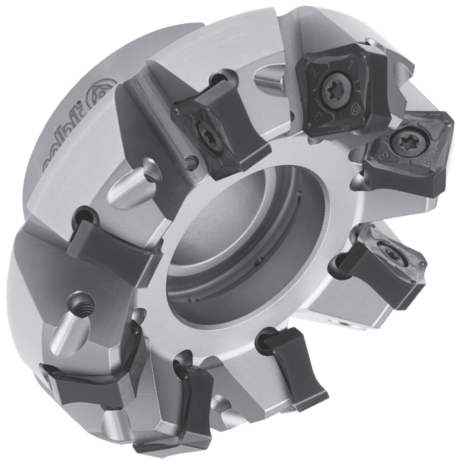
When using wiper insert, install the insert as shown on Fig. A if the insert is installed as shown on Fig. B breakage of the insert is inevitable and normal surface finish can not be obtained.



This point shows the SNKX insert difference to SNHX

Put the same side of insert in each pocket for best radial and axial runout when using SNKX.





### Arbor Mounting

KAPR=44,5°~46° | GAMP=-6°

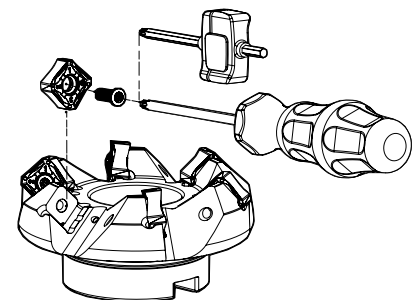
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)								WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DC2	DCX2	DCONMS	DCSFMS	LF	LF2		Arbor Type	APMX (mm)		
181088900	063A91245-05-06-022050	5	63	80,1	66,6	76,0	22	52	50	48	0,81	A	3,8   8,5	ON...06   SN...16	☉
181089000	080A91245-06-06-027050	6	80	97,1	83,6	93,0	27	60	50	48	1,06	B	3,8   8,5	ON...06   SN...16	☉
181089100	080A91245-08-06-027050	8	80	97,1	83,6	93,0	27	60	50	48	1,09	B	3,8   8,5	ON...06   SN...16	☉
181089200	100A91245-07-06-032063	7	100	117,1	103,6	113,0	32	80	63	61	2,24	B	3,8   8,5	ON...06   SN...16	☉
181089300	100A91245-10-06-032063	10	100	117,1	103,6	113,0	32	80	63	61	2,28	B	3,8   8,5	ON...06   SN...16	☉
181089400	125A91245-08-06-040063	8	125	142,1	128,6	138,0	40	90	63	61	3,04	B	3,8   8,5	ON...06   SN...16	☉
181089500	160A91245-10-06-U040063	10	160	177,1	163,6	173,0	40	110	63	61	4,40	C	3,8   8,5	ON...06   SN...16	☉
181089600	200A91245-12-06-U060063	12	200	217,1	203,6	213,0	60	172	63	61	9,12	C	3,8   8,5	ON...06   SN...16	☉
181089700	250A91245-14-06-U060063	14	250	267,1	253,6	263,0	60	172	63	61	11,93	C	3,8   8,5	ON...06   SN...16	☉

☉ 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
A91245 - 63	P0451400	XT20	DT2050	5,0	-	-
A91245 - 80	P0451400	XT20	DT2050	5,0	J0123510	SD6368-12
A91245 -100	P0451400	PT20	DT2050	5,0	J0164110	SD6368-16
A91245 -125	P0451400	PT20	DT2050	5,0	J0204610	SD6368-20
A91245 - 160-250	P0451400	PT20	DT2050	5,0	-	-

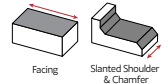


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.

Check the procedures for the clamping screws on the page A-301.

**PLUS 91245**

ONHX 06 | ONKX 06 | SNHX 16 | SNKX 16



**A**

**ONH(K)X 06 | SNH(K)X 16** Inserts | Pastilhas | Plaquetas



ONH(K)X-LP



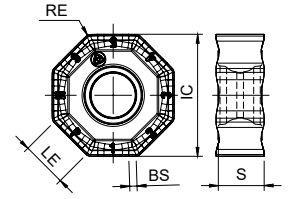
ONH(K)X-MP



ONH(K)X-MK



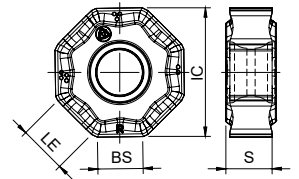
ONHX-LS



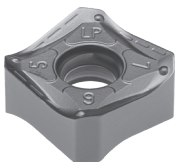
ONH(K)X-LP | MP | MK | LS



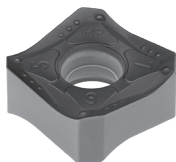
ONHX-W  
8 Cutting Edges (8R)



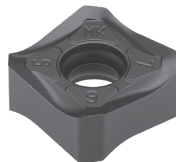
ONHX-W



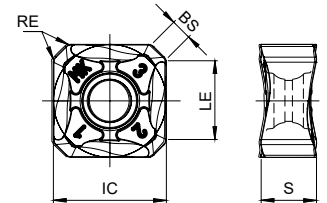
SNHX-LP



SNH(K)X-MP



SNH(K)X-MK



SNH(K)X-MK | LP | MP

(1) Geometry code	(2) Grade code ISO Reference	P						M			K						S			Dimensions Dimensões Dimensiones (mm)									
		CVD		PVD				PVD			CVD			PVD			PVD			IC	S	LE	RE	BS					
		T9	G4	T1	P3	P4	G6	P3	X9	G6	L5	L6	L9	T9	G4	T1	P3	P4	G6						P3	X9	G6		
1111954	ONHX 0606 ANEN-LP			⊗	⊗	⊗	⊗	⊗								⊗	⊗	⊗	⊗	⊗				16,50	6,20	6,20	0,80	1,00	
1112696	ONHX 0606 ANEN-LS	○					○	⊗	○				○						○	⊗	○				16,50	6,25	6,20	0,80	1,00
1111955	ONHX 0606 ANEN-MP			⊗			⊗		⊗			○			⊗			⊗			⊗				16,50	6,20	6,20	0,80	1,00
1111956	ONHX 0606 ANEN-MK											⊗	⊗												16,50	6,00	6,20	0,80	1,00
1112053	ONHX 0606 ANEN-W*		⊗	⊗								⊗			⊗	⊗									16,50	5,96	6,20	-	6,00
1112284	ONKX 0606 ANEN-LP	○	⊗	⊗	⊗	⊗	⊗	⊗	⊗		⊗		○	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗				16,50	6,20	6,20	0,80	1,00
1112287	ONKX 0606 ANEN-MP	⊗	⊗	⊗			⊗		⊗				⊗	⊗	⊗			⊗			⊗				16,50	6,20	6,20	0,80	1,00
1112291	ONKX 0606 ANEN-MK											⊗	⊗												16,50	6,00	6,20	0,80	1,00
1111951	SNHX 1606 ANER-LP			⊗		⊗	⊗		⊗				○		⊗	○	⊗	⊗	○		⊗				16,50	6,35	12,50	0,80	2,20
1111952	SNHX 1606 ANER-MP	⊗		⊗			⊗		⊗			○		⊗	⊗			⊗			⊗				16,50	6,35	12,50	0,80	2,20
1111953	SNHX 1606 ANER-MK												⊗												16,50	6,35	12,50	0,80	2,20
1112281	SNKX 1606 ANER-MP	⊗	⊗	⊗			⊗		⊗				⊗	⊗	⊗			⊗		⊗					16,50	6,35	12,50	0,80	2,20
1112282	SNKX 1606 ANER-MK												⊗	⊗											16,50	6,35	12,50	0,80	2,20

⊗ 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

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

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

ISO	PSM	Material	HB (Brinell)	Vc (m/min)					
				← Wear Resistance				Toughness →	
				PH5705	PH5320	PHP920	PH7920	PHP930	PHH930
P	1	Unalloyed Steel	125-220	-	-	180-250	180-240	160-230	-
	2	Low-Alloyed Steel	220-280	-	-	160-230	160-220	140-210	-
	3	High-Alloyed Steel	280-380	-	-	140-220	140-210	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	160-290	150-280	160-270	160-260	150-250	-
	8	Grey Cast Iron	180-245	170-320	160-320	140-250	140-240	140-230	-
	9	Nodular Cast iron	160-250	140-200	100-190	120-210	120-200	100-200	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	30-110

ISO	PSM	Material	HB (Brinell)	Vc (m/min)				Feed fz (mm/t)
				← Wear Resistance			Toughness →	
				PH7930	PH5740	PHS740	PH7740	SNH(K)X/ONH(K)X
P	1	Unalloyed Steel	125-220	160-220	-	140-220	140-200	0,15 <b>(0,25)</b> 0,4
	2	Low-Alloyed Steel	220-280	140-200	-	120-200	130-180	0,15 <b>(0,25)</b> 0,4
	3	High-Alloyed Steel	280-380	120-190	-	100-190	100-170	0,15 <b>(0,25)</b> 0,4
M	4	SS - Ferritic / Martensitic	200-330	140-200	-	-	130-180	0,1 <b>(0,20)</b> 0,3
	5	SS - Austenitic	200-330	120-160	-	-	110-160	0,1 <b>(0,20)</b> 0,3
	6	SS - Austenitic-ferritic (Duplex)	230-260	100-140	-	-	90-150	0,1 <b>(0,20)</b> 0,3
K	7	Malleable Cast Iron	130-230	150-240	160-260	-	140-220	0,15 <b>(0,25)</b> 0,4
	8	Grey Cast Iron	180-245	140-230	140-240	-	120-210	0,14 <b>(0,25)</b> 0,4
	9	Nodular Cast iron	160-250	100-190	120-200	-	100-190	0,14 <b>(0,25)</b> 0,4
S	11	Heat Resistant Super Alloys	200-320	30-100	-	-	30-100	0,1 <b>(0,15)</b> 0,17

(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.

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

ISO	PSM	Material	HB (Brinell)	Grades									
				← Wear Resistance				Toughness →					
				PH5705	PH5320	PHP920	PH7920	PHP930	PHH930	PH7930	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	●	●	●	●	●	●	●	●	●	●
S	11	Heat Resistant Super Alloys	200-320						●	●	●	●	



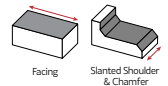
Good Conditions



Average Conditions



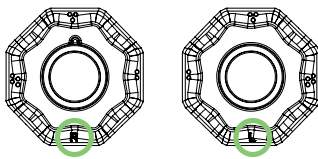
Difficult Conditions



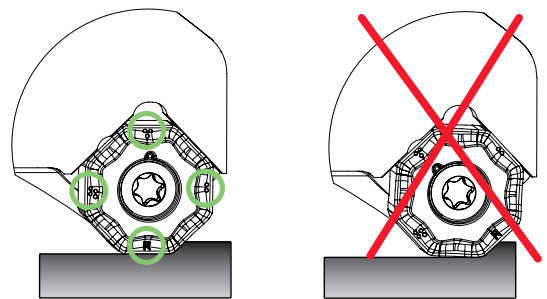
# CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

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

## WIPER INSERTS



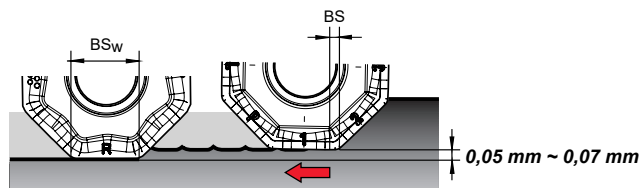
Wiper insert with 4 Right and 4 Left-hand cutting edges. The side work of the insert it's indicated by the letter R (Right) & L (Left).



The points and letter (R or L) on the insert indicates the side that should be parallel to the workpiece material.

### Recommended Cutting Conditions:

- $f_n$  should be equal to  $0,8 \times BS_w$
- Axial depth of cut is 0,5 to 0,8mm.



Example:

- The width of the parallel land (BS) of the insert is 1mm.
- To obtain a good surface finishing, the feed per revolution should be a maximum of 80% of 1mm = 0,8mm.
- The wiper insert will have a parallel land ( $BS_w$ ) with a width of 6,0mm.
- Result: Feed per revolution ( $f_n$ ) could be increased from 0,8mm to 4,8mm (80% of 6,0mm).

Note:

- Other limitations, such as machine power, must be taken into consideration.
- $f_n \leq 0,8 \times BS_w = f_z \leq 0,8 \times BS_w / Z$

How to use a wiper insert:

- Since wiper is one corner use to standard cutters, please attach the insert with the parallel land down to the workpiece cutting surface.
- The points and the letter (R or L) on the insert indicates the side that should be parallel to the workpiece material.
- The side work of the insert it's indicated by the letter (R - Right & L - Left).

**NEW** 57045

# LINEPRO



The new LINEPRO 57045 is engineered for face milling operations on stainless steel and exotic materials. It features a high number of teeth, resulting in enhanced productivity. Available in both normal and fine pitches, its design ensures an extremely positive insert position upon mounting, facilitating smooth cutting and achieving a superior surface finish. Moreover, it offers versatility by accommodating the mounting of two different types of inserts on the same toolholder.

A nova linha LINEPRO 57045 é projetada para operações de facejamento em aço inoxidável e materiais exóticos. Ela possui um grande número de dentes, resultando em produtividade aprimorada. Disponível em passos normais e finos, o seu design garante uma posição da pastilha extremamente positiva ao ser montada, permitindo um corte suave e alcançando um acabamento superficial superior. Além disso, oferece versatilidade ao permitir a montagem de dois tipos diferentes de pastilhas no mesmo suporte.

La nueva línea LINEPRO 57045 está diseñada para operaciones de fresado en acero inoxidable y materiales exóticos. Cuenta con un gran número de dientes, lo que resulta en una productividad mejorada. Disponible en pasos normales y finos, su diseño garantiza una posición de la pastilla extremadamente positiva al ser montada, lo que permite un corte suave y un acabado superficial superior. Además, ofrece versatilidad al permitir el montaje de dos tipos diferentes de pastillas en el mismo porta-herramientas.

## **NEW LINEPRO 57045** > page 62

> **From DC 20mm to 125mm**

De DC 20mm a 125mm | Desde DC 20mm 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

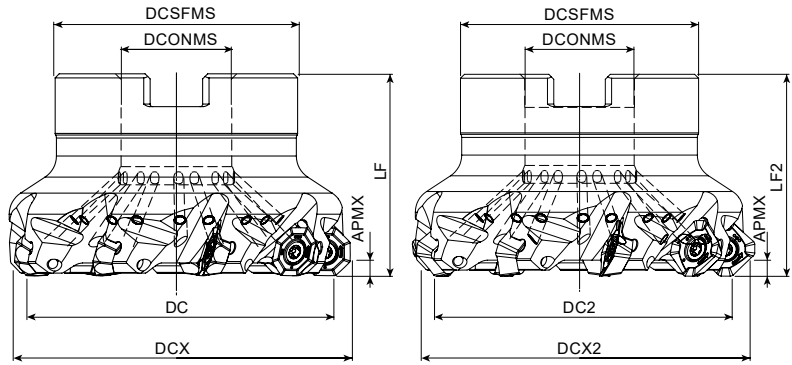
> **Two different geometries for same pocket (OFHX 0403.. and SFHX 1004..)**

Duas geometrias diferentes para o mesmo alojamento (OFHX 0403.. e SFHX 1004..) / Dos geometrias diferentes para el mismo alojamiento (OFHX 0403.. y SFHX 1004..)

> **Extremely positive rake angle**

Ângulo de ataque extremamente positivo | Ángulo de ataque extremadamente positivo





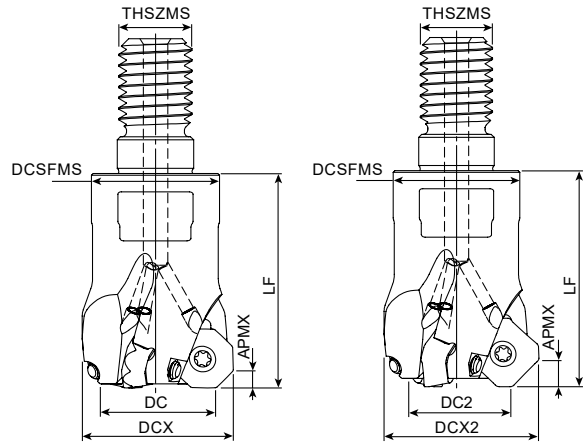
**Arbor Mounting**

KAPR=45° | GAMP=+18°

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)								WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DC2	DCX2	DCONMS	DCSFMS	LF	LF2		Arbor Type	APMX (mm)		
181164100	040A57045-04-18-016040	4	40	45,8	38,4	47,7	16	38	40	40,7	0,150	A	3,5   2,5	SF.10   OF.04	○
181164200	040A57045-06-18-016040	6	40	45,8	38,4	47,7	16	38	40	40,7	0,180	A	3,5   2,5	SF.10   OF.04	⊗
181164300	050A57045-05-18-022040	5	50	55,8	48,4	57,7	22	48	40	40,7	0,330	A	3,5   2,5	SF.10   OF.04	○
181164400	050A57045-07-18-022040	7	50	55,8	48,4	57,7	22	48	40	40,7	0,315	A	3,5   2,5	SF.10   OF.04	⊗
181164500	063A57045-06-18-022040	6	63	68,8	61,4	70,7	22	48	40	40,7	0,505	A	3,5   2,5	SF.10   OF.04	⊗
181164600	063A57045-09-18-022040	9	63	68,8	61,4	70,7	22	48	40	40,7	0,495	A	3,5   2,5	SF.10   OF.04	○
181164700	080A57045-07-18-027050	7	80	85,8	78,4	87,7	27	58	50	50,7	1,150	B	3,5   2,5	SF.10   OF.04	○
181164800	080A57045-11-18-027050	11	80	85,8	78,4	87,7	27	58	50	50,7	1,000	B	3,5   2,5	SF.10   OF.04	○
181164900	100A57045-09-18-032050	9	100	105,8	98,4	107,7	32	78	50	50,7	1,650	B	3,5   2,5	SF.10   OF.04	○
181165000	100A57045-13-18-032050	13	100	105,8	98,4	107,7	32	78	50	50,7	1,550	B	3,5   2,5	SF.10   OF.04	○
181165100	125A57045-12-18-040063	12	125	130,8	123,4	132,7	40	88	63	63,7	2,700	B	3,5   2,5	SF.10   OF.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)



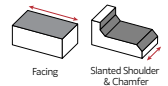
**Threaded Coupling**

KAPR=45° | GAMP=+18°

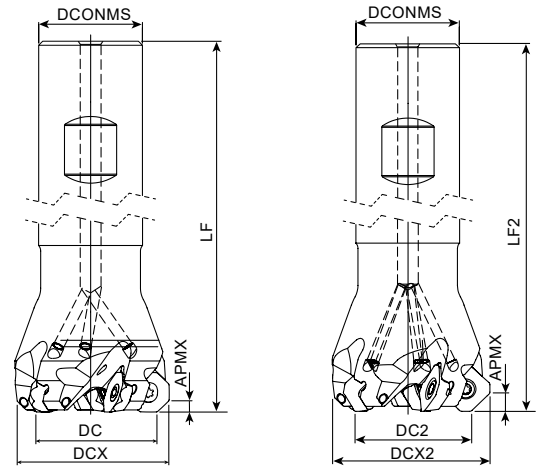
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)								WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DC2	DCX2	THSZMS	DCSFMS	LF	LF2		APMX (mm)			
181163800	020R57045-03-18-M12035	3	20	25,6	18,6	27,4	M12	21	35	35,7	0,100	3,5   2,5	SF.10   OF.04	○	
181163900	025R57045-04-18-M12035	4	25	30,7	23,3	32,6	M12	21	35	35,7	0,190	3,5   2,5	SF.10   OF.04	○	
181164000	032R57045-05-18-M16035	5	32	37,8	30,4	39,7	M16	29	35	35,7	0,310	3,5   2,5	SF.10   OF.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=45° | GAMP=+18°



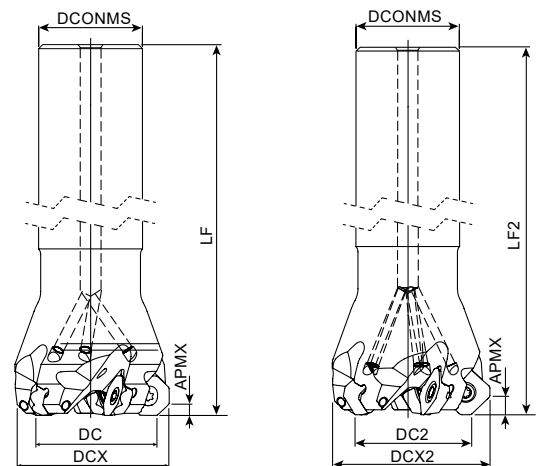
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)							WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DC2	DCX2	DCONMS	LF	Lf2		APMX (mm)			
181165900	020W57045-03-18-020080	3	20	25,6	18,6	27,7	20	80	80,7	0,180	3,5   2,5	SF..10   OF..04	⊗	
181166000	025W57045-04-18-020085	4	25	30,7	23,6	32,7	20	85	85,7	0,240	3,5   2,5	SF..10   OF..04	⊗	
181166100	032W57045-05-18-025100	5	32	37,8	30,6	39,7	25	100	100,7	0,375	3,5   2,5	SF..10   OF..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)



**Cylindrical Shank**  
KAPR=45° | GAMP=+18°



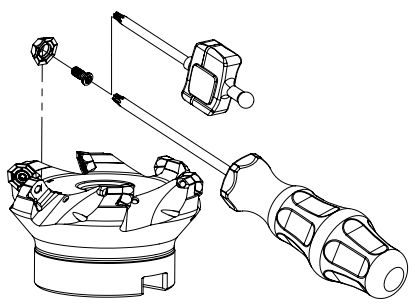
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)							WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DC2	DCX2	DCONMS	LF	Lf2		APMX (mm)			
181165200	020E57045-03-18-020080	3	20	25,6	18,6	27,7	20	80	80,7	0,180	3,5   2,5	SF..10   OF..04	⊗	
181165300	025E57045-04-18-020085	4	25	30,7	23,6	32,7	20	85	85,7	0,240	3,5   2,5	SF..10   OF..04	⊗	
181146500	032E57045-05-18-025100	5	32	37,8	30,6	39,7	25	100	100,7	0,375	3,5   2,5	SF..10   OF..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)

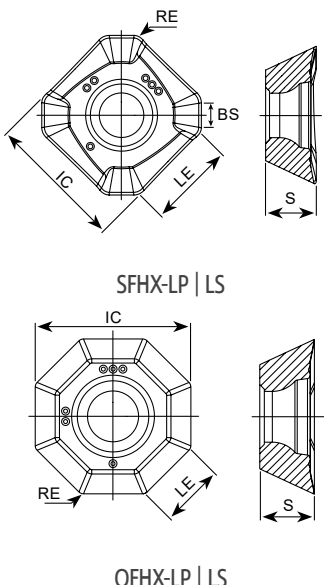
## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Screw	DIN 6368 Wrench
			Key (Torx - Nm)	Torque Value		
A57045 - 40-80	P0300800	XT09	DT0914	1,4	-	-
A57045 - 100	P0300800	XT09	DT0914	1,4	J0164110	SD6368-16
A57045 - 125	P0300800	XT09	DT0914	1,4	J0204610	SD6368-20
R57045 - 20-32	P0300800	XT09	DT0914	1,4	-	-
W57045 - 20-32	P0300800	XT09	DT0914	1,4	-	-
E57045 - 20-32	P0300800	XT09	DT0914	1,4	-	-



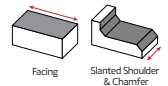
Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301. Check the procedures for the clamping screws on the page A-301.

## SFHX 100410 | OFHX 040305 Inserts | Pastilhas | Plaquitas



Geometry code	ISO Reference	P		M		K			S		Dimensions Dimensões Dimensiones (mm)					
		CVD		PVD		CVD		PVD		PVD		IC	S	LE	RE	BS
		T9	T1	P4	X9	Z3	T9	T1	P4	X9	Z3					
1112738	SFHX 100410 AFER-LS				⊗	⊗				⊗	⊗	10,10	3,72	6,50	1,00	2,50
1113485	SFHX 100410 AFSR-LP		⊗					⊗				10,10	3,72	6,50	1,00	2,50
1112737	OFHX 040305 AFEN-LS				⊗	⊗				⊗	⊗	10,00	3,45	4,10	0,50	-
1112739	OFHX 040305 AFSN-LP	○	⊗	○			○	⊗	○			10,00	3,45	4,10	0,50	-

⊗ 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 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 →	
				PHP920	PHP930	PHH530	PHH930	PHS740
P	1	Unalloyed steel	125-220	●	●	●	●	●
	2	Low-alloyed steel	220-280	●	●			●
	3	High-alloy 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 →		OFHX 04..	SFHX 10..
				PHP920	PHP930	PHH530	PHH930	PHS740		
P	1	Unalloyed steel	125-220	180-250	160-220	-	-	140-170	0,10-0,30	0,10-0,30
	2	Low-alloyed steel	220-280	170-210	150-180	-	-	130-160	0,10-0,30	0,10-0,30
	3	High-alloy steel	280-380	160-200	130-160	-	-	110-140	0,10-0,25	0,10-0,25
M	4	SS - Ferritic / Martensitic	200-330	-	-	120-180	100-160	-	0,10-0,25	0,10-0,25
	5	SS - Austenitic	200-330	-	-	100-160	90-150	-	0,10-0,25	0,10-0,25
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	70-140	60-130	-	0,10-0,20	0,10-0,20
K	7	Malleable cast iron	130-230	170-300	160-280	-	-	-	0,10-0,30	0,10-0,30
	8	Grey cast iron	180-245	150-250	140-240	-	-	-	0,10-0,30	0,10-0,30
	9	Nodular cast iron	160-250	90-210	90-200	-	-	-	0,10-0,25	0,10-0,25
S	11	Heat Resistant Super Alloys	200-320	-	-	30-75	25-70	-	0,07-0,15	0,07-0,15

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

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

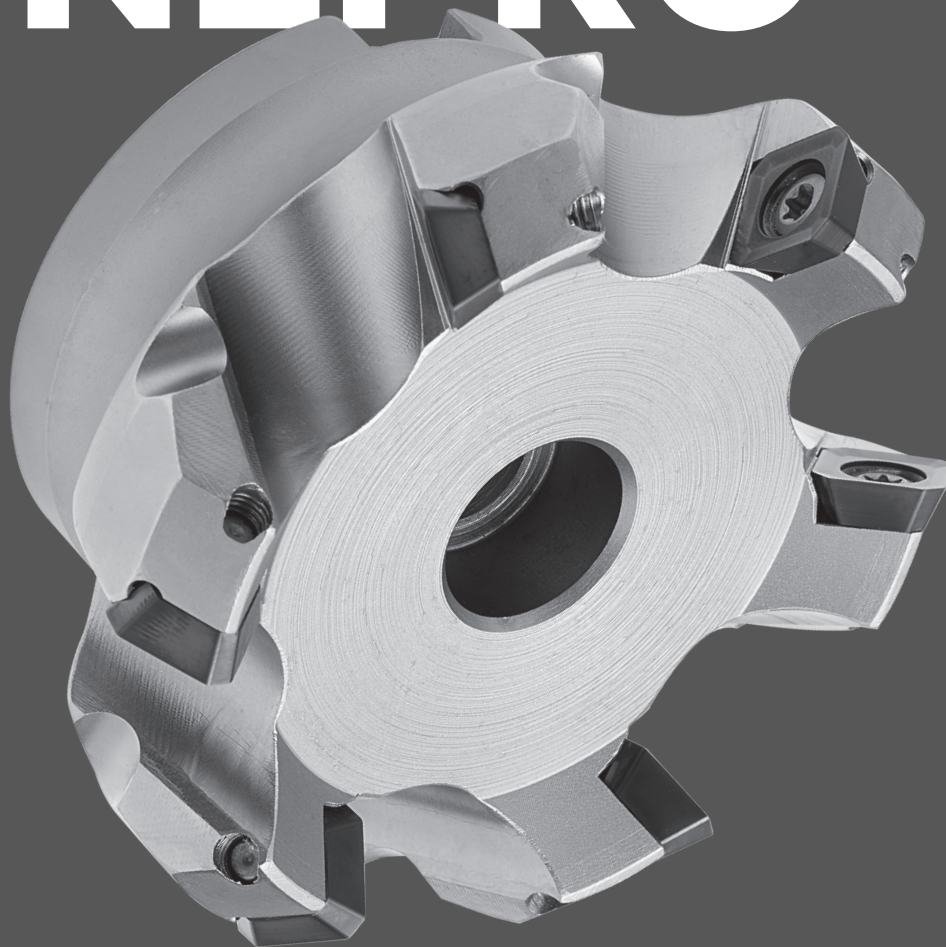
(Note 3) If chattering occurs, reduce ap and Vc by 30% and keep the same fz per tooth.

## 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	Difficult Operations
				P	1
2	Low-Alloyed Steel	220-280	LP		-
3	High-Alloyed Steel	280-380	LP		-
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	LP	-
	8	Grey Cast Iron	180-245	LP	-
	9	Nodular Cast iron	160-250	LP	-
S	11	Heat Resistant Super Alloys	200-320	LS	-

06045 | 09945

# LINEPRO



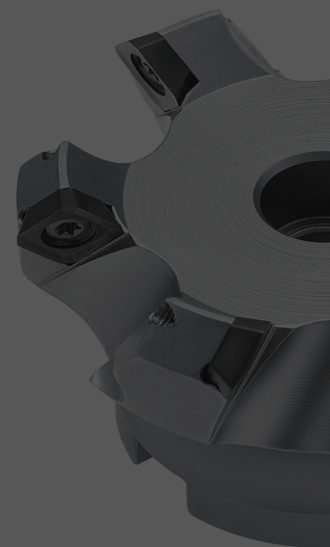
LINEPRO is a standard 45° face milling system designed for universal application. Its positive geometry ensures a sharp cutting edge that minimizes cutting forces while enhancing surface quality.

LINEPRO é um sistema padrão de facejamento a 45° projetada para aplicação universal. A sua geometria positiva garante uma aresta de corte afiada que minimiza as forças de corte, enquanto melhora a qualidade da superfície.

LINEPRO es un sistema estándar de fresado frontal a 45° diseñado para aplicación universal. Su geometría positiva garantiza un filo de corte afilado que minimiza las fuerzas de corte, mientras mejora la calidad de la superficie.

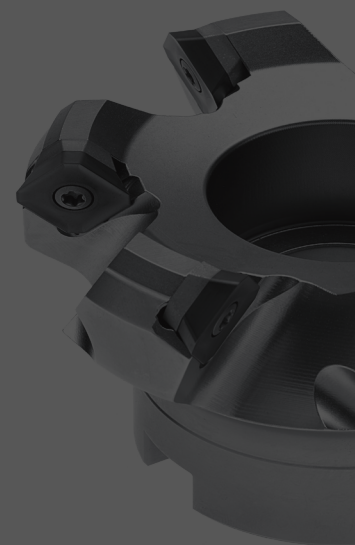
## LINEPRO 06045 > page 68

- > **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
- > **Low cutting forces**  
Baixas forças de corte | Bajas fuerzas de corte
- > **General application**  
Aplicação geral | Aplicación general



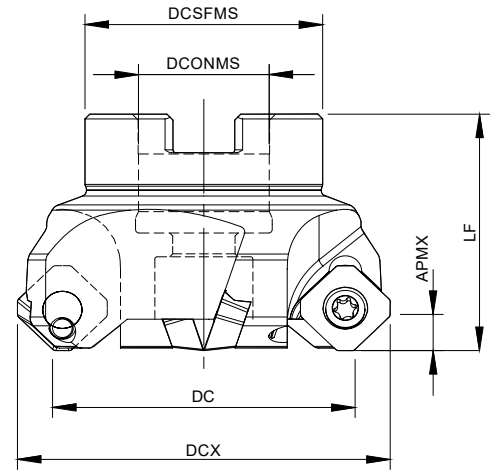
## LINEPRO 09945 > page 70

- > **From DC 50mm to 250mm**  
De DC 50mm a 250mm | Desde DC 50mm hasta 250mm
- > **Available in arbor mounting**  
Disponível em montagem tipo árvore | Disponible en fijación con tornillo central
- > **Excellent chip flow**  
Excelente fluxo de aparas | Excelente flujo de virutas
- > **High rigidity due to carbide shim**  
Alta rigidez devido ao calço de metal duro / Alta rigidez gracias al calce de carburo





Arbor Mounting  
KAPR=45° | GAMP=+19°

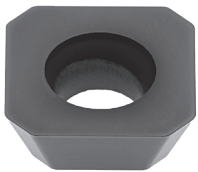


Order code Código	Reference Referência Referencia	CICIT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181163200	050A06045-04-19-022040	4	50	62	22	42	40	0,350	A	6,0	SE...T/W 1204	○
181148800	063A06045-05-19-022050	5	63	75	22	42	50	0,800	A	6,0	SE...T/W 1204	○
181148900	080A06045-06-19-027050	6	80	92	27	50	50	1,150	A	6,0	SE...T/W 1204	○
181149000	100A06045-06-19-032050	6	100	112	32	64	50	1,700	A	6,0	SE...T/W 1204	○
181163300	125A06045-07-19-040063	7	125	132	40	85	63	2,750	B	6,0	SE...T/W 1204	○
181040300	160A06045-08-19-U040063	8	160	172	40	100	63	4,600	C	6,0	SE...T/W 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)

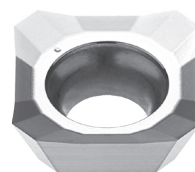
SEH... 1204 Inserts | Pastilhas | Plaquitás



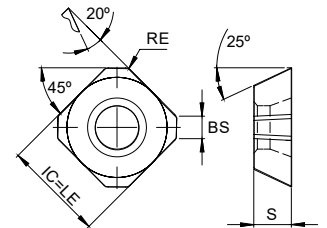
SEHW



SEHT



SEHT-LN



SEHW | SEHT | SEHT-LN

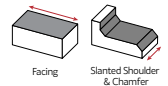
(1) Geometry code	ISO Reference	P		M	K		N	Dimensions Dimensões Dimensiones (mm)			
		PVD	PVD	PVD	PVD	UNC	IC	S	LE	BS	
(2) Grade code		68	I5	I5	68	I5	10				
		PH6920	PH6740	PH6740	PH6920	PH6740	PH0910				
1110216	SEHT 1204 AFEN	⊗	⊗	⊗	⊗	⊗		12,70	4,76	12,70	2,80
1110218	SEHT 1204 AFTN	⊗	⊗	⊗	⊗	⊗		12,70	4,76	12,70	2,80
1112283	SEHT 1204 AFFN-LN						⊗	12,70	4,76	12,70	2,00
1110219	SEHW 1204 AFEN	⊗	⊗	⊗	⊗	⊗		12,70	4,76	12,70	2,80
1110222	SEHW 1204 AFTN	⊗	⊗	⊗	⊗	⊗		12,70	4,76	12,70	2,80

⊗ First choice | Primeira opção | 1ª opción

⊗ Stock item | Produto de stock | Itens de stock

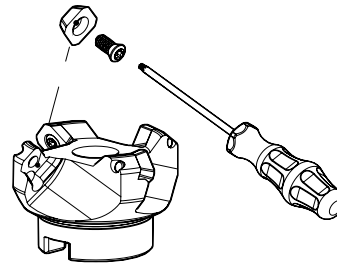
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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



**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A06045 - 50 - 160	P0501100	PT20	DT2050	5,0



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.

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

ISO	PSM	Material	HB (Brinell)	Grades		
				← Wear Resistance		Toughness →
				PH0910	PH6920	PH6740
P	1	Unalloyed steel	125-220	●	●	●
	2	Low-alloyed steel	220-280		●	●
	3	High-alloy 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)			Feed fz (mm/t)		
				← Wear Resistance		Toughness →	SEHT 1204...	SEHT 1204 LN	SEHW 1204...
				PH0910	PH6920	PH6740			
P	1	Unalloyed steel	125-220	-	150-230	130-160	0,10-0,20	-	0,10-0,20
	2	Low-alloyed steel	220-280	-	140-220	120-150	0,10-0,20	-	0,10-0,20
	3	High-alloy steel	280-380	-	130-180	100-130	0,10-0,20	-	0,10-0,20
M	4	SS - Ferritic / Martensitic	200-330	-	-	100-120	0,10-0,15	-	0,10-0,20
	5	SS - Austenitic	200-330	-	-	80-110	0,10-0,15	-	0,10-0,20
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	70-100	0,10-0,15	-	0,10-0,20
K	7	Malleable cast iron	130-230	-	-	130-250	0,10-0,25	-	0,10-0,25
	8	Grey cast iron	180-245	-	-	110-220	0,10-0,25	-	0,10-0,25
	9	Nodular cast iron	160-250	-	-	80-170	0,10-0,25	-	0,10-0,25
N	10	Aluminium and Non Ferrous	30-130	350-1400	-	-	0,10-0,25	-	-

(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-apanas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	SEHT 12... AFEN	SEHW 12... AFEN
	2	Low-Alloyed Steel	220-280	SEHT 12... AFTN	SEHW 12... AFTN
	3	High-Alloyed Steel	280-380	SEHT 12... AFTN	SEHW 12... AFTN
M	4	SS - Ferritic / Martensitic	200-330	SEHT 12... AFEN	SEHW 12... AFEN
	5	SS - Austenitic	200-330	SEHT 12... AFEN	SEHW 12... AFEN
	6	SS - Austenitic-ferritic (Duplex)	230-260	SEHW 12... AFEN	-
K	7	Malleable Cast Iron	130-230	SEHT 12... AFEN	SEHW 12... AFEN
	8	Grey Cast Iron	180-245	SEHT 12... AFEN	SEHW 12... AFEN
	9	Nodular Cast iron	160-250	SEHW 12... AFEN	SEHW 12... AFTN
N	10	Aluminium and Non Ferrous	30-130	SEHT 12... AFFN-LN	-

# A LINEPRO 09945

MILLING

Face milling

High feed milling

Shoulder milling

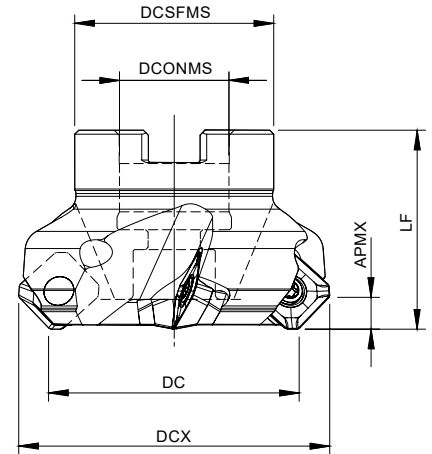
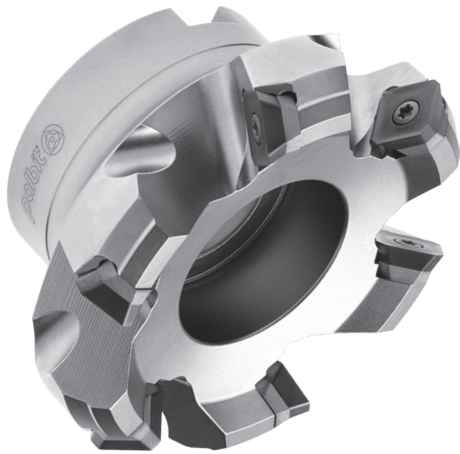
Profile milling

Specialty

Spare Parts

Technical Data

End Mills



**Arbor Mounting**  
KAPR=45° | GAMP=+20°~+21°

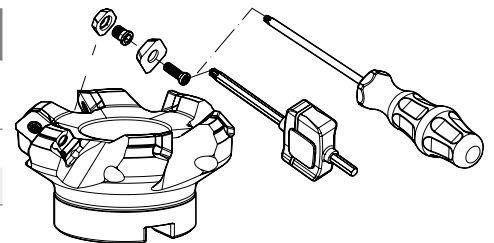
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCX	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181034700	050A09945-04-20-U022040	4	50	63	22	40	40	0,36	A	6,0	SE...13T3	☉
181024200	063A09945-05-21-U022040	5	63	76	22	48	40	0,59	A	6,0	SE...13T3	☉
181024300	080A09945-06-21-U027050	6	80	93	27	60	50	1,02	B	6,0	SE...13T3	☉
181024400	100A09945-07-21-U032050	7	100	113	32	70	50	1,52	B	6,0	SE...13T3	☉
181024500	125A09945-08-21-U040063	8	125	138	40	90	63	3,16	B	6,0	SE...13T3	☉
181024600	160A09945-10-21-U040063	10	160	173	40	110	63	4,61	C	6,0	SE...13T3	☉
181051400	250A09945-24-21-U060063L	24	250	263	60	172	63	13,89	C	6,0	SE...13T3	○
181024800	250A09945-24-21-U060063	24	250	263	60	172	63	13,89	C	6,0	SE...13T3	○

☉ Stock item | Produto de stock | Itens de stock

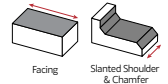
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire página A-8)

## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Shim	Shim Screw
A09945 - 50 - 80	P0351200	XT15	DT1530	3,0	CS130300	T0503509
A09945 - 100-250	P0351200	PT15	DT1530	3,0	CS130300	T0503509



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.



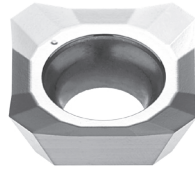
**SE... 13T3** Inserts | Pastilhas | Plaquetas



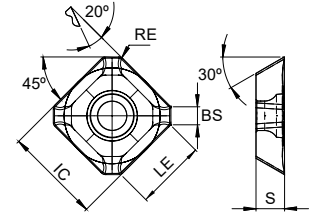
SEHT



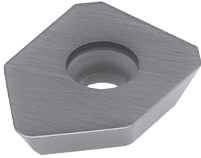
SEHW



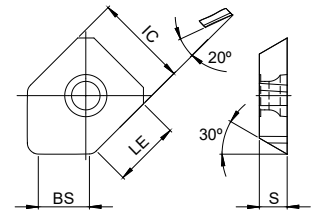
SEHT-LN



SEHT | SEHW | SEHT-LN



SEHT-W



SEHT-W

(1) Geometry code	(2) Grade code	P		M	K		N	Dimensions Dimensões Dimensiones (mm)			
		PVD		PVD	PVD		UNC	IC	S	LE	BS
		68	I5	I5	68	I5	10				
1110559	SEHT 13T3 AGSN	⊗	⊗	⊗	⊗	⊗		13,35	3,97	10,00	2,00
1111586	SEHT 13T3 AGFN-LN						⊗	13,35	3,97	10,00	2,30
1110627	SEHT 13T3 AGSN-W	⊗			⊗			13,35	3,97	10,00	8,20
1111146	SEHW 13T3 AGFN	⊗			⊗			13,35	3,97	10,00	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 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	PH6920	PH6740
P	1	Unalloyed steel	125-220	●	✓	✓
	2	Low-alloyed steel	220-280		✓	✓
	3	High-alloy 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)			Feed fz (mm/t)			
				← Wear Resistance		Toughness →				
				PH0910	PH6920	PH6740	SEHT 13T3 AGSN	SEHW 13T3 AGFN	SEHT 13T3 AGFN-LN	SEHT 13T3 AGSN-W
P	1	Unalloyed Steel	125-220	-	180-340	180-240	0,10-0,25	-	-	0,10-0,30
	2	Low-Alloyed Steel	220-280	-	180-340	160-220	0,10-0,20	-	-	0,10-0,30
	3	High-Alloyed Steel	280-380	-	180-330	140-210	0,10-0,20	-	-	0,10-0,30
M	4	SS - Ferritic / Martensitic	200-330	-	-	140-220	0,10-0,20	-	-	-
	5	SS - Austenitic	200-330	-	-	130-180	0,10-0,20	-	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	120-160	0,10-0,20	-	-	-
K	7	Malleable Cast Iron	130-230	-	-	160-260	0,10-0,25	0,10-0,25	-	0,10-0,30
	8	Grey Cast Iron	180-245	-	-	140-240	0,10-0,25	0,10-0,25	-	0,10-0,30
	9	Nodular Cast iron	160-250	-	-	120-200	0,10-0,20	0,10-0,20	-	0,10-0,30
N	10	Aluminium and Non Ferrous	30-130	350-1400	-	-	0,10-0,20	-	0,10-0,20	-

(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-apanas | Guía para aplicación del rompevirutas

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

## WIPER INSERTS

### Rec. Cutting Conditions

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

### Example:

- The width of parallel land ( $BS$ ) of the SEHT insert is 2,0 mm.
- With a cutter of 10 inserts and using a feed per tooth ( $f_z$ ) of 0,3 mm, the feed per revolution ( $f_n$ ) will be 3 mm, i.e. 66% bigger than the parallel land.
- To obtain a good surface finishing, the feed per revolution should be a maximum 80% of 2,0 mm = 1,6 mm.
- The wiper insert will have a parallel land ( $BS_W$ ) with a width of approximately 8,2 mm.
- Result: Feed per revolution ( $f_n$ ) could be increased from 1,6 mm to 60% of 6,0 mm = 4,9 mm.

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

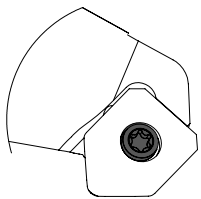


Fig. A

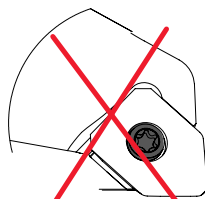


Fig. B

When using wiper insert, install the insert as shown on Fig. A.

If the insert is installed as shown on Fig. B breakage of the insert is inevitable and normal surface finish can not be obtained.



# **HIGH FEED MILLING**

## 1 TETRAFEED 16320 | 16420

- > Suitable for machining **P M K S**
- > See page A - 76

## 2 PENTA HIFEED 06320

- > Suitable for machining **P K**
- > See page A - 88

## 3 HIFEED 06410 | 06690 | 06815

- > Suitable for machining **P M K S**
- > See page A - 94

## 4 HIFEED 50560 | 50060

- > Suitable for machining **P M K S**
- > See page A - 112

## 5 LINEPRO 20090 | 20190 (with XPET-HF insert)

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

16320 | 16420

# TETRAFEED



TETRAFEED 16320 | 16420 are lines with a robust cutter body that provides higher fatigue and deformation resistance, ensuring a longer tool life. Thanks to its light-cutting action, combined with a robust shank design, TETRAFEED ensures secure and vibration-free machining, even with long overhangs. The progressive cutting insert edge permits a smoother cut, reducing cutting forces.

TETRAFEED 16320 | 16420 são linhas com um corpo de ferramenta robusto oferecendo maior resistência à fadiga e deformação, garantindo uma vida útil mais longa da ferramenta. Graças à sua ação de corte leve, combinada com um design de haste robusto, as TETRAFEED garantem fresagem segura e livre de vibrações, mesmo com balanços longos. A geometria curva da aresta de corte da pastilha permite um corte mais suave, reduzindo as forças de corte.

TETRAFEED 16320 | 16420 son líneas con un cuerpo de herramienta robusto que ofrece una mayor resistencia a la fatiga y deformación, asegurando una vida útil más larga de la herramienta. Gracias a su acción de corte ligera, combinada con un diseño de mango robusto, las TETRAFEED garantizan un fresado seguro y libre de vibraciones, incluso con voladizos largos. La geometría curva del filo de corte de la plaquita permite un corte más suave, reduciendo las fuerzas de corte.

## TETRAFEED 16320 > page 78

- > From DC 26mm to 80mm

De DC 16mm a 80mm | Desde DC 16mm hasta 80mm

- > 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

- > Robust XNKG 06 insert with 4 cutting edges

Pastilha XNKG 06 robusta com 4 arestas de corte | Plaquita XNKG 06 robusta con 4 filos de corte

- > Close pitch cutter design for high productivity

Passo fino para alta produtividade | Paso fino para alta productividad



## NEW TETRAFEED 16420 > page 84

- > From DC 50mm to 100mm

De DC 50mm a 100mm | Desde DC 50mm 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

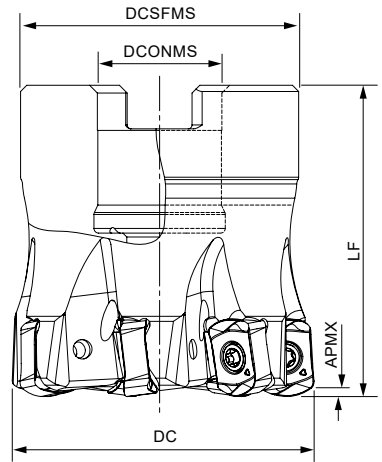
- > Ideal for rough milling of medium to large-sized components

Ideal para fresagem de desbaste de componentes de médio a grande porte | Ideal para el fresado de desbaste de componentes de tamaño mediano a grande.

- > For high removal rate materials

Para altas taxas de remoção de material | Para una alta tasa de remoción de material





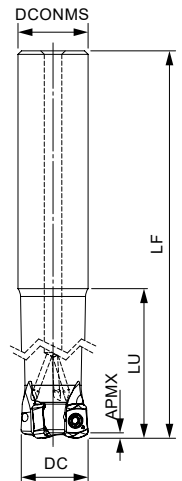
### Arbor Mounting

KAPR=20° | GAMP=-7° | RP=1,8

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181206300	032A16320-05-07-016040	5	32	16	30	40	0,14	A	1,00	XNKU 06...	☉
181218600	040A16320-05-07-016040	5	40	16	36	40	0,20	A	1,00	XNKU 06...	☉
181152300	040A16320-07-07-016040	7	40	16	36	40	0,20	A	1,00	XNKU 06...	☉
181157500	050A16320-06-07-022040	6	50	22	42	40	0,25	A	1,00	XNKU 06...	☉
181152400	050A16320-08-07-022040	8	50	22	42	40	0,29	A	1,00	XNKU 06...	☉
181152500	052A16320-08-07-022040	8	52	22	42	40	0,39	A	1,00	XNKU 06...	☉
181152600	063A16320-09-07-022040	9	63	22	48	40	0,50	A	1,00	XNKU 06...	☉
181177800	080A16320-10-07-027050	10	80	27	60	50	0,95	A	1,00	XNKU 06...	☉

☉ 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

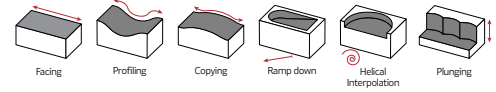
KAPR=20° | GAMP=-7° | RP=1,8

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert	Stock
			DC	DCONMS	LF	LU		APMX (mm)			
181183700	016E16320-02-07-016100	2	16	16	100	30	0,19	1,00	XNKU 06...	☉	
181171900	016E16320-02-07-016150	2	16	16	150	50	0,19	1,00	XNKU 06...	☉	
181183800	020E16320-03-07-020130	3	20	20	130	50	0,30	1,00	XNKU 06...	☉	
181183400	020E16320-03-07-020160	3	20	20	160	80	0,30	1,00	XNKU 06...	☉	
181183900	025E16320-04-07-025140	4	25	25	140	60	0,54	1,00	XNKU 06...	☉	
181183500	025E16320-04-07-025180	4	25	25	180	100	0,54	1,00	XNKU 06...	☉	
181172200	032E16320-05-07-032150	5	32	32	150	60	1,00	1,00	XNKU 06...	☉	
181183600	032E16320-05-07-032200	5	32	32	200	120	1,00	1,00	XNKU 06...	☉	

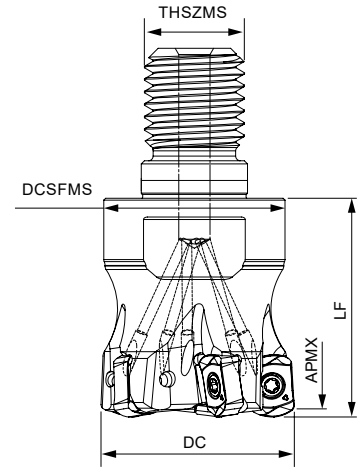
☉ Stock item | Produto de stock | Itens de stock

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

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



**Threaded Coupling**  
KAPR=20° | GAMP=-7° | RP=1,8



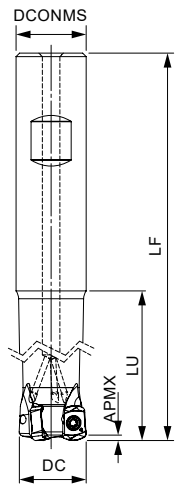
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)		
181151300	016R16320-02-07-M08025	2	16	M08	13	25	0,02	1,00	XNKU 06...	☉
181151400	020R16320-03-07-M10028	3	20	M10	18	28	0,05	1,00	XNKU 06...	☉
181151500	025R16320-04-07-M12035	4	25	M12	21	35	0,07	1,00	XNKU 06...	☉
181148000	032R16320-05-07-M16035	5	32	M16	29	35	0,16	1,00	XNKU 06...	☉
181178600	035R16320-05-07-M16035	5	35	M16	29	35	0,16	1,00	XNKU 06...	☉
181151600	035R16320-06-07-M16035	6	35	M16	29	35	0,17	1,00	XNKU 06...	☉
181151700	040R16320-05-07-M16045	5	40	M16	29	45	0,24	1,00	XNKU 06...	☉
181178500	040R16320-06-07-M16035	6	40	M16	29	35	0,23	1,00	XNKU 06...	☉
181151800	042R16320-07-07-M16035	7	42	M16	29	35	0,24	1,00	XNKU 06...	☉

☉ 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=20° | GAMP=-7° | RP=1,8

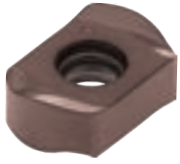


Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181161000	016W16320-02-07-016150	2	16	16	150	50	0,19	1,00	XNKU 06...	☉
181151900	020W16320-03-07-020160	3	20	20	160	90	0,29	1,00	XNKU 06...	☉
181152000	025W16320-04-07-025180	4	25	25	180	100	0,40	1,00	XNKU 06...	☉
181152100	032W16320-05-07-032200	5	32	32	200	120	1,10	1,00	XNKU 06...	☉

☉ 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)

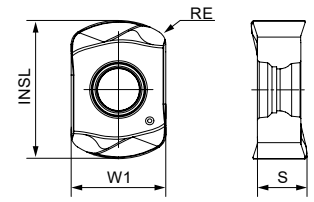
## XNKU 06T3... Inserts | Pastilhas | Plaquitas



XNKU-MP



XNKU-MS



XNKU-MP | MS

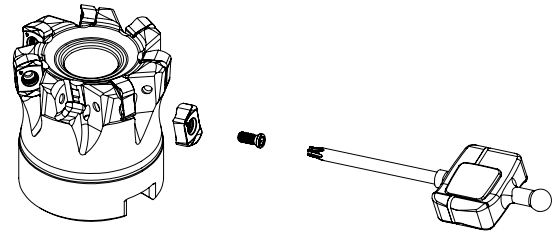
		P					M				K		S			Dimensions Dimensões Dimensiones (mm)			
		CVD	PVD				CVD	PVD			CVD	PVD	CVD	PVD					
(2) Grade code		T9	X5	T1	P4	Z2	T9	X9	Z2	Z3	T9	T1	T9	X9	Z3	W1	S	INSL	RE
(1) Geometry code	ISO Reference	PHS740	PHP910	PHP920	PHP930	PHP530	PHS740	PHH930	PHP530	PHH530	PHS740	PHP920	PHS740	PHH930	PHH530				
1112802	XNKU 06T310-MP	⊗	⊗	⊗	⊗		⊗	⊗			⊗	⊗	⊗	⊗		6,85	3,60	10,00	1,00
1113209	XNKU 06T310-MS					⊗			⊗	⊗				⊗		6,85	3,60	10,00	1,00

⊗ 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)

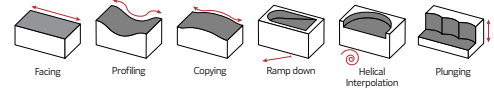
Insert order code = (1) Geometry Code + (2) Grade Code

## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A16320 - 32-80	P0250704	XT08	DT0812	1,20
R16320 - 20-42	P0250704	XT08	DT0812	1,20
W16320 - 20-32	P0250704	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.



**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 →				
				PHP910	PHP920	PHP930	PHH930	PHS740	PHP530	PHH530	XNKU 06...-MP	XNKU 06...-MS
P	1	Unalloyed Steel	125-220	180-250	180-250	160-230	-	160-230	180-340	-	0,50-1,50	0,50-1,50
	2	Low-Alloyed Steel	220-280	160-240	170-210	150-190	-	150-190	180-340	-	0,50-1,50	0,50-1,50
	3	High-Alloyed Steel	280-380	140-230	160-200	140-180	-	140-180	180-330	-	0,50-1,50	0,50-1,50
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	130-170	120-180	150-270	170-280	0,50-1,40	0,50-1,40
	5	SS - Austenitic	200-330	-	-	-	100-160	100-150	-	160-280	0,50-1,40	0,50-1,40
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	80-140	70-130	-	150-260	0,50-1,40	0,50-1,40
K	7	Malleable Cast Iron	130-230	180-300	180-320	-	-	160-300	-	-	0,50-1,50	-
	8	Grey Cast Iron	180-245	160-250	170-280	-	-	150-260	-	-	0,50-1,50	-
	9	Nodular Cast iron	160-250	150-210	100-240	-	-	80-220	-	-	0,50-1,50	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	30-75	30-70	-	30-150	0,50-1,30	0,50-1,30

(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.

(Note 3) When using  $DC=16\text{mm}$  apply 70% or less feed (fz) from the table.

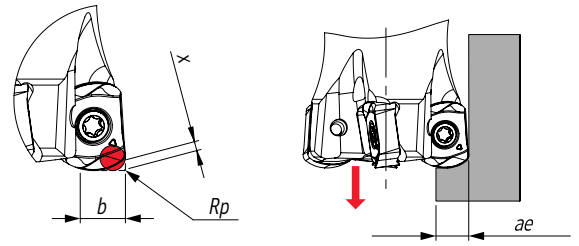
**GRADES SELECTION GUIDE** Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades						
				← Wear Resistance				Toughness →		
				PHP910	PHP920	PHP930	PHH930	PHS740	PHP530	PHH530
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

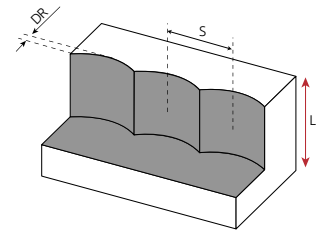
## PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	ae
XNKU 06T3...	1,8	0,4	3,6	3,4



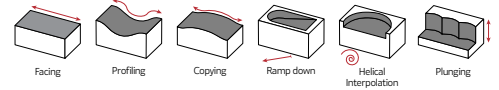
## PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
fz (mm/t)		
0,08-0,15	0,05 - 0,10	$S_{max} = \sqrt{DC \cdot Dr - Dr^2}$



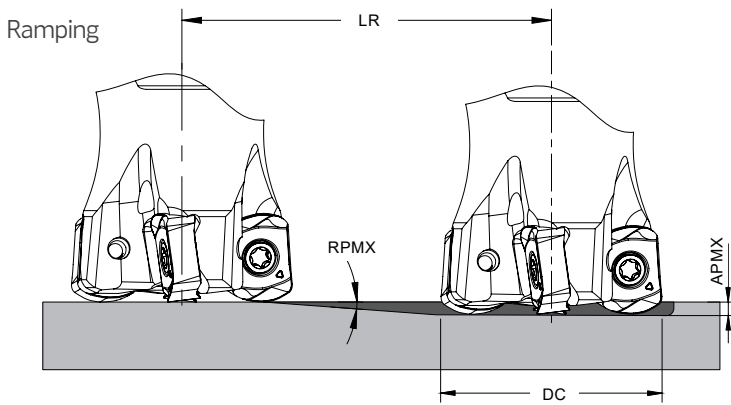
S max and DR corresponding cutting diameter DC (mm)											
DR (mm)	DC (mm) XNKU 06...										
	16	20	25	32	35	40	42	50	52	60	80
1	3,9	4,4	4,9	5,6	5,8	6,2	6,4	7,0	7,1	7,9	8,9
2	5,3	6,0	6,8	7,7	8,1	8,7	8,9	9,8	10,0	11,0	12,5
3	6,2	7,1	8,1	9,3	9,8	10,5	10,8	11,9	12,1	13,4	15,2

Note: Recommended for  $L \leq 4 Dc$  for extra long tool this step and side cut must be reduced.

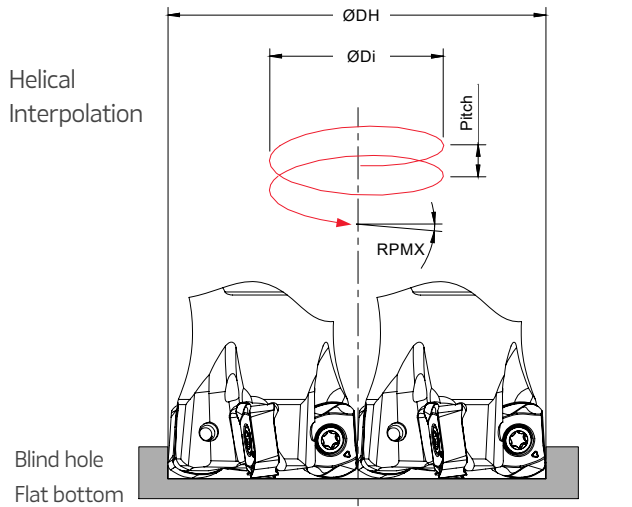


# RAMPING AND HELICAL INTERPOLATION

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



Helical Interpolation

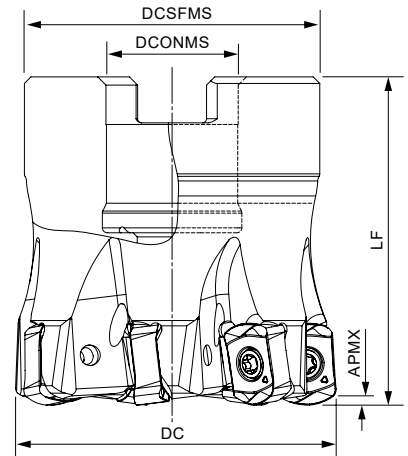


DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
16	2,00	1	28,6	24,8	-	0,96
20	1,30	1	44,1	32,8	-	1,00
25	0,90	1	63,7	42,8	-	0,87
32	0,65	1	88,1	56,8	-	1,00
35	0,55	1	104,2	62,8	-	0,83
40	0,50	1	114,6	72,8	-	0,94
42	0,45	1	127,3	76,8	-	0,89
50	0,35	1	163,7	92,8	-	0,99
52	0,35	1	163,7	96,8	-	0,85
63	0,30	1	191,0	118,8	-	0,92
80	0,20	1	286,5	152,8	-	0,91
						0,97
						0,79
						0,83

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.



**Arbor Mounting**  
KAPR=20° | GAMP=-7° | RP=3,2

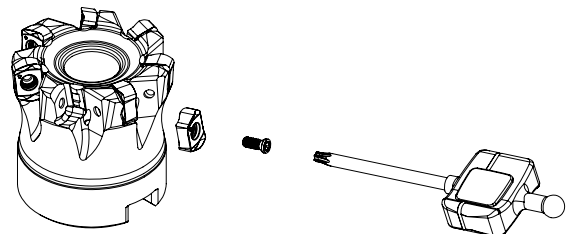
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181169300	050A16420-04-07-022045	4	50	22	42	45	0,28	A	1,50	XN KU 12...	☉
181180100	050A16420-05-07-022045	5	50	22	42	45	0,31	A	1,50	XN KU 12...	☉
181178400	052A16420-04-07-022045	4	52	22	42	45	0,33	A	1,50	XN KU 12...	☉
181180200	052A16420-05-07-022045	5	52	22	42	45	0,33	A	1,50	XN KU 12...	☉
181180300	063A16420-05-07-027050	5	63	27	48	50	0,51	A	1,50	XN KU 12...	☉
181180400	063A16420-06-07-027050	6	63	27	48	50	0,52	A	1,50	XN KU 12...	☉
181180500	066A16420-05-07-027050	5	66	27	48	50	0,54	A	1,50	XN KU 12...	☉
181180600	066A16420-06-07-027050	6	66	27	48	50	0,55	A	1,50	XN KU 12...	☉
181177900	080A16420-06-07-027050	6	80	27	60	50	0,94	A	1,50	XN KU 12...	☉
181180700	080A16420-08-07-027050	8	80	27	60	50	0,95	A	1,50	XN KU 12...	☉
181180800	100A16420-06-07-032050	6	100	32	80	50	1,21	A	1,50	XN KU 12...	○
181180900	100A16420-08-07-032050	8	100	32	80	50	1,24	A	1,50	XN KU 12...	☉

☉ 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)

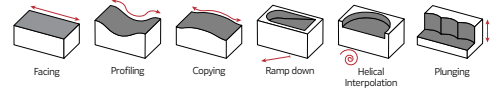
## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A16420 - 50-80	P0451400	XT20	DT2050	5,0
A16420 - 100	P0451400	PT20	DT2050	5,0
W16420 - 32-40	P0451400	XT20	DT2050	5,0



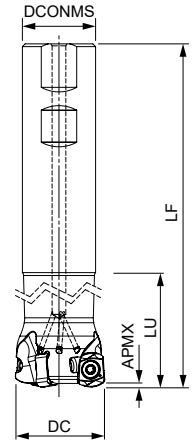
Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301. Check the procedures for the clamping screws on the page A-301.

**TETRAFEED 16420**  
XNKU 12



**Weldon Shank**

**KAPR=20° | GAMP=-7° | RP=3,2**



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181181000	032W16420-02-07-032150	2	32	32	150	70	0,80	1,50	XNKU 12...	☉
181181100	032W16420-02-07-032200	2	32	32	200	120	1,10	1,50	XNKU 12...	○
181181200	035W16420-02-07-032150	2	35	32	150	45	0,90	1,50	XNKU 12...	○
181181300	035W16420-02-07-032200	2	35	32	200	45	1,20	1,50	XNKU 12...	○
181181400	040W16420-03-07-032150	3	40	32	150	45	1,10	1,50	XNKU 12...	○
181181500	040W16420-03-07-032220	3	40	32	220	45	1,40	1,50	XNKU 12...	☉

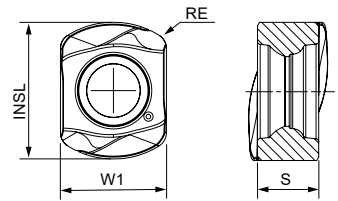
☉ Stock item | Produto de stock | Itens de stock

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

**XNKU 1205...** Inserts | Pastilhas | Plaquetas



XNKU-MP



XNKU-MP | MS

Geometry code	ISO Reference	P					M				K		S			Dimensions Dimensões Dimensiones (mm)			
		CVD		PVD			CVD		PVD		CVD	PVD	CVD	PVD		W1	S	INSL	RE
		T9	X5	T1	P4	Z2	T9	X9	Z2	Z3	T9	T1	T9	X9	Z3				
<sup>(1)</sup>		PHS740	PHP910	PHP920	PHP930	PHP530	PHS740	PHH930	PHP530	PHH530	PHS740	PHP920	PHS740	PHH930	PHH530	11,70	5,90	15,00	1,60

☉ 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 →		
				PHP910	PHP920	PHP930	PHH930	PHS740	
P	1	Unalloyed Steel	125-220	180-250	180-250	160-230	-	160-230	0,50-1,50
	2	Low-Alloyed Steel	220-280	160-240	170-210	150-190	-	150-190	0,50-1,50
	3	High-Alloyed Steel	280-380	140-230	160-200	140-180	-	140-180	0,50-1,50
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	130-170	120-180	0,50-1,40
	5	SS - Austenitic	200-330	-	-	-	100-160	100-150	0,50-1,40
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	80-140	70-130	0,50-1,40
K	7	Malleable Cast Iron	130-230	180-300	180-320	-	-	160-300	0,50-1,50
	8	Grey Cast Iron	180-245	160-250	170-280	-	-	150-260	0,50-1,50
	9	Nodular Cast iron	160-250	150-210	100-240	-	-	80-220	0,50-1,50
S	11	Heat Resistant Super Alloys	200-320	-	-	-	30-75	30-70	0,50-1,30

(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.

(Note 3) When using  $DC=16mm$  apply 70% or less feed (fz) from the table.

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

ISO	PSM	Material	HB (Brinell)	Grades				
				← Wear Resistance			Toughness →	
				PHP910	PHP920	PHP930	PHH930	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	●	●			●
S	11	Heat Resistant Super Alloys	200-320				●	●



Good Conditions



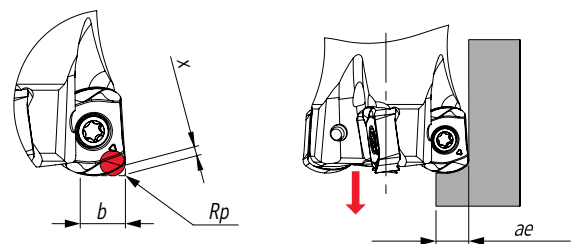
Average Conditions

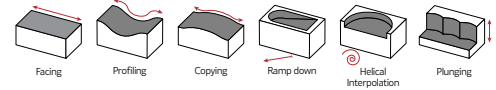


Difficult Conditions

## PROGRAMMING DATA Dados para programação | Datos para la programación

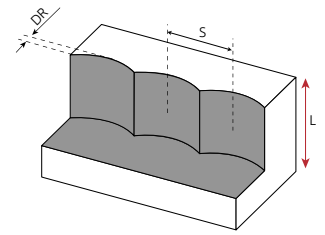
Insert	Programming Data			
	Rp	X	b	$a_e$
XNKU 1206...	3,2	0,65	7,5	7,1





**PLUNGING** Mergulho | Plunge

$L \leq 3DC$	$L > 3DC$	$S_{max}$
$f_z$ (mm/t)		
0,10-0,15	0,05 - 0,10	$S_{max} = \sqrt{DC \cdot Dr - Dr^2}$

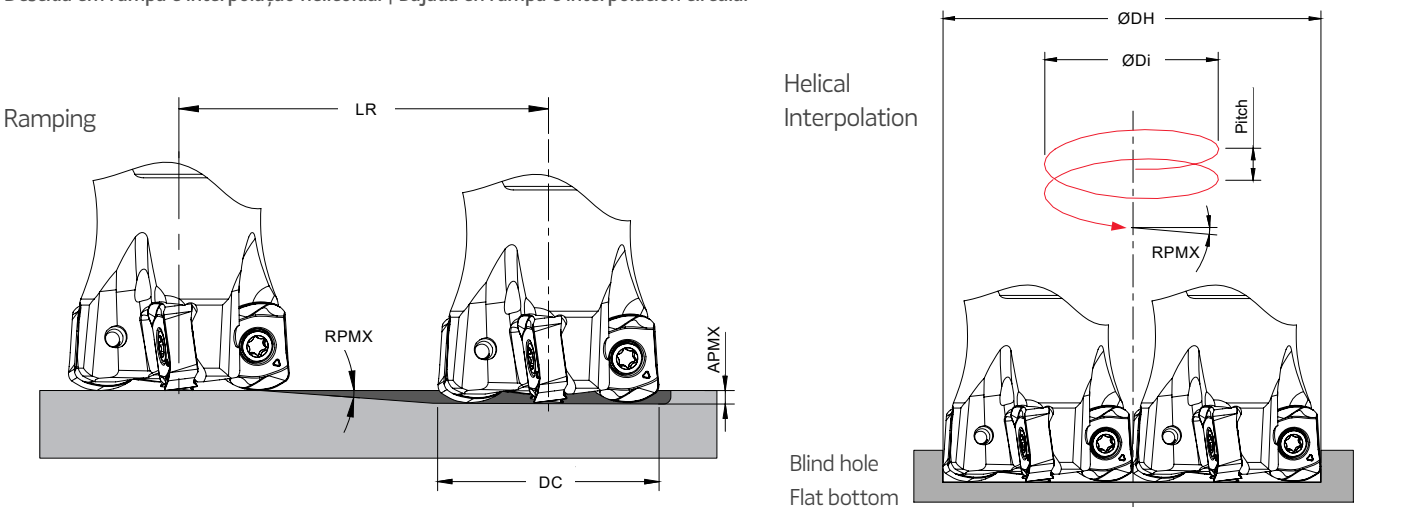


S max and DR corresponding cutting diameter DC (mm)									
DR (mm)	DC (mm)								
	32	35	40	50	52	63	66	80	100
1	5,6	5,8	6,2	7,0	7,1	7,9	8,1	8,9	9,9
2	7,7	8,1	8,7	9,8	10,0	11,0	11,3	12,5	14,0
3	9,3	9,8	10,5	11,9	12,1	13,4	13,7	15,2	17,1
4	10,6	11,1	12,0	13,6	13,9	15,4	15,7	17,4	19,6
5	11,6	12,2	13,2	15,0	15,3	17,0	17,5	19,4	21,8
6	12,5	13,2	14,3	16,2	16,6	18,5	19,0	21,1	23,7
7	13,2	14,0	15,2	17,3	17,7	19,8	20,3	22,6	25,5

Note: Recommended for  $L \leq 4 Dc$  for extra long tool this step and side cut must be reduced.

