A

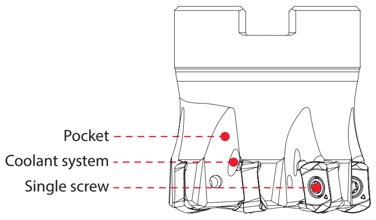
A - MILLING

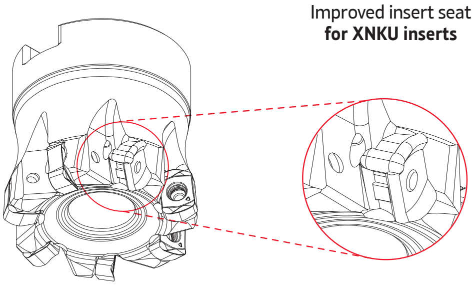
MILLING

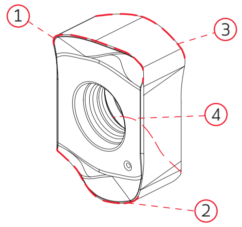
NEW TETRAFEED XN20-06

NEW

Nova linha TETRAFEED XN20-06 | Nueva línea TETRAFEED XN20-06




Improved insert seat
for XNKU inserts


Double-sided insert
4 cutting edges

MILLING CUTTER

Design
- Optimized design for better chip evacuation;

Pocket
- Strong pocket design for better cutter body durability;
- Improved insert seat;

INSERT

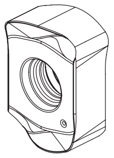
Insert Width
- Large cross section;

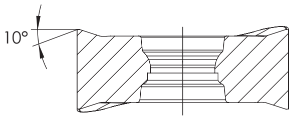
Cutting edge
- Improved cutting edge;
- Improved wear resistance;

Double-sided insert
- Double-sided insert with 4 cutting edges;

XNKU 06T3

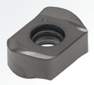
XNKU-MP





P	M	K	S

INSERT SIZE
06
XNKU
06T3
NEW
XNKU-MP



GEOMETRY FEATURES | Características geométricas | Características geométricas

Geometry	Features | Características | Características
Geometry **MP** General machining	Geometry with a reinforced cutting edge for general applications on different materials.

See more on page A - 204

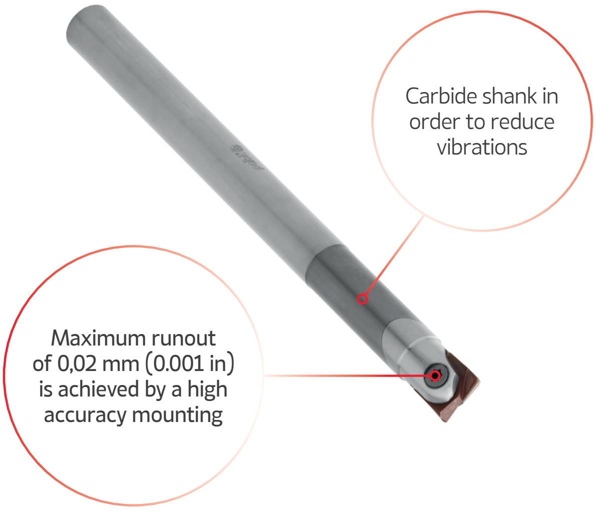
NEW W-PRO 62090

NEW

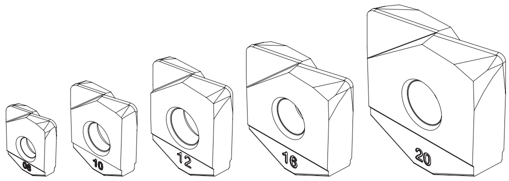
METRIC LINE

Nova linha W-PRO 62090 | Nueva línea W-PRO 62090

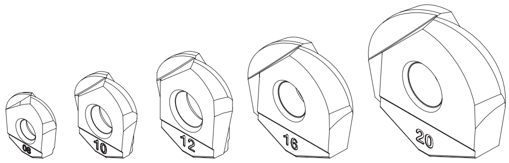
The new W-PRO is the combination of the most refined inserts and the most stable shanks. When looking for a finishing solution for Steels, Stainless Steels, Cast Irons, HRSA or Hardened Steels that can work for a long time while delivering a flawless machined surface, this is the best solution.



WCL



WCR



One toolholder for two types of inserts

See more on page A - 206

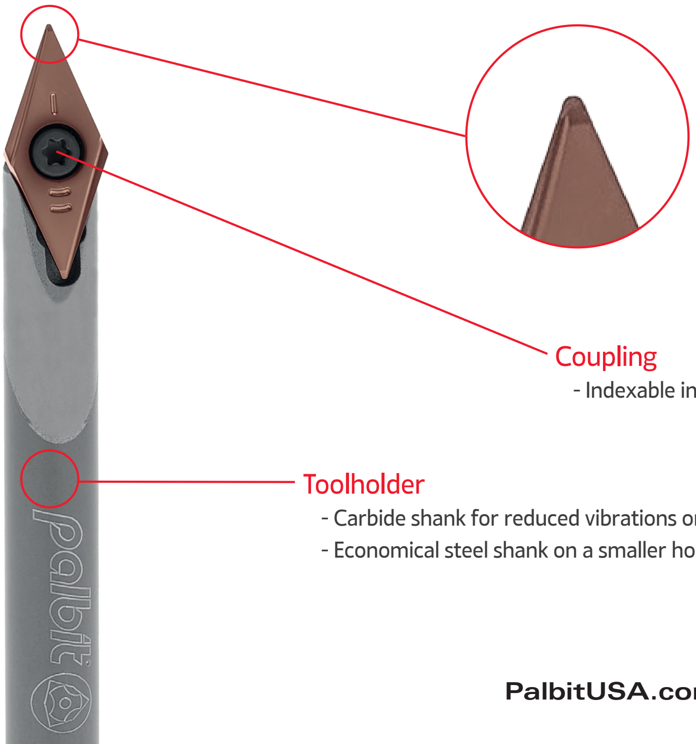
NEW ENGRAVING 64067

NEW

METRIC LINE

Nova linha ENGRAVING 64067 | Nueva línea ENGRAVING 64067

Higher performance and faster setup on engraving operations.
The biggest barrier in engraving is the time it takes to replace the tool. Focused on this, Palbit engineers developed a solution to overcome it. With the Indexable Line Engraving 64067, only the insert needs to be replaced. Consequently, the down time is sharply reduced, leading to a productivity boost!



Insert Geometry

- Very low depth of cut resulting on thin engraving.

Coupling

- Indexable insert assembly for faster replacement.

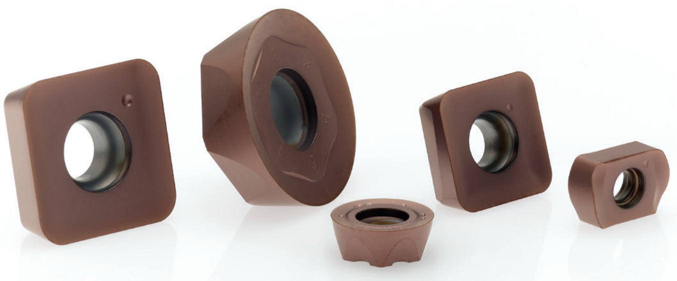
Toolholder

- Carbide shank for reduced vibrations on longer holders;
- Economical steel shank on a smaller holder.

See more on page A - 222

NEW MILLING GRADES | Novos graus de fresagem | Nuevos calidades de fresado

PHH GRADE - A new step on coating innovation for machining Stainless steels and HRSA



PHH
NEW
GRADE

PHH603 NEW
H05-H15
P01-P05
Recommended for finishing operations in steels and hardened steels. First choice in mold and die finishing applications.

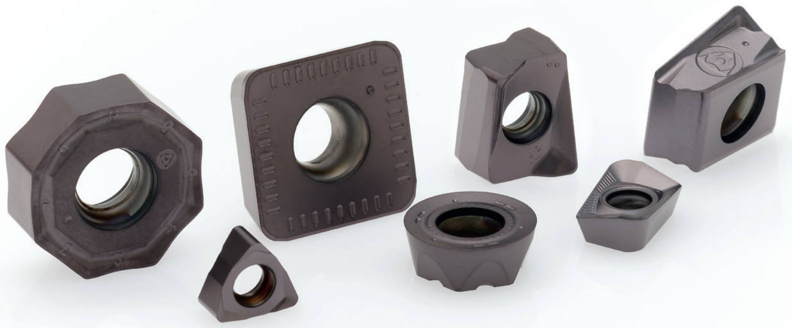
PHH910 NEW
P05-P10
H15-H30
Recommended for finishing operations in steels and hardened steels in unstable conditions.

PHH930 NEW
M20-M40
S20-S30
Recommended for general purpose milling of stainless steels and HRSA.

PHH530 NEW
M25-M40
S25-S35
Extremely heat resistant grade. First choice in hot-section turbine blade milling.

PHH808 NEW
M30-M40
S30-S40
High heat resistance grade. Economic choice in hot-section turbine blade milling

PHP GRADE - A new step on coating innovation for machining Steels and Cast Irons



PHP
NEW
GRADE

PHP910 NEW
P05-P10
K05-K10
Recommended for light operations in steels.

PHP920 NEW
P10-P35
K10-K30
Recommended for General Steel & Cast Iron Milling.

PHP930 NEW
P20-P40
K20-K40
Recommended for medium to roughing operations in steels and cast irons.

PHP530 NEW
P25-P40
M25-M40
Extremely heat resistant grade. First choice in cold-section turbine blade milling.

PHP808 NEW
P30-P40
High heat resistance grade. Economic choice for cold-section turbine blade milling.

GRADES CODIFICATION SYSTEM | Sistema de codificação de graus | Codificación de calidad

PH	X	X	XX
PH - Palbit Hardmetal	Coating	1 - Steel	01 - ISO Field
PD - Palbit diamond	PCD | PCBN Grade	2 - Stainess steel	(...)
PB - Palbit PCBN		3 - Cast Iron	50 - ISO Field
		4 - Non Ferrous	
		5 - Super Alloys	
		6 - Hardened Materials	
		7 - Wearparts	
		9 - Universal Range	

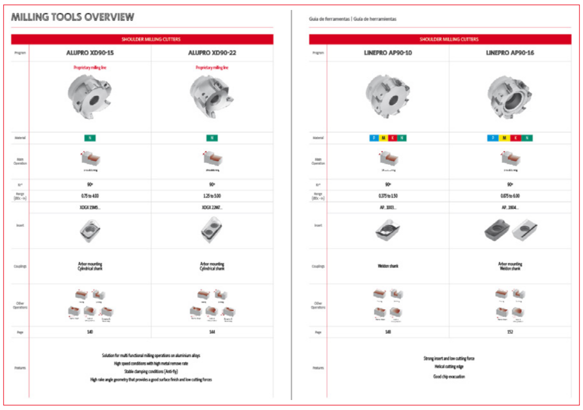
MILLING TOOL SELECTION

1 - Define your operation type:

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

Select your tool:

See page A - 22 | A - 28



MILLING TOOLS OVERVIEW

Guia de ferramentas | Guía de herramientas

SHOULDER MILLING CUTTERS

Program	ALUPRO XD90-15	ALUPRO XD90-22
	Proprietary milling line	Proprietary milling line
Material	N	N
Main Operation		
Kr°	90°	90°
Range (ØDc - in)	0.75 to 4.00	1.25 to 5.00
	XDGX 15M5...	XDGX 22M7...
Insert		
Couplings	Arbor mounting Cylindrical shank	Arbor mounting Cylindrical shank
Other Operations		
Page	140	144
Features	Solution for multi functional milling operations on aluminium alloys High speed conditions with high metal remove rate Stable clamping conditions (Anti-fly) High rake angle geometry that provides a good surface finish and low cutting forces	

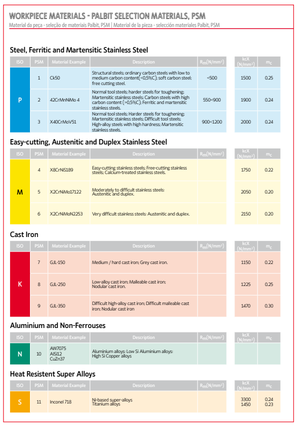
SHOULDER MILLING CUTTERS

Program	LINEPRO AP90-10	LINEPRO AP90-16
Material	P M K N	P M K N
Main Operation		
Kr°	90°	90°
Range (ØDc - in)	0.375 to 1.50	0.875 to 6.00
	AP...1003...	AP...1604...
Insert		
Couplings	Weldon shank	Arbor mounting Weldon shank
Other Operations		
Page	148	152
Features	Strong insert and low cutting force Helical cutting edge Good chip evacuation	

2 - Define your material according to ISO:

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

See the chapter General Technical Data on the last pages for Palbit Selection Materials - PSM



WORKPIECE MATERIALS - PALBIT SELECTION MATERIALS, PSM

Material da peça - seleção de materiais Palbit, PSM | Material de la pieza - selección materiales Palbit, PSM

Steel, Ferritic and Martensitic Stainless Steel

ISO	PSM	Material Example	Description	R_m(N/mm²)	kcX (N/mm²)	m_c
P	1	Ck50	Structural steels; ordinary carbon steels with low to medium carbon content(<0,5%C); soft carbon steel; free cutting steel.	<500	1500	0.25
	2	42CrMnNiMo 4	Normal tool steels; harder steels for toughening; Martensitic stainless steels; Carbon steels with high carbon content (>0,5%C); Ferritic and martensitic stainless steels.	550<900	1900	0.24
	3	X40CrMoV51	Normal tool steels; Harder steels for toughening; Martensitic stainless steels; Difficult tool steels; High-alloy steels with high hardness; Martensitic stainless steels.	900<1200	2000	0.24

Easy-cutting, Austenitic and Duplex Stainless Steel

ISO	PSM	Material Example	Description	R_m(N/mm²)	kcX (N/mm²)	m_c
M	4	X8CrNiS189	Easy-cutting stainless steels; Free-cutting stainless steels; Calcium-treated stainless steels.		1750	0.22
	5	X2CrNiMo17122	Moderately to difficult stainless steels: Austenitic and duplex.		2050	0.20
	6	X2CrNiMoN2253	Very difficult stainless steels: Austenitic and duplex.		2150	0.20

Cast Iron

ISO	PSM	Material Example	Description	R_m(N/mm²)	kcX (N/mm²)	m_c
K	7	GJL-150	Medium / hard cast iron; Grey cast iron.		1150	0.22
	8	GJL-250	Low-alloy cast iron; Malleable cast iron; Nodular cast iron.		1225	0.25
	9	GJL-350	Difficult high-alloy cast iron; Difficult malleable cast iron; Nodular cast iron		1470	0.30

Aluminium and Non-Ferrouses

ISO	PSM	Material Example	Description	R_m(N/mm²)	kcX (N/mm²)	m_c
N	10	AW7075 AlSi12 CuZn37	Aluminium alloys: Low Si Aluminium alloys: High Si Copper alloys			

Heat Resistent Super Alloys

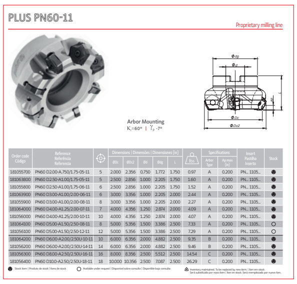
ISO	PSM	Material Example	Description	R_m(N/mm²)	kcX (N/mm²)	m_c
S	11	Inconel 718	Ni-based super-alloys Titanium alloys		3300 1450	0.24 0.23

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 mouting type
- The cutter marked as “stock available under request” has a minimum order quantity according to the following table:

Qty	* ØDc Size
10	≤ 4 in
5	> 4 in



PLUS PN60-11

Proprietary milling line

Arbor Mounting

K_r=60° | γ_p -7°

Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)					lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	ØDc2	Ød	Ødg	L		Arbor Type	Ap max (in)		
181055700	PN60 D2.00-A.750/1.75-05-11	5	2.000	2.356	0.750	1.772	1.750	0.97	A	0.200	PN... 1105...	●
181063800	PN60 D2.50-A1.00/1.75-05-11	5	2.500	2.856	1.000	2.205	1.750	1.60	A	0.200	PN... 1105...	●
181055800	PN60 D2.50-A1.00/1.75-06-11	6	2.500	2.856	1.000	2.205	1.750	1.52	A	0.200	PN... 1105...	●
181063900	PN60 D3.00-A1.00/2.00-06-11	6	3.000	3.356	1.000	2.205	2.000	2.44	A	0.200	PN... 1105...	●
181055900	PN60 D3.00-A1.00/2.00-08-11	8	3.000	3.356	1.000	2.205	2.000	2.27	A	0.200	PN... 1105...	●
181064000	PN60 D4.00-A1.25/2.00-07-11	7	4.000	4.356	1.250	2.874	2.000	4.09	A	0.200	PN... 1105...	●
181056000	PN60 D4.00-A1.25/2.00-10-11	10	4.000	4.356	1.250	2.874	2.000	4.07	A	0.200	PN... 1105...	●
181064100	PN60 D5.00-A1.50/2.50-08-11	8	5.000	5.356	1.500	3.386	2.500	7.33	A	0.200	PN... 1105...	○
181056100	PN60 D5.00-A1.50/2.50-12-11	12	5.000	5.356	1.500	3.386	2.500	7.29	A	0.200	PN... 1105...	○
181064200	PN60 D6.00-A2.00/2.50U-10-11	10	6.000	6.356	2.000	4.882	2.500	9.35	B	0.200	PN... 1105...	●
181056200	PN60 D6.00-A2.00/2.50U-14-11	14	6.000	6.356	2.000	4.882	2.500	9.46	B	0.200	PN... 1105...	●
181056300	PN60 D8.00-A2.50/2.50U-16-11	16	8.000	8.356	2.500	5.512	2.500	14.54	C	0.200	PN... 1105...	●
181056400	PN60 D10.0-A2.50/2.50U-18-11	18	10.000	10.356	2.500	7.087	2.500	26.29	C	0.200	PN... 1105...	●

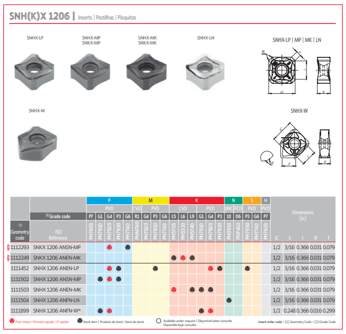
● Stock item | Produto de stock | Itens de stock
○ Available under request | Disponível sobre consulta | Disponible bajo consulta
△ Inventory maintained. To be replaced by new item. | Item em stock. Será substituído por novo item | Item en stock. Será reemplazado por nuevo item.

4 - Select your insert.

Choose the chipbreaker for your operation:

- Chipbreaker L= Light (for light cuts when low forces/power are required)
- Chipbreaker M = Medium (first choice for mixed production)
- Chipbreaker 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 0.984 in
150	> IC 0.984 in

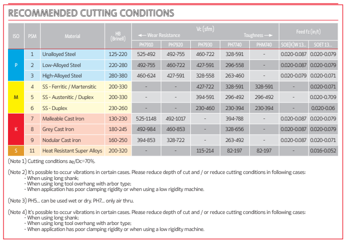


SNH(K)X 1206 | Inserts | Pastilhas | Plaquitas

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.



RECOMMENDED CUTTING CONDITIONS

INSERTS CODIFICATION FOR MILLING HOLDERS

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

Code	Inserts Description	Page
AN90-10	ANHX 1004...	149
AN90-12	ANHX 1204...	153
AN90-16	ANHX 1607...	157
AP90-10	AP... 1003...	186
AP90-16	AP... 1604	192
ON45-05	ON..X 0505.. | SN..X 1206	93
PN60-11	PNHX 1105...	89
RN90-12	RN... 1204...	203
RP90-10	RP... 10T3...	198
RP90-12	RP... 1204...	198
RP90-16	RP... 1605...	198
SN45-12	SN...X 1206...	93 | 97
SN45-16	SN...X 1606 | ON...X 0606...	101
SN88-12	SN...U 1206...	85

Code	Inserts Description		Page
SO10-08	SO... 0803...		115
SO10-13	SO... 13M5...		121
SO15-16	SO... 1605...		127
WD60-12	WD... 1204...		131
WN60-12	WNMW 1207...		135
WN90-04	WNHU 04T3...-LP		157
WN90-08	WNXT 0806..		138
XD90-15	XDGX 15M5...		179
XD90-22	XDGX 22M7...		183
XN20-06	XNKU 06T3...		105
XN90-12	XNHW 1205...		231
XP90-06	XPET 0602...		161
XP90-10	XPET 1003...		168
XP90-17	XPET 1706...		173
06320	POKT 0403	METRIC LINE	111
49590	WNXT 0806..	METRIC LINE	142
62090	WCL | WCR	METRIC LINE	107 | 108

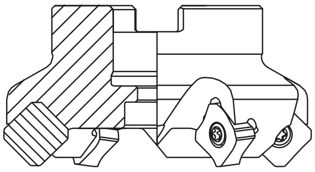
COUPLING TYPES

Tipo de acoplamento | Tipo de acoplamiento

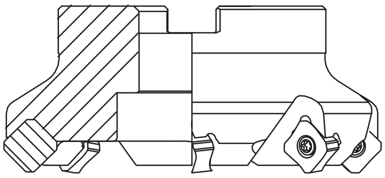
Symbol Símbolo Símblo	Coupling type Tipo de acoplamento Tipo de acoplamiento	Inserts fixation type Fixação de pastilhas Fijación de plaquitas	Standard Norma Norma
A	Arbor mounting Montagem tipo árvore Montaje tipo husillo	Insert screw Parafuso pastilha Tornillo de la plaquita	ISO 6462
B		Wedge Cunha Cuña	ISO 6462
C		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
D		Washer Anilha Arandela	ISO 6462
E	Cylindrical shank Haste cilíndrica Mango recto	Any type Qualquer tipo Cualquier tipo	DIN 1835 - A
R	Threaded coupling Acoplamento roscado Acoplamiento tipo tornillo	Any type Qualquer tipo Cualquier tipo	Palbit internal standard Norma interna Palbit
W	Weldon shank Haste weldon tipo mango	Any type Qualquer tipo Cualquier tipo	DIN 1835 - B
X	Special coupling Acoplamento 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

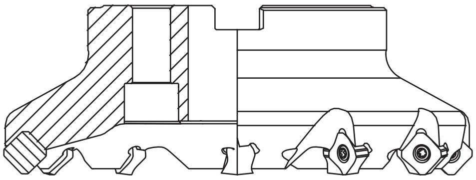
Arbor type A



Arbor type B



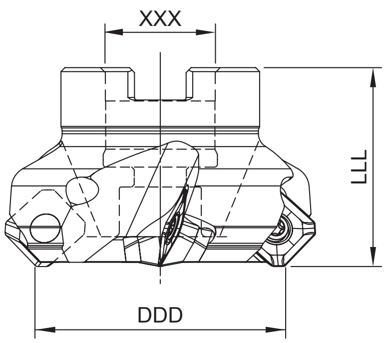
Arbor type C

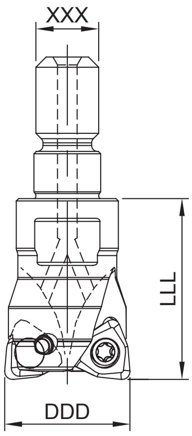


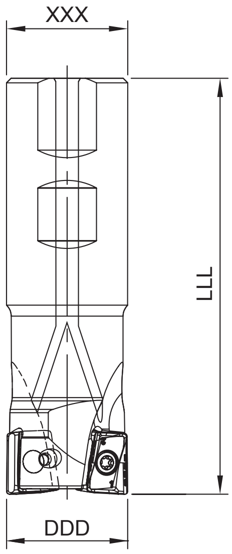
NOTE: For each type of arbor mounting (see previous table of coupling type on simbols A, B, C, D), we can have a different arbor types (see images above).

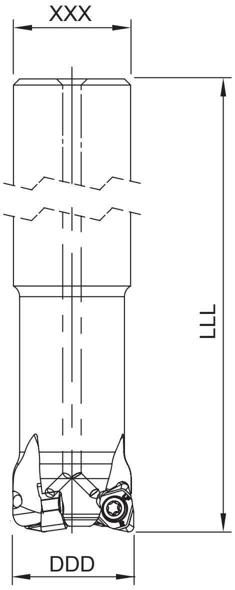
MILLING TOOLS CODIFICATION

Codificação das ferramentas de fresagem | Codificación de heramientas de fresado









AN 90-D3.00 A XXX/LLL U-06-16-L

Rotation (R/L)
Rotação (R/L)
Rotación (R/L)
*In case of right rotation the "R" is supressed.

Insert dimension
Dimensão da pastilha
Dimesion del inserto

Number of teeth
Número de dentes
Numero de dientes

Cooling system
Refrigeração
Refrigeración

U - Whitout cooling system
U - Sem refrigeração
U - Sin refrigeración

Total lenght
Comprimento total
Longitud total

Coupling diameter
Diâmetro de acoplamento
Diámetro de acoplamiento

Coupling Type (A-18)
Tipo de acoplamento (A-18)
Tipo de acoplamiento (A-18)

Diameter
Diâmetro
Diametro

Lead angle
Ângulo de posicionamento da pastilha
Ángulo de posicion del inserto

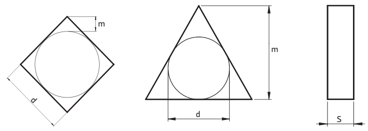
Insert Type (A-17)
Pastilha aplicável (A-17)
Inserto aplicable (A-17)

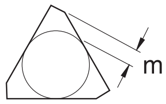
ISO | ANSI MILLING INSERTS CODE KEY

1- Insert shape symbol

H	120°	M	86°
O	135°	V	35°
P	108°	W	80°
S	90°	L	90°
T	60°	A	85°
C	80°	B	82°
D	55°	K	55°
E	75°	R	
F	50°	X	Special

3 - Tolerances symbol





Triangular inserts with a facet
(secondary cutting edge)

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

*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.

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

2 - Normal clearance symbol

A	B	C	D	E
3°	5°	7°	15°	20°
F	**G**	**N**	**P**	**O**
25°	30°	0	11°	Other clearance angle

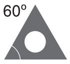
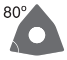
ISO | ANSI

S N H X

4 - Insert symbol

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

Sistema de identificação ISO/ANSI para pastilhas de fixação mecânica | Codificación ISO/ANSI para insertos indexables

 R's	 V's	 D's	 C's	 S's	 T's	 W's	Ø CI		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	

5 - Insert size symbol

* 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

6 - Insert thickness symbol

12 06 00 AN S N - MP

10* - Chipbreaker geometries

Cutting Condition	Main Application
1st letter	2nd letter
L - Light	P - Steel
M - Medium	M - Stainless Steel
H - Heavy	K - Cast Iron
W - Wiper	N - Aluminium
*only when required.	S - HRSA Titanium Alloys
	H - 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

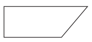
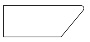
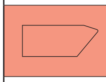
*only when required.

7.1* - Insert edges symbol

For inserts having secondary edges two digits are used:

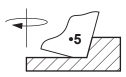
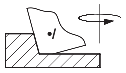
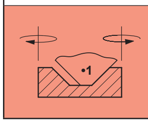
1st digit is secondary edge		2nd digit is secondary edges relief angle	
A	45º	A	3º
D	60º	B	5º
E	75º	C	7º
F	85º	D	15º
P	90º	E	20º
Z	special	F	25º
*only when required.		G	30º
		N	0º
		P	11º
		Z	special

8* - Cutting edge information

Shape	Honing	Symbol
	No honing	F
	With honing	E
	Chamfered No honing	T
	Chamfred with honing	S

*only when required.

9 - Cutting direction

Shape	Hand	Symbol
	Right	R
	Left	L
	None	N

MILLING TOOLS OVERVIEW

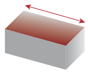
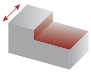
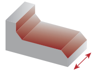
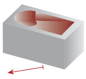
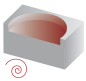
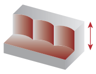
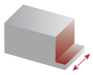
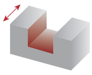
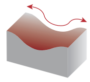
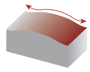
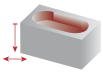
	PLUS AN90-10	PLUS AN90-12	PLUS AN90-16	LINEPRO AP90-10	LINEPRO AP90-16
Page	**148**	**152**	**156**	**186**	**190**
Insert	ANHX 1004...	ANHX 1206...	ANHX 1607...	AP... 1003...	AP... 1604...
Arbor mounting	Ø 1.50 to 4.00 in	Ø 2.00 to 4.00 in	Ø 2.00 to 6.00 in	-	Ø 1.50 to 6.00 in
Weldon Shank	Ø 0.75 to 2.00 in	Ø 1.00 to 1.50 in	Ø 1.25 to 2.00 in	Ø 0.375 to 1.50 in	Ø 0.875 to 1.50 in
Cylindrical Shank	-	-	-	-	-
Threaded Coupling	-	Ø 1.00 to 1.50 in	-	-	-
Facing	○	○	○	○	○
Shouldering	●	●	●	●	●
Slanted Shoulder & Chamfer					
Ramp down				○	○
Helical Interpolation				○	○
Plunging	○	○	○		
Side milling					
Slotting	○	○	○	○	○
Profiling					
Copying					
Plunging & Recessing					

● Main Operation

○ Other Operations

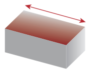
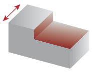
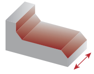
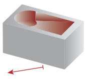
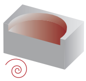
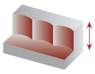
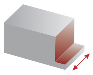
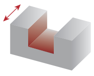
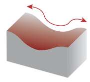
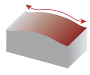
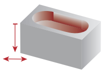
NEW PLUS ON45-05	PLUS PN60-11	TOROMILL RN90-12	TOROMILL RP90-10	TOROMILL RP90-12	TOROMILL RP90-16
92	**88**	**282**	**196**	**196**	**196**
ON..X 0505... SN..X 1206...	PN... 1105...	RNHX 1204...	RPHT 10T3...	RPHT 1204...	RPHT 1605...
Ø 2.00 to 5.00 in	Ø 2.00 to 10.00 in	Ø 1.50 to 3.00 in	Ø 1.50 to 2.00 in	Ø 2.00 to 4.00 in	Ø 3.00 to 5.00 in
-	-	Ø 1.25 in	-	-	-
-	-	-	Ø 1.00 to 1.50 in	-	-
-	-	Ø 1.25 to 1.50 in	Ø 1.00 to 1.50 in	-	-
◉	◉	◎	◎	◎	◎
◎					
		◎	◎	◎	◎
		◎	◎	◎	◎
		◎	◎	◎	◎
		◉	◉	◉	◉
		◉	◉	◉	◉

MILLING TOOLS OVERVIEW

	PLUS SN45-12	PLUS SN45-16	PLUS SN88-12	HIFEED SO10-08	HIFEED SO10-13	HIFEED SO15-16
Page	**96**	**100**	**84**	**114**	**120**	**126**
Insert	SN.. 1206...	SN... 1606... ON... 0606...	SN...U 1206...	SO... 0803...	SO... 13M5...	SO... 1605...
Arbor mounting	Ø 1.50 to 10.00 in	Ø 2.50 to 10.00 in	Ø 2.00 to 10.00 in	Ø 1.50 to 2.00 in	Ø 2.00 to 4.00 in	Ø 2.50 to 6.00 in
Weldon Shank	-	-	-	Ø 0.75 to 1.25 in	-	-
Cylindrical Shank	-	-	-	-	-	-
Threaded Coupling	-	-	-	Ø 1.50 to 1.25 in	-	-
 Facing	●	●	●	●	●	●
 Shouldering			○			
 Slanted Shoulder & Chamfer	○	○				
 Ramp down				○	○	○
 Helical Interpolation				○	○	○
 Plunging				○	○	○
 Side milling						
 Slotting						
 Profiling				●	●	●
 Copying				●	●	●
 Plunging & Recessing						

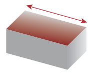
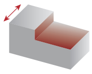
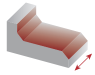
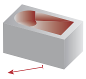
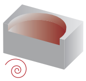
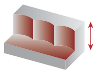
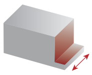
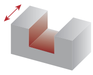
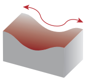
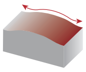
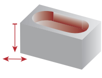
	HIFEED WD60-12	HIFEED WN60-12	PLUS WN90-04	NEW HEXAPLUS WN90-08	ALUPRO XD90-15	ALUPRO XD90-22
	130	134	146	138	178	182
	WD... 1204...	WN... 1207...	WNHU 04T308-LP	WNXT 0806...	XDGX 15M5...	XDGX 22M7...
	Ø 1.50 to 4.00 in	Ø 2.00 to 4.00 in	-	Ø 2.00 to 3.00 in	Ø 1.50 to 4.00 in	Ø 2.00 to 5.00 in
	-	-	-	-	-	-
	-	-	Ø 0.625 to 1.00 in	-	Ø 0.75 to 1.50 in	Ø 1.25 to 1.50 in
	-	-	Ø 0.625 to 1.00 in	-	-	-
	●	●	○	○	○	○
			●	●	●	●
	○	○		○	○	○
	○	○		○	○	○
		○				
				○		
					○	○
	●	●				
	●	●				
					○	○

MILLING TOOLS OVERVIEW

	TETRAFEED XN20-06	HARDMILL XN90-12	LINEPRO XP90-06	LINEPRO XP90-10	LINEPRO XP90-17
Page	**104**	**210**	**160**	**166**	**172**
Insert	XNKU... 06...	XNHW 1205...	XPET 0602...	XPET 1003...	XPET 1706...
Arbor mounting	Ø 1.50 to 2.50 in	Ø 1.50 to 4.00 in	-	Ø 1.50 to 2.50 in	Ø 1.50 to 5.00 in
Weldon Shank	Ø 0.625 to 1.25 in	-	-	Ø 0.625 to 1.00 in	Ø 1.25 to 1.50 in
Cylindrical Shank	Ø 0.625 to 1.50 in	-	Ø 0.375 to 0.625 in	-	-
Threaded Coupling	Ø 0.625 to 1.50 in	-	Ø 0.625 to 1.25 in	Ø 0.625 to 1.25 in	-
 Facing	●	●	●	●	○
 Shouldering		○	●	●	●
 Slanted Shoulder & Chamfer					
 Ramp down	○		○	○	○
 Helical Interpolation	○		○	○	○
 Plunging	○		○	○	○
 Side milling			○ (only with XPET-HF)	○ (only with XPET-HF)	
 Slotting			○	○	○
 Profiling	○		○	○	
 Copying	○		○	○	
 Plunging & Recessing					

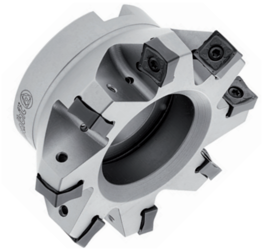
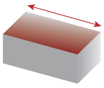
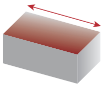
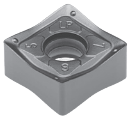
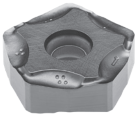
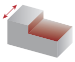
● Main Operation ○ Other Operations

METRIC LINE

	PENTA HIFEED 06320 NEW	HEXAPLUS 49590 NEW	W-PRO 62090 NEW
Page	**110**	**142**	**206**
Insert	POKT 0403...	WNXT 0806...	WC... 08 | 12 | 16 | 20
Arbor mounting	Ø 40-66	Ø 40-125	-
Weldon Shank	-	Ø 32-50	-
Cylindrical Shank	Ø 20-40	-	Ø 8 to 20 mm
Threaded Coupling	Ø 16-42	-	-
 Facing	●	○	○
 Shouldering		●	○
 Slanted Shoulder & Chamfer			
 Ramp down	○	○	
 Helical Interpolation	○	○	
 Plunging	○		
 Side milling		○	
 Slotting			
 Profiling	●		●
 Copying	●		●
 Plunging & Recessing			

MILLING TOOLS OVERVIEW

FACE MILLING CUTTERS

Program	PLUS SN88-12	PLUS PN60-11
	Proprietary milling line 	Proprietary milling line 
Material	P M K	P K
Main Operation	 Facing	 Facing
Krº	88º	60º
Range (ØDc - in)	2.00 to 10.00	2.00 to 10.00
Insert	SN...1206...	PN...1105...
		
Couplings	Arbor mounting	Arbor mounting
Other Operations	 Shouldering	
Page	84	88
Features	Indexable face mills with 8 helical cutting edges For rough to semi-finish with high-efficiency face milling Cutting edge angle enables performing face milling very close to the sidewall	Economical because double sided inserts applied 10 corners available improved insert design for distribution of cutting forces Excellent solution for cast iron

A
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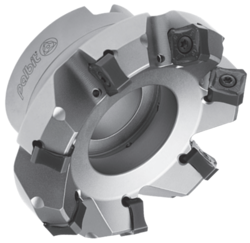
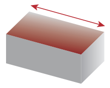
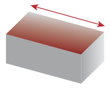
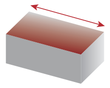
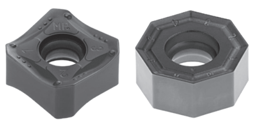
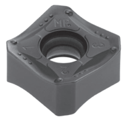
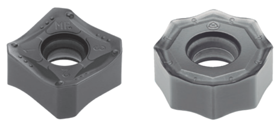
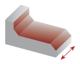
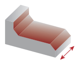
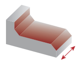
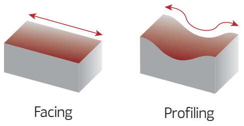
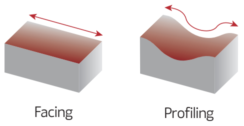
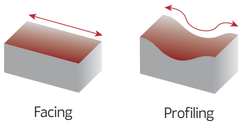
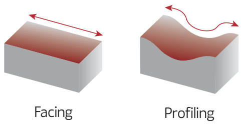
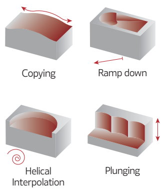
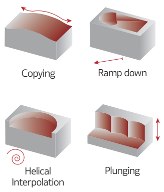
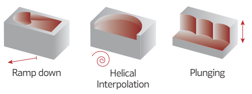
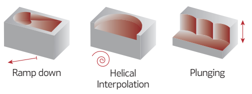
FACE MILLING CUTTERS

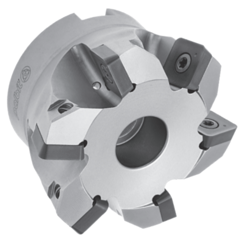
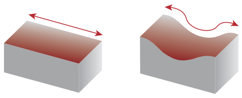
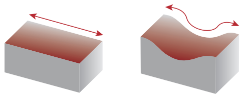
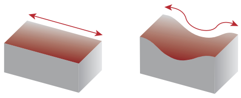
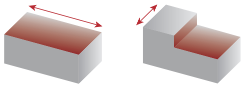
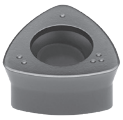
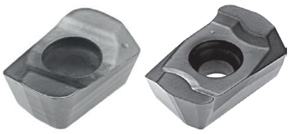
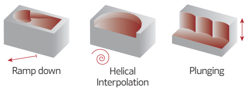
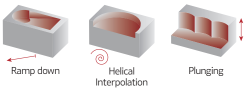
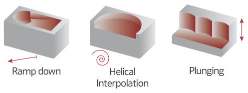
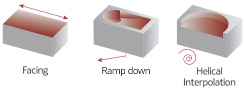
Program	PLUS ON45-05 NEW	PLUS SN45-12	PLUS SN45-16
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M K N S	P M K N S	P M K
Main Operation	 Facing	 Facing	 Facing
Krº	45º	45º	45º
Range (ØDc - in)	2.00 to 5.00	1.50 to 10.00	2.50 to 10.00
Insert	ON...0505... & SN...1206 	SN...1206... 	SN...1606... & ON...0606... 
Couplings	Arbor mounting	Arbor mounting	Arbor mounting
Other Operations	 Slanted Shoulder & Chamfer	 Slanted Shoulder & Chamfer	 Slanted Shoulder & Chamfer
Page	92	96	100
Features	New line for Heavy and Soft face milling Two different geometries for same pocket Insert geometries available for all applications materials Excellent surface finishing	Economical because double sided inserts applied Variety of insert geometries is available for all applications materials Excellent surface finishing Available in regular and fine pitch cutters	Two different geometries for same pocket Insert geometries available for all applications materials Excellent surface finishing Available in regular and fine pitch cutters

MILLING TOOLS OVERVIEW

HIFEED MILLING CUTTERS

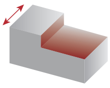
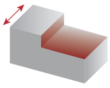
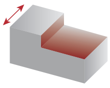
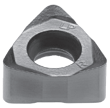
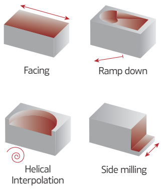
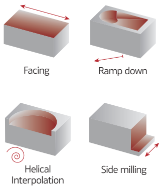
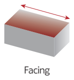
Program	TETRAFEED XN20-06 NEW	PENTA HIFEED 06320 NEW	HIFEED SO10-08	HIFEED SO10-13
	Proprietary milling line 	Proprietary milling line  METRIC LINE	Proprietary milling line 	Proprietary milling line 
Material	P M K S	P K	P M K S	P M K S
Main Operation				
Krº	20º	20º	10º	10º
Range (ØDc - in)	0.625 to 2.50	20 - 66	0.75 to 2.00	2.00 to 4.00
Insert	XNKU 06T3...	POKT 0403...	SO...0803...	SO...13M5...
				
Couplings	Arbor mounting Weldon shank Threaded coupling	Arbor mounting Cylindrical shank Threaded coupling	Arbor mounting Weldon shank Threaded coupling	Arbor mounting
Other Operations				
Page	204	110	114	120
Features	Double-sided insert with 4 cutting edges Optimized design for better chip evacuation High productivity	High feed cutting with low cutting load High productivity	High feed cutting with low cutting load High productivity	

HIFEED MILLING CUTTERS

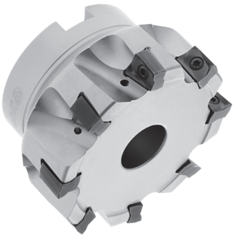
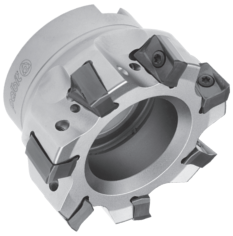
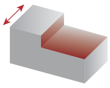
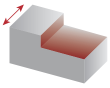
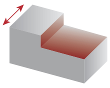
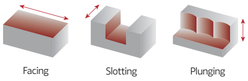
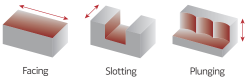
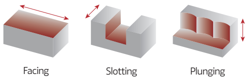
Program	HIFEED SO15-16	HIFEED WD60-12	HIFEED WN60-12	LINEPRO XP90-06 | XP90-10
	Proprietary milling line 			Proprietary milling line 
Material	P M K S	P M K S	P K	P M K S H
Main Operation				
Kr°	1.00 to 4.00 15°	-	-	90°
Range (ØDc - in)	2.50 to 6.00	2.00 to 3.00	2.00 to 4.00	0.375 to 2.50
Insert	SO...1605... 	WD...1204... 	WN...1207... 	XP...0602... | XP...1003... 
Couplings	Arbor mounting	Arbor mounting	Arbor mounting	Arbor mounting Weldon shank Threaded coupling Cylindrical shank
Other Operations				
Page	126	130	134	160 | 166
Features	High feed cutting with low cutting load High productivity	High feed cutting with low cutting load	High feed cutting with low cutting load Excellent in high overhang	New chipbreaker HF for Hifeed machining

MILLING TOOLS OVERVIEW

SHOULDER MILLING CUTTERS

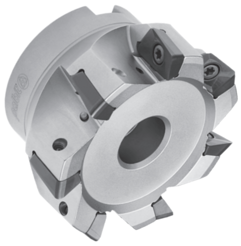
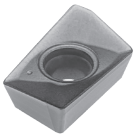
Program	HEXAPLUS WN90-08 NEW	HEXAPLUS 49590 NEW	PLUS WN90-04
	Proprietary milling line 	Proprietary milling line  METRIC LINE	Proprietary milling line 
Material	P K	P K	P K
Main Operation	 Shouldering	 Shouldering	 Shouldering
Krº	90º	90º	90º
Range (ØDc - in)	2.00 to 3.00	32 - 125	0.625 to 1.00
Insert	WNXT 0806...	WNXT 0806...	WNHU 04T308-LP
			
Couplings	Arbor mounting	Arbor mounting Weldon shank	Cylindrical shank Threaded coupling
Other Operations	 Facing Ramp down Helical Interpolation Side milling	 Facing Ramp down Helical Interpolation Side milling	 Facing
Page	138	142	146
Features	6 High rake cutting edges Excellent surface finish Strong insert seat 6 High rake cutting edges Excellent surface finish Strong insert seat		Economical because double sided inserts applied

SHOULDER MILLING CUTTERS

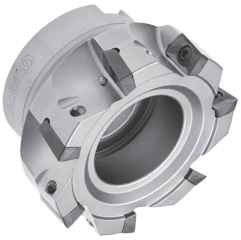
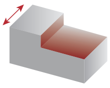
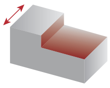
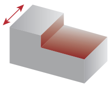
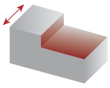
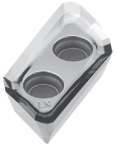
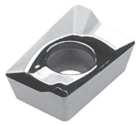
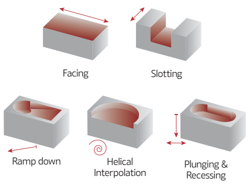
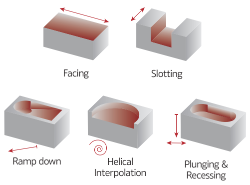
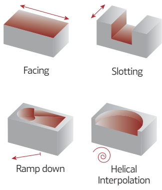
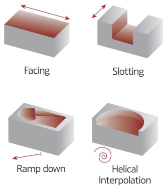
Program	PLUS AN90-10	PLUS AN90-12	PLUS AN90-16
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M K N S	P M K S	P K N
Main Operation	 Shouldering	 Shouldering	 Shouldering
Krº	90º	90º	90º
Range (ØDc - in)	0.75 to 4.00	1.00 to 4.00	1.25 to 6.00
Insert	ANHX 1004...	ANHX 1206...	ANHX 1607...
			
Couplings	Arbor mounting Weldon shank	Arbor mounting Weldon shank Threaded coupling	Arbor mounting Weldon shank
Other Operations			
Page	148	152	156
Features	4 corners insert with positive cutting edge Variety of insert geometries is available for all applications Helical cutting edge Available in regular and fine pitch cutters		

MILLING TOOLS OVERVIEW

SHOULDER MILLING CUTTERS

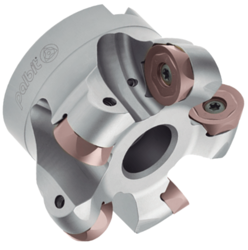
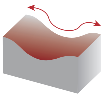
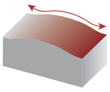
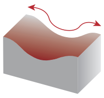
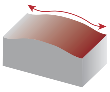
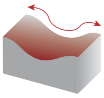
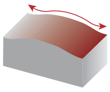
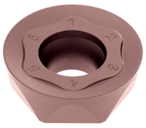
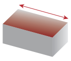
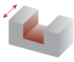
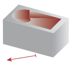
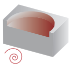
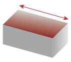
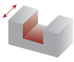
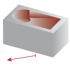
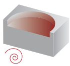
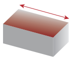
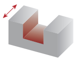
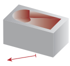
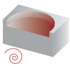
Program	LINEPRO XP90-06	LINEPRO XP90-10	LINEPRO XP90-17
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M K N S H	P M K N S H	P M K N S
Main Operation	Shouldering	Shouldering	Shouldering
Krº	90º	90º	90º
Range (ØDc - in)	0.375 to 1.25	0.625 to 2.00	1.25 to 5.00
Insert	XP...0602... 	XP...1003... 	XP...1706... 
Couplings	Cylindrical shank Threaded coupling	Arbor mounting Weldon shank Cylindrical shank Threaded coupling	Arbor mounting Weldon shank
Other Operations	Facing Slotting Ramp down Helical Interpolation Plunging	Facing Slotting Ramp down Helical Interpolation Plunging	Facing Slotting Ramp down Helical Interpolation Plunging
Page	160	166	172
Features	Excellent solution for square shoulder milling Offers longer tool life, better tolerances and better productivity parameters Low power requirement & smooth cutting possible due to positive helical angle Very flexible and suitable for most milling operations High positive cutting rake geometry		

SHOULDER MILLING CUTTERS

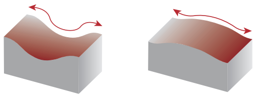
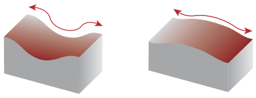
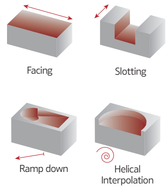
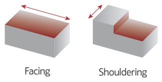
Program	ALUPRO XD90-15	ALUPRO XD90-22	LINEPRO AP90-10	LINEPRO AP90-16
	Proprietary milling line 	Proprietary milling line 		
Material	N	N	P M K N	P M K N
Main Operation	 Shouldering	 Shouldering	 Shouldering	 Shouldering
Krº	90º	90º	90º	90º
Range (ØDc - in)	0.75 to 4.00	1.25 to 5.00	0.375 to 1.50	0.875 to 6.00
Insert	XDGX 15M5...	XDGX 22M7...	AP...1003...	AP...1604...
				