**RAMPING AND HELICAL INTERPOLATION**

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



$\text{ØDi} = \text{ØDH} - DC$

DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
32	1,25	1,5	68,7	49	-	1,16
				-	57,6	1,50
35	1,1	1,5	78,1	55	-	1,20
				-	63,6	1,50
40	0,85	1,5	101,1	65	-	1,16
				-	73,6	1,50
50	0,6	1,5	143,2	85	-	1,15
				-	93,6	1,43
52	0,55	1,5	156,3	89	-	1,11
				-	97,6	1,37
63	0,45	1,5	191,0	111	-	1,18
				-	119,6	1,39
66	0,4	1,5	214,9	117	-	1,11
				-	125,6	1,30
80	0,3	1,5	286,5	145	-	1,06
				-	153,6	1,21
100	0,25	1,5	343,8	185	-	1,16
				-	193,6	1,28

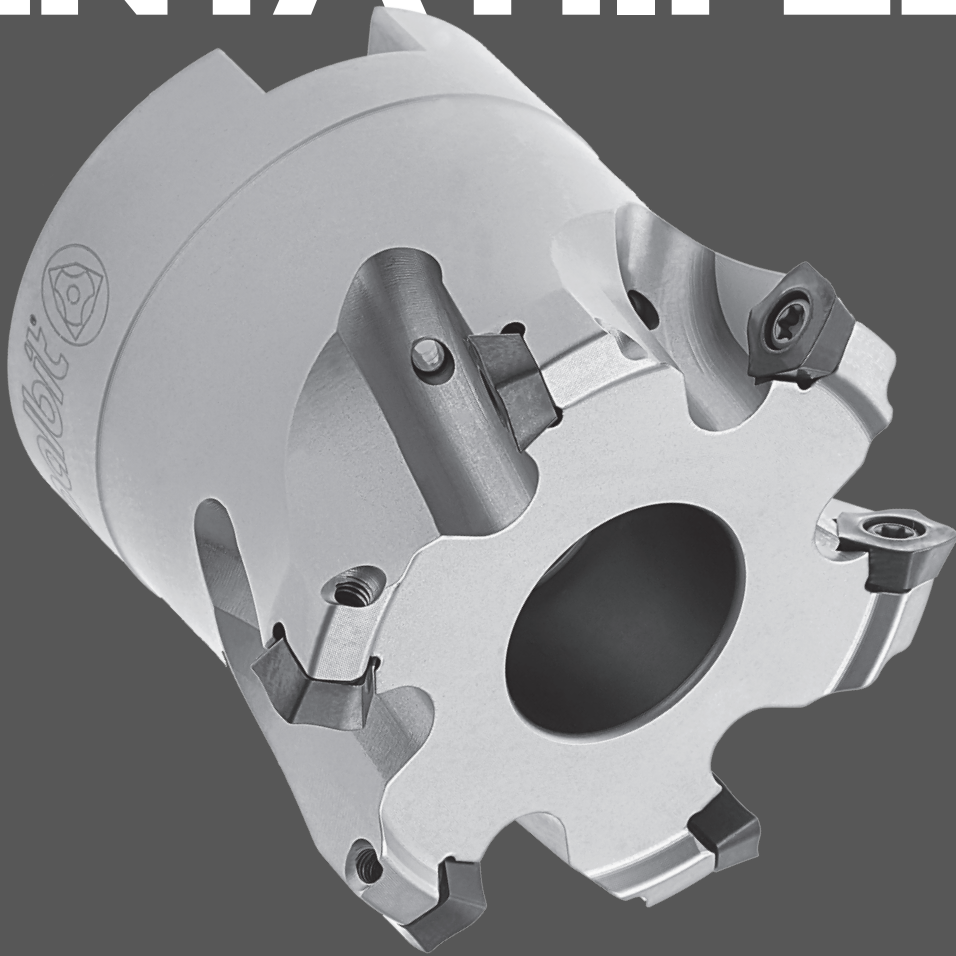
Note: During helical interpolation do not exceed APMX.

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

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

06320

# PENTA HIFEED



PENTA HIFEED features five positive cutting edges designed for high-feed applications with low cutting forces. This optimization enhances machining efficiency while also maintaining a long tool life.

A PENTA HIFEED possui cinco arestas de corte positivas projetadas para aplicações de alto avanço com baixas forças de corte. Essa otimização melhora a eficiência da fresagem, mantendo também uma longa vida útil da ferramenta.

PENTA HIFEED cuenta con cinco filos de corte positivos diseñados para aplicaciones de alto avance con bajas fuerzas de corte. Esta optimización mejora la eficiencia del fresado, manteniendo también una larga vida útil de la herramienta.

## PENTA HIFEED 06320 > page 90

- > From DC 16mm to 66mm

De DC 16mm a 66mm | Desde DC 16mm hasta 66mm

- > 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

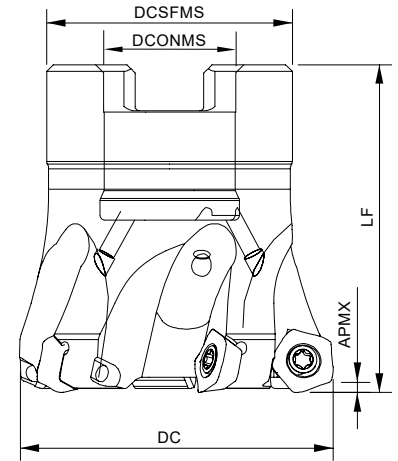
- > Positive insert with 5 cutting edges

Pastilhas positivas com 5 arestas de corte | Insertos positivos con 5 filos de corte

- > Low cutting forces

Baixas forças de corte | Bajas fuerzas de corte



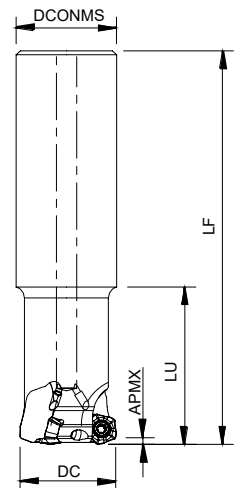


**Arbor Mounting**  
KAPR=20° | GAMP=14° | RP=2,5

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert	Stock
			DC	DCONMS	DCSFMS	LF		APMX (mm)	Arbor Type		
181129300	040A06320-05-14-016040	5	40	16	30	40	0,15	1,0	A	POKT 0403...	☒
181129400	050A06320-06-14-022045	6	50	22	40	45	0,19	1,0	A	POKT 0403...	☒
181129500	052A06320-06-14-022045	6	52	22	40	45	0,29	1,0	A	POKT 0403...	☒
181129600	063A06320-07-14-027050	7	63	27	48	50	0,50	1,0	A	POKT 0403...	○
181131300	066A06320-07-14-027050	7	66	27	48	50	0,55	1,0	A	POKT 0403...	○

☒ 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=20° | GAMP=14° | RP=2,5

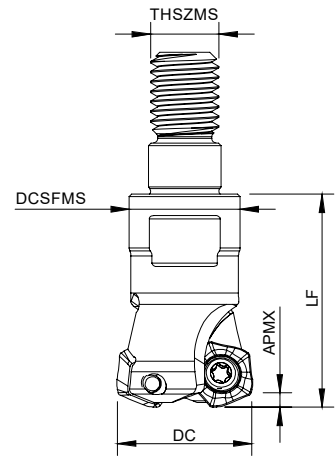
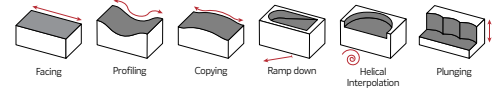
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert	Stock
			DC	DCONMS	LF	LU		APMX (mm)	Arbor Type		
181147200	020E06320-02-14-020130	2	20	20	130	40	0,38	1,0	POKT 0403...	☒	
181131000	025E06320-03-14-025150	3	25	25	150	40	0,41	1,0	POKT 0403...	☒	
181131100	032E06320-05-14-032180	5	32	32	180	40	0,56	1,0	POKT 0403...	☒	
181131200	040E06320-05-14-032180	5	40	32	180	50	0,70	1,0	POKT 0403...	○	

☒ 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)

# PENTA HIFEED 06320

POKT 04



## Threaded Coupling

KAPR=20° | GAMP=14° | RP=2,5

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)			
181113500	016R06320-02-14-M08025	2	16	M08	13	25	0,02	1,0	POKT 0403...	☉	
181113600	020R06320-02-14-M10025	2	20	M10	18	25	0,05	1,0	POKT 0403...	☉	
181113700	025R06320-03-14-M12028	3	25	M12	21	28	0,07	1,0	POKT 0403...	☉	
181129100	032R06320-05-14-M16035	5	32	M16	29	35	0,17	1,0	POKT 0403...	☉	
181129200	035R06320-05-14-M16035	5	35	M16	29	35	0,19	1,0	POKT 0403...	☉	
181130900	042R06320-05-14-M16035	5	42	M16	29	35	0,23	1,0	POKT 0403...	☉	

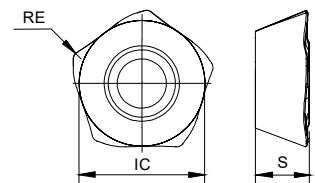
☉ Stock item | Produto de stock | Itens de stock

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

## POKT 0403... Inserts | Pastilhas | Plaquitas



POKT-MP



POKT-MP

	<sup>(2)</sup> Grade code	P				K		Dimensions Dimensões Dimensiones (mm)		
		PVD				PVD		IC	S	RE
		G1	G4	P3	G6	G1	G4			
<sup>(1)</sup> Geometry code	ISO Reference	PH7910	PH7920	PH7930	PH7740	PH7910	PH7920			
1112365	POKT 040305 ZDSR-MP	☉	☉	☉	☉	☉	☉	7,00	3,00	0,50

☉ First choice | Primeira opção | 1ª opción

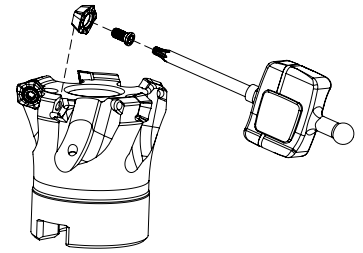
☉ Stock item | Produto de stock | Itens de stock

○ 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

## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
R06320 - 16-42	P0250503	XT08	DT0812	1,20
E06320 - 25-40	P0250503	XT08	DT0812	1,20
A06320 - 40-60	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 →
				PH7910	PH7920	PH7930	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)				Feed fz (mm/t)
				← Wear Resistance			Toughness →	
				PH7910	PH7920	PH7930	PH7740	POKT 04...-MP
P	1	Unalloyed Steel	125-220	180-250	180-240	160-220	140-200	0,50-1,50
	2	Low-Alloyed Steel	220-280	160-230	160-220	140-200	130-180	0,50-1,51
	3	High-Alloyed Steel	280-380	140-220	140-210	120-190	100-170	0,50-1,52
K	7	Malleable Cast Iron	130-230	180-300	160-260	-	-	0,50-1,53
	8	Grey Cast Iron	180-245	160-250	140-240	-	-	0,50-1,54
	9	Nodular Cast iron	160-250	150-200	120-200	-	-	0,50-1,55

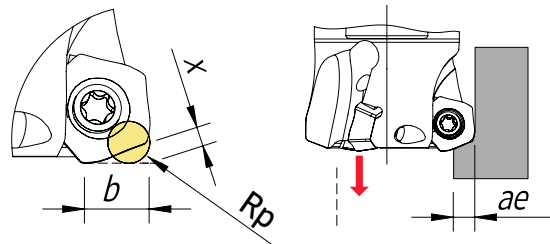
(Note 1) Cutting conditions  $a_e/D_c=70\%$ .

(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.

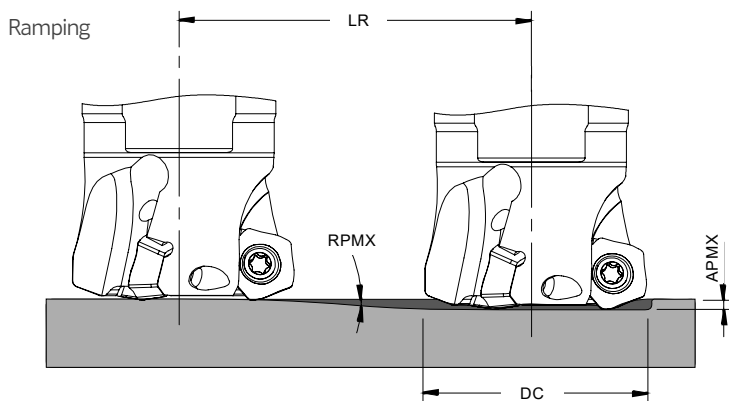
## PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	ae
POKT 0403...	2,5	1,2	4,3	4,0

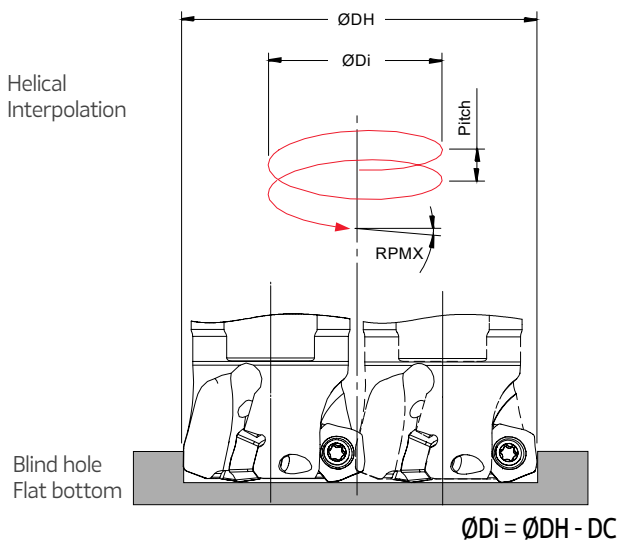


## RAMPING AND HELICAL INTERPOLATION

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



Helical Interpolation

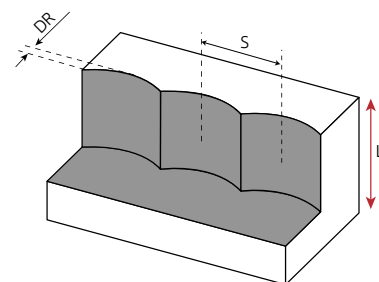


DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
16	15	1,0	3,7	23,4	-	6
				-	30,0	11
20	9,0	1,0	6,3	31,4	-	5
				-	38,0	8
25	5,0	1,0	11,4	41,4	-	4
				-	48,0	6
32	3,4	1,0	16,8	55,4	-	4
				-	62,0	5
35	3,0	1,0	19,1	61,4	-	4
				-	68,0	5
40	2,0	1,0	28,6	71,4	-	3
				-	78,0	4
42	2,0	1,0	28,6	84,0	-	4
				-	82,0	4
50	2,0	1,0	28,6	91,4	-	4
				-	98,0	5
52	2,0	1,0	28,6	95,4	-	4
				-	102,0	5
63	2,0	1,0	28,6	117,4	-	5
				-	124,0	6
66	1,8	1,0	31,8	123,4	-	5
				-	130,0	6

Note: During helical interpolation do not exceed APMX.

## PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
f <sub>z</sub> (mm/t)		
0,08-0,15	0,05 - 0,10	$S_{max} = \sqrt{DC \cdot Dr - Dr^2}$

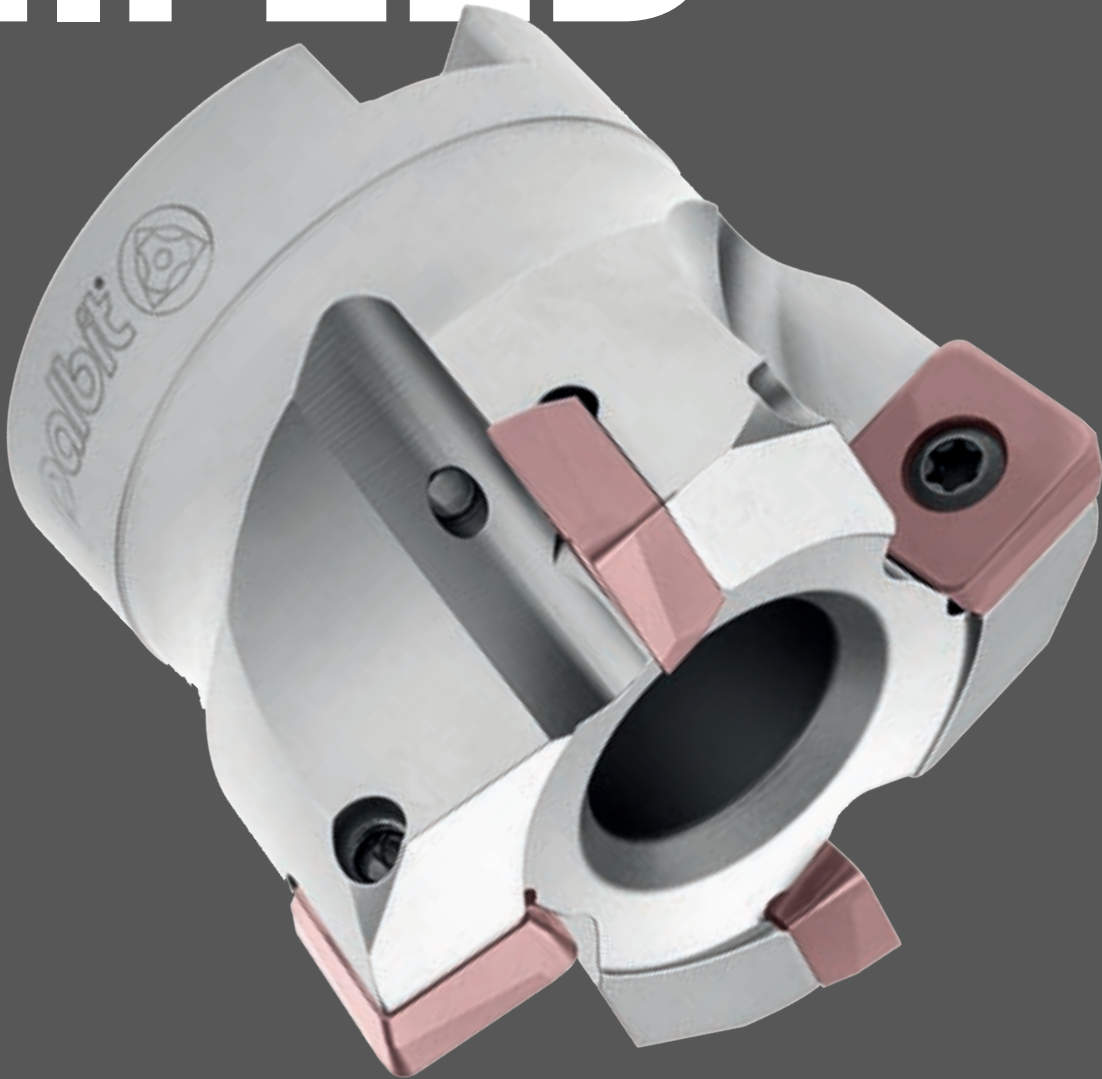


S max and DR corresponding cutting diameter DC (mm)											
DR (mm)	DC (mm)										
	16	20	25	32	35	40	42	50	52	63	66
1,0	3,9	4,4	4,9	5,7	5,8	6,2	6,4	7,0	7,1	7,9	8,1
2,0	5,3	6,0	6,8	2,7	8,1	8,7	8,9	9,8	10,0	11,0	11,3
3,0	6,2	7,1	8,1	9,3	9,8	10,5	10,8	11,9	12,1	13,4	13,7
4,0	6,9	8,0	9,2	10,6	11,1	12,0	12,3	13,6	13,9	15,4	15,7

Note: Recommended for L ≤ 4 Dc for extra long tool this step and side cut must be reduced.

06410 | 06690 | 06815

# HIFEED



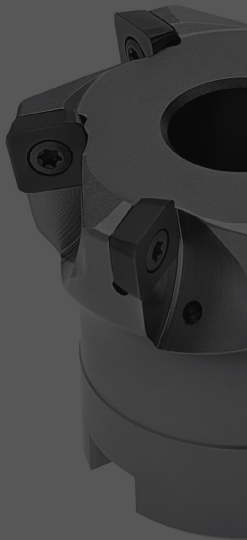
Designed for efficient rough milling across diverse materials in industries like die & mold, aerospace and automotive, HIFEED line spans a broad spectrum of applications. These applications include milling slots and pockets, helical interpolation strategies and plunging. Presenting an effective solution for boosting productivity in rough milling operations, excellent for mold and die industry.

Projetada para fresagem de desbaste eficiente em diversos materiais em indústrias como matrizes e moldes, aeroespacial e automóvel, a linha HIFEED abrange um amplo espectro de aplicações. Essas aplicações incluem fresagem de ranhuras e caixas, estratégias de interpolação helicoidal e fresagem em mergulho. Apresentando uma solução eficaz para aumentar a produtividade em operações de fresagem de desbaste é excelente para a indústria de moldes e matrizes.

Diseñada para un fresado de desbaste eficiente en diversos materiales en industrias como matrices y moldes, aeroespacial y automotriz, la línea HIFEED abarca un amplio espectro de aplicaciones. Estas aplicaciones incluyen fresado de ranuras y cavidades, estrategias de interpolación helicoidal y fresado en rampa. Presentando una solución efectiva para aumentar la productividad en operaciones de fresado de desbaste, es excelente para la industria de matrices y moldes.

## HIFEED 06410 > page 96

- > From DC 20mm to 52mm  
De DC 20mm a 52mm | Desde DC 20mm hasta 52mm
- > 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 4 cutting edges (SO.. 0803..)  
Pequena pastilha positiva com 4 arestas de corte (SO.. 0803..) | Plaquita positiva pequena com 4 filos de corte (SO.. 0803..)
- > For high productivity in small workpieces  
Para alta produtividade em pequenas peças de trabalho | Para alta productividad en piezas de trabajo pequeñas



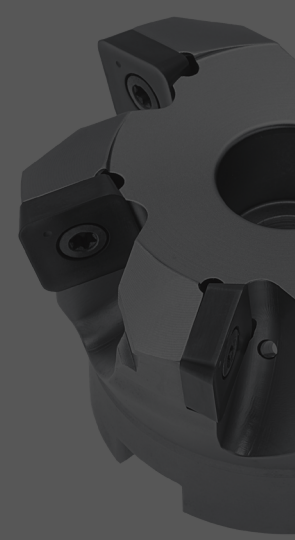
## HIFEED 06690 > page 102

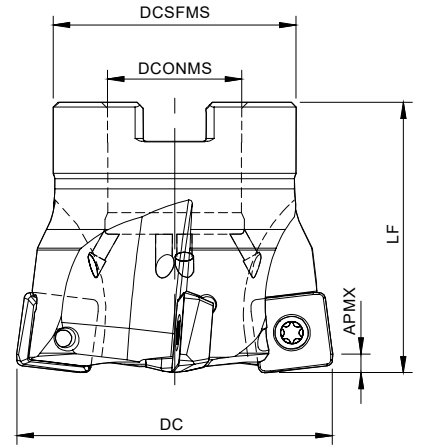
- > From DC 32mm to 100mm  
De DC 32mm a 100mm | Desde DC 32mm hasta 100mm
- > Available in arbor mounting and threaded coupling  
Disponível em montagem tipo árvore e acoplamento roscado | Disponible en fijación con tornillo central y roscada
- > Medium positive insert with 4 cutting edges (SO.. 13M5..)  
Pastilha positiva média com 4 arestas de corte (SO.. 13M5..) | Plaquita positiva media com 4 filos de corte (SO.. 13M5..)
- > Strong and reliable insert  
Pastilha forte e fiável | Plaquita fuerte y confiable



## HIFEED 06815 > page 108

- > From DC 63mm to 160mm  
De DC 63mm a 160mm | Desde DC 63mm 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
- > Large positive insert with 4 cutting edges (SO.. 1605..)  
Pastilha positiva grande com 4 arestas de corte (SO.. 1605..) | Plaquita positiva grande com 4 filos de corte (SO.. 1605..)
- > For high removal rate materials  
Para altas taxas de remoção de material | Para una alta tasa de remoción de material





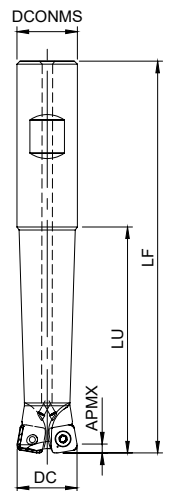
Arbor Mounting

KAPR=10° | GAMP=+2° | GAMF =+2° | RP=2,0

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)		
181149800	040A06410-05-02-016040	5	40	16	30	40	0,157	A	1,00	SO...0803...	☺
181153200	050A06410-06-02-022045	6	50	22	40	45	0,312	A	1,00	SO...0803...	☺
181149900	052A06410-06-02-022045	6	52	22	40	45	0,331	A	1,00	SO...0803...	☺

☺ 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)



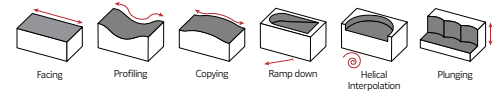
Weldon Shank

KAPR=10° | GAMP=+2° | GAMF =+2° | RP=2,0

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181076300	020W06410-02-02-020130	2	20	20	130	75	0,360	1,00	SO...0803...	☺
181080900	020W06410-02-02-020190	2	20	20	190	110	0,340	1,00	SO...0803...	☺
181076400	025W06410-03-02-025140	3	25	25	140	80	0,410	1,00	SO...0803...	☺
181081100	025W06410-03-02-025200	3	25	25	200	130	0,570	1,00	SO...0803...	☺
181076500	032W06410-04-02-032150	4	32	32	150	90	0,760	1,00	SO...0803...	☺
181081300	032W06410-04-02-032200	4	32	32	200	130	1,010	1,00	SO...0803...	☺

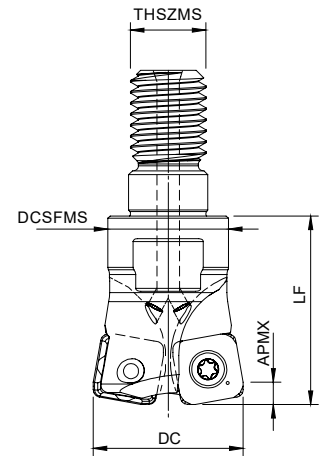
☺ Stock item | Produto de stock | Itens de stock

○ 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=10° | GAMP=+2° | GAMF =+2° | RP=2,0



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	Lf		APMX (mm)			
181071900	020R06410-02-02-M10025	2	20	M10	16	25	0,040	1,00		SO...0803...	☼
181076600	025R06410-03-02-M12028	3	25	M12	21	28	0,070	1,00		SO...0803...	☼
181076700	032R06410-04-02-M16035	4	32	M16	29	35	0,160	1,00		SO...0803...	☼
181076800	035R06410-04-02-M16035	4	35	M16	29	35	0,180	1,00		SO...0803...	☼
181076900	042R06410-05-02-M16035	5	42	M16	29	35	0,220	1,00		SO...0803...	☼

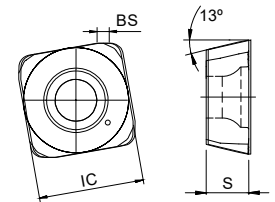
☼ Stock item | Produto de stock | Itens de stock

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

**SO...0803...** Inserts | Pastilhas | Plaquitás



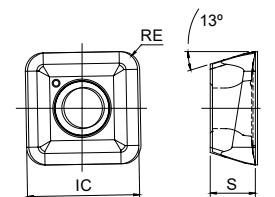
SOEW



SOEW



SOET



SOET

	(2) Grade code	P			M			K			S			Dimensions Dimensões Dimensiones (mm)			
		PVD			PVD			PVD			PVD			IC	S	RE	BS
		X5	T1	G6	X9	4H	G6	X5	T1	G6	X9	4H	G6				
(1) Geometry code	ISO Reference	PHP910	PHP920	PH7740	PHH930	PHF530	PH7740	PHP910	PHP920	PH7740	PHH930	PHF530	PH7740	IC	S	RE	BS
1111884	SOEW 080310 S	☼	☼					☼	☼				8,60	3,47	1,0	1,0	
1112149	SOET 080315-MS			☼	☼	☼	☼			☼	☼	☼	8,60	3,47	1,5	-	

☼ First choice | Primeira opção | 1ª opción

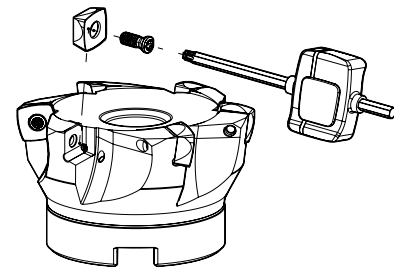
☼ Stock item | Produto de stock | Itens de stock

○ 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
A06410 - 40 - 52	P0300800	XT09	DT0914	1,4
R06410 - 20 - 42	P0300800	XT09	DT0914	1,4
W06410 - 20 - 32	P0300800	XT09	DT0914	1,4



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 →	
				PHP910	PHP920	PHH930	PHF530	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

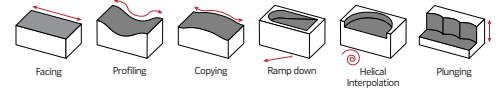
## RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)					Feed fz (mm/t)	
				← Wear Resistance			Toughness →		SOEW 08...	SOET 08...
				PHP910	PHP920	PHH930	PHF530	PH7740		
P	1	Unalloyed Steel	125-220	180-250	180-250	-	-	140-200	0,40-1,80	0,40-1,80
	2	Low-Alloyed Steel	220-280	160-240	160-230	-	-	130-180	0,40-1,80	-
	3	High-Alloyed Steel	280-380	140-230	140-220	-	-	100-170	0,40-1,50	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	140-210	140-250	130-180	-	0,40-1,30
	5	SS - Austenitic	200-330	-	-	120-170	130-240	110-160	-	0,40-1,30
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	100-150	120-220	90-150	-	0,10-1,00
K	7	Malleable Cast Iron	130-230	180-300	160-270	-	-	-	0,40-1,80	0,40-1,80
	8	Grey Cast Iron	180-245	160-250	140-250	-	-	-	0,40-1,80	-
	9	Nodular Cast iron	160-250	150-210	120-210	-	-	-	0,40-1,80	-
S	11	Heat Resistant Super Alloys	200-320			30-110	30-150	30-100	-	0,40-1,00

(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.

(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.

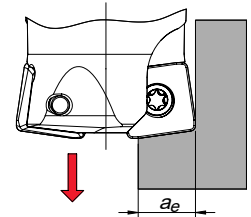
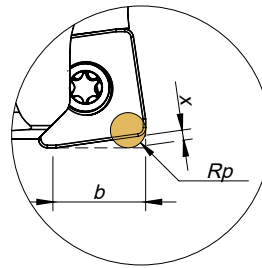


## CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	SOET 08...	SOEW 08...
	2	Low-Alloyed Steel	220-280	SOEW 08...	-
	3	High-Alloyed Steel	280-380	SOEW 08...	-
M	4	SS - Ferritic / Martensitic	200-330	SOET 08...	-
	5	SS - Austenitic	200-330	SOET 08...	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	SOET 08...	-
	7	Malleable Cast Iron	130-230	SOET 08...	SOEW 08...
K	8	Grey Cast Iron	180-245	SOEW 08...	-
	9	Nodular Cast iron	160-250	SOEW 08...	-
S	11	Heat Resistant Super Alloys	200-320	SOET 08...	-

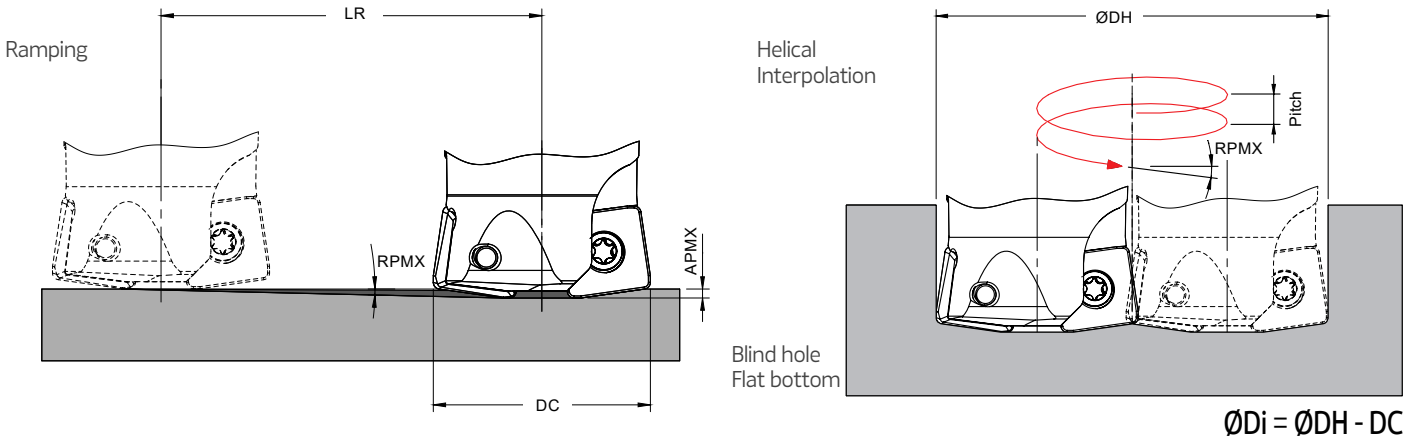
## PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	a <sub>e</sub>
SO... 0803..	2,0	0,8	6,8	6,3



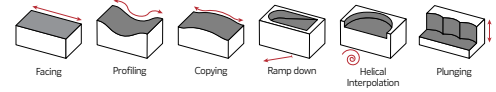
RAMPING AND HELICAL INTERPOLATION

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



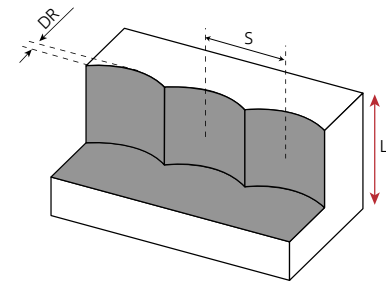
DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
20	15	1,0	3,2	26,4	-	6
25	9,5	1,0	6,0	-	38,0	17
				36,4	-	5
32	5,5	1,0	10,4	-	48,0	12
				50,4	-	5
35	4,5	1,0	12,7	-	62,0	9
				56,4	-	5
40	3,5	1,0	16,3	-	68,0	8
				66,4	-	5
42	3,5	1,0	16,3	-	80,0	7
				70,4	-	5
50	3,5	1,0	16,3	-	82,0	7
				86,4	-	6
52	3,5	1,0	16,3	-	100,0	9
				90,4	-	7
				-	104,0	9

Note: During helical interpolation do not exceed APMX.



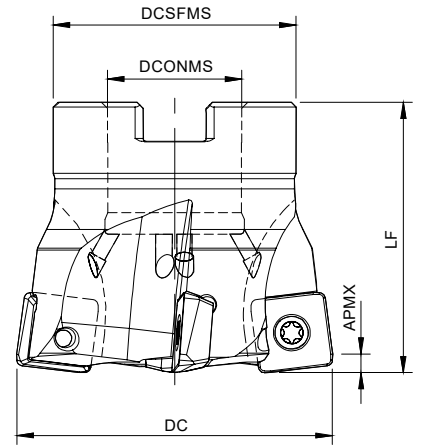
# PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
f <sub>z</sub> (mm/t)		
0,08-0,15	0,05-0,10	S <sub>max</sub> = √DC·DR·DR <sup>2</sup>



S max and DR corresponding cutting diameter DC (mm)								
DR (mm)	DC (mm)							
	20	25	32	35	40	42	50	52
1,0	4,4	4,9	5,6	5,8	6,2	6,4	7,0	7,1
2,0	6,0	6,8	7,7	8,1	8,7	8,9	9,8	10,0
3,0	7,1	8,1	9,3	9,8	10,5	10,8	11,9	12,1
4,0	8,0	9,2	10,6	11,1	12,0	12,3	13,6	13,9
5,0	8,7	10,0	11,6	12,2	13,2	13,6	15,0	15,3
6,0	9,2	10,7	12,5	13,2	14,3	14,7	16,2	16,6

Note: Recommended for L ≤ 4 Dc for extra long tool this step and side cut must be reduced.



Arbor Mounting

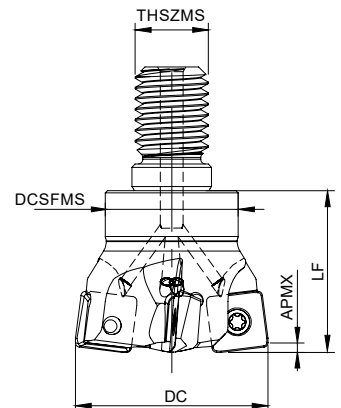
KAPR=10° | GAMP=+5° | RP=2,5

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)		
181069100	050A06690-04-05-022045	4	50	22	40	45	0,274	A	1,50	SO...13M5...	☉
181111100	050A06690-05-05-022045	5	50	22	40	45	0,272	A	1,50	SO...13M5...	☉
181029800	052A06690-04-05-022045	4	52	22	40	45	0,290	A	1,50	SO...13M5...	☉
181033500	063A06690-05-05-027050	5	63	27	48	50	0,500	A	1,50	SO...13M5...	☉
181029900	066A06690-05-05-027050	5	66	27	48	50	0,550	A	1,50	SO...13M5...	☉
181030000	080A06690-06-05-027050	6	80	27	60	50	0,955	A	1,50	SO...13M5...	☉
181113100	100A06690-08-05-032050*	8	100	32	70	50	1,500	A	1,50	SO...13M5...	☉

☉ 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)

\* For shank assembly a DIN 6912 screw is needed.



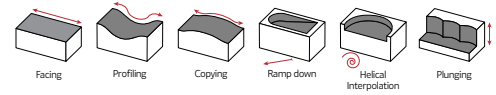
Threaded Coupling

KAPR=10° | GAMP=+5° | RP=2,5

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)			
181038700	032R06690-03-05-M16035	3	32	M16	29	35	0,145	1,50	SO...13M5	☉	
181064600	035R06690-03-05-M16035	3	35	M16	29	35	0,163	1,50	SO...13M5	☉	
181038800	042R06690-04-05-M16035	4	42	M16	29	35	0,194	1,50	SO...13M5	☉	

☉ 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)



**SO...13M5...** Inserts | Pastilhas | Plaquetas



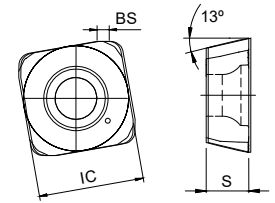
SOEW



SOEW-MD



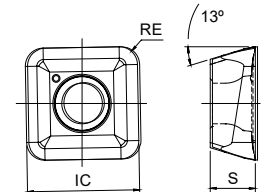
**NEW** SOEW-MP



SOEW



SOET-MS



SOET

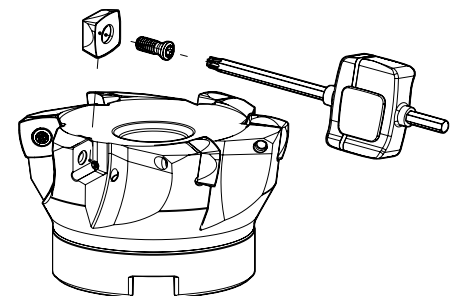
(1) Geometry code	(2) Grade code	P			M			K			S			Dimensions Dimensões Dimensiones (mm)			
		PVD			PVD			PVD			PVD			IC	S	RE	BS
		X5	T1	G6	X9	4H	G6	X5	T1	G6	X9	4H	G6				
1111906	SOEW 13M510 S	⊗	⊗	⊗				⊗	⊗	⊗				12,43	5,00	1,20	1,0
1112813	SOEW 13M510-MD		⊗					⊗	⊗					12,43	5,00	1,20	1,0
1113533	SOEW 13M520-MP		⊗					⊗	⊗					12,45	5,00	2,00	1,0
1112147	SOET 13M520-MS	○		⊗	⊗	⊗	⊗			⊗	⊗	⊗	⊗	12,43	5,00	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 página A-9)    Insert order code = (1) Geometry Code + (2) Grade Code

**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Retaining Screw
			Key (Torx - Nm)	Torque Value	
R06690 - 32 - 42	P0401200	XT15	DT1530	3,0	-
A06690 - 50 - 80	P0401200	XT15	DT1530	3,0	-
A06690 - 100	P0401200	XT15	DT1530	3,0	D1603500

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 →	
				PHP910	PHP920	PHH930	PHF530	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			Toughness →		SOEW S	SOEW MD	SOEW MP	SOET MS
				PHP910	PHP920	PHH930	PHF530	PH7740				
P	1	Unalloyed Steel	125-220	180-250	180-250	-	-	140-200	0,50-2,10	0,50-2,20	0,50-2,20	0,50-2,10
	2	Low-Alloyed Steel	220-280	160-240	160-230	-	-	130-180	0,50-2,10	0,50-2,20	0,50-2,20	-
	3	High-Alloyed Steel	280-380	140-230	140-220	-	-	100-170	0,50-2,00	0,50-2,10	0,50-2,10	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	140-210	140-250	130-180	-	-	-	0,50-1,80
	5	SS - Austenitic	200-330	-	-	120-170	130-240	110-160	-	-	-	0,50-1,80
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	100-150	120-220	90-150	-	-	-	0,50-1,50
K	7	Malleable Cast Iron	130-230	180-300	160-270	-	-	140-220	0,50-2,10	0,50-2,20	0,50-2,20	0,50-2,10
	8	Grey Cast Iron	180-245	160-250	140-250	-	-	120-210	0,50-2,10	0,50-2,20	0,50-2,20	-
	9	Nodular Cast iron	160-250	150-210	120-210	-	-	100-190	0,50-2,10	0,50-2,20	0,50-2,20	-
S	11	Heat Resistant Super Alloys	200-320	-	-	30-110	30-150	30-100	-	-	-	0,40-1,30

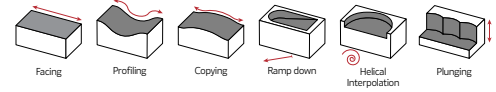
(Note 1) Cutting conditions  $a_e/D_c=70\%$ .

(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.

(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.

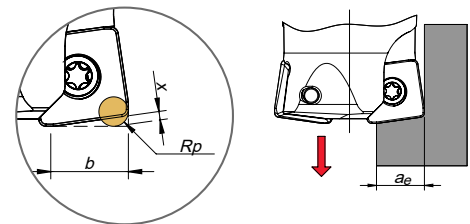


## CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

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

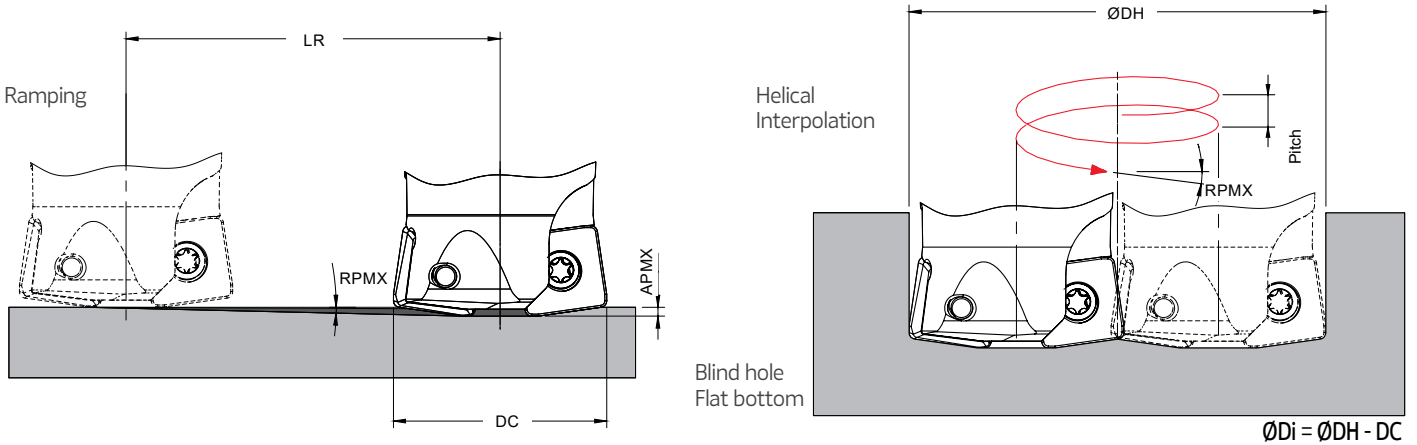
## PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	ae
SO... 13M5..	2,5	1,1	10,5	10,0
SOEW 13M520-MP	3,0	0,9	9,2	8,7



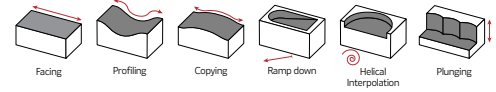
RAMPING AND HELICAL INTERPOLATION

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



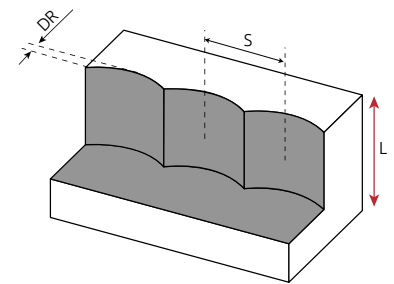
DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
32	10,0	1,5	6,0	43	-	6
				-	62,0	16
35	9,0	1,5	9,5	49	-	6
				-	68,0	16
42	6,4	1,5	13,4	63	-	7
				-	82,0	14
50	4,3	1,5	19,9	79	-	6
				-	98,0	11
52	4,0	1,5	21,5	83	-	6
				-	102,0	10
63	3,0	1,5	28,6	105	-	6
				-	124,0	10
66	2,6	1,5	33,0	111	-	6
				-	130,0	9
80	2,0	1,5	43,0	139	-	6
				-	158,0	8
100	1,0	1,5	85,9	179	-	4
				-	198,0	5

Note: During helical interpolation do not exceed APMX.



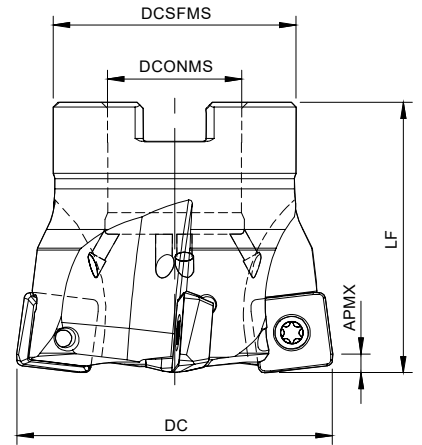
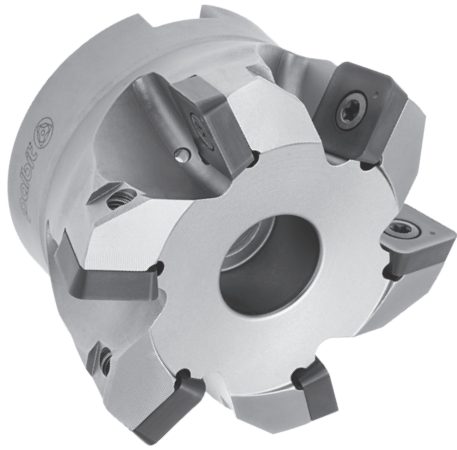
# PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
f <sub>z</sub> (mm/t)		
0,10-0,20	0,07-0,14	$S_{max} = \sqrt{DC \cdot DR - DR^2}$



S max and DR corresponding cutting diameter DC (mm)								
DR (mm)	DC (mm)							
	32	35	42	50	52	63	66	80
1,0	5,6	5,8	6,4	7,0	7,1	7,9	8,1	8,9
2,0	7,7	8,1	8,9	9,8	10,0	11,0	11,3	12,5
3,0	9,3	9,8	10,8	11,9	12,1	13,4	13,7	15,2
4,0	10,6	11,1	12,3	13,6	13,9	15,4	15,7	17,4
5,0	11,6	12,2	13,6	15,0	15,3	17,0	17,5	19,4
6,0	12,5	13,2	14,7	16,2	16,6	18,5	19,0	21,1
7,0	13,2	14,0	15,7	17,3	17,7	19,8	20,3	22,6
8,0	13,9	14,7	16,5	18,3	18,8	21,0	21,5	24,0
9,0	14,4	15,3	17,2	19,2	19,7	22,0	22,6	25,3
10,0	14,8	15,8	17,9	20,2	20,5	23,0	23,7	26,5

Note: Recommended for L ≤ 4 Dc for extra long tool this step and side cut must be reduced.



Arbor Mounting

KAPR=15° | GAMP=+2° | RP=4,5

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)		
181100400	063A06815-05-02-027050	5	63	27	48	50	0,460	A	3,50	SO...1605...	☉
181081900	066A06815-05-02-027050	5	66	27	48	50	0,500	A	3,50	SO...1605...	☉
181082000	080A06815-06-02-027050	6	80	27	60	50	0,900	A	3,50	SO...1605...	☉
181082100	100A06815-08-02-032050	8	100	32	80	50	1,600	B	3,50	SO...1605...	☉
181082200	125A06815-10-02-040063	10	125	40	90	63	2,900	B	3,50	SO...1605...	☉
181082300	160A06815-12-02-U040063	12	160	40	110	63	4,400	C	3,50	SO...1605...	☉

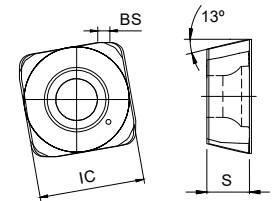
☉ Stock item | Produto de stock | Itens de stock

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

SO...1605... Inserts | Pastilhas | Plaquitás



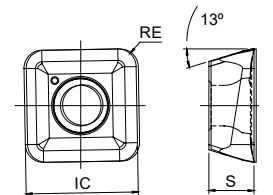
SOEW



SOEW



SOET



SOET

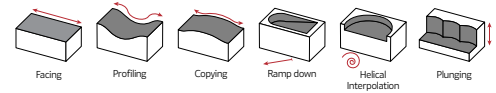
(1) Geometry code	(2) Grade code ISO Reference	P			M		K			S		Dimensions Dimensões Dimensiones (mm)			
		PVD			PVD		PVD			PVD		IC	S	RE	BS
		X5	T1	G6	X9	G6	X5	T1	G6	X9	G6				
1111907	SOEW 160512 S	☉	☉	☉		☉	☉	☉	☉			16,40	5,26	1,20	1,50
1112221	SOET 160520-MS			☉	☉	☉			☉	☉		16,40	5,26	2,00	-

☉ First choice | Primeira opção | 1ª opción

☉ Stock item | Produto de stock | Itens de stock

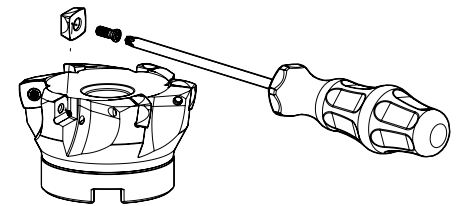
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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



**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A06815 - 63-80	P0501302	PT20	DT2050	5,0	-	-
A06815 - 100	P0501302	PT20	DT2050	5,0	J0123510	SD6368-12
A06815 - 125	P0501302	PT20	DT2050	5,0	J0164110	SD6368-16
A06815 - 160	P0501302	PT20	DT2050	5,0	-	-



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.

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

ISO	PSM	Material	HB (Brinell)	Grades				
				← Wear Resistance				Toughness →
				PHP910	PHP920	PHH930	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		Toughness →		SOEW S...	SOET MS...
				PHP910	PHP920	PHH930	PH7740		
P	1	Unalloyed Steel	125-220	180-250	180-250	-	140-200	0,50-2,10	0,50-2,20
	2	Low-Alloyed Steel	220-280	160-240	160-230	-	130-180	0,50-2,10	0,50-2,20
	3	High-Alloyed Steel	280-380	140-230	140-220	-	100-170	0,50-2,00	0,50-1,80
M	4	SS - Ferritic / Martensitic	200-330	-	-	140-210	130-180	-	0,50-1,80
	5	SS - Austenitic	200-330	-	-	120-170	110-160	-	0,50-1,80
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	100-150	90-150	-	0,50-1,50
K	7	Malleable Cast Iron	130-230	180-300	160-270	-	140-220	0,50-2,10	0,50-2,00
	8	Grey Cast Iron	180-245	160-250	140-250	-	120-210	0,50-2,10	0,50-2,00
	9	Nodular Cast iron	160-250	150-210	120-210	-	100-190	0,50-2,10	0,50-1,80
S	11	Heat Resistant Super Alloys	200-320	-	-	30-110	30-100	-	0,40-1,30

(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.

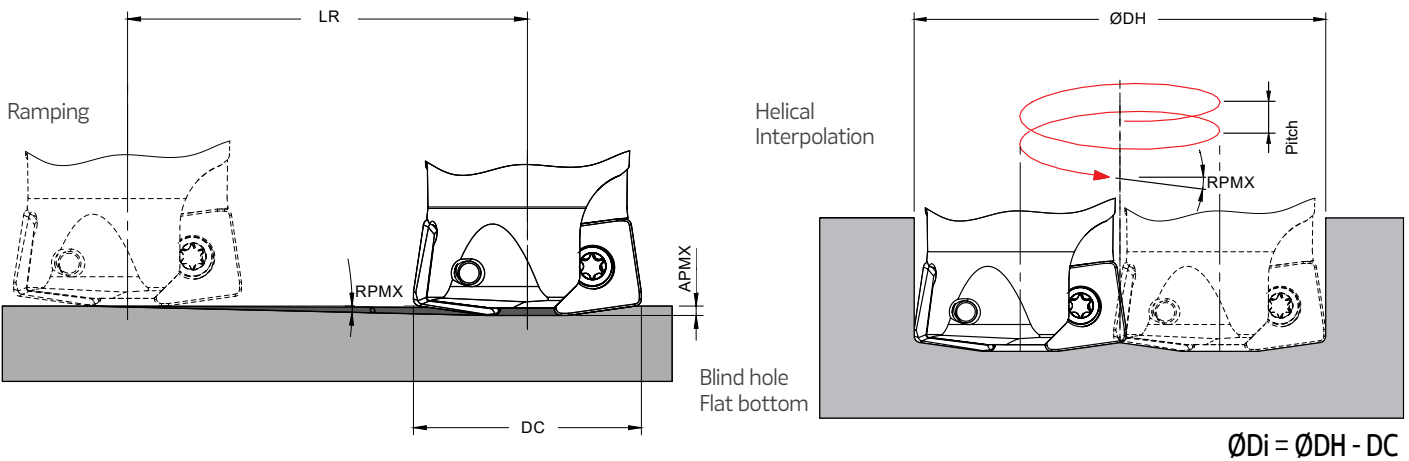
(Note 3) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:  
 - When using long shank;  
 - When using long tool overhang with arbor type;  
 - When application has poor clamping rigidity or when using a low rigidity 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	SOET 16...	SOEW 16...
	2	Low-Alloyed Steel	220-280	SOEW 16...	-
	3	High-Alloyed Steel	280-380	SOEW 16...	-
M	4	SS - Ferritic / Martensitic	200-330	SOET 16...	-
	5	SS - Austenitic	200-330	SOET 16...	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	SOET 16...	-
	7	Malleable Cast Iron	130-230	SOET 16...	SOEW 16...
K	8	Grey Cast Iron	180-245	SOEW 16...	-
	9	Nodular Cast iron	160-250	SOEW 16...	-
S	11	Heat Resistant Super Alloys	200-320	SOET 16...	-

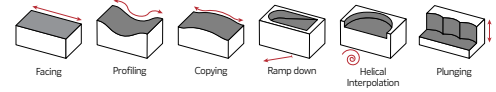
RAMPING AND HELICAL INTERPOLATION

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



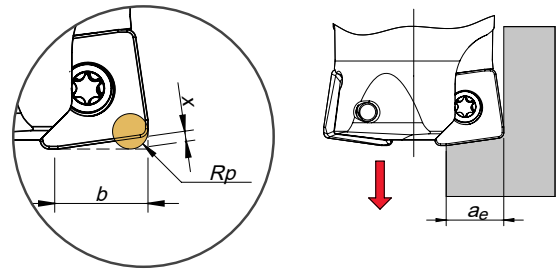
DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
63	3,5	3,5	80,2	99,0	-	6
66	3,0	3,5	66,8	105	-	6
				-	123,6	11
80	2,0	3,5	100,2	133	-	5
				-	157,5	8
100	1,5	3,5	133,7	173	-	6
				-	197,5	8
125	1,0	3,5	200,5	223	-	5
				-	247,5	6
160	0,5	3,5	401,1	293	-	3
				-	317,5	4

Note: During helical interpolation do not exceed APMX.



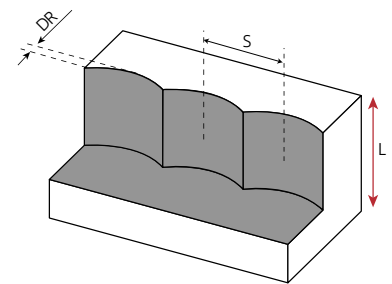
**PROGRAMMING DATA** Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	ae
SO...1605..	4,5	2,3	13,5	12,8



**PLUNGING** Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
fz (mm/t)		
0,10-0,20	0,07-0,14	$S_{max} = \sqrt{DC \cdot DR - DR^2}$



S max and DR corresponding cutting diameter DC (mm)		
DR (mm)	DC (mm)	
	66	80
1,0	8,1	8,9
2,0	11,3	12,5
3,0	13,7	15,2
4,0	15,7	17,4
5,0	17,5	19,4
6,0	19,0	21,1
7,0	20,3	22,6
8,0	21,5	24,0
9,0	22,6	25,3
10,0	23,7	26,5
11,0	24,6	27,5
12,0	25,5	28,6

Note: Recommended for L ≤ 4 Dc for extra long tool this step and side cut must be reduced.

50560 | 50060

# HIFEED



The HIFEED line featuring three cutting edges excels in high overhang applications, demonstrating exceptional stability and performance. Its curved design mitigates vibration and enhances tool longevity, making them ideal for challenging machining tasks.

A linha HIFEED, com três arestas de corte, destaca-se em aplicações de elevada profundidade, demonstrando estabilidade e desempenho excepcionais. Seu design curvo reduz a vibração e melhora a longevidade da ferramenta, tornando-as ideais para tarefas de fresagem desafiadoras.

La línea HIFEED, con tres filos de corte, sobresale en aplicaciones de alta profundidad, demostrando una estabilidad y rendimiento excepcionales. Su diseño curvado reduce la vibración y mejora la longevidad de la herramienta, haciéndolas ideales para tareas de fresado desafiantes.

## HIFEED 50560 > page 114

- > **From DC 52mm to 80mm**  
De DC 52mm a 80mm | Desde DC 52mm hasta 80mm
- > **Available in arbor mounting**  
Disponível em montagem tipo árvore | Disponible en fijación con tornillo central
- > **Screw and Washer**  
Parafuso e Anilha | Tornillo y Arandela



## HIFEED 50060 > page 118

- > **From DC 35mm to 80mm**  
De DC 35mm a 80mm | Desde DC 35mm hasta 80mm
- > **Available in arbor mounting and threaded coupling**  
Disponível em montagem tipo árvore e acoplamento roscado | Disponible en fijación con tornillo central y roscada
- > **Excellent in high overhang applications**  
Excelente em aplicações de elevada profundidade | Excelente en aplicaciones con una gran longitud



# A HIFEED 50560

MILLING

Face milling

High feed milling

Shoulder milling

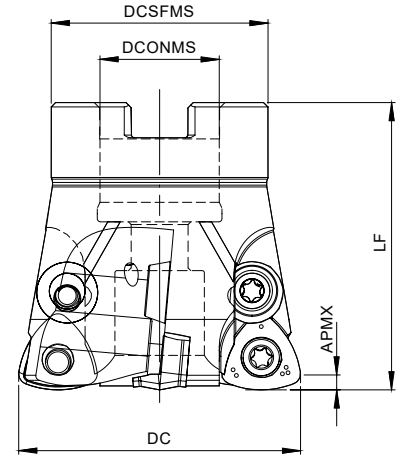
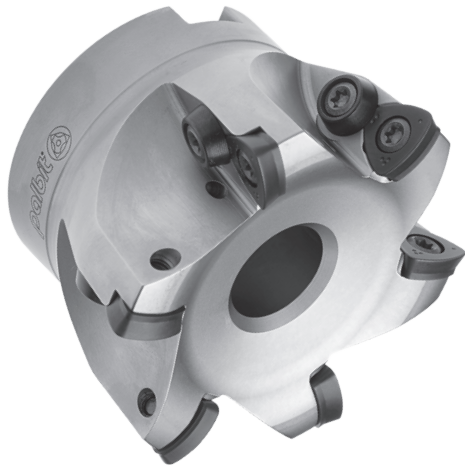
Profile milling

Specialty

Spare Parts

Technical Data

End Mills



**Arbor Mounting**  
KAPR=45° | GAMP=+20°~+21°

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)		
181020800	052C50560-04-05-022053	4	52	22	40	53	0,390	A	1,5	WD... 1204...	☼
181172400	063C50560-05-05-027053	5	63	27	48	53	0,590	A	1,5	WD... 1204...	☼
181020200	066C50560-05-05-027053	5	66	27	48	53	0,640	A	1,5	WD... 1204...	☼
181020300	080C50560-06-05-027053	6	80	27	60	53	1,060	A	1,5	WD... 1204...	☼

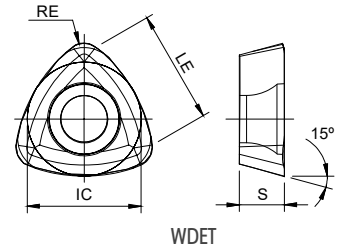
☼ Stock item | Produto de stock | Itens de stock

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

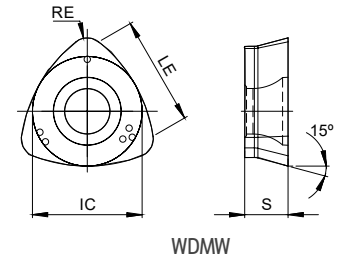
## WD... 1204... Inserts | Pastilhas | Plaquititas



WDET



WDMW



Geometry code	ISO Reference	P		M		K		S		Dimensions Dimensões Dimensiones (mm)				
		PVD		PVD		PVD		PVD		IC	S	LE	RE	
		G4	P3	G6	P3	G6	G4	G6	P3					G6
1112148	WDET 120420-MS	PH7920	PH7930	PH7740	PH7930	PH7740	PH7920	PH7740	PH7930	PH7740	12,00	4,76	11,9	2,00
1111123	WDMW 120420-T	☼		☼			☼	☼			12,00	4,76	11,9	2,00

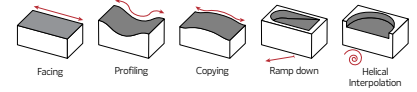
☼ First choice | 1ª Escolha | 1ª Opción

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

Insert Order Code: <sup>(1)</sup>Geometry code + <sup>(2)</sup>Grade code

☼ Stock items | Itens de stock

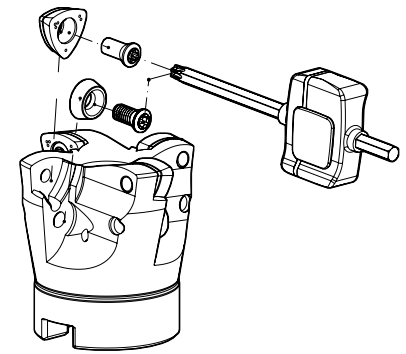
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)



**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value	Washer	Washer Screw
A50560 – 52 - 80	P0451001	XT20	DT2050	5,0	HC01200	P0451001

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 →
				PH7910	PH7920	PH7930	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	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	WDET 12...	WDMW 12...
	2	Low-Alloyed Steel	220-280	WDMW 12...	-
	3	High-Alloyed Steel	280-380	WDMW 12...	-
M	4	SS - Ferritic / Martensitic	200-330	WDET 12...	-
	5	SS - Austenitic	200-330	WDET 12...	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	WDET 12...	-
K	7	Malleable Cast Iron	130-230	WDMW 12...	-
	8	Grey Cast Iron	180-245	WDMW 12...	-
	9	Nodular Cast iron	160-250	WDMW 12...	-
S	11	Heat Resistant Super Alloys	200-320	WDET 12...	-

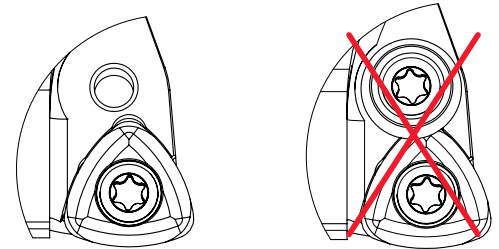
RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)				Feed fz (mm/t)	
				← Wear Resistance		Toughness →		WDMW 12...	WDET 12...
				PH7910	PH7920	PH7930	PH7740		
P	1	Unalloyed Steel	125-220	180-250	180-240	160-220	140-200	0,30-1,50	0,30-1,30
	2	Low-Alloyed Steel	220-280	160-230	160-220	140-200	130-180	0,30-1,50	0,30-1,30
	3	High-Alloyed Steel	280-380	140-220	140-210	120-190	100-170	0,30-1,30	0,30-1,00
M	4	SS - Ferritic / Martensitic	200-330			140-200	130-180	-	0,30-1,30
	5	SS - Austenitic	200-330			120-160	110-160	-	0,30-1,30
	6	SS - Austenitic-ferritic (Duplex)	230-260			100-140	90-150	-	0,30-1,00
K	7	Malleable Cast Iron	130-230	180-300	160-260		140-220	0,30-1,50	-
	8	Grey Cast Iron	180-245	160-250	140-240		120-210	0,30-1,50	-
	9	Nodular Cast iron	160-250	150-200	120-200		100-190	0,30-1,40	-
S	11	Heat Resistant Super Alloys	200-320	-	-	30-100	30-100	-	0,30-1,00

(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:

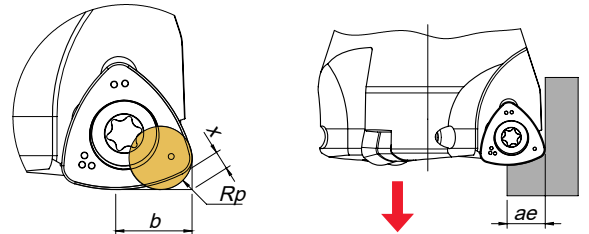
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.



When using WDET insert, please remove the washer and the washer screw, otherwise it will break the insert.

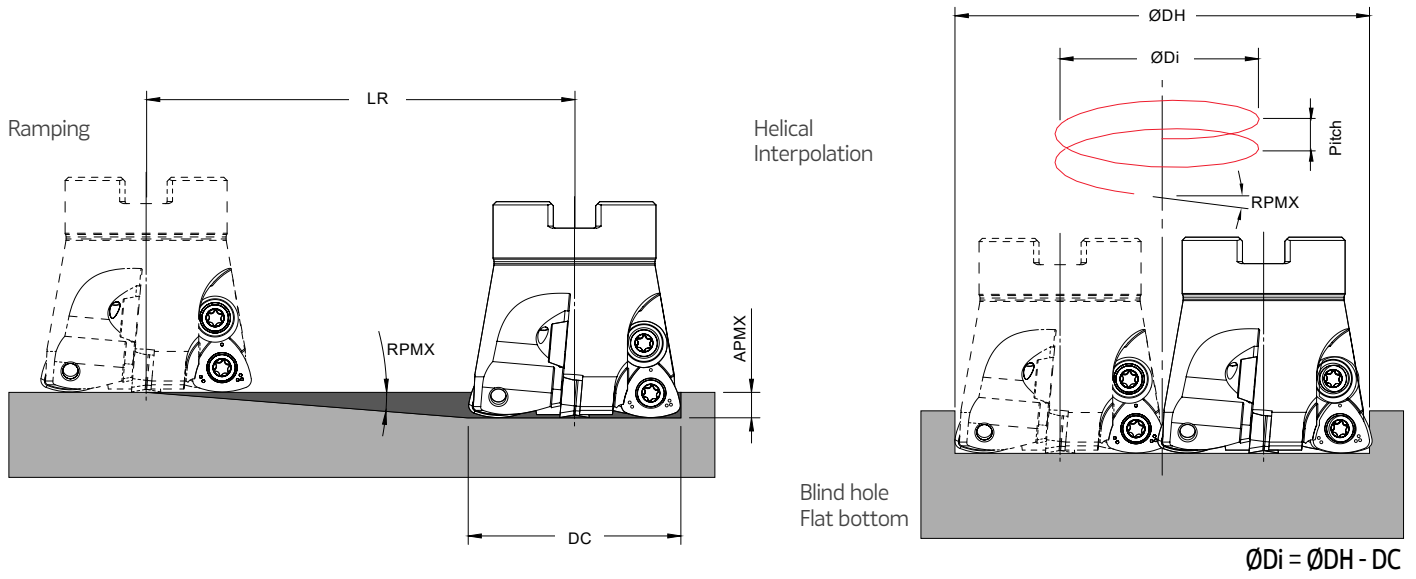
PROGRAMMING DATA Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	x	b	$a_e$
WD... 1204	3,2	0,7	7,2	7,0



# RAMPING AND HELICAL INTERPOLATION

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



DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
52	0,8	1,5	107,4	89,6	-	1
66	0,4	1,5	214,9	117,6	-	1
				-	130,0	1
80	0,3	1,5	286,5	145,6	-	1
				-	158,0	1

Note: During helical interpolation do not exceed APMX.

# A HIFEED 50060

MILLING

Face milling

High feed milling

Shoulder milling

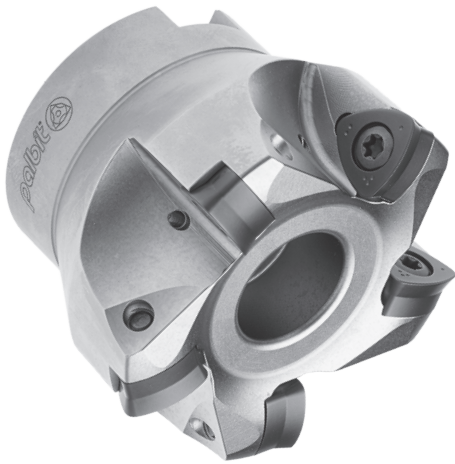
Profile milling

Specialty

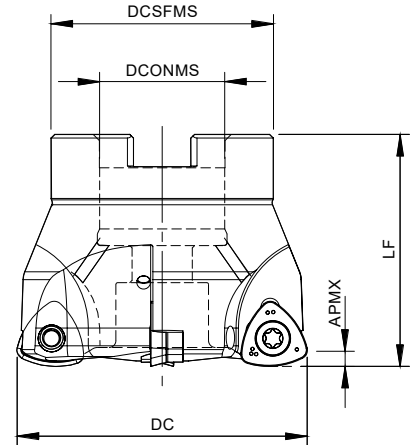
Spare Parts

Technical Data

End Mills



**Arbor Mounting**  
GAMP=0° | RP=3,5



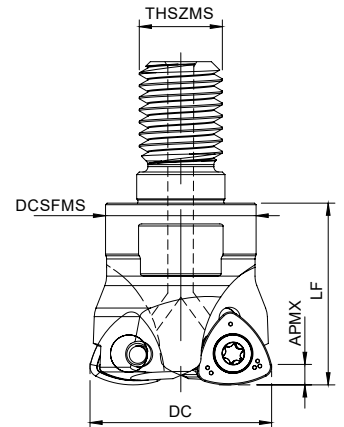
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181020400	052A50060-03-022045	3	52	22	40	45	0,320	A	1,8	WN... 1207	☉
181033900	063A50060-04-027050	4	63	27	48	50	0,547	A	1,8	WN... 1207	☉
181028700	066A50060-04-027050	4	66	27	48	50	0,597	A	1,8	WN... 1207	☉
181035900	066A50060-05-027050	5	66	27	48	50	0,610	A	1,8	WN... 1207	☉
181020100	080A50060-05-027050	5	80	27	60	50	1,000	A	1,8	WN... 1207	☉

☉ 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)



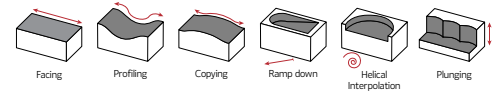
**Threaded Coupling**  
GAMP=0° | RP=3,5



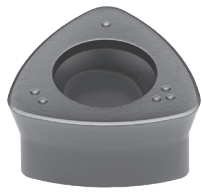
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)		
181039000	035R50060-02-M16035	2	35	M16	29	35	0,166	1,8	WN... 1207	☉

☉ Stock item | Produto de stock | Itens de stock

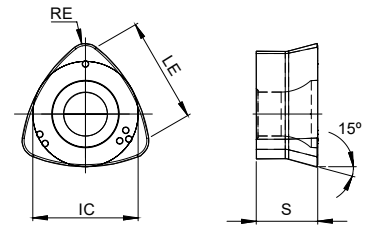
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



**WNMW 1207** Inserts | Pastilhas | Plaquetas



WNMW



WNMW

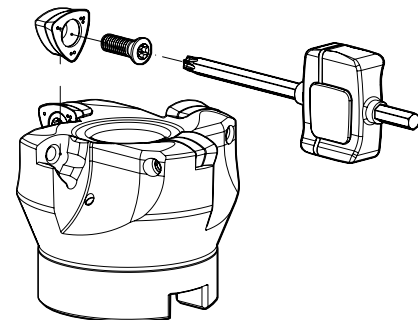
		P				K		Dimensions Dimensões Dimensiones (mm)			
		PVD				PVD		IC	S	LE	RE
(1) Geometry code	(2) Grade code	G1	G4	78	86	G1	G4				
1121148	WNMW 1207-SP	PH7910	PH7920	PH6125	PH6135	PH7910	PH7920	12,00	7,00	11,90	2,00

⊗ 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 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
R50060 - 35	P0451400	XT20	DT2050	5,0
A50060 - 52 - 80	P0451400	XT20	DT2050	5,0

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.



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

ISO	PSM	Material	HB (Brinell)	Grades			
				← Wear Resistance		Toughness →	
				PH7910	PH7920	PH6125	PH6135
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 →		
				PH7910	PH7920	PH6125	PH6135	
P	1	Unalloyed Steel	125-220	180-250	180-240	160-190	150-180	0,30-1,50
	2	Low-Alloyed Steel	220-280	160-230	160-220	140-180	140-170	0,30-1,50
	3	High-Alloyed Steel	280-380	140-220	140-210	130-160	120-150	0,30-1,30
K	7	Malleable Cast Iron	130-230	180-300	160-260	-	-	0,30-1,50
	8	Grey Cast Iron	180-245	160-250	140-240	-	-	0,30-1,50
	9	Nodular Cast iron	160-250	150-200	120-200	-	-	0,30-1,40

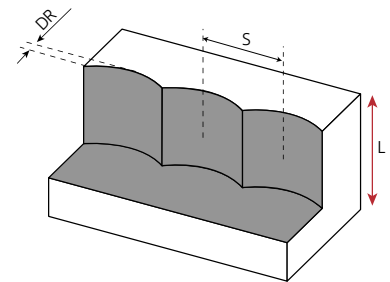
(Note 1) Cutting conditions  $a_e/D_c=70\%$ .

(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.

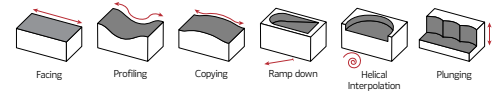
## PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
fz (mm/t)		
0,10-0,20	0,07-0,14	$S_{max} = \sqrt{DC \cdot DR - DR^2}$



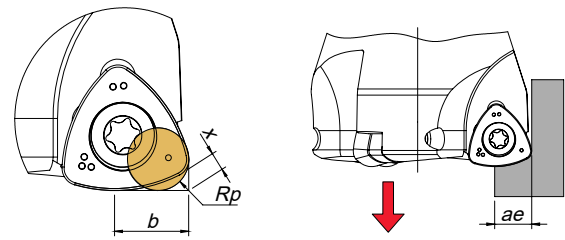
S max and DR corresponding cutting diameter DC (mm)					
DR (mm)	DC (mm)				
	35	52	63	66	80
1,0	5,8	7,1	7,9	8,1	8,9
2,0	8,1	10,0	11,0	11,3	12,5
3,0	9,8	12,1	13,4	13,7	15,2
4,0	11,1	13,9	15,4	15,7	17,4
5,0	12,2	15,3	17,0	17,5	19,4
6,0	13,2	16,6	18,5	19,0	21,1
7,0	14,0	17,7	19,8	20,3	22,6
8,0	14,7	18,8	21,0	21,5	24,0

Note: Recommended for  $L \leq 4 D_c$ , for  $L > 4 D_c$  steps must be reduced to 40%.



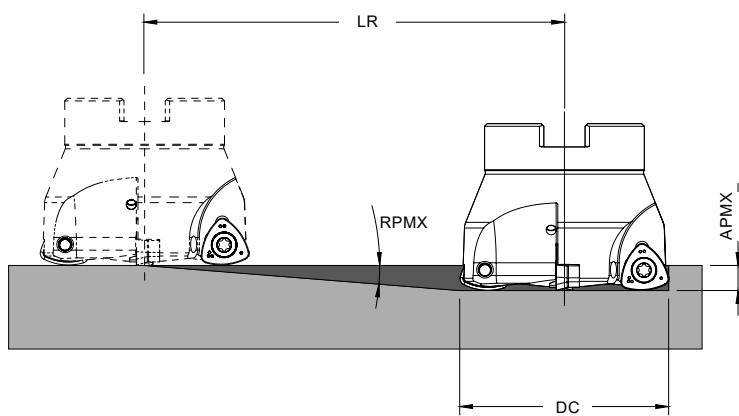
**PROGRAMMING DATA** Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	ae
WNMW 12	3,5	0,9	8,4	8,0



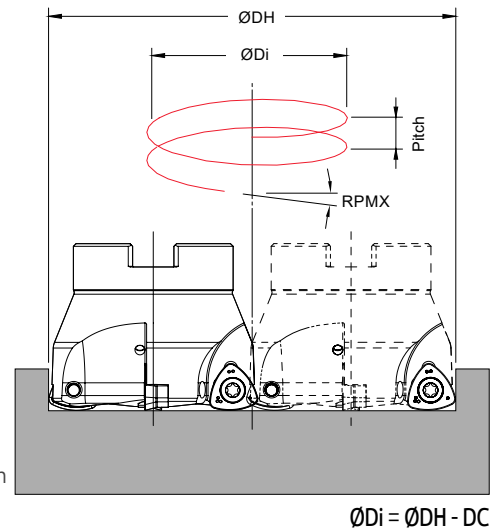
**RAMPING AND HELICAL INTERPOLATION**

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



Helical Interpolation


Blind hole  
Flat bottom



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

DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
35	3,0	1,8	34,3	53,2	-	2
52	1,8	1,8	57,3	87,2	-	5
				-	102,0	4
63	1,2	1,8	85,9	109,2	-	3
				-	124,0	4
66	1,0	1,8	114,6	115,2	-	3
				-	130,0	3
80	0,9	1,8	114,6	143,0	-	3
				-	158,0	3

Note: During helical interpolation do not exceed APMX.



**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 49490 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

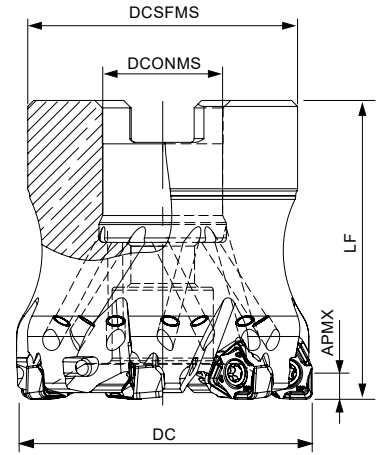
- > Full 90° main cutting edge

Aresta de corte a 90° | Filo de corte a 90°





**Arbor Mounting**  
KAPR=90° | GAMP=-5°



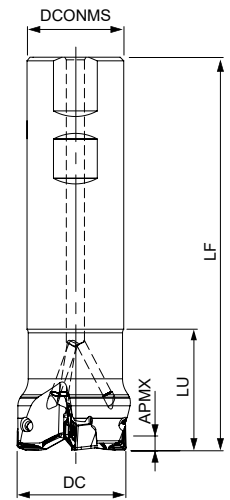
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181192200	032A49490-06-05-016040	6	32	16	30	40	0,124	A	3,5	WNXT 04   WOXT 04	⊗
181192300	040A49490-07-05-016040	7	40	16	36	40	0,204	A	3,5	WNXT 04   WOXT 04	⊗
181192400	050A49490-08-05-022040	8	50	22	42	40	0,285	A	3,5	WNXT 04   WOXT 04	⊗
181192500	050A49490-09-05-022040	9	50	22	42	40	0,280	A	3,5	WNXT 04   WOXT 04	⊗
181192600	063A49490-10-05-022040	10	63	22	48	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 página 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)			
181218900	020W49490-03-05-020090	3	20	20	90	29	0,310	3,5	WNXT 04   WOXT 04	⊗	
181193300	020W49490-03-05-020150	3	20	20	150	29	0,310	3,5	WNXT 04   WOXT 04	⊗	
181219000	025W49490-04-05-025100	4	25	20	100	29	0,565	3,5	WNXT 04   WOXT 04	⊗	
181193400	025W49490-05-05-025100	4	25	20	170	29	0,565	3,5	WNXT 04   WOXT 04	⊗	
181219100	025W49490-05-05-025170	5	25	20	100	29	0,591	3,5	WNXT 04   WOXT 04	⊗	
181193500	025W49490-05-05-025170	5	25	20	170	29	0,591	3,5	WNXT 04   WOXT 04	⊗	
181193600	032W49490-05-05-032110	5	32	32	110	31	1,185	3,5	WNXT 04   WOXT 04	○	
181193700	032W49490-06-05-032110	6	32	32	110	31	1,132	3,5	WNXT 04   WOXT 04	○	

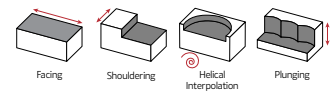
⊗ Stock item | Produto de stock | Itens de stock

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

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

# HEXAPLUS 49490

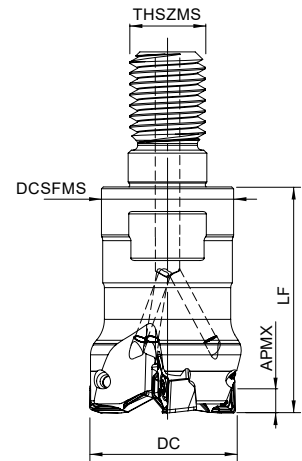
WNXT 04 | WOXT 04



A



**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	32	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 | 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)

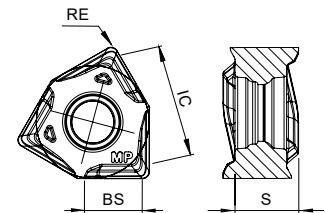
## W..XT 0403... Inserts | Pastilhas | Plaquetas



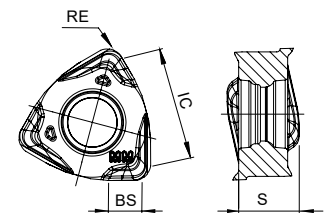
WNXT-MP



WOXT-MM



WNXT



WOXT

Geometry code (1)	ISO Reference	P		M			K	S		Dimensions Dimensões Dimensiones (mm)			
		PVD		PVD			PVD	PVD		IC	S	RE	BS
		T1	P4	P4	X9	4H	T1	X9	4H				
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 pagina A-9)

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

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

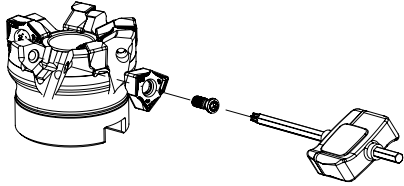
Spare Parts

Technical Data

End Mills

## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			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

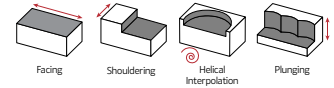


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301. Check the procedures for the clamping screws on the page A-301.

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

ISO	PSM	Material	HB (Brinell)	Grades			
				← Wear Resistance			Toughness →
				PHP920	PHP930	PHH930	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 →		WNXT 04	WOXT 04
				PHP920	PHP930	PHH930	PHF530		
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	140-210	140-250	-	0,05-0,20
	5	SS - Austenitic	200-330	-	100-160	120-170	130-240	-	0,05-0,20
	6	SS - Austenitic-ferritic (Duplex)	220-260	-	80-140	100-150	120-220	-	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	-	-	30-110	30-150	-	0,05-0,15

**MILLING**

Face milling

High feed milling

Shoulder milling

**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	

Profile milling

Specialty

Spare Parts

Technical Data

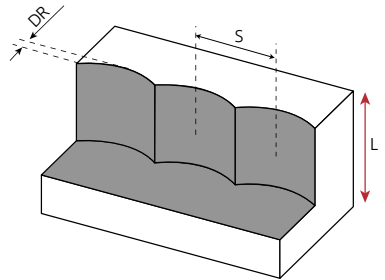
End Mills

**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 <sub>z</sub> (mm/t)		
0,10-0,30	0,08-0,25	



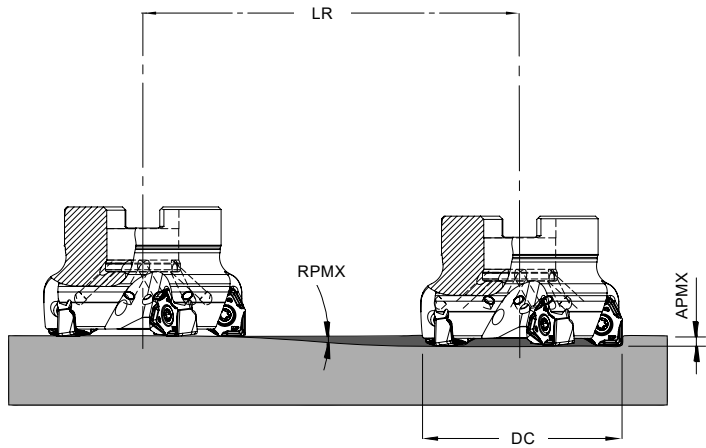
S max and DR corresponding cutting diameter DC (mm)							
DR (mm)	DC (mm)						
	18	20	25	32	40	50	60
1,0	4,1	4,4	4,9	5,6	6,2	7,0	7,9
1,5	5,0	5,3	5,9	6,8	7,6	8,5	9,6
2,0	5,7	6,0	6,8	7,7	8,7	9,8	11,0
2,5	6,2	6,6	7,5	8,6	9,7	10,9	12,3

Note: This values are only for WNXT inserts.

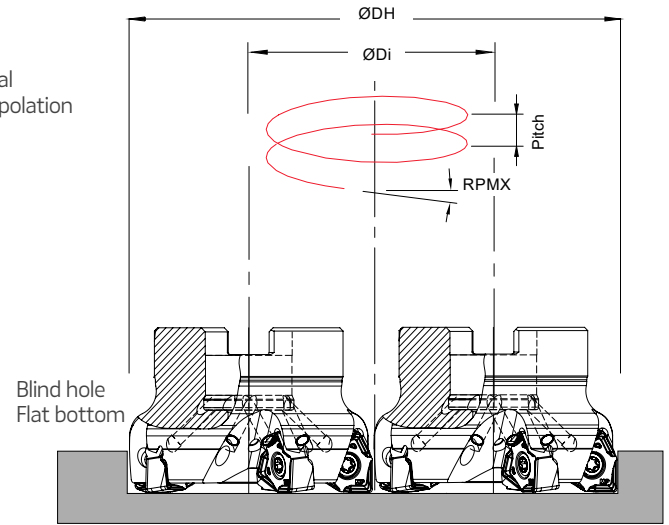
# RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical Interpolation



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

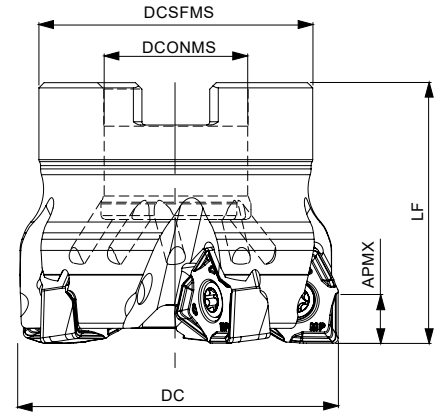
DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
18	2,40	3,5	83,5	31,2	-	1,70
				-	34,4	2,10
20	2,00	3,5	100,2	35,2	-	1,60
				-	38,4	2,00
25	1,50	3,5	133,7	45,2	-	1,60
				-	48,4	1,90
32	1,15	3,5	174,4	59,2	-	1,70
				-	62,4	1,90
40	0,85	3,5	235,9	75,2	-	1,60
				-	78,4	1,70
50	0,65	3,5	308,5	95,2	-	1,60
				-	98,4	1,70
63	0,50	3,5	401,1	121,2	-	1,50
				-	124,4	1,60

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.

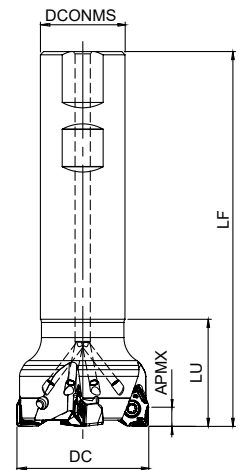


**Arbor Mounting**  
KAPR=90° | GAMP=-6°

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	48	40	0,500	A	7,5	WNXT 0806...	⊗
181173600	063A49590-06-06-022040	6	63	22	48	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)

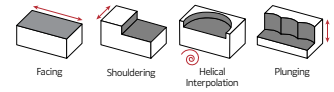


**Weldon Shank**  
KAPR=90° | GAMP=-6°

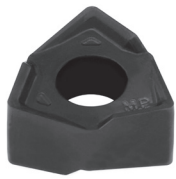
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181174300	032W49590-02-06-032125	2	32	32	125	40	0,650	7,5	WNXT 0806...	⊗
181174500	040W49590-03-06-032130	3	40	32	130	40	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

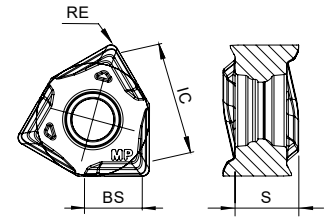
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



WNXT 0806... Inserts | Pastilhas | Plaquetas



WNXT



WNXT

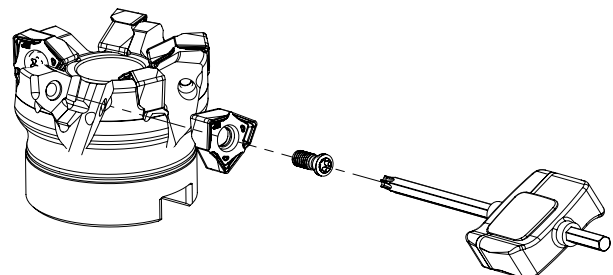
	<sup>(2)</sup> Grade code	P		K		Dimensions Dimensões Dimensiones (mm)			
		PVD		PVD		IC	S	RE	BS
		T1	P4	T1	P4				
<sup>(1)</sup> Geometry code	ISO Reference	PHP920	PHP930	PHP920	PHP930				
1113000	WNXT 080608 PNSR-MP					12,70	6,30	0,80	4,10

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	✓	✓	

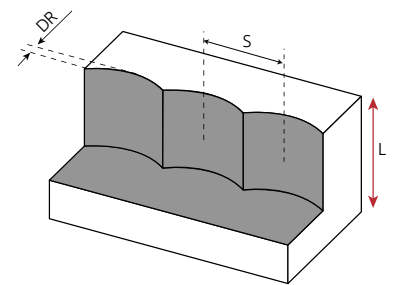
Good Conditions    
 Average Conditions    
 Difficult Conditions

## 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 →		
				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.
fz (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

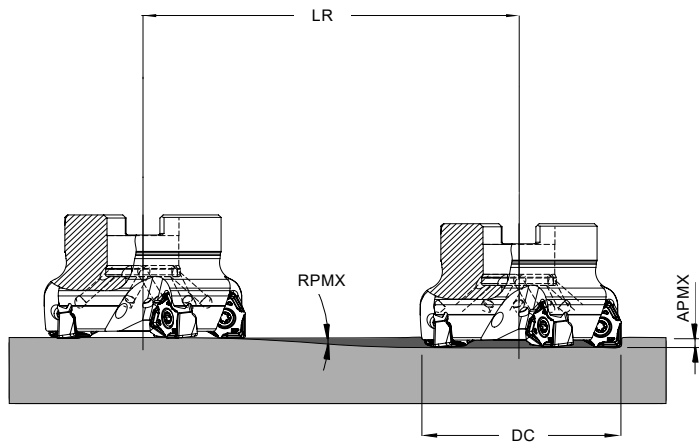
**PROGRAMMING DATA** Dados para programação | Datos para la programación

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

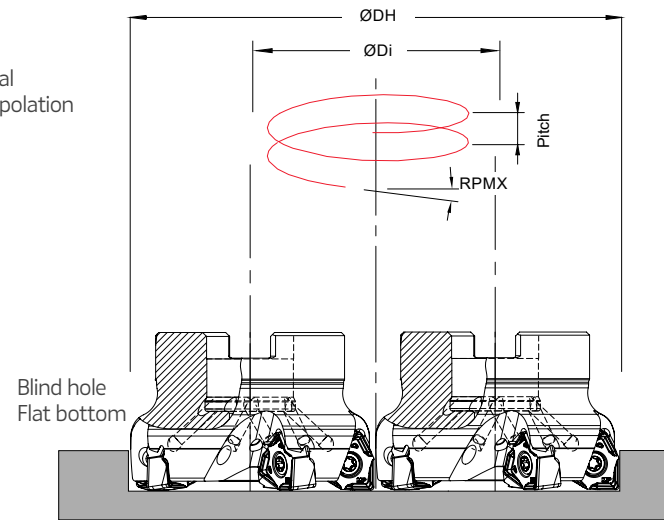
**RAMPING AND HELICAL INTERPOLATION**

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
40	0,30	7,5	1432,4	70,2	-	0,49
50	0,20	7,5	2148,6	90,2	-	0,44
63	0,14	7,5	3069,4	116,2	-	0,40
80	0,10	7,5	4297,2	150,2	-	0,38
100	0,07	7,5	6138,8	190,2	-	0,34
125	0,05	7,5	8594,4	240,2	-	0,31
160	0,04	7,5	10743,0	310,2	-	0,32
						0,34

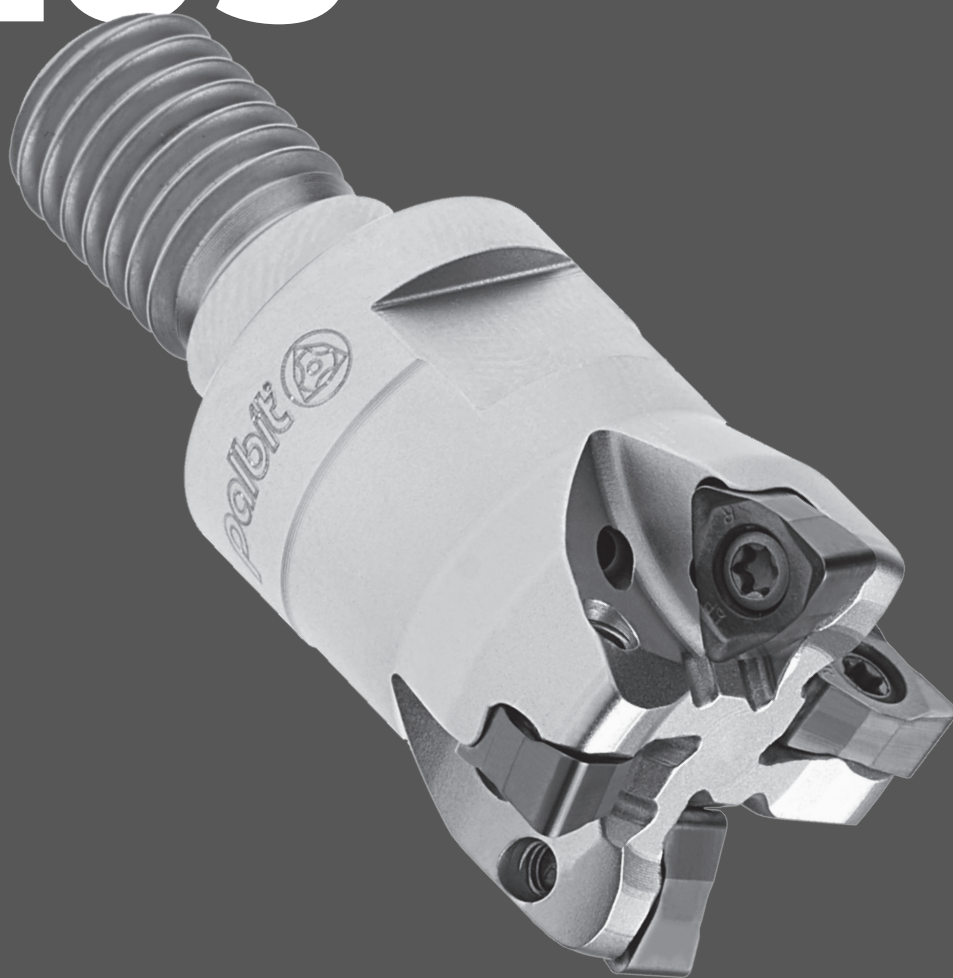
Note: During helical interpolation do not exceed APMX.

(\*) 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-aperas 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

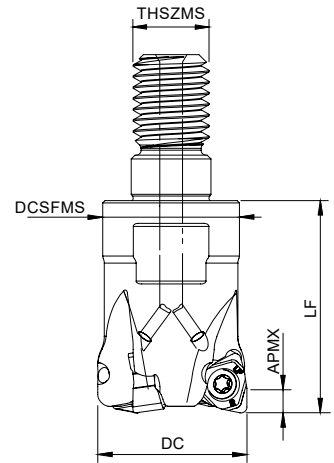
- > Negative inserts with 6 cutting-edges

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

- > Chip breaker for aluminium application

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



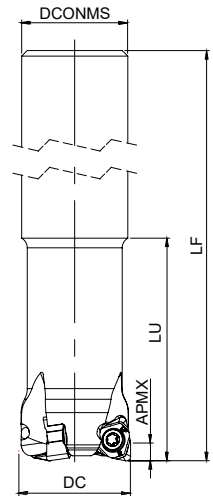


**Threaded Coupling**  
KAPR=90° | GAMP=-7°

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specification APMX (mm)	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF				
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°

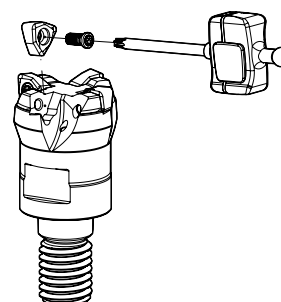
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specification APMX (mm)	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU				
181136100	016E49090-02-07-U015150	2	16	15	150	32	0,185	3,00	WNHU 04T3..	☉
181136200	020E49090-03-07-U019150	3	20	19	150	40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

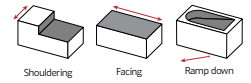
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

## SPARE PARTS Acessórios | Repuestos

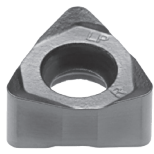
Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
R49090 - 20-32	P0250704	XT08	DT0812	1,2
E49090 - 16-25	P0250704	XT08	DT0812	1,2



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.



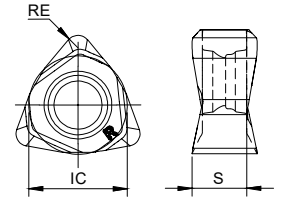
WNHU 04T3.. Inserts | Pastilhas | Plaquetas



WNHU-LP



WNHU-LN



WNHU-LP | LN

(1) Geometry code	(2) Grade code	P			K			N	Dimensions Dimensões Dimensiones (mm)		
		PVD			PVD			UNC	IC	S	RE
		X5	T1	P4	X5	T1	P4	10			
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 PNER-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
				PH0910	PHP910	PHP920	PHP930		
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 pequena 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

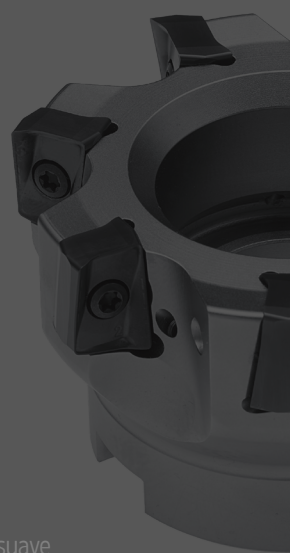
Disponível em montagem tipo árvore, acoplamento roscado e haste weldon | Disponible en fijación con tornillo central, fijación roscada y mango tipo weldon

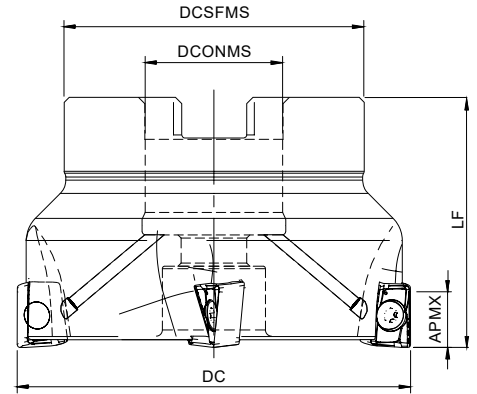
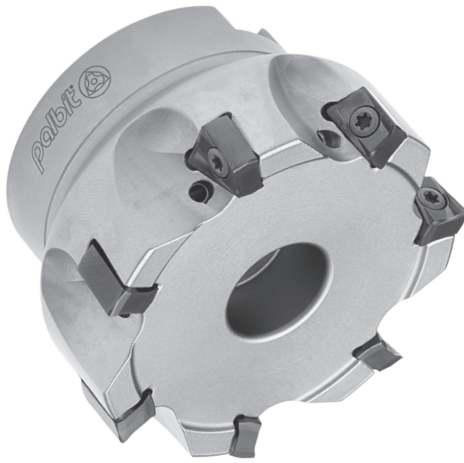
- > Large negative insert with 4 cutting edges (ANHX 1607..)

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...	☉

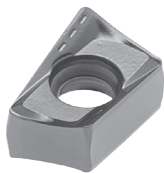
☉ Stock item | Produto de stock | Itens de stock

○ 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



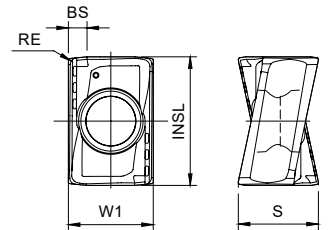
ANHX-LP



ANHX-LM



ANHX-LN



ANHX-LP | LM | LN

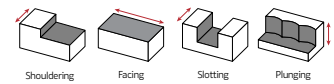
(1) Geometry code	(2) Grade code ISO Reference	P						M		K						N		S		Dimensions Dimensões Dimensiones (mm)				
		CVD		PVD				PVD		CVD		PVD				UNC		PVD						
		T9	G1	X5	T1	P4	G6	X9	G6	T9	G1	X5	T1	P4	G6	10	X9	G6	W1	S	INSL	RE	BS	
1111652	ANHX 100405 PNR-LP			☉	☉	☉		○				☉	☉	☉		○		6,60	6,20	10,00	0,50	0,85		
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

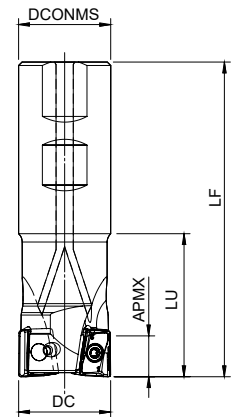
☉ Stock item | Produto de stock | Itens de stock

○ 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...	☉

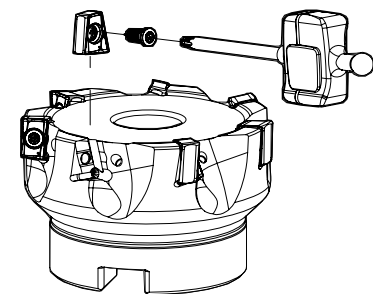
☉ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire 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
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)	Grades						
				← 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	ANHX... LP	ANHX... LM	ANHX... 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  $a_e/D_c=70\%$ .

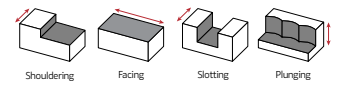
(Note 2)

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

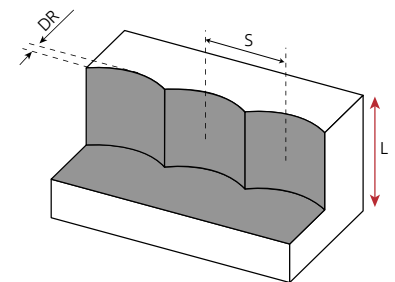


# CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

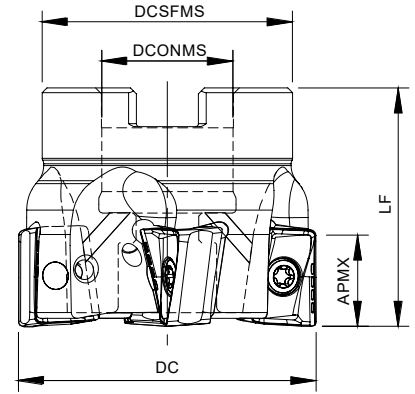
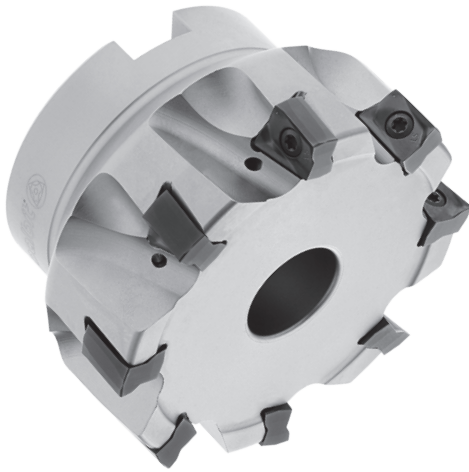
ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1 <sup>st</sup> choice	Difficult Operations
<b>P</b>	1	Unalloyed Steel	125-220	ANHX 10... LM	ANHX 10... LP
	2	Low-Alloyed Steel	220-280	ANHX 10... LM	ANHX 10... LP
	3	High-Alloyed Steel	280-380	ANHX 10... LM	ANHX 10... LP
<b>M</b>	4	SS - Ferritic / Martensitic	200-330	ANHX 10... LM	-
	5	SS - Austenitic	200-330	ANHX 10... LM	-
	6	SS - Austenitic-ferritic (Duplex)	220-260	ANHX 10... LM	-
<b>K</b>	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	-
<b>N</b>	10	Aluminium and Non Ferrous	30-130	ANHX 10... LN	-
<b>S</b>	11	Heat Resistant Super Alloys	200-320	ANHX 10... LM	-

## PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
f <sub>z</sub> (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)										
	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

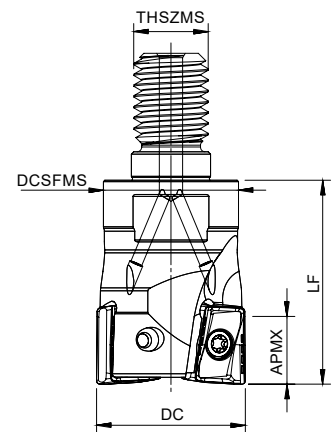


**Arbor Mounting**  
KAPR=90° | GAMP=-6°

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)



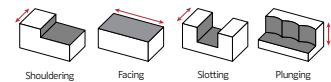
**Threaded Coupling**  
KAPR=90° | GAMP=-6°

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

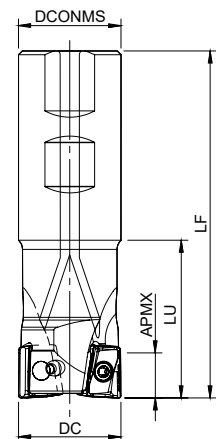
Spare Parts

Technical Data

End Mills



**Weldon Shank**  
KAPR=90° | GAMP=-6°



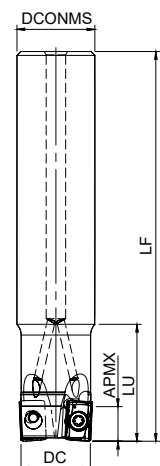
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181116000	025W17590-02-06-025110	2	25	25	110	35	0,37	11,00	ANHX 1206...	☉
181120600	032W17590-03-06-032150	3	32	32	150	35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



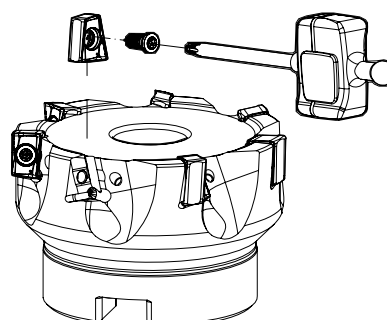
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181116300	026E17590-02-06-025200	2	26	25	200	40	0,66	11,00	ANHX 1206...	☉
181116200	033E17590-03-06-032250	3	33	32	250	40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

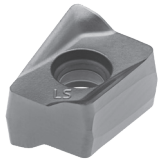
**SPARE PARTS** Acessórios | Repuestos

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

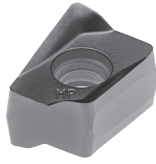


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301.  
Check the procedures for the clamping screws on the page A-301.

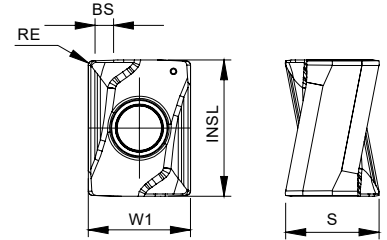
**MILLING** ANHX 1206... Inserts | Pastilhas | Plaquetas



ANHX-LS



ANHX-MP



ANHX-LS | MP

		P					M			K					S			Dimensions Dimensões Dimensiones (mm)					
		CVD		PVD			PVD			CVD		PVD			PVD			W1	S	INSL	RE	BS	
(1)	(2) Grade code	T9	T1	P3	P4	G6	P3	X9	G6	T9	L6	T1	P3	P4	G6	P3	X9						G6
Geometry code	ISO Reference	PHS740	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740	PHS740	PH5320	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740					
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 página 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	
				PH5320	PHP920	PHH930	PHP930	PH7930	PHS740			PH7740
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	-

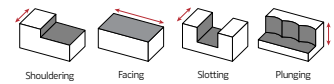
(Note 1) Cutting conditions ae/Dc=70%.

(Note 2)

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				●		●

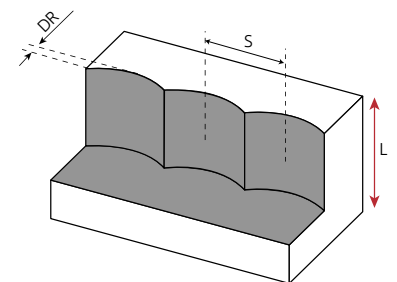
○ Good Conditions      ● Average Conditions      ● Difficult Conditions

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

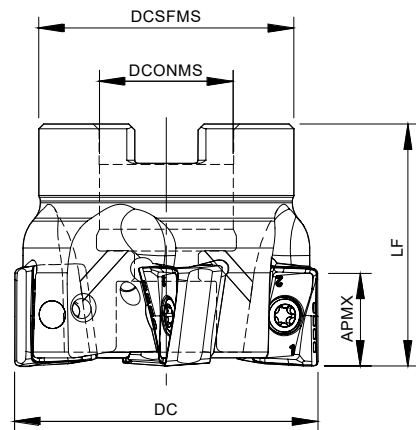
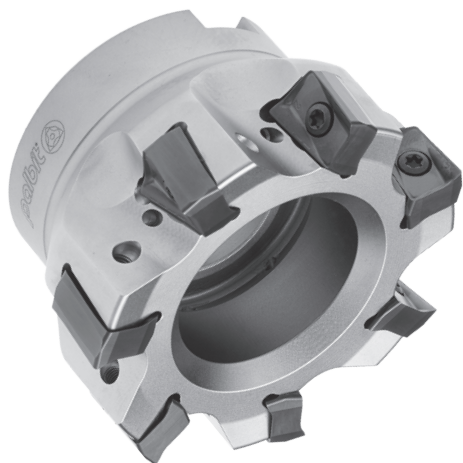
ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1 <sup>st</sup> choice	Difficult Operations
P	1	Unalloyed Steel	125-220	ANHX 12... LS	ANHX 12... MP
	2	Low-Alloyed Steel	220-280	ANHX 12... MP	-
	3	High-Alloyed Steel	280-380	ANHX 12... MP	-
M	4	SS - Ferritic / Martensitic	200-330	ANHX 12...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

## PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
f <sub>z</sub> (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
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

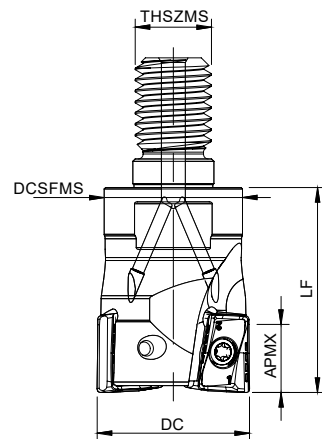


**Arbor Mounting**  
KAPR=90° | GAMP=-4°

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)

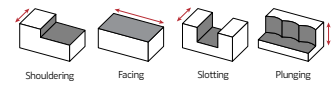


**Threaded Coupling**  
KAPR=90° | GAMP=-4°

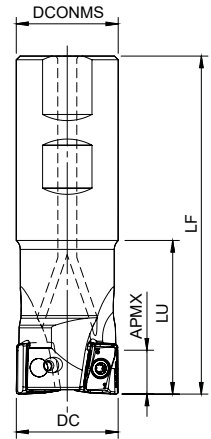
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)		
181082800	032R18190-02-04-M16043	2	32	M16	29	43	0,20	15,0	ANHX 1607...	☉
181082900	040R18190-03-04-M16043	3	40	M16	29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



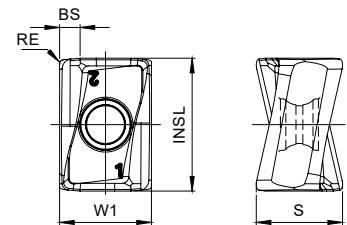
ANHX-LP



ANHX-MP



ANHX-LN



ANHX-LP | MP | LN

(1) Geometry code	(2) Grade code	P							K							N	Dimensions Dimensões Dimensiones (mm)				
		CVD		PVD					CVD		PVD					UNC	W1	S	INSL	RE	BS
		T9	G1	X5	G4	T1	P3	P4	T9	G1	X5	G4	T1	P3	P4	10					
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

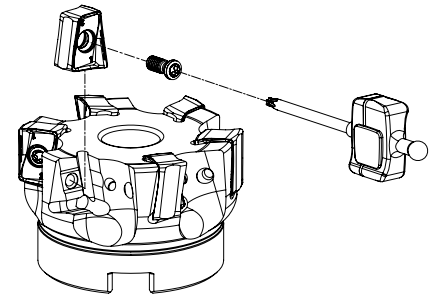
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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 Accessórios | 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  $a_e/D_c=70\%$ .

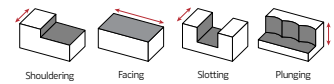
(Note 2)

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
<b>P</b>	1	Unalloyed Steel	125-220	●	●	●	●	●	●	●
	2	Low-Alloyed Steel	220-280		●	●	●	●	●	●
	3	High-Alloyed Steel	280-380		●	●	●	●	●	●
<b>K</b>	7	Malleable Cast Iron	130-230		●	●	●	●	●	●
	8	Grey Cast Iron	180-245		●	●	●	●	●	●
	9	Nodular Cast iron	160-250		●	●	●	●	●	●
<b>N</b>	10	Aluminium and Non Ferrous	30-130	✓						

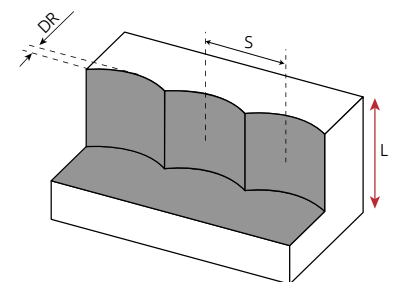
● Good Conditions     
 ● Average Conditions     
 ● Difficult Conditions

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

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1 <sup>st</sup> choice	Difficult Operations
				<b>P</b>	1
2	Low-Alloyed Steel	220-280	ANHX 16... LP		ANHX 16... MP
3	High-Alloyed Steel	280-380	ANHX 16... LP		ANHX 16... MP
<b>K</b>	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
<b>N</b>	10	Aluminium and Non Ferrous	30-130	ANHX 16... LN	-

## PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
f <sub>z</sub> (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-aperas, 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

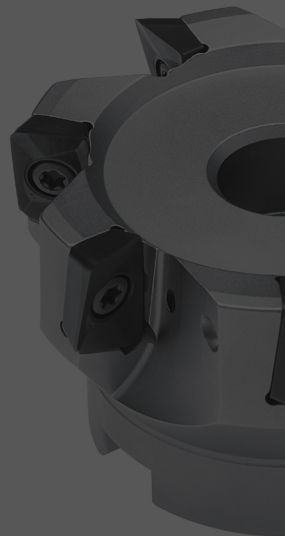
- > From DC 10mm to 32mm  
De DC 10mm a 32mm | Desde DC 10mm hasta 32mm
- > Available in threaded coupling and cylindrical shank  
Disponível em acoplamento roscado e haste cilíndrica | Disponible en fijación roscada y mango cilíndrico
- > Small positive insert with 2 cutting edges (XP.. 0602..)  
Pastilha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

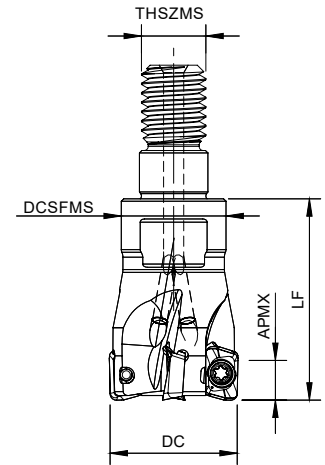
## LINEPRO 20190 > page 162

- > 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 com 2 fillos 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 com 2 fillos 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





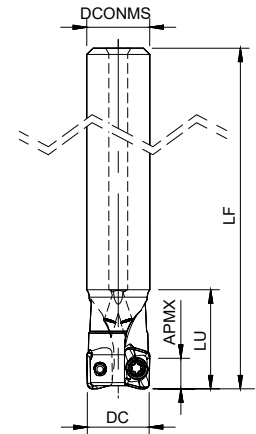
Threaded Coupling

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)



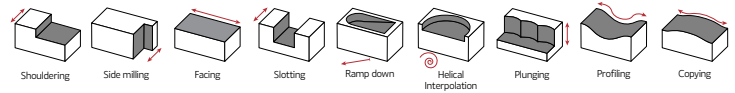
Cylindrical Shank

KAPR=90° | GAMP=+4°

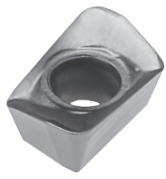
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	APMX (mm)			Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		LP LN	HF	MH		
181087100	010E20090-02-04-010055	2	10	10	55	16	0,03	4,00	0,30	2,00	XP.. 0602...	☉
181108300	010E20090-02-04-010100	2	10	10	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

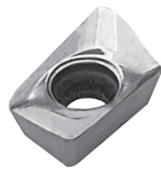
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



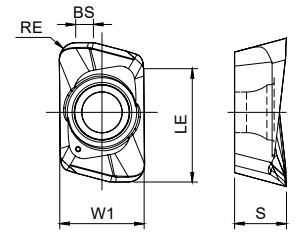
**XP.. 0602...** Inserts | Pastilhas | Plaquetas



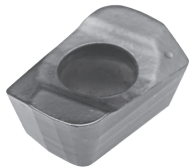
XPET-LP



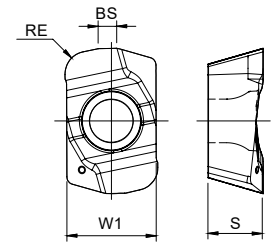
XPET-LN



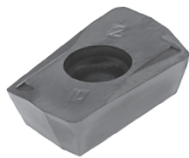
XPET-LP | LN



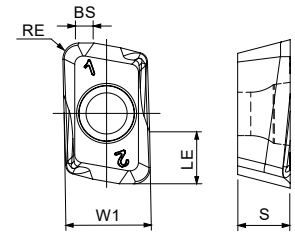
XPET-HF  
(HiFeed geometry)



XPET-HF



XPHW-MH  
(finishing geometry)



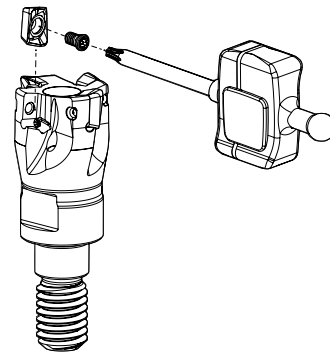
XPHW-MH

Geometry code	ISO Reference	P				M	K		N	S	H		Dimensions Dimensões Dimensiones (mm)				
		PVD				PVD	PVD		UNC	PVD	PVD		W1	S	LE	RE	BS
		X4	X6	T1	P4	X9	T1	P4	10	X9	X4	X6					
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

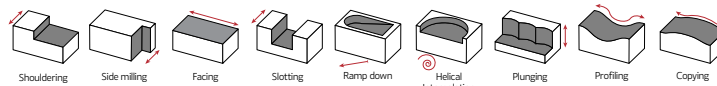


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301. Check the procedures for the clamping screws on the page A-301.

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:

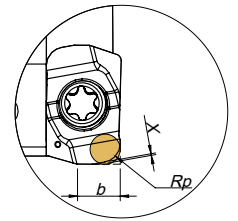
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

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	-
	7	Malleable Cast Iron	130-230	XPET 06... LP/HF	-
K	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	-

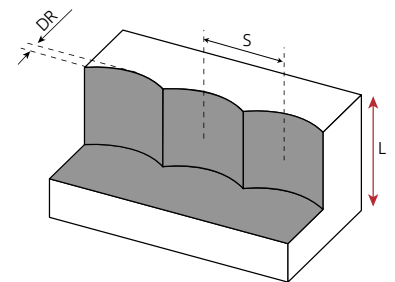
PROGRAMMING DATA Dados para programação | Datos para la programación

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



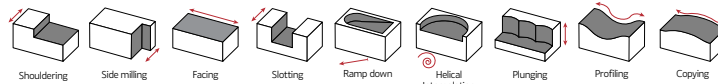
PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
fz (mm/t)		
0,04-0,07	0,03-0,05	$S_{max} = \sqrt{DC \cdot DR - DR^2}$



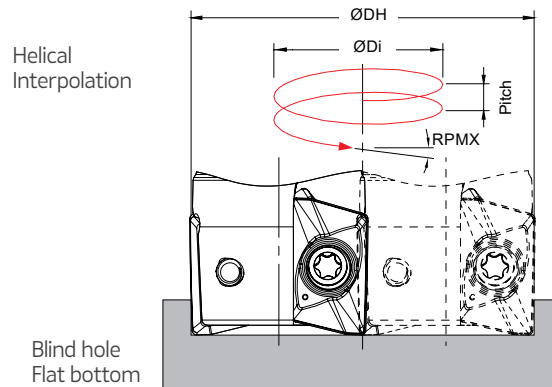
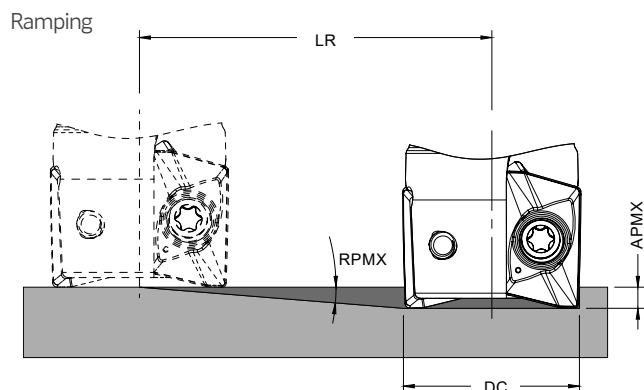
S max and DR corresponding cutting diameter DC (mm)								
DR (mm)	DC (mm)							
	10	12	16	17	20	21	25	32
0,5	2,2	2,4	2,8	2,9	3,1	3,2	3,5	4,0
1	3,0	3,3	3,9	4,0	4,4	4,5	4,9	5,6
2*	4,0	4,5	5,3	5,5	6,0	6,2	6,8	7,7

\* 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		
	RPMX	APMX	Min LR	Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
				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

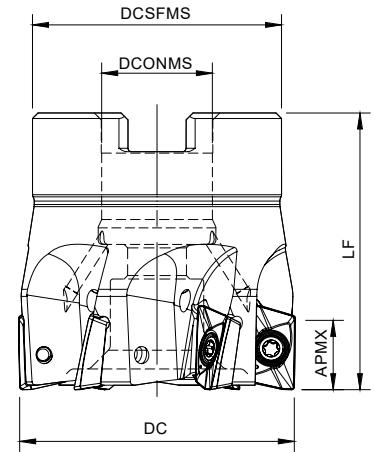
Note: During helical interpolation do not exceed maximum pitch

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)



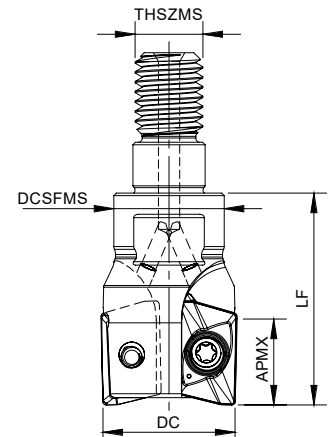
**Arbor Mounting**  
KAPR=90° | GAMP=+8°

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...	☉
181216500	080A20190-10-08-027050	10	80	27	60	40	1,00	A	10,0	10,0	0,80	3,00	XP.. 1003...	☉
181216600	100A20190-12-08-032050	12	100	32	80	50	1,00	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.



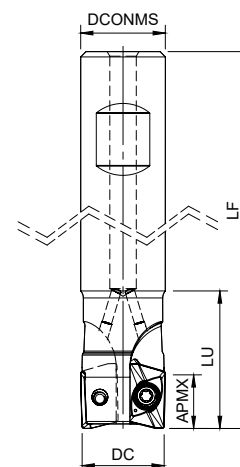
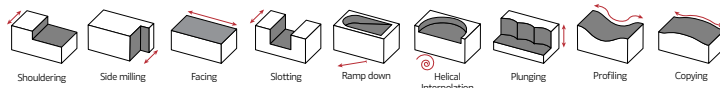
**Threaded Coupling**  
KAPR=90° | GAMP=+5°~+6°

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...	☉
181210300	035R20190-05-06-M16035	5	35	M16	29	35	0,18	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	CICT	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.

**MILLING**

Face milling

High feed milling

Shoulder milling

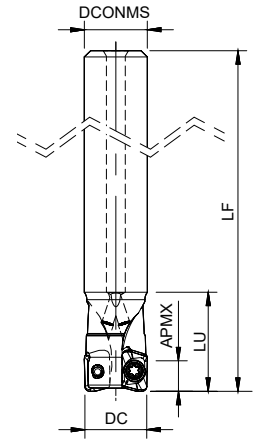
Profile milling

Specialty

Spare Parts

Technical Data

End Mills



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...	☉

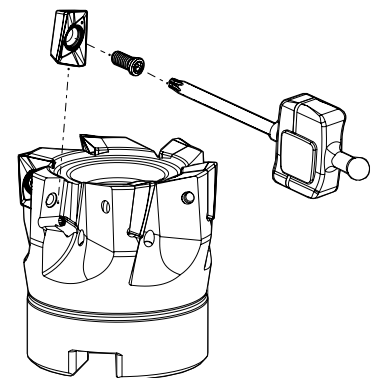
☉ Stock item | Produto de stock | Itens de stock

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

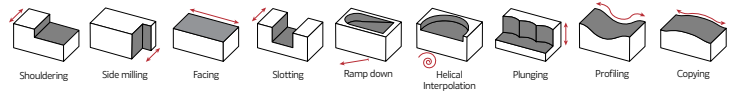
Note: Type -B\* cutters can only assemble inserts with a radius between 2,0 and 4,0.

SPARE PARTS Acessórios | Repuestos

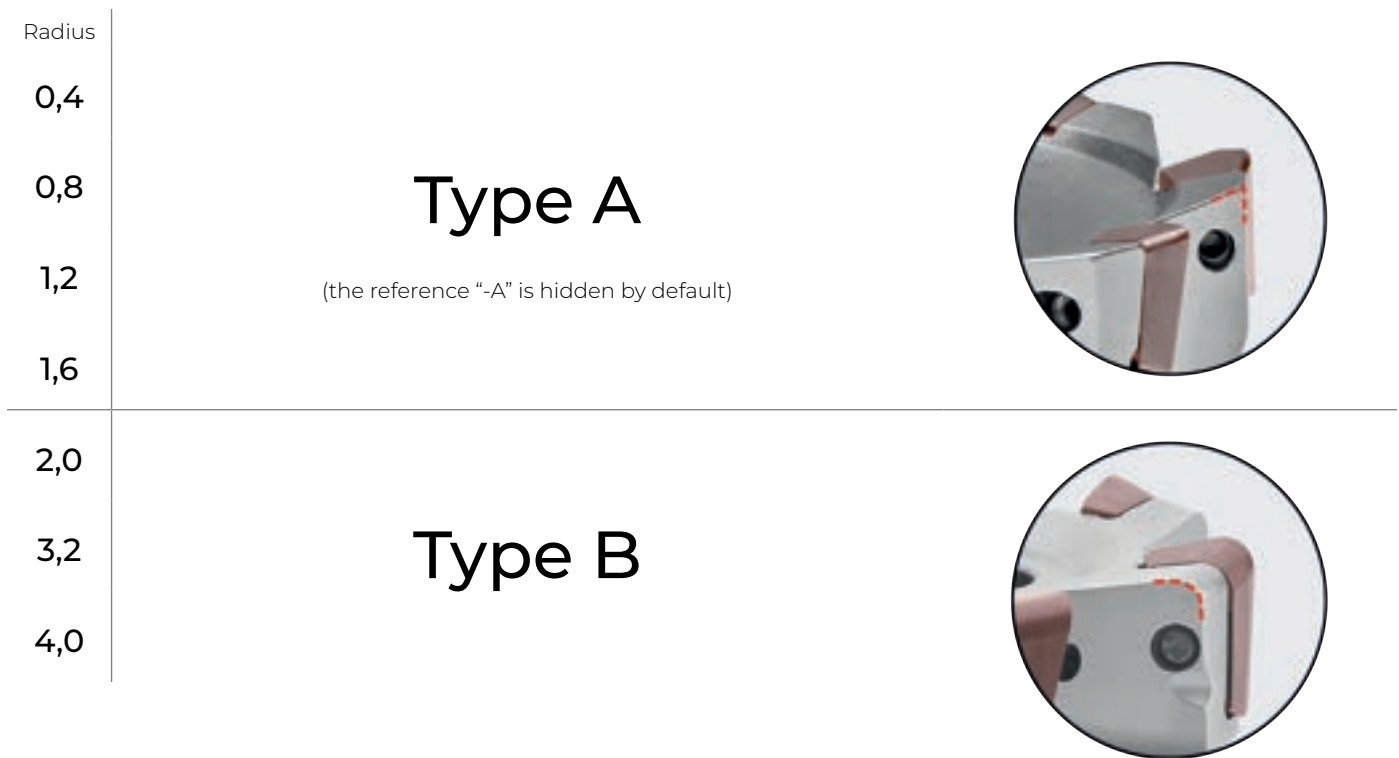
Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A20190 - 40-63	P0250704	XT08	DT0812	1,2
R20190 - 16	P0250503	XT08	DT0812	1,2
R20190 - 20-40	P0250704	XT08	DT0812	1,2
W20190 - 16-17	P0250503	XT08	DT0812	1,2
W20190 - 20-32	P0250704	XT08	DT0812	1,2
E20190 - 16	P0250503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



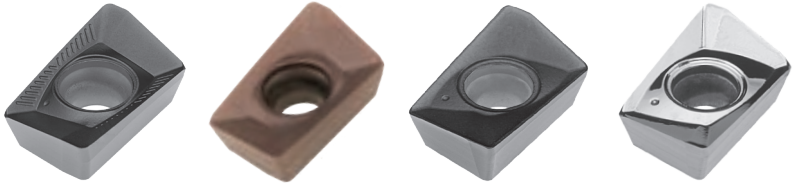
Toolholders are designed to accommodate inserts with various radius. On the LinePro 20190 toolholders, there are two types that can be distinguished by their specific features.

### Toolholder Types: A vs. B

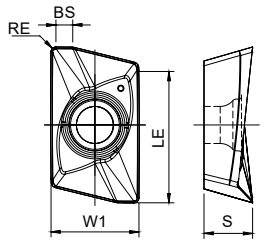
- > **Type A Toolholders**, denoted by the "-A" reference, are tailored for inserts with radius of 0.4, 0.8, 1.2, and 1.6 mm. It's important to note that the "-A" reference is hidden by default. These toolholders are characterized by a more streamlined and less pronounced radius support, making them 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 | Plaquitas



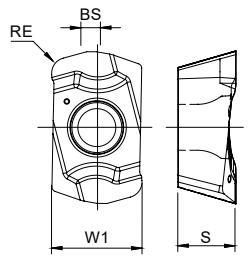
XPET-LP      XPET-LS      XPET-MP      XPET-LN



XPET-LP | LS | MP | LN



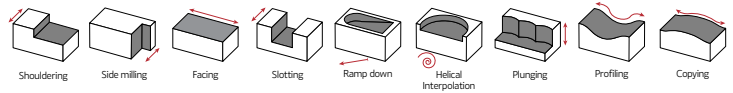
XPET-HF  
(HiFeed geometry)



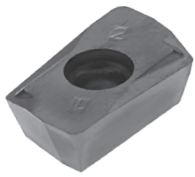
XPET-HF

Geometry code	ISO Reference	P		M		K			N		S		H		Dimensions / Dimensões / Dimensiones (mm)									
		CVD	PVD				CVD	PVD		UNC	PCD	PVD	PVD		W1	S	LE	RE	BS					
		T9	G1	X5	T1	P4	X9	4H	L5	L9	X5	T1	P4	10						D6	X9	4H	X4	X6
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

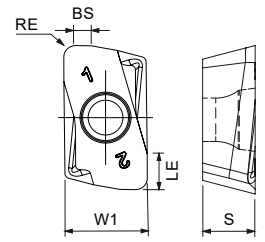
⊗ First choice | Primeira opção | 1ª opción      ⊗ Stock item | Produto de stock | Itens de stock      ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)      Insert order code = (1) Geometry Code + (2) Grade Code



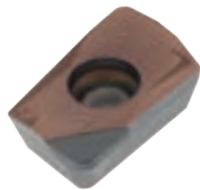
**XPHW 1003...** Inserts | Pastilhas | Plaquetas



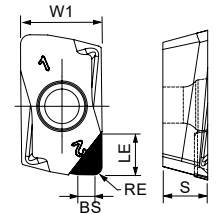
**XPHW-MH**  
(finishing geometry)



**XPHW-MH**



**XPHW-R Z1**



**XPHW-R Z1**

Geometry code	ISO Reference	Material															Dimensions								
		P					M	K					N		S	H		W1	S	LE	RE	BS			
		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										
1112500	XPHW 100308 ZER-MH																				6,95	3,60	3,00	0,80	1,50
1112736	XPHW 100310 ZER-MH																				6,95	3,60	3,00	1,00	1,30
1112735	XPHW 100320 ZER-MH																				6,95	3,60	3,00	1,20	0,30
1112556	XPHW 100308 R Z1																				6,95	3,60	3,80	0,80	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

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	PHF530	PH5740	PHS740	
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	140-250	-	-	-
	5	SS - Austenitic	200-330	-	-	-	-	-	-	120-170	130-240	-	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	-	100-150	120-220	-	-	-
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
	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	-	30-110	-	-	-	-
	12	Hardened Steels	40-55 HRC	-	-	70-270	-	-	-	-	30-150	-	-	-

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	-
	11	Heat Resistant Super Alloys	200-320	0,05-0,07	0,05-0,07	-	-	0,40-0,60	-	-
	12	Hardened Steels	40-55 HRC	-	-	-	-	-	-	0,08-0,15

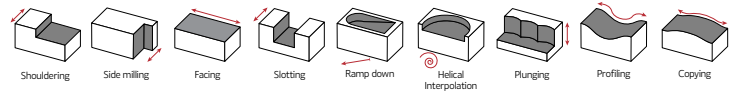
(Note 1) Cutting conditions  $a_e/D_c=70\%$ .