Couplings	Arbor mounting Cylindrical shank	Arbor mounting Cylindrical shank	Weldon shank	Arbor mounting Weldon shank
Other Operations				
Page	178	182	186	190
Features	Solution for multi functional milling operations on aluminium alloys High speed conditions with high metal remove rate Stable clamping conditions (Anti-fly) High rake angle geometry that provides a good surface finish and low cutting forces		Strong insert and low cutting force Helical cutting edge Good chip evacuation	

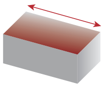
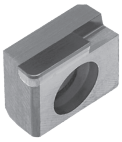
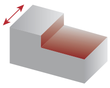
MILLING TOOLS OVERVIEW

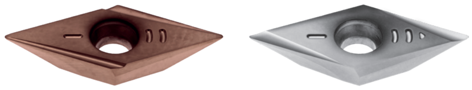
PROFILE MILLING CUTTERS

Program	TOROMILL RP90-10	TOROMILL RP90-12	TOROMILL RP90-16
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M S	P M S	P M S
Main Operation	 Profiling  Copying	 Profiling  Copying	 Profiling  Copying
Kr°	-	-	-
Range (ØDc - in)	1.00 to 2.00	2.00 to 4.00	3.00 to 5.00
Insert	RPHT 10T3...	RPHT 1204...	RPHT 1605...
			
Couplings	Arbor mounting Cylindrical shank Threaded coupling	Arbor mounting	Arbor mounting
Other Operations	 Facing  Slotting  Ramp down  Helical Interpolation	 Facing  Slotting  Ramp down  Helical Interpolation	 Facing  Slotting  Ramp down  Helical Interpolation
Page	196	196	196
Features	Excellent solution for profile milling Low power requirement & smooth cutting possible due to positive helical angle First choice for problematic materials (M and S material classes) High positive cutting rake geometry		

PROFILE MILLING CUTTERS

Program	TOROMILL RN90-12	NEW W-PRO 62090
	Proprietary milling line 	Proprietary milling line  METRIC LINE
Material	P M K S	P M K S H
Main Operation	 Profiling Copying	 Profiling Copying
Kr°	-	90°
Range (ØDc - in)	1.25 to 3.00	8 to 20 mm
Insert	RNHX 1204...	WCL... | WCR...
		
Couplings	Arbor mounting Weldon shank Threaded coupling	Cylindrical shank Threaded coupling
Other Operations	 Facing Slotting Ramp down Helical Interpolation	 Facing Shouldering
Page	202	206
Features	Excellent solution for Profile milling "First choice for problematic materials (M and S material classes) High positive cutting rake geometry	Helical profile for smooth cutting Tight Insert tolerances Carbide shank to reduce vibrations

HARDMILL	
Program	HARDMILL XN90-12
	
Material	K N
Main Operation	 Facing
Krº	90º
Range (ØDc - in)	1.50 to 4.00
Insert	XNHW 1205...
	
Couplings	Arbor mounting
Other Operations	 Shouldering
Page	210
Features	Excellent solution for aluminium PCD tip

	CENTER & CHAMFER	ENGRAVING
Program	CENTER & CHAMFER	NEW ENGRAVING 64067
		 METRIC LINE
Material	P M K	P M K S
Main Operation		
Kr°	-	-
Range (ØDc - in)	0.512	0,45 to 0,65 mm
Insert	SOMT | SOGT 11T3...	VPGT 0602...
		
Couplings	Weldon Shank	Cylindrical Shank
Other Operations	Spotting Chamfering Engraving Grooving Spot Drilling	Engraving
Page	220	222
Features	Milling tool for a wide range of center & chamfer operations	Milling tool for a wide range of engraving operations

METRIC LINES OVERVIEW

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MILLING TOOLS OVERVIEW - METRIC LINES

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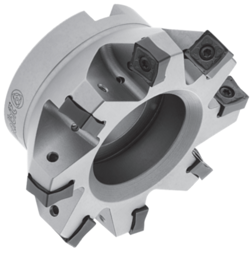
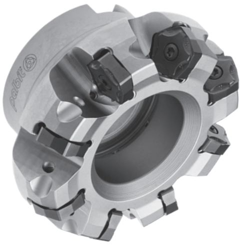
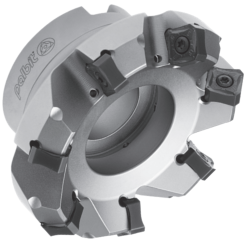
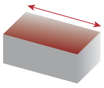
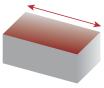
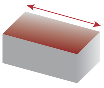
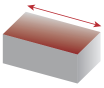
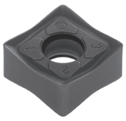
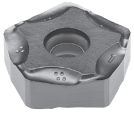
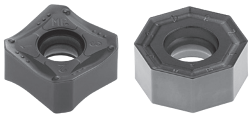
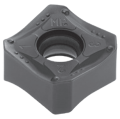
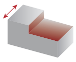
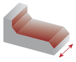
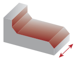
FACE MILLING CUTTERS

Program	PLUS 28088	PLUS 90260	PLUS 90845	PLUS 90945
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M K	P K	P M K N S	P M K N S
Main Operation	 Facing	 Facing	 Facing	 Facing
Krº	88º	60º	45º	45º
Range (ØDc - mm)	50 - 200	50 - 160	32 - 250	50 - 250
Insert	SN...1206...	PN...1105...	SN...1206... & ON...0505...	SN...1206...
				
Couplings	Arbor mounting	Arbor mounting	Arbor mounting Weldon shank	Arbor mounting
Other Operations	 Shouldering		 Slanted Shoulder & Chamfer	 Slanted Shoulder & Chamfer
Features	Indexable face mills with 8 helical cutting edges For rough to semi-finish with high-efficiency face milling Cutting edge angle enables performing face milling very close to the sidewall	Economical because double sided inserts applied 10 corners available improved insert design for distribution of cutting forces Excellent solution for cast iron	New line for Heavy and Soft face milling Two different geometries for same pocket Insert geometries available for all applications materials Excellent surface finishing	Economical because double sided inserts applied Variety of insert geometries is available for all applications materials Excellent surface finishing Available in regular and fine pitch cutters

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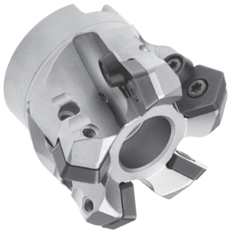
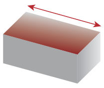
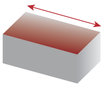
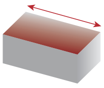
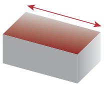
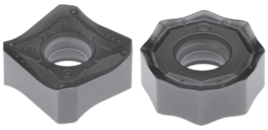
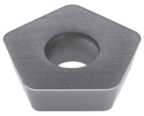
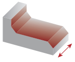
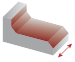
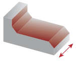
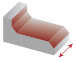
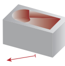
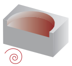
FACE MILLING CUTTERS

Program	PLUS 91245	LINEPRO 06045	LINEPRO 09945	LINEPRO 00036
	Proprietary milling line 			
Material	P M K S	P M K N	P M K N	P K
Main Operation	 Facing	 Facing	 Facing	 Facing
Krº	45º	45º	45º	36º
Range (ØDc - mm)	63 - 250	50 - 160	50 - 250	66 - 160
Insert	SN...1606... & ON...0606...	SE...1204...	SE...13T3...	PD...1204...
				
Couplings	Arbor mounting	Arbor mounting	Arbor mounting	Arbor mounting
Other Operations	 Slanted Shoulder & Chamfer	 Slanted Shoulder & Chamfer	 Slanted Shoulder & Chamfer	 Slanted Shoulder & Chamfer  Ramp down  Helical Interpolation
Features	Two different geometries for same pocket Excellent surface finishing Available in regular and fine pitch cutters	Low cutting forces Good chip flow	Low cutting forces Suitable for high-speed machining Excellent chip flow High rigidity due to carbide shim	High rake angle and low cutting forces

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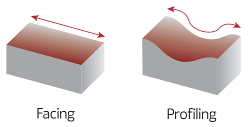
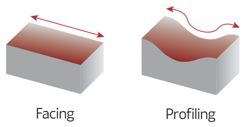
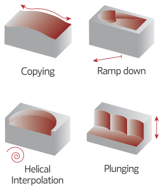
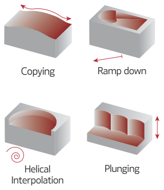
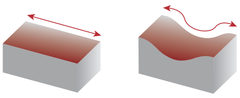
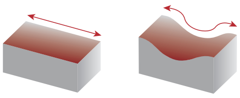
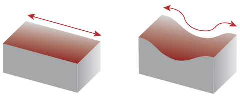
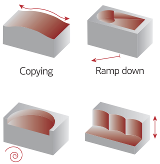
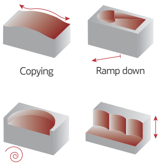
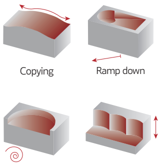
HIFEED MILLING CUTTERS

Program	TETRAFEED 16320 NEW	PENTA HIFEED 06320
	Proprietary milling line 	Proprietary milling line 
Material	P M K S	P K
Main Operation		
Krº	20º	20º
Range (ØDc - mm)	16 - 63	20 - 66
Insert	XNKU 06T3... 	POKT 0403... 
Couplings	Arbor mounting Weldon shank Threaded coupling	Arbor mounting Cylindrical shank Threaded coupling
Other Operations		
Features	Double-sided insert with 4 cutting edges Optimized design for better chip evacuation High productivity	High feed cutting with low cutting load High productivity

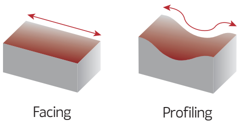
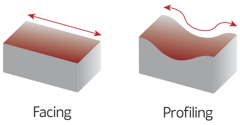
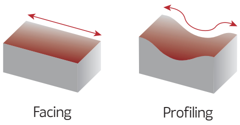
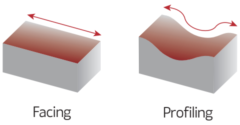
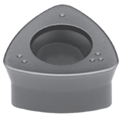
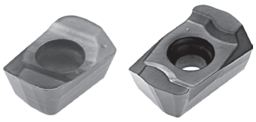
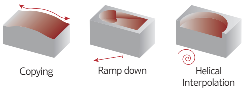
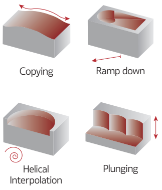
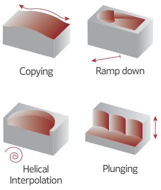
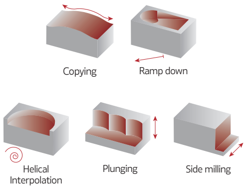
METRIC LINES available at **www.palbitusa.com**

HIFEED MILLING CUTTERS

Program	HIFEED 06410	HIFEED 06690	HIFEED 06815
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M K S	P M K S	P M K S
Main Operation			
Kr°	10°	10°	15°
Range	20 - 42	32 - 100	63 - 160
Insert	SO...0803...	SO...13M5...	SO...1605...
			
Couplings	Weldon shank Threaded coupling	Arbor mounting Threaded coupling	Arbor mounting
Other Operations			
Features	High feed cutting with low cutting load High productivity		

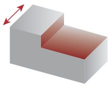
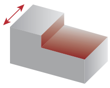
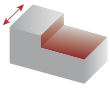
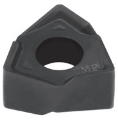
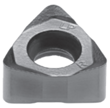
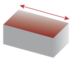
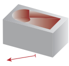
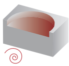
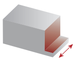
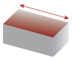
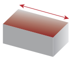
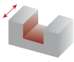
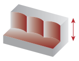
METRIC LINES available at **www.palbitusa.com**

HIFEED MILLING CUTTERS

Program	HIFEED 50560	HIFEED 50060	HIFEED 06590	PRO 20090 | 20190
				Proprietary milling line 
Material	P M K S	P K	P M K	P M K S
Main Operation				
Kr°	-	-	10°	90°
Range	52 - 80	35 - 80	20 - 42	10 - 63
Insert	WD...1204...	WN...1207...	SP...08T3...	XPET 0602... - HF | XPET 1003... - HF
				
Couplings	Arbor mounting	Arbor mounting Threaded coupling	Weldon shank Threaded coupling	Arbor mounting Weldon shank Cylindrical shank Threaded coupling
Other Operations				
Features	High feed cutting with low cutting load	High feed cutting with low cutting load Excellent in high overhang	High feed cutting with low cutting load	Chipbreaker HF for Hifeed machining

METRIC LINES available at **www.palbitusa.com**

SHOULDER MILLING CUTTERS

Program	HEXAPLUS 49590 NEW	PLUS 49090	PLUS 17190
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P K	P K	P M K N S
Main Operation	 Shouldering	 Shouldering	 Shouldering
Krº	90º	90º	90º
Range (ØDc - mm)	32 - 125	16 - 32	14 - 100
Insert	WNXT 0806...	WNHU 04T308-LP	ANHX 1004...
			
Couplings	Arbor mounting Weldon shank	Cylindrical shank Threaded coupling	Arbor mounting Weldon shank
Other Operations	 Facing  Ramp down  Helical Interpolation  Side milling	 Facing	 Facing  Slotting  Plunging
Features	6 High rake cutting edges Excellent surface finish Strong insert seat	Economical because double sided inserts applied	4 corners insert with positive cutting edge Variety of insert geometries is available for all applications Helical cutting edge Available in regular and fine pitch cutters

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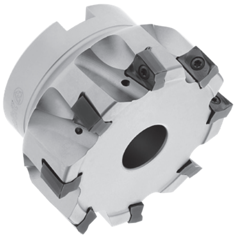
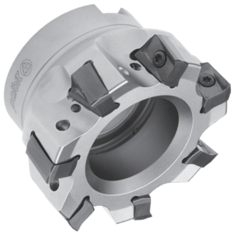
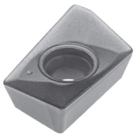
SHOULDER MILLING CUTTERS

Program	PLUS 17590	PLUS 18190	LINEPRO 20090	LINEPRO 20190
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M K S	P K N	P M K N S H	P M K N S H
Main Operation	Shouldering	Shouldering	Shouldering	Shouldering
Krº	90º	90º	90º	90º
Range (ØDc - mm)	25 - 125	32 - 160	10 - 32	16 - 63
Insert	ANHX 1206... 	ANHX 1607... 	XP...0602... 	XP...1003... 
Couplings	Arbor mounting Weldon shank Cylindrical shank Threaded coupling	Arbor mounting Weldon shank Threaded coupling	Cylindrical shank Threaded coupling	Arbor mounting Weldon shank Cylindrical shank Threaded coupling
Other Operations	Facing Slotting Plunging	Facing Slotting Plunging	Facing Slotting Ramp down Helical Interpolation Plunging	Facing Slotting Ramp down Helical Interpolation Plunging
Features	4 corners insert with positive cutting edge Variety of insert geometries is available for all applications Helical cutting edge Available in regular and fine pitch cutters		Excellent solution for square shoulder milling Offers longer tool life, better tolerances and better productivity parameters Low power requirement & smooth cutting possible due to positive helical angle Very flexible and suitable for most milling operations High positive cutting rake geometry	

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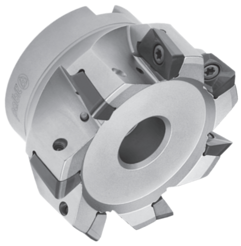
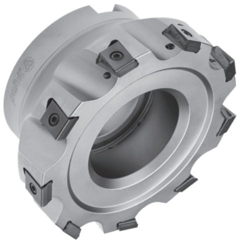
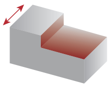
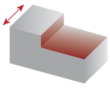
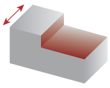
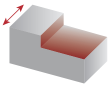
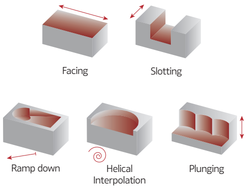
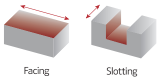
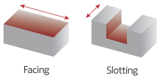
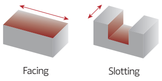
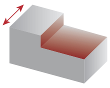
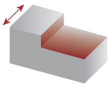
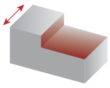
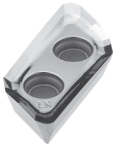
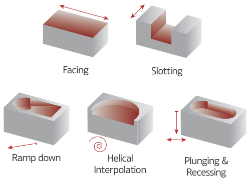
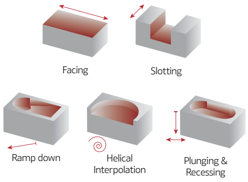
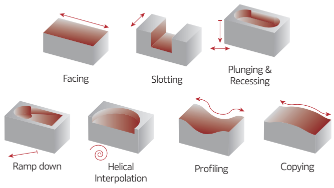
SHOULDER MILLING CUTTERS

Program	LINEPRO 20290	TGPLUS 90090	TGPLUS 90190	TGPLUS 90390
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M K N S	P M K	P M K	P K
Main Operation				
Krº	90º	90º	90º	90º
Range (ØDc - mm)	32 - 125	16 - 63	25 - 125	50 - 160
Insert	XP...1706...	LNXT 0904...	LNXT 1306...	LNXT 1506...
				
Couplings	Arbor mounting Weldon shank	Arbor mounting Weldon shank Cylindrical shank Threaded coupling	Arbor mounting Cylindrical shank Weldon shank	Arbor mounting
Other Operations				
Features	Excellent solution for square shoulder milling Offers longer tool life, better tolerances and better productivity parameters Low power requirement & smooth cutting possible due to positive helical angle	Tangential inserts with 4 corners available High rake angle insert reduces cutting force Excellent insert rigidity and excellent machining stability Improved pocket configuration Available in regular and fine pitch cutters		

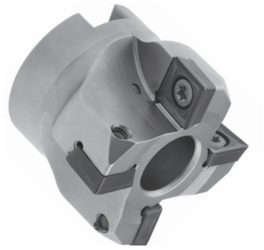
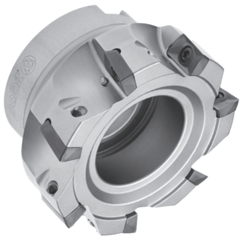
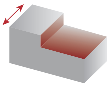
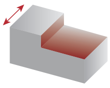
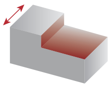
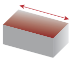
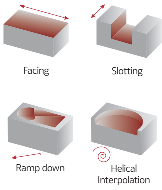
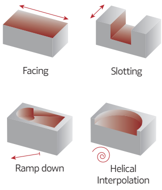
METRIC LINES available at **www.palbitusa.com**

SHOULDER MILLING CUTTERS

Program	ALUPRO 76090	ALUPRO 77090	ALUPRO 08390
	Proprietary milling line 	Proprietary milling line 	
Material	N	N	N
Main Operation	 Shouldering	 Shouldering	 Shouldering
Kr°	90º	90º	90º
Range (ØDc - mm)	20 - 100	32 - 125	32
Insert	XDGX 15M5...	XDGX 22M7...	VCGX 2205...
			
Couplings	Arbor mounting Cylindrical shank	Arbor mounting Cylindrical shank	Threaded coupling
Other Operations			
Features	Solution for multi functional milling operations on aluminium alloys High speed conditions with high metal remove rate Stable clamping conditions (Anti-fly) High rake angle geometry that provides a good surface finish and low cutting forces		Excellent chip flow

METRIC LINES available at **www.palbitusa.com**

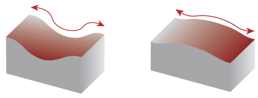
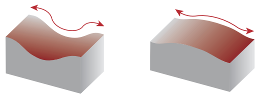
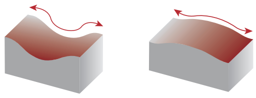
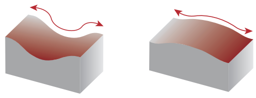
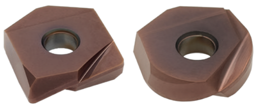
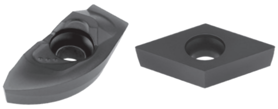
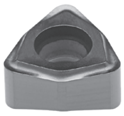
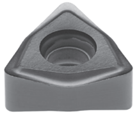
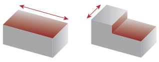
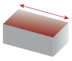
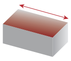
SHOULDER MILLING CUTTERS

Program	LINEPRO 06290 NEW	LINEPRO 17090	LINEPRO 18090
			
Material	P M K S	P M K N	P M K N
Main Operation	 Shouldering	 Shouldering	 Shouldering
Kr°	90°	90°	90°
Range (ØDc - mm)	40 - 160	16 - 63	25 - 125
Insert	SP...1204...	AP...1003...	AP...1604...
			
Couplings	Arbor mounting	Arbor mounting Weldon shank Threaded coupling	Arbor mounting Weldon shank
Other Operations	 Facing	 Facing Slotting Ramp down Helical Interpolation	 Facing Slotting Ramp down Helical Interpolation
Features	Positive inserts with 4 cutting edges Recommended for conventional milling machines and machining centers	Strong insert and low cutting force Helical cutting edge Good chip evacuation	

MILLING TOOLS OVERVIEW - METRIC LINES

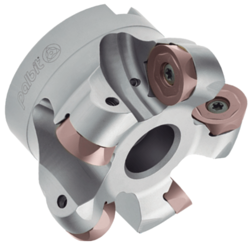
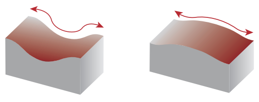
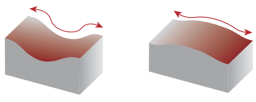
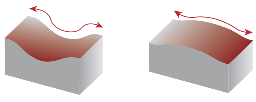
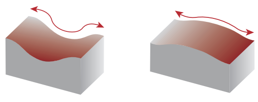
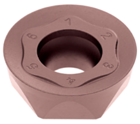
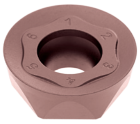
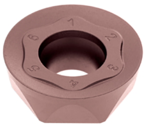
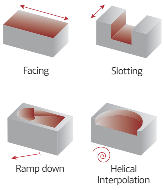
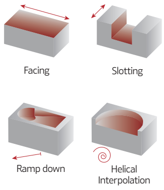
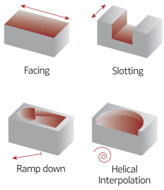
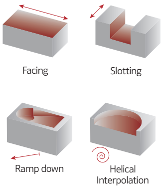
METRIC LINES available at **www.palbitusa.com**

PROFILE MILLING CUTTERS

Program	W-PRO 62090 NEW	BALLPRO 63090 NEW	PLUS 49095	PLUS 45095
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M K S H	P K	P K H	P K H
Main Operation				
Krº	90º	-	95º	95º
Range (ØDc - mm)	8 - 20	32	16 - 35	25 - 42
Insert	WCL... | WCR... 	XPGT 3206... | DCMW 11T3... 	WNHU 04T3... 	WNHU 0604... 
Couplings	Cylindrical shank Threaded coupling	Threaded coupling	Threaded coupling	Threaded coupling
Other Operations		-		
Features	Helical profile for smooth cutting Tight Insert tolerances Carbide shank to reduce vibrations	Designed for finishing and semi-finishing Strong insert design Stable cutting performance	Economical because double sided inserts applied Designed for finishing and profile miling Robust geometry	

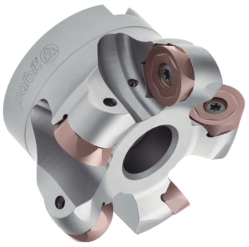
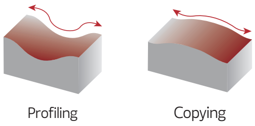
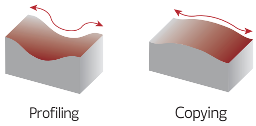
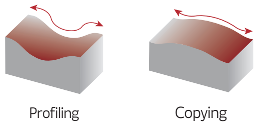
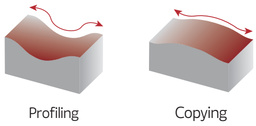
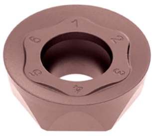
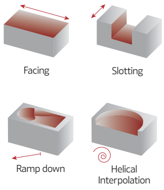
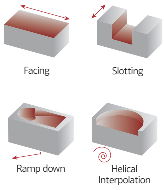
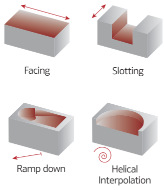
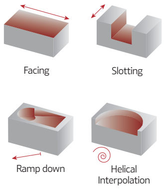
METRIC LINES available at **www.palbitusa.com**

PROFILE MILLING CUTTERS

Program	TOROMILL 33590	TOROMILL 33690	TOROMILL 33790	TOROMILL 33890
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M S	P M S	P M S	P M S
Main Operation	 Profiling Copying	 Profiling Copying	 Profiling Copying	 Profiling Copying
Krº	-	-	-	-
Range (ØDc - mm)	16 -32	20 - 52	40 - 80	50 - 125
Insert	RDHT 0802...	RPHT 10T3...	RPHT 1204...	RPHT 1605...
				