(Note 2)

Operation	$a_e$	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	-

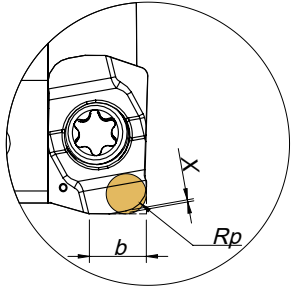
## GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades								PCD		
				← Wear Resistance				Toughness →						
				PH0910	PH5705	PHH603	PHP910	PHP920	PHP930	PHH930	PHF530		PHS740	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							✓	✓			
H	12	Hardened Steels	40-55 HRC			✓								

Good Conditions    
 Average Conditions    
 Difficult Conditions

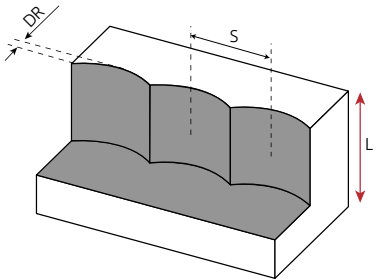
## PROGRAMMING DATA Dados para programação | Datos para la programación

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



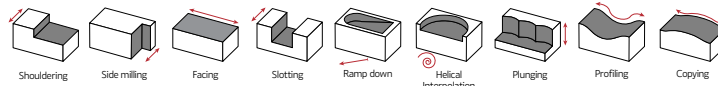
## PLUNGING Mergulho | Plunge

L ≤ 3DC	L > 3DC	S max.
fz (mm/t)		
0,08-0,20	0,06-0,15	$S_{max} = \sqrt{DC \cdot DR - DR^2}$



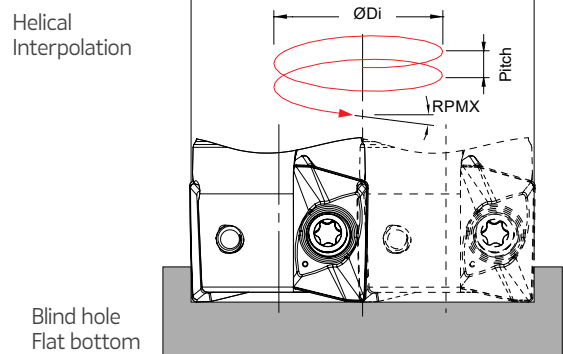
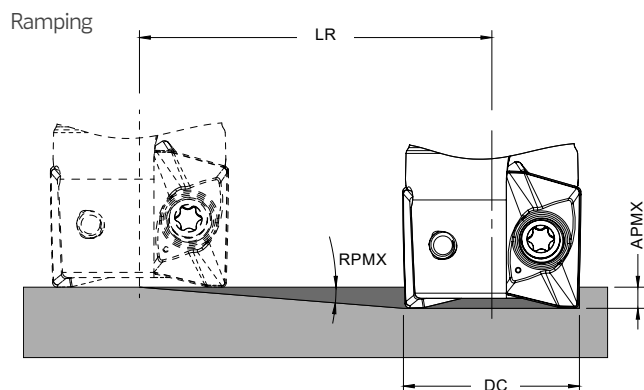
S max and DR corresponding cutting diameter DC (mm)													
DR (mm)	DC (mm)												
	16	17	20	22	25	27	32	40	50	63	80	100	
1	3,9	4,0	4,4	4,6	4,9	5,1	5,6	6,2	7,0	7,9	8,9	9,9	
2	5,3	5,5	6,0	6,3	6,8	7,1	7,7	8,7	9,8	11,0	12,5	14,0	
3*	6,2	6,5	7,1	7,5	8,1	8,5	9,3	10,5	11,9	13,4	15,2	17,1	
4**	6,9	7,2	8,0	8,5	9,2	9,6	10,6	12,0	13,6	15,4	17,4	19,6	

\* 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



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

DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
				ØDHmin	ØDHmax	
16	7,5	10	76,0	27,6	-	4,8
17	7	10	81,4	29,6	-	4,9
20	5	10	114,3	35,6	-	4,3
22	4,5	10	127,1	39,6	-	4,4
25	3,5	10	163,5	45,6	-	4,0
27	3	10	190,8	49,6	-	3,7
32	2,5	10	229,0	59,6	-	3,8
40	1,7	10	336,9	75,6	-	3,3
50	1,3	10	440,7	95,6	-	3,3
63	1	10	572,9	121,6	-	3,2
80	0,8	10	716,2	155,6	-	3,3
100	0,6	10	954,9	195,6	-	3,1

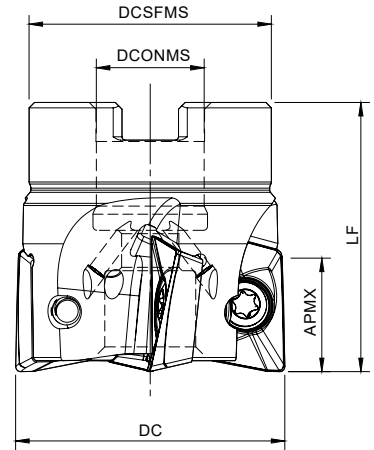
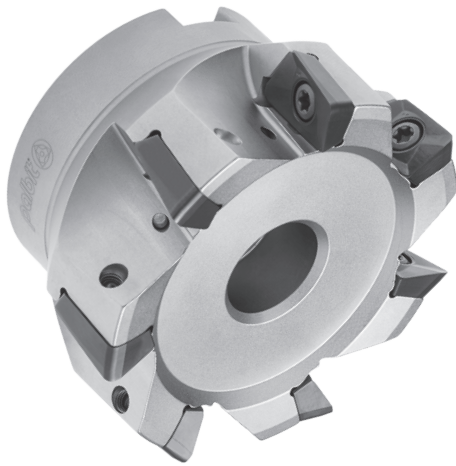
(1) using LP insert with radius 0,8 mm

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



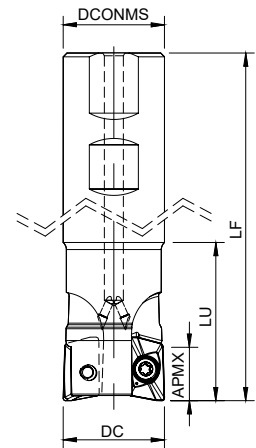
Arbor Mounting

KAPR=90° | GAMP=+7°~+8°

Order code Código	Reference Referência Referencia	CICT	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	36	40	0,18	A	17,0	8,0	XPET 1706...	☉
181091000	050A20290-05-08-022040	5	50	22	40	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)



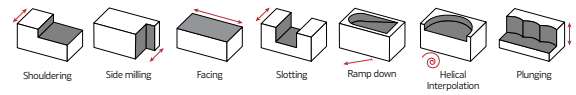
Weldon Shank

KAPR=90° | GAMP=+6°~+7°

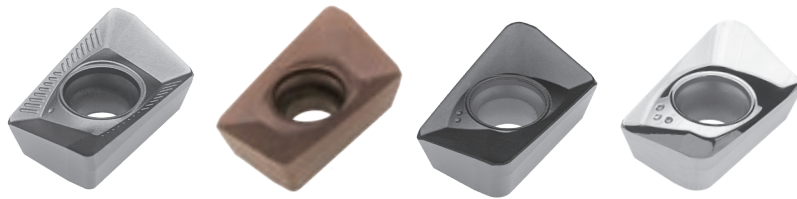
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	APMX (mm)		Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		LP   MP   LS   LN	LN Z1 Z1W		
181090500	032W20290-02-06-032110	2	32	32	110	50	0,56	17,0	8,0	XPET 1706...	☉
181090600	032W20290-02-06-032200	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

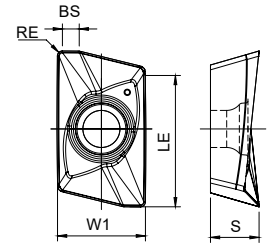
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



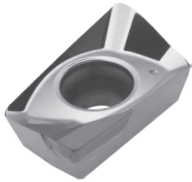
**XPET 1706...** Inserts | Pastilhas | Plaquetas



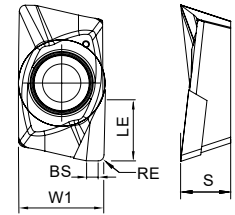
XPET-LP      XPET-LS      XPET-MP      XPET-LN



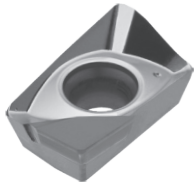
XPET-LP | LS | MP | LN



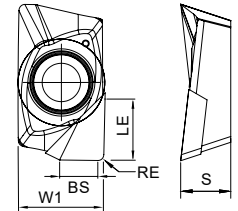
XPET-LN Z1



XPET-LN Z1



XPET-LN Z1W



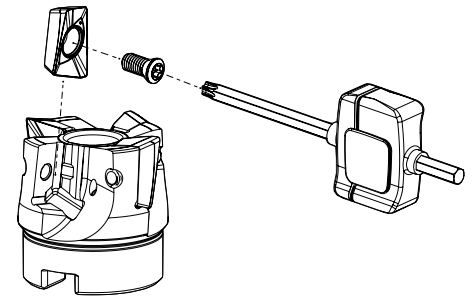
XPET-LN Z1W

(1) Geometry code	(2) Grade code	P		M			K				N		S			Dimensions Dimensões Dimensiones (mm)						
		CVD		PVD		PVD			CVD		PVD		UNC	PCD	PVD			W1	S	LE	RE	BS
		T9	T1	G6	X9	4H	G6	L5	L9	T1	G6	10	D6	X9	G6							
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.

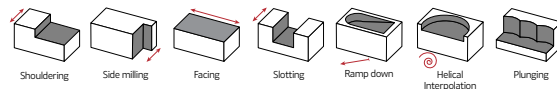
GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades							PCD		
				← Wear Resistance					Toughness →				
				PH0910	PH5705	PHP920	PHP930	PHH930	PHF530	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

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	PHF530	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	140-250	-	-	130-180	-
	5	SS - Austenitic	200-330	-	-	-	-	120-170	130-240	-	-	110-160	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	100-150	120-220	-	-	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	30-150	-	-	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)

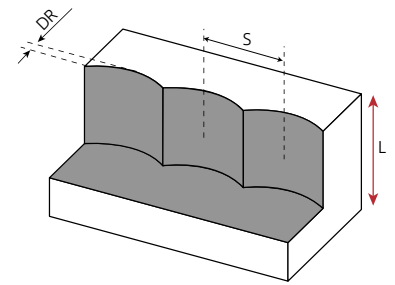
Operation	$a_e$	Vc & fz	AP (mm)
Slotting	100%	<20%	2,0-6,0
Shouldering	<50%	>8%	7,0-13,0
	≤25%	>12%	13,0-16,0

(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.

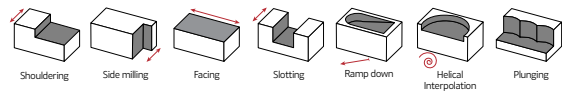
PLUNGING Mergulho | Plunge

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



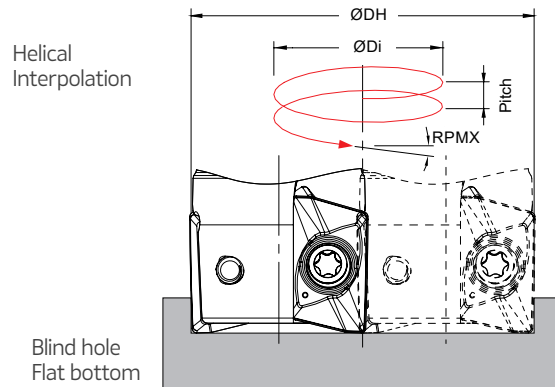
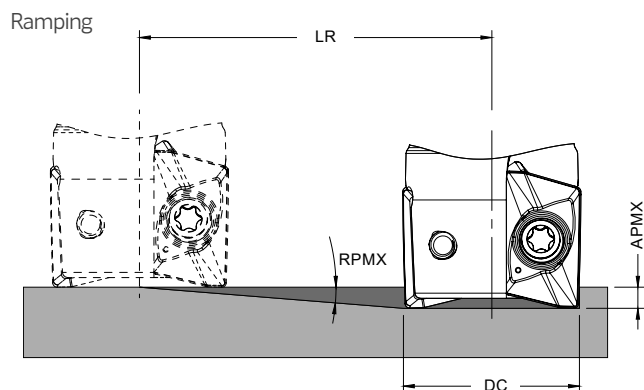
S max and DR corresponding cutting diameter DC (mm)							
DR (mm)	DC (mm)						
	32	40	50	63	80	100	125
1	5,6	6,2	7,0	7,9	8,9	9,9	11,1
2	7,7	8,7	9,8	11,0	12,5	14,0	15,7
3*	9,3	10,5	11,9	13,4	15,2	17,1	19,1
4*	10,6	12,0	13,6	15,4	17,4	19,6	22,0

\* 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
40	2,7	17,0	360,5	-	62,4	6,3
				74,8	-	5,2
50	2,0	17,0	486,8	-	78,4	5,7
				94,8	-	4,9
63	1,5	17,0	649,2	-	98,4	5,3
				120,8	-	4,8
80	1,0	17,0	973,9	-	124,4	5,0
				154,8	-	4,1
100	0,8	17,0	1217,5	-	158,4	4,3
				194,8	-	4,2
125	0,7	17,0	1498,4	-	198,4	4,3
				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 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.

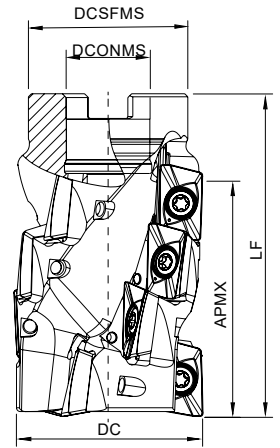
A HELIPRO 20290 proporciona grandes profundidades de corte e elevadas taxas de remoção de metal em aplicações de corte e perfilagem. Concebida para ter um desempenho superior em operações de maquinação grandes e pesadas, devido à elevada durabilidade e estabilidade de corte.

La HELIPRO 20290 proporciona grandes profundidades de corte y altas velocidades de arranque de metal en aplicaciones de corte y perfilado. Diseñada para un rendimiento superior en operaciones de mecanizado grandes y pesadas gracias a su gran 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





**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	115	105	79	6,595	XP.. 1706...	☉

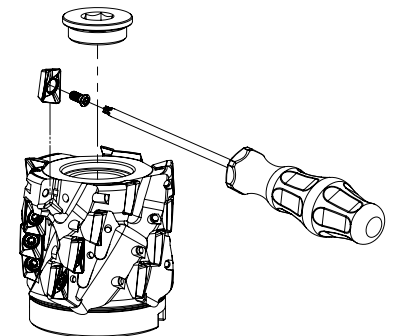
☉ Stock item | Produto de stock | Itens de stock

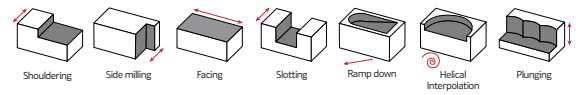
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

## SPARE PARTS Acessórios | Repuestos

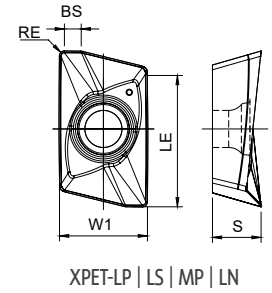
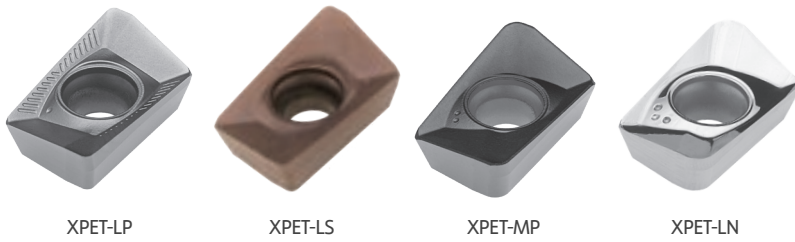
Cutter DC	Insert Screw	Key (Torx)	Order separately		Sealing Cap
			Key (Torx - Nm)	Torque Value	
A20290 - 50	P0451001	PT20	DT2050	5,0	TRM2009S8
A20290 - 63	P0451001	PT20	DT2050	5,0	TRM2411S10
A20290 - 80	P0451001	PT20	DT2050	5,0	TRM3012S14
A20290 - 100-125	P0451001	PT20	DT2050	5,0	TRM3615S17

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.





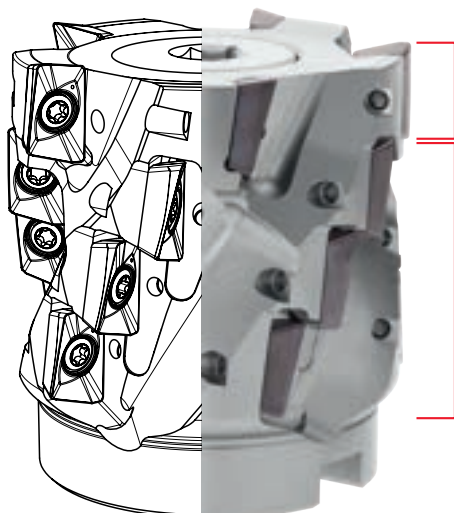
**XPET 1706...** Inserts | Pastilhas | Plaquetas



(1) Geometry code	(2) Grade code	P			M		K				N	S		Dimensions Dimensões Dimensiones (mm)					
		CVD		PVD	PVD		CVD		PVD		UNC	PVD		W1	S	LE	RE	BS	
		T9	T1	G6	X9	G6	L5	L9	T1	G6	10	X9	G6						
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

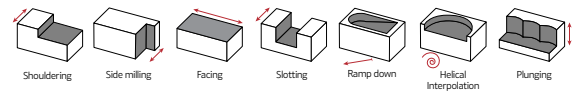
ISO	PSM	Material	HB (Brinell)	Vc (m/min)							
				← Wear Resistance				Toughness →			
				PH0910	PH5705	PHP920	PHP930	PHH930	PH5740	PHS740	PH7740
P	1	Unalloyed Steel	125-220	-	-	180-250	160-230	-	-	140-220	140-200
	2	Low-Alloyed Steel	220-280	-	-	160-230	140-210	-	-	120-200	130-180
	3	High-Alloyed 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 adjusted 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.

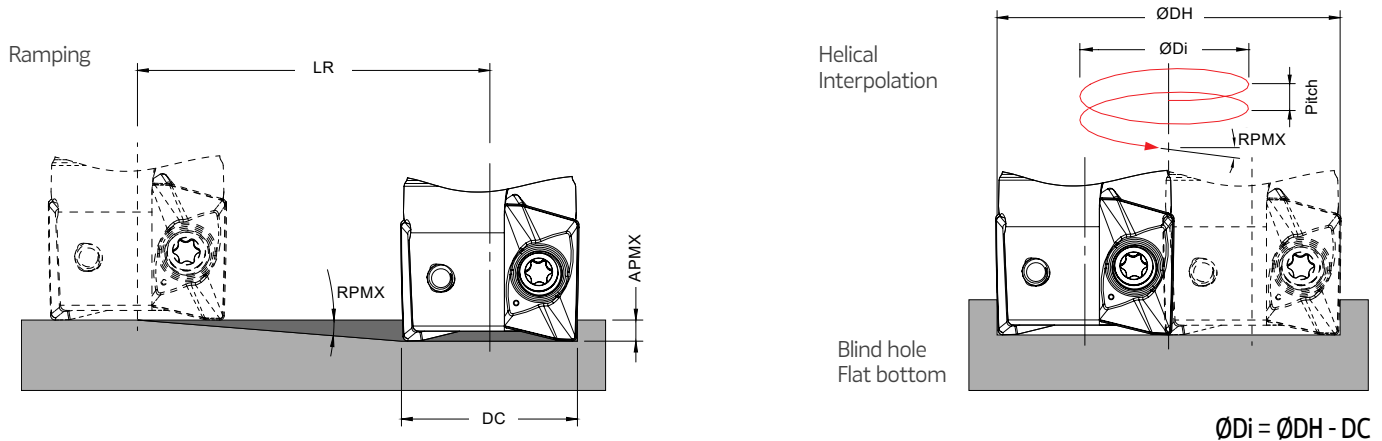


# CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra- aparas | Guía para aplicación del rompevirutas

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
	7	Malleable Cast Iron	130-230	XPET 17... LP	XPET 17... MP
K	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



DC	Ramping			Helical Interpolation		
	RPMX	APMX	Min LR	Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
				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



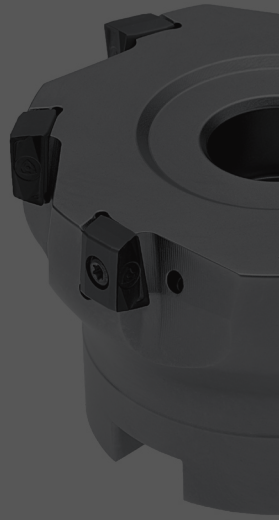
The TGPLUS series offers unparalleled reliability in rough shoulder milling, thanks to robust cutting edges and thicker cross-sections, complemented by a highly rigid cutter featuring a thicker core. The TGPLUS series design optimizes stability and surface area contact between the insert and the cutter 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 pequena con 4 filos de corte (LNXT 0904..)
- > **Excellent machining stability**  
Excelente estabilidade de maquinação | Excelente estabilidad de mecanizado



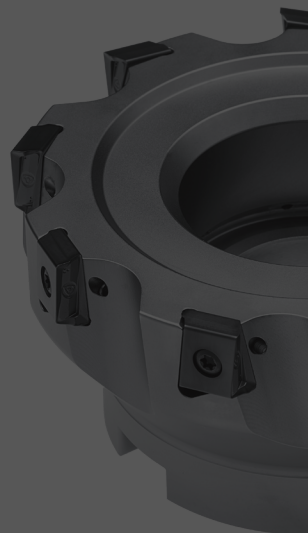
## TGPLUS 90190 > page 190

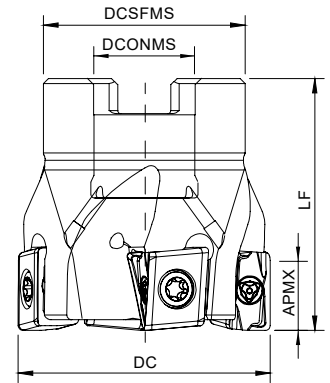
- > **From DC 25mm to 125mm**  
De DC 25mm a 125mm | Desde DC 25mm hasta 125mm
- > **Available in arbor mounting, weldon and cylindrical shank**  
Disponível em montagem tipo árvore, haste weldon e cilíndrica | Disponible en fijación con tornillo central, mango tipo weldon y cilíndrico
- > **Medium tangential 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



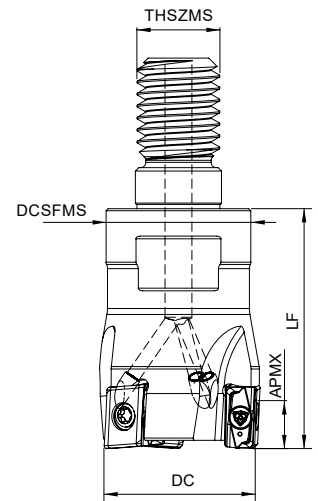


**Arbor Mounting**  
KAPR=90° | GAMP=-4°

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)

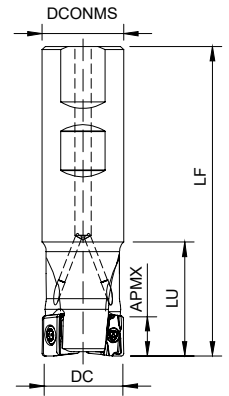
**TGPLUS 90090**  
LNXT 09



**A**



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



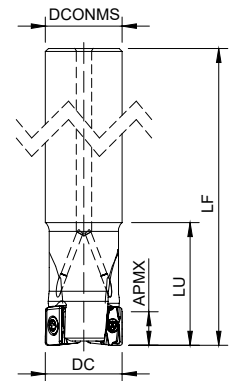
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)		
181109400	016W90090-02-06-016090*	2	16	16	90	25	0,12	7,0	LNXT 0904...	☉
181109500	025W90090-03-04-025095	3	25	25	95	30	0,31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

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

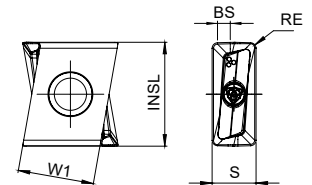
## LNXT 0904... Inserts | Pastilhas | Plaquetas



LNXT-MP



LNXT-LS



LNXT-MP | LS

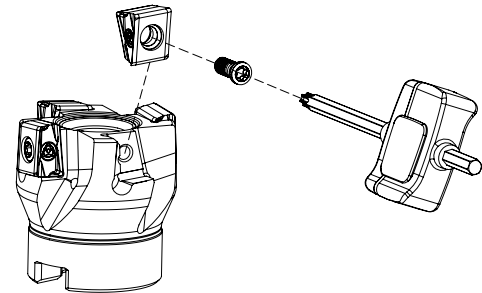
	<sup>(2)</sup> Grade code	P			M	K			S	Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD		PVD	CVD	PVD		PVD	W1	S	INSL	RE	BS
		T9	T1	G6	X9	L6	T1	G6	X9					
<sup>(1)</sup> Geometry code	ISO Reference	PH5740	PHP920	PH7740	PHH930	PH5320	PHP920	PH7740	PHH930					
1112225	LNXT 090404 PNER-MP	☉	☹	☉		☉	☹	☉		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 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
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

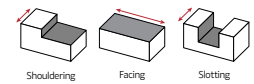


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301. Check the procedures for the clamping screws on the page A-301.

## 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			Toughness →		LNXT 09... MP	LNXT 09... LS
				PH5320	PHP920	PHH930	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	-	-	-	-

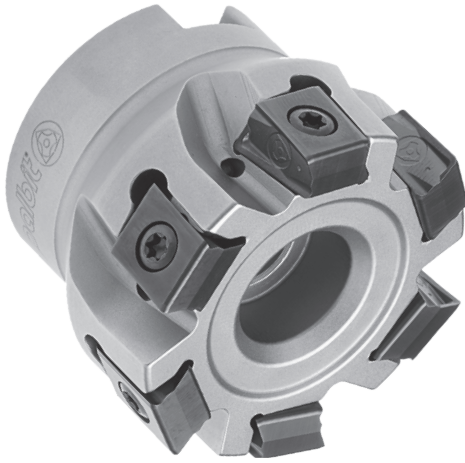
(Note 1) Cutting conditions  $a_e/D_c=70\%$ .

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

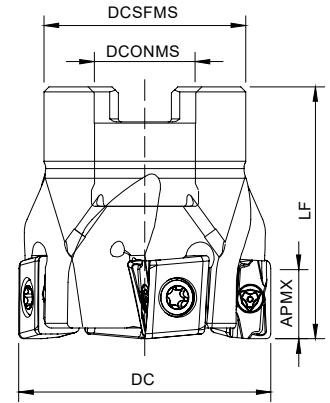
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

## 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°



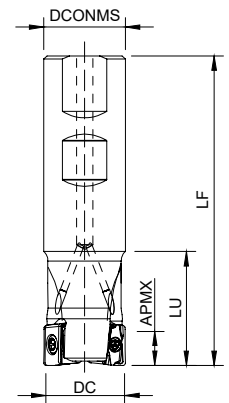
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181118800	040A90190-04-04-016040	4	40	16	32	40	0,17	A	11	LNXT 1306...	☉
181118900	040A90190-05-04-016040	5	40	16	32	40	0,18	A	11	LNXT 1306...	☉
181111200	050A90190-05-04-022040	5	50	22	40	40	0,27	A	11	LNXT 1306...	☉
181111300	050A90190-06-04-022040	6	50	22	40	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°



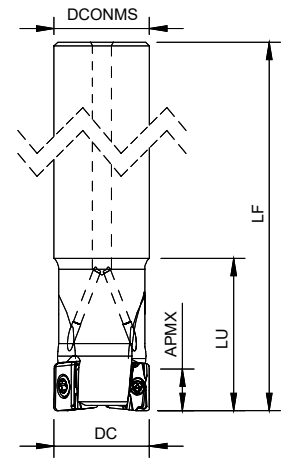
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)			
181118300	025W90190-02-04-025095	2	25	25	95	45	0,29	11	LNXT 1306...	☉	
181109800	032W90190-03-04-032110	3	32	32	110	50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

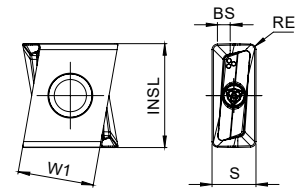
⊗ Stock item | Produto de stock | Itens de stock

○ 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

(1) Geometry code	ISO Reference	P			M	K			Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD		PVD	CVD	PVD		W1	S	INSL	RE	BS
		T9	T1	G6	G6	L6	T1	G6					
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

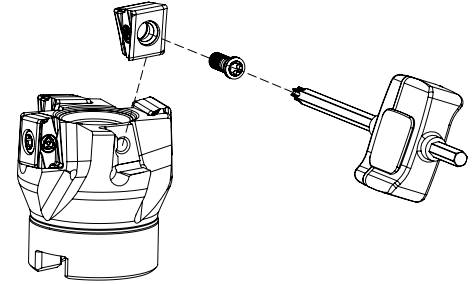
⊗ Stock item | Produto de stock | Itens de stock

○ 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	Insert Screw	Key (Torx)	Order separately		Order separately	
			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

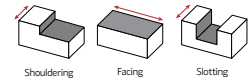


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301. Check the procedures for the clamping screws on the page A-301.

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

ISO	PSM	Material	HB (Brinell)	Grades			
				← Wear Resistance			Toughness →
				PH5320	PHP920	PH5740	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



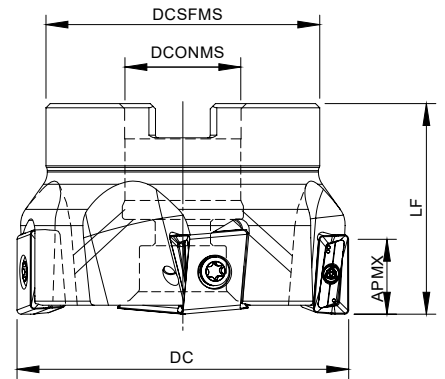
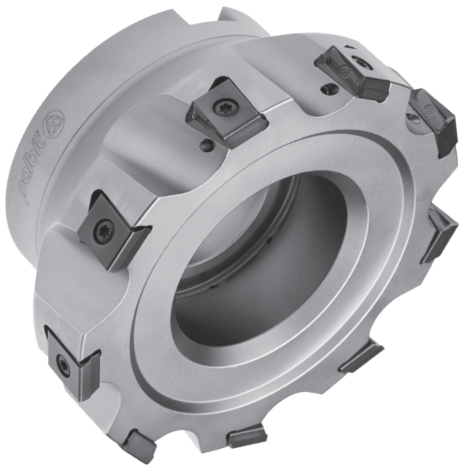
**RECOMMENDED CUTTING CONDITIONS** Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)				Feed fz (mm/t)
				← Wear Resistance		Toughness →		
				PH5320	PHP920	PHS740	PH7740	LNXT 09... MP
<b>P</b>	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
<b>M</b>	4	SS - Ferritic / Martensitic	200-330	-	-	-	130-180	0,08-0,25
	5	SS - Austenitic	200-330	-	-	-	110-160	0,08-0,20
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	90-150	0,08-0,15
<b>K</b>	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	40	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...	☉

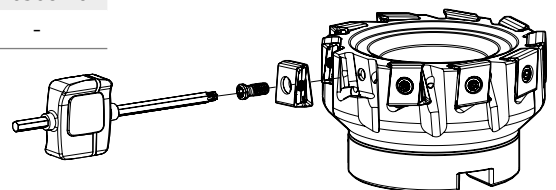
☉ Stock item | Produto de stock | Itens de stock

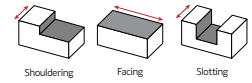
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire página A-8)

## SPARE PARTS Acessórios | Repuestos

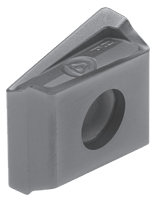
Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A90390 - 50 - 80	P0401200	XT15	DT1530	3,0	-	-
A90390 - 80	P0401200	XT15	DT1530	3,0	J0123510	SD6368-12
A90390 - 100	P0401200	XT15	DT1530	3,0	J0164110	SD6368-16
A90390 - 125	P0401200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



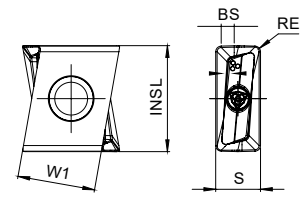
LNXT-HP



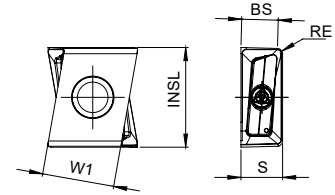
LNXT-MP



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	W1	S	INSL	RE	BS
(1) Geometry code	ISO Reference	PH5740	PH7910	PH7920	PHP920	PH7740	PH5705	PH5740	PH7910	PH7920	PHP920	PH7740					
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 | 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 →		
				PH5705	PH7910	PHP920	PH7920	PH5740	PH5740	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
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

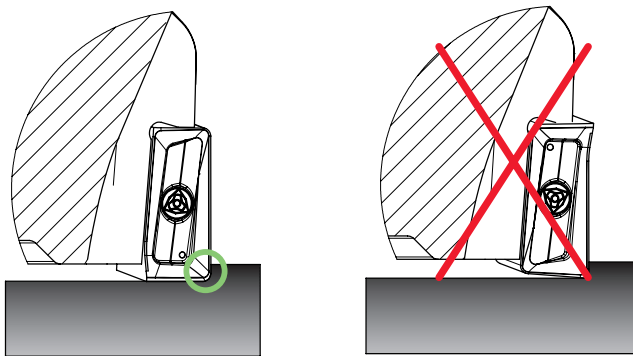
### Rec. Cutting Conditions

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

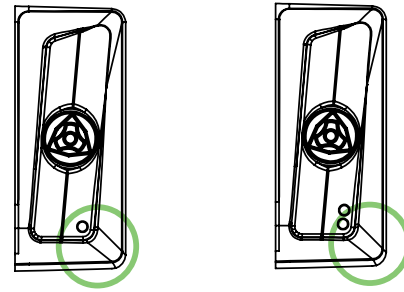
### Example:

- 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



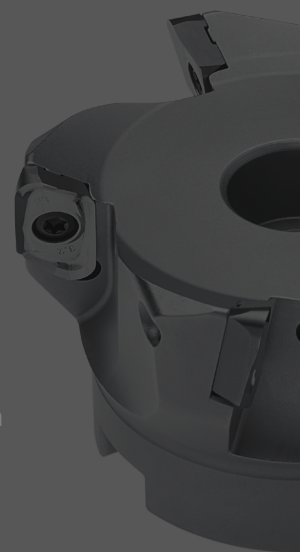
The ALUPRO lines are precision-engineered tools designed specifically for machining aluminum components. These tools feature specialized geometries optimized for the unique properties of aluminum, allowing for efficient material removal and extended tool life. With sharp cutting edges and low cutting 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 geometrias 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

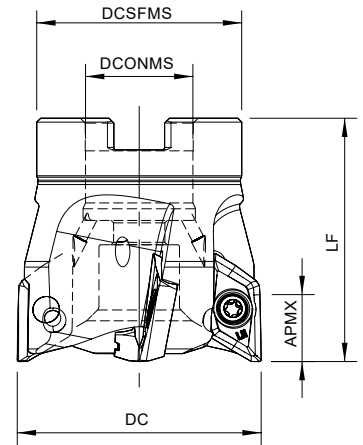
- > **From DC 20mm to 100mm**  
De DC 20mm a 100mm | Desde DC 20mm hasta 100mm
- > **Available in arbor mounting, threaded coupling and cylindrical shank**  
Disponível em montagem tipo árvore, acoplamento roscado e haste cilíndrica | Disponible en fijación con tornillo central, fijación roscada y mango 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-voó) | 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°

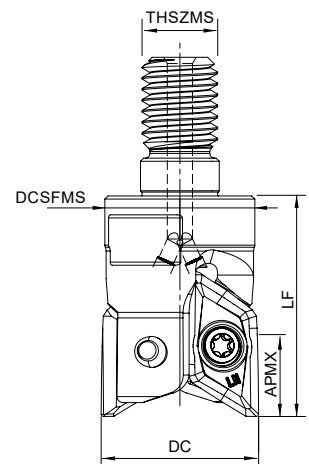
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Cutter Type	APMX (mm)	RPM max		
181094200	040A76090-03-11-016050-A	3	40	16	32	50	0,3	A	14,0	29 000	0,4-3,2	☉
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**



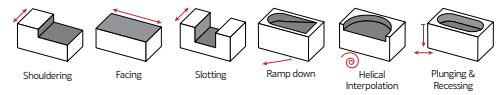
**Threaded Coupling**  
KAPR=90° | GAMP=+6°~+11°

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

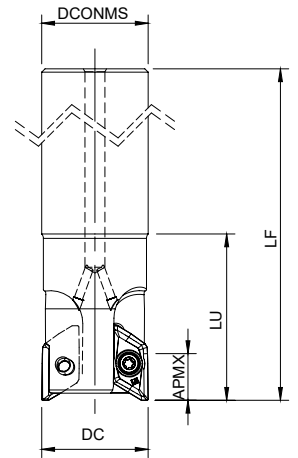
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

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.



**Cylindrical Shank**

KAPR=90° | GAMP=+6°~+11°



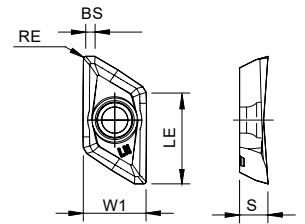
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			DC	DCONMS	LF	LU		Cutter Type	APMX (mm)	rpm max		
181095000	020E76090-01-06-020150-A	1	20	20	150	60	0,2	A	14,0	40 000	0,4-3,2	⊗
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



(1) Geometry code	ISO Reference	PH0910	Dimensions Dimensões Dimensiones (mm)					Cutter Type
			W1	S	LE	RE	BS	
		N						
		UNC						
	(2) Grade code	10						
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

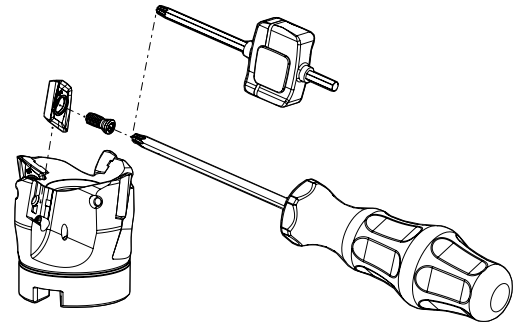
⊗ Stock item | Produto de stock | Itens de stock

○ 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:

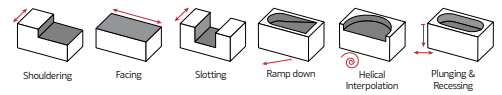
DC	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
RPM (min <sup>-1</sup> )	40000	38000	33000	29000	24000	21000	19000	16000

- 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 <sup>-1</sup> )	15000	12000	9500	8500	7600	6800	6000	5400

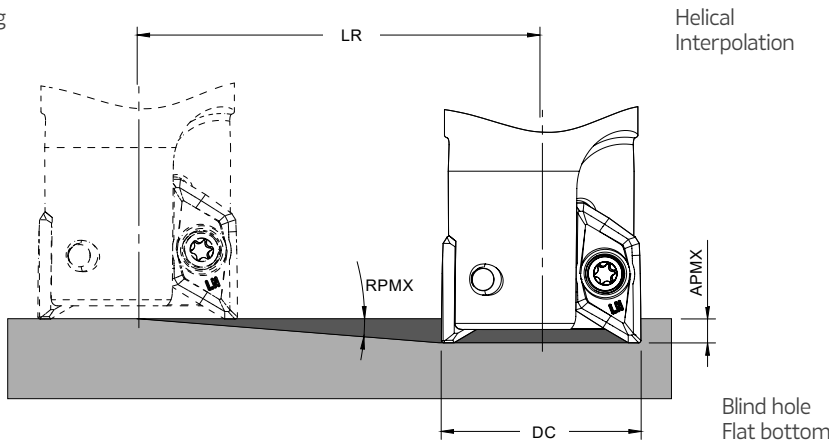
- When setting the spindle speed, take into consideration the maximum allowable revolutions of arbor or chuck.
- Use the specified set bolt when using the arbor type with internal coolant supply.



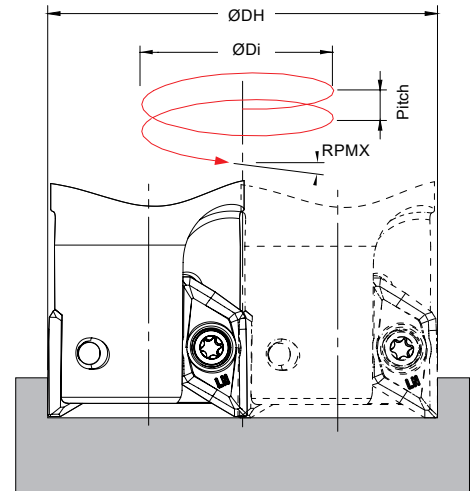
# RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical Interpolation

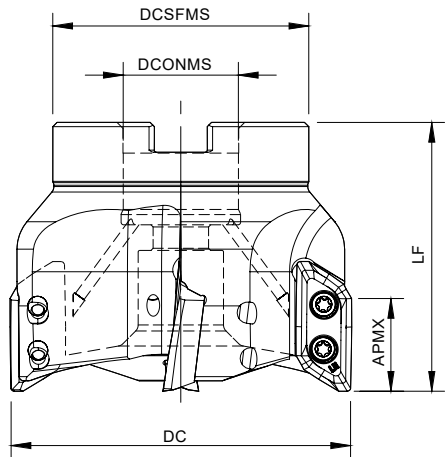


$$\text{ØDi} = \text{ØDH} - \text{DC}$$

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

(1) 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

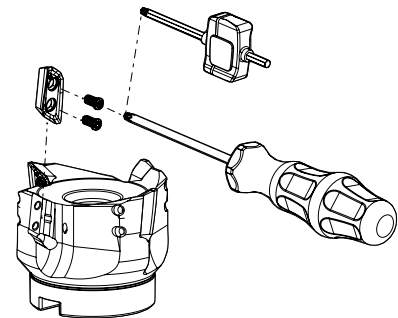
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

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

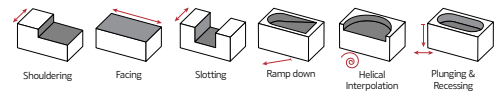
Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately	
			Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A77090 - 50-80	P0401200	XT15	DT1530	3,0	-	-
A77090 - 100	P0401200	PT15	DT1530	3,0	J0164110	SD6368-16
A77090 - 125	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20
E77090 - 32-40	P0401200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

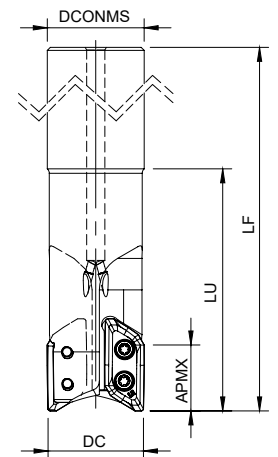


A



### Cylindrical Shank

KAPR=90° | GAMP=+6°



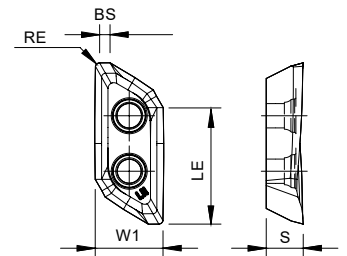
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			DC	DCONMS	LF	LU		Cutter Type	APMX (mm)	rpm max		
181069800	032E77090-02-06-032170-A	2	32	32	170	80	0,8	A	21.5	41 000	0,8-3,2	☉
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 | Plaquetas



(1) Geometry code	ISO Reference	N		Dimensions Dimensões Dimensiones (mm)					Cutter Type
		UNC	10	W1	S	LE	RE	BS	
1111618	XDGX 22M708 PDFR-LN	☉		13,00	7,00	22,0	0,80	2,00	A
1111619	XDGX 22M716 PDFR-LN	☉		13,00	7,00	22,0	1,60	1,20	A
1111620	XDGX 22M720 PDFR-LN	☉		13,00	7,00	22,0	2,00	0,80	A
1111621	XDGX 22M732 PDFR-LN	☉		13,00	7,00	22,0	3,20	0,60	A
1111622	XDGX 22M740 PDFR-LN	☉		13,00	7,00	22,0	4,00	0,90	B
1111623	XDGX 22M750 PDFR-LN	☉		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

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

**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  $a_e/D_c=70\%$ .

(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.

(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).

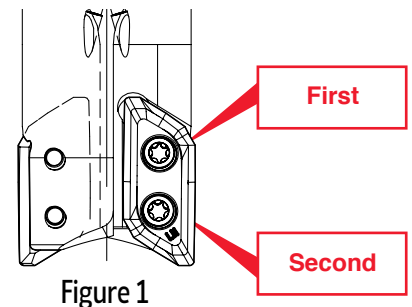


Table 1 - Maximum allowable revolutions:

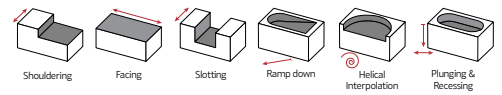
DC	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125
RPM (min <sup>-1</sup> )	41000	36000	30000	25000	23000	19000	16000

- 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:

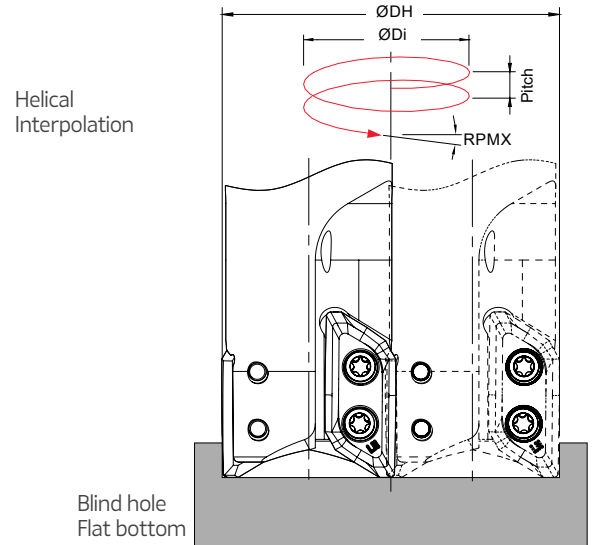
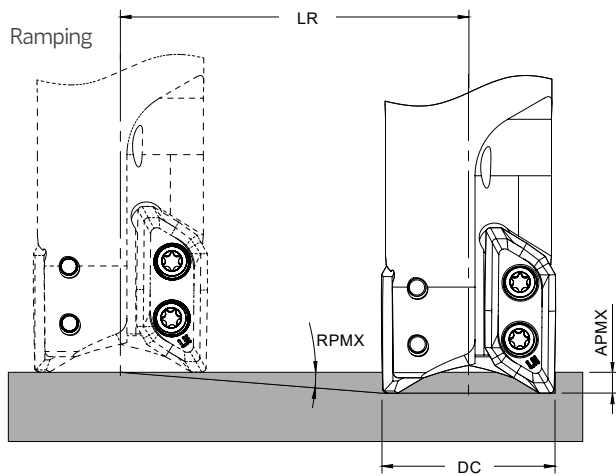
DC	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125
RPM (min <sup>-1</sup> )	9500	7600	6000	4800	3800	3000	2400

- 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



Blind hole  
Flat bottom

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

Cutter Type	DC	Ramping			Helical Interpolation		
		RPMX	APMX	Min LR	Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
					ØDHmin	ØDHmax	
A	32	19	21,5	62,4	60,0 -	- 62,4	30,3 32,9
	40	13	21,5	93,1	76,0 -	- 78,4	26,1 27,8
	50	9	21,5	135,7	96,0 -	- 98,4	22,9 24,1
	63	7	21,5	175,1	122,0 -	- 124,4	22,7 23,7
	80	5	21,5	245,7	156,0 -	- 158,4	20,9 21,5
	100	4	21,5	307,5	196,0 -	- 198,4	21,1 21,6
	125	3	21,5	410,2	246,0 -	- 248,4	19,9 20,3
B	32	18	21,0	64,6	60,0 -	- 62,4	28,6 31,0
	40	11	21,0	108,0	76,0 -	- 78,4	22,0 23,4
	50	8	21,0	149,4	96,0 -	- 98,4	20,3 21,4
	63	6	21,0	199,8	122,0 -	- 124,4	19,5 20,3
	80	4	21,0	300,3	156,0 -	- 158,4	16,7 17,2
	100	3	21,0	400,7	196,0 -	- 198,4	15,8 16,2
	125	2	21,0	601,4	246,0 -	- 248,4	13,3 13,5

(1) using insert radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch.

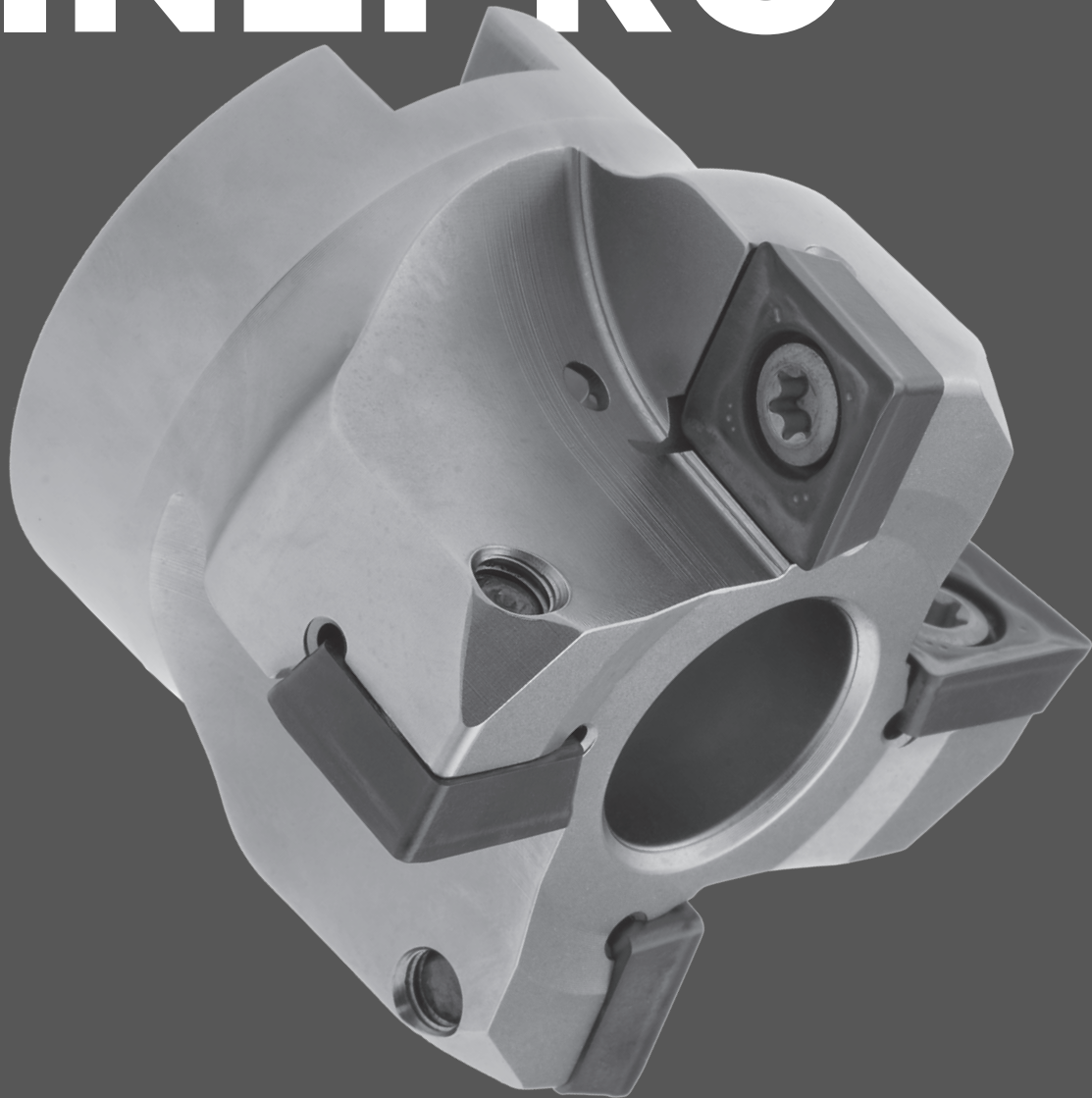
When using different insert radius to calculate the ØDHmin and ØDHmax use the equation below:

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

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

06290

# LINEPRO



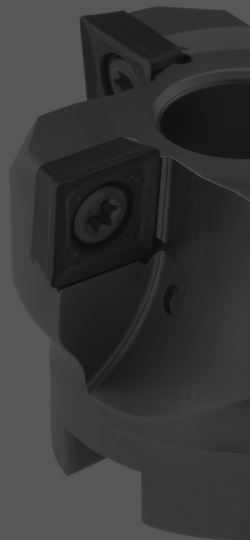
The LINEPRO 06290 is designed for general-purpose shoulder milling operations. Featuring a positive insert with four cutting edges, it ensures versatile and efficient performance across diverse material applications.

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



# A LINEPRO 06290

MILLING

Face milling

High feed milling

Shoulder milling

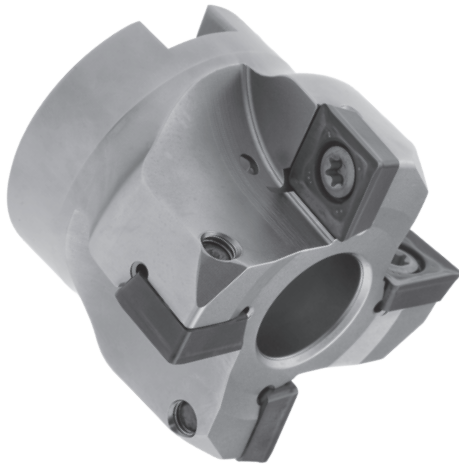
Profile milling

Specialty

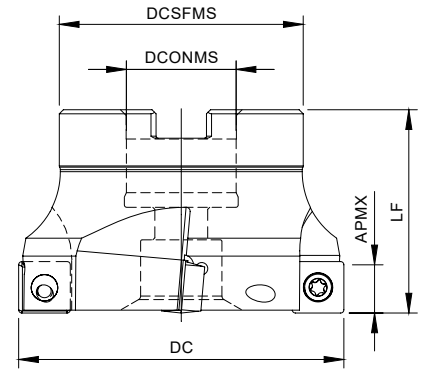
Spare Parts

Technical Data

End Mills



**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)

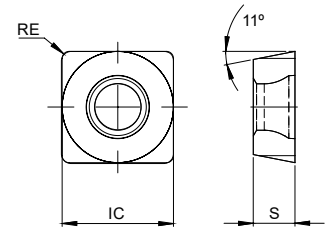
## SP.. 1204... Inserts | Pastilhas | Plaquitás



SPG(M)X-MP



SPG(M)X-MS



SPG(M)X-MP | MS

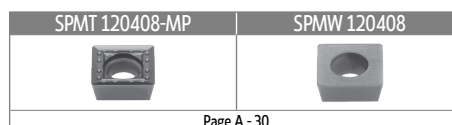
Geometry code	ISO Reference	P	M	K	S	Dimensions Dimensões Dimensiones (mm)		
		PVD	PVD	PVD	PVD	IC	S	RE
<sup>(2)</sup> Grade code		T1	X9	T1	X9			
<sup>(1)</sup>		PHP920	PHH930	PHP920	PHH930			
1113002	SPGX 120408 PDSR-MP	☼		☼		12,70	4,76	0,80
1113003	SPGX 120408 PDSR-MS		☼		☼	12,70	4,76	0,80
1112916	SPMX 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 opção

☼ Stock item | Produto de stock | Itens de stock

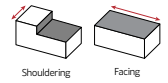
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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



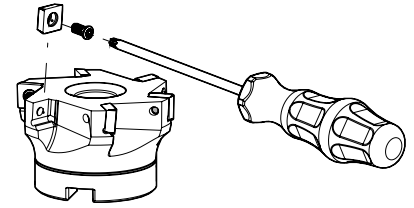
Page A - 30

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



**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Order separately			Order separately		
	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 →	SPG(M)X...MP	SPM(M)X...MS
				PHP920	PHH930		
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

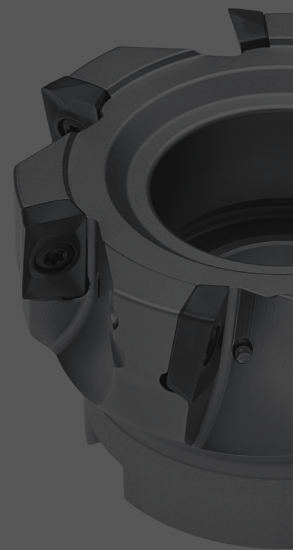
Disponível em montagem tipo árvore e haste weldon | Disponible en fijación con tornillo central y mango tipo weldon

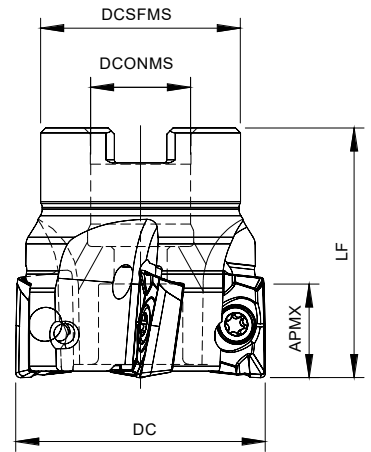
- > Large positive insert with 2 cutting edges (AP.. 1604..)

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



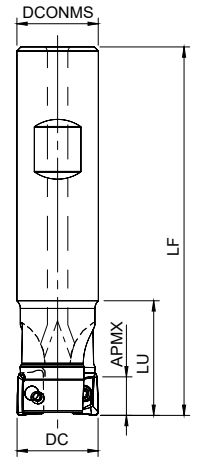


**Arbor Mounting**  
KAPR=90° | GAMP=+9°

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		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)

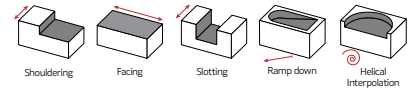


**Weldon Shank**  
KAPR=90° | GAMP=+7°~+9°

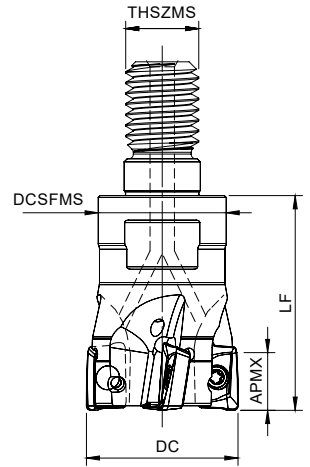
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU		APMX (mm)			
181041300	016W17090-02-07-016085	2	16	16	85	26	0,110	9,0	AP.. 1003...	☺	
181031700	016W17090-02-07-016150	2	16	16	150	26	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	LF		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...	⊗

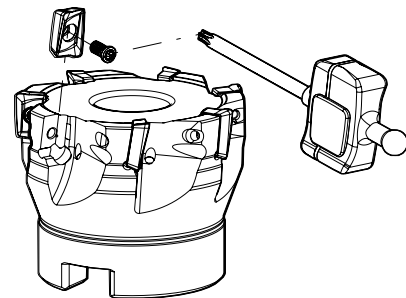
⊗ Stock item | Produto de stock | Itens de stock

○ 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.



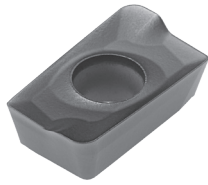
# A LINEPRO 17090

MILLING

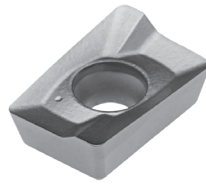
## AP.. 1003... Inserts | Pastilhas | Plaquetas



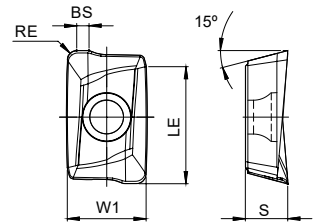
APET - LN



APKT - X



APKT - X1



APET-LN | APKT-X | APKT-X1

Geometry code	ISO Reference	P		M	K		N	Dimensions Dimensões Dimensiones (mm)				
		PVD		PVD	PVD		UNC	W1	S	LE	RE	BS
		68	66	66	68	66	10					
(1)		PH6920	PH6930	PH6930	PH6920	PH6930	PH0910					
1112043	APET 100305 PDFR-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

Face milling

High feed milling

Shoulder milling

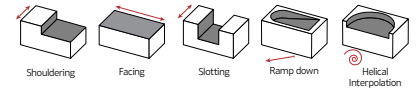
Profile milling

Specialty

Spare Parts

Technical Data

End Mills



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

ISO	PSM	Material	HB (Brinell)	Grades		
				← Wear Resistance		Toughness →
				PH0910	PH6920	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- aparas | 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... PDFR-LN	-

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

ISO	PSM	Material	HB (Brinell)	Vc (m/min)		
				← Wear Resistance		Toughness →
				PH0910	PH6920	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
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:

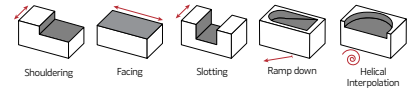
Operation	$a_e$	Vc & fz	AP (mm)
Slotting	100%	<20%	3,0-4,0
Shouldering	<50%	>8%	5,0-6,0
	≤25%	>12%	7,0-8,0

(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.

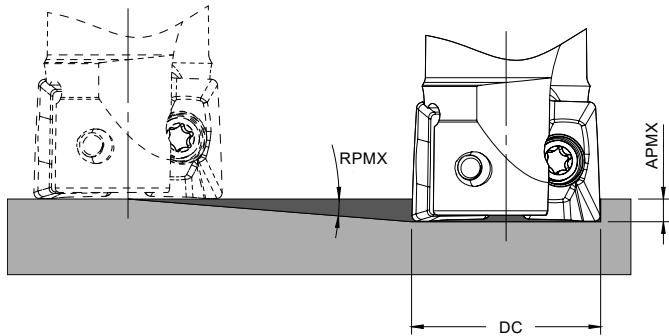
(Note 5) If chattering occurs, reduce  $a_p$  and Vc by 30% and keep the same fz per tooth.



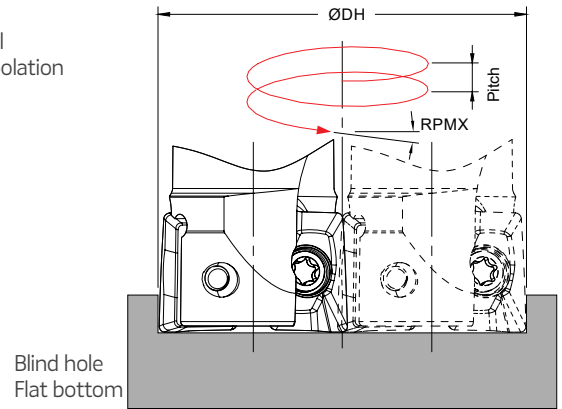
# RAMPING AND HELICAL INTERPOLATION

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

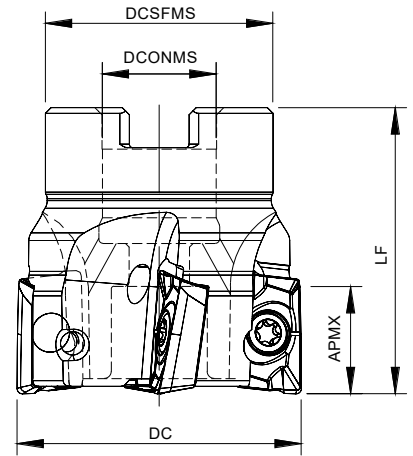
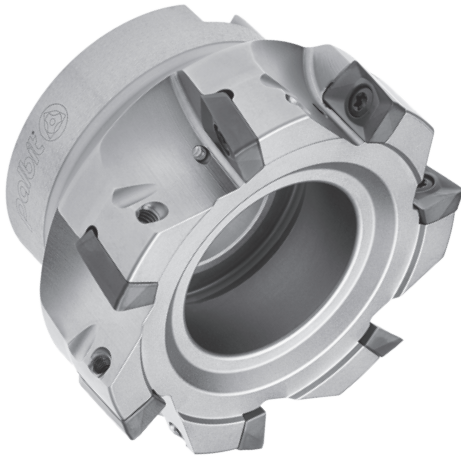
(1) using LP insert with radius 0,8 mm

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



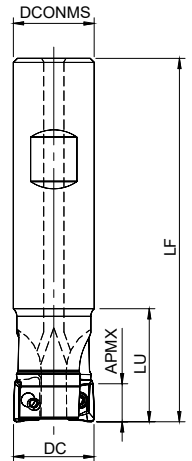
Arbor Mounting

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)



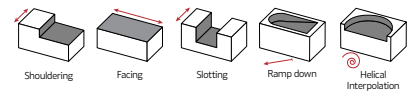
Weldon Shank

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	☺	

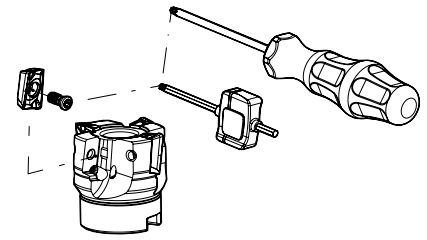
☺ Stock item | Produto de stock | Itens de stock

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



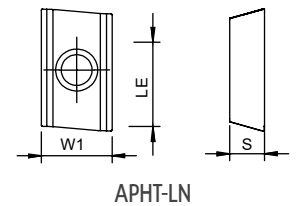
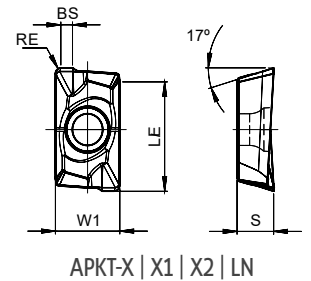
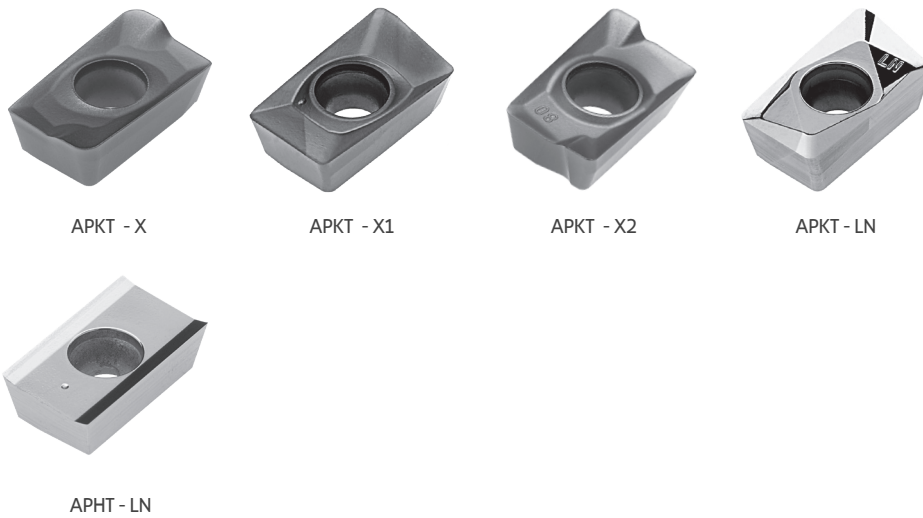
**SPARE PARTS** Acessórios | Repuestos

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 | Plaquetas






Geometry code	ISO Reference	P				M		K				N	Dimensions Dimensões Dimensiones (mm)				
		PVD				PVD		PVD				UNC	W1	S	LE	RE	BS
		68	G4	66	P3	66	P3	68	G4	66	P3	10					
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


## 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... PDFR-LN
				P	1	Unalloyed Steel
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  $a_e/D_c=70\%$ .

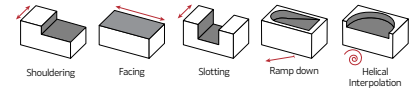
(Note 2) Cutting conditions for slotting and shouldering operations:

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.

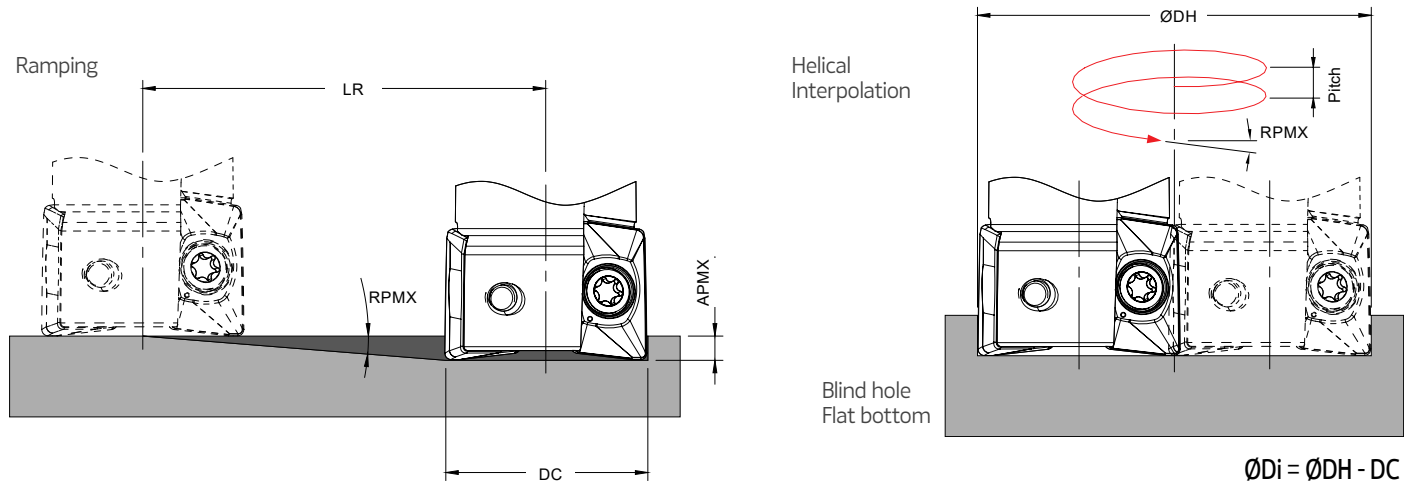


# CHIP BREAKER SELECTION GUIDE Guia para aplicações do quebra-afaras | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chip breaker application	
				1st choice	Difficult Operations
P	1	Unalloyed Steel	125-220	APKT 16... PDER-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... PDER-X(X2)	-
	5	SS - Austenitic	200-330	APKT 16... PDER-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



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

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



# PROFILE MILLING

**1 W-PRO 62090**

- > Suitable for machining **P M K S H**
- > See page A - 226

**2 PLUS 49095 | 45095**

- > Suitable for machining **P K H**
- > See page A - 232

**3 TOROMILL 33590 | 33690 | 33790 | 33890 | 33990**

- > Suitable for machining **P M S**
- > See page A - 238

**4 TURBOMILL 34190 | 34290**

- > Suitable for machining **P M S**
- > See page A - 242

**5 TOROMILL X2 35190**

- > Suitable for machining **P M K S**
- > See page A - 252

**6 TOROMILL 24590 | 25090 | 25190 | 25290 | 25390**

- > Suitable for machining **P K H**
- > See page A - 260

**7 LINEPRO 40095 | 41095 | 40595**

- > Suitable for machining **P K N H**
- > See page A - 268

62090

# W-PRO



W-PRO is a high precision finishing tool featuring a variety of shank options and two types of inserts, allowing each shank to accommodate either insert type. Its unique pocket design ensures secure insert clamping, precise edge positioning, and runout accuracy of 0.02mm or less.

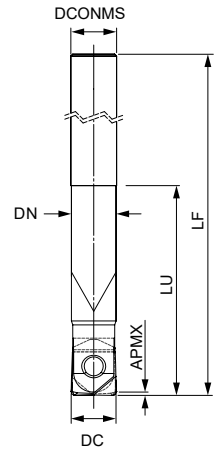
A W-PRO é uma ferramenta de acabamento de alta precisão que apresenta uma variedade de opções de haste e dois tipos de pastilhas, permitindo que cada haste acomode qualquer tipo de pastilha. O seu design de alojamento garante fixação segura da pastilha, posicionamento preciso da aresta e precisão de concentricidade de 0,02 mm ou menos.

A W-PRO es una herramienta de acabado de alta precisión que presenta una variedad de opciones de vástago y dos tipos de plaquitas, permitiendo que cada vástago pueda alojar cualquier tipo de plaquita. Su diseño de alojamiento garantiza una sujeción segura de la plaquita, un posicionamiento preciso del filo y una precisión de concentricidad de 0,02 mm o menos.