Couplings	Cylindrical shank Threaded coupling	Arbor mounting Cylindrical shank Threaded coupling	Arbor mounting	Arbor mounting
Other Operations				
Features	Excellent solution for Profile milling Low power requirement & smooth cutting possible due to positive helical angle First choice for problematic materials (M and S material classes) High positive cutting rake geometry			

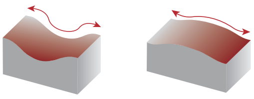
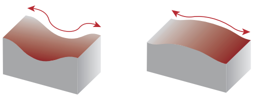
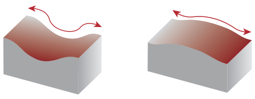
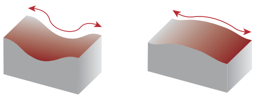
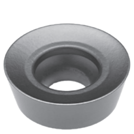
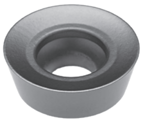
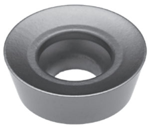
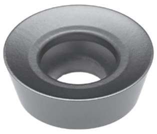
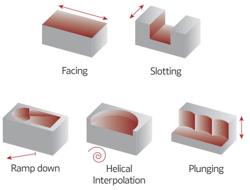
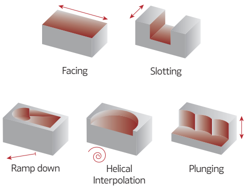
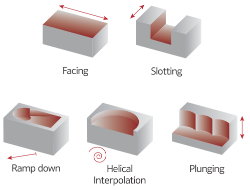
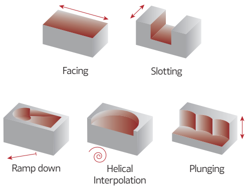
METRIC LINES available at **www.palbitusa.com**

PROFILE MILLING CUTTERS

Program	TOROMILL 33990	TURBOMILL 34190 NEW	TURBOMILL 34290 NEW	TOROMILL X2 35190
	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 	Proprietary milling line 
Material	P M S	P M S	P M S	P M K S
Main Operation				
Kr°	-	-	-	-
Range (ØDc - mm)	80 - 125	42 - 52	40 - 80	32 - 80
Insert	RPHT 2006...	RPHT 10T3...-LS(4)	RPHT 1204...-LS(4)	RNHX 1204...
				
Couplings	Arbor mounting	Arbor mounting	Arbor mounting	Arbor mounting Weldon shank Threaded coupling
Other Operations				
Features	Excellent solution for Profile milling Low power requirement & smooth cutting possible due to positive helical angle First choice for problematic materials (M and S material classes) High positive cutting rake geometry	Excellent solution for Profile milling First choice for problematic materials (M and S material classes) Improved insert seat		Excellent solution for Profile milling “First choice for problematic materials (M and S material classes) High positive cutting rake geometry

METRIC LINES available at **www.palbitusa.com**

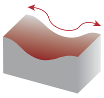
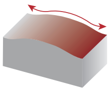
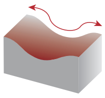
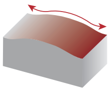
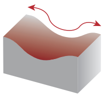
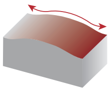
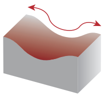
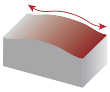
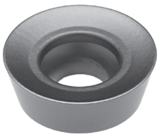
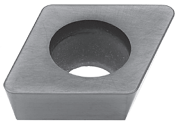
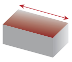
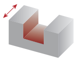
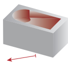
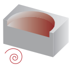
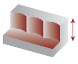
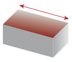
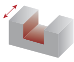
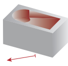
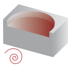
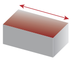
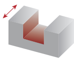
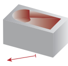
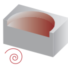
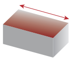
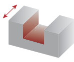
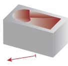
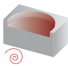
PROFILE MILLING CUTTERS

Program	TOROMILL 24590	TOROMILL 25090	TOROMILL 25190	TOROMILL 25290
				
Material	P K H	P K H	P K H	P K H
Main Operation				
Kr°	-	-	-	-
Range (ØDc - mm)	15 - 20	20 - 52	24 - 80	32 - 160
Insert	RD...0702...	RD...1003...	RD...12T3...	RD...1604...
				
Couplings	Weldon shank Threaded coupling	Arbor mounting Weldon shank Threaded coupling	Arbor mounting Weldon shank Threaded coupling	Arbor mounting Threaded coupling
Other Operations				
Features	Offers longer tool life, better tolerances and better productivity parameters Low power requirement & smooth cutting possible due to positive helical angle Very flexible and suitable for most milling operations High positive cutting rake geometry			

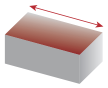
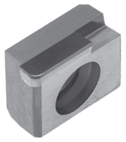
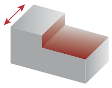
MILLING TOOLS OVERVIEW - METRIC LINES

METRIC LINES available at **www.palbitusa.com**

PROFILE MILLING CUTTERS

Program	TOROMILL 25390	LINEPRO 40095	LINEPRO 40595	LINEPRO 41095
				
Material	P K H	P K N H	P K N H	P K N H
Main Operation	 Profiling  Copying	 Profiling  Copying	 Profiling  Copying	 Profiling  Copying
Krº	-	95º	95º	95º
Range (ØDc - mm)	80 - 160	16 - 25	25 - 80	10 - 12
Insert	RD...2006...	XD...0602...	XD...10T3...	XD...0401...
				
Couplings	Arbor mounting	Threaded coupling	Arbor mounting Threaded coupling	Threaded coupling
Other Operations	 Facing  Slotting  Ramp down  Helical Interpolation  Plunging	 Facing  Slotting  Ramp down  Helical Interpolation	 Facing  Slotting  Ramp down  Helical Interpolation	 Facing  Slotting  Ramp down  Helical Interpolation
Features	Offers longer tool life, better tolerances and better productivity parameters Low power requirement & smooth cutting possible due to positive helical angle Very flexible and suitable for most milling operations High positive cutting rake geometry	Designed for finishing and profile milling Low power consumption		

METRIC LINES available at **www.palbitusa.com**

	HARDMILL	CENTER & CHAMFER	SPOT FACE
Program	HARDMILL 72090	CENTER & CHAMFER	SPOT FACE
			
Material	K N	P M K	P M K
	 Facing		
Kr°	90°	-	-
Range (ØDc - mm)	40 - 160	13	10 - 21
Insert	XNHW 1205...	SOMT|SOGT 11T3...	SPKX 05... | 06... | 07... | 09...
			
Couplings	Arbor mounting	Weldon Shank	Weldon Shank Cylindrical shank
	 Shouldering	Spotting Chamfering Engraving Grooving Spot Drilling	Spot face
Features	Excellent solution for aluminium PCD tip	Milling tool for a wide range of center & chamfer operations	Economical solution Smooth cutting

ANYTIME, ANYWHERE

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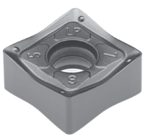
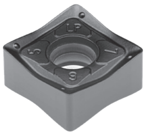
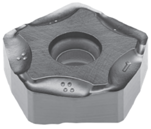
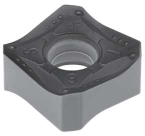
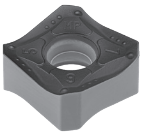
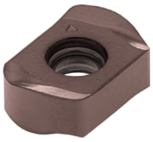
MILLING INSERTS OVERVIEW

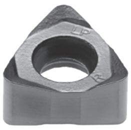
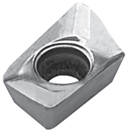
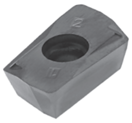
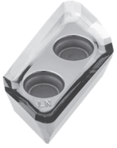
FACE MILLING INSERTS

Reference	SNHU	SNKU	PNHX	PNKX	SNHX	SNKX
	Proprietary milling insert 	Proprietary milling insert 			Proprietary milling insert 	Proprietary milling insert 
Size	12	12	11	11	12 | 16	12 | 16
Material	P M K	P M K	P K	P K	P M K N S	P K
Page	85	85	89	89	93 | 97 | 101	93 | 97 | 101

HIFEED MILLING INSERTS

Reference	XNKU NEW	POKT NEW	SOEW	SOET	WDET	WDMW
	Proprietary milling insert 	Proprietary milling insert 	Proprietary milling insert 	Proprietary milling insert 	Proprietary milling insert 	
Size	06	04	08 | 13 | 16	08 | 13 | 16	12	12
Material	P M K S	P K	P K	P M S	P M S	P K
Page	105	111	115 | 121 | 127	115 | 121 | 127	131	131

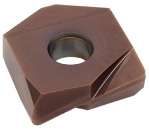
SHOULDER MILLING INSERTS

Reference	WNXT NEW	WNHU	ANHX	XPET	XPHW	XDGX
	Proprietary milling insert 	Proprietary milling insert 	Proprietary milling insert 	Proprietary milling insert 	Proprietary milling insert 	Proprietary milling insert 
Size	08	04	10 | 12 | 16	06 | 10 | 17	06 | 10	15 | 22
Material	P K	P K	P M K N S	P M K N S	P H	N
Page	138 | 142	157	149 | 153 | 157	161 | 168 | 173	161 | 168	179 | 183

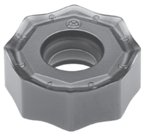
PROFILE MILLING INSERTS

Reference	RPHT	RNHX
	Proprietary milling insert 	Proprietary milling insert 
Size	10 | 12 | 16	12
Material	P M S	P M K S
Page	198	203

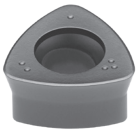
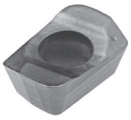
PROFILE MILLING INSERTS - METRIC LINE

Reference	WCR NEW	WCL NEW
	Proprietary milling insert 	Proprietary milling insert 
Size	08 | 10 | 12 | 16 | 20	08 | 10 | 12 | 16 | 20
Material	P M K N S H	P M K N S H
Page	107	108

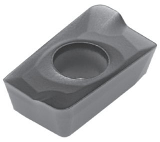
FACE MILLING INSERTS

Reference	ONHX	ONHX-LS NEW	ONKX
	Proprietary milling insert 	Proprietary milling insert 	Proprietary milling insert 
Size	05 | 06	06	05 | 06
Material	P M K S	M S	P M K S
Page	93 | 101	101	93 | 101

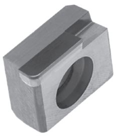
HIFEED MILLING INSERTS

Reference	WNMW	XPET...HF
		Proprietary milling insert 
Size	12	06 | 10
Material	P K	P M K S
Page	135	161 | 168

SHOULDER MILLING INSERTS

Reference	APKT	APET	APHT
			
Size	10 | 16	10	16
Material	P M K N	N	N
Page	186 | 192	186	192

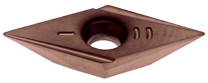
HARDMILL MILLING INSERTS

Reference	XNHW
	
Size	12
Material	K N
Page	231

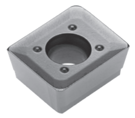
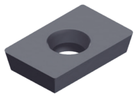
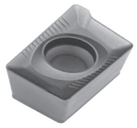
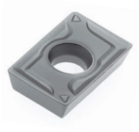
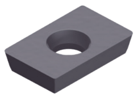
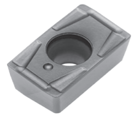
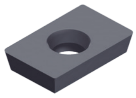
CENTER & CHAMFER INSERTS

Reference	SOMT	SOGT NEW
		
Size	11	11
Material	P M K	P M K
Page	220	220

ENGRAVING INSERTS

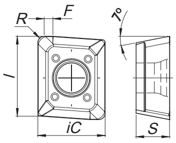
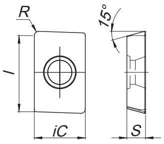
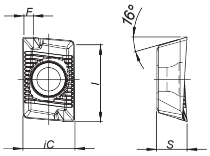
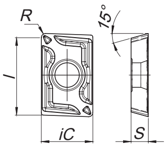
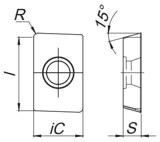
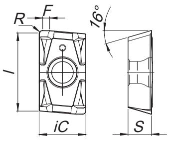
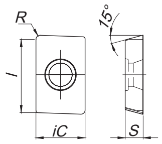
Reference	VPGT NEW
	METRIC LINE 
Size	06
Material	P M N S
Page	222

MILLING INSERTS OVERVIEW

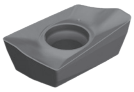
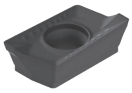
Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P							M			K									N
			PVD							PVD			CVD		PVD						UNC	UNC
		(2) Grade code	M6	54	68	66	78	86	I5	68	66	I5	L5	L9	D2	54	68	67	66	I5	17	10
			PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5705	PH5740	PH6705	PH6910	PH6920	PH6325	PH6930	PH6740	PH0325	PH0910
	1111423	ACET 150612 TR			●			△		●							●					
	1110005	ADHW 150308 R			○												○					
	1110006	ADKT 1505 PDR			●	○				●	○						●		○			
	1111218	ADKT 1505 PDSR			◉	●				◉	●						◉		●			
	1111209	ADKT 1505 PDTR			●	○				●	○						●		○			
	1110010	ADMT 150308R			○			○		○							○					
	1110011	ADMW 150308R			○												○					
	1110014	APFT 1604 PDFR			○												○					
	1110015	APFT 1604 PDSR			●					●							●					
	1110557	APFT 1604 PDTR			○												○					
	1111184	APFW 1604 PDER			○												○					
	1110016	APFW 1604 PDTR			○												○					

◉ First choice | 1ª Escolha | 1ª Opción
● Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
						
0.500	0.250	0.591	0.047	-	0.067	
						
0.375	0.125	0.591	0.031	-	-	
0.376	0.222	0.618	-	-	0.063	
0.376	0.222	0.618	-	-	0.063	
0.376	0.222	0.618	-	-	0.063	
						
0.375	0.125	0.591	0.031	-	-	
						
0.375	0.125	0.591	0.031	-	-	
0.375	0.187	0.630	0.031	-	0.079	
0.375	0.187	0.630	0.031	-	0.079	
0.375	0.187	0.630	0.031	-	0.079	
0.375	0.187	0.630	0.031	-	0.079	
0.375	0.187	0.630	0.031	-	0.079	

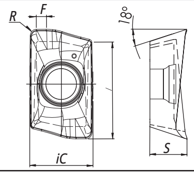
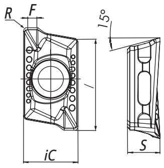
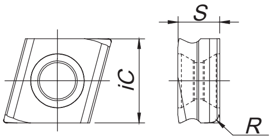
MILLING INSERTS OVERVIEW

			P							M		K						S			N
			PVD							PVD		PVD						PVD			UNC
		(2) Grade code	G1	54	68	G4	P3	86	I5	P3	66	G1	54	G4	68	P3	I5	P3	G6	I5	10
Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	PH7910	PH6910	PH6920	PH7920	PH7930	PH6135	PH6740	PH7930	PH6930	PH7910	PH6910	PH7920	PH6920	PH7930	PH6740	PH7930	PH7740	PH6740	PH0910
	1112192	BOMT 130408R			○										○						
	1110038	BCKT 1304 PDR						○													
	1112194	ENHQ 090400 R			○																
	1110617	ENHQ 090400-L			○																
	1112208	ENHQ 090408-L			○																
	1112207	ENHQ 090408-R			○																
	1111037	ENHQ 120600 L			○																
	1110790	ENHQ 120600 R			○																
	1110730	ENHQ 120610 L			○																
	1110729	ENHQ 120610 R			○																
	1111353	ENHQ 120630 TR			○																
	1110793	ENHQ 120640 R			○																

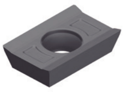
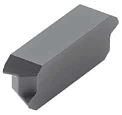
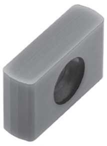
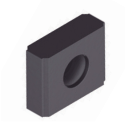
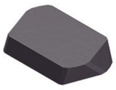
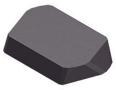
First choice | 1ª Escolha | 1ª Opción
Stock Itens | Itens de stock

△ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock
○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.320	0.191	0.453	0.047	-	0.055	
0.331	0.193	0.504	0.024	-	0.055	
0.375	0.187	-	-	-	-	
0.375	0.187	-	-	-	-	
0.375	0.187	-	0.031	-	-	
0.375	0.187	-	0.031	-	-	
0.500	0.250	-	-	-	-	
0.500	0.250	-	-	-	-	
0.500	0.250	-	0.039	-	-	
0.500	0.250	-	0.039	-	-	
0.500	0.250	-	0.118	-	-	
0.500	0.250	-	0.157	-	-	

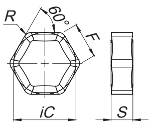
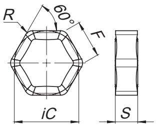
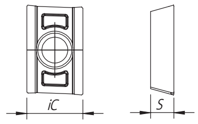
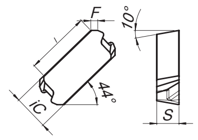
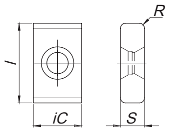
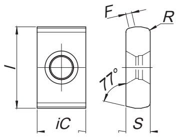
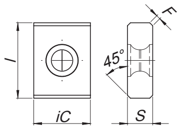
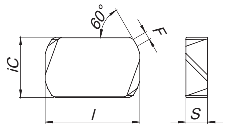
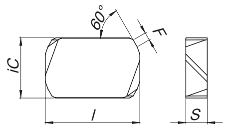
MILLING INSERTS OVERVIEW

Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P							M		K								N
			PVD							PVD		CVD		PVD					UNC	UNC
		(2) Grade code	M6	54	68	66	78	86	I5	68	66	L5	L9	D2	54	68	67	I5	17	10
			PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH5705	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0325	PH0910
	1110922	HNGF 090520 - V										◉				⊚	△			
	1110957	HNGF 090520 - W										◉		⊚	△					
	1112410	LDHT 15T3			○															
	1112388	LNCX 1806 AZ R-11			○											○		○		
	1112428	LNCX 1806 AZ L-11			○											○		○		
	1111876	LNE 323-02														○				
	1111877	LNE 323-10														○				
	1110952	LNE 323-02 SP														○				
	1111420	LNE 434-02														○				
	1111416	LNJN 2205 DDSR-A1														○				
	1111351	LNJN 3007 DDTP-SP														○				

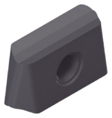
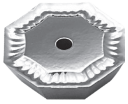
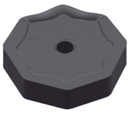
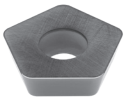
◉ First choice | 1ª Escolha | 1ª Opción
⊚ Stock Itens | Itens de stock
△ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock
○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.638	0.219	0.361	0.079	-	-	
0.368	0.219	0.361	0.079	-	-	
0.375	0.156	-	-	-	-	
0.394	0.252	0.739	-	-	0.079	
0.394	0.252	0.739	-	-	0.079	
0.375	0.187	0.625	-	-	0.016	
0.375	0.187	0.625	0.050	-	-	
0.375	0.187	0.625	0.031	-	0.047	
0.562	0.250	0.750	-	-	0.031	
0.551	0.197	0.866	-	0.079	-	
0.630	0.276	1.181	-	0.079	-	

MILLING INSERTS OVERVIEW

			P							M			K							N
			PVD							PVD			CVD	PVD					UNC	UNC
		(2) Grade code	M6	54	68	66	78	86	I5	68	66	I5	L9	D2	54	68	67	I5	17	10
Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0325	PH0910
	1123709	LNUJ 220920S R			○															
	1111518	OFEN 070405 TN		⊛	◉				⊛				△		⊛	◉		⊛		
	1111569	OFKR 070408 FN-LN																		⊛
	1111568	OFKR 070408 SN-MP		⊛	◉		⊛		⊛			⊛			⊛	◉		⊛		
	1112015	ONEF 090520 ZZTN-W-14											○							
	1112016	ONMF 090520 ANTN-MK-16											○					○		
	1110554	PDHW 120420 T			◉		⊛	⊛								⊛				
	1110555	PDMW 120420 T		△	△		⊛	⊛												

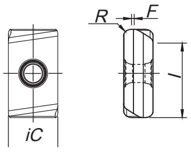
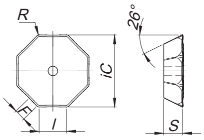
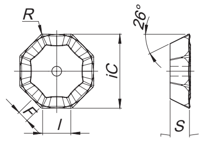
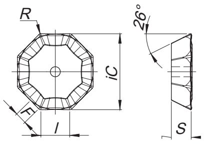
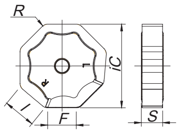
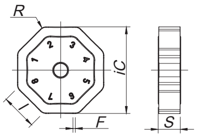
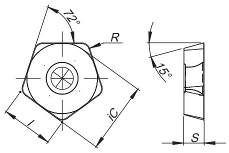
◉ First choice | 1ª Escolha | 1ª Opción

⊛ Stock Itens | Itens de stock

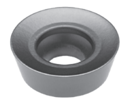
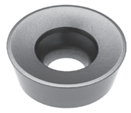
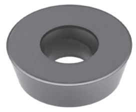
△ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

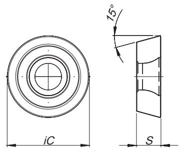
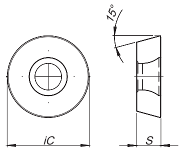
Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.625	0.372	0.945	-	0.039	-	
0.709	0.187	0.291	0.024	-	0.087	
0.709	0.187	0.291	0.024	-	0.087	
0.709	0.187	0.291	0.024	-	0.063	
0.866	0.219	0.354	0.079	-	0.354	
0.866	0.219	0.354	0.079	-	0.024	
0.650	0.188	0.472	0.079	-	-	
0.650	0.188	0.472	0.079	-	-	

MILLING INSERTS OVERVIEW

Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P							M			K					N	H	
			PVD							PVD			PVD					PCD	PVD	CBN
		(2) Grade code	M6	54	68	66	78	86	I5	68	66	I5	D2	54	68	67	66	D6	M6	D4
			PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH6705	PH6910	PH6920	PH6325	PH6930	PDP410	PH6103	PBH910
	1112040	RDHT 12T3 M0S-MP			★		○		●											
	1112039	RDHT 1604 M0S-MP			★		○		●											
	1110082	RDHT 1003 M0T					★	●												
	1110083	RDHT 12T3 M0T					★	●												
	1110084	RDHT 1604 M0T					★	●												
	1110672	RDHT 2006 M0T					○	○												
	2110530	RDHW 0702 M0T 02020																		○
	2110531	RDHW 1003 M0T 02020																		○
	1110961	RDHW 0702 M0F																○		
	1110548	RDHW 0702 M0T	●	●	★		△	△						●	★				●	
	1110962	RDHW 1003 M0F																○		
	1110087	RDHW 1003 M0T	●	●	★			●						●	★				●	
	1110090	RDHW 12T3 M0T	●	●	★			●						●	★				●	
	1110092	RDHW 1604 M0T	●	●	★			●						●	★				●	
	1111217	RDHW 2006 M0T			○		○	○												
	1110583	RDMT 1003 M0T					★	●												
	1110558	RDMT 12T3 M0T					★	●												
	1110556	RDMT 1604 M0T					★	●												
	1110659	RDMT 2006 M0T					○	○												
	1110549	RDMW 1003 M0T			●		★	●							●					
	1110096	RDMW 12T3 M0T		△	●	△	★	●							●		△			
	1110097	RDMW 1604 M0T			●	△	★	●					△		●		△			
	1110869	RDMW 2006 M0T					★	○							○					
	1112133	RPEW 1204 M0			○						○				○					
	1121079	RPMW 1003 M0			○						○				○					
	1120454	RPMW 1204 M0T			○						○				○					
	1121742	RPMT 1003 M0T			○										○					
	1120448	RPMT 1204 M0T			○										○					