## **W-PRO 62090** > page 228

- > **From DC 8mm to 20mm**  
De DC 8mm a 20mm | Desde DC 8mm hasta 20mm
- > **Available in threaded steel coupling and cylindrical carbide shank**  
Disponível em acoplamento roscado e haste cilíndrica | Disponible en fijación roscada y mango cilíndrico
- > **One toolholder for two types of inserts**  
Um suporte para dois tipos de pastilhas | Un portaherramientas para dos tipos de plaquitas
- > **Ideal for finishing operations on hardened steels**  
Ideal para operações de acabamento em aços endurecidos | Ideal para operaciones de acabado en aceros endurecidos





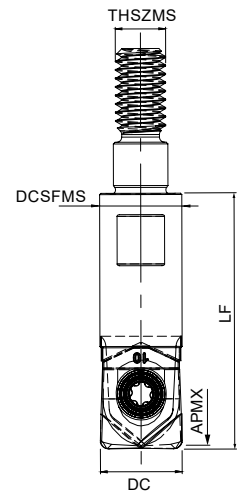
Cylindrical Carbide Shank

Tolerance R	Runout Tolerance
± 0,015	R 0,02

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications				Insert Pastilha Inserto	Stock
			DC	DCONMS	DN	LF	LU		APMX (mm)		A <sub>e</sub> max (mm)			
181156600	008E62090-02-U008140	2	8	8	7,7	140	35	0,09	4,0	2,5	0,8	0,8	WCR 08.../WCL 08...	⊗
181156700	010E62090-02-U010150	2	10	10	9,7	150	45	0,15	5,0	3,0	1,0	1,0	WCR 10.../WCL 10...	⊗
181156800	010E62090-02-U010180	2	10	10	9,7	180	45	0,18	5,0	3,0	1,0	1,0	WCR 10.../WCL 10...	⊗
181155700	012E62090-02-U012165	2	12	12	11,7	165	55	0,24	6,0	4,0	1,2	1,2	WCR 12.../WCL 12...	⊗
181156900	012E62090-02-U012200	2	12	12	11,7	200	55	0,29	6,0	4,0	1,2	1,2	WCR 12.../WCL 12...	⊗
181157000	016E62090-02-U016200	2	16	16	15,7	200	65	0,51	8,0	5,0	1,6	1,6	WCR 16.../WCL 16...	⊗
181157100	016E62090-02-U016250	2	16	16	15,7	250	65	0,67	8,0	5,0	1,6	1,6	WCR 16.../WCL 16...	⊗
181157200	020E62090-02-U020220	2	20	20	19,7	220	70	0,87	10,0	6,0	2,0	2,0	WCR 20.../WCL 20...	⊗
181157300	020E62090-02-U020250	2	20	20	19,7	250	70	1,00	10,0	6,0	2,0	2,0	WCR 20.../WCL 20...	⊗
181157400	020E62090-02-U020300	2	20	20	19,7	300	70	1,23	10,0	6,0	2,0	2,0	WCR 20.../WCL 20...	⊗

⊗ 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)



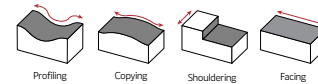
Threaded Steel Shank

Tolerance R	Runout Tolerance
± 0,015	R 0,05

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications				Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)		A <sub>e</sub> max (mm)			
181167000	010R62090-02-UM06030	2	10	M6	9,8	30	0,011	5	3,0	1,0	1,0	WCR 10.../WCL 10...	⊗
181167100	012R62090-02-UM06030	2	12	M6	9,8	30	0,016	6	4,0	1,2	1,2	WCR 12.../WCL 12...	⊗
181167200	016R62090-02-UM08030	2	16	M8	12,8	30	0,028	8	5,0	1,6	1,6	WCR 16.../WCL 16...	⊗
181167300	020R62090-02-UM10035	2	20	M10	17,8	35	0,058	10	6,0	2,0	2,0	WCR 20.../WCL 20...	⊗

⊗ Stock item | Produto de stock | Itens de stock

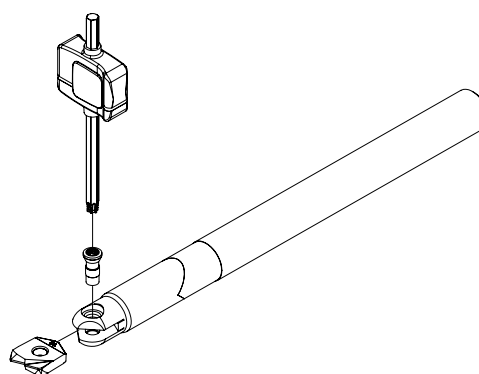
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
8	P0300726	XT08	DT0812	1,2
10	P0350825	XT10	DT1020	2,0
12	P0501025	XT20	DT2050	5,0
16	P0501326	XT20	DT2050	5,0
20	P0601725	XT25	-	6,9

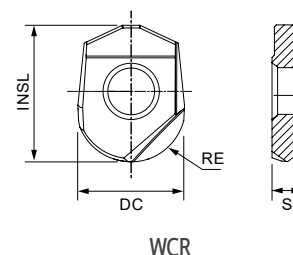
Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301. Check the procedures for the clamping screws on the page A-301.



**WCR** Inserts | Pastilhas | Plaquetas



WCR

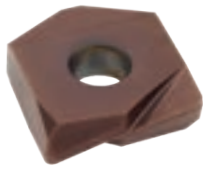


(1) Geometry code	ISO Reference	P				M				K				H				Dimensions Dimensões Dimensiones (mm)			
		PVD				PVD				PVD				PVD				INSL	RE	S	DC
		X4	8F	X6	4F	X4	8F	X6	4F	X4	8F	X6	4F	X4	8F	X6	4F				
1112900	WCR 08	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	9,7	4,0	2,1	8,0
1111914	WCR 10		△	△	△		△	△	△		△	△	△		△	△	△	12,0	5,0	2,7	10,0
1112099	WCR 12	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	14,6	6,0	3,2	12,0
1112100	WCR 16	△	△		△	△	△		△	△	△		△	△	△		△	16,6	8,0	4,2	16,0
1112101	WCR 20		△		△		△		△		△		△		△		△	20,0	10,0	5,2	20,0

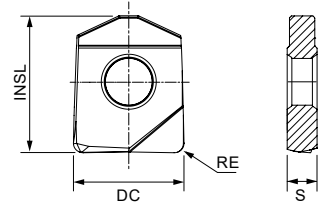
△ First choice | 1ª Escolha | 1ª Opción    
 △ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock  
⊖ Stock Items | Itens de stock    
 ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire página A-9)

Insert Order Code: (1) Geometry code + (2) Grade code

WCL Inserts | Pastilhas | Plaquetas



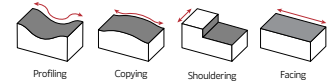
WCL



WCL

(1) Geometry code	ISO Reference	P				M				K				H				Dimensions Dimensões Dimensiones (mm)			
		PVD				PVD				PVD				PVD				INSL	RE	S	DC
		X4	8F	X6	4F	X4	8F	X6	4F	X4	8F	X6	4F	X4	8F	X6	4F				
1112879	WCL-08 R0.3	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	9,7	0,3	2,1	8,0
1112880	WCL-08 R0.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	9,7	0,5	2,1	8,0
1112853	WCL-08 R1.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	9,7	1,0	2,1	8,0
1112881	WCL-10 R0.3	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	12,0	0,3	2,7	10,0
1112882	WCL-10 R0.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	12,0	0,5	2,7	10,0
1112848	WCL-10 R1.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	12,0	1,0	2,7	10,0
1112883	WCL-10 R1.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	12,0	1,5	2,7	10,0
1112884	WCL-10 R2.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	12,0	2,0	2,7	10,0
1112885	WCL-12 R0.3	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	14,6	0,3	3,2	12,0
1112886	WCL-12 R0.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	14,6	0,5	3,2	12,0
1112096	WCL-12 R1.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	14,6	1,0	3,2	12,0
1112887	WCL-12 R1.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	14,6	1,5	3,2	12,0
1112888	WCL-12 R2.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	14,6	2,0	3,2	12,0
1112889	WCL-12 R3.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	14,6	3,0	3,2	12,0
1112890	WCL-16 R0.3	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	16,6	0,3	4,2	16,0
1112891	WCL-16 R0.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	16,6	0,5	4,2	16,0
1112097	WCL-16 R1.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	16,6	1,0	4,2	16,0
1112892	WCL-16 R1.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	16,6	1,5	4,2	16,0
1112893	WCL-16 R2.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	16,6	2,0	4,2	16,0
1112894	WCL-16 R3.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	16,6	3,0	4,2	16,0
1112895	WCL-20 R0.3	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	20,0	0,3	5,2	20,0
1112896	WCL-20 R0.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	20,0	0,5	5,2	20,0
1112098	WCL-20 R1.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	20,0	1,0	5,2	20,0
1112897	WCL-20 R1.5	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	20,0	1,5	5,2	20,0
1112898	WCL-20 R2.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	20,0	2,0	5,2	20,0
1112899	WCL-20 R3.0	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	20,0	3,0	5,2	20,0

⊗ 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 →	
				PHH603	PHF603	PHH910	PHF910	PHH910	PHF910
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	●	●	●	●	●	●
H	12	Hardened Steels	40-55 HRC	●	●	●	●	●	●

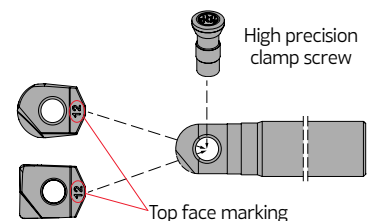
● Good Conditions    
 ● Average Conditions    
 ● Difficult Conditions

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

ISO	PSM	Material	HB (Brinell)	Vc (m/min)				Feed fz (mm/t)	
				← Wear Resistance				Toughness →	
				PHH603	PHF603	PHH910	PHF910	WCR	WCL
P	1	Unalloyed Steel	125-220	180-310	180-310	140-270	140-270	0,15-0,45	0,10-0,30
	2	Low-Alloyed Steel	220-280	180-300	180-300	140-260	140-260	0,15-0,40	0,10-0,25
	3	High-Alloyed Steel	280-380	180-280	180-280	140-220	140-220	0,10-0,40	0,10-0,25
M	4	SS - Ferritic / Martensitic	200-330	170-300	170-300	130-260	130-260	0,15-0,35	0,10-0,25
	5	SS - Austenitic	200-330	160-290	160-290	120-250	120-250	0,15-0,35	0,10-0,25
	6	SS - Austenitic-ferritic (Duplex)	230-260	150-270	150-270	110-230	110-230	0,15-0,30	0,08-0,20
K	7	Malleable Cast Iron	130-230	200-380	200-380	180-370	180-370	0,10-0,50	0,10-0,35
	8	Grey Cast Iron	180-245	180-360	180-360	180-350	180-350	0,10-0,45	0,10-0,30
	9	Nodular Cast iron	160-250	160-310	160-310	160-290	160-290	0,10-0,40	0,10-0,30
H	12	Hardened Steels	46-54 HRC	90-270	90-270	80-260	80-260	0,05-0,20	0,05-0,15
	13	Hardened Steels	55-62 HRC	80-200	80-200	70-180	70-180	0,05-0,15	0,04-0,12
	14	Hardened Steels	63-70 HRC	70-180	70-180	70-160	70-160	0,04-0,12	0,04-0,10

## PROCEDURES FOR CLAMPING SCREWS Procedimentos para parafusos de aperto | Procedimientos para sujetar tornillos

1. Check the insert seat.  
Before assembly cutter it is important to ensure that the insert seat has not been damaged during machining or handling.
2. Clean the insert seat.  
Make sure that the insert seat is free from dust or chips from previous machining. If necessary, clean the insert seat with pressurised air.
3. Position the insert.  
Position the insert with the top face marking in the direction of screw placement and couple the insert into the cutter.
4. Lubricate the insert screw.  
Apply sufficient screw lubrication to prevent seizure. Lubricant should be applied in small quantity to the screw threads.
5. Always use a torque wrench to ensure that screws are correctly tightened ( please confirm torque data ). Excessive torque will negatively affect the performance of the tool and can cause screw and insert breakage. Unsuccessful torque leads to insert movement, vibration and degrade the cutting result. Dedicated adjustable torque wrench can be ordered separately. Please do not press down the insert during tightening process.



**Note:** Always replace worn or damaged screws.

**CAUTION** To avoid affecting tolerances do not tighten the screw without assembling the insert in the toolholder.

49095 | 45095

# PLUS



The PLUS line is designed for semi-finishing to finishing operations, featuring double-sided positive inserts. The PLUS line offers the advantage of an economical insert with six positive cutting edges. This makes it ideal for profile applications in the mold and die industry.

A linha PLUS é projetada para operações de semi-acabamento a acabamento, apresentando pastilhas positivas de dois lados. Oferece a vantagem de uma pastilha econômica com seis arestas de corte positivas. Isso torna-a ideal para aplicações de perfil na indústria de moldes e matrizes.

La línea PLUS está diseñada para operaciones de semiacabado a acabado, presentando plaquitas positivas de dos lados. Ofrece la ventaja de una plaquita económica con seis filos de corte positivos. Esto la hace ideal para aplicaciones de perfil en la industria de moldes y matrizes.

## LINEPRO 49095 > page 234

- > From DC 16mm to 35mm

De DC 16mm a 35mm | Desde DC 16mm hasta 35mm

- > Available in threaded coupling

Disponível em acoplamento roscado | Disponible en fijación roscada

- > Negative inserts with 6 cutting-edges

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



## LINEPRO 45095 > page 236

- > From DC 25mm to 42mm

De DC 25mm a 42mm | Desde DC 25mm hasta 42mm

- > Available in threaded coupling

Disponível em acoplamento roscado | Disponible en fijación roscada

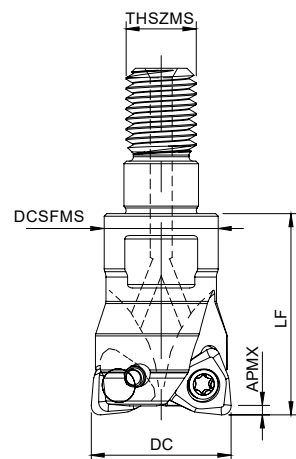
- > Designed for finishing and profile milling

Projetado para acabamento e fresagem de perfil | Diseñado para acabado y fresado de perfil





**Threaded Coupling**  
KAPR=95° | GAMP=-7°



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	Lf		APMX (mm)		
181030400	016R49095-02-07-M08023	2	16	M8	13	23	0,024	0,30	WNHU 04T310	⊗
181028600	020R49095-03-07-M10028	3	20	M10	18	28	0,052	0,30	WNHU 04T310	⊗
181030500	025R49095-04-07-M12030	4	25	M12	21	30	0,082	0,30	WNHU 04T310	⊗
181030600	035R49095-05-07-M16035	5	35	M16	29	35	0,190	0,30	WNHU 04T310	⊗

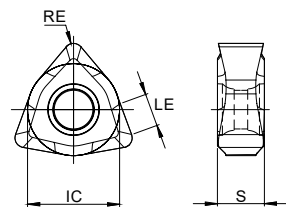
⊗ Stock item | Produto de stock | Itens de stock

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

**WNHU 04T310** Inserts | Pastilhas | Plaquetas



WNHU



WNHU

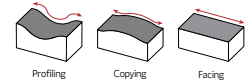
Geometry code (1)	ISO Reference	P			K		H		Dimensions Dimensões Dimensiones (mm)				
		PVD			PVD		PVD						
		(2) Grade code	X5	T1	P4	X5	T1	X4	X5	iC	S	I	R
1110783	WNHU 04T310	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	6,35	3,50	2,80	1,00

⊗ First choice | Primeira opção | 1ª opción

⊗ Stock item | Produto de stock | Itens de stock

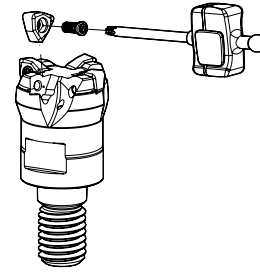
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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



**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Order separately			
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value
R49095 - 16-35	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.

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

ISO	PSM	Material	HB (Brinell)	Grades			
				← Wear Resistance			Toughness →
				PHH603	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		✓	✓	
H	12	Hardened Steels	40-55 HRC	✓	✓		

(Note 1) Grade PHH603 must be used only on finishing operations.



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 →
				PHH603	PHP910	PHP920	PHP930
P	1	Unalloyed Steel	125-220	-	180-250	180-240	160-220
	2	Low-Alloyed Steel	220-280	-	160-240	160-220	140-200
	3	High-Alloyed Steel	280-380	180-310	140-230	140-210	120-190
K	7	Malleable Cast Iron	130-230	-	180-300	160-260	150-240
	8	Grey Cast Iron	180-245	-	160-250	140-240	140-230
	9	Nodular Cast iron	160-250	-	150-210	120-200	100-190
H	12	Hardened Steels	40-55 HRC	70-270	60-250	-	-

(Note 1) Grade PHH603 must be used only on finishing operations.

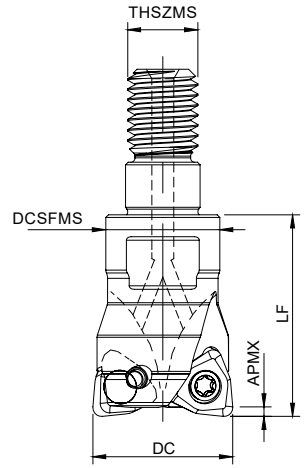
(Note 2)

Insert	Feed $f_z$ (mm/t)		AP Rec.
	Roughing	Finishing	
WNHU 04T310	0,15-0,25	0,10-0,20	0,10-0,50

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

(Note 4) If chattering occurs, reduce  $a_p$  and  $V_c$  by 30% and keep the same  $f_z$  per tooth.

MILLING



**Threaded Coupling**  
KAPR=95° | GAMP=-6°

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

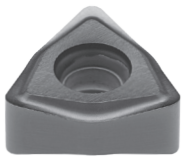
End Mills

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications	Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)		
181037500	025R45095-02-06-M12030	2	25	M12	21	30	0,079	0,50	WNHU 060410	⊗
181037600	035R45095-03-06-M16035	3	35	M16	29	35	0,185	0,50	WNHU 060410	⊗
181037700	042R45095-04-06-M16035	4	42	M16	29	35	0,219	0,50	WNHU 060410	⊗

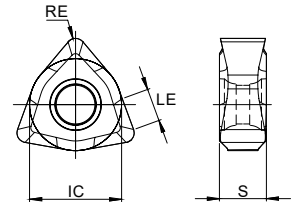
⊗ Stock item | Produto de stock | Itens de stock

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

**WNHU 060410** Inserts | Pastilhas | Plaquetas



WNHU



WNHU

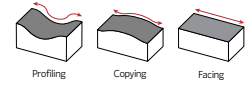
		P	K	H		Dimensions Dimensões Dimensiones (mm)			
		PVD	PVD	PVD					
(2) Grade code		X5	X5	X4	X5	IC	S	LE	RE
(1) Geometry code	ISO Reference	PHP910	PHP910	PHH603	PHP910				
1111424	WNHU 060410	⊗	⊗	⊗	⊗	9,53	4,76	3,40	1,00

⊗ First choice | Primeira opção | 1ª opción

⊗ Stock item | Produto de stock | Itens de stock

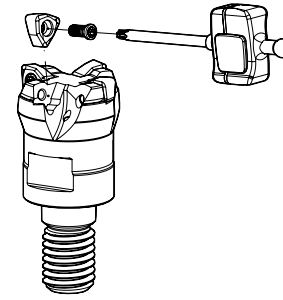
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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



**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Order separately			
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value
R45095 - 25-42	P0350902	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.

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

ISO	PSM	Material	HB (Brinell)	Grades	
				← Wear Resistance	Toughness →
				PHH603	PHP910
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		✓
H	12	Hardened Steels	40-55 HRC	✓	✓

(Note 1) Grade PHH603 must be used only on finishing operations.

● 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 →
				PHH603	PHP910
P	1	Unalloyed Steel	125-220	-	180-250
	2	Low-Alloyed Steel	220-280	-	160-240
	3	High-Alloyed Steel	280-380	180-310	140-230
K	7	Malleable Cast Iron	130-230	-	180-300
	8	Grey Cast Iron	180-245	-	160-250
	9	Nodular Cast iron	160-250	-	150-210
H	12	Hardened Steels	40-55 HRC	70-270	60-250

(Note 1) Grade PHH603 must be used only on finishing operations.

(Note 2)

Insert	Feed $f_z$ (mm/t)		AP Rec.
	Roughing	Finishing	
WNHU 060410	0,15-0,30	0,10-0,25	0,10-0,50

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

(Note 4) If chattering occurs, reduce  $a_p$  and  $V_c$  by 30% and keep the same  $f_z$  per tooth.

33590 | 33690 | 33790 | 33890 | 33990

# TOROMILL

34190 | 34290

# TURBOMILL



The TOROMILL and TURBOMILL lines are designed for rough machining in challenging cutting materials. The innovative TURBOMILL round insert copy mill features a unique anti-rotation system. This system effectively secures the inserts in place, preventing any movement within the pockets during machining. As a result, it ensures tool reliability and precise indexing when machining difficult cutting materials.

As linhas TOROMILL e TURBOMILL são projetadas para fresagem de desbaste em materiais de corte desafiadores. A inovadora fresa de cópia com pastilha redonda TURBOMILL apresenta um sistema único de anti-rotação. Esse sistema garante efetivamente que as pastilhas permaneçam no lugar, evitando qualquer movimento dentro dos alojamentos durante a fresagem. Como resultado, garante a fiabilidade da ferramenta e a indexação precisa ao maquinar materiais de corte difíceis.

Las líneas TOROMILL y TURBOMILL están diseñadas para fresado de desbaste en materiales de corte desafiantes. La innovadora fresa de copia con plaquita redonda TURBOMILL presenta un sistema único de anti-rotación. Este sistema garantiza efectivamente que las plaquitas permanezcan en su lugar, evitando cualquier movimiento dentro de los alojamientos durante el fresado. Como resultado, asegura la fiabilidad de la herramienta y la indexación precisa al mecanizar materiales de corte difíciles.

## **TOROMILL** 33590 | 33690 | 33790 | 33890 | 33990 > page 240

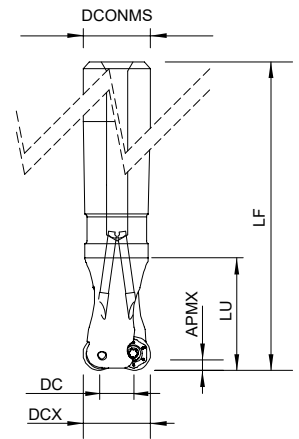
- > **From DC 16mm to 125mm**  
De DC 16mm a 125mm | Desde DC 16mm hasta 125mm
- > **Available in arbor, threaded, weldon and cylindrical shank**  
Disponível em montagem tipo árvore, acoplamento roscado e haste cilíndrica | Disponible en fijación con tornillo central, fijación roscada y mango cilíndrico
- > **Smooth cutting and low power requirement**  
Corte suave e baixa potência requerida | Corte suave y bajo requisito de potencia
- > **For stainless and HRSA applications**  
Para aplicações em aço inoxidável e HRSA | Para aplicaciones de acero inoxidable y HRSA



## **TURBOMILL** 34190 | 34290 > page 244

- > **From DC 20mm to 80mm**  
De DC 20mm a 80mm | Desde DC 20mm hasta 80mm
- > **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
- > **Unique anti-rotation system**  
Sistema único de anti-rotação | Sistema único de anti-rotación
- > **Round positive insert with 4 or 6 cutting edges**  
Pastilha positiva redonda com 4 ou 6 arestas de corte | Plaquita positiva redonda con 4 o 6 filos de corte





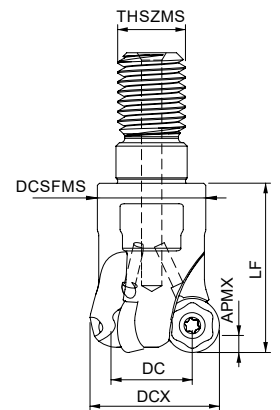
## Cylindrical Shank

GAMP=+5°

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications	Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	LF	LU		APMX (mm)		
33590											
181122500	016E33590-02-04-016160	2	16	8	16	160	59	0,19	4,0	RD...0802 M0E	⊗
181122600	020E33590-03-05-020180	3	20	12	20	180	59	0,35	4,0	RD...0802 M0E	⊗
181122700	025E33590-04-05-025200	4	25	17	25	200	59	0,76	4,0	RD...0802 M0E	⊗
33690											
181123400	020E33690-02-05-020180	2	20	10	20	180	50	0,40	5,0	RP...10T3 M0E	⊗
181123500	025E33690-03-05-025200	3	25	15	25	200	60	0,76	5,0	RP...10T3 M0E	⊗
181123600	032E33690-04-05-032200	4	32	22	32	200	60	1,10	5,0	RP...10T3 M0E	⊗

⊗ 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)



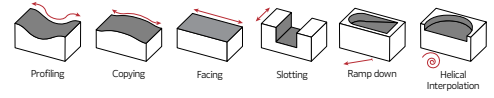
## Threaded Coupling

GAMP=+5°

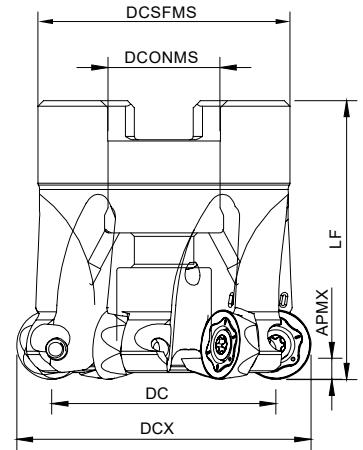
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications	Insert Pastilha Inserto	Stock
			DCX	DC	THSZMS	DCSFMS	LF		APMX (mm)		
33590											
181098600	016R33590-02-04-M08020	2	16	8	M8	13	20	0,02	4,0	RD...0802 M0E	⊗
181122800	020R33590-03-05-M10025	3	20	12	M10	16	25	0,07	4,0	RD...0802 M0E	⊗
181122900	025R33590-04-05-M12030	4	25	17	M12	21	30	0,10	4,0	RD...0802 M0E	⊗
181123000	032R33590-05-05-M16043	5	32	24	M16	29	43	0,25	4,0	RD...0802 M0E	○
33690											
181110600	020R33690-02-05-M10032	2	20	10	M10	16	32	0,12	5,0	RP...10T3 M0E	○
181110700	025R33690-03-05-M12035	3	25	15	M12	21	35	0,09	5,0	RP...10T3 M0E	⊗
181110800	032R33690-04-05-M16035	4	32	22	M16	29	35	0,31	5,0	RP...10T3 M0E	⊗
181120700	035R33690-05-05-M16045	5	35	25	M16	29	45	0,22	5,0	RP...10T3 M0E	⊗

⊗ 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)



**Arbor Mounting**  
GAMP=+5°



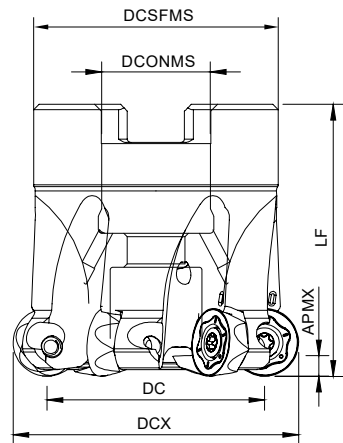
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
<b>33690</b>												
181123700	042A33690-06-05-016040	6	42	32	16	36	40	0,18	A	5,0	RP...10T3 MOE	☉
181123800	050A33690-06-05-022040	6	50	40	22	42	40	0,26	A	5,0	RP...10T3 MOE	☉
181123900	052A33690-07-05-022040	7	52	42	22	42	40	0,25	A	5,0	RP...10T3 MOE	○
<b>33790</b>												
181098700	040A33790-04-05-016040	4	40	28	16	36	40	0,18	A	6,0	RP...1204 MOE	☉
181111500	050A33790-04-05-022040	4	50	38	22	42	40	0,24	A	6,0	RP...1204 MOE	☉
181124200	052A33790-05-05-022040	5	52	40	22	42	40	0,25	A	6,0	RP...1204 MOE	☉
181122100	063A33790-06-05-022040	6	63	51	22	48	40	0,38	A	6,0	RP...1204 MOE	☉
181124300	066A33790-06-05-027050	6	66	54	27	48	50	0,46	A	6,0	RP...1204 MOE	○
181124400	080A33790-07-05-027050	7	80	68	27	60	50	0,88	A	6,0	RP...1204 MOE	○

☉ 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)



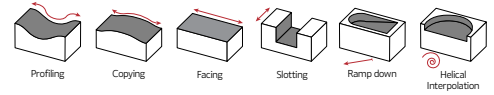
Arbor Mounting  
GAMP=+5°



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
33890												
181124500	050A33890-04-05-022040	4	50	34	22	42	40	0,23	A	8,0	RP...1605 MOE	☺
181124600	052A33890-04-05-022040	4	52	36	22	42	40	0,245	A	8,0	RP...1605 MOE	☺
181114900	063A33890-05-05-022040	5	63	47	22	48	40	0,369	A	8,0	RP...1605 MOE	☺
181124700	066A33890-05-05-027050	5	66	54	27	48	50	0,46	A	8,0	RP...1605 MOE	☺
181124800	080A33890-06-05-027052	6	80	64	27	60	52	0,93	A	8,0	RP...1605 MOE	☺
181124900	100A33890-07-05-032052	7	100	84	32	80	52	1,57	A	8,0	RP...1605 MOE	☺
181122200	125A33890-08-05-040052	8	125	109	40	90	52	2,64	A	8,0	RP...1605 MOE	☺
33990												
181112200	080A33990-05-05-027050	5	80	60	27	60	50	0,70	A	10,0	RP...2006 MOE	☺
181099800	100A33990-06-05-032063	6	100	80	32	80	63	1,62	A	10,0	RP...2006 MOE	☺
181099900	125A33990-06-05-040063	6	125	105	40	90	63	2,53	A	10,0	RP...2006 MOE	☺

☺ 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)



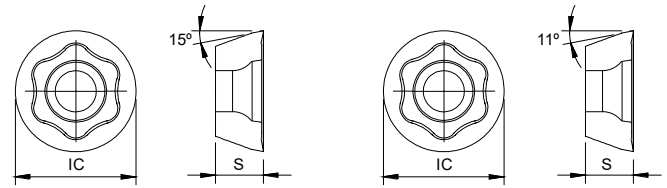
**RDHT | RPHT** Inserts | Pastilhas | Plaquetas



RDHT



RPHT



RDHT

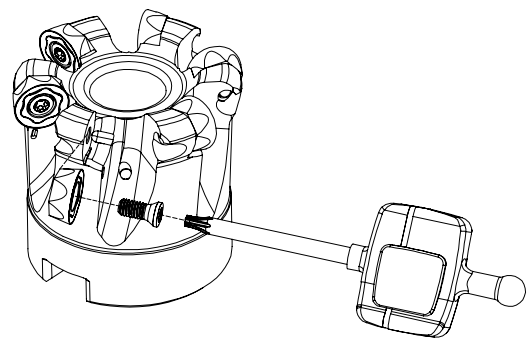
RPHT

		P				M				S			Dimensions Dimensões Dimensiones (mm)	
		CVD	PVD			PVD				PVD				
(1)	(2) Grade code	T9	T1	Z1	Z2	X9	Y2	Z2	Z3	X9	Y2	Z3	IC	S
Geometry code	ISO Reference	PHS740	PHP920	PHP808	PHP530	PHH930	PHH808	PHP530	PHH530	PHH930	PHH808	PHH530		
1112152	RDHT 0802 M0E-LS				⊗			⊗	⊗			⊗	8,00	2,38
1112253	RPHT 10T3 M0E-MS		⊗			⊗				⊗			10,00	3,97
1112772	RPHT 10T3 M0E-LS	⊗		⊗	⊗		⊗	⊗	⊗		⊗	⊗	10,00	3,97
1112186	RPHT 1204 M0E-MS		⊗			⊗				⊗			12,00	4,76
1112766	RPHT 1204 M0E-LS	⊗		⊗	⊗		⊗	⊗	⊗		⊗	⊗	12,00	4,76
1112254	RPHT 1605 M0E-MS		⊗			⊗				⊗			16,00	5,56
1112951	RPHT 1605 M0E-LS			⊗	⊗		⊗	⊗	⊗		⊗	⊗	16,00	5,56
1112958	RPHT 2006 M0E-LS				⊗		⊗	⊗	⊗		⊗	⊗	20,00	6,35

⊗ 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
	33590			
R33590	P0250503	XT08	DT0812	1,20
E33590	P0250503	XT08	DT0812	1,20
	33690			
A33690	P0300800	XT09	DT0914	1,40
R33690	P0300800	XT09	DT0914	1,40
E33690	P0300800	XT09	DT0914	1,40
	33790			
A33790	P0350800	XT15	DT1530	3,00
	33890			
A33890	P0451100	XT20	DT2050	5,00
	33990			
A33990	P0501302	PT20	DT2050	5,00

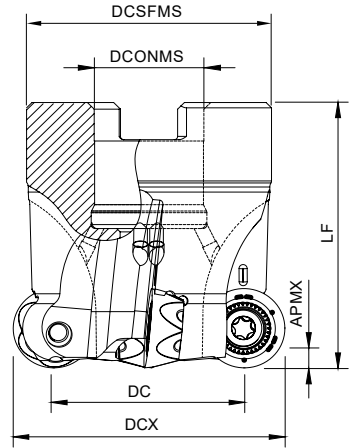


Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-301. Check the procedures for the clamping screws on the page A-301.



## Arbor Mounting

GAMP=+5°



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181160100	042A34190-06-05-016040	6	42	32	16	36	40	0,16	A	5	RPHT 10T3M0E-LS(4)	⊗
181160200	050A34190-06-05-022039	6	50	40	22	42	40	0,26	A	5	RPHT 10T3M0E-LS(4)	⊗
181160700	052A34190-07-05-022040	7	52	42	22	42	40	0,30	A	5	RPHT 10T3M0E-LS(4)	⊗

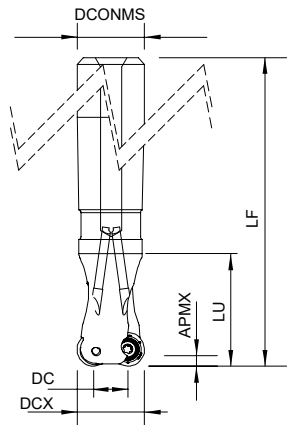
⊗ Stock item | Produto de stock | Itens de stock

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



## Cylindrical Shank

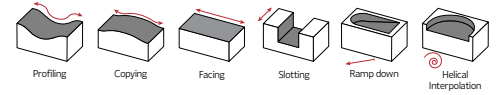
GAMP=+5°



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	LF	LU		APMX (mm)			
181187200	020E34190-02-05-020180	2	20	10	20	180	50	0,40	5,0	RPHT 10T3M0E-LS(4)	⊗	
181183300	025E34190-03-05-025200	3	25	15	25	200	60	0,76	5,0	RPHT 10T3M0E-LS(4)	⊗	
181191500	032E34190-04-05-032200	4	32	22	32	200	60	0,98	5,0	RPHT 10T3M0E-LS(4)	○	

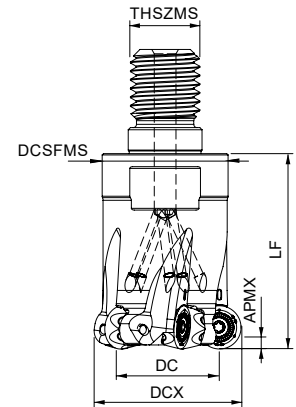
⊗ Stock item | Produto de stock | Itens de stock

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



**Threaded Coupling**

GAMP=+5°



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications	Insert Pastilha Inserto	Stock
			DCX	DC	THSZMS	DCSFMS	LF		APMX (mm)		
181191600	020R34190-02-05-M10032	2	20	10	M10	16	32	0,10	5,0	RPHT 10T3M0E-LS(4)	○
181191700	025R34190-03-05-M12035	3	25	15	M12	21	35	0,19	5,0	RPHT 10T3M0E-LS(4)	○
181191800	032R34190-04-05-M16035	4	32	22	M16	29	35	0,31	5,0	RPHT 10T3M0E-LS(4)	○
181182300	035R34190-05-05-M16045	5	35	25	M16	29	45	0,40	5,0	RPHT 10T3M0E-LS(4)	⊗

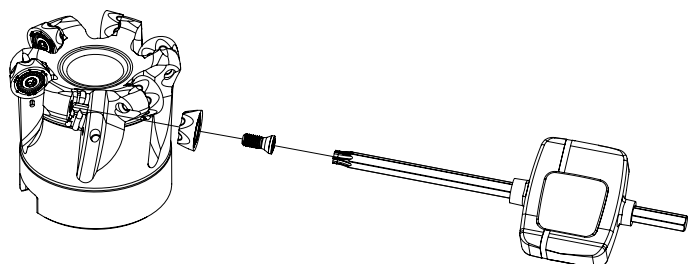
⊗ Stock item | Produto de stock | Itens de stock

○ 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

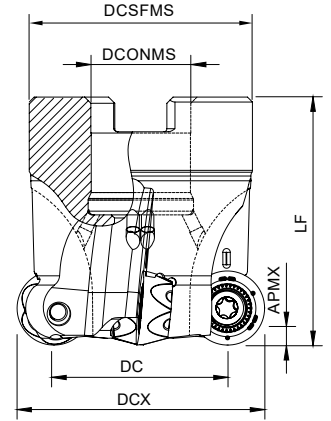
Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A34190 - 42-52	P0300800	XT09	DT0914	1,40
E34190 - 20-32	P0300800	XT09	DT0914	1,40
R34190 - 20-35	P0300800	XT09	DT0914	1,40

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.





Arbor Mounting  
GAMP=+5°



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181159600	040A34290-04-05-016040	4	40	28	16	36	40	0,15	A	6	RPHT 1204 M0E-LS(4)	☉
181186300	050A34290-05-05-022040	5	50	38	22	42	40	0,24	A	6	RPHT 1204 M0E-LS(4)	☉
181159500	052A34290-05-05-022040	5	52	40	22	42	40	0,25	A	6	RPHT 1204 M0E-LS(4)	☉
181160400	063A34290-06-05-022040	6	63	51	22	48	40	0,36	A	6	RPHT 1204 M0E-LS(4)	☉
181160500	066A34290-06-05-027050	6	66	54	27	48	50	0,40	A	6	RPHT 1204 M0E-LS(4)	☉
181160600	080A34290-07-05-027050	7	80	68	27	60	50	0,68	A	6	RPHT 1204 M0E-LS(4)	☉

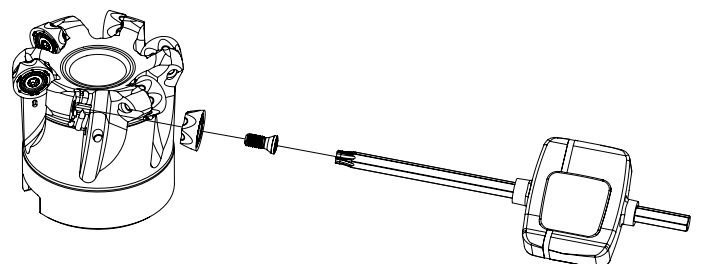
☉ Stock item | Produto de stock | Itens de stock

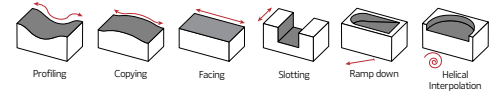
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

## SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
A34290 - 40	P0350800	XT15	DT1530	3,00
A34290 - 50	P0351000	XT15	DT1530	3,00
A34290 - 52-80	P0350800	XT15	DT1530	3,00

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.





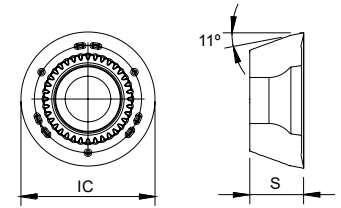
RPHT-LS Inserts | Pastilhas | Plaquetas



RPHT-LS



RPHT-LS4



RPHT-LS | LS4

		P			M			S		Dimensions Dimensões Dimensiones (mm)	
		CVD	PVD		PVD			PVD			
		T9	Z1	Z2	Y2	Z2	Z3	Y2	Z3		
<sup>(1)</sup> Geometry code	<sup>(2)</sup> Grade code ISO Reference	PHS740	PHP808	PHP530	PHH808	PHP530	PHH530	PHH808	PHH530	IC	S
1112772	RPHT 10T3 M0E-LS	☉	☉	☹	☉	☉	☹	☉	☹	10,00	3,97
1113021	RPHT 10T3 M0E-LS4			☹		☉	☹		☹	10,00	3,97
1112766	RPHT 1204 M0E-LS	☉	☉	☹	☉	☉	☹	☉	☹	12,00	4,76
1113020	RPHT 1204 M0E-LS4			☹		☉	☹		☹	12,00	4,76

☉ 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

## GRADES SELECTION GUIDE

Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades						
				← Wear Resistance						Toughness →
				PHP920	PHH930	PHP530	PHH530	PHP808	PHH808	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		✓		✓		✓	
S	11	Heat Resistant Super Alloys	200-320		✓		✓		✓	



Good Conditions



Average Conditions



Difficult Conditions

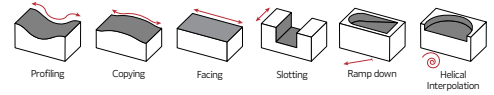
## RECOMMENDED CUTTING CONDITIONS

Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)						
				← Wear Resistance						Toughness →
				PHP920	PHH930	PHP530	PHH530	PHP808	PHH808	PHS740
P	1	Unalloyed Steel	125-220	180-250	-	180-340	-	180-340	-	180-350
	2	Low-Alloyed Steel	220-280	160-230	-	180-340	-	180-340	-	180-340
	3	High-Alloyed Steel	280-380	140-220	-	180-330	-	180-330	-	180-340
M	4	SS - Ferritic / Martensitic	200-330	-	140-210	150-270	170-280	-	160-270	-
	5	SS - Austenitic	200-330	-	120-170	-	160-280	-	160-270	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	100-150	-	150-260	-	150-250	-
S	11	Heat Resistant Super Alloys	200-320	-	30-110	-	30-150	-	30-140	-

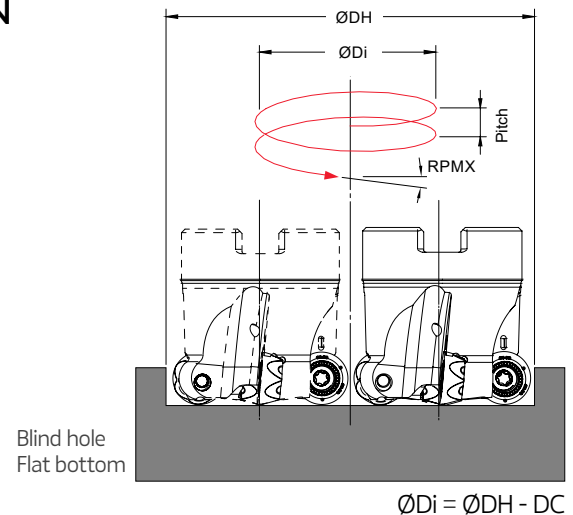
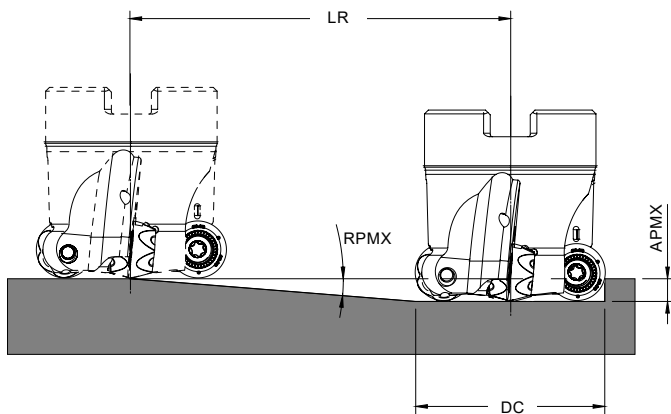
ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)				
				RDHT 08..	RPHT 10...	RPHT 12...	RPHT 16...	RPHT 20...
				P	1	Unalloyed Steel	125-220	0,05-0,35
2	Low-Alloyed Steel	220-280	0,05-0,35		0,05-0,40	0,05-0,45	0,08-0,55	0,10-0,55
3	High-Alloyed Steel	280-380	0,05-0,30		0,05-0,35	0,05-0,40	0,08-0,50	0,10-0,55
M	4	SS - Ferritic / Martensitic	200-330	0,05-0,25	0,05-0,30	0,05-0,35	0,08-0,45	0,10-0,50
	5	SS - Austenitic	200-330	0,05-0,25	0,05-0,30	0,05-0,35	0,08-0,45	0,10-0,50
	6	SS - Austenitic-ferritic (Duplex)	230-260	0,05-0,25	0,05-0,30	0,05-0,35	0,08-0,45	0,10-0,45
S	11	Heat Resistant Super Alloys	200-320	0,05-0,20	0,05-0,25	0,05-0,30	0,08-0,35	0,10-0,40

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



# RAMPING AND HELICAL INTERPOLATION

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



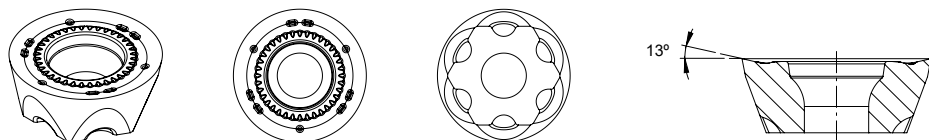
Insert	DC	Ramping			Helical Interpolation		
		RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
<b>33590</b>							
RD... 08	16	10,0	4,0	22,7	24	-	4
	20	8,0	4,0	28,5	32	32	8
	25	10,0	4,0	22,7	42	40	5
	32	8,0	4,0	28,5	56	50	8
<b>33690   34190</b>							
RP.. 10	20	7,0	5,0	40,7	30	-	3
	25	6,0	5,0	47,6	40	40	7
	32	6,0	5,0	47,6	54	50	4
	35	5,0	5,0	57,2	60	64	8
	42	5,0	5,0	57,2	74	70	7
	50	4,0	5,0	71,5	90	84	6
	52	3,0	5,0	95,4	94	100	9
<b>33790   34290</b>							
RP.. 12	40	8,0	6,0	42,7	68	-	12
	50	3,5	6,0	98,1	88	80	17
	52	3,0	6,0	114,5	92	100	7
	63	2,5	6,0	137,4	114	104	9
	66	2,5	6,0	137,4	120	126	6
	80	2,0	6,0	171,8	148	132	8
<b>33890</b>							
RP.. 16	50	7,0	8,0	65,2	84	-	13
	52	7,0	8,0	65,2	88	100	19
	63	7,0	8,0	65,2	110	104	13
	66	3,0	8,0	152,6	116	126	20
	80	3,0	8,0	152,6	144	132	18
	100	3,0	8,0	152,6	184	160	24
	125	2,5	8,0	183,2	234	200	8
<b>33990</b>							
RP.. 20	80	4,0	10,0	143,0	140	-	10
	100	3,0	10,0	190,8	180	160	13
	125	2,5	10,0	229,0	230	200	16

Note: During helical interpolation do not exceed APMX.

RPHT-LS INSERT INFORMATION Informação de pastilha RPHT-LS | Información del inserto RPHT-LS

P M S

RPHT-LS

RPHT 10 | 12  
16 | 20

RPHT-LS

**6 cutting edges insert**

- Insert with 6 cutting edges for a higher productivity.

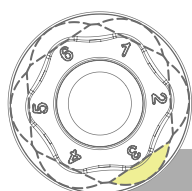
**Insert Geometry**

- Improved geometry for low cutting force;
- Positive insert with a brand new edge positioning system.

**The maximum depth of cut using 6 cutting edges (LS)**

TOROMILL 33590

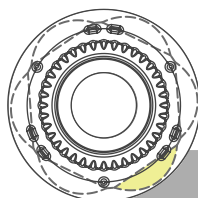
RDHT 0802 M0E-LS



1,95 mm

TOROMILL 33690  
TURBOMILL 34190

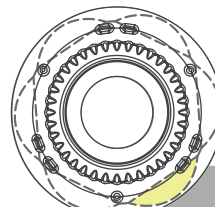
RPHT 10T3 M0E-LS



2,45 mm

TOROMILL 33690  
TURBOMILL 34290

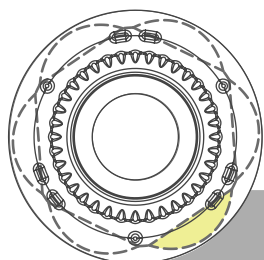
RPHT 1204 M0E-LS



2,90 mm

TOROMILL 33890

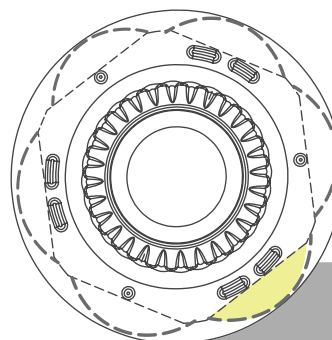
RPHT 1605 M0E-LS



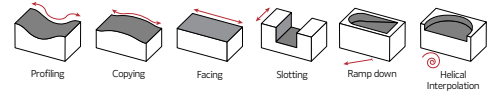
3,90 mm

TOROMILL 33990

RPHT 2006...



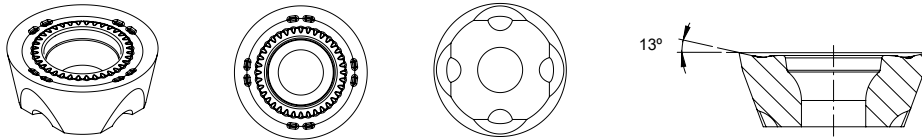
4,90 mm



# INSERT INFORMATION RPHT-LS4 Informação de pastilha RPHT-LS | Información del inserto RPHT-LS



RPHT-LS4



### 4 cutting edges insert

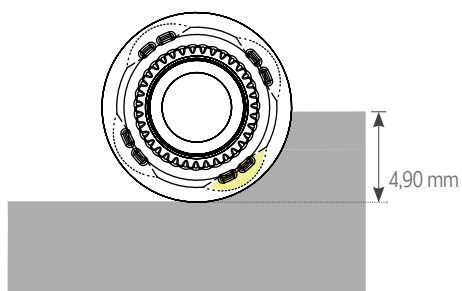
- Insert with 4 cutting edges for higher depth of cut.

### Insert Geometry

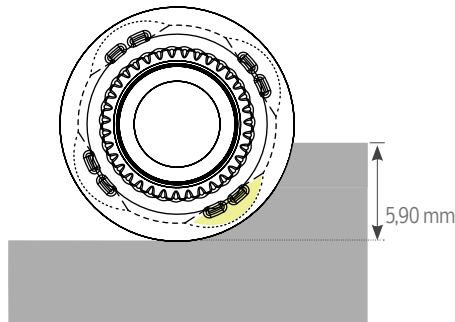
- Improved geometry for low cutting force;
- Positive insert with a brand new edge positioning system.

## The maximum depth of cut using 4 cutting edges (LS4)

TURBOMILL 34190  
RPHT 10T3 M0E-LS4



TURBOMILL 34290  
RPHT 1204 M0E-LS4



## GEOMETRY FEATURES Características geométricas | Características geométricas

Geometry	Features   Características   Características
Geometry <b>LS</b> General machining	Optimized geometry for stainless steel and HRSA. Suitable for alloy steel machining.
Geometry <b>LS4</b> General machining	Optimized geometry for stainless steel and HRSA. Suitable for alloy steel machining. 4 Cutting edges version.

35190

# TOROMILL X2



The TOROMILL X2 line is a double-sided inserts offer double the cost-effectiveness, boasting machining with high metal removal rates. With twice the number of cutting edges and an optimal depth of cut, they ensure efficient performance. This design not only enhances productivity but also reduces downtime for insert changes.

A linha TOROMILL X2 é composta por pastilhas de dois lados que oferecem o dobro de economia, proporcionando fresagem com altas taxas de remoção de metal. Com o dobro de arestas de corte e uma profundidade de corte otimizada, elas garantem um desempenho eficiente. Esse design não apenas aumenta a produtividade, mas também reduz o tempo de troca de pastilhas.

La línea TOROMILL X2 está compuesta por plaquitas de doble cara que ofrecen el doble de economía, permitiendo el fresado con altas tasas de remoción de metal. Con el doble de filos de corte y una profundidad de corte óptima, garantizan un rendimiento eficiente. Este diseño no solo aumenta la productividad, sino que también reduce el tiempo de cambio de plaquitas.

## TOROMILL X2 35190 > page 254

- > From DC 32mm to 100mm

De DC 32mm a 100mm | Desde DC 32mm hasta 100mm

- > 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

- > Round negative insert with 12 cutting edges

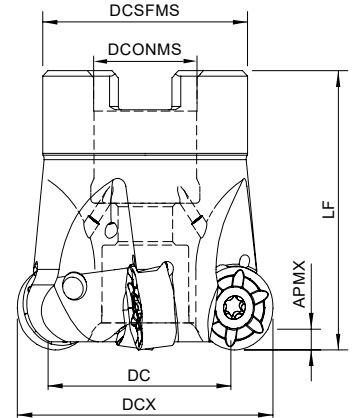
Pastilha negativa redonda com 12 arestas de corte | Pastilla negativa redonda con 12 filos de corte





## Arbor Mounting

GAMP=-7°



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
181111600	040A35190-04-07-016040	4	40	28	16	32	40	0,20	A	3,0	RNHX 1204 MOE...	⊗
181100200	050A35190-05-07-022040	5	50	38	22	40	40	0,24	A	3,0	RNHX 1204 MOE...	⊗
181128800	063A35190-06-07-022050	6	63	51	22	48	50	0,55	A	3,0	RNHX 1204 MOE...	⊗
181128900	080A35190-07-07-027050	7	80	68	27	60	50	0,78	A	3,0	RNHX 1204 MOE...	⊗
181175600	100A35190-09-07-032050	9	100	82	32	70	50	1,00	B	3,0	RNHX 1204 MOE...	⊗

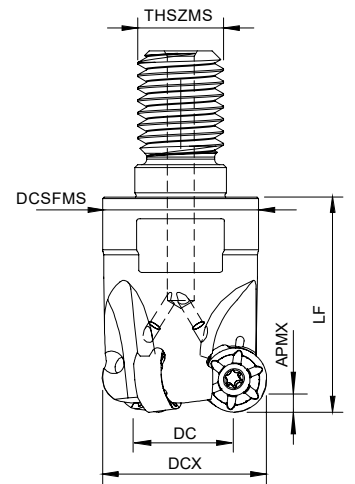
⊗ Stock item | Produto de stock | Itens de stock

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



## Threaded Coupling

GAMP=-7°

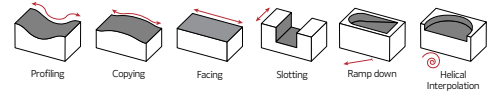


Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications	Insert Pastilha Inserto	Stock
			DCX	DC	THSZMS	DCSFMS	LF		APMX (mm)		
181128500	032R35190-03-07-M16040	3	32	20	M16	29	40	0,16	3,0	RNHX 1204 MOE...	⊗
181128700	042R35190-04-07-M16040	4	42	30	M16	29	40	0,20	3,0	RNHX 1204 MOE...	○

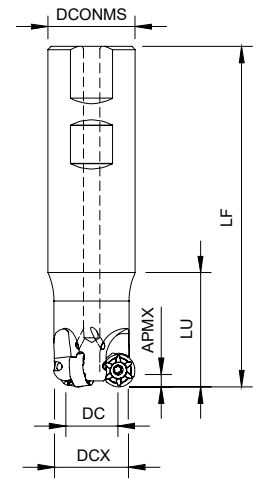
⊗ Stock item | Produto de stock | Itens de stock

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

**TOROMILL X2 35190**  
RNHX 12



**Weldon Shank**  
GAMP=-7°



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications	Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	LF	LU		APMX (mm)		
181087000	032W35190-03-07-032125	3	32	20	32	125	42	0,98	3,0	RNHX 1204 MOE...	☼

☼ 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)

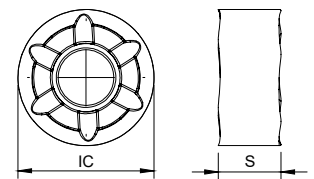
**RNHX 1204...** Inserts | Pastilhas | Plaquetas



RNHX-LP



RNHX-MP



RNHX-LP | MP

Geometry code (1)	ISO Reference	P			M			K		S		Dimensions Dimensões Dimensiones (mm)	
		PVD			PVD			PVD		PVD			
		T1	P4	Z2	X9	Z2	Z3	T1	P4	X9	Z3		
1112030	RNHX 1204 MOE-LP	☼		☼	☼	☼	☼			☼	☼	12,00	4,76
1112052	RNHX 1204 MOE-MP	☼	☼					☼	☼			12,00	4,76

☼ First choice | Primeira opção | 1ª opción

☼ Stock item | Produto de stock | Itens de stock

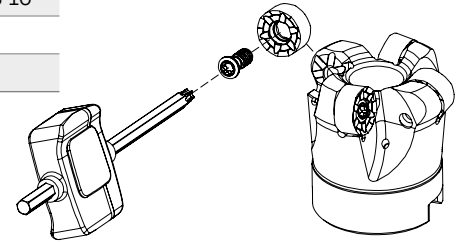
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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

## SPARE PARTS Acessórios | Repuestos

Cutter DC	Order separately					
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A35190 - 40-80	P0401065	XT15	DT1530	3,00	-	-
A35190 - 100	P0401065	XT15	DT1530	3,00	J0164110	SD6368-16
R35190 - 32-42	P0401065	XT15	DT1530	3,00	-	-
W35190 - 32	P0401065	XT15	DT1530	3,00	-	-

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.



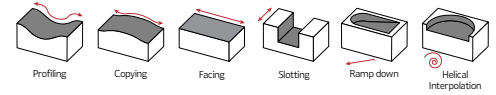
## GRADES SELECTION GUIDE Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades				
				← Wear Resistance			Toughness →	
				PHP920	PHP930	PHH930	PHP530	PHH530
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

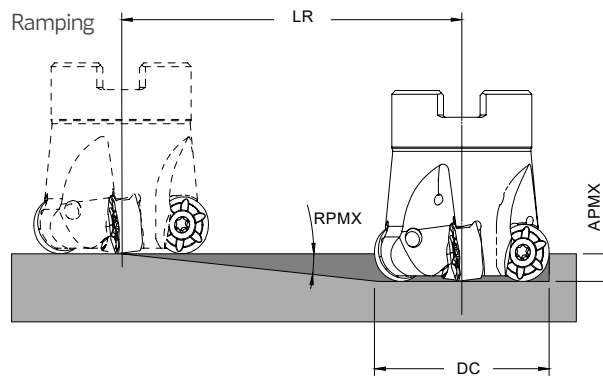
ISO	PSM	Material	HB (Brinell)	Vc (m/min)					Feed fz (mm/t)	
				← Wear Resistance			Toughness →		RNHX 12... LP	RNHX 12... MP
				PHP920	PHP930	PHH930	PHP530	PHH530		
P	1	Unalloyed Steel	125-220	180-250	160-230	-	180-340	-	0,15-0,45	0,15-0,50
	2	Low-Alloyed Steel	220-280	160-230	140-210	-	180-340	-	0,15-0,45	0,15-0,50
	3	High-Alloyed Steel	280-380	140-220	120-200	-	180-330	-	0,15-0,45	0,15-0,45
M	4	SS - Ferritic / Martensitic	200-330	-	-	140-210	150-270	170-280	0,10-0,35	-
	5	SS - Austenitic	200-330	-	-	120-170	-	160-280	0,10-0,35	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	100-150	-	150-260	0,10-0,35	-
K	7	Malleable Cast Iron	130-230	-	150-280	-	-	-	-	0,15-0,55
	8	Grey Cast Iron	180-245	-	130-230	-	-	-	-	0,15-0,55
	9	Nodular Cast iron	160-250	-	80-190	-	-	-	-	0,15-0,50
S	11	Heat Resistant Super Alloys	200-320	-	-	30-110	-	30-150	0,05-0,30	-



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

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

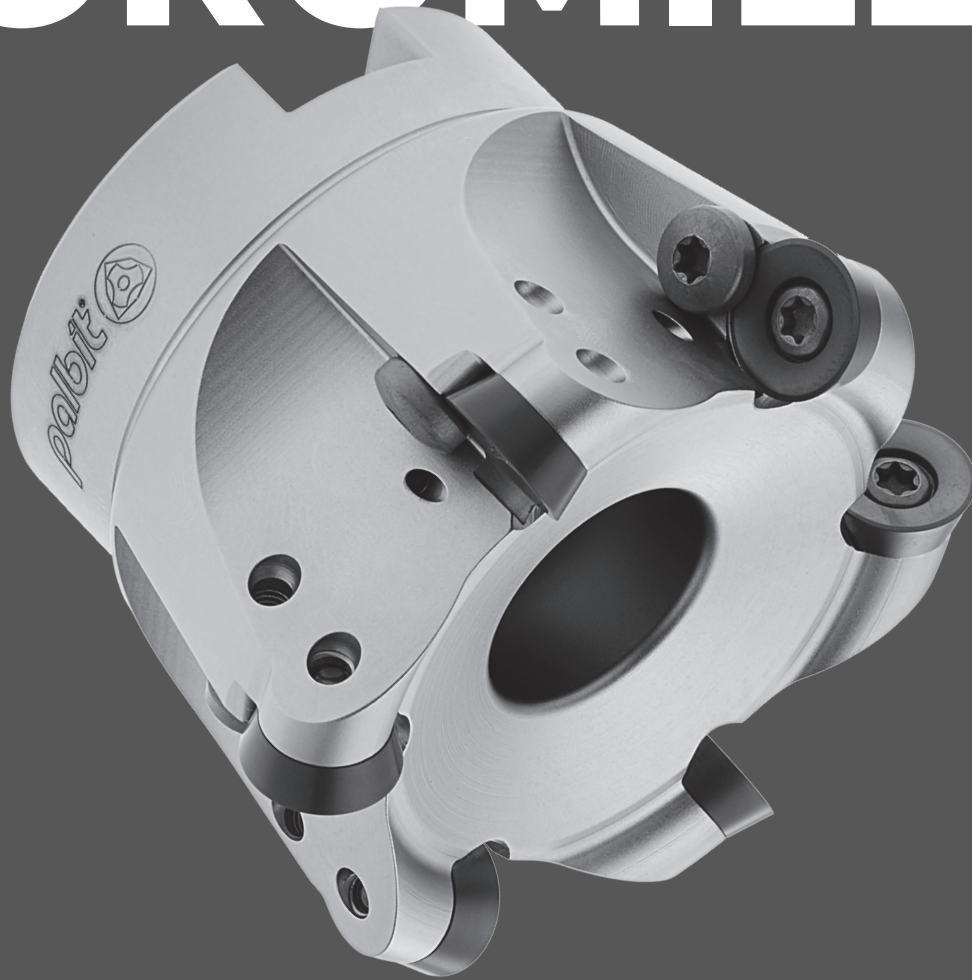
## RAMPING Descida em rampa | Bajada en rampa



Insert	DC	Ramping		
		RPMX	APMX	Min LR
RNHX 1204	32	1	3	171,9
	40	0,8	3	214,8
	42	0,8	3	214,8
	50	0,8	3	214,8
	63	0,6	3	286,5
	80	0,5	3	343,8

24590 | 25090 | 25190 | 25290 | 25390

# TOROMILL



The TOROMILL is a standard profile milling tool designed for steel applications.

A TOROMILL é uma ferramenta standard de fresagem de perfil projetada para aplicações em aço.

El TOROMILL es una herramienta estándar de fresado de perfil diseñada para aplicaciones en acero.

## **TOROMILL** 24590 | 25090 | 25190 | 25290 | 25390 > page 260

> **From DC 15mm to 160mm**

De DC 15mm a 160mm | Desde DC 15mm 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

> **From sizes 07 to 20**

De tamanhos 07 a 20 | Desde el tamaño 07 hasta el 20

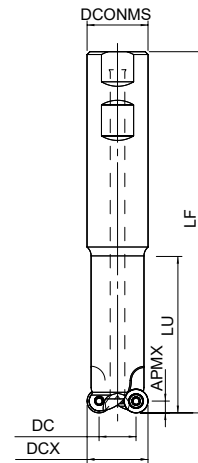
> **Lower power requirement**

Menor necessidade de potência | Menor necesidad de potencia





**Weldon Shank**  
GAMP=0°



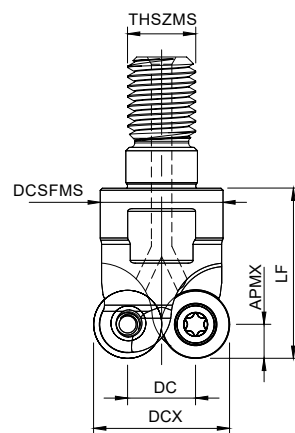
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications APMX (mm)	Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	LF	LU				
24590											
181047000	015W24590-02-U016160	2	15	8	16	160	40	0,220	3,5	RD... 0702...	⊗
181047100	015W24590-02-U025220	2	15	8	25	220	40	0,600	3,5	RD... 0702...	⊗
25090											
181047200	020W25090-02-020160	2	20	10	20	160	-	0,322	5,0	RD... 1003...	⊗
181047300	020W25090-02-025220	2	20	10	25	220	60	0,610	5,0	RD... 1003...	⊗
25190											
181047400	025W25190-02-025220	2	25	13	25	220	-	0,678	6,0	RD... 12T3...	⊗
181047500	025W25190-02-032230	2	25	13	32	230	80	1,015	6,0	RD... 12T3...	⊗

⊗ 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)



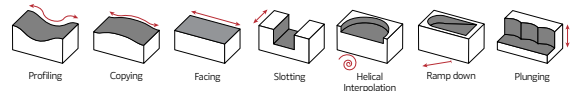
**Threaded Coupling**  
GAMP=0°



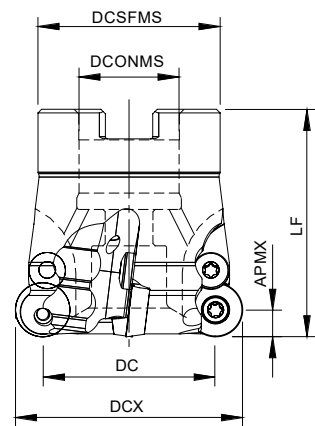
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications APMX (mm)	Insert Pastilha Inserto	Stock
			DCX	DC	THSZMS	DCSFMS	LF				
24590											
181015400	015R24590-03-M08020	3	15	8	M8	13	20	0,019	3,5	RD... 0702...	⊗
181019100	016R24590-02-M08020	2	16	9	M8	13	20	0,019	3,5	RD... 0702...	⊗
181037900	016R24590-03-M08020	3	16	9	M8	13	20	0,019	3,5	RD... 0702...	⊗
181011400	020R24590-04-M10025	4	20	13	M10	18	25	0,047	3,5	RD... 0702...	⊗
25090											
181011500	020R25090-02-M10025	2	20	10	M10	18	25	0,041	5,0	RD... 1003...	⊗
181011600	025R25090-03-M12030	3	25	15	M12	21	30	0,075	5,0	RD... 1003...	⊗
181011700	030R25090-04-M16035	4	30	20	M16	29	35	0,190	5,0	RD... 1003...	○
181015500	035R25090-05-M16043	5	35	25	M16	29	43	0,240	5,0	RD... 1003...	⊗
181049900	042R25090-05-M16040	5	42	32	M16	29	40	0,243	5,0	RD... 1003...	⊗
25190											
181011800	024R25190-02-M12032	2	24	12	M12	21	32	0,072	6,0	RD... 12T3...	⊗
181011900	035R25190-03-M16042	3	35	23	M16	29	42	0,205	6,0	RD... 12T3...	⊗
181012000	042R25190-04-M16042	4	42	30	M16	29	42	0,232	6,0	RD... 12T3...	⊗

⊗ 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)



**Arbor Mounting**  
GAMP=0° (\*+7°)



Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
<b>25090</b>												
181010600	042A25090-06-016044	6	42	32	16	36	44	0,254	A	5,0	RD... 1003...	⊗
181017500	052A25090-07-022050	7	52	42	22	40	50	0,395	A	5,0	RD... 1003...	⊗
<b>25190</b>												
181051900	050C25190-05-07-022050*	5	50	38	22	40	50	0,312	A	6,0	RD... 12T3...	⊗
181010700	052C25190-05-022050	5	52	40	22	40	50	0,337	A	6,0	RD... 12T3...	⊗
181010800	052C25190-05-07-022050*	5	52	40	22	40	50	0,335	A	6,0	RD... 12T3...	⊗
181016100	066C25190-06-027050	6	66	54	27	48	50	0,550	A	6,0	RD... 12T3...	⊗
181010900	066C25190-06-07-027050*	6	66	54	27	48	50	0,600	A	6,0	RD... 12T3...	⊗
181016500	080C25190-07-027050	7	80	68	27	60	50	1,000	A	6,0	RD... 12T3...	⊗
181016600	080C25190-07-07-027052*	7	80	68	27	60	52,5	1,000	A	6,0	RD... 12T3...	⊗

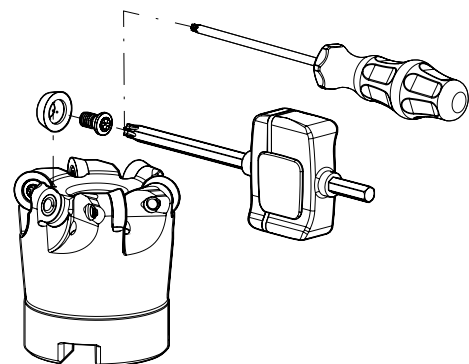
⊗ Stock item | Produto de stock | Itens de stock

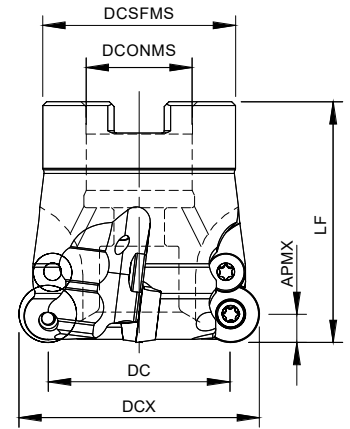
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Screw Clamp
			Key (Torx - Nm)	Torque Value	
W24590 - 15	P0250503	XT08	DT0812	1,2	-
R24590 - 15-20	P0250503	XT08	DT0812	1,2	-
W25090 - 20	P0350800	XT15	DT1530	3,0	-
R25090 - 20-42	P0350800	XT15	DT1530	3,0	-
A25090 - 42-52	P0350800	XT15	DT1530	3,0	-
W25190 - 25	P0350800	XT15	DT1530	3,0	-
R25190 - 24-42	P0350800	XT15	DT1530	3,0	-
C25190 - 50-80	P0350800	XT15	DT1530	3,0	P0350750

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.





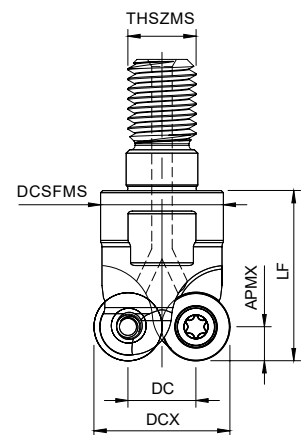
## Arbor Mounting

GAMP=0° (\*+7°)

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	DCONMS	DCSFMS	LF		Arbor Type	APMX (mm)		
25290												
181017900	052C25290-04-022050	4	52	36	22	40	50	0,305	A	8,0	RD... 1604...	⊗
181018000	052C25290-04-07-022050*	4	52	36	22	40	50	0,324	A	8,0	RD... 1604...	⊗
181011000	066C25290-05-027050	5	66	50	27	48	50	0,550	A	8,0	RD... 1604...	⊗
181016700	066C25290-05-07-027050*	5	66	50	27	48	50	0,550	A	8,0	RD... 1604...	⊗
181016200	080C25290-06-027052	6	80	64	27	60	52	0,910	A	8,0	RD... 1604...	⊗
181011100	080C25290-06-07-027052*	6	80	64	27	60	52	0,934	A	8,0	RD... 1604...	⊗
181017300	125C25290-08-07-U040052*	8	125	109	40	90	52	2,340	B	8,0	RD... 1604...	⊗
181017400	160C25290-09-07-U040052*	9	160	144	40	120	52	4,750	B	8,0	RD... 1604...	⊗
25390												
181026400	080C25390-05-07-027050*	5	80	60	27	60	50	0,840	A	10,0	RD... 2006...	⊗
181016800	100C25390-06-07-U032052*	6	100	80	32	70	52	1,180	B	10,0	RD... 2006...	⊗
181020500	125C25390-07-07-U040052*	7	125	105	40	90	52	2,030	B	10,0	RD... 2006...	⊗
181020600	160C25390-08-07-U040052*	8	160	140	40	120	52	4,320	B	10,0	RD... 2006...	⊗

⊗ 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)



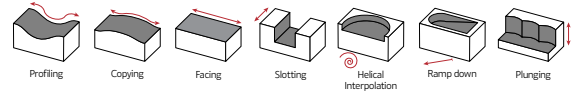
## Threaded Coupling

GAMP=0°

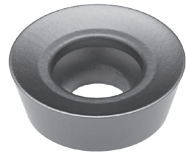
Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)					WT	Specifications		Insert Pastilha Inserto	Stock
			DCX	DC	THSZMS	DCSFMS	LF		APMX (mm)			
25290												
181002600	032R25290-02-M16040	2	32	16	M16	29	40	0,162	8,0	RD... 1604...	⊗	
181034800	035R25290-03-M16042	3	35	19	M16	29	42	0,230	8,0	RD... 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)



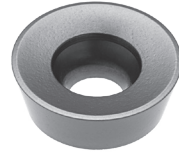
**RDHW | RDHT | RDMW | RDMT** Inserts | Pastilhas | Plaquetas



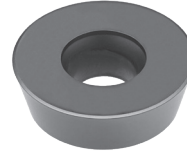
RDHT



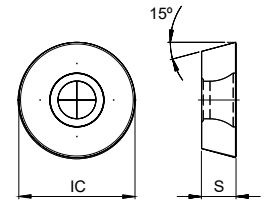
RDHW



RDMT



RDMW



RDHT | RDHW | RDMT | RDMW

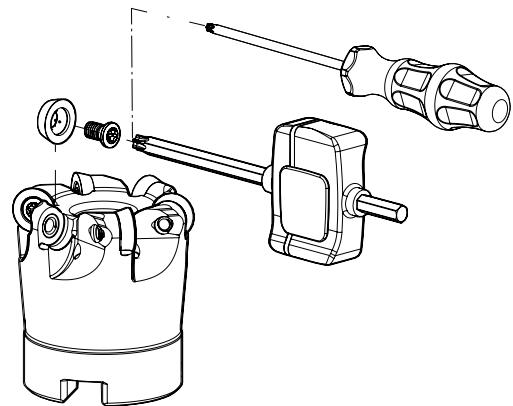
	<sup>(2)</sup> Grade code	P						K			H	Dimensions Dimensões Dimensiones (mm)	
		PVD						PVD			PVD		
		M6	54	68	78	86	I5	54	68	I5	M6	IC	S
<sup>(1)</sup> Geometry code	ISO Reference	PH6103	PH6910	PH6920	PH6125	PH6135	PH6740	PH6910	PH6920	PH6740	PH6103		
1110548	RDHW 0702 M0T	☉	☉	☹				☉	☹		☹	7,00	2,38
1110087	RDHW 1003 M0T	☉	☉	☹		☉		☉	☹		☹	10,00	3,18
1110082	RDHT 1003 M0T				☹	☉						10,00	3,18
1110583	RDMT 1003 M0T				☹	☉						10,00	3,18
1110549	RDMW 1003 M0T			☉	☹	☉						10,00	3,18
1110090	RDHW 12T3 M0T	☉	☉	☹		☉		☉	☹		☹	12,00	3,97
1112040	RDHT 12T3 M0S-MP			☹			☉		☹	☉		12,00	3,97
1110083	RDHT 12T3 M0T				☹	☉						12,00	3,97
1110558	RDMT 12T3 M0T				☹	☉						12,00	3,97
1110096	RDMW 12T3 M0T			☹	☉	☉			☹			12,00	3,97
1110092	RDHW 1604 M0T	☉	☉	☹		☉		☉	☹		☹	16,00	4,76
1112039	RDHT 1604 M0S-MP			☹			☉		☹	☉		16,00	4,76
1110084	RDHT 1604 M0T				☹	☉						16,00	4,76
1110556	RDMT 1604 M0T				☹	☉						16,00	4,76
1110097	RDMW 1604 M0T			☹	☉	☉			☹			16,00	4,76
1110869	RDMW 2006 M0T				☹							20,00	6,35

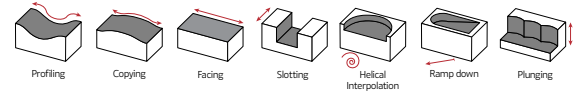
☹ First choice | 1ª Escolha | 1ª Opción    ☉ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock    **Insert Order Code:** <sup>(1)</sup> Geometry code + <sup>(2)</sup> Grade code  
 ☉ Stock Items | Itens de stock    ○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

SPARE PARTS Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately		
			Key (Torx - Nm)	Torque Value	Screw Clamp	Washer	Washer Screw
24590							
W24590 - 15	P0250503	XT08	DT0812	1,2	-	-	-
R24590 - 15-20	P0250503	XT08	DT0812	1,2	-	-	-
25090							
W25090 - 20	P0350800	XT15	DT1530	3,0	-	-	-
R25090 - 20-42	P0350800	XT15	DT1530	3,0	-	-	-
A25090 - 42-52	P0350800	XT15	DT1530	3,0	-	-	-
25190							
W25190 - 25	P0350800	XT15	DT1530	3,0	-	-	-
R25190 - 24-42	P0350800	XT15	DT1530	3,0	-	-	-
C25190 - 50-80	P0350800	XT15	DT1530	3,0	P0350750	-	-
25290							
R25290 - 32-35	P0451001	XT20	DT2050	5,0	-	-	-
C25290 - 52-80	P0451001	XT20	DT2050	5,0	-	HC01200	P0451001
C25290 - 125-160	P0451001	XT20	DT2050	5,0	-	HC01200	P0451001
25390							
C25390 - 80-160	P0601402	TT20	-	10,0	-	HC01200	P0451001

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 →		
				PH6103	PH6910	PH6920	PH6125	PH6135	PH6740
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		✓	✓			✓
H	12	Hardened Steels	40-55 HRC	✓					

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	RD...T ...	RD...W ...
	2	Low-Alloyed Steel	220-280	RD...T ...	-
	3	High-Alloyed Steel	280-380	RD...W ...	-
K	7	Malleable Cast Iron	130-230	RD...T ...	RD...W ...
	8	Grey Cast Iron	180-245	RD...W ...	-
	9	Nodular Cast iron	160-250	RD...W ...	-
H	12	Hardened Steels	40-55 HRC	RD...W ...	-

## RECOMMENDED CUTTING CONDITIONS

Condições de corte recomendadas | Condiciones de corte recomendables

ISO	PSM	Material	HB (Brinell)	Vc (m/min)					
				← Wear Resistance				Toughness →	
				PH6103	PH6910	PH6920	PH6125	PH6135	PH6740
P	1	Unalloyed Steel	125-220	180-300	180-250	150-230	160-190	150-180	130-160
	2	Low-Alloyed Steel	220-280	180-250	170-210	140-220	140-180	140-170	120-150
	3	High-Alloyed Steel	280-380	180-230	160-200	130-180	130-160	120-150	100-130
K	7	Malleable Cast Iron	130-230	-	170-300	150-280	-	-	130-250
	8	Grey Cast Iron	180-245	-	150-250	130-230	-	-	110-220
	9	Nodular Cast iron	160-250	-	90-210	80-190	-	-	80-170
H	12	Hardened Steels	40-55 HRC	120-240	-	-	-	-	-

ISO	PSM	Material	HB (Brinell)	RD... 07		RD... 10		RD... 12	
				fz (mm/t)	AP (mm)	fz (mm/t)	AP (mm)	fz (mm/t)	AP (mm)
				P	1	Unalloyed Steel	125-220	≤0,18	≤1,50
2	Low-Alloyed Steel	220-280	≤0,18		≤1,50	≤0,24	≤2,50	≤0,25	≤2,50
3	High-Alloyed Steel	280-380	≤0,15		≤1,50	≤0,21	≤2,50	≤0,20	≤2,50
K	7	Malleable Cast Iron	130-230	≤0,20	≤1,50	≤0,25	≤2,50	≤0,24	≤2,50
	8	Grey Cast Iron	180-245	≤0,20	≤1,50	≤0,25	≤2,50	≤0,24	≤2,50
	9	Nodular Cast iron	160-250	≤0,18	≤1,50	≤0,22	≤2,50	≤0,22	≤2,50
H	12	Hardened Steels	40-55 HRC	≤0,12	≤1,50	≤0,18	≤2,50	≤0,18	≤2,50

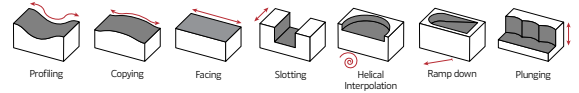
ISO	PSM	Material	HB (Brinell)	RD... 16		RD... 20	
				fz (mm/t)	AP (mm)	fz (mm/t)	AP (mm)
				P	1	Unalloyed Steel	125-220
2	Low-Alloyed Steel	220-280	≤0,33		≤3,50	≤0,33	≤5,00
3	High-Alloyed Steel	280-380	≤0,27		≤3,50	≤0,27	≤5,00
K	7	Malleable Cast Iron	130-230	≤0,35	≤3,50	≤0,35	≤5,00
	8	Grey Cast Iron	180-245	≤0,35	≤3,50	≤0,35	≤5,00
	9	Nodular Cast iron	160-250	≤0,32	≤3,50	≤0,32	≤5,00
H	12	Hardened Steels	40-55 HRC	≤0,25	≤3,50	≤0,20	≤5,00

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

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

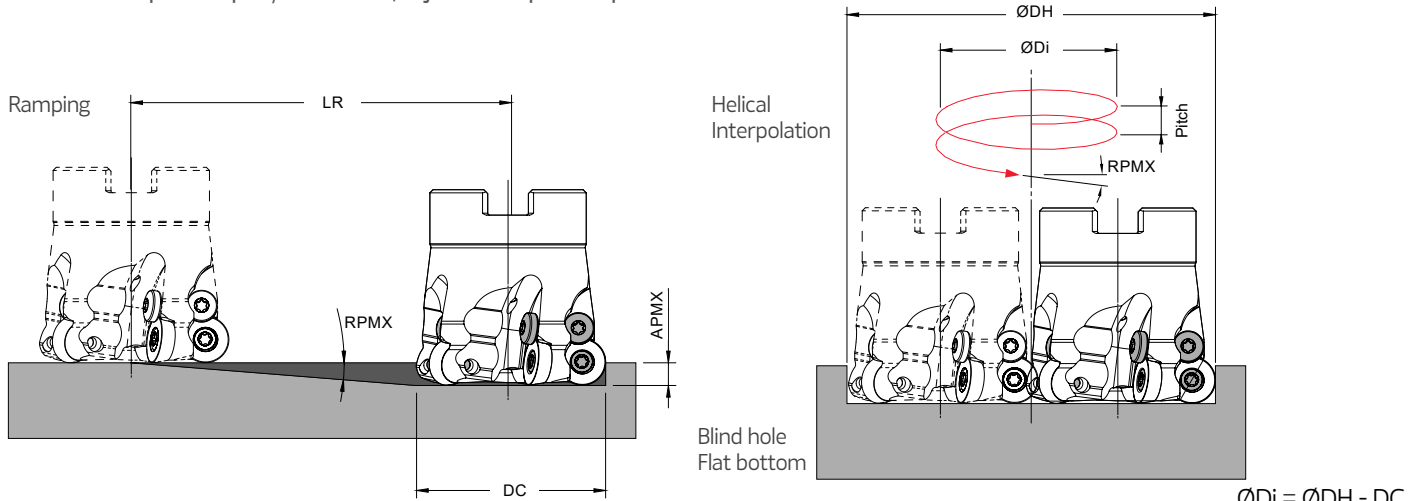
(Note 3) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:

- 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.



# RAMPING AND HELICAL INTERPOLATION

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

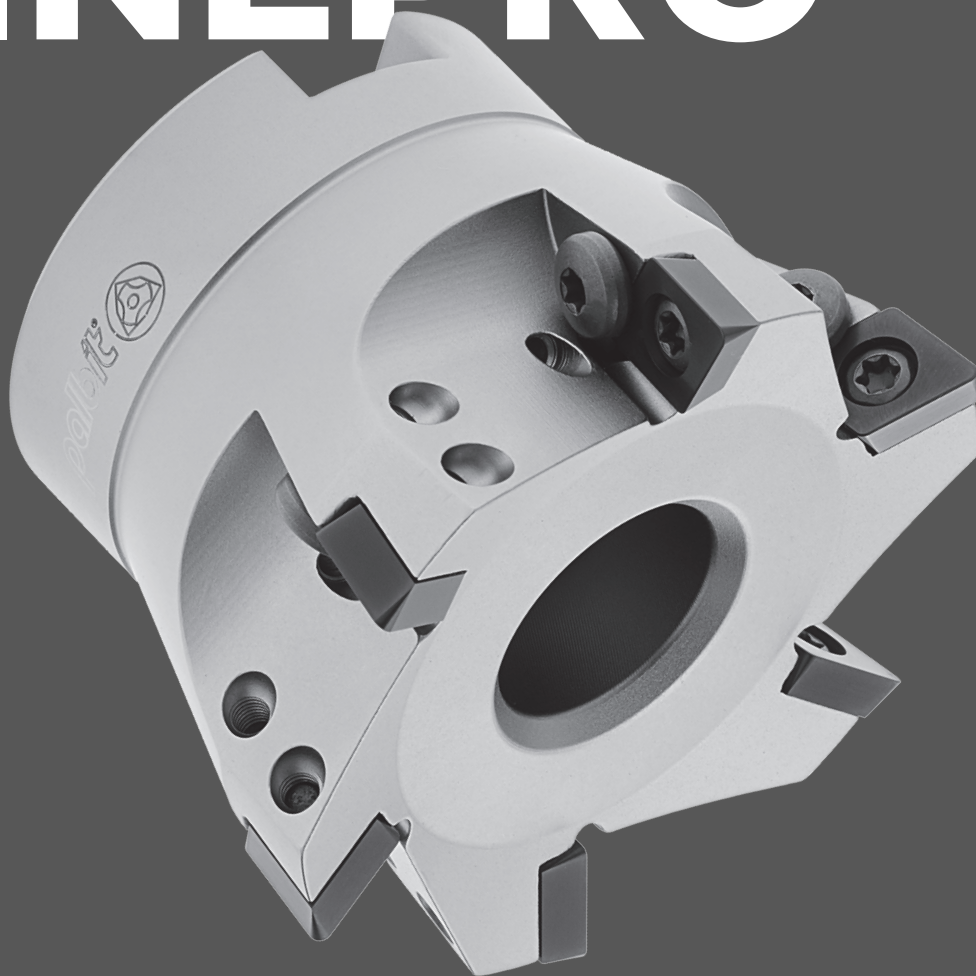


Insert	DC	Ramping			Helical Interpolation		
		RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
RD... 07	15	9,4	3,5	21,1	23,0	-	4,0
	16	8	3,5	24,9	25,0	30,0	7,0
	20	6	3,5	33,3	33,0	32,0	3,0
RD... 10	20	25,0	5,0	10,7	30,0	40,0	14,0
	25	22,0	5,0	12,4	40,0	50,0	19,0
	30	13,5	5,0	20,8	50,0	60,0	31,0
	35	12,0	5,0	23,5	60,0	70,0	15,0
	42	10,0	5,0	28,4	74,0	84,0	23,0
	52	7,0	5,0	40,7	94,0	104,0	16,0
RD... 12	24	17,0	6,0	19,6	36,0	48,0	11,1
	25	16,2	6,0	20,7	38,0	50,0	23,0
	35	12,0	6,0	28,2	58,0	70,0	11,0
	42	10,3	6,0	33,0	72,0	84,0	15,0
	50	6,4	6,0	53,5	88,0	100,0	23,0
	52	6,0	6,0	57,1	92,0	104,0	17,0
	66	3,5	6,0	79,8	120,0	132,0	13,0
	80	2,5	6,0	104,1	148,0	160,0	17,0
RD... 16	32	20,0	8,0	22,0	48,0	64,0	11,1
	35	18,0	8,0	24,6	54,0	70,0	23,0
	52	13,0	8,0	34,7	88,0	104,0	15,0
	66	8,5	8,0	53,5	116,0	132,0	26,0
	80	6,0	8,0	76,1	144,0	160,0	37,0
	125	3,5	8,0	130,8	234,0	250,0	23,0
	160	2,5	8,0	183,2	304,0	320,0	30,0
RD... 20	80	6,0	10,0	76,1	140,0	160,0	21,0
	100	5,0	10,0	91,4	180,0	200,0	26,0
	125	4,5	10,0	101,6	230,0	250,0	21,0
	160	3,0	10,0	152,6	300,0	320,0	27,0

Note: During helical interpolation do not exceed APMX.

41095 | 40095 | 40595

# LINEPRO



The LINEPRO is a versatile profile milling tool equipped with carbide inserts suitable for steel, cast iron, and hardened steel operation, while offering carbide inserts with PCD tips for aluminum applications.

A LINEPRO é uma ferramenta versátil de fresagem de perfil equipada com pastilhas de metal duro adequadas para operações em aço, ferro fundido e aço temperado, enquanto oferece pastilhas de metal duro com pontas de PCD para aplicações em alumínio.

La LINEPRO es una herramienta versátil de fresado de perfil equipada con plaquitas de metal duro adecuadas para operaciones en acero, hierro fundido y acero endurecido, mientras que ofrece plaquitas de metal duro con puntas de PCD para aplicaciones en aluminio.

## **LINEPRO** 41095 | 40095 | 40595 > page 270

> **From DC 16mm to 80mm**

De DC 16mm a 80mm | Desde DC 16mm hasta 80mm

> **Available in arbor mounting and threaded coupling**

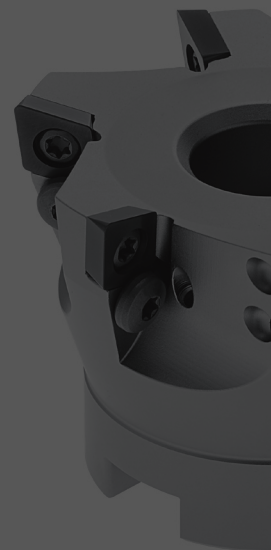
Disponível em montagem tipo árvore e acoplamento roscado | Disponible en fijación con tornillo central y fijación roscada

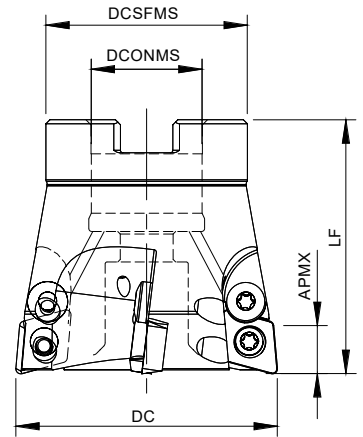
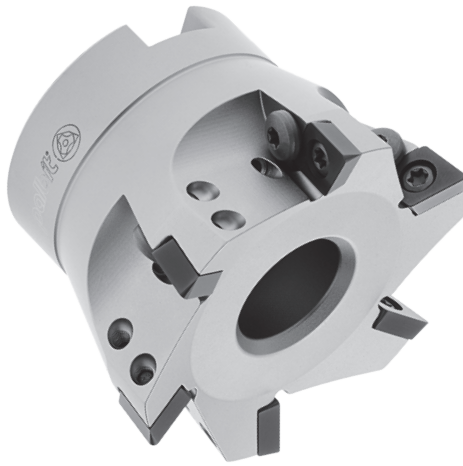
> **Screw clamp**

Parafuso de grampo | Tornillo de brida

> **PCD tipped insert for aluminium application**

Pastilhas com pontas de PCD para aplicação em alumínio | Plaquetas con puntas de PCD para aplicación en aluminio



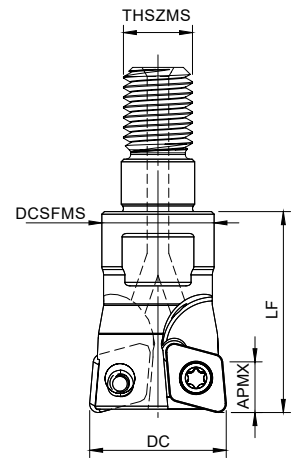


**Arbor Mounting**  
KAPR=95° | GAMP=+7°

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)		
40595											
181027700	052C40595-05-07-022050	5	52	22	40	50	0,342	A	1,0	XD... 10T3...	⊗
181027800	066C40595-06-07-027050	6	66	27	48	50	0,565	A	1,0	XD... 10T3...	⊗
181027900	080C40595-07-07-027050	7	80	27	60	50	0,972	A	1,0	XD... 10T3...	⊗

⊗ 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)

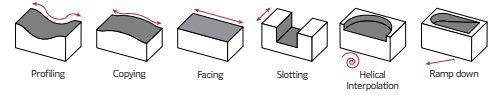


**Threaded Coupling**  
KAPR=95° | GAMP=+7° (\*+9°)

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	THSZMS	DCSFMS	LF		APMX (mm)			
41095											
181012400	010R41095-02-09-M06020*	2	10	M6	9,8	20	0,010	0,8	XD... 0401...	⊗	
181016300	012R41095-02-09-M06020*	2	12	M6	9,8	20	0,012	0,8	XD... 0401...	⊗	
40095											
181012100	016R40095-02-07-M08023	2	16	M8	13	23	0,022	1,0	XD... 0602...	⊗	
181012200	020R40095-03-07-M10028	3	20	M10	18	28	0,050	1,0	XD... 0602...	⊗	
181015600	025R40095-03-07-M12030	3	25	M12	21	30	0,081	1,0	XD... 0602...	⊗	
181034000	025R40095-04-07-M12030	4	25	M12	21	30	0,078	1,0	XD... 0602...	⊗	
40595											
181015700	025R40595-02-07-M12035	2	25	M12	21	35	0,077	1,0	XD... 10T3...	⊗	
181012300	035R40595-03-07-M16043	3	35	M16	29	43	0,200	1,0	XD... 10T3...	⊗	
181016900	042R40595-04-07-M16043	4	42	M16	29	43	0,230	1,0	XD... 10T3...	⊗	

⊗ Stock item | Produto de stock | Itens de stock

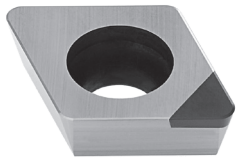
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)



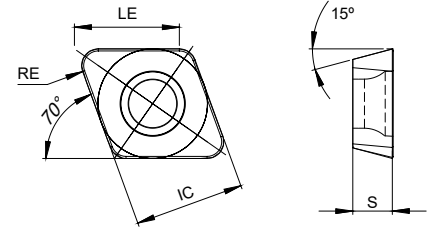
XDHW Inserts | Pastilhas | Plaquetas



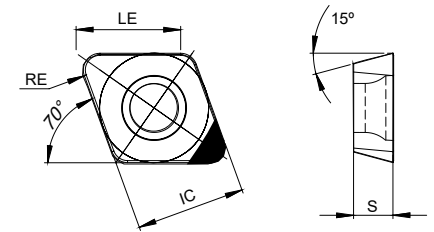
XDHW



XDHW - PCD & PCBN (HARDMILL)



XDHW



XDHW FN | XDHW SN

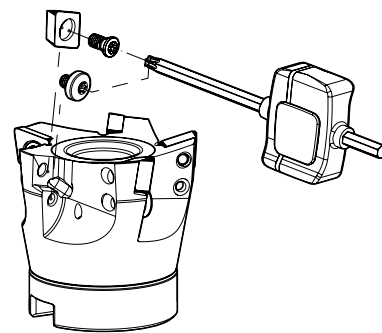
(1) Geometry code	(2) Grade code	P				K		N		H		Dimensions Dimensões Dimensiones (mm)			
		PVD				PVD		CVD	PCD	PVD	PCBN	IC	S	LE	RE
		M6	54	78	86	54	78	P2	D6	M6	S4				
1110905	XDHW 040105	○	○	○		○		⊗		○		4,00	1,59	4,00	0,50
1110573	XDHW 040110	⊗	⊗	⊗		⊗	⊗	⊗		⊗		4,00	1,59	4,00	1,00
1112316	XDHW 040110 FN								⊗			4,00	1,59	4,00	1,00
1112317	XDHW 040110 SN										⊗	4,00	1,59	4,00	1,00
1110532	XDHW 060210	⊗	⊗	⊗	⊗	⊗	⊗	⊗		⊗		6,50	2,38	6,20	1,00
1112318	XDHW 060210 FN								⊗			6,50	2,38	6,20	1,00
1111875	XDHW 060210 SN										⊗	6,50	2,38	6,20	1,00
1110565	XDHW 10T310	⊗	⊗	⊗	⊗	⊗	⊗	○		⊗		10,00	3,97	9,90	1,00
1112320	XDHW 10T310 FN								⊗			10,00	3,97	9,90	1,00
1112321	XDHW 10T310 SN										⊗	10,00	3,97	9,90	1,00

⊗ 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

## SPARE PARTS Accesórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately		Order separately
			Key (Torx - Nm)	Torque Value	Screw Clamp
R41095 - 10 - 12	P0180401	XT06	DT0606	0,6	-
R40095 - 16 - 25	P0250503	XT08	DT0812	1,2	-
R40595 - 25 - 42	P0350800	XT15	DT1530	3,0	-
C40595 - 52 - 80	P0350800	XT15	DT1530	3,0	P0350750

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	PCBN		
				← Wear Resistance			Toughness →				PDP410	PBH920
				PHD103	PH6103	PH6910	PH6125	PH6135				
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	✓					✓			
H	12	Hardened Steels	40-55 HRC		✓					✓		

● Good Conditions    ● Average Conditions    ● Difficult Conditions

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

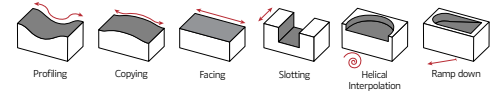
ISO	PSM	Material	HB (Brinell)	Vc (m/min)					PCD	PCBN		
				← Wear Resistance			Toughness →				PDP410	PBH920
				PHD103	PH6103	PH6910	PH6125	PH6135				
P	1	Unalloyed Steel	125-220	-	180-300	180-250	160-190	150-180	-	-		
	2	Low-Alloyed Steel	220-280	-	180-250	170-210	140-180	140-170	-	-		
	3	High-Alloyed Steel	280-380	-	180-230	160-200	130-160	120-150	-	-		
K	7	Malleable Cast Iron	130-230	-	-	170-300	160-290	-	-	-		
	8	Grey Cast Iron	180-245	-	-	150-250	140-240	-	-	-		
	9	Nodular Cast iron	160-250	-	-	90-210	80-200	-	-	-		
N	10	Aluminium and Non Ferrous	30-130	300-1000	-	-	-	-	800-3000	-		
H	12	Hardened Steels	40-55 HRC	-	120-260	-	-	-	-	200-600		

(Note 1)

Insert	Feed fz (mm/t)		AP Rec.
	Roughing	Finishing	
XDHW 04	0,10-0,20	0,10-0,15	0,1-0,5
XDHW 06	0,15-0,30	0,10-0,25	0,2-0,8
XDHW 10	0,15-0,35	0,10-0,30	0,2-0,8

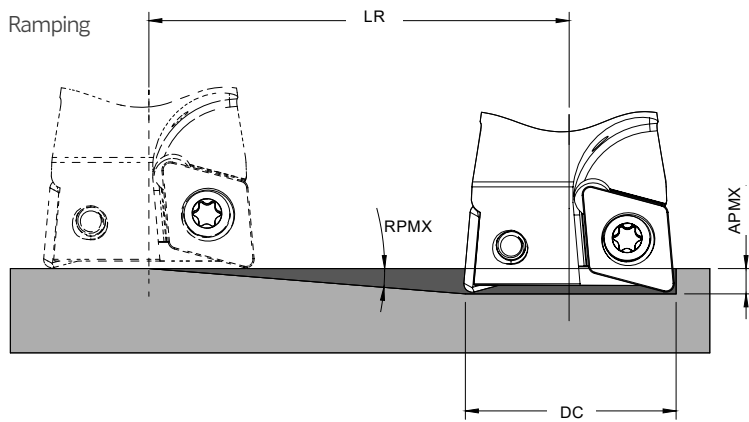
(Note 2) Cutting conditions should be adjusted according to the machine and work rigidity.

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

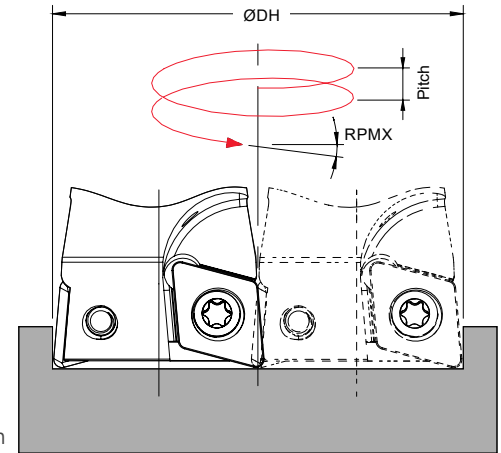


# RAMPING AND HELICAL INTERPOLATION

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



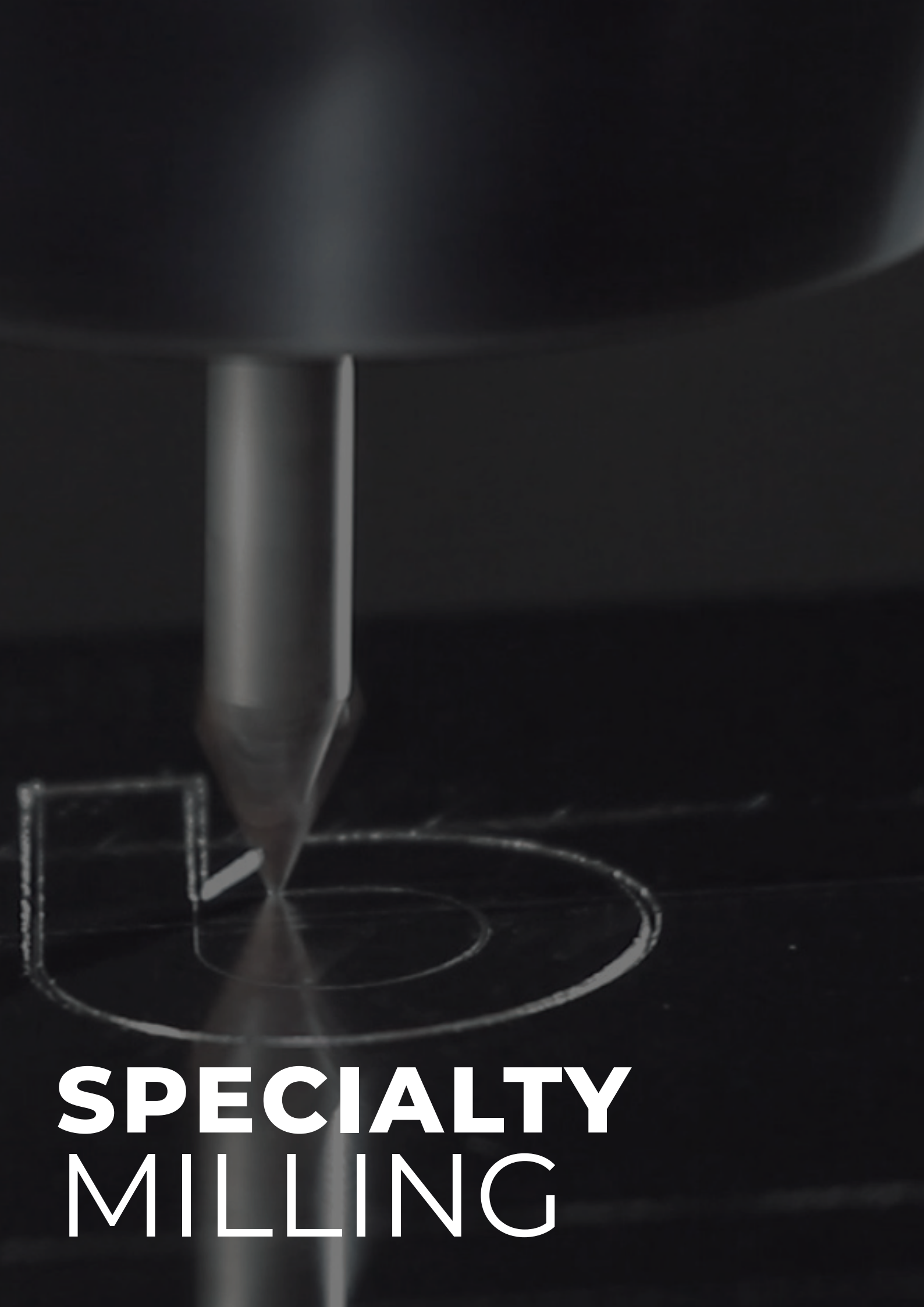
Helical Interpolation



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

Insert	DC	Ramping			Helical Interpolation		
		RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.
XDHW 04...	10	7,3	0,8	6,2	18,0	-	3,2
	12	5,3	0,8	8,6	22,0	-	4,0
XDHW 06...	16	8	1,0	7,1	30,0	-	6,2
	20	5,7	1,0	10,0	38,0	-	7,1
	25	4	1,0	14,3	48,0	-	5,6
XDHW 10...	25	8,7	1,0	6,5	-	50,0	11,1
	35	5,2	1,0	11,0	68,0	-	12,0
	42	4	1,0	14,3	-	70,0	9,4
	52	3	1,0	19,1	82,0	-	10,0
	66	2,3	1,0	24,9	102,0	-	8,8
	80	1,8	1,0	31,8	130,0	-	9,2
					158,0	-	8,2
					-	104,0	8,6
					-	132,0	8,1
					-	160,0	8,3
					-	-	7,7
					-	-	7,9

Note: During helical interpolation do not exceed APMX.



# **SPECIALTY MILLING**

## 1 **HARDMILL 72090**

- > Suitable for machining **N**
- > See page A - 276

## 2 **CENTER & CHAMFER**

- > Suitable for machining **P M K**
- > See page A - 280

## 3 **ENGRAVING 64067**

- > Suitable for machining **P M N S**
- > See page A - 284

## 4 **SPOT FACE**

- > Suitable for machining **P M K S**
- > See page A - 288

72090

# HARDMILL



The HARDMILL 72090 is a specialized tool designed for specific applications in the automobile industry, such as gearbox housings. It features adjustment wedges for precise face milling on aluminum components.

A HARDMILL 72090 é uma ferramenta especializada projetada para aplicações específicas na indústria automóvel, como caixas de velocidades. Apresenta cunhas de ajuste de parafuso para fresagem frontal precisa em componentes de alumínio.

La HARDMILL 72090 es una herramienta especializada diseñada para aplicaciones específicas en la industria automotriz, como cajas de cambios. Presenta cuñas de ajuste de tornillo para fresado frontal preciso en componentes de aluminio.

## **HARDMILL 72090** > page 278

- > **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
- > **Excellent solution for aluminium**  
Excelente solução para alumínio | Excelente solución para aluminio
- > **PCD tipped insert**  
Pastilha com ponta de PCD | Inserto con punta de PCD



# A HARDMILL 72090

MILLING

Face milling

High feed milling

Shoulder milling

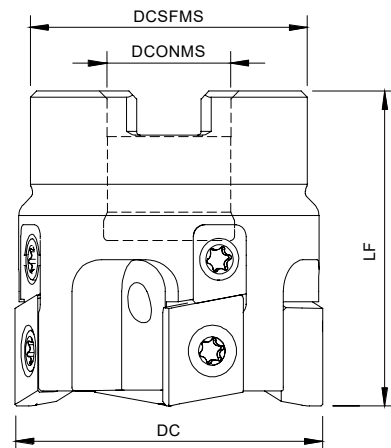
Profile milling

Specialty

Spare Parts

Technical Data

End Mills



**Arbor Mounting**  
KAPR=90° | GAMP=0°

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Specifications		Insert Pastilha Inserto	Stock
			DC	DCONMS	DCSFMS	LF		Arbor Type	RPM max		
181129700	040A72090-04-016040	4	40	16	36	40	0,32	A	32 000	XNHW 1205...	☼
181129800	050A72090-04-022040	4	50	22	46	40	0,38	A	32 000	XNHW 1205...	☼
181129900	050A72090-05-022040	5	50	22	46	40	0,37	A	32 000	XNHW 1205...	○
181130000	063A72090-04-022040	4	63	22	49	40	0,65	A	29 000	XNHW 1205...	○
181130100	063A72090-07-022040	7	63	22	49	40	0,62	A	29 000	XNHW 1205...	☼
181130200	080A72090-05-027050	5	80	27	60	50	1,25	A	26 000	XNHW 1205...	☼
181130300	080A72090-09-027050	9	80	27	60	50	1,17	A	26 000	XNHW 1205...	☼
181130400	100A72090-06-032050	6	100	32	70	50	1,93	A	24 000	XNHW 1205...	☼
181130500	100A72090-12-032050	12	100	32	70	50	1,80	A	24 000	XNHW 1205...	○
181130600	125A72090-08-040063	8	125	40	72	63	2,88	A	22 000	XNHW 1205...	○
181130700	125A72090-14-040063	14	125	40	72	63	2,60	A	22 000	XNHW 1205...	○
181135500	160A72090-10-040063	10	160	40	72	63	3,30	A	18 000	XNHW 1205...	○
181135600	160A72090-16-040063	16	160	40	118	63	5,45	A	18 000	XNHW 1205...	○

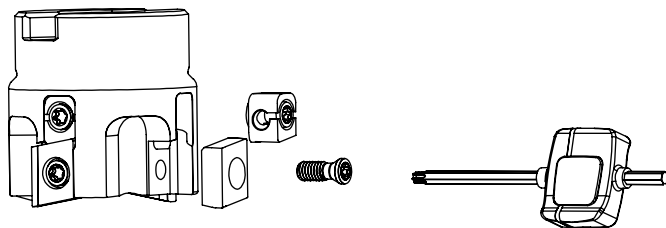
☼ Stock item | Produto de stock | Itens de stock

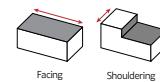
○ Available under request (see page A-8) | Disponível sobre consulta (consulte a página A-8) | Disponible bajo consulta (mire pagina A-8)

## SPARE PARTS Acessórios | Repuestos

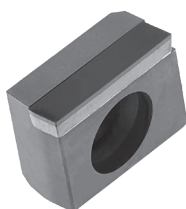
Cutter DC	Insert Screw	Key (Torx)	Order separately		
			Key (Torx - Nm)	Torque Value	Wedge
A72090 - 40-160	P0401100	XT15	DT1530	3,00	SETDEV AS 04 00

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.

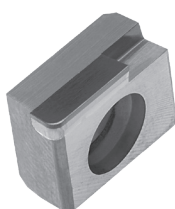




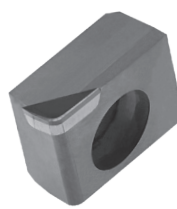
**XNHW 1205...** Inserts | Pastilhas | Plaquetas



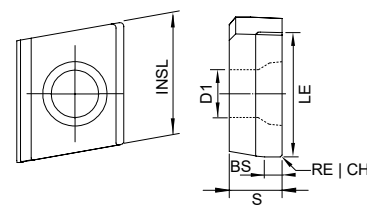
XNHW 1205 PZFR-020120



XNHW 120508 PZTR-000080



XNHW 120508 PZTR-015045



XNHW

Geometry code	ISO Reference	N		Dimensions Dimensões Dimensões (mm)								
		PCD		INSL	S	LE	D1	RE	CHW	KCH	BS	
		I3	D6									
(1)	(2) Grade code	PDP403	PDP410									
1112564	XNHW 120504 PZFR-015045	○	○	12,25	5,40	4,50	4,80	0,40	-	-	1,50	
1112565	XNHW 120504 PZFR-000080	○	○	12,25	5,40	8,00	4,80	0,40	-	-	-	
1112566	XNHW 120508 PZFR-015045	⊗	○	12,25	5,40	4,50	4,80	0,80	-	-	1,50	
1112551	XNHW 120508 PZTR-015045	⊗	○	12,25	5,40	4,50	4,80	0,80	-	-	1,50	
1112552	XNHW 120508 PZTR-000080	○	○	12,25	5,40	8,00	4,80	0,80	-	-	-	
1112553	XNHW 1205 PZFR-020120	⊗	○	12,25	5,40	12,00	4,80	-	0,20	45°	2,00	
1112567	XNHW 1205 PZFR-030045	○	○	12,25	5,40	4,50	4,80	-	0,20	45°	3,00	
1112568	XNHW 1205 PZTR-030045	○	○	12,25	5,40	4,50	4,80	-	0,20	45°	3,00	

⊗ 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

**INSERTS CODIFICATION SYSTEM** Sistema de codificação de pastilhas | Sistema de codificación de insertos

ISO CODE	Insert size	Insert thickness	Insert radius	Cutting edge position angle	Cutting edge relief angle	Cutting edge conditions	Cut direction	Wiper edge lenght	Máx. Ap
XNHW	12	05	04	P	Z	F	R	015	030



XNHW 120504 PZFR-0150045



XNHW 120504 PZFR-000080



XNHW 120508 PZFR-015045



XNHW 120508 PZTR-015045



XNHW 120508 PZTR-000080



XNHW 1205 PZFR-020120



XNHW 1205 PZFR-030045



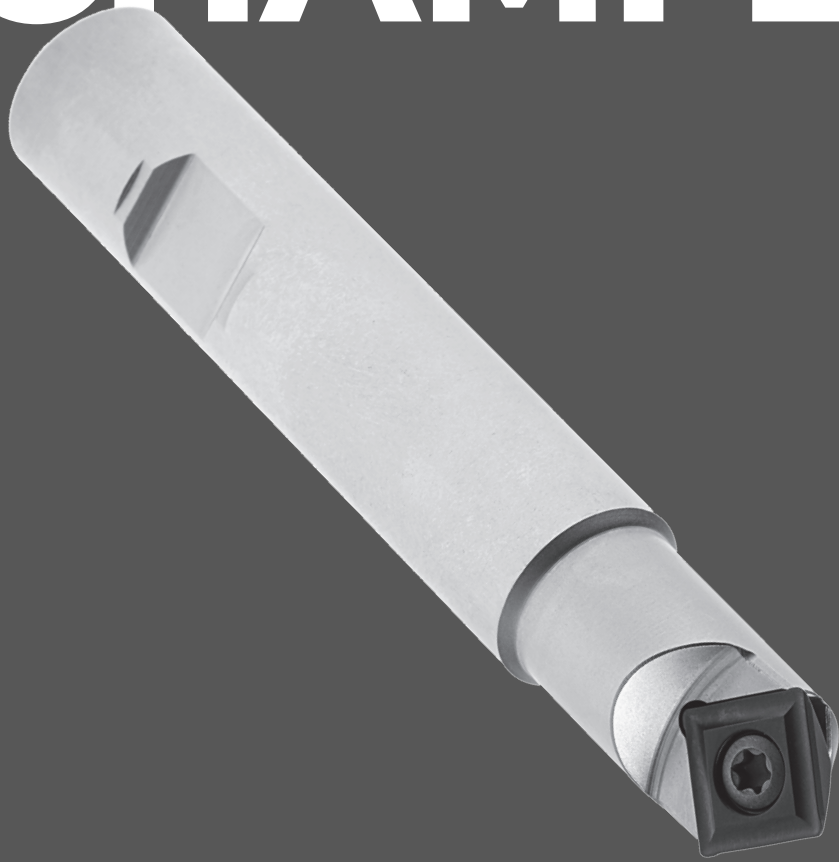
XNHW 1205 PZTR-030045

■ Cutting edge Type (radius, chamfer)    ■ Wiper cutting edge    ■ Edge Preparation (F, T)

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

ISO	Material		HB (Brinell)	Vc (m/min)	Feed fz (mm/t)
	Work piece material	Type of treatment / alloy		PDP403	XNHW 12...
N	Aluminium wrought alloys		80	300 - 4000	0,05 - 0,40
			90	300 - 1500	
	Aluminium cast alloys	< 12% Si	130	300 - 5000	
		< 12% Si	90	300 - 3000	
		> 12% Si	100	300 - 1000	
	Non-ferrous materials	brass, red bronze	100	100 - 700	
		bronze	-	100 - 1500	
lead-free copper and electrolytic copper		-	300 - 3000		
Non-metallic materials	thermosetting plastics	-	80 - 300		
	fibre-reinforced plastics	200-320	80 - 300		
	hard rubber		80 - 300		

# CENTER & CHAMFER



The CENTER & CHAMFER line are versatile tool suitable for a variety of milling applications, including chamfering, spot drilling, engraving, and even grooving.

A CENTER & CHAMFER é uma ferramenta versátil adequada para uma variedade de aplicações de fresagem, incluindo chanfragem, furação de ponto, gravação e até mesmo ranhuras.

La línea CENTER & CHAMFER es una herramienta versátil adecuada para una variedad de aplicaciones de fresado, incluyendo chaflanado, taladrado puntual, grabado e incluso ranurado.

## CENTER & CHAMFER > page 282

- > Chamfering

Chanfragem | Chaflanado

- > Spot Drilling

Furação de ponto | Taladrado puntual

- > Grooving

Ranhuras | Ranurado

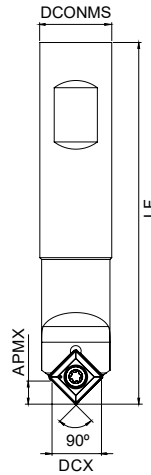
- > Engraving

Gravação | Grabado



# A CENTER & CHAMFER

MILLING



Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)						WT	Insert Pastilha Inserto	Stock
			DCX	APMX	APMN	DCONMS	LF	KAPR			
181147400	CHT S16H N11-45	1	13	6,5	1,0	16	100	45°	0,146	SO..T 11T3..	☉
181147500	CHT S16M N11-45	1	13	6,5	1,0	16	150	45°	0,180	SO..T 11T3..	☉

Order code Código	Reference Referência Referencia	Nº Toolholder	Holder designation	Nº inserts	Insert Pastilha Inserto	Stock
1410286G4	PK SOMT 11T308 CHTS16H	1	CHT S16H N11-45	10	SOMT 11T308	☉
1410287G4	PK SOMT 11T308 CHTS16M	1	CHT S16M N11-45	10	SOMT 11T308	☉
1410318G4	PK SOGT 11T303 CHTS16H	1	CHT S16H N11-45	10	SOGT 11T303	☉
1410317G4	PK SOGT 11T303 CHTS16M	1	CHT S16M N11-45	10	SOGT 11T303	☉

☉ 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)

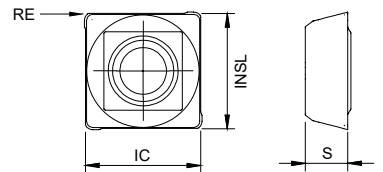
## SO...T 11T3... Inserts | Pastilhas | Plaquitas



SOMT



SOGT



SOMT | SOGT

Geometry code	ISO Reference	P	M	K	Dimensions Dimensões Dimensiones (mm)			
		PVD	PVD	PVD	IC	S	INSL	RE
<sup>(2)</sup> Grade code		G4	G4	G4				
<sup>(1)</sup>		PH7920	PH7920	PH7920				
1112425	SOMT 11T308	☉	☉	☉	10,85	4,02	11,00	0,80
1112973	SOGT 11T303	☉	☉	☉	10,85	4,00	11,00	(0,30)

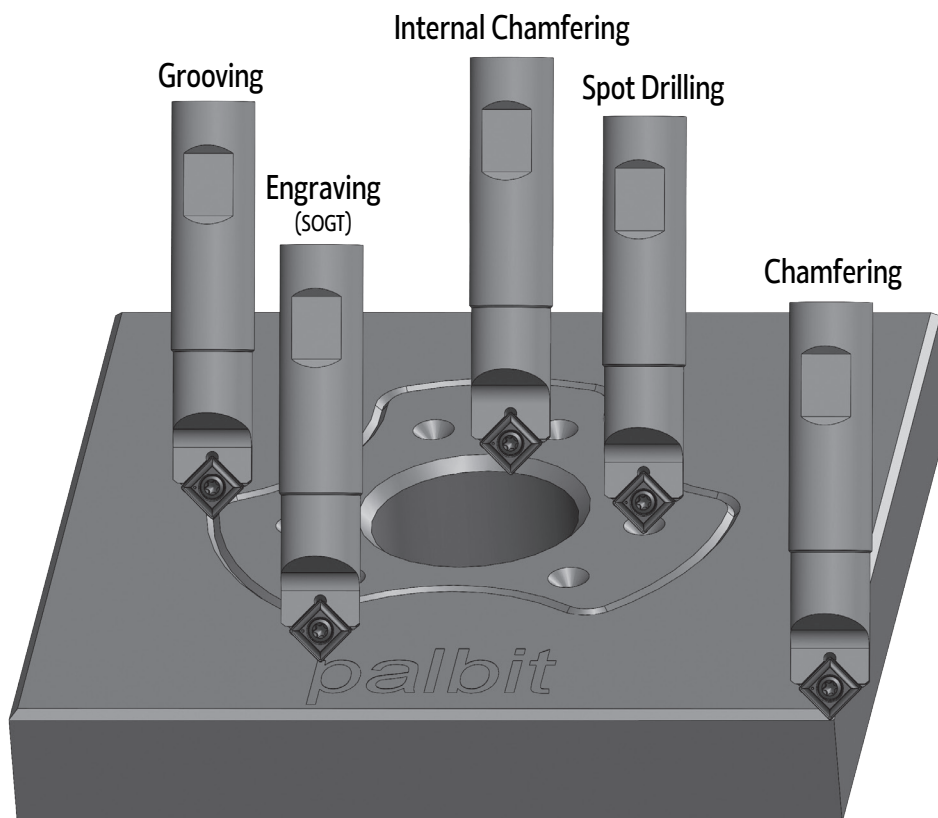
☉ First choice | Primeira opção | 1ª opción

☉ 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)

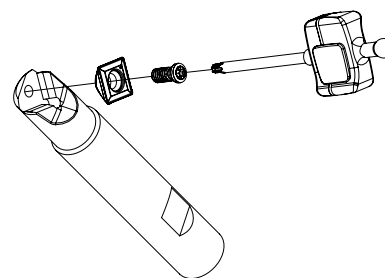
Insert order code = (1) Geometry Code + (2) Grade Code

**TOOL SELECTION** Selecção de ferramenta | Selección de herramienta



**SPARE PARTS** Acessórios | Repuestos

Cutter DC	Insert Screw	Key (Torx)	Order separately	
			Key (Torx - Nm)	Torque Value
CHT S16...	P0350800	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

ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Feed fz (mm/t)	
				PH7920	SOMT 11T308	SOGT 11T303
P	1	Unalloyed Steel	125-220	120-150	0,04-0,08	0,05-0,10
	2	Low-Alloyed Steel	220-280	100-120	0,03-0,07	0,05-0,10
	3	High-Alloyed Steel	280-380	60-100	0,03-0,06	0,04-0,08
M	4	SS - Ferritic / Martensitic	200-330	100-150	0,04-0,07	0,03-0,06
	5	SS - Austenitic	200-330	80-120	0,03-0,06	0,03-0,06
	6	SS - Austenitic-ferritic (Duplex)	230-260	50-90	0,03-0,06	0,03-0,08
K	7	Malleable Cast Iron	130-230	90-150	0,05-0,10	0,05-0,10
	8	Grey Cast Iron	180-245	80-120	0,05-0,08	0,05-0,08
	9	Nodular Cast iron	160-250	70-110	0,04-0,08	0,04-0,08

**NEW** 64067

# ENGRAVING



The ENGRAVING 64047 features an indexable carbide insert, ensuring excellent repeatability while drastically reducing presetting time, and eliminates the need for resharpening. The high positive rake angle facilitates faster cutting and enhanced durability compared to traditional engravers, revolutionizing the engraving process with unmatched efficiency and longevity.

A ENGRAVING 64047 apresenta uma pastilha de metal duro indexável, garantindo excelente repetibilidade enquanto reduz drasticamente o tempo de pré-ajuste e elimina a necessidade de afiação. O alto ângulo de inclinação positivo facilita o corte mais rápido e aumenta a durabilidade em comparação com as ferramentas de gravação tradicionais, revolucionando o processo de gravação com eficiência e longevidade incomparáveis.

La ENGRAVING 64047 presenta una pastilla de metal duro indexable, garantizando una excelente repetibilidad al tiempo que reduce drásticamente el tiempo de ajuste previo y elimina la necesidad de afilado. El alto ángulo de inclinación positiva facilita el corte más rápido y aumenta la durabilidad en comparación con las herramientas de grabado tradicionales, revolucionando el proceso de grabado con eficiencia y longevidad incomparables.

## **NEW ENGRAVING 64067** > page 286

> **45° Engraving tool**

Ferramenta de gravação a 45° | Herramienta de grabado a 45°

> **Fine engraving with 0,2mm bottom width**

Gravação fina com largura de fundo de 0,2mm | Grabado fino con un ancho de fondo de 0,2mm

> **Suitable for engraving on steel, stainless steel, superalloys and aluminium**

Adequado para gravação em aço, aço inoxidável, superligas e alumínio | Adecuado para grabado en acero, acero inoxidable, superaleaciones y aluminio



# A NEW ENGRAVING 64067

MILLING

Face milling

High feed milling

Shoulder milling

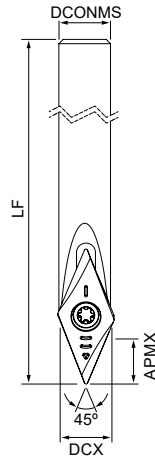
Profile milling

Specialty

Spare parts

Technical Data

End Mills



Type A: Steel Shank  
Type B: Carbide Shank

Order code Código	Reference Referência Referencia	CICT	Type	Dimensions   Dimensões   Dimensiones (mm)							WT	Insert Pastilha Inserto	Stock
				DCN	DCX	APMN	APMX	DCONMS	LF	KAPR			
181168500	002E64067-01-10-U006040	1	A	0,45~0,65	2,10	0,05~0,20	2,00	6	40	67,5°	0,011	VPGT 0602...	☉
181191300	002E64067-01-10-U006065	1	B	0,45~0,65	2,10	0,05~0,20	2,00	6	65	67,5°	0,024	VPGT 0602...	☉
181168700	002E64067-01-10-U006100*	1	B	0,45~0,65	2,10	0,05~0,20	2,00	6	100	67,5°	0,050	VPGT 0602...	☉

Order code Código	Reference Referência Referencia	Nº Toolholder	Holder designation	Nº inserts	Insert Pastilha Inserto	Stock
1410321Y3	PK VPGT 060202-45LM E64067-006040	1	002E64067-01-10-U006040	10	VPGT 060202-45LM	☉
1410322Y3	PK VPGT 060202-45LM E64067-006065	1	002E64067-01-10-U006065	10	VPGT 060202-45LM	☉
1410324Z5	PK VPGT 060202-45LN E64067-006040	1	002E64067-01-10-U006040	10	VPGT 060202-45LN	☉
1410325Z5	PK VPGT 060202-45LN E64067-006065	1	002E64067-01-10-U006065	10	VPGT 060202-45LN	☉
1410326Z5	PK VPGT 060202-45LN E64067-006100	1	002E64067-01-10-U006100*	10	VPGT 060202-45LN	☉

☉ 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: Recommended only for non-ferrous materials machining

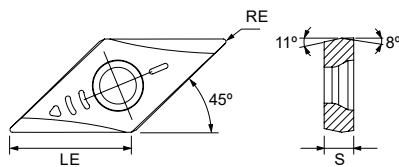
## VPGT 0602... Inserts | Pastilhas | Plaquitas



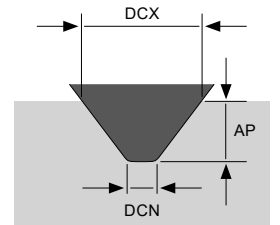
VPGT-45LM



VPGT-45LN



VPGT-45LM | 45LN



	(2) Grade code	P	M	N	S	Dimensions Dimensões Dimensiones (mm)							
		PVD	PVD	UNC	PVD	LE	S	RE	DCN	DCX	APMN	APMX	
(1) Geometry code	ISO Reference	PHH920	PHH920	PH0610	PHH920								
1113054	VPGT 060202-45LM	☉	☉		☉	6,35	2,00	0,20	0,65	2,10	0,20	2,00	
1113055	VPGT 060202-45LN			☉	○	6,35	2,00	0,20	0,45	2,10	0,05	2,00	

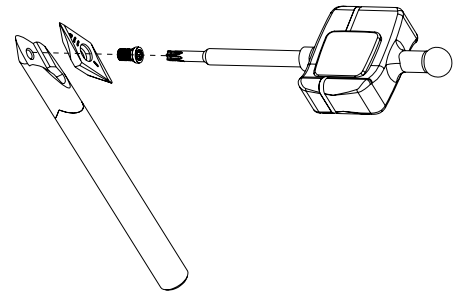
☉ First choice | Primeira opção | 1ª opción

☉ 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

**SPARE PARTS** Acessórios | Repuestos



Cutter DC	Order separately			
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value
002E64067	P0220401	XT06	DT0606	0,6

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

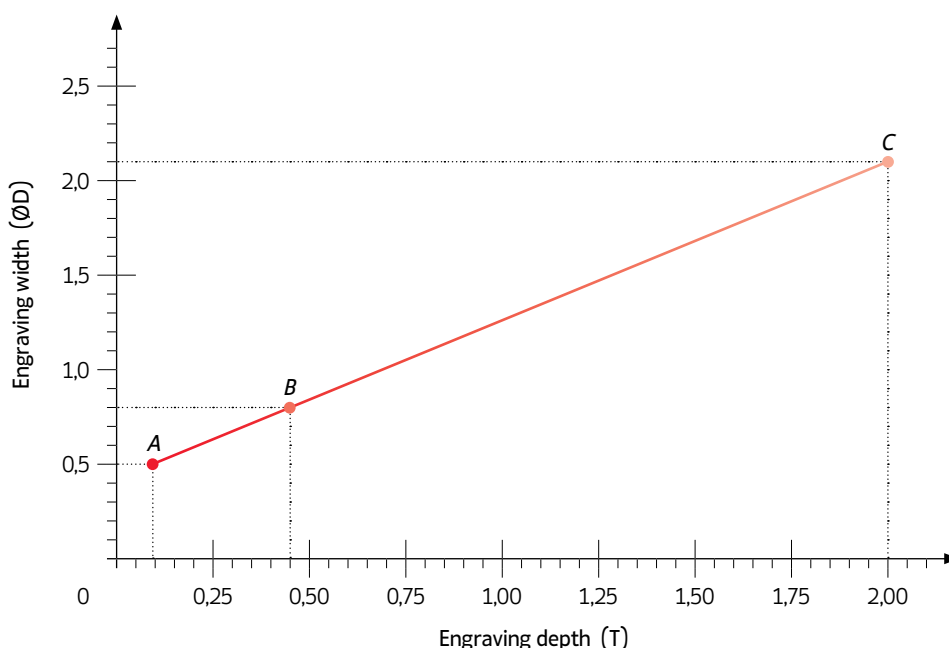
ISO	PSM	Material	n (RPM)	f (mm/rev)	
				VPGT 060602-45LM	VPGT 060602-45LN
P	1	Carbon Steel	5 000 - 40 000	0,008 - 0,05	-
	3	Alloy Steel	5 000 - 40 000	0,008 - 0,03	-
M	5	SS - Austenitic	5 000 - 40 000	0,008 - 0,05	-
N	10	Aluminium and Non Ferrous	5 000 - 40 000	-	0,008 - 0,05
S	11	Heat Resistant Super Alloys	5 000 - 30 000	0,005 - 0,03	-

**ap per step:**

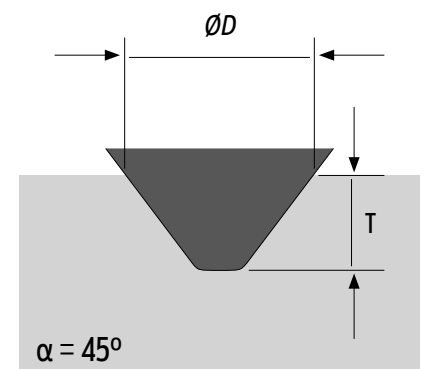
ISO	PSM	Material	AP (mm)							
			1st	2nd	3rd	4th	5th	6th	Next steps	Tmax: 2mm
P	1	Carbon Steel	0,70	0,70	0,30	0,20	0,10	-	-	0,10
	3	Alloy Steel	0,50	0,40	0,30	0,30	0,20	0,20	0,10	0,10
M	5	SS - Austenitic	0,50	0,40	0,20	0,30	0,20	0,20	0,10	0,05
N	10	Aluminium and Non Ferrous	1,00	0,80	0,20	-	-	-	-	0,10
S	11	Heat Resistant Super Alloys	0,50	0,40	0,20	0,30	0,20	0,20	0,10	0,05

(Note 1) It is recommended to start engraving by steps according to the parameters on the table above.  
 (Note 2) Whenever possible, infeed should be done starting outside the workpiece being machined.

**REFERENCE CHART** Gráfico de referência | Tabla de referencia



- **Point A:**  
Width = 0,5 mm x Depth = 0,08 mm
- **Point B:**  
Width = 0,8 mm x Depth = 0,45 mm
- **Point C:**  
Width = 2,1 mm x Depth = 2,00 mm



# SPOT FACE



Spot face milling is a precision machining process crucial in crafting components for high-performance applications, particularly in the automotive and aerospace industries.

A fresagem de caixa é um processo de maquinação de precisão crucial no fabrico de componentes para aplicações de alto desempenho, especialmente nas indústrias automóvel e aeroespacial.

El fresado de caja es un proceso de mecanizado de precisión crucial en la fabricación de componentes para aplicaciones de alto rendimiento, especialmente en las industrias automotriz y aeroespacial.

## **SPOT FACE** > page 290

- > From DC 10mm to 25mm

De DC 10mm a 25mm | Desde DC 10mm hasta 25mm

- > Counterbore hole

Furo de rebaxo | Orificio avellanado

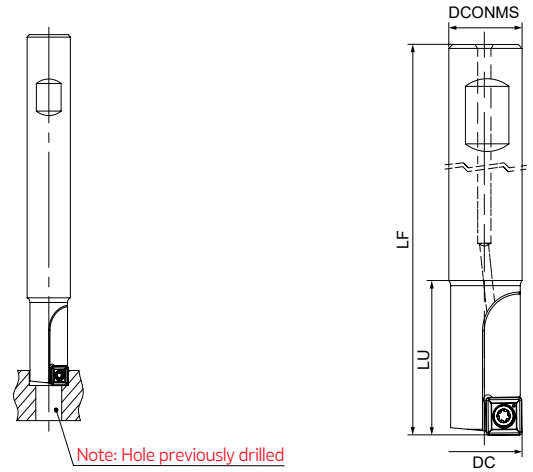
- > Smooth cutting

Corte suave | Corte suave



# A SPOT FACE

MILLING



Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

Order code Código	Reference Referência Referencia	CICT	Dimensions   Dimensões   Dimensiones (mm)				WT	Insert Pastilha Inserto	Stock
			DC	DCONMS	LF	LU			
181150100	SP91 D10-W10/100-01-05	1	10	10	100	30	0,048	SPKX 05T104	⊗
181150200	SP91 D11-W12/100-01-05	1	11	12	100	30	0,070	SPKX 05T104	⊗
181150300	SP91 D13-W16/100-01-06	1	13	16	100	30	0,116	SPKX 060204	⊗
181150400	SP91 D14-W16/120-01-06	1	14	16	120	30	0,123	SPKX 060204	⊗
181150500	SP91 D17-W20/120-01-07	1	17	20	120	35	0,224	SPKX 070308	⊗
181150600	SP91 D18-W20/140-01-07	1	18	20	140	35	0,272	SPKX 070308	⊗
181150700	SP91 D20-W20/140-01-09	1	20	20	140	40	0,303	SPKX 090308	⊗
181150800	SP91 D21-W25/150-01-09	1	21	25	150	40	0,449	SPKX 090308	⊗
181150900	SP91 D25-W25/150-01-11	1	25	25	150	40	0,473	SPKX 110408	⊗

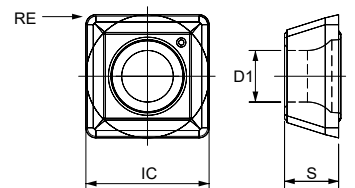
⊗ Stock item | Produto de stock | Itens de stock

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

## SPKX Inserts | Pastilhas | Plaquetas



(PHL grade)



SPKX

Geometry code	ISO Reference	P			M			K			S			Dimensions Dimensões Dimensiones (mm)			
		PVD			PVD			PVD			PVD			IC	S	D1	RE
		68	66	3B	68	66	3B	68	66	3B	68	66	3B				
1111635	SPKX 05T104	⊗			⊗			⊗			⊗			5,00	1,98	2,20	0,40
1111282	SPKX 060204	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	6,00	2,38	2,55	0,40
1111636	SPKX 070308	⊗			⊗			⊗			⊗			7,94	3,18	2,85	0,80
1111637	SPKX 090308	⊗			⊗			⊗			⊗			9,80	3,18	4,10	0,80
1111282	SPKX 110408	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	11,50	4,80	4,40	0,80

⊗ First choice | Primeira opção | 1ª opción

⊗ Stock item | Produto de stock | Itens de stock

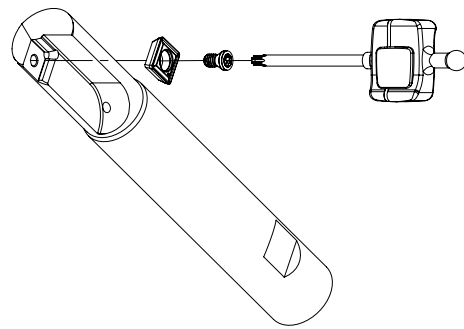
○ Available under request (see page A-9) | Disponível sobre consulta (consulte a página A-9) | Disponible bajo consulta (mire pagina A-9)

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

⊗ 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	
			Key (Torx - Nm)	Torque Value
10-11	P0200400	XT06	DT0606	0,6
13-14	P0220500	XT07	DT0709	0,9
17-18	P0250704	XT08	DT0812	1,2
20-21	P0350702	XT15	DT1530	3,0
25	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.