★ First choice | 1ª Escolha | 1ª Opción
● Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.472	0.156	-	-	-	-	
0.630	0.188	-	-	-	-	
0.394	0.125	-	-	-	-	
0.472	0.156	-	-	-	-	
0.630	0.188	-	-	-	-	
0.787	0.250	-	-	-	-	
0.276	0.094	-	-	-	-	
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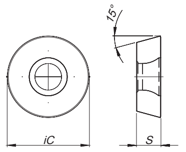
0.276	0.094	-	-	-	-	
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0.394	0.125	-	-	-	-	
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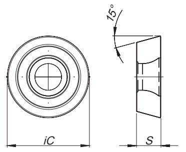
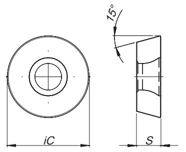
0.630	0.188	-	-	-	-	
0.787	0.250	-	-	-	-	
0.394	0.125	-	-	-	-	
0.472	0.156	-	-	-	-	
0.630	0.188	-	-	-	-	
0.787	0.250	-	-	-	-	
0.394	0.125	-	-	-	-	
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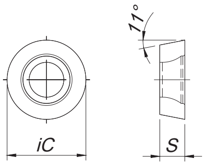
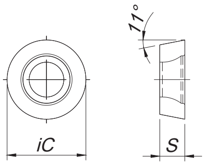
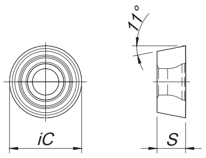
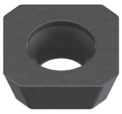
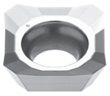
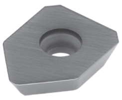
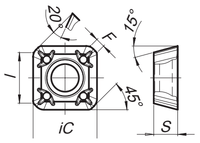
0.630	0.188	-	-	-	-	
0.787	0.250	-	-	-	-	
0.472	0.187	-	-	-	-	
0.394	0.125	-	-	-	-	
0.472	0.187	-	-	-	-	
0.394	0.125	-	-	-	-	
0.472	0.187	-	-	-	-	

MILLING INSERTS OVERVIEW

Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P	P	P	P	P	P	P	M	M	M	K	K	K	K	K	K	K	N
			PVD							PVD			CVD	PVD					UNC	UNC
		(2) Grade code	M6	54	68	66	78	86	15	68	66	15	L9	D2	54	68	67	15	17	10
			PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0325	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			○											○				
	1110576	SEHT 09T3 AFTN			○											○				
	1110218	SEHT 1204 AFTN			◉				◎			◎				◉		◎		
	1110216	SEHT 1204 AFEN			◉				◎			◎				◉		◎		
	1110559	SEHT 13T3 AGSN			◉				◎			◎				◉		◎		
	1110931	SEHT 13T3 AGTN			○		△					○				○		○		
	1112283	SEHT 1204 AFFN-LN																		◎
	1111586	SEHT 13T3 AGFN-LN																		◎
	1110627	SEHT 13T3 AGSN-W			◎		△	△								◎				

◉ First choice | 1ª Escolha | 1ª Opción
◎ Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

<table>
<tr><th colspan="6">Dimensions (in) | Dimensões (in) | Dimensiones (in)</th><th rowspan="2">Drawing</th></tr>
<tr><th>ic</th><th>S</th><th>l</th><th>R</th><th>a</th><th>F</th></tr>
<tr><td>0.500</td><td>0.187</td><td>0.394</td><td>-</td><td>-</td><td>0.071</td><td rowspan="2"> </td></tr>
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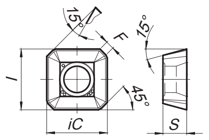
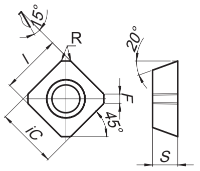
<tr><td>0.500</td><td>0.187</td><td>0.394</td><td>-</td><td>-</td><td>0.071</td><td> </td></tr>
<tr><td>0.375</td><td>0.156</td><td>0.287</td><td>0.012</td><td>-</td><td>0.059</td><td rowspan="5"> </td></tr>
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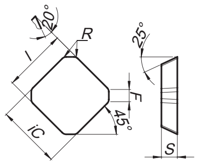
<tr><td>0.500</td><td>0.187</td><td>0.354</td><td>-</td><td>-</td><td>0.098</td></tr>
<tr><td>0.625</td><td>0.187</td><td>-</td><td>0.047</td><td>-</td><td>-</td></tr>
<tr><td>0.500</td><td>0.125</td><td>0.362</td><td>0.031</td><td>-</td><td>0.094</td><td rowspan="6"> </td></tr>
<tr><td>0.500</td><td>0.125</td><td>0.362</td><td>0.031</td><td>-</td><td>0.094</td></tr>
<tr><td>0.500</td><td>0.125</td><td>0.362</td><td>0.047</td><td>-</td><td>0.094</td></tr>
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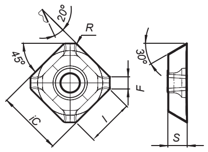
<tr><td>0.625</td><td>0.187</td><td>0.457</td><td>0.039</td><td>-</td><td>0.094</td></tr>
<tr><td>0.375</td><td>0.156</td><td>0.287</td><td>-</td><td>-</td><td>0.059</td><td rowspan="5"> </td></tr>
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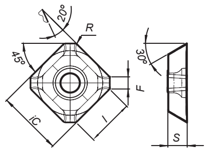
<tr><td>0.526</td><td>0.156</td><td>0.394</td><td>-</td><td>-</td><td>0.079</td></tr>
<tr><td>0.500</td><td>0.188</td><td>0.500</td><td>-</td><td>-</td><td>0.079</td><td rowspan="2"> </td></tr>
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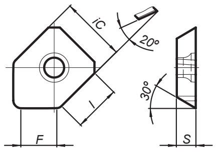
<tr><td>0.526</td><td>0.156</td><td>0.394</td><td>-</td><td>-</td><td>0.323</td><td> </td></tr>
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MILLING INSERTS OVERVIEW

			P								M			K						N
			PVD								PVD			CVD	PVD					UNC
		(2) Grade code	M6	54	G4	68	66	78	86	I5	68	66	I5	L9	D2	54	68	67	I5	10
Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	PH6103	PH6910	PH7920	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0910
	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			△	○											○			
	1110266	SNGN 120408				○											○			
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	1110597	SNGN 190412				○											○			
	1110598	SNGN 190416				○											○			
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	1120542	SNUN 120408				○											○			
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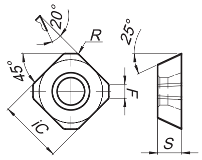
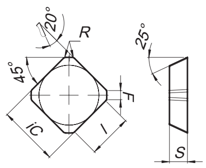
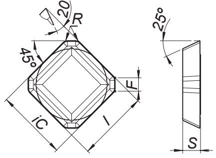
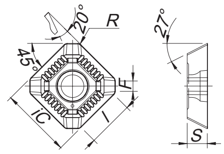
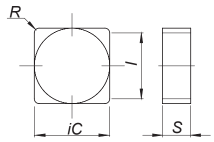
	1121880	SNUN 190612T					○													

★ First choice | 1ª Escolha | 1ª Opción
● Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.500	0.188	0.500	-	-	0.110	
0.500	0.188	0.500	-	-	0.110	
0.526	0.156	0.394	-	-	0.079	
0.625	0.187	0.457	0.008	-	0.110	
0.625	0.187	0.457	0.008	-	0.110	
0.500	0.125	0.362	0.047	-	0.094	
0.500	0.125	0.362	0.047	-	0.094	
0.500	0.125	0.362	0.047	-	0.094	
0.500	0.125	0.362	0.047	-	0.094	
0.500	0.187	0.362	0.047	-	0.094	
0.500	0.187	0.362	0.047	-	0.094	
0.500	0.187	0.362	0.047	-	0.094	
0.625	0.187	0.484	0.039	-	0.094	
0.625	0.187	0.484	0.039	-	0.094	
0.500	0.125	0.362	0.047	-	0.094	
0.500	0.125	0.362	0.047	-	0.094	
0.500	0.187	0.362	0.047	-	0.094	
0.625	0.187	0.484	0.039	-	0.094	
0.551	0.157	0.362	0.039	-	0.110	
0.500	0.187	-	0.031	-	-	
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0.750	0.187	-	0.047	-	-	
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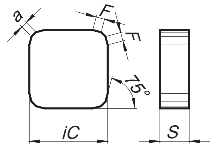
0.500	0.187	-	-	0.059	0.031	
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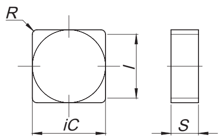
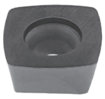
0.500	0.187	0.437	0.016	-	-	
0.500	0.187	0.437	0.031	-	-	
0.500	0.187	0.437	0.047	-	-	
0.750	0.250	-	0.047	-	-	

MILLING INSERTS OVERVIEW

			P							M			K						
			PVD							PVD			CVD	PVD					UNC
		(2) Grade code	M6	54	68	66	78	86	I5	68	66	I5	L9	D2	54	68	67	I5	17
Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH5740	PH6705	PH6910	PH6920	PH6325	PH6740	PH0325
	1110765	SPGN 090312			○											○			
	1111173	SPGN 090316			○											○			
	1110300	SPGN 120308			○											○			
	1110301	SPGN 120312			○											○			
	1110303	SPGN 120408			○											○			
	1110588	SPGN 120412			○											○			
	1110590	SPGN 150408			○											○			
	1110304	SPGN 150412			○											○			
	1110326	SPKN 1203 EDFR																	△
	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 EDSL			○											○			
	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			⊛		△	△								⊛			

◉ First choice | 1ª Escolha | 1ª Opción
⊛ Stock Itens | Itens de stock
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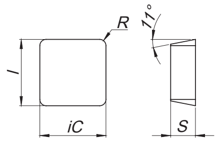
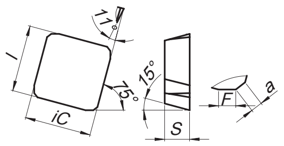
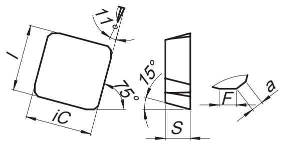
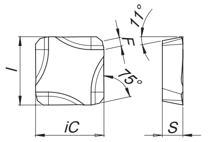
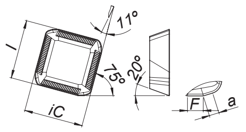
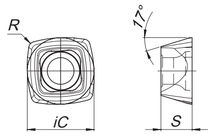
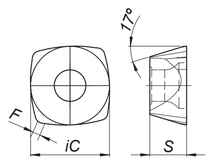
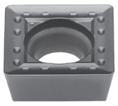
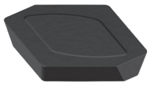
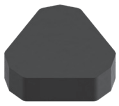
Insert Order Code: (1) Geometry code + (2) Grade code

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

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.375	0.125	-	0.047	-	-	
0.375	0.125	-	0.063	-	-	
0.500	0.125	-	0.031	-	-	
0.500	0.125	-	0.047	-	-	
0.500	0.187	-	0.031	-	-	
0.500	0.187	-	0.047	-	-	
0.625	0.187	-	0.031	-	-	
0.625	0.187	-	0.047	-	-	
0.500	0.125	0.500	-	0.039	0.059	
0.500	0.125	0.500	-	0.039	0.059	
0.500	0.125	0.500	-	0.039	0.059	
0.500	0.187	0.500	-	0.039	0.059	
0.500	0.187	0.500	-	0.039	0.059	
0.500	0.187	0.500	-	0.039	0.059	
0.625	0.187	0.625	-	0.039	0.059	
0.625	0.187	0.625	-	0.039	0.059	
0.625	0.187	0.625	-	0.039	0.059	
0.625	0.187	0.625	-	0.039	0.059	
0.625	0.187	0.625	-	0.039	0.059	
0.625	0.187	0.625	-	0.039	0.059	
0.500	0.125	0.500	-	0.039	0.055	
0.625	0.187	0.625	-	0.039	0.055	
0.625	0.187	0.625	-	0.039	0.055	
0.750	0.250	0.750	-	0.039	0.055	
0.335	0.156	-	0.031	-	-	
0.512	0.219	-	0.039	-	-	
0.335	0.156	-	0.031	-	-	
0.335	0.156	-	0.031	-	-	
0.512	0.219	-	0.039	-	-	
0.512	0.219	-	0.039	-	-	
0.512	0.219	-	0.039	-	-	

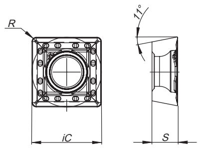
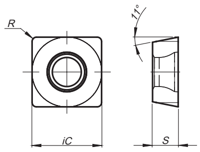
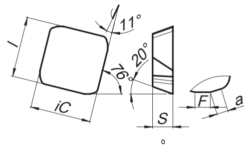
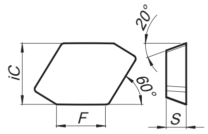
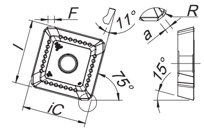
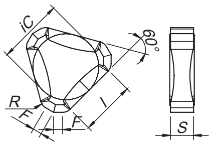
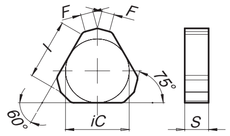
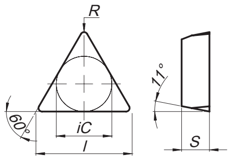
MILLING INSERTS OVERVIEW

A
MILLING
News & Features
Overview
Face milling
Hifeed milling
Shoulder milling
Profile milling
Hardmill
Center & Chamfer
Engraving
Spare Parts
Technical Data

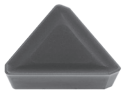
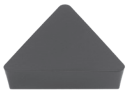
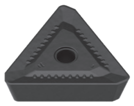
			P							M		K							S	
			PVD							PVD		CVD		PVD					PVD	
		(2) Grade code	54	68	G4	78	86	I5	G6	68	I5	L5	L9	D2	54	68	G4	I5	P3	I5
Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	PH6910	PH6920	PH7920	PH6125	PH6135	PH6740	PH7740	PH6920	PH6740	PH5705	PH5740	PH6705	PH6910	PH6920	PH7920	PH6740	PH7930	PH6740
	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										●	◉		○	○				
	1110395	TNJN 1204 AN														○				
	1110422	TPGN 110304		○												○				
	1110423	TPGN 110308		○												○				
	1110425	TPGN 160304		●												●				
	1110426	TPGN 160308		●												●				
	1110431	TPGN 220408		○												○				
	1110432	TPGN 220412		○												○				

◉ First choice | 1ª Escolha | 1ª Opción
● Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

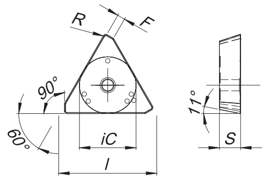
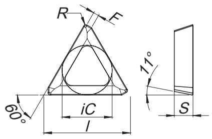
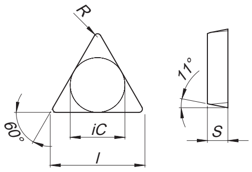
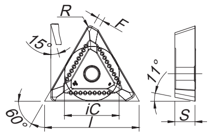
Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.250	0.188	-	0.031	-	-	
0.250	0.188	-	0.031	-	-	
0.750	0.250	0.750	-	0.039	0.055	
0.750	0.250	-	-	-	0.472	
0.500	0.125	0.500	0.039	0.039	0.054	
0.500	0.187	0.472	0.079	-	0.067	
0.500	0.187	0.472	0.118	-	0.051	
0.500	0.187	0.472	-	-	0.098	
0.250	0.125	-	0.016	-	-	
0.250	0.125	-	0.016	-	-	
0.375	0.125	-	0.016	-	-	
0.375	0.125	-	0.031	-	-	
0.500	0.188	-	0.031	-	-	
0.500	0.188	-	0.047	-	-	

MILLING INSERTS OVERVIEW

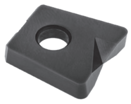
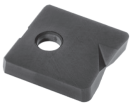
Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P								M			K						N
			PVD						CVD		PVD			CVD	PVD				UNC	UNC
		(2) Grade code	54	68	G4	66	I5	G6	L8	L9	68	66	I5	L9	54	68	67	I5	17	10
			PH6910	PH6920	PH7920	PH6930	PH6740	PH7740	PH5125	PH5740	PH6920	PH6930	PH6740	PH5740	PH6910	PH6920	PH6325	PH6740	PH0325	PH0910
	1110450	TPKN 1603 PDEL		○												○				
	1110543	TPKN 1603 PDSL		○												○				
	1110547	TPKN 1603 PPEN		○												○				
	1110460	TPKN 1603 PPSN		○												○				
	1110462	TPKN 1603 PPTN		○												○				
	1110452	TPKN 1603 PDFR	○																	
	1110458	TPKN 1603 PPER		○												○				
	1110461	TPKN 1603 PPSR		○												○				
	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		○												○				
	1111404	TPKN 2204 PPTR		○												○				
	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 Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.375	0.125	0.650	0.028	-	0.047	
0.375	0.125	0.650	0.028	-	0.047	
0.375	0.125	0.650	-	-	0.043	
0.375	0.125	0.650	-	-	0.043	
0.375	0.125	0.650	-	-	0.043	
0.375	0.125	0.650	0.028	-	0.055	
0.375	0.125	0.650	-	-	0.043	
0.375	0.125	0.650	-	-	0.043	
0.375	0.125	0.650	0.028	-	0.055	
0.375	0.125	0.650	0.028	-	0.047	
0.375	0.125	0.650	0.028	-	0.055	
0.375	0.125	0.650	-	-	0.043	
0.375	0.125	0.650	-	-	0.043	
0.500	0.187	0.866	0.020	-	0.067	
0.500	0.187	0.866	0.020	-	0.067	
0.500	0.187	0.866	0.020	-	0.067	
0.500	0.187	0.866	-	-	0.055	
0.500	0.187	0.866	-	-	0.055	
0.500	0.187	0.866	-	-	0.055	
0.375	0.125	0.650	0.024	-	0.047	
0.375	0.125	0.650	0.024	-	0.047	
0.500	0.187	0.866	0.020	-	0.067	
0.250	0.125	0.433	0.016	-	-	
0.250	0.125	0.433	0.031	-	-	
0.375	0.125	0.650	0.016	-	-	
0.375	0.125	0.650	0.031	-	-	
0.375	0.125	0.650	0.047	-	-	
0.500	0.187	0.866	0.016	-	-	
0.500	0.187	0.866	0.031	-	-	
0.500	0.187	0.866	0.047	-	-	
0.625	0.250	1.063	0.063	-	-	
0.500	0.187	0.866	0.039	-	0.067	

MILLING INSERTS OVERVIEW

Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	P								M			K						N	H
			PVD								PVD			PVD						UNC	PVD
		(2) Grade code	P7	M6	G1	54	G4	68	78	I5	68	66	I5	G1	54	G4	68	67	I5	10	M6
			PH7603	PH6103	PH7910	PH6910	PH7920	PH6920	PH6125	PH6740	PH6920	PH6930	PH6740	PH7910	PH6910	PH7920	PH6920	PH6325	PH6740	PH0910	PH6103
	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		○		○		○	○						○		○				

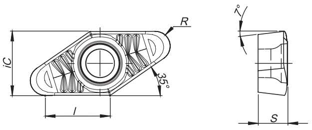
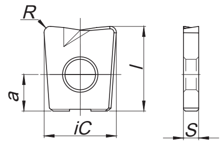
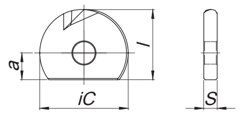
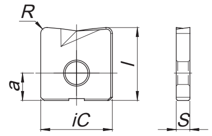
🔴 First choice | 1ª Escolha | 1ª Opción

◉ Stock Itens | Itens de stock

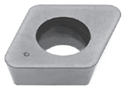
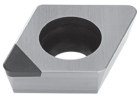
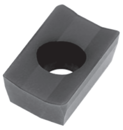
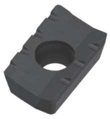
△ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.500	0.220	0.500	0.118	-	-	
0.315	0.079	0.374	0.024	0.157	-	
0.394	0.098	0.453	0.031	0.197	-	
0.472	0.098	0.551	0.039	0.236	-	
0.630	0.118	0.630	0.051	0.236	-	
0.787	0.118	0.787	0.063	0.236	-	
0.315	0.079	0.374	-	0.098	-	
0.394	0.098	0.453	-	0.197	-	
0.472	0.098	0.469	-	0.236	-	
0.630	0.118	0.547	-	0.236	-	
0.787	0.118	0.626	-	0.236	-	
0.984	0.157	0.839	-	0.354	-	
1.260	0.197	1.016	-	0.394	-	
0.315	0.079	0.374	0.024	0.157	-	
0.394	0.098	0.453	0.031	0.197	-	
0.472	0.098	0.551	0.039	0.236	-	
0.630	0.118	0.630	0.051	0.236	-	
0.787	0.118	0.787	0.063	0.236	-	

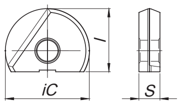
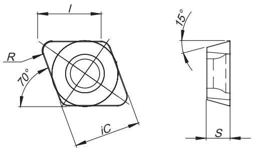
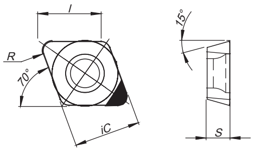
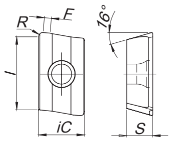
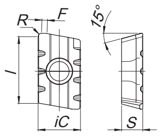
MILLING INSERTS OVERVIEW

			P							M			K				N			H	
			PVD							PVD			PVD				CVD	UNC	PCD	PVD	CBN
		(2) Grade code	M6	54	68	66	78	86	15	68	66	15	D2	54	68	15	P2	10	D6	M6	S4
Inserts Pastilhas Plaquitas	(1) Geometry code	ISO Reference	PH6103	PH6910	PH6920	PH6930	PH6125	PH6135	PH6740	PH6920	PH6930	PH6740	PH6705	PH6910	PH6920	PH6740	PHD103	PH0910	PDP410	PH6103	PBH920
	1110543	WPZ 08	●	○	○									○	○						
	1110551	WPZ 10	●	○	○									○	○						
	1110552	WPZ 12	●	○	○									○	○						
	1110544	WPZ 16	●	○	○									●	○						
	1110553	WPZ 20	●	○	○									●	○						
	1110661	WPZ 25	●	◉	○									●	○						
	1110662	WPZ 32	●	◉	○									●	○						
	1110905	XDHW 040105	○	○			○							○	○		●			○	
	1110573	XDHW 040110	◉	●			●							◉	○	●	●			●	
	1110532	XDHW 060210	◉	●			●	●						◉	○	●	●			●	
	1110565	XDHW 10T310	◉	●			●	●						◉	○	●	○			●	
	1112316	XDHW 040110 FN																	●		
	1112317	XDHW 040110 SN																			●
	1112318	XDHW 060210 FN																	●		
	1111875	XDHW 060210 SN																			●
	1112320	XDHW 10T310 FN																	●		
	1112321	XDHW 10T310 SN																			●
	1110910	XPHT 1604 PDTR			○										○						
	1111206	XPHT 160420 PPTR			○										○						
	1110926	XPHT 160432 PDSR			○										○						
	1110958	XPHT 160412-MR			○										○						

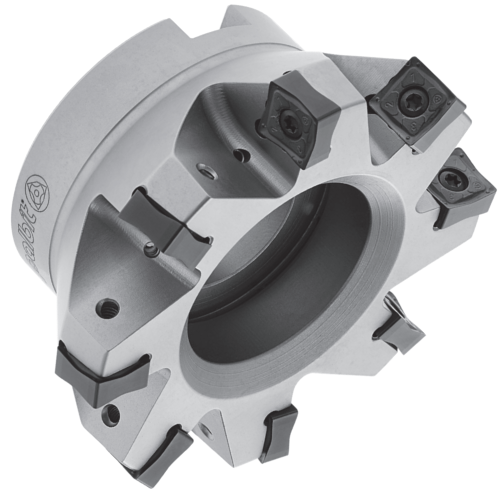
◉ First choice | 1ª Escolha | 1ª Opción
● Stock Itens | Itens de stock

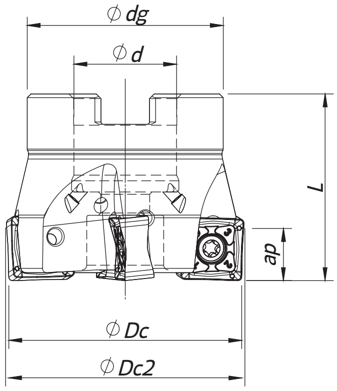
△ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock
○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

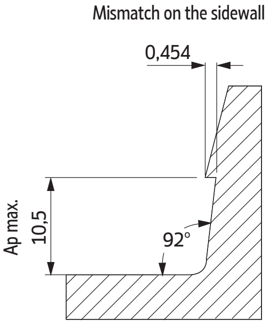
Insert Order Code: (1) Geometry code + (2) Grade code

Dimensions (in) | Dimensões (in) | Dimensiones (in)						Drawing
ic	S	l	R	a	F	
0.315	0.094	0.276	–	0.118	–	
0.394	0.102	0.335	–	0.138	–	
0.472	0.118	0.394	–	0.157	–	
0.630	0.157	0.472	–	0.157	–	
0.787	0.197	0.591	–	0.197	–	
0.984	0.236	0.728	–	0.236	–	
1.260	0.276	0.925	–	0.295	–	
0.157	0.063	0.157	0.020	-	-	
0.157	0.063	0.157	0.039	-	-	
0.256	0.094	0.244	0.039	-	-	
0.394	0.156	0.390	0.039	-	-	
0.157	0.063	0.157	0.039	-	-	
0.157	0.063	0.157	0.039	-	-	
0.256	0.094	0.244	0.039	-	-	
0.256	0.094	0.244	0.039	-	-	
0.394	0.156	0.390	0.039	-	-	
0.394	0.156	0.390	0.039	-	-	
0.375	0.187	0.630	0.047	-	0.067	
0.375	0.187	0.630	0.079	–	0.028	
0.375	0.187	0.630	0.126	–	–	
0.375	0.187	0.630	0.047	–	0.067	

PLUS SN88-12







Arbor Mounting

$\kappa_r=88°$ | $\gamma_p=-6°$

Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)					lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	ØDc2	Ød	Ødg	L		Arbor Type	Ap max (in)		
181103400	SN88 D2.00-A.750/1.75-04-12	4	2.000	2.035	0.750	1.772	1.750	0.92	A	0.413	SN... 1206...	◎
181103500	SN88 D2.00-A.750/1.75-05-12	5	2.000	2.035	0.750	1.772	1.750	0.88	A	0.413	SN... 1206...	◎
181103600	SN88 D2.50-A1.00/1.75-05-12	5	2.500	2.535	1.000	2.205	1.750	1.14	A	0.413	SN... 1206...	◎
181103700	SN88 D2.50-A1.00/1.75-06-12	6	2.500	2.535	1.000	2.205	1.750	1.10	A	0.413	SN... 1206...	◎
181103800	SN88 D3.00-A1.00/2.00-07-12	7	3.000	3.035	1.000	2.205	2.000	2.20	A	0.413	SN... 1206...	◎
181103900	SN88 D3.00-A1.00/2.00-09-12	9	3.000	3.035	1.000	2.205	2.000	2.12	A	0.413	SN... 1206...	○
181139100	SN88 D4.00-A1.50/2.50-08-12	8	4.000	4.035	1.500	2.874	2.500	3.52	A	0.413	SN... 1206...	○
181139200	SN88 D4.00-A1.50/2.50-11-12	11	4.000	4.035	1.500	2.874	2.500	3.30	A	0.413	SN... 1206...	○
181104000	SN88 D4.00-A1.25/2.00-08-12	8	4.000	4.035	1.250	2.874	2.000	3.52	A	0.413	SN... 1206...	△
NEW 181104100	SN88 D4.00-A1.25/2.00-11-12	11	4.000	4.035	1.250	2.874	2.000	3.30	A	0.413	SN... 1206...	○
181104200	SN88 D5.00-A1.50/2.50-12-12	12	5.000	5.035	1.500	3.386	2.500	6.83	A	0.413	SN... 1206...	○
181104300	SN88 D6.00-A2.00/2.50U-18-12	18	6.000	6.035	2.000	4.882	2.500	7.71	B	0.413	SN... 1206...	◎
181104400	SN88 D8.00-A2.50/2.50U-14-12	14	8.000	8.035	2.500	5.512	2.500	13.90	C	0.413	SN... 1206...	◎
181104500	SN88 D10.0-A2.50/2.50U-22-12	22	10.000	10.035	2.500	7.087	2.500	15.87	C	0.413	SN... 1206...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

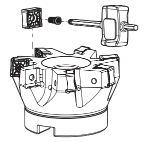
△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplazado por nuevo iten.