**GRADES SELECTION GUIDE** Guia para seleção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades			
				← Wear Resistance		Toughness →	
				PH6920	PH6930	PHC930	PHL930
P	1	Unalloyed Steel	125-220	Good	Good	Good	Good
	2	Low-Alloyed Steel	220-280	Good	Good	Good	Good
	3	High-Alloyed Steel	280-380	Good	Good	Good	Good
M	4	SS - Ferritic / Martensitic	200-330	Good	Good	Good	Good
	5	SS - Austenitic	200-330	Good	Good	Good	Good
	6	SS - Austenitic-ferritic (Duplex)	230-260	Good	Good	Good	Good
K	8	Grey Cast Iron	180-245	Good	Good	Good	Good
	9	Nodular Cast iron	160-250	Good	Good	Good	Good
S	11	Heat Resistant Super Alloys	200-320	Good	Good	Good	Good

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 →	
				PH6920	PH6930	PHC930	PHC930
P	1	Unalloyed Steel	125-220	180-250	160-240	160-240	160-240
	2	Low-Alloyed Steel	220-280	160-220	140-200	140-200	140-200
	3	High-Alloyed Steel	280-380	130-180	110-160	110-160	110-160
M	4	SS - Ferritic / Martensitic	200-330	170-230	140-210	140-210	140-210
	5	SS - Austenitic	200-330	160-200	130-200	130-200	130-200
	6	SS - Austenitic-ferritic (Duplex)	230-260	140-180	120-190	120-190	120-190
K	8	Grey Cast Iron	180-245	180-250	150-220	150-220	150-220
	9	Nodular Cast iron	160-250	130-200	110-180	110-180	110-180
S	11	Heat Resistant Super Alloys	200-320	40-120	30-100	30-100	30-100

ISO	PSM	Material	HB (Brinell)	Feed fz (mm/t)				
				SPKX 05...	SPKX 06...	SPKX 07...	SPKX 09...	SPKX 11...
				P	1	Unalloyed Steel	125-220	0,05-0,08
2	Low-Alloyed Steel	220-280	0,06-0,12		0,08-0,15	0,10-0,18	0,12-0,22	0,12-0,25
3	High-Alloyed Steel	280-380	0,06-0,10		0,08-0,15	0,10-0,20	0,12-0,23	0,12-0,26
M	4	SS - Ferritic / Martensitic	200-330	0,05-0,10	0,06-0,12	0,08-0,15	0,09-0,16	0,10-0,20
	5	SS - Austenitic	200-330	0,04-0,08	0,05-0,10	0,06-0,12	0,07-0,13	0,08-0,18
	6	SS - Austenitic-ferritic (Duplex)	230-260	0,04-0,08	0,05-0,11	0,06-0,13	0,07-0,14	0,08-0,19
K	8	Grey Cast Iron	180-245	0,06-0,12	0,08-0,16	0,12-0,20	0,15-0,25	0,15-0,30
	9	Nodular Cast iron	160-250	0,06-0,10	0,08-0,15	0,10-0,18	0,12-0,20	0,15-0,25
S	11	Heat Resistant Super Alloys	200-320	0,04-0,08	0,05-0,10	0,06-0,12	0,07-0,13	0,08-0,18



## 1 SHANKS

> See page A - 294

## 2 SCREWS

> See page A - 298

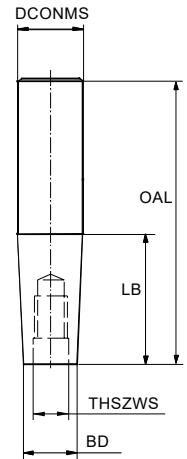
## 3 KEYS

> See page A - 300

## 4 OTHERS

> See page A - 300

## MULTIFIT DENSIMET ANTI-VIBRATION Shank | Adaptador | Fijación

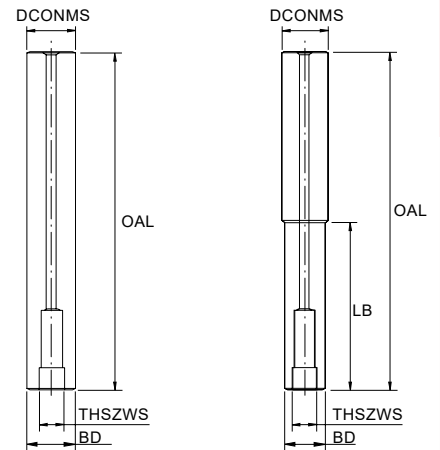


Order code Código	Reference Referência Referencia	Dimensions   Dimensões   Dimensiones (mm)					Stock
		DCONMS	LB	OAL	BD	THSZWS	
1191008A0	AC-RI-D12-M06-L040-AV	12	40	90	9,8	M6	⊗
1191009A0	AC-RI-D12-M06-L060-AV	12	60	110	9,8	M6	⊗
1191021A0	AC-RI-D12-M06-L080-AV	12	80	130	9,8	M6	⊗
1191010A0	AC-RI-D16-M08-L040-AV	16	40	95	12,8	M8	⊗
1191011A0	AC-RI-D16-M08-L060-AV	16	60	115	12,8	M8	⊗
1191012A0	AC-RI-D16-M08-L080-AV	16	80	135	12,8	M8	⊗
1191013A0	AC-RI-D16-M08-L100-AV	16	100	155	12,8	M8	⊗
1191022A0	AC-RI-D16-M08-L120-AV	16	120	175	12,8	M8	⊗
1191014A0	AC-RI-D20-M10-L040-AV	20	40	100	15,8	M10	⊗
1191015A0	AC-RI-D20-M10-L060-AV	20	60	120	15,8	M10	⊗
1191016A0	AC-RI-D20-M10-L080-AV	20	80	140	15,8	M10	○
1191017A0	AC-RI-D20-M10-L100-AV	20	100	160	15,8	M10	○
1191018A0	AC-RI-D20-M10-L120-AV	20	120	180	15,8	M10	○
1191026A0	AC-RI-D20-M10-L080-D17,8-AV	20	80	140	17,8	M10	⊗
1191027A0	AC-RI-D20-M10-L100-D17,8-AV	20	100	160	17,8	M10	⊗
1191028A0	AC-RI-D20-M10-L120-D17,8-AV	20	120	180	17,8	M10	⊗
1191023A0	AC-RI-D25-M12-L060-AV	25	60	125	20,8	M12	⊗
1191024A0	AC-RI-D25-M12-L080-AV	25	80	145	20,8	M12	⊗
1191025A0	AC-RI-D25-M12-L100-AV	25	100	165	20,8	M12	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

**MULTIFIT CARBIDE ANTI-VIBRATION** Shank | Adaptador | Fijación



Standard Version

Customized Version

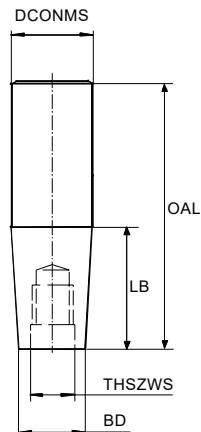
Order code Código	Reference Referência Referencia	Dimensions   Dimensões   Dimensiones (mm)					Stock
		DCONMS	OAL	THSZWS	BD*	LB*	
219102600	AC-RI-D12-M06-L100-HW	12	100	M6	-	-	⊗
219102700	AC-RI-D12-M06-L150-HW	12	150	M6	-	-	⊗
219102800	AC-RI-D16-M08-L100-HW	16	100	M8	-	-	⊗
219102900	AC-RI-D16-M08-L150-HW	16	150	M8	-	-	⊗
219103000	AC-RI-D20-M10-L150-HW	20	150	M10	-	-	⊗
219103100	AC-RI-D20-M10-L200-HW	20	200	M10	-	-	⊗
219103200	AC-RI-D25-M12-L150-HW	25	150	M12	-	-	⊗
219103300	AC-RI-D25-M12-L200-HW	25	200	M12	-	-	⊗
219103400	AC-RI-D32-M16-L250-HW	32	250	M16	-	-	⊗

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

\* Customized versions under request

## MULTIFIT CYLINDRICAL IN STEEL Shank | Adaptador | Fijación

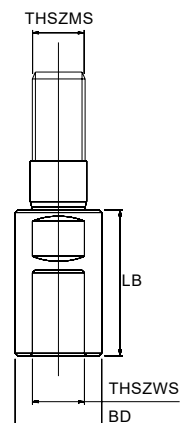


Order code Código	Reference Referência Referencia	Dimensions   Dimensões   Dimensiones (mm)					Stock
		DCONMS	LB	OAL	BD	THSZWS	
181179000	AC-RI-D12-M06-L020	12	20	65	9,8	M6	☉
181179100	AC-RI-D16-M08-L040	16	40	88	12,8	M8	☉
181179200	AC-RI-D20-M10-L045	20	45	95	17,8	M10	☉
181179300	AC-RI-D25-M12-L050	25	50	106	20,8	M12	☉
181179400	AC-RI-D32-M16-L050	32	50	110	28,8	M16	☉

☉ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

## MULTIFIT EXTENSIONS FOR THREADED TYPE CUTTER Shank | Adaptador | Fijación



Order code Código	Reference Referência Referencia	Dimensions   Dimensões   Dimensiones (mm)				Stock
		BD	THSZMS	THSZWS	LB	
181186100	AL-M08-L040-M08	13,8	M8	M8	40	☉
181182900	AL-M10-L060-M10	18,0	M10	M10	60	☉
181191000	AL-M12-L060-M12	21,0	M12	M12	60	☉
181191100	AL-M16-L060-M16	29,0	M16	M16	60	☉

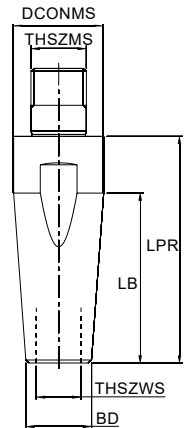
☉ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

## SPARE PARTS

Accessories | Repuestos

# MULTIFIT REDUCERS FOR THREADED TYPE CUTTER Shank | Adaptador | Fijación

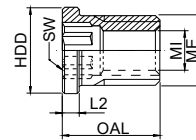


Order code Código	Reference Referência Referencia	Dimensions   Dimensões   Dimensiones (mm)						Stock
		THSZMS	THSZWS	DCONMS	BD	LPR	LB	
181186200	AL-M08-L040-M06	M8	M6	13,8	10,0	40	25	⊗
181190700	AL-M10-L040-M08	M10	M8	18,0	13,8	40	25	⊗
181190800	AL-M12-L040-M10	M12	M10	21,0	18,0	40	15	⊗
181190900	AL-M16-L040-M12	M16	M12	29,0	21,0	40	19	⊗

⊗ Stock item | Produto de stock | Itens de stock

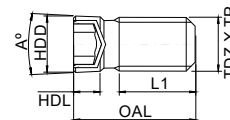
○ Available under request | Disponível sobre consulta | Disponible bajo consulta

## SHIM SCREW



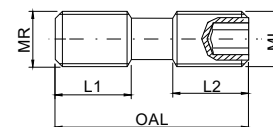
Order code Código	Screw Parafuso Tornillo	Dimensions   Dimensões   Dimensiones (mm)					
		SW	MI	ME	HDD	OAL	L2
290030400	T0503509	3,5	M3,5 x 0,6	M5,0 x 0,5	6,3	7	1,2

## ADJUSTMENT SCREW



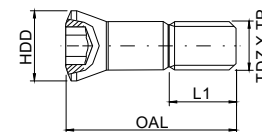
Order code Código	Screw Parafuso Tornillo	T (torx)	Dimensions   Dimensões   Dimensiones (mm)					
			TDZ x TP	HDD	A°	OAL	L1	HDL
290051500	F0601441	T-20	M6 x 1,0	6,3	5°	13,6	8,5	3,2

## DIFFERENTIAL SCREW



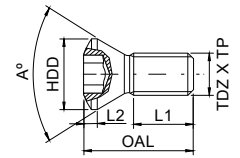
Order code Código	Screw Parafuso Tornillo	T (torx)	Dimensions (mm)				
			MR	ML	OAL	L1	L2
290016300	F0701800	T-20	M7 x 0,75	M7 x 0,75	18	7,5	7,5

## INSERT SCREW



Order code Código	Screw Parafuso Tornillo	T (torx)	Dimensions   Dimensões   Dimensiones (mm)			
			TDZ x TP	HDD	OAL	L1
290013900	P0400925	T-15	M4 x 0,5	5,80	8,6	3,5
290010600	P0500925	T-20	M5 x 0,5	6,70	9,5	3,4
290014400	P0501325	T-20	M5 x 0,5	7,50	12,8	4,5
290014000	P0501525	T-20	M5 x 0,5	7,50	15,5	4,5

**INSERT SCREW**



Order code Código	Screw Parafuso Tornillo	T (torx)	Dimensions   Dimensões   Dimensiones (mm)					
			TDZ x TP	HDD	A°	OAL	L1	L2
290078800	P0180300	T-GIP	M1,8 x 0,35	2,45	60°	3,4	1,5	0,5
290058400	P0180400	T-GIP	M1,8 x 0,35	2,45	60°	3,7	1,8	0,5
290011300	P0180401	T-6	M1,8 x 0,35	2,75	55°	3,6	1,9	0,4
290031400	P0200500	T-6	M2 x 0,4	2,80	60°	4,7	2,9	0,6
290030600	P0220500	T-7	M2,2 x 0,45	3,20	60°	5,0	3,0	0,6
290033100	P0250503	T-8	M2,5 x 0,45	3,45	60°	5,5	2,8	0,7
290048900	P0250601	T-8	M2,5 x 0,45	3,45	60°	6,0	3,5	0,8
290013400	P0250700	T-8	M2,5 x 0,45	3,3	55°	7	4	0,8
290031300	P0250704	T-8	M2,5 x 0,45	3,45	60°	6,5	4,0	0,7
290084200	P0300726	T-8	M3 x 0,35	4,40	60°	6,7	1,7	0,7
290009100	P0300800	T-9	M3 x 0,5	4,4	60°	7,4	4,2	0,8
290081700	P0350702	T-15	M3,5	5,3	55°	7	3,1	2
290019900	P0350800	T-15	M3,5 x 0,6	5,5	60°	7,7	3,7	1
290084300	P0350825	T-10	M3,5 x 0,35	5,70	54°	8,4	2,8	1
290027100	P0350902	T-10	M3,5 x 0,6	4,7	60°	9	5,5	0,4
290030900	P0350903	T-15	M3,5 x 0,6	5,45	60°	9	6	0,6
290075200	P0350904	T-10	M3,5 x 0,6	4,8	60°	9	5	0,8
290005800	P0351200	T-15	M3,5 x 0,6	5,30	60°	12	8	1,4
290094600	P0400803	T-15	M4 x 0,7	5,5	60°	8	5,5	1
290048200	P0400900	T-15	M4 x 0,7	5,5	60°	9	5,5	1
290075600	P0401065	T-15	M4 x 0,7	5,7	60°	10	6	1
290007000	P0401100	T-15	M4 x 0,7	5,3	55°	11	8	2
290047500	P0401200	T-15	M4 x 0,7	5,5	60°	11	6	1,2
290026900	P0451001	T-20	M4,5 x 0,75	6,6	55°	10,5	5,5	1
290017600	P0451100	T-20	M4,5 x 0,75	6,85	55°	11	6,6	0,7
290006700	P0451400	T-20	M4,5 x 0,75	7,2	60°	14	9	1
290084400	P0501025	T-20	M5 x 0,5	7,00	60°	9,9	2,6	0,9
290084500	P0501326	T-20	M5 x 0,5	6,70	42°	13,3	3,8	1,15
290017500	P0501100	T-20	M5 x 0,8	6,4	43°	11	5,9	0,5
290031700	P0501300	T-20	M5 x 0,8	7	60°	12,8	8	1,3
290078900	P0501302	T-20	M5 x 0,8	7	60°	13	8,2	0,8
290048300	P0601402	T-20	M6 x 1,0	8,4	60°	14	9	0,9
290084600	P0601725	T-25	M6 x 0,75	7,96	44°	16,8	5,7	1,15

**MILLING**

Face milling

High feed milling

Shoulder milling

Profile milling

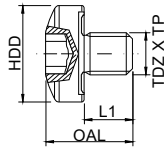
Specialty

Spare Parts

Technical Data

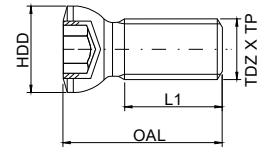
End Mills

## ADJUSTMENT SCREW



Order code Código	Screw Parafuso Tornillo	T (torx)	Dimensions   Dimensões   Dimensiones (mm)			
			TDZ x TP	HDD	OAL	L1
290014200	P0350750	T-15	M3,5 x 0,6	8,00	7,2	4,0

## WASHER SCREW



Order code Código	Screw Parafuso Tornillo	Dimensions   Dimensões   Dimensiones (mm)			
		TDZ x TP	HDD	OAL	L1
290075600	P0401065	M4 x 0,7	5,7	10,0	6,0
290018500	P0601265	M6 x 1,0	9,00	12,4	6,5
290011000	P0601765	M6 x 1,0	9,00	17,0	11,0
290028400	P0802265	M8 x 1,25	11,0	22,0	15,0

## OTHERS

Sealing Cap	Order Code	Reference
	119236000	TRM2009S8
	119237600	TRM2411S10
	119235900	TRM3012S14
	119236600	TRM3615S17

Washer	Order Code	Reference
	290012100	HC01200
	290060200	HC01400
	290002900	HC01800

Torx Keys	Order Code	Reference
	290058600	XT 06IP
	290011400	XT 06
	290012900	XT07
	290011700	XT 08
	290025700	XT 09
	290013100	XT 10
	290012400	XT 15
	290013200	XT 20
	290014800	PT 15
	290014900	PT 20
	290089000	TT 20
	290059500	LT 30

Cartridge Screw	Order Code	Reference
	119169600	D0602096

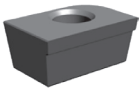
Shim	Order Code	Reference
	116022223	CS130300
	290060400	CT160300
	290060300	CT220300


Spring Pin	Order Code	Reference
	290060600	BE02500
	290060500	BE04000


Wedge (insert)	Order Code	Reference
	290060900	WA7001
	290061100	WA7003
	119200100	SETDEV AS 04 00


## SPARE PARTS

Acessórios | Repuestos

Wedge (Cartridge)	Order Code	Reference
	290061000	WA7002
	290061200	WA7004

Hex Key	Order Code	Reference
	290021200	SS40
	290021300	SS50
	290058700	TS40

Screw for Coolant Supply	Order Code	Reference	TDZ	HDD
	119163000	J0123510	12	37,9
	119163100	J0164110	16	45,0
	119163200	J0204610	20	54,8

Dynamometric Torque Key	Order Code	Reference	Torx	Nm
 (Predefined torque)	290078300	DT0606IP	6IP	0,6
	290059600	DT0606	6	0,6
	290059700	DT0709	7	0,9
	290059800	DT0812	8	1,2
	290059900	DT0914	9	1,4
	290060000	DT1020	10	2,0
	290047800	DT1530	15	3,0
290078400	DT2050	20	5,0	

DIN 6368 Wrench	Order Code	Reference
	290058000	SD6368-12
	290058100	SD6368-16
	290058200	SD6368-20

Retaining Screw	Order Code	Reference
	290087700	D1603500
	290087800	D2004000

## PROCEDURES FOR CLAMPING SCREWS

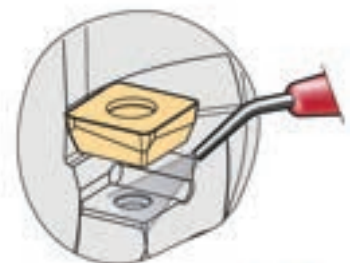
1. Always use a torque wrench to ensure that screws are correctly tightened (please confirm torques data on catalogue). Torque that is too high will negatively affect the performance of the tool and can cause screw and insert breakage. Torque that is too low will cause insert movement, vibration and degrade the cutting result. Dedicated adjustable torque wrench can be ordered separately (please see above).

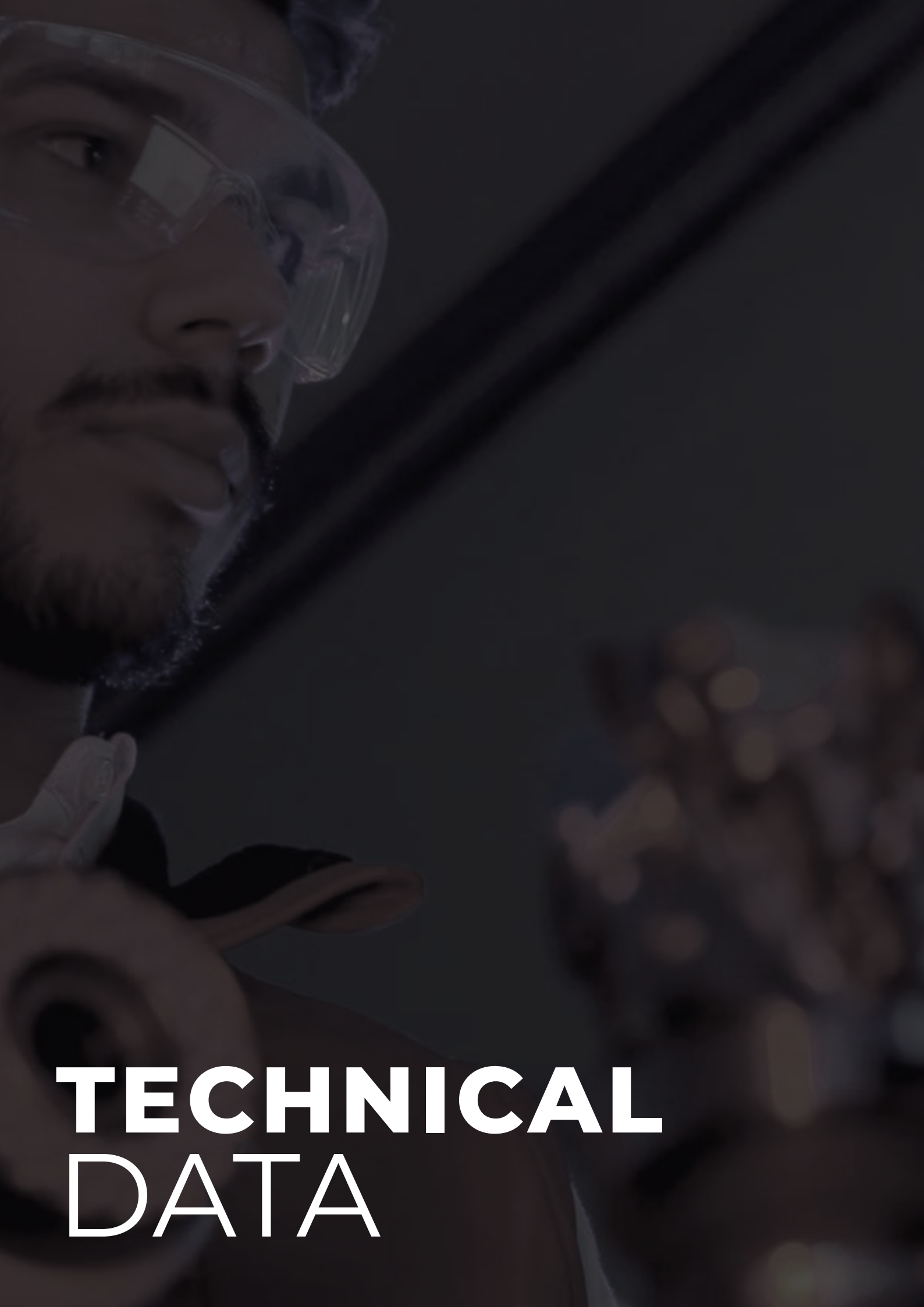
2. Clean the insert seat.  
Make sure that the insert seat is free from dust or chips from the machining. If necessary, clean the insert seat with compressed air.

3. Check the insert seat.  
Before assembly cutter it is important to ensure that the insert seat has not been damaged during machining or handling.

4. Apply sufficient screw lubrication to prevent seizure. Lubricant should be applied to the screw threads as well as to the screw head face.

5. Replace worn or damaged screws.





# TECHNICAL DATA

## 1 MILLING GRADES

> See page A - 304

## 2 CUTTING DATA CALCULATION

> See page A - 308

## 3 POWER REQUIREMENT CALCULATION

> See page A - 309

# A MILLING GRADES

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

	1	5	10	15	20	25	30	35	40	45	50		
P STEEL		NEW PHF603										PVD             CVD	
		PHH603											
			NEW PHF910										
			PHH910										
			PHP910										
			PH7910										
				PHP920									
				PH7920									
					PHP930								
					PH7930								
						PHP530							
							PHP808						
							PH7740						
							PH5740						
M STAINLESS STEEL					PHH930							PVD	
					PH7930								
						PHH530							
						PHP530							
							PHH808						
							PH7740						
K CAST IRON			PHP910									PVD          CVD	
			PH7910										
				PHP920									
				PH7920									
					PHP930								
					PH7930								
						PH7740							
			PH5705										
				PH5320									
							PH5740						

# MILLING GRADES

Craus para fresagem | Qualidades para fresado

		1	5	10	15	20	25	30	35	40	45	50		
<b>N</b> ALUMINIUM & NFM			PH0910											UNCOATED
			PHD103											CVD
			PDP403											PCD
			PDP410											PCD
<b>S</b> HEAT Resistant / TITANIUM ALLOYS								PHH930						PVD
								PH7930						
								PHH530						
								PHH808						
								PH7740						
<b>H</b> HARDENED MATERIALS			PHH603											PVD
				PH7603										
					PHH910									
		PBH920												

# MILLING GRADES DESCRIPTION

## PVD GRADES

### PHP..

Product of the latest coating technology, the new PHP coating comes to revolutionize the milling of Steel and Cast Iron.

PHP is a balanced PVD coating that combines high hardness and high cracking resistance.

It's composition and structure ensure an optimal adhesion which results in a very smooth surface preventing built-up edge, coating worn-out and keeps the insert in a lubricated-like condition.



WEAR RESISTANCE

TOUGHNESS

#### PHP910

P05-P10  
K05-K10

Recommended for light operations in steels.

#### PHP920

P10-P35  
K10-K30

Recommended for General Steel & Cast Iron Milling.

#### PHP930

P20-P40  
K20-K40

Recommended for medium to roughing operations in steels and cast irons.

#### PHP530

P25-P40  
M25-M40

Extremely heat resistant grade. First choice in cold-section turbine blade milling.

#### PHP808

P30-P40

High heat resistance grade. Economic choice for cold-section turbine blade milling.

### PHH...

Product of the latest coating technology, the new PHH coating comes to revolutionize the milling of stainless steel, HRSA as well and hardened steel.

PHH is a stable PVD coating that merges both high hardness and an incomparable heat resistance.

It's structure contains refractory materials which allows it to work at the highest temperature and the hardest conditions.



WEAR RESISTANCE

TOUGHNESS

#### PHH603

P01-P05  
H05-H15

Recommended for finishing operations in steels and hardened steels.

NEW

#### PHF603

P01-P05  
H05-H15

Recommended for finishing operations in steels and hardened steels. First choice for finishing applications.

#### PHH910

P05-P10  
H15-H30

Recommended for finishing operations in steels and hardened steels in unstable conditions.

NEW

#### PHF910

P05-P10  
H15-H30

Recommended for finishing operations in hardened steels ensuring superior surface quality, wear resistance, and thermal stability.

#### PHH930

M20-M40  
S20-S30

Recommended for general purpose milling of stainless steels and HRSA.

#### PHH530

M25-M40  
S25-S35

Extremely heat resistant grade. First choice in hot-section turbine blade milling.

#### PHH808

M30-M40  
S30-S40

High heat resistance grade. Economic choice in hot-section turbine blade milling.

### PH7... | PH6...

A medium thickness PVD coating with good compatibility with steels, stainless steels, cast irons and HRSA.

WEAR RESISTANCE

TOUGHNESS

#### PH7603

(PH6103)  
H01-H20

#### PH7910

(PH6910)  
P05-P10  
K05-K10

#### PH7920

(PH6920)  
P10-P35  
K10-K30

#### PH7930

(PH6930)  
P20-P40  
M20-M30  
K20-K40  
S25-S35

#### PH7740

(PH6740)  
P30-P50  
M30-M50  
K30-K40  
S30-S40

Note: PH6... grades are very similar to PH7... The difference being that PH7 is mostly used in proprietary milling lines while PH6... is used on interchangeable inserts.

## MILLING GRADES DESCRIPTION

Descrição de graus para fresagem | Descripción de calidades para fresagem

## CVD GRADES

PHS740...

A tough substrate combined with a thin CVD coating with excellent thermal resistance and hardness at high temperature. 1st choice solution for removal of oxide layer from workpiece surface and for unstable conditions where a lot of heat is generated (ex: heavy duty applications).



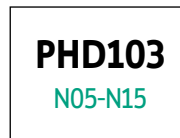
PH5...

A thick CVD coating with very smooth surface. Can be used wet or dry. Ideal for machining cast irons.



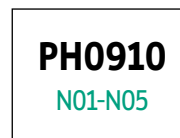
## PHD103

A carbide substrate with high abrasion resistance coated with crystalline diamond CVD coating. Ideal for graphite machining.



## PH0910 - UNCOATED GRADE

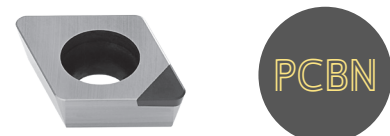
Uncoated carbide micro-grain grade combining a good abrasive wear resistance and toughness. Suitable for rough to finish operations of aluminum alloys.



## PCBN GRADE

PBH920

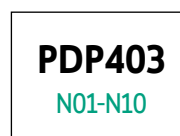
Carbide insert with Polycrystalline Cubic Boron Nitride tip for finishing operations on hardened steels.



## PCD GRADE

PDP4...

Carbide insert with Polycrystalline Diamond tip for finishing operations on aluminums and non-ferrous metallic materials.



# A CUTTING DATA CALCULATION

Cálculo de condições de corte | Cálculo de datos de corte

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

## > Formulas

Spindle Speed (rev/min)

$$n = \frac{v_c \cdot 1000}{\pi \cdot D_c}$$

Cutting Speed (m/min)

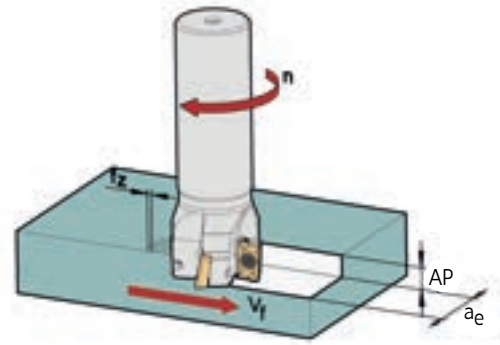
$$v_c = \frac{n \cdot \pi \cdot DC}{1000}$$

Feed Speed (mm/min)

$$v_f = n \cdot Z_n \cdot f_z$$

Feed per Tooth (mm/tooth)

$$f_z = \frac{v_f}{n \cdot Z_n}$$



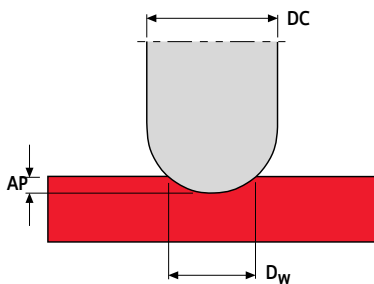
Feed per Revolution (mm/rev)

$$f = Z_n \cdot f_z$$

Metal removal Rate (cm<sup>3</sup>/min)

$$Q = \frac{a_e \cdot AP \cdot v_f}{1000}$$

## > Cutting Speed and Spindle Speed for Copying



### NOMENCLATURE

$a_e$	- Width of cut mm/radial depth of cut	(mm)
$AP$	- Depth of cut mm/axial depth of cut	(mm)
$DC$	- Cutter diameter	(mm)
$D_w$	- Effective diameter in cut	(mm)
$f$	- Feed per Revolution	(mm/rev)
$f_z$	- Feed per Tooth	(mm/tooth)
$n$	- Spindle Speed	(rev/min)
$Q$	- Material removal Rate	(cm <sup>3</sup> /min)
$v_c$	- Cutting Speed	(m/min)
$v_f$	- Feed Speed	(mm/min)
$Z_n$	- N <sup>o</sup> of teeth	

$$v_c = \frac{n \cdot \pi \cdot D_w}{1000} \quad (\text{m/min})$$

$$n = \frac{v_c \cdot 1000}{\pi \cdot D_w} \quad (\text{RPM})$$

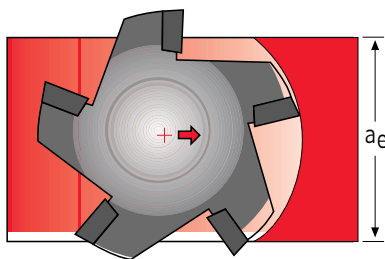
$$D_w = 2 \cdot \sqrt{a_p(DC-AP)} \quad (\text{mm})$$

# POWER REQUIREMENT CALCULATION

Cálculo de potência requerida | Cálculo del requerimiento de potencia

## > Calculating the power demand

$$P_c = \frac{AP \times a_e \times v_f}{6000000 \times \eta} \times k_c$$



- $P_c$  - Power (kW)
- $AP$  - Depth of cut (mm)
- $a_e$  - Width of cut (mm)
- $v_f$  - Feed speed (mm/min)
- $\eta$  - Efficiency
- $k_c$  - Cutting force per mm<sup>2</sup>

## > Calculating average chip thickness ( $h_m$ ) and cutting force per mm<sup>2</sup> ( $k_c$ )

$$h_m = \frac{360 \times f_z \times a_e}{\pi \times DC \times \omega_e} \times \sin k_r$$

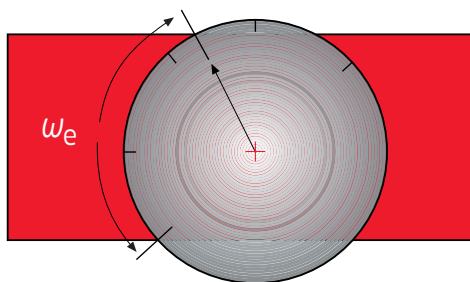
- $h_m$  - Average chip thickness (mm)
- $f_z$  - Feed per tooth (mm/tooth)
- $DC$  - Cutter diameter (mm)
- $\omega_e$  - Engagement angle
- $k_r$  - Lead angle

$$k_c = \frac{1}{h_m^{m_c^*}} \times k_{c^*}$$

- $m_c^*$  - Exponent
- $k_{c^*}$  - Cutting force for 1 mm chip thickness (N/mm<sup>2</sup>)

\* Please see these values on page 1023.

## > Engagement angle



Engagement $a_e / DC$	Engagement angle $\omega_e$
70%	89°
100%	180°

Engagement $a_e / DC$	Engagement angle $\omega_e$
5%	26°
10%	37°
75%	60°

## LOOKING FOR MORE TROUBLESHOOTING OR COMPARATIVE GRADES CHART?



Check the qrcode for more information.



**SOLID CARBIDE  
END MILLS**

## 1 PCD TIPPED END MILLS

> See page A - 312

## 2 CHOOSE BY MATERIAL

> See page A - 318

## 3 CHOOSE BY APPLICATION

> See page A - 336

## 4 GENERAL INTEG

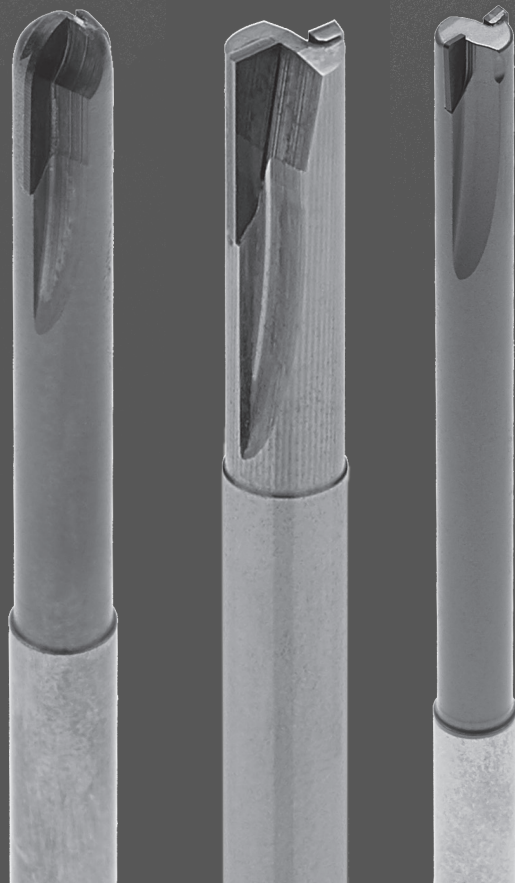
> See page A - 352

## 5 INTEG GRADES

> See page A - 364

END MILLS

# PCD TIPPED



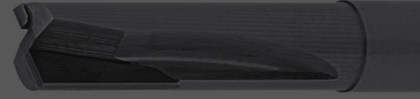
PCD end mills are brazed-tipped tools specifically designed for non-ferrous applications. PCD withstands abrasion wear, significantly prolonging tool life. PCD end mills operate at higher speeds than traditional carbide end mills, resulting in improved surface finish and extended tool life.

Fresas de topo PCD são ferramentas com ponta brasada especificamente projetadas para aplicações não ferrosas. O PCD suporta desgaste por abrasão, prolongando significativamente a vida útil da ferramenta. As fresas de topo PCD operam em velocidades mais altas do que as fresas de metal duro integral de topo tradicionais, resultando em melhor acabamento de superfície e vida útil estendida.

Las fresas de punta PCD son herramientas con punta soldada diseñadas específicamente para aplicaciones no ferrosas. El PCD soporta el desgaste por abrasión, prolongando significativamente la vida útil de la herramienta. Las fresas de punta PCD operan a velocidades más altas que las fresas de punta de carburo tradicionales, lo que resulta en un mejor acabado superficial y una vida útil prolongada.

## STRAIGHT EDGE > page 315

- > From DC 4mm to 16mm  
De DC 4mm a 16mm | Desde DC 4mm hasta 16mm
- > 2 or 3 cutting edges  
2 ou 3 arestas de corte | 2 o 3 aristas de corte
- > Flat top geometry  
Disponível com geometria em topo raso | Disponible con geometría en topo plano
- > Short version  
Disponível em versão curta | Disponible en versión corta



## BULL NOSE > page 316

- > From DC 3mm to 12mm  
De DC 4mm a 16mm | Desde DC 4mm hasta 16mm
- > 1 or 2 cutting edges  
1 ou 2 arestas de corte | 1 o 2 aristas de corte
- > 5° dish angle  
Ângulo de topo de 5° | Ángulo de la punta de 5°
- > Short and long version  
Disponível em versão curta e longa | Disponible en versión corta y larga



## BALL NOSE > page 317

- > From DC 3mm to 12mm  
De DC 3mm a 12mm | Desde DC 3mm hasta 12mm
- > 1 or 2 cutting edges  
1 ou 2 arestas de corte | 1 o 2 aristas de corte
- > Spheric geometry  
Disponível com geometria esférica | Disponible con geometría esférica
- > Short version  
Disponível em versão curta | Disponible en versión corta



# CODIFICATION SYSTEM FOR PCD TIPPED END MILLS

Sistema de codificação para fresas de metal duro com pontas de PCD | Sistema de codificación para fresas de carburo con puntas de PCD

Straight Flute example:

<b>D</b>	<b>S</b>	<b>N</b>	<b>S</b>	<b>2</b>	<b>050</b>	<b>080</b>	<b>010</b>	<b>060</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>

1 - Tool type
D - Diamond (PCD tipped)

2 - Design
B - Ball nose S - Straight

3 - Application
N - Non-ferrous materials

4 - Length of Shank
S - Short length L - Long length XL - Extra long length

5 - Flutes number (NOF)
Example: NOF = 1 ; NOF = 2 ; NOF = 3

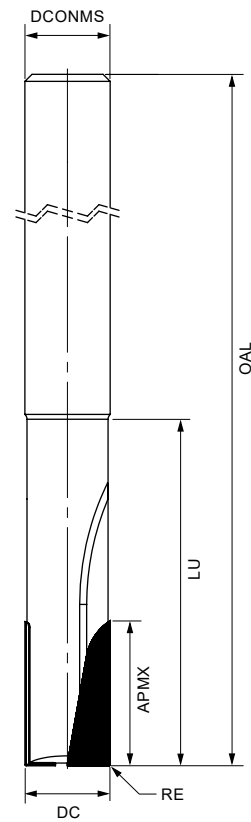
6 - Cutting diameter (DC)
Example: 120 = 12,0 mm ; 008 = 0,8 mm

7 - Max cutting depth (APMX - on straight flute solid carbide)
060 = 6 mm ; 080 = 8 mm

8 - Corner radius (Suppressed when it doesn't exist)
R... Example: R150 = 1,5 mm ; R015 = 0,15 mm

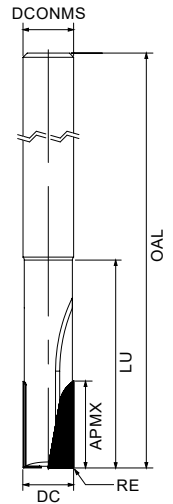
9 - Shank diameter (only on straight flute solid carbide)
Example: 060 = 6 mm

Straight Flute technical drawing example



DC	Tool diameter
DCONMS	Shank diameter
OAL	Overall length
LU	Neck length
APMX	Tip length
RE	Corner form (radius or chamfer)

# HARDMILL STRAIGHT EDGE



(1) Geometry code	(2) Grade code		NOF	N PCD D6 PDP410	Dimensions   Dimensões   Dimensiones (mm)					
					DC	DCONMS	OAL	LU	APMX	RE
1180011	DSNS 2 040 060 010 060	2	2	⊗	4	6	51	6,40	6	0,10
1180012	DSNS 2 050 080 010 060	2	2	⊗	5	6	51	8,40	8	0,10
1180006	DSNS 2 060 080 010 060	2	2	⊗	6	6	63	21	8	0,10
1180013	DSNS 2 080 080 010 080	2	2	⊗	8	8	63	27	8	0,10
1180014	DSNS 2 080 120 010 080	2	2	⊗	8	8	63	27	12	0,10
1180015	DSNS 2 100 080 010 100	2	2	⊗	10	10	72	32	8	0,10
1180016	DSNS 2 100 160 010 100	2	2	⊗	10	10	72	32	16	0,10
1180017	DSNS 2 120 080 010 120	2	2	⊗	12	12	83	38	8	0,10
1180018	DSNS 2 120 160 010 120	2	2	⊗	12	12	83	38	16	0,10
1180019	DSNS 3 140 080 010 140	3	3	⊗	14	14	83	38	8	0,10
1180020	DSNS 3 140 160 010 140	3	3	⊗	14	14	83	38	16	0,10
1180021	DSNS 3 160 120 010 160	3	3	⊗	16	16	100	52	12	0,10
1180022	DSNS 3 160 200 010 160	3	3	⊗	16	16	100	52	20	0,10

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

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

## NON-FERROUS MATERIALS Materials não ferrosos | Materiales no ferrosos

ISO	Workpiece Material	Vc (m/min)		fz (mm/t)		Coolant
		min	max	min	max	
N	Aluminium <6%Si	200	6000	0,05	0,30	Emulsion / MQL
	Aluminium <12%Si	200	4000	0,05	0,25	
	Aluminium >12%Si	200	2000	0,05	0,20	
	Cooper/Cooper Alloys	250	3000	0,03	0,30	

## SYNTHETICS MATERIALS Materiais sintéticos | Materiales sintéticos

ISO	Workpiece Material	Vc (m/min)		fz (mm/t)		Coolant
		min	max	min	max	
N	Graphit	150	2500	0,05	0,40	Dry/ Air
	GFRP, CFRP	200	3000	0,05	0,40	Dry/ Air
	Plastics (Termo/Duroplast)	100	2500	0,05	0,30	Emulsion/MQL
	Acrylic (PMMA)	100	1200	0,01	0,25	Emulsion /MQL
	Laminate	100	1200	0,02	0,50	Dry/Air

These recommended parameters are only approximate values. It can be necessary to adjust them regarding to the specific machining operation.

# A HARDMILL BULL NOSE

MILLING

Face milling

High feed milling

Shoulder milling

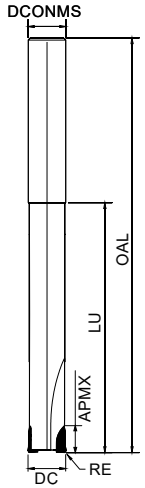
Profile milling

Specialty

Spare Parts

Technical Data

End Mills



(1) Geometry code	Reference Referência Referencia	NOF	PDP410	Dimensions   Dimensões   Dimensiones (mm)						
				DC	DCONMS	OAL	LU	APMX	RE	
1180073	DSNS 1 030 050 030 040	1	⊗	3	4	60	30	5	0,30	
1180075	DSNL 2 040 050 030 040	2	⊗	4	4	75	45	5	0,30	
1180076	DSNL 2 060 060 030 060	2	⊗	6	6	100	60	6	0,30	
1180077	DSNL 2 080 060 030 080	2	⊗	8	8	125	80	6	0,30	
1180074	DSNL 2 100 060 050 100	2	⊗	10	10	150	100	6	0,30	
1180078	DSNL 2 120 070 050 120	2	⊗	12	12	150	100	7	0,30	

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

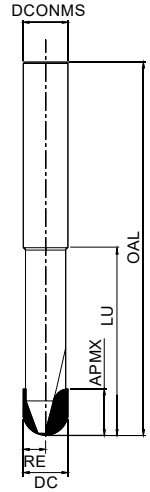
Order code = (1) Geometry Code + (2) Grade Code

Material Group	Correction factor	V <sub>C</sub> (m/min)
Aluminium cast alloys 5% < Si ≤ 12%	1,6	790-1000
Aluminium cast alloys 12% < Si	1,5	790-1000
Fibre-reinforced synthetics	1,0	400-500
Graphite	1,0	700-850

DC	 $a_e = 0,2 \times DC$ $APMX = 0,1 \times DC$	 $APMX = 0,05 \times DC$
	f <sub>z</sub> (mm/t)	f <sub>z</sub> (mm/t)
3	0,020	0,022
4	0,025	0,028
6	0,035	0,040
8	0,050	0,055
10	0,060	0,070
12	0,075	0,078

Please note that the value fz from the table above must be multiplied with the corresponding correction factor.

# HARDMILL BALL NOSE



(1) Geometry code	(2) Grade code		N	Dimensions   Dimensões   Dimensiones (mm)						
			PCD	DC	DCONMS	OAL	LU	APMX	RE	
	Reference Referência Referencia	NOF	D6							
1180079	DBNS 1 030 050 150 060	1	⊗	3	3	60	30	5	1,50	
1180080	DBNS 1 040 100 200 040	1	⊗	4	4	60	30	10	2,00	
1180081	DBNS 2 060 100 300 060	2	⊗	6	6	80	40	10	3,00	
1180082	DBNS 2 080 100 400 080	2	⊗	8	8	80	40	10	4,00	
1180083	DBNS 2 100 100 500 100	2	⊗	10	10	80	40	10	5,00	
1180084	DBNS 2 120 100 600 120	2	○	12	12	100	60	10	6,00	

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

Order code = (1) Geometry Code + (2) Grade Code

Material Group	Correction factor	V <sub>c</sub> (m/min)
Aluminium cast alloys 5% < Si ≤ 12%	1,6	790-1000
Aluminium cast alloys 12% < Si	1,5	790-1000
Fibre-reinforced synthetics	1,0	400-500
Graphite	1,0	700-850

DC	 $a_e = 0,2 \times DC$ $APMX = 0,1 \times DC$	 $APMX = 0,05 \times DC$
	$f_z$ (mm/t)	$f_z$ (mm/t)
3	0,020	0,022
4	0,025	0,028
6	0,035	0,040
8	0,050	0,055
10	0,060	0,070
12	0,075	0,078

Please note that the value  $f_z$  from the table above must be multiplied with the corresponding correction factor.

CHOOSE BY

# MATERIAL



A high-performance solid carbide end mills designed for specific workpiece materials, offering improved productivity, extended tool life, and providing high process security for demanding parts production in industries such as aerospace, automotive, mold and die, and power generation.

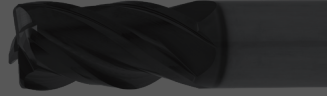
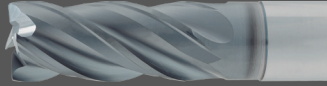
Fresas de metal duro integral de alto desempenho projetadas para materiais de peças específicas, oferecendo produtividade aprimorada, vida útil estendida e alta segurança de processo para produção de peças exigentes em indústrias como aeroespacial, automóvel, moldes e matrizes e geração de energia.

Fresas de carburo integral de alto rendimiento diseñadas para materiales específicos de piezas, ofreciendo productividad mejorada, vida útil prolongada y alta seguridad del proceso para la producción de piezas exigentes en industrias como aeroespacial, automotriz, moldes y matrices, y generación de energía.

NEW

## STEEL INTEG > page 323

- > Steel specialized end mills  
Fresas especiais para aço | Fresas especiales para acero
- > From DC 2mm to 25mm  
De DC 2mm a 25mm | Desde DC 2mm hasta 25mm
- > Chamfer or radius geometry  
Disponível com geometria em chanfro ou raio | Disponible con geometría en chaflán o radio
- > Short and long version  
Disponível em versão curta e longa | Disponible en versión corta y larga



NEW

## INOX INTEG > page 326

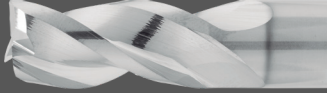
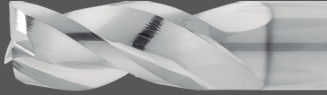
- > Stainless steel specialized end mills  
Fresas especiais para aço inox | Fresas especiales para acero inoxidable
- > From DC 2mm to 20mm  
De DC 2mm a 20mm | Desde DC 2mm hasta 20mm
- > Chamfer or radius geometry  
Disponível com geometria em chanfro ou raio | Disponible con geometría en chaflán o radio
- > Short version  
Disponível em versão curta | Disponible en versión corta



NEW

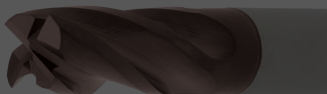
## AL INTEG > page 329

- > Aluminium specialized end mills  
Fresas especiais para alumínio | Fresas especiales para aluminio
- > From DC 2mm to 20mm  
De DC 2mm a 20mm | Desde DC 2mm hasta 20mm
- > Chamfer, radius, ball nose or flat top geometry  
Disponível com geometria em chanfro, raio, topo redondo ou topo raso | Disponible con geometría en chaflán, radio, topo redondeado o plano
- > Short version  
Disponível em versão curta | Disponible en versión corta



## HARD INTEG > page 334

- > Hardened steel specialized end mills  
Fresas especiais para aço | Fresas especiales para acero
- > From DC 2mm to 12mm  
De DC 2mm a 12mm | Desde DC 2mm hasta 12mm
- > Ball nose or flat top geometry  
Disponível com geometria redonda ou topo raso | Disponible con geometría redondeada o plano
- > Short and long version  
Disponível em versão curta e longa | Disponible en versión corta y larga

















# SELECTION GUIDE FOR SOLID CARBIDE END MILLS

Guia de seleção para fresas de metal duro integral | Guía para fresas en carburo monobloque

A

MILLING

	DC	NOF	HELIX ANGLE	GEOMETRY	FINISHING	ROUGHING	MATERIAL	DESCRIPTION	PAGE
 <b>STEEL INTEG</b> HC35PS NEW	2-25	4	35° 38°	 Corner chamfer	■ ■ ■ ■ ■	■ ■ ■ ■ ■	PK	Steel Specialized End mills	A-323
 <b>STEEL INTEG</b> HC35ML	1-20	4	35° 38°	 Corner chamfer	■ ■ ■ ■ ■	■ ■ ■ ■ ■	PK		A-324
 <b>STEEL INTEG</b> HR35GL	12-20	4	35° 38°	 Corner radius	■ ■ ■ ■ ■	■ ■ ■ ■ ■	PMKS		A-325
 <b>INOX INTEG</b> HR37SS NEW	2-20	4	38° 39°	 Corner radius	■ ■ ■ ■ ■	■ ■ ■ ■ ■	M		A-326
 <b>INOX INTEG</b> HC40SS	3-20	4	40° 41°	 Corner chamfer	■ ■ ■ ■ ■	■ ■ ■ ■ ■	M		A-327
 <b>INOX INTEG</b> HRO40SS	3-20	4	39° 41°	 Corner chamfer	■ ■ ■ ■ ■	■ ■ ■ ■ ■	M		A-328

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

# SELECTION GUIDE FOR SOLID CARBIDE END MILLS

Guia de seleção para fresas de metal duro integral | Guía para fresas en carburo monobloque

MILLING

Face milling

High feed milling

Shoulder milling















Profile milling

Specialty

Spare Parts

Technical Data

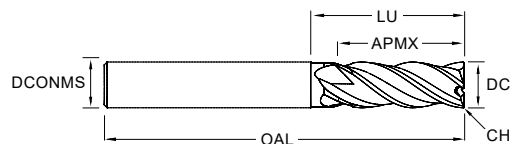
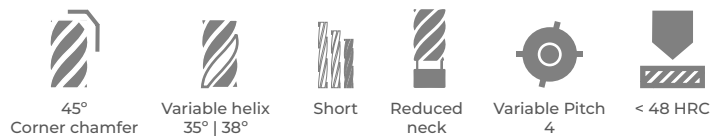
End Mills

	DC	NOF	HELIX ANGLE	GEOMETRY	FINISHING	ROUGHING	MATERIAL	DESCRIPTION	PAGE
 <b>AL INTEG</b> HR35HPAS NEW	2-20	3	35°	 Corner radius	■ ■ ■ ■ ■	■ ■ ■ ■ ■	N	Aluminium Specialized End mills	A-329
 <b>AL INTEG</b> HF45HPAS NEW	2-20	3	45°	 Square	■ ■ ■ ■ ■	■ ■ ■ ■ ■	N		A-330
 <b>AL INTEG</b> HB50HPAS NEW	2-20	2	50°	 Ball nose	■ ■ ■ ■ ■	■ ■ ■ ■ ■	N		A-331
 <b>AL INTEG</b> HC38AS	3-20	3	38°	 Corner chamfer	■ ■ ■ ■ ■	■ ■ ■ ■ ■	N		A-332
 <b>AL INTEG</b> HF30AS	2-12	1	30°	 Square	■ ■ ■ ■ ■	■ ■ ■ ■ ■	N		A-333
 <b>HARD INTEG</b> HF30HL	4-12	4	30°	 Square	■ ■ ■ ■ ■	■ ■ ■ ■ ■	H		Hardened Materials Specialized End mills
 <b>HARD INTEG</b> HB30HL	2-12	2	30°	 Ball nose	■ ■ ■ ■ ■	■ ■ ■ ■ ■	H	A-335	

## NEW HC35PS Corner chamfer



P K



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		2A	Dimensions   Dimensões   Dimensiones (mm)						
		Reference Referência Referencia	NOF		PHU910	DC	DCONMS	APMX	CHW	KCH	LU
HA (Cylindrical)	HB (Weldon)										
1182241	1182240	HC35PS 4 020 05	4	⊗	2	6	5	0,08	45°	8	57
1182242	1181829	HC35PS 4 030 08	4	⊗	3	6	8	0,1	45°	12	57
1182243	1181749	HC35PS 4 040 08	4	⊗	4	6	8	0,1	45°	12	57
1182244	1181750	HC35PS 4 050 10	4	⊗	5	6	10	0,15	45°	15	57
1182245	1181751	HC35PS 4 060 13	4	⊗	6	6	13	0,2	45°	21	57
1182246	1181834	HC35PS 4 070 19	4	⊗	7	8	19	0,2	45°	27	63
1182247	1181752	HC35PS 4 080 19	4	⊗	8	8	19	0,2	45°	27	63
1182248	1181830	HC35PS 4 090 22	4	⊗	9	10	22	0,2	45°	32	72
1182249	1181753	HC35PS 4 100 22	4	⊗	10	10	22	0,2	45°	32	72
1182250	1181831	HC35PS 4 110 26	4	○	11	12	26	0,2	45°	38	83
1182180	1181828	HC35PS 4 120 26	4	⊗	12	12	26	0,2	45°	38	83
1182251	1181832	HC35PS 4 130 26	4	○	13	14	26	0,3	45°	38	83
1182252	1181754	HC35PS 4 140 26	4	⊗	14	14	26	0,3	45°	38	83
1182253	1181755	HC35PS 4 160 32	4	⊗	16	16	32	0,3	45°	44	92
1182254	1181756	HC35PS 4 180 32	4	⊗	18	18	32	0,3	45°	44	92
1182255	1181757	HC35PS 4 200 38	4	⊗	20	20	38	0,3	45°	50	104
1182256	1181833	HC35PS 4 250 42	4	○	25	25	42	0,3	45°	56	121

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

End mill order code = (1) Geometry Code + (2) Grade Code

Note: For HB (Weldon) end mills, the reference ends with "-W"  
Example: "HC35PS 4 030 08-W"

**HC35ML** Corner chamfer

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

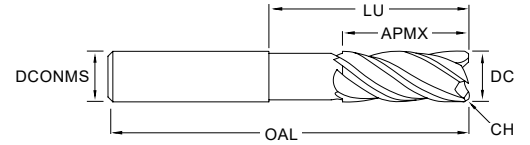
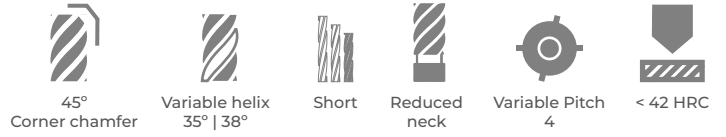
Spare Parts

Technical Data

End Mills



P K



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		T1	Dimensions   Dimensões   Dimensiones (mm)						
		Reference Referência Referencia	NOF		DC	DCONMS	APMX	CHW	KCH	LU	OAL
HA (Cylindrical)	HB (Weldon)			PHP920							
1180480	-	HF35ML 4 010 03	4	○	1	6	2,5	-		5	57
1180482	1180483	HC35ML 4 020 05	4	⊗	2	6	5	0,07	45°	10	57
1180466	1180467	HC35ML 4 030 08	4	⊗	3	6	8	0,15	45°	15	57
1180137	1180468	HC35ML 4 040 11	4	⊗	4	6	11	0,15	45°	17	57
1180469	1180521	HC35ML 4 050 13	4	⊗	5	6	13	0,15	45°	19	57
1180138	1180470	HC35ML 4 060 13	4	⊗	6	6	13	0,15	45°	21	57
1180052	1180471	HC35ML 4 080 19	4	⊗	8	8	19	0,15	45°	27	63
1180053	1180472	HC35ML 4 100 22	4	⊗	10	10	22	0,20	45°	32	72
1180139	1180473	HC35ML 4 120 26	4	⊗	12	12	26	0,20	45°	38	83
1180474	1180475	HC35ML 4 140 26	4	⊗	14	14	26	0,25	45°	38	83
1180153	1180476	HC35ML 4 160 32	4	⊗	16	16	32	0,35	45°	44	92
1180477	1180478	HC35ML 4 180 32	4	⊗	18	18	32	0,45	45°	44	92
1180140	1180479	HC35ML 4 200 38	4	⊗	20	20	38	0,60	45°	54	104

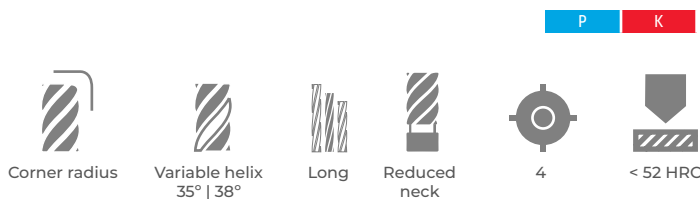
⊗ Stock item | Produto de stock | Itens de stock      ○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

Note: For HB (Weldon) end mills, the reference ends with "-W"

Example: "HC35ML 4 030 08-W"

## HR35GL Corner radius



All order codes are cylindrical shank.  
Weldon shank available under request.

(1) Geometry code	(2) Grade code		T1	Dimensions   Dimensões   Dimensiones (mm)				
	Reference Referência Referencia	NOF	PHP920	DC	DCONMS	APMX	RE	OAL
1180042	HR35GL 4 120 26 R100	4	☉	12	12	26	1	81
1180043	HR35GL 4 120 26 R200	4	☉	12	12	26	2	81
1180044	HR35GL 4 120 26 R300	4	☉	12	12	26	3	81
1180187	HR35GL 4 160 24 R100	4	☉	16	16	24	1	100
1180188	HR35GL 4 160 24 R200	4	☉	16	16	24	2	100
1180189	HR35GL 4 200 40 R100	4	☉	20	20	40	1	100
1180190	HR35GL 4 200 40 R200	4	☉	20	20	40	2	100

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

End mill order code = (1) Geometry Code + (2) Grade Code

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

ISO	Material	f <sub>z</sub> (mm/t)			V <sub>c</sub> (m/min)		
		a <sub>e</sub> = 25%	a <sub>e</sub> = 40%	a <sub>e</sub> = 100%	a <sub>e</sub> = 25%	a <sub>e</sub> = 40%	a <sub>e</sub> = 100%
P	Unalloyed Steel	0,008 x DC	0,005 x DC	0,004 x DC	190	180	150
	Low-Alloyed Steel	0,007 x DC	0,004 x DC	0,003 x DC	180	160	130
	High-Alloyed Steel	0,006 x DC	0,004 x DC	0,003 x DC	160	150	120
K	Malleable Cast Iron	0,008 x DC	0,005 x DC	0,004 x DC	230	210	180
	Grey Cast Iron	0,008 x DC	0,005 x DC	0,004 x DC	230	210	170
	Nodular Cast Iron	0,008 x DC	0,004 x DC	0,004 x DC	210	190	160

Note<sup>1</sup>: Recommended feed values for maximum a<sub>p</sub>. For reduced a<sub>p</sub>, consider increasing F<sub>z</sub> up to 25%.

Note<sup>2</sup>: Cutting speeds selected for an economic use of the tool, for higher productivity consider increasing up to 70%.

**NEW HR37SS** Corner radius

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

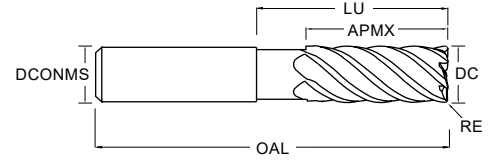
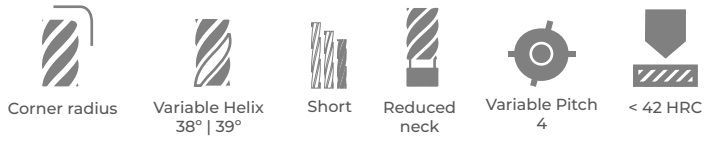
Spare Parts

Technical Data

End Mills



M



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		1F	Dimensions   Dimensões   Dimensiones (mm)					
		Reference Referência Referencia	NOF		PHF920	DC	DCONMS	APMX	RE	LU
HA (Cylindrical)	HB (Weldon)									
-	1182351	HR37SS 4 020 05 R020-W	4	☉	2	6	5	0,2	11	57
-	1182352	HR37SS 4 030 08 R020-W	4	☉	3	6	8	0,2	16	57
-	1182353	HR37SS 4 040 08 R020-W	4	☉	4	6	8	0,2	19	57
-	1182354	HR37SS 4 050 10 R020-W	4	☉	5	6	10	0,2	21	57
-	1182355	HR37SS 4 060 13 R030-W	4	☉	6	6	13	0,3	23	57
-	1182356	HR37SS 4 080 19 R050-W	4	☉	8	8	19	0,5	31	63
-	1181510	HR37SS 4 100 22 R050-W	4	☉	10	10	22	0,5	33	72
-	1182357	HR37SS 4 120 26 R100-W	4	☉	12	12	26	1,0	37	83
-	1182358	HR37SS 4 160 32 R100-W	4	☉	16	16	32	1,0	44	92
-	1182359	HR37SS 4 200 38 R100-W	4	☉	20	20	38	1,0	55	104

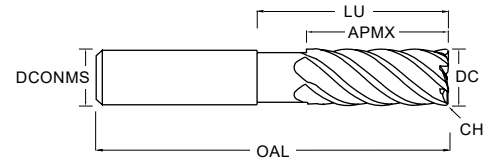
☉ Stock item | Produto de stock | Itens de stock      ○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

## HC40SS Corner chamfer



M



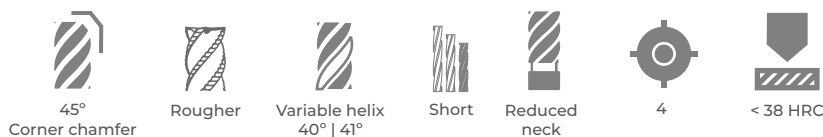
<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		Z9 PHU920	Dimensions   Dimensões   Dimensiones (mm)						
		Reference Referência Referencia	NOF		DC	DCONMS	APMX	CHW	KCH	LU	OAL
HA (Cylindrical)	HB (Weldon)										
1180484	1180485	HF40SS 4 010 03	4	⊗	1	6	2,5	-	-	5	57
1180380	1180487	HF40SS 4 020 05	4	⊗	2	6	5	-	-	10	57
1180381	1180488	HC40SS 4 030 08	4	⊗	3	6	8	0,15	45°	15	57
1180382	1180489	HC40SS 4 040 11	4	⊗	4	6	11	0,15	45°	17	57
1180383	1180490	HC40SS 4 050 13	4	⊗	5	6	13	0,15	45°	19	57
1180384	1180389	HC40SS 4 060 13	4	⊗	6	6	13	0,15	45°	21	57
1180329	1180491	HC40SS 4 080 19	4	⊗	8	8	19	0,15	45°	27	63
1180385	1180492	HC40SS 4 100 22	4	⊗	10	10	22	0,20	45°	32	72
1180386	1180493	HC40SS 4 120 26	4	⊗	12	12	26	0,20	45°	38	83
1180436	1180494	HC40SS 4 140 26	4	⊗	14	14	26	0,25	45°	38	83
1180387	1180390	HC40SS 4 160 32	4	⊗	16	16	32	0,35	45°	44	92
1180555	1180556	HC40SS 4 180 32	4	⊗	18	18	32	0,45	45°	44	92
1180388	1180455	HC40SS 4 200 38	4	⊗	20	20	38	0,60	45°	54	104

⊗ Stock item | Produto de stock | Itens de stock

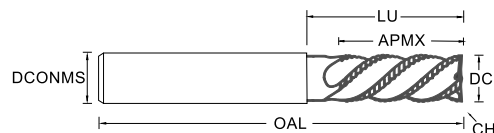
○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

## HRO40SS Rougher



M



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		Z9	Dimensions   Dimensões   Dimensiones (mm)						
		Reference Referência Referencia	NOF		PHU920	DC	DCONMS	APMX	CHW	KCH	LU
HA (Cylindrical)	HB (Weldon)										
1180701	1180702	HRO40SS 4 030 08	4	☉	3	6	8	0,15	45°	24	57
1180445	1180392	HRO40SS 4 040 11	4	☉	4	6	11	0,15	45°	17	57
1180446	1180393	HRO40SS 4 050 13	4	☉	5	6	13	0,15	45°	19	57
1180447	1180394	HRO40SS 4 060 13	4	☉	6	6	13	0,15	45°	21	57
1180448	1180395	HRO40SS 4 080 19	4	☉	8	8	19	0,15	45°	27	63
1180391	1180396	HRO40SS 4 100 22	4	☉	10	10	22	0,20	45°	32	72
1180449	1180397	HRO40SS 4 120 26	4	☉	12	12	26	0,20	45°	38	83
1180450	1180398	HRO40SS 4 140 26	4	☉	14	14	26	0,25	45°	38	83
1180451	1180399	HRO40SS 4 160 32	4	☉	16	16	32	0,35	45°	44	92
1180452	1180400	HRO40SS 4 180 32	4	☉	18	18	32	0,45	45°	44	92
1180453	1180454	HRO40SS 4 200 38	4	☉	20	20	38	0,60	45°	54	104

☉ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

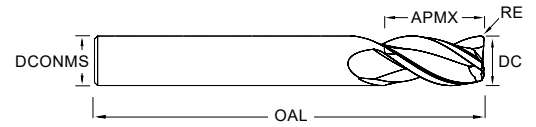
## RECOMMENDED CUTTING CONDITIONS Condições de corte recomendadas | Condiciones de corte recomendables

ISO	Material	f <sub>z</sub> (mm/t)			V <sub>c</sub> (m/min)		
		a <sub>e</sub> = 25%	a <sub>e</sub> = 40%	a <sub>e</sub> = 100%	a <sub>e</sub> = 25%	a <sub>e</sub> = 40%	a <sub>e</sub> = 100%
M	SS - Ferritic / Martensitic	0,006 x DC	0,005 x DC	0,004 x DC	140	130	110
	SS - Austenitic	0,006 x DC	0,005 x DC	0,003 x DC	130	120	110
	SS - Austenitic-ferritic (Duplex)	0,005 x DC	0,004 x DC	0,003 x DC	120	110	100

Note<sup>1</sup>: Feed valid for when the end mill works with its whole ap, for when the end mill is working with lower depths of cut consider increasing the feed up to 25%.

Note<sup>2</sup>: Cutting speeds selected for an economic use of the tool, for higher productivity consider increasing up to 70%.

**NEW** HR35HPAS Corner radius



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		H3	Dimensions   Dimensões   Dimensiones (mm)				
		Reference Referência Referencia	NOF		PMT910	DC	APMX	RE	DCONMS
HA (Cylindrical)	HB (Weldon)								
1182443	-	HR35HPAS 3 020 04 R050	3	○	2	4	0,5	6	57
1182444	-	HR35HPAS 3 030 06 R050	3	⊗	3	6	0,5	6	57
1182445	-	HR35HPAS 3 040 08 R050	3	⊗	4	8	0,5	6	57
1182446	-	HR35HPAS 3 050 10 R050	3	○	5	10	0,5	6	57
1182182	-	HR35HPAS 3 060 13 R050	3	⊗	6	13	0,5	6	57
1181710	-	HR35HPAS 3 080 19 R050	3	⊗	8	19	0,5	8	63
1182183	-	HR35HPAS 3 100 22 R050	3	⊗	10	22	0,5	10	72
1182184	-	HR35HPAS 3 120 26 R050	3	⊗	12	26	0,5	12	83
1182447	-	HR35HPAS 3 140 28 R050	3	○	14	28	0,5	14	83
1182292	-	HR35HPAS 3 160 32 R050	3	⊗	16	32	0,5	16	92
1182448	-	HR35HPAS 3 180 36 R050	3	○	18	36	0,5	18	92
1182449	-	HR35HPAS 3 200 40 R050	3	⊗	20	40	0,5	20	104

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

End mill order code = (1) Geometry Code + (2) Grade Code

**NEW HF45HPAS** Flat top

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

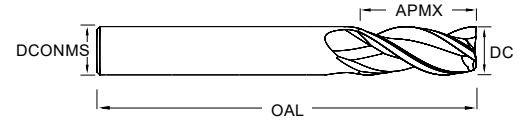
Spare Parts

Technical Data

End Mills



N



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		H3	Dimensions   Dimensões   Dimensiones (mm)			
HA (Cylindrical)	HB (Weldon)	Referencia Referência Referencia	NOF	PMT910	DC	APMX	DCONMS	OAL
1182450	-	HF45HPAS 3 020 04	3	⊗	2	4	6	57
1182451	-	HF45HPAS 3 030 06	3	⊗	3	6	6	57
1182333	-	HF45HPAS 3 040 08	3	⊗	4	8	6	57
1182452	-	HF45HPAS 3 050 08	3	⊗	5	10	6	57
1182334	-	HF45HPAS 3 060 13	3	⊗	6	13	6	57
1182335	-	HF45HPAS 3 080 19	3	⊗	8	19	8	63
1182336	-	HF45HPAS 3 100 22	3	⊗	10	22	10	72
1182337	-	HF45HPAS 3 120 26	3	⊗	12	26	12	83
1182453	-	HF45HPAS 3 140 28	3	○	14	28	14	83
1182338	-	HF45HPAS 3 160 32	3	⊗	16	32	16	92
1182454	-	HF45HPAS 3 180 36	3	○	18	36	18	92
1182455	-	HF45HPAS 3 200 40	3	⊗	20	40	20	104

⊗ Stock item | Produto de stock | Itens de stock

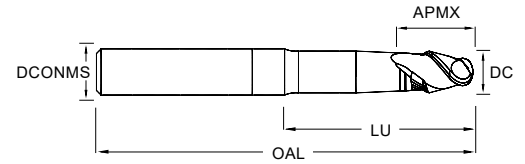
○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

## NEW HB50HPAS Ball nose



N



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		H3	Dimensions   Dimensões   Dimensiones (mm)				
		Reference Referência Referencia	NOF		PMT910	DC	APMX	DCONMS	LU
HA (Cylindrical)	HB (Weldon)								
1182456	-	HB50HPAS 2 020 02	2	⊗	2	2	6	10	57
1182457	-	HB50HPAS 2 030 03	2	○	3	3	6	12	57
1182339	-	HB50HPAS 2 040 04	2	⊗	4	4	6	20	57
1182458	-	HB50HPAS 2 050 05	2	○	5	5	6	25	57
1182340	-	HB50HPAS 2 060 06	2	⊗	6	6	6	25	57
1182341	-	HB50HPAS 2 080 08	2	⊗	8	8	8	30	63
1182342	-	HB50HPAS 2 100 10	2	⊗	10	10	10	35	72
1182343	-	HB50HPAS 2 120 12	2	⊗	12	12	12	40	83
1182459	-	HB50HPAS 2 140 14	2	○	14	14	14	40	83
1182460	-	HB50HPAS 2 160 16	2	○	16	16	16	50	92
1182461	-	HB50HPAS 2 180 18	2	○	18	18	18	50	92
1182462	-	HB50HPAS 2 200 20	2	○	20	20	20	50	104

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

**HC38AS** Corner chamfer

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

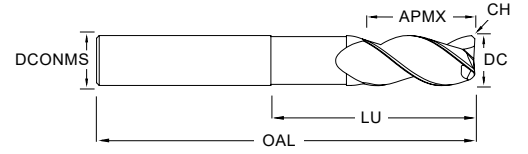
Spare Parts

Technical Data

End Mills



N



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		12	Dimensions   Dimensões   Dimensiones (mm)						
		Reference Referência Referencia	NOF		PH0920	DC	DCONMS	APMX	CHW	KCH	LU
HA (Cylindrical)	HB (Weldon)										
1180401	1180410	HC38AS 3 030 07	3	⊗	3	6	7	0,15	45°	15	57
1180402	1180411	HC38AS 3 040 08	3	⊗	4	6	8	0,15	45°	17	57
1180403	1180412	HC38AS 3 050 10	3	⊗	5	6	10	0,15	45°	19	57
1180404	1180413	HC38AS 3 060 10	3	⊗	6	6	10	0,15	45°	21	57
1180405	1180414	HC38AS 3 080 16	3	⊗	8	8	16	0,15	45°	27	63
1180406	1180415	HC38AS 3 100 19	3	⊗	10	10	19	0,20	45°	32	72
1180407	1180416	HC38AS 3 120 22	3	⊗	12	12	22	0,20	45°	38	83
1180408	1180417	HC38AS 3 160 26	3	⊗	16	16	26	0,35	45°	44	92
1180409	1180418	HC38AS 3 200 32	3	⊗	20	20	32	0,35	45°	54	104

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

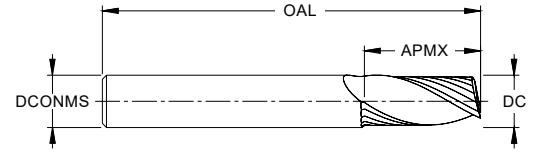
End mill order code = (1) Geometry Code + (2) Grade Code

Note: For HB (Weldon) end mills, the reference ends with "-W"  
Example: "HC38AS 3 030 07-W PH0920"

## HF30AS Single flute



All order codes are cylindrical shank.  
Weldon shank available under request.



(1) Geometry code	(2) Grade code		12 PH0920	Dimensions   Dimensões   Dimensiones (mm)			
	Reference Referência Referencia	NOF		DC	DCONMS	APMX	OAL
1180751	HF30AS 1 020 05	1	⊗	2	6	5	57
1180752	HF30AS 1 030 08	1	⊗	3	6	8	57
1180753	HF30AS 1 040 11	1	⊗	4	6	11	57
1180754	HF30AS 1 050 13	1	⊗	5	6	13	57
1180755	HF30AS 1 060 13	1	⊗	6	6	13	57
1180756	HF30AS 1 080 19	1	⊗	8	8	19	63
1180757	HF30AS 1 100 25	1	⊗	10	10	22	72
1180758	HF30AS 1 120 26	1	⊗	12	12	26	83

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

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

ISO	Material	f <sub>z</sub> (mm/t)			V <sub>c</sub> (m/min)		
		a <sub>e</sub> = 25%	a <sub>e</sub> = 40%	a <sub>e</sub> = 100%	a <sub>e</sub> = 25%	a <sub>e</sub> = 40%	a <sub>e</sub> = 100%
N	Aluminium <6%Si	0,011 x DC	0,009 x DC	0,006 x DC	230	220	190
	Aluminium <12%Si	0,009 x DC	0,008 x DC	0,005 x DC	210	200	180
	Aluminium >12%Si	0,008 x DC	0,007 x DC	0,005 x DC	200	190	170

Note<sup>1</sup>: Recommended feed values for maximum a<sub>p</sub>. For reduced a<sub>p</sub>, consider increasing f<sub>z</sub> up to 25%.

Note<sup>2</sup>: Cutting speeds selected for an economic use of the tool, for higher productivity consider increasing up to 70%.

**HF30HL** Flat top

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills



Square



Helix 30°



Long



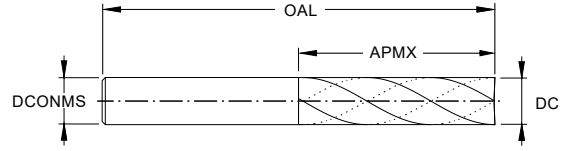
4



< 70 HRC

H

All order codes are cylindrical shank,  
Weldon shank available under request.



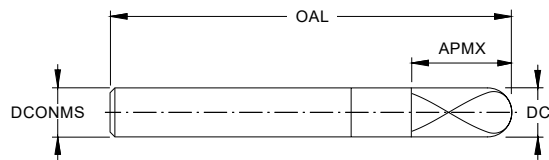
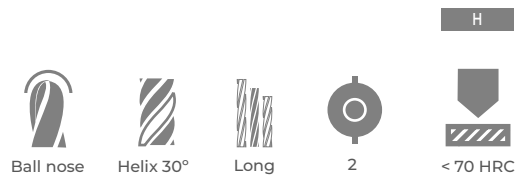
(1) Geometry code	(2) Grade code		X4 PHH603	Dimensions   Dimensões   Dimensiones (mm)			
	Reference Referência Referencia	NOF		DC	DCONSMS	APMX	OAL
1180112	HF30HL 4 040 20	4	⊗	4	6	20	75
1180358	HF30HL 4 050 20	4	⊗	5	6	20	75
1180196	HF30HL 4 060 30	4	⊗	6	6	30	75
1180113	HF30HL 4 080 35	4	⊗	8	8	35	100
1180359	HF30HL 4 100 40	4	⊗	10	10	40	100
1180111	HF30HL 4 120 50	4	⊗	12	12	50	100

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

## HB30HL Ball nose



All order codes are cylindrical shank.  
Weldon shank available under request.

(1) Geometry code	(2) Grade code		X4 PHH603	Dimensions   Dimensões   Dimensiones (mm)			
	Reference Referência Referencia	NOF		DC	DCONMS	APMX	OAL
1180356	HB30HL 2 020 04	2	⊗	2	6	4	75
1180357	HB30HL 2 030 06	2	⊗	3	6	6	75
1180093	HB30HL 2 040 08	2	⊗	4	6	8	75
1180109	HB30HL 2 050 10	2	⊗	5	6	10	75
1180130	HB30HL 2 060 12	2	⊗	6	6	12	75
1180131	HB30HL 2 080 16	2	⊗	8	8	16	75
1180132	HB30HL 2 100 20	2	⊗	10	10	20	100
1180141	HB30HL 2 120 24	2	⊗	12	12	24	100

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

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

ISO	Material	fz (mm/t)		Vc (m/min)	
		ae = 10%	ae = 30%	ae = 10%	ae = 30%
H	Hardened Steels	0,006 × DC	0,005 × DC	120	110

CHOOSE BY

# APPLICATION



Exceptional performance solid carbide end mills designed for specific applications. The high quality is a direct outcome of specialized end mill geometry for each type of application, including optimized flute design, specialized edge honing, and wear-resistant coatings.

Fresas de metal duro integral de alto desempenho projetadas para aplicações específicas. A alta qualidade é resultado direto da geometria especializada da fresa para cada tipo de aplicação, incluindo design de flutes otimizado, afiação de aresta especializada e revestimentos resistentes ao desgaste.

Fresas de carburo integral de alto rendimiento diseñadas para aplicaciones específicas. La alta calidad es el resultado directo de la geometría especializada de la fresa para cada tipo de aplicación, incluido el diseño optimizado de las ranuras, el afilado especializado de los bordes y los recubrimientos resistentes al desgaste.

## HIFEED INTEG > page 340

- > High feed milling  
Fresagem de alto avanço | Fresado de alta avance
- > Special radius roughing end mills  
Fresas especiais de raio para desbaste | Fresas especiales de radio para desbaste

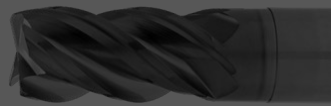
NEW



## DYN INTEG > page 342

- > Trochoidal milling  
Fresagem trocoidal | Fresado trocoidal
- > For steel, stainless steel and superalloys applications  
Para aço, aço inoxidável e aplicações em superligas | Para acero, acero inoxidable y aplicaciones en superaleaciones

NEW



## RAD INTEG > page 344

- > 5-Axis milling  
Fresagem a 5 eixos | Fresado de 5 ejes
- > Conical or tangential end mills  
Fresas cónicas e tangenciais | Fresas cónicas ou tangenciais



## FIN INTEG > page 346

- > Finishing milling  
Dresagem de acabamento | Fresado de acabado
- > Long end mill with corner chamfer  
Fresas longas com chanfro nos cantos | Fresa larga con chaflán en las esquinas



## MIN INTEG > page 348

- > Micro milling  
Microfresagem | Microfresado
- > Ball nose end mills  
Fresas de topo redondo | Fresas de topo redondeado



## CHAMF INTEG > page 351




- > Chamfer Milling  
Fresagem de chanfro | Fresado de chaflán
- > 45° chamfers  
Chanfros a 45° | Chaflanes a 45°





# SELECTION GUIDE FOR SOLID CARBIDE END MILLS

Guia de seleção para fresas de metal duro integral | Guía para fresas en carburo monobloque

	DC	NOF	HELIX ANGLE	GEOMETRY	FINISHING	ROUGHING	MATERIAL	DESCRIPTION	PAGE
 <b>HIFEED INTEG</b> HXR30HFGS NEW	3-12	4-5	-	 Special radius			PMKSH	Special radius Roughing End mills	A-340
 <b>DYN INTEG</b> HR38TSM NEW	6-20	5	38°	 Corner radius			MS	Trochoidal Milling	A-342
 <b>DYN INTEG</b> HC40TSP	6-20	5	40° 41° 42°	 Corner chamfer			PK		A-343
 <b>RAD INTEG</b> HXC30GL	8-16	4	30°	 Radial segment			PMKS	Radial Segment End mills	A-344
 <b>RAD INTEG</b> HXT30GL	6-16	4	30°	 Radial segment			PMKS		A-344
 <b>FIN INTEG</b> HC45FL	3-20	6	43° 45°	 Corner chamfer			PMKH	Finishing End mills	A-346
 <b>MIN INTEG</b> HB30MINS	0,4-3,0	2	30°	 Ball nose			PMKSH	Micro Machining End mills	A-348
 <b>CHAMF INTEG</b> HCHGS	3-20	4	0°	 Conical Top			PMK	Chamferings End mills	A-351

# A HIFEED INTEG High Feed End mills

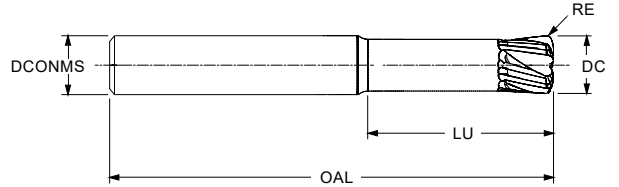
## NEW HXR30HFGS Special radius roughing

MILLING

P M K S H



All order codes are cylindrical shank,  
Weldon shank available under request.



(1) Geometry code	(2) Grade code		2A PHU910	Dimensions   Dimensões   Dimensiones (mm)							
	Reference Referência Referencia	NOF		DC	DCONMS	APMX	RE	PR*	LU	OAL	
1181449	HXR30HFGS 4 030 002 XR020	4	⊗	3	6	0,20	0,20	0,40	9	63	
1181450	HXR30HFGS 4 040 003 XR030	4	⊗	4	6	0,30	0,30	0,50	12	63	
1181451	HXR30HFGS 4 050 003 XR040	4	⊗	5	6	0,30	0,40	0,60	15	63	
1181452	HXR30HFGS 4 060 004 XR050	4	⊗	6	6	0,40	0,50	0,80	24	63	
1181453	HXR30HFGS 5 080 004 XR060	5	⊗	8	8	0,40	0,60	0,90	32	75	
1181430	HXR30HFGS 5 100 005 XR080	5	⊗	10	10	0,50	0,80	1,20	32	75	
1181454	HXR30HFGS 5 120 005 XR100	5	⊗	12	12	0,50	1,00	1,40	36	83	

⊗ Stock item | Produto de stock | Itens de stock    ⊙ Available under request | Disponível sobre consulta | Disponible bajo consulta  
\*Programming radius

End mill order code = (1) Geometry Code + (2) Grade Code

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

ISO	Workpiece Material	f <sub>z</sub> (mm/t)			v <sub>c</sub> (m/min)			Plunging	
		a <sub>e</sub> = 25%	a <sub>e</sub> = 50%	a <sub>e</sub> = 100%	a <sub>e</sub> = 25%	a <sub>e</sub> = 50%	a <sub>e</sub> = 100%	f <sub>z</sub> (mm/t)	v <sub>c</sub> (m/min)
P	Unalloyed Steel	0,044 x DC	0,038 x DC	0,023 x DC	300	280	270	0,004 x DC	160
	Low-Alloyed Steel	0,044 x DC	0,038 x DC	0,023 x DC	280	250	230	0,004 x DC	140
	High-Alloyed Steel	0,040 x DC	0,036 x DC	0,020 x DC	200	180	150	0,004 x DC	120
M	Stainless Steel (Ferritic / Martensitic)	0,035 x DC	0,035 x DC	0,018 x DC	180	160	150	0,003 x DC	110
	Stainless Steel (Austenitic)	0,035 x DC	0,033 x DC	0,018 x DC	120	110	100	0,003 x DC	100
	Stainless Steel (Austenitic/Ferritic/Duplex)	0,033 x DC	0,031 x DC	0,018 x DC	80	70	60	0,003 x DC	60
K	Malleable Cast Iron	0,034 x DC	0,032 x DC	0,021 x DC	170	150	130	0,003 x DC	110
	Grey Cast Iron	0,035 x DC	0,035 x DC	0,021 x DC	220	200	180	0,003 x DC	120
	Nodular Cast Iron	0,034 x DC	0,032 x DC	0,021 x DC	160	140	120	0,003 x DC	110
S	Heat Resistant Super Alloys	0,022 x DC	0,017 x DC	0,014 x DC	40	35	30	0,002 x DC	30
H	Hardened Steels	0,026 x DC	0,021 x DC	0,014 x DC	90	85	70	0,002 x DC	70

Note: Plunge Depth = 2 x DC  
Ae Stepover = 0,2 x DC

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

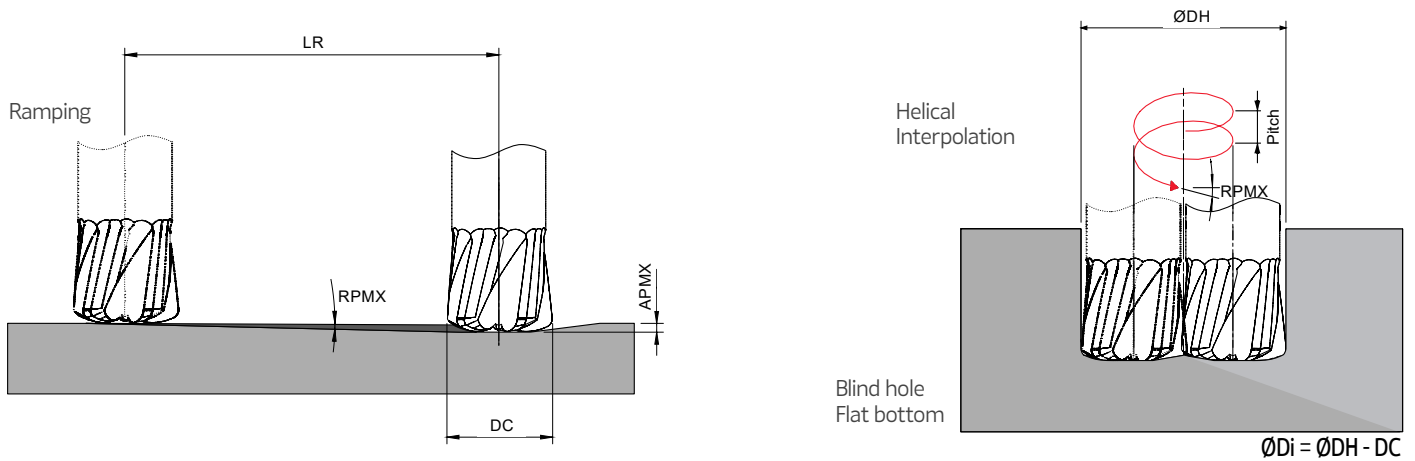
Spare Parts

Technical Data

End Mills

## RAMPING AND HELICAL INTERPOLATION

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

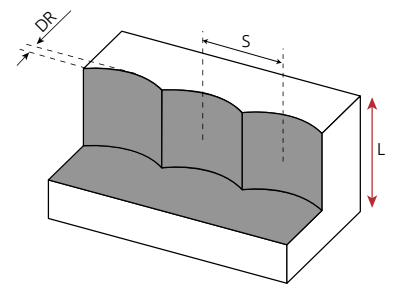


DC	Ramping			Helical Interpolation			Max Angle (°)
	RPMX	APMX	Min LR	ØDHmin	ØDHmax	Max Pitch/Rev.	
3	1,5	0,2	7,6	4,0	-	0,07	1,5
4	1,5	0,3	11,5	5,3	-	0,10	1,5
				-	8,0	0,30	1,3
5	1,5	0,3	11,5	6,7	-	0,10	1,5
				-	10,0	0,30	1,0
6	1,5	0,4	15,3	8,0	-	0,15	1,5
				-	12,0	0,40	1,2
8	1,5	0,4	15,3	10,7	-	0,20	1,5
				-	16,0	0,40	0,9
10	1,5	0,5	19,1	13,3	-	0,25	1,5
				-	20,0	0,50	0,9
12	1,5	0,5	19,1	16,0	-	0,30	1,5
				-	24,0	0,50	0,7

Note: During helical interpolation do not exceed APMX.

## PLUNGING Mergulho | Plunge

Cutting Conditions	
Vc (m/min)	fz (mm/t)
70%	35%



S max and DR corresponding cutting diameter DC (mm)							
DR (mm)	DC (mm)						
	3	4	5	6	8	10	12
0,5	1,1	1,3	1,5	1,7	1,9	2,2	2,4
1,0	1,4	1,7	2,0	2,2	2,6	3,0	3,3
1,5	-	-	2,3	2,6	3,1	3,6	4,0
2,0	-	-	-	-	3,5	4,0	4,5
3,0	-	-	-	-	-	4,6	5,2

**NEW HR38TSM** Corner radius

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

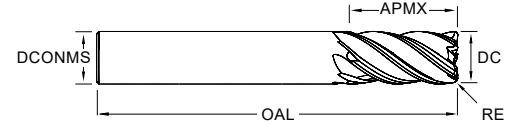
Specialty

Spare Parts

Technical Data

End Mills

M S

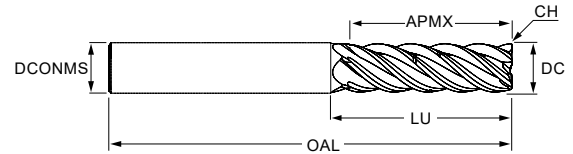


<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		4F	Dimensions   Dimensões   Dimensiones (mm)				
		Reference Referência Referencia	NOF		PHF910	DC	DCONMS	APMX	RE
HA (Cylindrical)	HB (Weldon)								
<b>HR38TSM S</b>									
1182476	1182501	HR38TSM S 5 060 12 R100	5	○	6	6	12	1,00	57
1182477	1182502	HR38TSM S 5 060 12 R050	5	⊗	6	6	12	0,50	57
1182478	1182503	HR38TSM S 5 080 16 R100	5	○	8	8	16	1,00	63
1182479	1182504	HR38TSM S 5 080 16 R050	5	⊗	8	8	16	0,50	63
1182480	1182505	HR38TSM S 5 100 20 R100	5	⊗	10	10	20	1,00	72
1182481	1182506	HR38TSM S 5 100 20 R050	5	○	10	10	20	0,50	72
1182332	1182507	HR38TSM S 5 120 24 R100	5	⊗	12	12	24	1,00	83
1182482	1182508	HR38TSM S 5 120 24 R050	5	○	12	12	24	0,50	83
1182331	1182509	HR38TSM S 5 160 32 R100	5	⊗	16	16	32	1,00	92
1182483	1182510	HR38TSM S 5 160 32 R200	5	○	16	16	32	2,00	92
1182484	1182511	HR38TSM S 5 180 36 R100	5	○	18	18	36	1,00	92
1182485	1182512	HR38TSM S 5 180 36 R200	5	○	18	18	36	2,00	92
1182486	1182513	HR38TSM S 5 200 40 R100	5	○	20	20	40	1,00	104
1182487	1182514	HR38TSM S 5 200 40 R200	5	○	20	20	40	2,00	104
<b>HR38TSM L</b>									
1182488	1182515	HR38TSM L 5 060 18 R100	5	○	6	6	18	1,00	57
1182489	1182516	HR38TSM L 5 060 18 R050	5	⊗	6	6	18	0,50	57
1182490	1182517	HR38TSM L 5 080 24 R100	5	○	8	8	24	1,00	63
1182491	1182518	HR38TSM L 5 080 24 R050	5	⊗	8	8	24	0,50	63
1182492	1182519	HR38TSM L 5 100 30 R100	5	⊗	10	10	30	1,00	72
1182493	1182520	HR38TSM L 5 100 30 R050	5	⊗	10	10	30	0,50	72
1182494	1182521	HR38TSM L 5 120 36 R100	5	⊗	12	12	36	1,00	83
1182495	1182522	HR38TSM L 5 120 36 R050	5	⊗	12	12	36	0,50	83
1182390	1182523	HR38TSM L 5 160 48 R100	5	⊗	16	16	48	1,00	100
1182496	1182524	HR38TSM L 5 160 48 R200	5	○	16	16	48	2,00	100
1182497	1182525	HR38TSM L 5 180 54 R100	5	○	18	18	54	1,00	104
1182498	1182526	HR38TSM L 5 180 54 R200	5	○	18	18	54	2,00	104
1182499	1182527	HR38TSM L 5 200 60 R100	5	○	20	20	60	1,00	110
1182500	1182528	HR38TSM L 5 200 60 R200	5	○	20	20	60	2,00	110

⊗ Stock item | Produto de stock | Itens de stock      ○ Available under request | Disponível sobre consulta | Disponible bajo consulta  
 Note: For HB (Weldon) end mills, the reference ends with "-W"  
 Example: "HR38TSM S 080 16 R100-W"

End mill order code = (1) Geometry Code + (2) Grade Code

## HC40TSP Corner chamfer



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		T1	Dimensions   Dimensões   Dimensiones (mm)						
		Reference Referência Referencia	NOF		PHP920	DC	DCONMS	APMX	CHW	KCH	LU
HA (Cylindrical)	HB (Weldon)										
HC40TSP											
1180118	1180456	HC40TSPL 5 060 20	5	⊗	6	6	20	0,15	45°	26	63
1180119	1180457	HC40TSPL 5 080 25	5	⊗	8	8	25	0,15	45°	32	70
1180225	1180458	HC40TSPL 5 100 32	5	⊗	10	10	32	0,20	45°	38	79
1180690	1180689	HC40TSPL 5 120 41	5	⊗	12	12	41	0,20	45°	48	100
1180226	1180460	HC40TSPL 5 160 50	5	⊗	16	16	50	0,25	45°	60	110
1180123	1180461	HC40TSPL 5 180 60	5	⊗	18	18	60	0,30	45°	66	130
1180462	1180463	HC40TSPL 5 200 64	5	⊗	20	20	64	0,35	45°	70	130
HC40TSPXL											
-	1180514	HC40TSPXL 5 060 30	5	⊕	6	6	30	0,15	45°	36	75
1180508	1180515	HC40TSPXL 5 080 40	5	⊕	8	8	40	0,15	45°	46	81
-	1180516	HC40TSPXL 5 100 50	5	⊕	10	10	50	0,20	45°	59	100
-	1180517	HC40TSPXL 5 120 60	5	⊕	12	12	60	0,20	45°	67	120
-	1180520	HC40TSPXL 5 200 100	5	⊕	20	20	100	0,35	45°	104	162

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

End mill 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

Note: For HB (weldon) end mills, the reference ends with "W"

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

ISO	Workpiece Material	fz (mm/t)			Vc (m/min)		
		ae = 5,0%	ae = 15%	ae = 30%	ae = 5,0%	ae = 15%	ae = 30%
P	Unalloyed Steel	0,009 x DC	0,009 x DC	0,008 x DC	180	170	170
	Low-Alloyed Steel	0,008 x DC	0,007 x DC	0,007 x DC	160	160	150
	High-Alloyed Steel	0,007 x DC	0,007 x DC	0,006 x DC	140	140	140
M	SS - Ferritic / Martensitic	0,010xDC	0,008xDC	0,006xDC	160	150	120
	SS - Austenitic	0,009xDC	0,007xDC	0,005xDC	150	140	110
	SS - Austenitic-ferritic (Duplex)	0,008xDC	0,005xDC	0,004xDC	130	120	100
K	Malleable Cast Iron	0,009 x DC	0,009 x DC	0,008 x DC	210	210	200
	Grey Cast Iron	0,009 x DC	0,009 x DC	0,008 x DC	210	200	200
	Nodular Cast Iron	0,009 x DC	0,008 x DC	0,007 x DC	190	190	180
S	Heat Resistant Super Alloys	0,005xDC	0,004xDC	0,003xDC	80	60	40

Note<sup>1</sup>: Feed valid for when the end mill works with its whole ap, for when the end mill is working with lower depths of cut consider increasing the feed up to 25%.

Note<sup>2</sup>: Cutting speeds selected for an economic use of the tool, for higher productivity consider increasing up to 70%.

# RAD INTEG Conical and Tangential Segment End mills

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

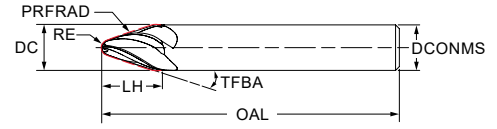
Technical Data

End Mills

## HXC30GL Conical



P M K S



All order codes are cylindrical shank.  
Weldon shank available under request.

(1) Geometry code	(2) Grade code		T1		Y3		Dimensions   Dimensões   Dimensiones (mm)					
	Reference Referência Referencia	NOF	PHP920	PHH920	DC	DCONMS	TFBA	PRFRAD	RE	LH	OAL	
1180046	HXC30GL 4 080 10 18RM030	4	☉	☉	8	8	18	300	1	10	75	
1180047	HXC30GL 4 120 14 18RM045	4	☉	☉	12	12	18	450	2	14	83	
1180048	HXC30GL 4 160 18 18RM120	4	☉	☉	16	16	18	1200	3	18	95	
1180049	HXC30GL 4 160 12 28RM080	4	☉	☉	16	16	28	800	3	12	95	
1180050	HXC30GL 4 160 16 18RM120	4	☉	☉	16	16	18	1200	4	16	110	
1180051	HXC30GL 4 160 11 28RM080	4	☉	☉	16	16	28	800	4	11	110	

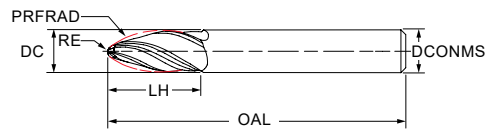
☉ Stock item | Produto de stock | Itens de stock      ○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

## HXT30GL Tangential



P M K S



All order codes are cylindrical shank.  
Weldon shank available under request.

(1) Geometry code	(2) Grade code		T1		Y3		Dimensions   Dimensões   Dimensiones (mm)					
	Reference Referência Referencia	NOF	PHP920	PHH920	DC	DCONMS	PRFRAD	RE	LH	OAL		
1180045	HXT30GL 4 060 22 RM095	4	☉	☉	6	6	95	1	22	63		
1180037	HXT30GL 4 080 24 RM095	4	☉	☉	8	8	95	1	24	70		
1180038	HXT30GL 4 100 28 RM085	4	☉	☉	10	10	85	2	28	72		
1180039	HXT30GL 4 120 28 RM090	4	☉	☉	12	12	90	2	28	83		
1180691	HXT30GL 4 160 30 RM080	4	☉	☉	16	16	80	3	30	110		

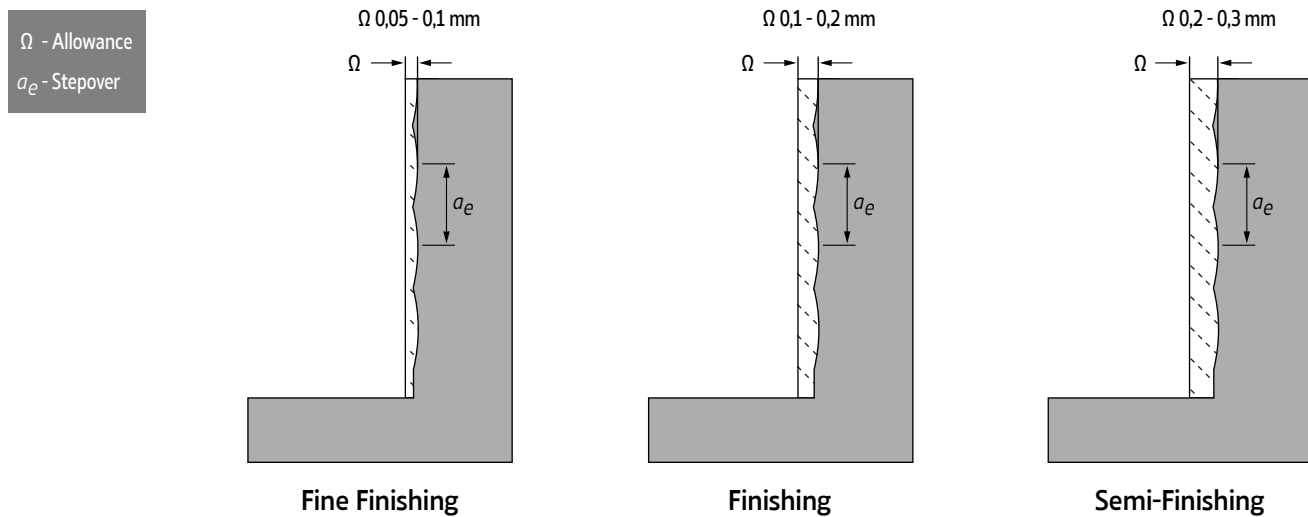
☉ Stock item | Produto de stock | Itens de stock      ○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

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

ISO	Material	Grades	
		PHP920	PHH920
P	Unalloyed Steel	✓	
	Low-Alloyed Steel	✓	
	High-Alloyed Steel	✓	
M	Stainless Steel (Ferritic / Martensitic)		✓
	Stainless Steel (Austenitic)		✓
	Stainless Steel (Austenitic/Ferritic/Duplex)		✓
K	Malleable Cast Iron	✓	
	Grey Cast Iron	✓	
	Nodular Cast Iron	✓	
S	Heat Resistant Super Alloys		✓

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



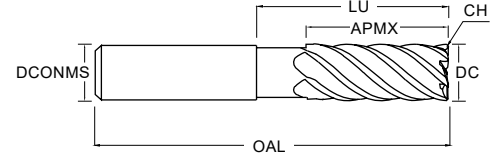
ISO	Workpiece Material	Vc (m/min)	fz (mm/t)				
			HXC30GL - Conical		HXT30GL - Tangential		
			$\Omega$ 0,05 - 0,1 mm	$\Omega$ 0,1 - 0,2 mm	$\Omega$ 0,05 - 0,1 mm	$\Omega$ 0,1 - 0,2 mm	$\Omega$ 0,2 - 0,3 mm
P	Unalloyed Steel	180	0,007 x DC	0,006 x DC	0,007 x DC	0,006 x DC	0,005 x DC
	Low-Alloyed Steel	160	0,006 x DC	0,005 x DC	0,006 x DC	0,005 x DC	0,004 x DC
	High-Alloyed Steel	150	0,005 x DC	0,004 x DC	0,005 x DC	0,004 x DC	0,004 x DC
M	Stainless Steel (Ferritic / Martensitic)	120	0,005 x DC	0,004 x DC	0,005 x DC	0,004 x DC	0,004 x DC
	Stainless Steel (Austenitic)	120	0,004 x DC	0,003 x DC	0,004 x DC	0,003 x DC	0,003 x DC
	Stainless Steel (Austenitic/Ferritic/Duplex)	110	0,003 x DC	0,003 x DC	0,003 x DC	0,003 x DC	0,002 x DC
K	Malleable Cast Iron	220	0,007 x DC	0,006 x DC	0,007 x DC	0,006 x DC	0,005 x DC
	Grey Cast Iron	210	0,007 x DC	0,006 x DC	0,007 x DC	0,006 x DC	0,005 x DC
	Nodular Cast Iron	190	0,006 x DC	0,005 x DC	0,006 x DC	0,005 x DC	0,005 x DC
S	Heat Resistant Super Alloys	60	0,003 x DC	0,003 x DC	0,003 x DC	0,003 x DC	0,002 x DC

## HC45FL Corner chamfer

MILLING



P M K H



All order codes are cylindrical shank.  
Weldon shank available under request.

<sup>(1)</sup> Geometry code	<sup>(2)</sup> Grade code		T1		X7		Dimensions   Dimensões   Dimensiones (mm)					
	Reference Referência Referencia	NOF	PHP920	PHP603	DC	DCONMS	APMX	CHW	KCH	LU	OAL	
			○	⊗	mm	mm	mm	mm	mm	mm	mm	mm
1180845	HC45FL 6 030 08	6	○	⊗	3	6	8	0,15	45°	15	57	
1180846	HC45FL 6 040 11	6	○	⊗	4	6	11	0,15	45°	17	57	
1180847	HC45FL 6 050 13	6	○	⊗	5	6	13	0,15	45°	19	57	
1180342	HC45FL 6 060 13	6	⊗	⊗	6	6	13	0,15	45°	21	57	
1180062	HC45FL 6 080 19	6	⊗	⊗	8	8	19	0,15	45°	28	63	
1180344	HC45FL 6 100 22	6	⊗	⊗	10	10	22	0,20	45°	30	72	
1180343	HC45FL 6 120 26	6	⊗	⊗	12	12	26	0,20	45°	34	83	
1180848	HC45FL 6 160 32	6	○	○	16	16	32	0,35	45°	44	92	
1180849	HC45FL 6 200 38	6	○	○	20	20	38	0,60	45°	54	104	

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

End mill order code = (1) Geometry Code + (2) Grade Code

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

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

ISO	Material	Grades	
		PHP603	PHP920
P	Unalloyed Steel	⊕	⊗
	Low-Alloyed Steel	⊗	⊕
	High-Alloyed Steel	⊗	⊕
M	Stainless Steel (Ferritic / Martensitic)	⊕	⊗
	Stainless Steel (Austenitic)	⊕	⊗
	Stainless Steel (Austenitic/Ferritic/Duplex)	⊕	⊗
K	Malleable Cast Iron	⊕	⊗
	Grey Cast Iron	⊗	⊕
	Nodular Cast Iron	⊗	⊕
H	Hardened Steels	⊗	-

⊗ First choice | 1ª Escolha | 1ª Opción

⊕ Suitable | Adequado | Adecuado

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

ISO	Material	Vc (m/min)		fz (mm/t)
		PHP603	PHP920	
P	Unalloyed Steel	200	190	0,009 x DC
	Low-Alloyed Steel	170	160	0,007 x DC
	High-Alloyed Steel	140	130	0,005 x DC
M	Stainless Steel (Ferritic / Martensitic)	130	120	0,006 x DC
	Stainless Steel (Austenitic)	120	110	0,005 x DC
	Stainless Steel (Austenitic/Ferritic/Duplex)	90	90	0,004 x DC
K	Malleable Cast Iron	240	230	0,009 x DC
	Grey Cast Iron	240	230	0,009 x DC
	Nodular Cast Iron	200	190	0,008 x DC
H	Hardened Steels	80	-	0,004 x DC

Note<sup>1</sup>: Feed valid for when the end mill works with its whole ap, for when the end mill is working with lower depths of cut consider increasing the feed up to 25%.

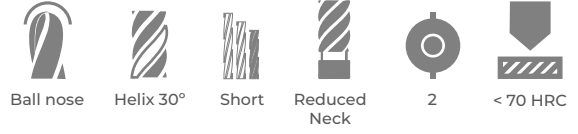
Note<sup>2</sup>: Cutting speeds selected for an economic use of the tool, for higher productivity consider increasing up to 70%.

## HB30MINS Short neck

MILLING

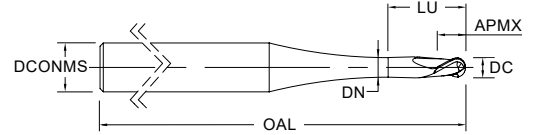


P M K S H



Face milling

All order codes are cylindrical shank.  
Weldon shank available under request.



High feed milling

(1) Geometry code	(2) Grade code		X4 PHH603	Dimensions   Dimensões   Dimensiones (mm)					
	Reference Referência Referencia	NOF		DC	DCONMS	DN	APMX	LU	OAL
1180769	HB30MINS 2 004 01 010	2	☉	0,4	4	0,37	0,4	1,0	50
1180297	HB30MINS 2 005 01 015	2	☉	0,5	4	0,45	0,6	1,5	50
1180288	HB30MINS 2 006 01 020	2	☉	0,6	4	0,58	0,6	2,0	50
1180289	HB30MINS 2 008 01 020	2	☉	0,8	4	0,78	0,8	2,0	50
1180298	HB30MINS 2 010 02 025	2	☉	1,0	4	0,95	1,3	2,5	50
1180290	HB30MINS 2 010 01 030	2	☉	1,0	4	0,95	1,0	3,0	50
1180291	HB30MINS 2 012 02 030	2	☉	1,2	4	1,15	1,2	3,0	50
1180292	HB30MINS 2 016 02 040	2	☉	1,6	4	1,55	1,6	4,0	50
1180293	HB30MINS 2 020 02 040	2	☉	2,0	4	1,94	2,0	4,0	50
1180307	HB30MINS 2 020 03 050	2	☉	2,0	4	1,95	2,5	5,0	50
1180299	HB30MINS 2 025 03 060	2	☉	2,5	6	2,45	3,0	6,0	60
1180309	HB30MINS 2 030 04 075	2	☉	3,0	6	2,95	4,0	7,5	60

Shoulder milling

Profile milling

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

End mill order code = (1) Geometry Code + (2) Grade Code

Specialty

Spare Parts

Technical Data

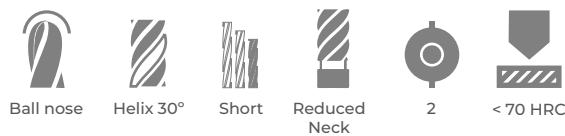
End Mills

# MIN INTEG Micro Machining End mills

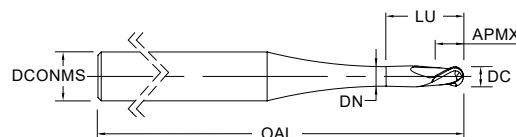
## HB30MINS Medium neck



P M K S H



All order codes are cylindrical shank.  
Weldon shank available under request.



(1) Geometry code	(2) Grade code		X4 PHH603	Dimensions   Dimensões   Dimensiones (mm)					
	Reference Referência Referencia	NOF		DC	DCONMS	DN	APMX	LU	OAL
1180305	HB30MINS 2 005 01 025	2	⊗	0,5	4	0,45	0,4	2,5	50
1180308	HB30MINS 2 010 02 050	2	⊗	1,0	4	0,95	1,3	5,0	50
1180336	HB30MINS 2 016 02 080	2	⊗	1,6	4	1,55	1,6	8,0	50
1180310	HB30MINS 2 020 03 100	2	⊗	2,0	4	1,95	2,5	10,0	50
1180311	HB30MINS 2 025 03 125	2	⊗	2,5	6	2,45	3,0	12,5	60
1180301	HB30MINS 2 030 04 150	2	⊗	3,0	6	2,95	4,0	15,0	60

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

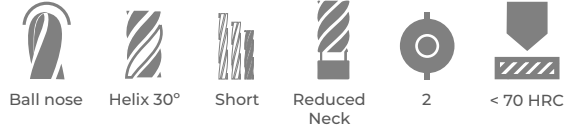
End mill order code = (1) Geometry Code + (2) Grade Code

## HB30MINS Long neck

MILLING

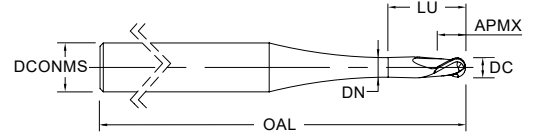


P M K S H



Face milling

All order codes are cylindrical shank.  
Weldon shank available under request.



High feed milling

(1) Geometry code	(2) Grade code		X4 PHH603	Dimensions   Dimensões   Dimensiones (mm)					
	Reference Referência Referencia	NOF		DC	DCONMS	DN	APMX	LU	OAL
1180306	HB30MINS 2 005 01 040	2	⊗	0,5	4	0,45	0,6	4,0	50
1180300	HB30MINS 2 010 02 080	2	⊗	1,0	4	0,95	1,3	8,0	50
1180337	HB30MINS 2 016 02 128	2	⊗	1,6	4	1,55	1,6	12,8	50
1180302	HB30MINS 2 020 03 160	2	⊗	2,0	4	1,95	2,5	16,0	50
1180312	HB30MINS 2 025 03 200	2	⊗	2,5	6	2,45	3,0	20,0	60
1180313	HB30MINS 2 030 04 240	2	⊗	3,0	6	2,95	4,0	24,0	60

Shoulder milling

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

End mill order code = (1) Geometry Code + (2) Grade Code

Profile milling

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

Specialty

ISO	Material	Copying					
		fz (mm/t)		Vc (m/min)			
		$\alpha < 15^\circ$	$\alpha > 15^\circ$	AP = 0,05 DC $\alpha < 15^\circ$	AP = 0,25 DC $\alpha < 15^\circ$	AP = 0,05 DC $\alpha > 15^\circ$	AP = 0,25 DC $\alpha > 15^\circ$
P	Unalloyed Steel	0,010 x DC	0,003 x DC	700	340	460	220
	Low-Alloyed Steel	0,009 x DC	0,003 x DC	650	320	430	210
	High-Alloyed Steel	0,008 x DC	0,003 x DC	590	290	390	190
M	Stainless Steel (Ferritic / Martensitic)	0,009 x DC	0,003 x DC	600	300	400	200
	Stainless Steel (Austenitic)	0,008 x DC	0,003 x DC	560	280	370	190
	Stainless Steel (Austenitic/Ferritic/Duplex)	0,007 x DC	0,002 x DC	540	270	360	180
K	Malleable Cast Iron	0,008 x DC	0,003 x DC	650	320	430	210
	Grey Cast Iron	0,008 x DC	0,003 x DC	640	310	420	200
	Nodular Cast Iron	0,007 x DC	0,002 x DC	600	300	400	190
S	Heat Resistant Super Alloys	0,007 x DC	0,002 x DC	230	110	150	80
H	Hardened Steels	0,008 x DC	0,003 x DC	460	230	310	150

Spare Parts

Technical Data

Note: Since some of the end mills have low DC the above Vc cannot be achieved by any conventional machining center. The end mills still work at much lower Vc.

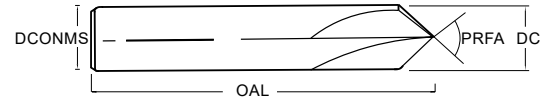
End Mills

# CHAMF INTEG Chamfering End mills

## HCHGS



P M K



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		Z9	Dimensions   Dimensões   Dimensiones (mm)					
		HA (Cylindrical)	HB (Weldon)		Reference Referência Referencia	NOF	PHU920	DC	DCONMS	PRFA
1180366	-			HCHGS 4 030 02 90	4	⊗	3	3	90°	38
1180367	-			HCHGS 4 040 02 90	4	⊗	4	4	90°	50
1180368	1180496			HCHGS 4 060 03 90	4	⊗	6	6	90°	57
1180369	1180497			HCHGS 4 080 04 90	4	⊗	8	8	90°	63
1180370	1180498			HCHGS 4 100 05 90	4	⊗	10	10	90°	72
1180371	1180499			HCHGS 4 120 06 90	4	⊗	12	12	90°	83
1180372	1180500			HCHGS 4 160 08 90	4	⊗	16	16	90°	92
1180373	1180553			HCHGS 4 200 10 90	4	⊗	20	20	90°	104

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

End mill order code = (1) Geometry Code + (2) Grade Code

Note: For HB (weldon) end mills, the reference ends with "-W"

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

ISO	Material	Chamfering	
		fz (mm/t)	Vc (m/min)
P	Unalloyed Steel	0,008 x DC	180
	Low-Alloyed Steel	0,007 x DC	160
	High-Alloyed Steel	0,006 x DC	140
M	Stainless Steel (Ferritic / Martensitic)	0,007 x DC	150
	Stainless Steel (Austenitic)	0,006 x DC	130
	Stainless Steel (Austenitic/Ferritic/Duplex)	0,004 x DC	110
K	Malleable Cast Iron	0,008 x DC	210
	Grey Cast Iron	0,008 x DC	210
	Nodular Cast Iron	0,008 x DC	190

GENERAL  
**INTEG**



Solid carbide end mills for a general industrial applications, from roughing to finishing operations.

Fresas de metal duro integral para aplicações industriais gerais, desde operações de desbaste até acabamento.

Fresas de carburo integral para aplicaciones industriales generales, desde operaciones de desbaste hasta acabado.

## HF30G > page 356

- > Flat top end mills

Fresas de topo raso | Fresas de topo plano

- > 2 or 4 flutes

2 ou 4 flutes | 2 o 4 ranuras

- > Short and extra long version

Disponível em versão curta e extra longa | Disponible en versión corta y extra larga



## HR30G > page 359

- > Corner radius end mills

Fresas de raio de canto | Fresas de radio de esquina

- > 4 flutes

4 flutes | 4 ranuras

- > Short version

Disponível em versão curta | Disponible en versión corta



## HB30G > page 360

- > Ball nose end mills

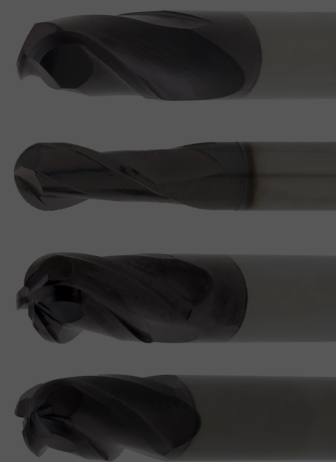
Fresas de topo redondo | Fresas de topo redondeado

- > 2 or 4 flutes

2 ou 4 flutes | 2 o 4 ranuras

- > Short and long version

Disponível em versão curta e longa | Disponible en versión corta y larga



## HRO45G > page 362

- > Rougher end mills

Fresas para desbaste | Fresas para desbaste

- > From 3 to 6 flutes

De 3 a 6 flutes | De 3 a 6 ranuras

- > Short version

Disponível em versão curta | Disponible en versión corta





# SELECTION GUIDE FOR SOLID CARBIDE END MILLS

Guia de seleção para fresas de metal duro integral | Guía para fresas en carburo monobloque

	DC		HELIX ANGLE	GEOMETRY	FINISHING	ROUGHING	MATERIAL	DESCRIPTION	PAGE
 INTEG HF30GS 2	2-20	2	30°	 Square			PMK	Flat Top End mills	A-356
 INTEG HF30GS 4	2-20	4	30°	 Square			PMK		A-357
 INTEG HF30GXL 4	2-12	4	30°	 Square			PMK		A-358
 INTEG HR30GS 4	3-20	4	30°	 Corner radius			PMK	Round Corner End mills	A-359
 INTEG HB30GS 2	2-12	2	30°	 Ball nose			PMK	Ball Nose End mills	A-360
 INTEG HB30GL 2	4-12	2	30°	 Ball nose			PMK		A-360
 INTEG HB30GS 4	2-12	4	30°	 Ball nose			PMK		A-361
 INTEG HB30GL 4	2-20	4	30°	 Ball nose			PMK		A-361
 INTEG HRO45GS	3-20	4   6	45°	 Corner chamfer			PMK		Rougher End mills

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

**HF30GS 2** Flat top

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills



P M K



Square



Helix 30°



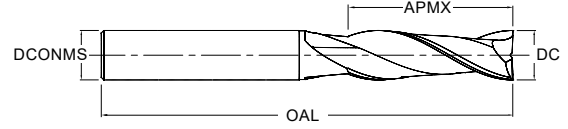
Short



2



< 45 HRC



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		T1	Dimensions   Dimensões   Dimensiones (mm)			
		Reference Referência Referencia	NOF		PHP920	DC	DCONMS	APMX
HA (Cylindrical)	HB (Weldon)							
1180587	-	HF30GS 2 020 06	2	⊗	2	4	6	38
1180588	-	HF30GS 2 030 12	2	⊗	3	4	12	38
1180589	-	HF30GS 2 040 14	2	⊗	4	4	14	50
1180590	-	HF30GS 2 050 16	2	⊗	5	6	16	50
1180591	-	HF30GS 2 060 19	2	⊗	6	6	19	50
1180592	1180532	HF30GS 2 080 20	2	⊗	8	8	20	63
1180593	1180533	HF30GS 2 100 22	2	⊗	10	10	22	75
1180594	1180534	HF30GS 2 120 25	2	⊗	12	12	25	75
1180595	1180535	HF30GS 2 140 26	2	⊗	14	14	26	83
1180596	1180536	HF30GS 2 160 32	2	⊗	16	16	32	89
1180597	1180537	HF30GS 2 180 32	2	⊗	18	18	32	92
1180598	1180538	HF30GS 2 200 38	2	⊗	20	20	38	104

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

End mill order code = (1) Geometry Code + (2) Grade Code

## HF30GS 4 Flat top



P M K



<sup>(1)</sup> Order code		<sup>(2)</sup> Grade code		T1	Dimensions   Dimensões   Dimensiones (mm)			
		Reference Referência Referencia	NOF		DC	DCONMS	APMX	OAL
HA (Cylindrical)	HB (Weldon)			PHP920				
1180262	-	HF30GS 4 020 06	4	⊗	2	4	6	38
1180219	-	HF30GS 4 030 12	4	⊗	3	4	12	38
1180215	-	HF30GS 4 040 14	4	⊗	4	4	14	50
1180195	-	HF30GS 4 050 16	4	⊗	5	6	16	50
1180263	-	HF30GS 4 060 19	4	⊗	6	6	19	50
1180223	1180605	HF30GS 4 070 19	4	⊗	7	8	19	63
1180202	1180544	HF30GS 4 080 20	4	⊗	8	8	20	63
1180224	1180606	HF30GS 4 090 22	4	⊗	9	10	22	75
1180216	1180545	HF30GS 4 100 22	4	⊗	10	10	22	75
1180264	1180546	HF30GS 4 120 25	4	⊗	12	12	25	75
1180220	1180547	HF30GS 4 140 26	4	⊗	14	14	26	83
1180129	1180548	HF30GS 4 160 32	4	⊗	16	16	32	89
1180221	1180549	HF30GS 4 180 32	4	⊗	18	18	32	92
1180222	1180550	HF30GS 4 200 38	4	⊗	20	20	38	104

⊗ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

**HF30GXL 4** Flat top

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills



P M K



Square



Helix 30°



Extra long



4



< 45 HRC

All order codes are cylindrical shank.  
Weldon shank available under request.



(1) Geometry code	(2) Grade code		T1		G4		Dimensions   Dimensões   Dimensiones (mm)			
	Reference Referência Referencia	NOF	PHP920	PH7920	DC	DCONMS	APMX	OAL		
1180708	HF30GXL 4 020 09	4	○	⊕	2	4	9	100		
1180265	HF30GXL 4 030 12	4	○		3	6	12	100		
1180266	HF30GXL 4 040 16	4	○	⊕	4	6	16	100		
1180267	HF30GXL 4 050 20	4	⊕		5	6	20	100		
1180268	HF30GXL 4 060 20	4	⊕		6	6	20	100		
1180269	HF30GXL 4 080 20	4	⊕		8	8	20	120		
1180270	HF30GXL 4 100 25	4	⊕		10	10	25	120		
1180057	HF30GXL 4 120 30	4	⊕		12	12	30	120		

⊕ Stock item | Produto de stock  
Itens de stock

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

○ Available under request | Disponível sobre consulta  
Disponível bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

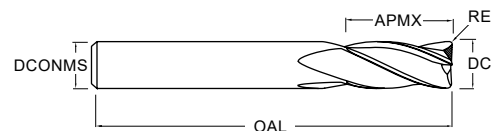
## HR30GS 4 Corner radius



P M K



All order codes are cylindrical shank.  
Weldon shank available under request.



(1) Geometry code	(2) Grade code		T1 PHP920	Dimensions   Dimensões   Dimensiones (mm)				
	Reference Referência Referencia	NOF		DC	DCONMS	APMX	RE	OAL
1180231	HR30GS 4 030 12 R025	4	○	3	4	12	0,25	50
1180232	HR30GS 4 030 12 R050	4	○	3	4	12	0,50	50
1180233	HR30GS 4 040 14 R025	4	○	4	4	14	0,25	50
1180234	HR30GS 4 040 14 R050	4	○	4	4	14	0,50	50
1180235	HR30GS 4 050 16 R025	4	○	5	6	16	0,25	50
1180236	HR30GS 4 050 16 R050	4	○	5	6	16	0,50	50
1180237	HR30GS 4 060 19 R050	4	⊗	6	6	19	0,50	50
1180238	HR30GS 4 060 19 R100	4	⊗	6	6	19	1,00	50
1180239	HR30GS 4 070 19 R050	4	○	7	8	19	0,50	63
1180240	HR30GS 4 070 19 R100	4	○	7	8	19	1,00	63
1180241	HR30GS 4 080 20 R050	4	⊗	8	8	20	0,50	63
1180242	HR30GS 4 080 20 R100	4	⊗	8	8	20	1,00	63
1180243	HR30GS 4 090 22 R050	4	○	9	10	22	0,50	75
1180244	HR30GS 4 090 22 R100	4	○	9	10	22	1,00	75
1180245	HR30GS 4 100 22 R100	4	⊗	10	10	22	1,00	75
1180246	HR30GS 4 100 22 R200	4	⊗	10	10	22	2,00	75
1180247	HR30GS 4 120 25 R100	4	⊗	12	12	25	1,00	75
1180248	HR30GS 4 120 25 R200	4	⊗	12	12	25	2,00	75
1180249	HR30GS 4 140 26 R100	4	○	14	14	26	1,00	83
1180250	HR30GS 4 140 26 R200	4	○	14	14	26	2,00	83
1180251	HR30GS 4 160 32 R100	4	⊗	16	16	32	1,00	89
1180252	HR30GS 4 160 32 R200	4	⊗	16	16	32	2,00	89
1180253	HR30GS 4 180 32 R100	4	○	18	18	32	1,00	92
1180254	HR30GS 4 180 32 R200	4	○	18	18	32	2,00	92
1180255	HR30GS 4 200 38 R100	4	⊗	20	20	38	1,00	104
1180256	HR30GS 4 200 38 R200	4	⊗	20	20	38	2,00	104

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

End mill order code = (1) Geometry Code + (2) Grade Code

## HB30GS 2 Ball nose

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

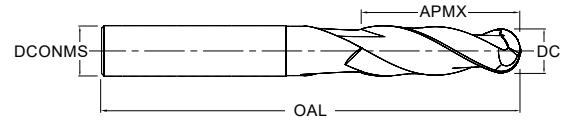
Spare Parts

Technical Data

End Mills



P M K



All order codes are cylindrical shank.  
Weldon shank available under request.

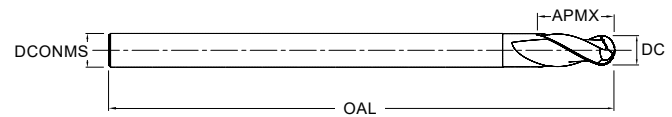
<sup>(1)</sup> Geometry code	<sup>(2)</sup> Grade code		T1		Dimensions   Dimensões   Dimensiones (mm)			
	Reference Referência Referencia	NOF	PHP920	PH7920	DC	DCONMS	APMX	OAL
1180278	HB30GS 2 020 06	2	○	△	2	3	6	38
1180279	HB30GS 2 030 12	2	⊗		3	3	12	38
1180280	HB30GS 2 040 14	2	○	△	4	4	14	50
1180281	HB30GS 2 050 16	2	⊗		5	6	16	50
1180282	HB30GS 2 060 19	2	○	△	6	6	19	50
1180283	HB30GS 2 080 20	2	⊗		8	8	20	63
1180284	HB30GS 2 100 22	2	⊗		10	10	22	75
1180285	HB30GS 2 120 25	2	⊗		12	12	25	75

⊗ Stock item | Produto de stock | Itens de stock    
 △ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock    
 ○ Available under request | Disponível sobre consulta | Disponible bajo consulta    
 End mill order code = (1) Geometry Code + (2) Grade Code

## HB30GL 2 Ball nose



P M K



All order codes are cylindrical shank.  
Weldon shank available under request.

<sup>(1)</sup> Geometry code	<sup>(2)</sup> Grade code		T1		Dimensions   Dimensões   Dimensiones (mm)			
	Reference Referência Referencia	NOF	PHP920		DC	DCONMS	APMX	OAL
1180688	HB30GL 2 040 08	2	⊗		4	6	8	75
1180128	HB30GL 2 060 12	2	⊗		6	6	12	75
1180029	HB30GL 2 080 14	2	⊗		8	8	14	100
1180030	HB30GL 2 100 18	2	⊗		10	10	18	100
1180031	HB30GL 2 120 22	2	⊗		12	12	22	100

⊗ Stock item | Produto de stock | Itens de stock    
 △ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock    
 ○ Available under request | Disponível sobre consulta | Disponible bajo consulta    
 End mill order code = (1) Geometry Code + (2) Grade Code

## HB30GS 4 Ball nose



P M K



All order codes are cylindrical shank.  
Weldon shank available under request.

(1) Geometry code	(2) Grade code		T1 PHP920	Dimensions   Dimensões   Dimensiones (mm)			
	Reference Referência Referencia	NOF		DC	DCONMS	APMX	OAL
1180156	HB30GS 4 020 03	4	⊗	2	4	3	50
1180157	HB30GS 4 030 05	4	⊗	3	4	5	50
1180068	HB30GS 4 040 06	4	⊗	4	6	6	60
1181837	HB30GS 4 050 08	4	⊗	5	6	8	60
1180272	HB30GS 4 060 09	4	⊗	6	6	9	60
1180066	HB30GS 4 080 16	4	⊗	8	8	16	63
1180432	HB30GS 4 100 20	4	⊗	10	10	20	75
1180287	HB30GS 4 120 25	4	⊗	12	12	25	75

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

End mill order code = (1) Geometry Code + (2) Grade Code

## HB30GL 4 Ball nose



P M K



All order codes are cylindrical shank.  
Weldon shank available under request.

(1) Geometry code	(2) Grade code		T1 PHP920	Dimensions   Dimensões   Dimensiones (mm)			
	Reference Referência Referencia	NOF		DC	DCONMS	APMX	OAL
1180273	HB30GL 4 020 04	4	⊗	2	4	4	75
1180274	HB30GL 4 030 08	4	⊗	3	4	8	75
1180275	HB30GL 4 040 11	4	○	4	4	11	75
1180150	HB30GL 4 050 13	4	⊗	5	6	13	75
1180032	HB30GL 4 060 13	4	⊗	6	6	13	75
1180064	HB30GL 4 080 16	4	⊗	8	8	16	100
1180065	HB30GL 4 100 16	4	⊗	10	10	16	100
1180071	HB30GL 4 120 25	4	⊗	12	12	25	100
1180276	HB30GL 4 160 32	4	⊗	16	16	32	120
1180277	HB30GL 4 200 38	4	⊗	20	20	38	120

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

End mill order code = (1) Geometry Code + (2) Grade Code

## HRO45GS Rougher

MILLING

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

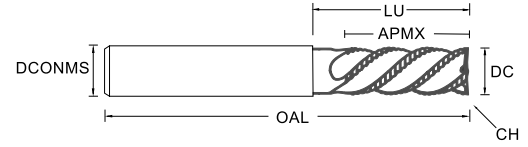
Spare Parts

Technical Data

End Mills



P M K



(1) Order code		(2) Grade code		Z9	Dimensions   Dimensões   Dimensiones (mm)						
		Reference Referência Referencia	NOF	PHU920	DC	DCONMS	APMX	CHW	KCH	LU	OAL
HA (Cylindrical)	HB (Weldon)										
1180557	1180558	HRO45GS 3 030 08	3	○	3	6	8	0,15	45°	15	57
1180559	1180560	HRO45GS 4 040 11	4	○	4	6	11	0,15	45°	17	57
1180561	1180562	HRO45GS 4 050 13	4	○	5	6	13	0,15	45°	19	57
1180439	1180563	HRO45GS 4 060 13	4	⊗	6	6	13	0,15	45°	21	57
1180440	1180564	HRO45GS 4 080 19	4	⊗	8	8	19	0,15	45°	27	63
1180441	1180565	HRO45GS 4 100 22	4	⊗	10	10	22	0,20	45°	32	72
1180374	1180465	HRO45GS 4 120 26	4	⊗	12	12	26	0,20	45°	38	83
1180566	1180567	HRO45GS 5 160 32	5	⊗	16	16	32	0,35	45°	44	92
1180568	1180569	HRO45GS 6 200 38	6	⊗	20	20	38	0,60	45°	54	104

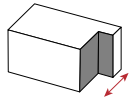
⊗ Stock item | Produto de stock | Itens de stock      ○ Available under request | Disponível sobre consulta | Disponible bajo consulta

End mill order code = (1) Geometry Code + (2) Grade Code

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

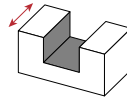
ISO	Material	f <sub>z</sub> (mm/t)			V <sub>c</sub> (m/min)		
		a <sub>e</sub> = 25%	a <sub>e</sub> = 40%	a <sub>e</sub> = 100%	a <sub>e</sub> = 25%	a <sub>e</sub> = 40%	a <sub>e</sub> = 100%
P	Unalloyed Steel	0,008 x DC	0,007 x DC	0,005 x DC	170	160	140
	Low-Alloyed Steel	0,007 x DC	0,006 x DC	0,004 x DC	150	140	120
	High-Alloyed Steel	0,006 x DC	0,005 x DC	0,004 x DC	130	120	100
M	Stainless Steel (Ferritic / Martensitic)	0,006 x DC	0,005 x DC	0,004 x DC	110	110	90
	Stainless Steel (Austenitic)	0,005 x DC	0,004 x DC	0,003 x DC	100	90	80
	Stainless Steel (Austenitic/Ferritic/Duplex)	0,004 x DC	0,003 x DC	0,002 x DC	80	80	70
K	Malleable Cast Iron	0,008 x DC	0,007 x DC	0,005 x DC	200	190	170
	Grey Cast Iron	0,008 x DC	0,007 x DC	0,005 x DC	200	190	160
	Nodular Cast Iron	0,008 x DC	0,007 x DC	0,004 x DC	180	170	150

**Side milling**



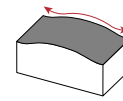
Finishing:  $a_e < 0,15 \times Dc$   
 Semi-finishing:  $0,15 \times Dc < a_e < 0,3 \times Dc$   
 Roughing:  $a_e > 0,3 \times Dc$

**Slotting**



$a_e = 100\% \times Dc$

**Copying**



Finishing:  $a_e < 0,20 \times Dc$   
 $a_p < 0,03 \times Dc$   
 Semi-finishing:  $0,20 \times Dc < a_e < 0,40 \times Dc$   
 $0,03 \times Dc < a_p < 0,10 \times Dc$   
 Roughing:  $a_e > 0,40 \times Dc$   
 $a_p > 0,10 \times Dc$

$\alpha$ : Surface inclination angle.

ISO	Material	fz (mm/t)					
		Side Milling			Slotting	Copying	
		$a_e = 12,5\%$	$a_e = 25\%$	$a_e = 40\%$	$a_e = 100\%$	$\alpha < 15^\circ$	$\alpha > 15^\circ$
P	Unalloyed Steel	$0,009 \times Dc$	$0,008 \times Dc$	$0,005 \times Dc$	$0,004 \times Dc$	$0,012 \times Dc$	$0,004 \times Dc$
	Low-Alloyed Steel	$0,008 \times Dc$	$0,007 \times Dc$	$0,004 \times Dc$	$0,003 \times Dc$	$0,010 \times Dc$	$0,003 \times Dc$
	High-Alloyed Steel	$0,007 \times Dc$	$0,006 \times Dc$	$0,004 \times Dc$	$0,003 \times Dc$	$0,009 \times Dc$	$0,003 \times Dc$
M	Stainless Steel (Ferritic / Martensitic)	$0,007 \times Dc$	$0,006 \times Dc$	$0,004 \times Dc$	$0,003 \times Dc$	$0,009 \times Dc$	$0,003 \times Dc$
	Stainless Steel (Austenitic)	$0,005 \times Dc$	$0,005 \times Dc$	$0,003 \times Dc$	$0,002 \times Dc$	$0,007 \times Dc$	$0,002 \times Dc$
	Stainless Steel (Austenitic/Ferritic/Duplex)	$0,004 \times Dc$	$0,004 \times Dc$	$0,002 \times Dc$	$0,002 \times Dc$	$0,006 \times Dc$	$0,002 \times Dc$
K	Malleable Cast Iron	$0,009 \times Dc$	$0,008 \times Dc$	$0,005 \times Dc$	$0,004 \times Dc$	$0,012 \times Dc$	$0,004 \times Dc$
	Grey Cast Iron	$0,009 \times Dc$	$0,008 \times Dc$	$0,005 \times Dc$	$0,004 \times Dc$	$0,012 \times Dc$	$0,004 \times Dc$
	Nodular Cast Iron	$0,008 \times Dc$	$0,008 \times Dc$	$0,004 \times Dc$	$0,004 \times Dc$	$0,011 \times Dc$	$0,004 \times Dc$

(Note 1) Side milling and slotting feed valid for when the end mill works with its whole  $a_p$ , for when the end mill is working with lower depths of cut consider increasing the feed up to 25%.  
 (Note 2) Copying feed valid for low  $a_p$  ( $a_p / D < 0,1$ ), for higher  $a_p$  consider decreasing the feed by 50%.

ISO	Material	Vc (m/min)							
		Side Milling			Slotting	Copying			
		$a_e = 12,5\%$	$a_e = 25\%$	$a_e = 40\%$	$a_e = 100\%$	AP = 0,05 DC $\alpha < 15^\circ$	AP = 0,25 DC $\alpha < 15^\circ$	AP = 0,05 DC $\alpha > 15^\circ$	AP = 0,25 DC $\alpha > 15^\circ$
P	Unalloyed Steel	200	190	180	150	480	240	320	160
	Low-Alloyed Steel	190	180	160	130	440	220	290	150
	High-Alloyed Steel	170	160	150	120	400	200	260	130
M	Stainless Steel (Ferritic / Martensitic)	150	140	130	110	360	180	240	120
	Stainless Steel (Austenitic)	120	110	100	80	290	140	190	100
	Stainless Steel (Austenitic/Ferritic/Duplex)	100	100	80	70	250	120	160	80
K	Malleable Cast Iron	240	230	220	170	580	290	380	190
	Grey Cast Iron	230	230	210	170	560	280	380	190
	Nodular Cast Iron	220	210	190	160	520	260	350	170

(Note 3) Table valid for PHP920 grade, for PH7920 consider reducing the cutting velocity by 10 m/min.  
 (Note 4) Cutting speeds selected for an economic use of the tool, for higher productivity consider increasing up to 70%.  
 (Note 5) For copying, spindle speed is calculated as follows:  $n = \frac{Vc \times 1000}{\pi \times 2 \sqrt{a_p}(Dc - a_p)}$

## COATINGS

### PHP

- Perfect coating adhesion;
- Smoothest surface;
- Suitable for dry and wet machining;
- Color: Black;



The PHP is the recommended coating for general machining on steel and cast iron.

Because of its smoothness at medium temperatures, the chips are able to flow effortlessly, maintaining the flutes clean and a long tool life even in dry conditions.

### PHH

- Highest thermal stability;
- Smooth surface;
- High performance in dry machining;
- Color: Light brown;



The PHH is the recommended coating for Hardened steels, as well as stainless steels and HRSA.

Because of its high performance at high temperatures the coating successfully protect the cutting edges allowing the tool to work for long periods of time.

### PHU

- High thermal shock resistance;
- Carefully engineered surface quality;
- Suitable for dry and wet machining;
- Color: Grey;



Combining both excellent thermal resistance and excellent surface quality, the PHU coating is recommended for stainless steels, while also being suitable for steels and cast iron.

Because of its surface quality and thermal resistance it is able to prevent built-up-edge in both low-alloy steels and stainless steels, making it a very versatile coating.

### PHF

- High resistance wear and thermal stability;
- Superior surface quality;
- Suitable for dry and wet machining;
- Color: Red gold;



PHF boasts high resistance to wear, combining this with exceptional adhesion and very homogeneous wear behavior. Additionally, its dense layer structure and high silicon doping contribute to its superior thermal stability, facilitating heat dissipation in the chip and consequently increasing process stability.

### PHT

- Optimum chip removal;
- Excellent protection against built-up edges;
- Top performance on aluminum applications;
- Color: Silver;



PHT is a unique nanocrystalline coating, exceptionally dense yet smooth, with maximum adhesion even on sharp cutting edges. It effectively prevents the formation of built-up edges and ensures excellent machining results in non-ferrous metals, even at high operating temperatures.

## SUBSTRATE

### PH0910

A micrograin substrate that combines wear resistance and toughness.  
Higher rigidity contributes to a longer tool life.  
Recommended for semi-finishing to roughing on stable to slightly unstable conditions.

### PH0920

Universal substrate with great balance between toughness and wear resistance.  
Outstanding heat dissipation properties.  
Recommended for semi-finishing to roughing on most materials.

### PH0603

Harder grade with extreme wear resistance.  
Excellent thermal stability.  
Recommended for finishing applications and hardened steels.

Face milling

High feed milling

Shoulder milling

Profile milling

Specialty

Spare Parts

Technical Data

End Mills

## LOOKING FOR MORE TROUBLESHOOTING?



Check the qrcode for more information.