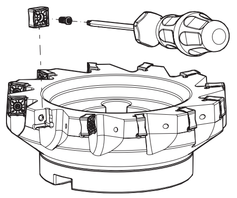
SPARE PARTS | Acessórios | Repuestos

Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			lbf/in	lbf/in
SN88-A-12 - 2.00-3.00	P0401200	XT15	DT1530	26.6
SN88-A-12 - 4.00-10.00	P0401200	PT15	DT1530	26.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.





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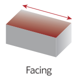
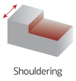
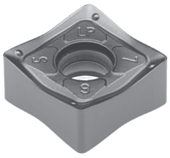


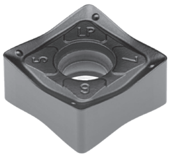


SNH(K)U 1206 | Inserts | Pastilhas | Plaquitas

SNHU-LP
(PHP grade)

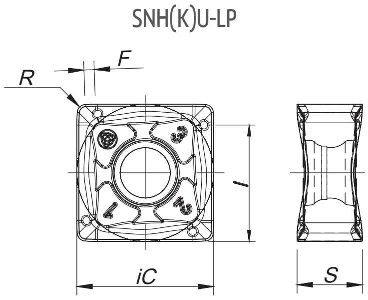


SNKU-LP
(PHP grade)



PHP
NEW
GRADE

SNH(K)U-LP



		P						M			K									Dimensions Dimensões Dimensiones (in)				
		CVD	PVD					PVD			CVD				PVD									
	(2) Grade code	T9	G4	T1	P3	P4	G6	P3	X9	G6	L5	L6	L9	T9	G4	T1	P3	P4	G6					
(1) Geometry code	ISO Reference	PHS740	PH7920	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740	PH5705	PH5320	PH5740	PHS740	PH7920	PHP920	PH7930	PHP930	PH7740	iC	S	l	R	F
1112020	SNHU 120608 ZNER-LP			◉		●	●			●	◉		●			●		●	●	0.524	1/4	0.457	0.031	0.039
1112278	SNKU 120608 ZNER-LP	●	△	◉	△		●	△		●	◉	●	●	●	△	●	△		●	0.524	1/4	0.457	0.031	0.039

◉ First choice | 1ª Escolha | 1ª Opción
● Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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	PHP930	PH7930	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	✓	✓	✓	✓	✓	✓		✓		✓

● Good Conditions
◐ Average Conditions
✱ Difficult Conditions

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PLUS SN88-12

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM)				
				← Wear Resistance				
				PH5705	PH5320	PHP920	PH7920	PHP930
P	1	Unalloyed Steel	125-220	-	-	590-820	590-787	525-754
	2	Low-Alloyed Steel	220-280	-	-	525-754	525-722	459-689
	3	High-Alloyed Steel	280-380	-	-	459-722	459-689	394-656
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	459-722	-
	5	SS - Austenitic	200-330	-	-	-	426-590	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	394-525	-
K	7	Malleable Cast Iron	130-230	525-951	492-918	525-886	525-853	492-820
	8	Grey Cast Iron	180-245	558-1050	525-1050	459-820	459-787	459-754
	9	Nodular Cast iron	160-250	459-656	328-623	394-689	394-656	328-656

(Note 1) The above table indicates the cutting conditions of 70% of the tool engagement.
(Note 2) With low workspace clamping rigidity or long overhang of the tool, adjust cutting speed and feed to 70 or 80% of the recommended conditions above.
(Note 3) Surface finishing is determinated by speed/feed used.
(Note 4) PH5... and PHS... can be used wet or dry. PH7... use only air.

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Vc (SFM)				Toughness →	Feed fz (in/t)
PH7930	PHH930	PH5740	PHS740	PH7740	SNH(K)U 1206
525-722	-	-	459-722	459-656	0.004-0.014
459-656	-	-	394-656	426-590	0.004-0.014
394-623	-	-	328-623	328-558	0.004-0.014
459-656	459-689	-	-	426-590	0.004-0.014
394-525	394-558	-	-	361-525	0.004-0.014
328-459	328-492	-	-	-	0.004-0.014
492-787	-	525-853	-	459-722	0.004-0.014
459-754	-	459-787	-	394-689	0.004-0.014
328-623	-	394-656	-	328-623	0.004-0.014

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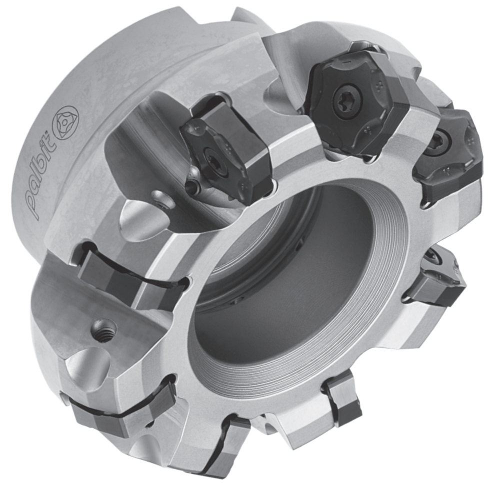
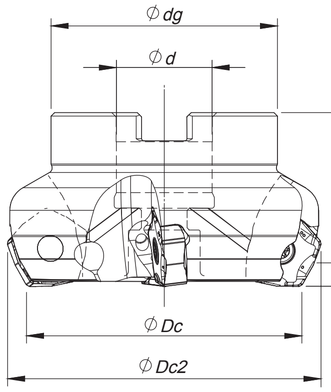
PLUS PN60-11



Arbor Mounting

$K_r=60°$ | γ_p -7°



Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)					lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	ØDc2	Ød	Ødg	L		Arbor Type	Ap max (in)		
181055700	PN60 D2.00-A.750/1.75-05-11	5	2.000	2.356	0.750	1.772	1.750	0.97	A	0.200	PN... 1105...	◎
181063800	PN60 D2.50-A1.00/1.75-05-11	5	2.500	2.856	1.000	2.205	1.750	1.60	A	0.200	PN... 1105...	◎
181055800	PN60 D2.50-A1.00/1.75-06-11	6	2.500	2.856	1.000	2.205	1.750	1.52	A	0.200	PN... 1105...	◎
181063900	PN60 D3.00-A1.00/2.00-06-11	6	3.000	3.356	1.000	2.205	2.000	2.44	A	0.200	PN... 1105...	◎
181055900	PN60 D3.00-A1.00/2.00-08-11	8	3.000	3.356	1.000	2.205	2.000	2.27	A	0.200	PN... 1105...	◎
181064000	PN60 D4.00-A1.25/2.00-07-11	7	4.000	4.356	1.250	2.874	2.000	4.09	A	0.200	PN... 1105...	◎
181056000	PN60 D4.00-A1.25/2.00-10-11	10	4.000	4.356	1.250	2.874	2.000	4.07	A	0.200	PN... 1105...	◎
181064100	PN60 D5.00-A1.50/2.50-08-11	8	5.000	5.356	1.500	3.386	2.500	7.33	A	0.200	PN... 1105...	○
181056100	PN60 D5.00-A1.50/2.50-12-11	12	5.000	5.356	1.500	3.386	2.500	7.29	A	0.200	PN... 1105...	○
181064200	PN60 D6.00-A2.00/2.50U-10-11	10	6.000	6.356	2.000	4.882	2.500	9.35	B	0.200	PN... 1105...	◎
181056200	PN60 D6.00-A2.00/2.50U-14-11	14	6.000	6.356	2.000	4.882	2.500	9.46	B	0.200	PN... 1105...	◎
181056300	PN60 D8.00-A2.50/2.50U-16-11	16	8.000	8.356	2.500	5.512	2.500	14.54	C	0.200	PN... 1105...	◎
181056400	PN60 D10.0-A2.50/2.50U-18-11	18	10.000	10.356	2.500	7.087	2.500	26.29	C	0.200	PN... 1105...	◎

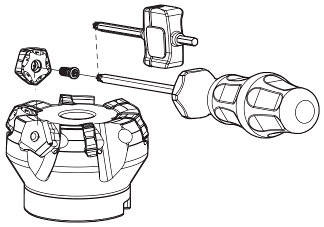
◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

SPARE PARTS | Acessórios | Repuestos

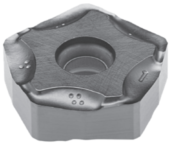
Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
				lbf/in
PN60-A-11 - 2.00-3.00	P0401200	XT15	DT1530	26.6
PN60-A-11 - 4.00-10.00	P0401200	PT15	DT1530	26.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



PNH(K)X 1105 | Inserts | Pastilhas | Plaquitas

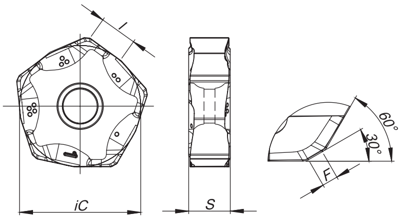
PNHX-MK



PNHX-HK

PNKX-MK

PNH(K)X-MK | HK



		P				K						Dimensions Dimensões Dimensiones (in)				
		PVD				CVD		PVD								
	(2) Grade code	G1	X5	G4	T1	L5	L9	G1	X5	G4	T1					
(1) Geometry code	ISO Reference	PH7910	PHP910	PH7920	PHP920	PH5705	PH5740	PH7910	PHP910	PH7920	PHP920	iC	S	l	R	F
1111374	PNHX 1105 ZNER-MK	△	○	△	◉	◉	◎	△	○	△	◎	0.650	0.223	0.224	-	0.051
1111998	PNHX 1105 ZNER-HK					◉	○					0.650	0.223	0.224	-	0.051
1112294	PNKX 1105 ZNER-MK	△	○	△	◉	◉	○	△	○	△	◎	0.650	0.223	0.224	-	0.051

◉ First choice | 1ª Escolha | 1ª Opción
◎ Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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 ●	PHP910 ●	PH7920 ◐	PHP920 ◐	PH5740 ✱
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

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PLUS PN60-11

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance		
				PH5705	PH7910	PHP910
P	1	Unalloyed Steel	125-220	-	590-820	590-820
	2	Low-Alloyed Steel	220-280	-	525-755	525-788
	3	High-Alloyed Steel	280-380	-	460-722	460-755
K	7	Malleable Cast Iron	130-230	525-950	590-1004	590-1004
	8	Grey Cast Iron	180-245	558-1050	525-820	525-820
	9	Nodular Cast iron	160-250	460-656	492-656	492-690

(Note 1) Cutting conditions a_e/DC=70%.
(Note 2) Cutting conditions should be ajusted 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.

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

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult Operations
P	1	Unalloyed Steel	125-220	PNH(K)X 11... MK	-
	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

Vc (SFM)		Toughness →	Feed fz (in/t)
PH7920	PHP920	PH5740	PNH(K)X 1105
590-788	590-820	-	0.006-0.012
525-722	525-755	-	0.006-0.012
460-690	460-722	-	0.006-0.010
525-854	525-886	525-854	0.005-0.014
460-788	460-820	460-788	0.005-0.014
394-656	394-690	394-656	0.005-0.012

PDF

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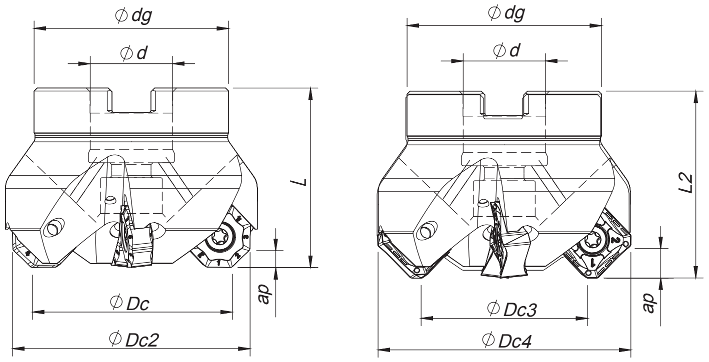
PLUS ON45-05

NEW



Arbor Mounting

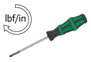
κ_r=45° | γ_p=-6°

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (mm)								lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	ØDc2	ØDc3	ØDc4	Ød	Ødg	L	L2		Arbor Type	Ap (in)		
181185700	ON45 D2.00-A.750/1.75-04-05	4	2.000	2.299	1.886	2.473	0.750	1.770	1.750	1.809	0.844	A	0.138 | 0.236	ON...05 | SN...12	◎
181185800	ON45 D2.50-A1.00/1.75-06-05	6	2.500	2.799	2.386	2.973	1.000	2.200	1.750	1.809	1.157	A	0.138 | 0.236	ON...05 | SN...12	◎
181185900	ON45 D3.15-A1.00/2.00-07-05	7	3.150	3.449	3.036	3.623	1.000	2.200	2.000	2.059	1.865	A	0.138 | 0.236	ON...05 | SN...12	◎
181186000	ON45 D5.00-A1.50/2.50-10-05	10	5.000	5.229	4.886	5.473	1.500	3.380	2.500	2.559	6.548	A	0.138 | 0.236	ON...05 | SN...12	◎

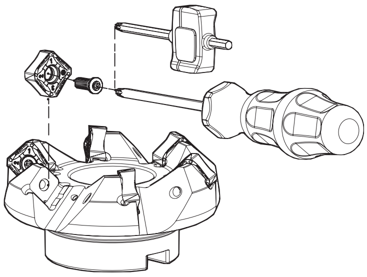
◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
				lbf/in
ON45-05 – 2.00-3.15	P0401200	XT15	DT1530	26.6
ON45-05 – 5.00	P0401200	PT15	DT1530	26.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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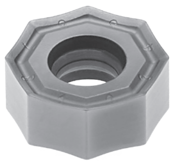
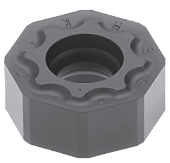
ONH(K)X 05 | SNH(K)X 12 | Inserts | Pastilhas | Plaquitas

ONH(K)X-LP



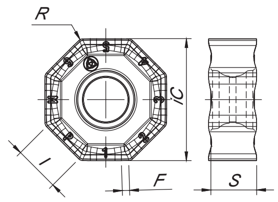
ONH(K)X-MK



ONH(K)X-MP
(PHS grade)

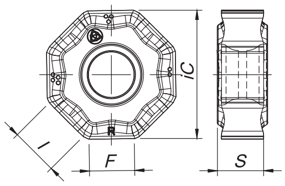
PHP
NEW
GRADE

ONH(K)X-MK | LP | MP

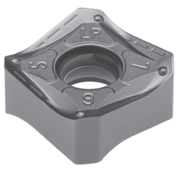


ONHX-W
8 Cutting Edges (8R)

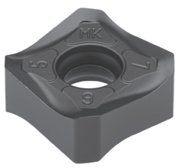
ONHX-W



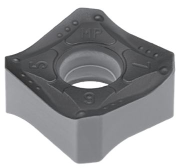
SNHX-LP



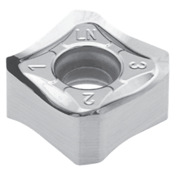
SNH(K)X-MK



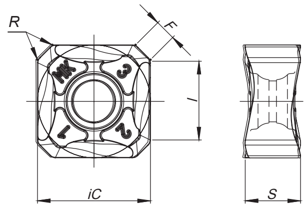
SNH(K)X-MP
(PHS grade)



SNHX-LN



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



		P							M		K									N	S		Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD						PVD		CVD			PVD						UNC	PVD						
	(2) Grade code	T9	X5	G4	T1	P3	P4	G6	X9	G6	L5	L6	L9	X5	G4	T1	P3	P4	G6	10	X9	G6					
(1) Geometry code	ISO Reference	PHS740	PHP910	PH7920	PHP920	PH7930	PHP930	PH7740	PHH930	PH7740	PH5705	PH5320	PH5740	PHP910	PH7920	PHP920	PH7930	PHP930	PH7740	PH0910	PHH930	PH7740	iC	S	l	R	F
1112302	ONHX 050505 ANEN-LP				◈		◉	◉		◈						◈		◉	◉			◈	1/2	0.205	0.209	0.020	-
1112304	ONHX 050505 ANSN-MP				◈		◉									◈		◉					1/2	0.205	0.209	0.020	-
1112301	ONKX 050505 ANEN-LP	○		△	◈	△	◉	○	○						△	◈	△	◉	○		○	○	1/2	0.205	0.209	0.020	-
1112303	ONKX 050505 ANSN-MP	◉		△	◈	△	◉								△	◈	△	◉					1/2	0.205	0.209	0.020	-
1112305	ONKX 050500 ANEN-MK										○	◈	◉				△						1/2	0.205	0.209	-	-
1112307	ONHX 050500 ANER-W			△	◈						◉				△	◈							1/2	0.205	0.209	-	0.169
1111452	SNHX 1206 ANEN-LP				◈		◉		◈							◈		◉	○		◈	○	1/2	0.250	0.366	0.031	0.079
1111502	SNHX 1206 ANSN-MP	◉	◉	◉	◈		◉							◉		◈		◉	○		○	○	1/2	0.250	0.366	0.031	0.079
1111503	SNHX 1206 ANEN-MK										◈		◉	◉	△	◉							1/2	0.250	0.366	0.031	0.079
1111504	SNHX 1206 ANFN-LN																			◈			1/2	0.250	0.366	0.031	0.079
1112293	SNKX 1206 ANSN-MP	◉		△	◈			◉					○		△	◈			◉			◈	1/2	0.250	0.366	0.031	0.079
1112249	SNKX 1206 ANEN-MK										◉	◈	◉										1/2	0.250	0.366	0.031	0.079

◈ First choice | 1ª Escolha | 1ª Opción
◉ Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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PLUS ON45-05

NEW

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	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

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

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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	-

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance						Toughness →
				PH0910	PH5705	PH5320	PHP910	PHP920	PH7920	PHP930
P	1	Unalloyed Steel	125-220	-	-	-	591-820	591-820	591-788	525-722
	2	Low-Alloyed Steel	220-280	-	-	-	525-788	525-755	525-722	460-656
	3	High-Alloyed Steel	280-380	-	-	-	460-755	460-722	460-689	394-624
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	-	460-722	460-656
	5	SS - Austenitic	200-330	-	-	-	-	-	427-591	394-525
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	394-525	328-460
K	7	Malleable Cast Iron	130-230	-	525-952	492-919	591-984	525-886	525-853	492-788
	8	Grey Cast Iron	180-245	-	558-1050	525-1050	525-820	460-820	460-788	460-755
	9	Nodular Cast iron	160-250	-	460-656	328-624	492-689	394-689	394-656	328-624
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	-	99-328

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance				Toughness →	Feed fz (in/t)	
				PHH930	PH7930	PH5740	PHS740	PH7740	SNH(K)X 12...	ONH(K)X 05...
P	1	Unalloyed Steel	125-220	-	525-722	-	460-722	460-656	0.004-0.014	0.004-0.014
	2	Low-Alloyed Steel	220-280	-	460-656	-	394-656	427-591	0.004-0.014	0.004-0.014
	3	High-Alloyed Steel	280-380	-	394-624	-	328-624	328-558	0.004-0.012	0.004-0.012
M	4	SS - Ferritic / Martensitic	200-330	460-689	460-656	-	-	427-591	0.004-0.012	0.004-0.012
	5	SS - Austenitic	200-330	394-558	394-525	-	-	361-525	0.004-0.012	0.004-0.012
	6	SS - Austenitic-ferritic (Duplex)	230-260	328-492	328-460	-	-	296-492	0.004-0.010	0.004-0.010
K	7	Malleable Cast Iron	130-230	-	492-788	525-853	-	460-722	0.004-0.014	0.004-0.014
	8	Grey Cast Iron	180-245	-	460-755	460-788	-	394-689	0.004-0.014	0.004-0.014
	9	Nodular Cast iron	160-250	-	328-624	394-656	-	328-624	0.004-0.012	0.004-0.012
N	10	Aluminium and Non Ferrous	30-130	-	-	-	-	-	0.004-0.014	-
S	11	Heat Resistant Super Alloys	200-320	99-361	99-328	-	-	99-328	0.003-0.008	0.003-0.008

(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) PH5... and PHS... can be used wet or dry. PH7... use only air.

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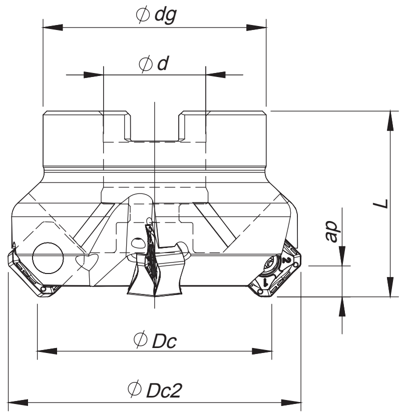
PLUS SN45-12

Arbor Mounting

$\kappa_r=45°$ | $\gamma_p=-6°$



Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)					lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	ØDc2	Ød	Ødg	L		Arbor Type	Ap max (in)		
181072800	SN45 D1.50-A.500/1.50-03-12	3	1.500	2.006	0.500	1.417	1.500	1.03	A	0.236	SN... 1206	◎
181048800	SN45 D2.00-A.750/1.75-04-12	4	2.000	2 513	0.750	1.772	1.750	1.05	A	0.236	SN... 1206	◎
181062700	SN45 D2.00-A.750/1.75-06-12	6	2.000	2 513	0.750	1.772	1.750	1.03	A	0.236	SN... 1206	◎
181048900	SN45 D2.50-A1.00/1.75-06-12	6	2.500	3 013	1.000	2.205	1.750	1.51	A	0.236	SN... 1206	◎
181062800	SN45 D2.50-A1.00/1.75-08-12	8	2.500	3 013	1.000	2.205	1.750	1.52	A	0.236	SN... 1206	◎
181049000	SN45 D3.00-A1.00/2.00-07-12	7	3.000	3 513	1.000	2.205	2.000	2.23	A	0.236	SN... 1206	◎
181062900	SN45 D3.00-A1.00/2.00-10-12	10	3.000	3 513	1.000	2.205	2.000	2.16	A	0.236	SN... 1206	◎
181136600	SN45 D4.00-A1.50/2.50-08-12	8	4.000	4 513	1.500	2.874	2.500	3.91	A	0.236	SN... 1206	◎
181136700	SN45 D4.00-A1.50/2.50-12-12	12	4.000	4 513	1.500	2.874	2.500	3.80	A	0.236	SN... 1206	◎
181063000	SN45 D4.00-A1.25/2.00-12-12	12	4.000	4 513	1.250	2.874	2.000	3.80	A	0.236	SN... 1206	△
181049200	SN45 D5.00-A1.50/2.50-10-12	10	5.000	5 513	1.500	3.386	2.500	7.36	A	0.236	SN... 1206	◎
181049300	SN45 D6.00-A2.00/2.50U-12-12	12	6.000	6 513	2.000	4.882	2.500	9.51	B	0.236	SN... 1206	◎
181054400	SN45 D8.00-A2.50/2.50U-14-12	14	8.000	8 513	2.500	5.512	2.500	13.51	C	0.236	SN... 1206	◎
181054500	SN45 D10.0-A2.50/2.50U-16-12	16	10.000	10 513	2.500	7.087	2.500	24.58	C	0.236	SN... 1206	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

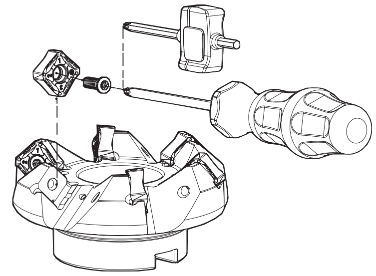
△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplazado por nuevo iten.

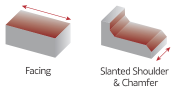
SPARE PARTS | Acessórios | Repuestos

Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			lbf/in	lbf/in
SN45-A-12 - 1.50-3.00	P0401200	XT15	DT1530	26.6
SN45-A-12 - 4.00-10.00	P0401200	PT15	DT1530	26.6

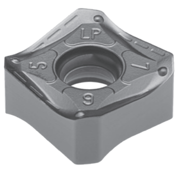
Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



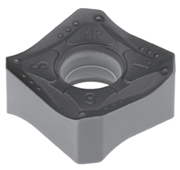


SNH(K)X 1206 | Inserts | Pastilhas | Plaquitas

SNHX-LP

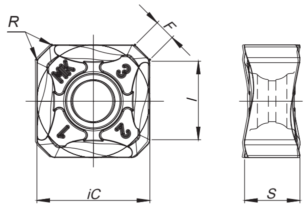


SNH(K)X-MP

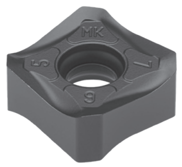


PHP
NEW
GRADE

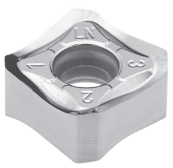
SNH(K)X-MK | LP | MP | LN



SNH(K)X-MK

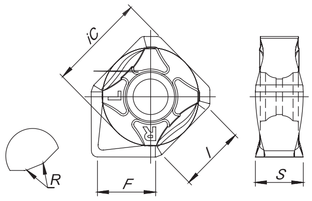


SNHX-LN



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

SNHX-W



		P						M		K								N	S		Dimensions Dimensões Dimensiones (mm)				
		CVD	PVD					PVD		CVD			PVD					UNC	PVD						
	(2) Grade code	T9	X5	G4	T1	P4	G6	X9	G6	L5	L6	L9	X5	G4	T1	P4	G6	10	X9	G6					
(1) Geometry code	ISO Reference	PHS740	PHP910	PH7920	PHP920	PHP930	PH7740	PHH930	PH7740	PH5705	PH5320	PH5740	PHP910	PH7920	PHP920	PHP930	PH7740	PH0910	PHH930	PH7740	iC	S	l	R	F
1111452	SNHX 1206 ANEN-LP				◉	◎		◉							◉	◎	○		◉	○	1/2	0.250	0.366	0.031	0.079
1111502	SNHX 1206 ANSN-MP	◎	◎	◎	◉	◎							◎		◉	◎	○		○	○	1/2	0.250	0.366	0.031	0.079
1111503	SNHX 1206 ANEN-MK									◉		◎	◎	△	◎						1/2	0.250	0.366	0.031	0.079
1111504	SNHX 1206 ANFN-LN																	◉			1/2	0.250	0.366	0.031	0.079
1111899	SNHX 1206 ANFN-W*		◎		◉								◎		◉						1/2	0.248	0.366	0.016	0.299
1112293	SNKX 1206 ANSN-MP	◎		△	◉		◎					○		△	◉		◎			◉	1/2	0.250	0.366	0.031	0.079
1112249	SNKX 1206 ANEN-MK									◎	◉	◎									1/2	0.250	0.366	0.031	0.079

◉ First choice | 1ª Escolha | 1ª Opción
◎ Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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

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Technical Data page A - 232

PLUS SN45-12

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM)						
				← Wear Resistance						
				PH0910	PH5705	PH5320	PHP910	PHP920	PH7920	PHP930
P	1	Unalloyed Steel	125-220	-	-	-	590-820	590-820	590-788	525-755
	2	Low-Alloyed Steel	220-280	-	-	-	525-788	525-755	525-722	460-690
	3	High-Alloyed Steel	280-380	-	-	-	460-755	460-722	460-690	394-656
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	-	460-722	-
	5	SS - Austenitic	200-330	-	-	-	-	-	426-590	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	394-525	-
K	7	Malleable Cast Iron	130-230	-	525-950	492-918	590-1004	525-886	525-854	492-820
	8	Grey Cast Iron	180-245	-	558-1050	525-1050	525-820	460-820	460-788	460-755
	9	Nodular Cast iron	160-250	-	460-656	328-624	492-690	394-690	394-656	328-656
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	-	-

(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) PH5... and PHS... can be used wet or dry. PH7... use only air.

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	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								✓	✓			✓

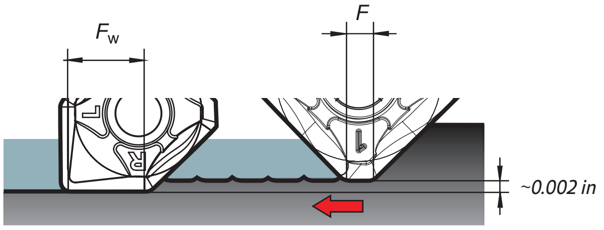
● Good Conditions ◉ Average Conditions ✱ Difficult Conditions

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

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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	-

Vc (SFM)				Toughness →	Feed fz (in/t)				
PHH930	PH7930	PH5740	PHS740	PH7740	SNHX 12...LP	SNH(K)X 12... MP	SNH(K)X 12... MK	SNH(K)X 12... LN	SNH(K)X 12... W
-	525-722	-	460-722	460-656	0.004-0.014	0.004-0.014	-	-	0.004-0.014
-	460-656	-	394-656	426-590	0.004-0.014	0.004-0.014	-	-	0.004-0.014
-	394-624	-	328-624	328-558	0.004-0.012	0.004-0.012	-	-	0.004-0.012
460-690	460-656	-	-	426-590	0.004-0.012	-	-	-	-
394-558	394-525	-	-	360-525	0.004-0.012	-	-	-	-
328-492	328-460	-	-	-	0.004-0.010	-	-	-	-
-	492-788	525-854	-	460-722	0.004-0.014	-	0.004-0.014	-	0.004-0.016
-	460-755	460-788	-	394-690	0.004-0.014	-	0.004-0.014	-	0.004-0.016
-	328-624	394-656	-	328-624	0.004-0.012	-	0.004-0.012	-	0.004-0.012
-	-	-	-	-	-	-	-	0.004-0.014	-
100-360	100-328	-	-	100-328	0.003-0.008	-	-	-	-

WIPER INSERTS



Recommended Cutting Conditions:

- f_Z should be equal to 0,8 x F_W / Z
- Axial depth of cut is 0.020 to 0.031 in.

Example:

- The width of the parallel land (F) of the insert is 0.079 in.
- To obtain a good surface finishing, the feed per revolution should be a maximum of 80% of 0.079 in = 0.063 in.
- The wiper insert will have a parallel land (F_W) with a width of 0.299 in.
- Result: Feed per revolution (f_n) could be increased from 0.063 to 0.240 in (80% of 0.299 in).

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

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 workspace cutting surface.

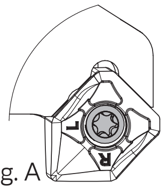


Fig. A

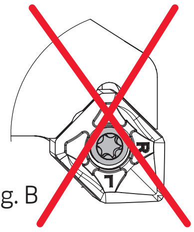
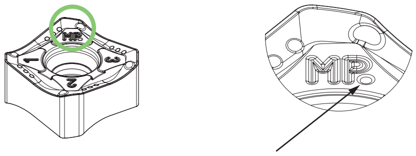


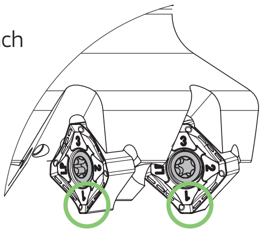
Fig. B

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 been obtained.



This point shows the SNKX insert difference to SNHX

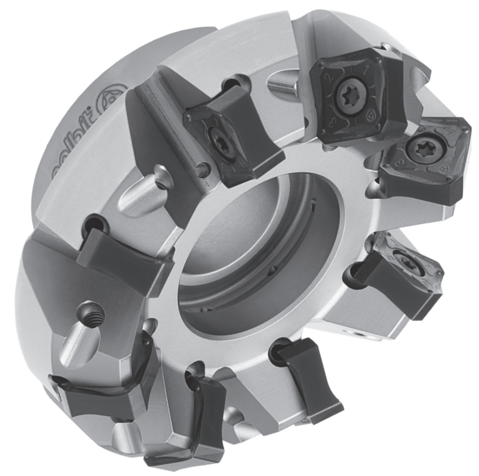
Put the same side of insert in each pocket for best radial and axial runout when using SNKX.

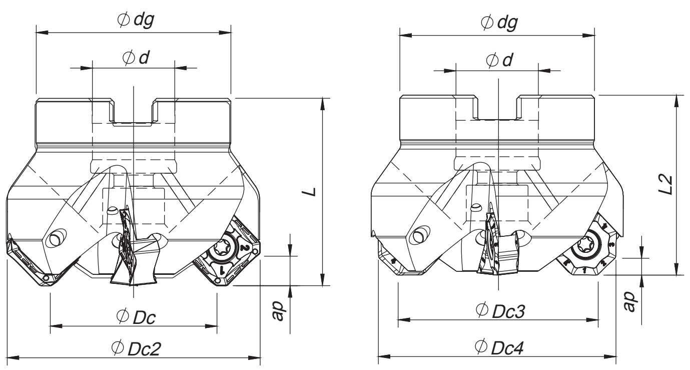


PDF

PLUS SN45-16

Proprietary milling line





Arbor Mounting
κ_r=45° | γ_p=-6°

Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)									Specifications		Insert Pastilha Inserto	Stock
			ØDc	ØDc2	ØDc3	ØDc4	Ød	Ødg	L	L2	lbs	Arbor Type	Ap (in)		
181102400	SN45 D2.50-A1.00/2.00-05-16	5	2.500	3.173	2.641	3.011	1.000	2.047	2.000	1.921	1.79	A	0.335|0.150	SN...16|ON...06	⊛
181102500	SN45 D3.00-A1.00/2.00-06-16	6	3.000	3.673	3.141	3.511	1.000	2.362	2.000	1.921	2.40	A	0.335|0.150	SN...16|ON...06	⊛
181102600	SN45 D3.00-A1.00/2.00-08-16	8	3.000	3.673	3.141	3.511	1.000	2.362	2.000	1.921	2.33	A	0.335|0.150	SN...16|ON...06	○
181138800	SN45 D4.00-A1.50/2.50-07-16	7	4.000	4.673	4.141	4.511	1.500	3.150	2.500	2.421	4.95	A	0.335|0.150	SN...16|ON...06	⊛
181138900	SN45 D4.00-A1.50/2.50-10-16	10	4.000	4.673	4.141	4.511	1.500	3.150	2.500	2.421	4.85	A	0.335|0.150	SN...16|ON...06	○
181102700	SN45 D4.00-A1.25/2.00-07-16	7	4.000	4.673	4.141	4.511	1.250	3.150	2.000	1.921	5.02	A	0.335|0.150	SN...16|ON...06	△
181102800	SN45 D4.00-A1.25/2.00-10-16	10	4.000	4.673	4.141	4.511	1.250	3.150	2.000	1.921	4.93	A	0.335|0.150	SN...16|ON...06	○
181102900	SN45 D5.00-A1.50/2.50-08-16	8	5.000	5.673	5.141	5.511	1.500	3.543	2.500	2.421	6.70	A	0.335|0.150	SN...16|ON...06	⊛
181103000	SN45 D6.00-A2.00/2.50U-10-16	10	6.000	6.673	6.141	6.511	2.000	4.331	2.500	2.421	9.70	B	0.335|0.150	SN...16|ON...06	⊛
181103100	SN45 D8.00-A2.50/2.50U-12-16	12	8.000	8.673	8.141	8.511	2.500	6.772	2.500	2.421	20.11	C	0.335|0.150	SN...16|ON...06	⊛
181103200	SN45 D10.0-A2.50/2.50U-14-16	14	10.000	10.673	10.141	10.511	2.500	6.772	2.500	2.421	26.37	C	0.335|0.150	SN...16|ON...06	⊛

⊛ Stock item | Produto de stock | Itens de stock

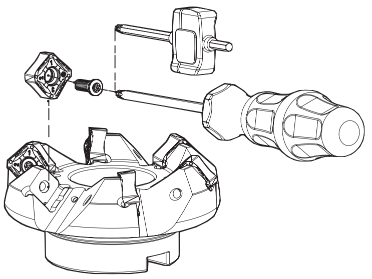
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplazado por nuevo iten.

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
SN45-A-16 - 2.50-3.00	P0451400	XT20	DT2050	44.3
SN45-A-16 - 4.00-10.00	P0451400	PT20	DT2050	44.3

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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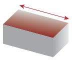
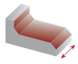




ONH(K)X 0606 | SNH(K)X 1606 | Inserts | Pastilhas | Plaquitas

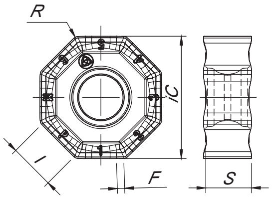
ONH(K)X-LP

ONH(K)X-MP
(PHP grade)

ONH(K)X-MK

PHP
NEW
GRADE

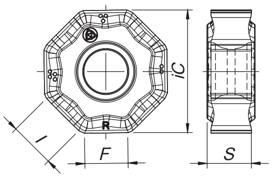
ONH(K)X-LP | MP | MK



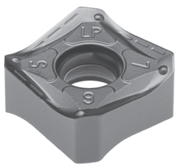
ONHX-W
(8 Cutting edges (4R + 4L))

ONHX-LS NEW
(PHH grade)

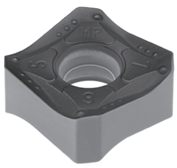
ONHX-W



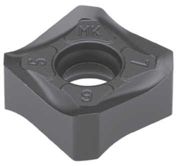
SNHX-LP



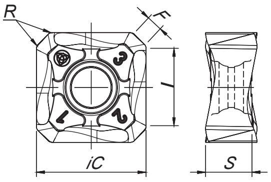
SNH(K)X-MP
(PHS grade)



SNH(K)X-MK



SNH(K)X-MK | LP | MP



		P						M			K									S			Dimensions Dimensões Dimensiones (in)				
		CVD	PVD					PVD			CVD			PVD					PVD							
	(2) Grade code	T9	G4	T1	P3	P4	G6	P3	X9	G6	L5	L6	L9	G4	T1	P3	P4	G6	P3	X9	G6					
(1) Geometry code	ISO Reference	PHS740	PH7920	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740	PH5705	PH5320	PH5740	PH7920	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740	iC	S	l	R	F
1111954	ONHX 0606 ANEN-LP			●	△	◉	◉	△		◉					●	△	◉	◉	△		◉	0.650	1/4	0.244	0.031	0.039
NEW 1112696	ONHX 0606 ANEN-LS	○					○		◉	○								○		◉	○	0.650	1/4	0.244	0.031	0.039
1111955	ONHX 0606 ANEN-MP			●			◉			◉			○		●			◉			◉	0.650	1/4	0.244	0.031	0.039
1111956	ONHX 0606 ANEN-MK										●		◉									0.650	1/4	0.244	0.031	0.039
1112053	ONHX 0606 ANEN-W*		△	◉							●			△	◉							0.650	1/4	0.244	-	0.236
1112284	ONKX 0606 ANEN-LP	○	△	●	△	◉	◉	△	●	◉		●		△	◉	△	◉	◉	△	●	◉	0.650	1/4	0.244	0.031	0.039
1112287	ONKX 0606 ANEN-MP	◉	△	●			◉			◉				△	◉			◉			◉	0.650	1/4	0.244	0.031	0.039
1112291	ONKX 0606 ANEN-MK										●		◉									0.650	1/4	0.244	0.031	0.039
1111951	SNHX 1606 ANER-LP			●		◉	◉			◉			○		●	○	◉	◉	○		◉	0.650	1/4	0.492	0.031	0.087
1111952	SNHX 1606 ANER-MP	◉		●			◉			◉		○			●			◉			◉	0.650	1/4	0.492	0.031	0.087
1111953	SNHX 1606 ANER-MK												◉									0.650	1/4	0.492	0.031	0.087
1112281	SNKX 1606 ANER-MP	◉	△	●			◉			◉				△	●			◉			◉	0.650	1/4	0.492	0.031	0.087
1112282	SNKX 1606 ANER-MK											●	◉									0.650	1/4	0.492	0.031	0.087

● First choice | 1ª Escolha | 1ª Opción
◉ Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

* Wiper insert with 4 rights and 4 left-hand cutting edges.

PLUS SN45-16

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

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM)					
				← Wear Resistance					Toughness →
				PH5705	PH5320	PHP920	PH7920	PHP930	PHH930
P	1	Unalloyed Steel	125-220	-	-	590-820	590-788	525-755	-
	2	Low-Alloyed Steel	220-280	-	-	525-755	525-722	460-690	-
	3	High-Alloyed Steel	280-380	-	-	460-722	460-690	394-656	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-		-	460-690
	5	SS - Austenitic	200-330	-	-	-		-	394-558
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-		-	328-492
K	7	Malleable Cast Iron	130-230	525-950	492-918	525-886	525-854	492-820	-
	8	Grey Cast Iron	180-245	558-1050	525-1050	460-820	460-788	460-755	-
	9	Nodular Cast iron	160-250	460-656	328-624	394-690	394-656	328-656	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	100-360

ISO	PSM	Material	HB (Brinell)	Vc (SFM)				Feed fz (in/t)
				← Wear Resistance			Toughness →	
				PH7930	PH5740	PHS740	PH7740	SNH(K)X/ONH(K)X
P	1	Unalloyed Steel	125-220	525-722	-	460-722	460-656	0.006-0.016
	2	Low-Alloyed Steel	220-280	460-656	-	394-656	426-590	0.006-0.016
	3	High-Alloyed Steel	280-380	394-624	-	328-624	328-558	0.006-0.016
M	4	SS - Ferritic / Martensitic	200-330	460-656	-	-	426-590	0.004-0.012
	5	SS - Austenitic	200-330	394-525	-	-	360-525	0.004-0.012
	6	SS - Austenitic-ferritic (Duplex)	230-260	328-460	-	-	-	0.004-0.012
K	7	Malleable Cast Iron	130-230	492-788	525-854	-	460-722	0.006-0.016
	8	Grey Cast Iron	180-245	460-755	460-788	-	394-690	0.006-0.016
	9	Nodular Cast iron	160-250	328-624	394-656	-	328-624	0.006-0.016
S	11	Heat Resistant Super Alloys	200-320	100-328	-	-	100-328	0.004-0.007

(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) PH5... and PHS... can be used wet or dry. PH7... use only air.

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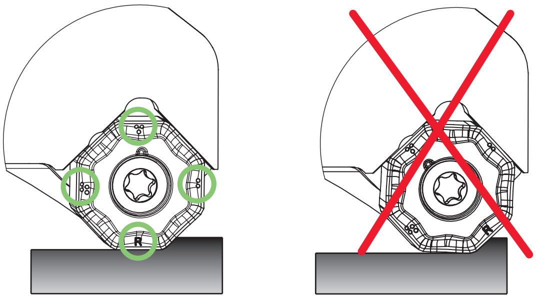
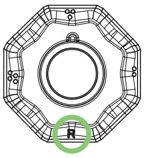
CHIPBREAKER SELECTION GUIDE | Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choice	Alternative
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

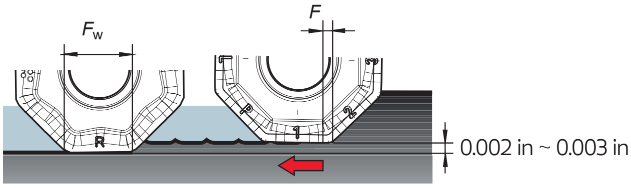


The points and letter (R or L) on the insert indicates the side that should be parallel to the workspace material.



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).

WIPER INSERTS



Recommended Cutting Conditions
- f_Z should be equal to 0,8 x F_W / Z
- Axial depth of cut is 0.020 to 0.031 in.

Example:
- The width of the parallel land (F) of the insert is 0.039 in.
- To obtain a good surface finishing, the feed per revolution should be a maximum of 80% of 0.039 in = 0.031 in.
- The wiper insert will have a parallel land (F_W) with a width of 0.236 in.
- Result: Feed per revolution (f_n) could be increased from 0.031 to 0.189 in (80% of 0.236 in).

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

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 workspace cutting surface.
- The points and the letter (R or L) on the insert indicates the side that should be parallel to the worspace material.
- The side work of the insert it's indicated by the letter (R - Right & L - Left).

PDF

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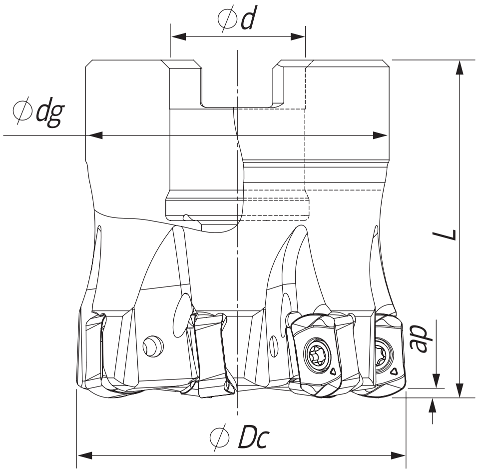
TETRAFEED XN20-06

NEW



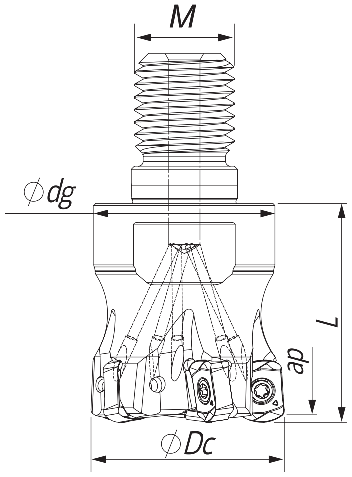
Arbor Mounting

$\kappa_r=20^\circ$ | $\gamma_p=-7^\circ$ | Rp=0.071

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)	Arbor Type		
181169900	XN20 D1.50-A.500/1.50-07-06	7	1.500	0.500	1.417	1.500	0.434	0.040	A	XNKU 06...	◎
181170000	XN20 D2.00-A.750/1.50-08-06	8	2.000	0.750	1.772	1.500	0.725	0.040	A	XNKU 06...	◎
181170100	XN20 D2.50-A1.00/1.50-09-06	9	2.500	1.000	2.205	1.500	1.100	0.040	A	XNKU 06...	○

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Threaded Coupling

$\kappa_r=20^\circ$ | $\gamma_p=-7^\circ$ | Rp=0.071

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)		
181169400	XN20 D.625-R-08/.984-02-06	2	0.625	M8	0.580	0.985	0.050	0.040	XNKU 06...	◎
181169500	XN20 D.750-R-10/1.18-03-06	3	0.750	M10	0.730	1.180	0.090	0.040	XNKU 06...	◎
181169600	XN20 D1.00-R-12/1.18-04-06	4	1.000	M12	0.905	1.180	0.145	0.040	XNKU 06...	◎
181169700	XN20 D1.25-R-16/1.38-05-06	5	1.250	M16	1.180	1.380	0.340	0.040	XNKU 06...	◎
181169800	XN20 D1.50-R-20/1.58-06-06	6	1.500	M20	1.440	1.575	0.455	0.040	XNKU 06...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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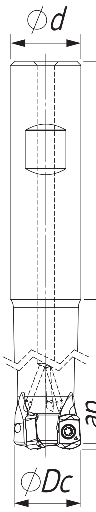
Weldon Shank

$\kappa_r=20°$ | $\gamma_p=-7°$ | Rp=0.071



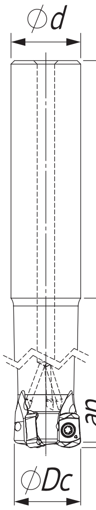
Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert	Stock
			ØDc	Ød/M	L	L1		Ap max (in)		
181170200	XN20 D.625-W.625/3.50-02-06	2	0.625	0.625	3.500	1.250	0.224	0.040	XNKU 06...	◎
181170300	XN20 D.750-W.750/4.00-03-06	3	0.750	0.750	4.000	1.750	0.372	0.040	XNKU 06...	◎
181170400	XN20 D1.00-W1.00/5.00-04-06	4	1.000	1.000	5.000	2.500	0.782	0.040	XNKU 06...	◎
181170500	XN20 D1.25-W1.25/5.00-05-06	5	1.250	1.250	5.000	2.500	1.316	0.040	XNKU 06...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

Cylindrical Shank

$\kappa_r=20°$ | $\gamma_p=-7°$ | Rp=0.071



Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert	Stock
			ØDc	Ød/M	L	L1		Ap max (in)		
181170600	XN20 D.625-C.625/6.00-02-06	2	0.625	0.625	6.000	2.000	0.458	0.040	XNKU 06...	◎
181170700	XN20 D.750-C.750/6.50-03-06	3	0.750	0.750	6.500	2.950	0.632	0.040	XNKU 06...	◎
181170800	XN20 D1.00-C1.00/7.00-04-06	4	1.000	1.000	7.000	4.000	1.106	0.040	XNKU 06...	◎
181170900	XN20 D1.25-C1.25/8.00-05-06	5	1.250	1.250	8.000	5.000	2.074	0.040	XNKU 06...	◎
181171000	XN20 D1.50-C1.50/5.00-06-06	6	1.500	1.500	5.000	2.250	1.973	0.040	XNKU 06...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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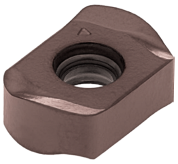
TETRAFEED XN20-06 NEW

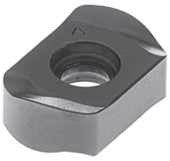
XNKU 06T3... | Inserts | Pastilhas | Plaquitas

XNKU-MP
(PHP grade)

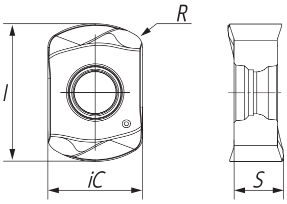
XNKU-MP
(PHH grade)



XNKU-MP
(PHS grade)



XNKU-MP



		P					M				K		S			Dimensions Dimensões Dimensiones (in)			
		CVD	PVD				CVD	PVD			CVD	PVD	CVD	PVD					
	(2) Grade code	T9	G4	T1	X9	Z2	T9	X9	Z2	Z3	T9	T1	T9	X9	Z3				
(1) Geometry code	ISO Reference	PHS740	PHP910	PHP920	PHP930	PHP530	PHS740	PHH930	PHP530	PHH530	PHS740	PHP920	PHS740	PHH930	PHH530	iC	S	l	R
1112802	XNKU 06T310-MP	◎	◎	◉	○	◎	◎	◉	◎	◎	◎	◉	◎	◉	◎	0.270	0.140	0.400	0.040

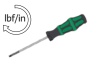
◉ First choice | Primeira opção | 1ª opción

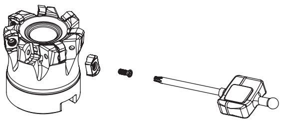
◎ Stock item | Produto de stock | Itens de stock

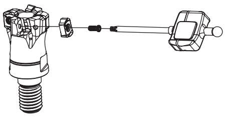
○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

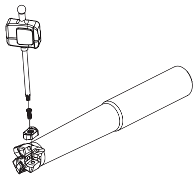
Insert order code = (1) Geometry Code + (2) Grade Code

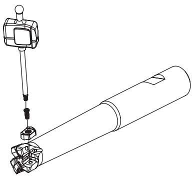
SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
				lbf/in
XN-A-06 - 1.500-2.500	P0250704	XT08	DT0812	10.6
XN-R-06 - 0.625-1.500	P0250704	XT08	DT0812	10.6
XN-W-06 - 0.265-1.250	P0250704	XT08	DT0812	10.6
XN-C-06 - 0.625-1.500	P0250704	XT08	DT0812	10.6









Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

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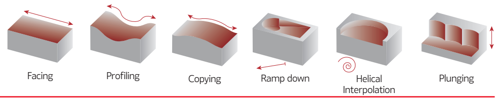

GRADES SELECTION GUIDE | Guia para selecção de graus | Tabla para selección de calidades

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

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance						Toughness →	Feed fz (in/t)
				PHP910	PHP920	PHP930	PHH930	PHP530	PHH530	PHS740	XNKU 06...-MP
P	1	Unalloyed Steel	125-220	590-820	590-820	525-755	-	590-1115	-	525-755	0.020-0.060
	2	Low-Alloyed Steel	220-280	525-790	560-690	490-625	-	590-1115	-	490-620	0.020-0.060
	3	High-Alloyed Steel	280-380	460-755	525-655	460-590	-	590-1082	-	460-590	0.020-0.060
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	425-560	492-886	558-918	395-590	0.020-0.055
	5	SS - Austenitic	200-330	-	-	-	330-525	-	525-918	330-490	0.020-0.055
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	260-455	-	492-854	230-420	0.020-0.055
K	7	Malleable Cast Iron	130-230	590-985	590-1050	-	-	-	-	525-985	0.020-0.060
	8	Grey Cast Iron	180-245	525-820	560-920	-	-	-	-	490-850	0.020-0.060
	9	Nodular Cast iron	160-250	490-690	330-790	-	-	-	-	260-720	0.020-0.060
S	11	Heat Resistant Super Alloys	200-320	-	-	-	100-245	-	100-492	100-230	0.020-0.050

(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) When using ØDc=0.625in apply 70% or less feed (fz) from the table.

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Technical Data
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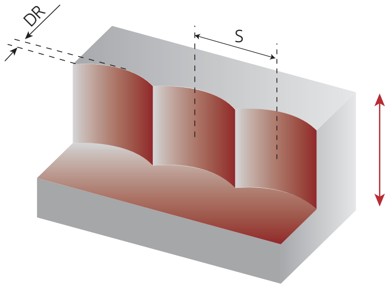
TETRAFEED XN20-06

NEW

PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.003-0.006	0.002-0.004	$Smax = \sqrt{DC.Dr\text{-}Dr^2}$

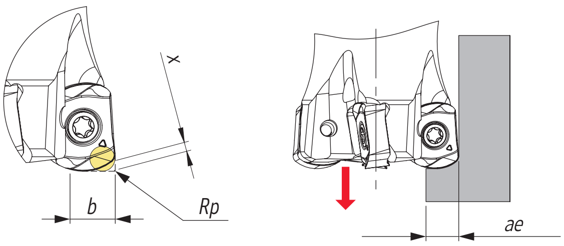


S max and DR corresponding cutting diameter Dc (in)							
DR (in)	Dc (in)						
	0.625	0.750	1.000	1.250	1.500	2.000	2.500
0.040	0.155	0.170	0.195	0.220	0.240	0.280	0.315
0.080	0.210	0.230	0.270	0.305	0.335	0.390	0.440
0.120	0.245	0.275	0.325	0.370	0.405	0.475	0.535

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

PROGRAMMING DATA | Dados para programação | Datos para la programación

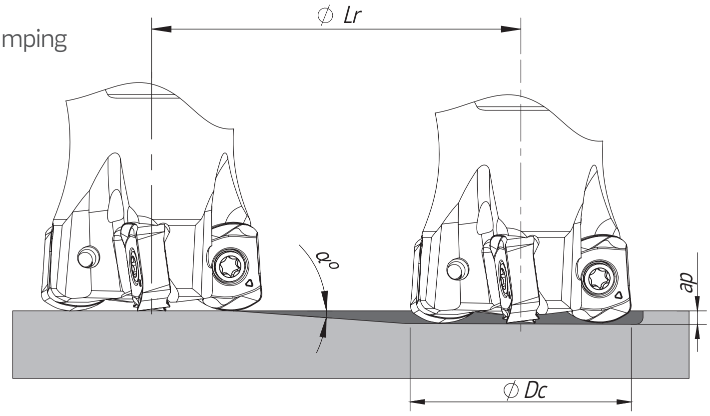
Insert	Programming Data			
	Rp	X	b	a_e
XNKU 06T310-MP	0.070	0.015	0.140	0.135



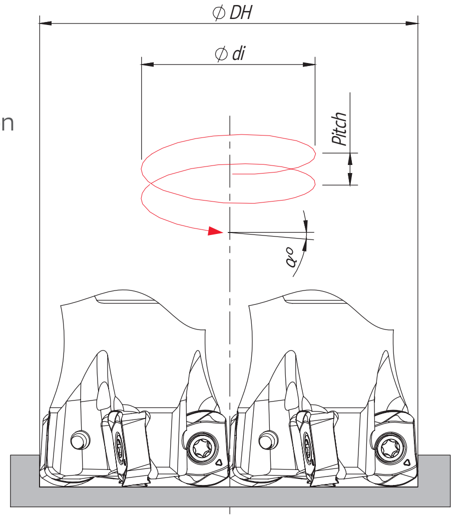
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical
Interpolation



Blind hole
Flat bottom

Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
0.625	0.5	0.040	4.510	0.970 -	- 1.171	0.009 0.014
0.750	0.5	0.040	4.510	1.220 -	- 1.421	0.012 0.018
1.000	0.8	0.040	2.820	1.720 -	- 1.921	0.030 0.040
1.250	0.8	0.040	2.820	2.220 -	- 2.421	0.040 0.040
1.500	0.4	0.040	5.635	2.720 -	- 2.921	0.026 0.030
2.000	0.3	0.040	7.520	3.720 -	- 3.921	0.028 0.030
2.500	0.25	0.040	9.025	4.720 -	- 4.921	0.030 0.033

Note: During helical interpolation do not exceed max Pitch.
(*) 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.

PDF
VIDEO

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Technical Data
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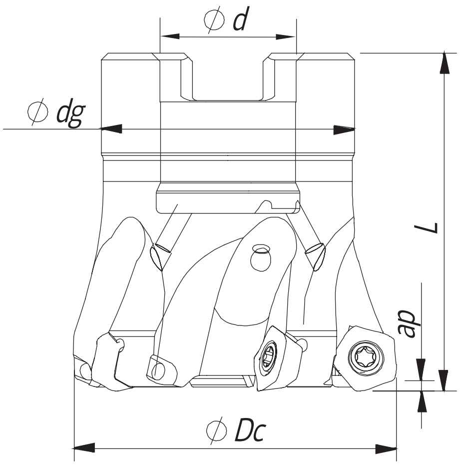
PENTA HIFEED 06320

NEW

METRIC LINE

Proprietary milling line



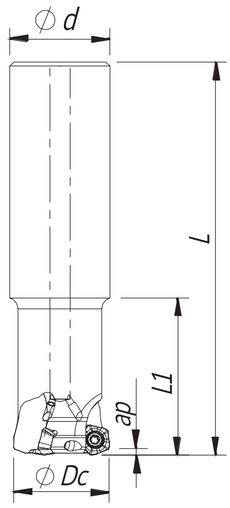
Arbor Mounting

κ_r=20º | γ_p=14º | Rp=2,5

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (mm)				Kg	Specifications		Insert	Stock
			ØDc	Ød	Ødg	L		Ap max (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-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Cylindrical Shank

κ_r=20º | γ_p=14º | Rp=2,5

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (mm)				Kg	Specifications	Insert	Stock
			ØDc	Ød	L	L1		Ap max (mm)		
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	50	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-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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Technical Data
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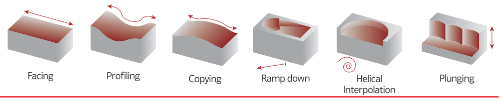
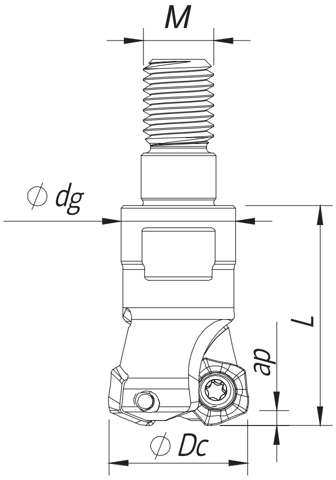
PENTA HIFEED 06320
POKT

NEW

METRIC LINE





Threaded Coupling

K_r=20º | γ_p=14º | Rp=2,5

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (mm)				Kg	Specifications	Insert	Stock
			ØDc	ØM	Ødg	L		Ap max (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...	◎

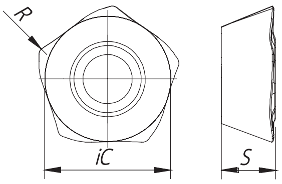
◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

POKT 0403... ‖ Inserts | Pastilhas | Plaquitas

POKT-MP

POKT-MP



		P				K		Dimensions Dimensões Dimensiones (mm)		
		PVD				PVD				
	(2) Grade code	G1	G4	P3	G6	G1	G4			
(1) Geometry code	ISO Reference	PH7910	PH7920	PH7930	PH7740	PH7910	PH7920	iC	S	R
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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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Technical Data
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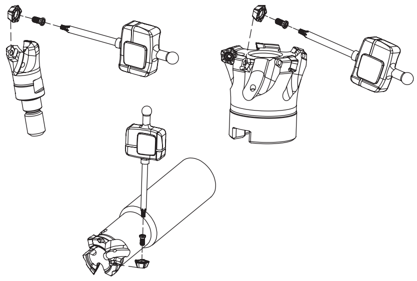
PENTA HIFEED 06320

NEW

METRIC LINE

SPARE PARTS Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value	Screw	DIN 6368 Wrench
			Order separately	lbf/in	Order separately	
R06320 - 16-42	P0250503	XT08	DT0812	10.6	-	-
E06320 - 25-40	P0250503	XT08	DT0812	10.6	-	-
A06320 - 40-60	P0250503	XT08	DT0812	10.6	-	-



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

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

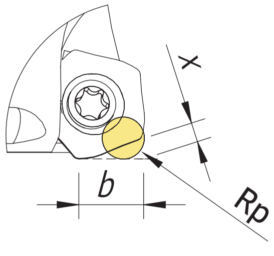
ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance			Toughness →	Feed fz (in/t)
				PH7910	PH7920	PH7930	PH7740	POKT 04...-MP
P	1	Unalloyed Steel	125-220	591-820	591-788	525-722	460-656	0.020-0.060
	2	Low-Alloyed Steel	220-280	525-755	525-722	460-656	427-591	0.020-0.060
	3	High-Alloyed Steel	280-380	460-722	460-689	394-624	328-558	0.020-0.060
K	7	Malleable Cast Iron	130-230	591-984	525-853	-	-	0.020-0.061
	8	Grey Cast Iron	180-245	525-820	460-788	-	-	0.020-0.061
	9	Nodular Cast iron	160-250	492-656	394-656	-	-	0.020-0.062

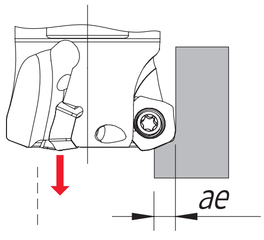
(Note 1) Cutting conditions a_e/Dc=70%.
(Note 2) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

(Note 3) PH5... and PHS... can be used wet or dry. PH7... use only air.

PROGRAMMING DATA | Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	a_e
POKT 0403...	0.098	0.047	0.169	0.157





PDF

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Technical Data
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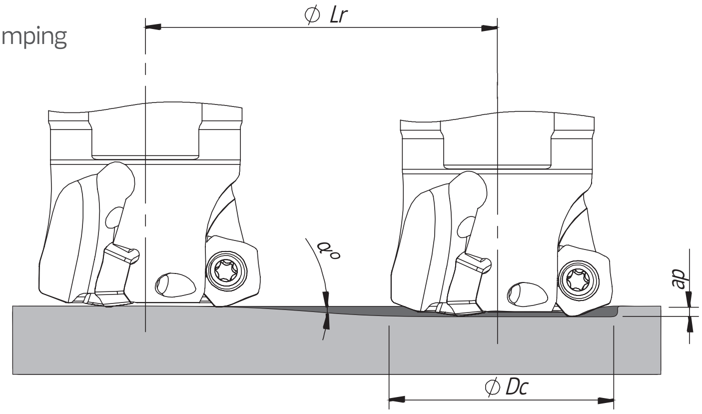
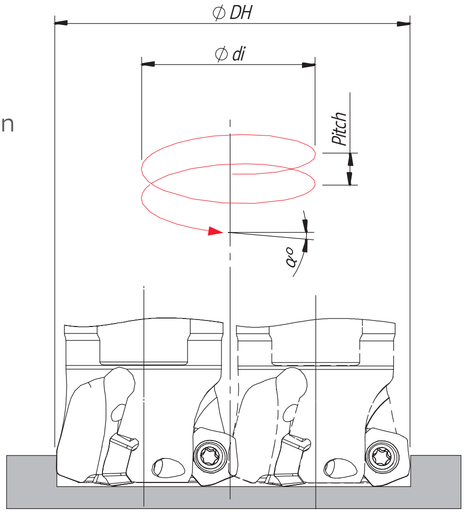
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical
Interpolation



Blind hole
Flat bottom

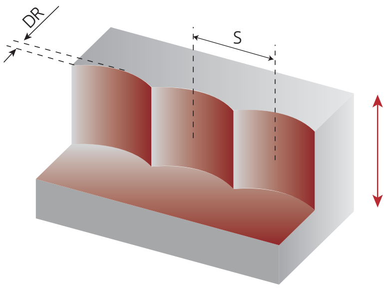
Ødi = ØDH - ØDc

ØDc (mm)	Ramping (in)			Helical Interpolation (in)		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
16	15	0.039	0.146	0.921 -	- 1.181	0.236 0.433
20	9,0	0.039	0.248	1.236 -	- 1.496	0.197 0.315
25	5,0	0.039	0.449	1.630 -	- 1.890	0.157 0.236
32	3,4	0.039	0.661	2.181 -	- 2.441	0.157 0.197
35	3,0	0.039	0.752	2.417 -	- 2.677	0.157 0.197
40	2,0	0.039	1.126	2.811 -	- 3.071	0.118 0.157
42	2,0	0.039	1.126	3.307 -	- 3.228	0.157 0.157
50	2,0	0.039	1.126	3.598 -	- 3.858	0.157 0.197
52	2,0	0.039	1.126	3.756 -	- 4.016	0.157 0.197
63	2,0	0.039	1.126	4.622 -	- 4.882	0.197 0.236
66	1,8	0.039	1.252	4.858 -	- 5.118	0.197 0.236

Note: During helical interpolation do not exceed max Pitch.

PLUNGING | Mergulho | Plunge

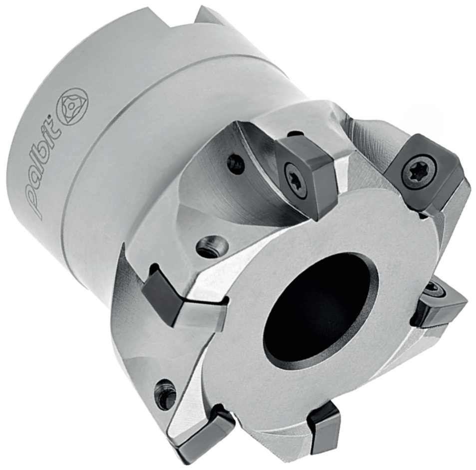
L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.004-0.006	0.002-0.004	$Smax = \sqrt{DC.Dr\text{-}Dr^2}$



S max and DR corresponding cutting diameter Dc (in)											
DR (in)	Dc (mm)										
	16	20	25	32	35	40	42	50	52	63	66
0.039	0.154	0.173	0.193	0.224	0.228	0.244	0.252	0.276	0.280	0.311	0.319
0.079	0.209	0.236	0.268	0.106	0.319	0.343	0.350	0.386	0.394	0.433	0.445
0.118	0.244	0.280	0.319	0.366	0.386	0.413	0.425	0.469	0.476	0.528	0.539
0.157	0.272	0.315	0.362	0.417	0.437	0.472	0.484	0.535	0.547	0.606	0.618

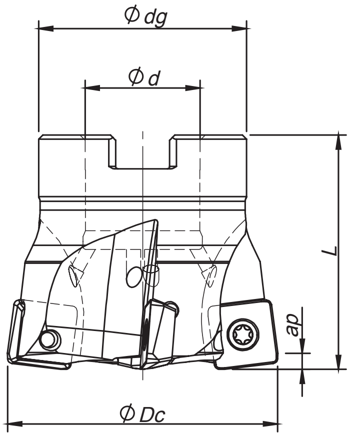
Note: Recommended for L ≤ 4 Dc for extra long tool this step and side cut must be reduced.

HIFEED SO10-08



Arbor Mounting

$\kappa_r=10°$ | $\gamma_p=+2°$ | $\gamma_f=+2°$ | $R_p=0.079$



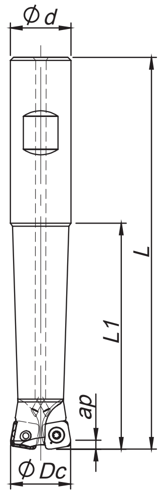
Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)	Arbor Type		
181135300	SO10 D1.50-A.500/1.50-05-08	5	1.500	0.500	1.200	1.500	0.33	0.039	A	SO...0803...	◎
181135400	SO10 D2.00-A.750/1.75-06-08	6	2.000	0.750	1.457	1.750	0.63	0.039	A	SO...0803...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

Weldon Shank

$\kappa_r=10°$ | $\gamma_p=+2°$ | $\gamma_f=+2°$ | $R_p=0.079$



Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		Ap max (in)		
181078700	SO10 D.750-W.750/5.00-02-08	2	0.750	0.750	5.000	2.835	0.79	0.039	SO...0803...	◎
181078800	SO10 D.750-W.750/8.00-02-08	2	0.750	0.750	8.000	2.835	0.69	0.039	SO...0803...	◎
181078900	SO10 D1.00-W1.00/5.00-03-08	3	1.000	1.000	5.000	2.835	0.90	0.039	SO...0803...	◎
181079000	SO10 D1.00-W1.00/8.00-03-08	3	1.000	1.000	8.000	4.843	1.26	0.039	SO...0803...	◎
181134800	SO10 D1.25-W1.25/6.00-04-08	4	1.250	1.250	6.000	3.425	0.76	0.039	SO...0803...	◎
181134900	SO10 D1.25-W1.25/8.00-04-08	4	1.250	1.250	8.000	4.843	1.68	0.039	SO...0803...	◎

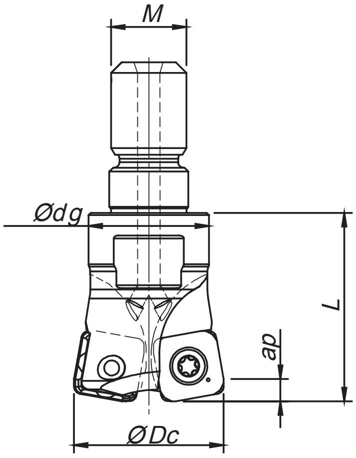
◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

HIFEED SO10-08

SOEW | SOET

Facing Profiling Copying Ramp down Helical Interpolation Plunging



Threaded Coupling

$\kappa_r=10°$ | $\gamma_p=+2°$ | $\gamma_f=+2°$ | $R_p=0.079$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)		
181135000	SO10 D.750-R-10/.984-02-08	2	0.750	M10	0.630	0.984	0.088	0.039	SO...0803...	◎
181135100	SO10 D1.00-R-12/1.18-03-08	3	1.000	M12	0.827	1.181	0.154	0.039	SO...0803...	◎
181135200	SO10 D1.25-R-16/1.37-04-08	4	1.250	M16	1.142	1.378	0.358	0.039	SO...0803...	◎

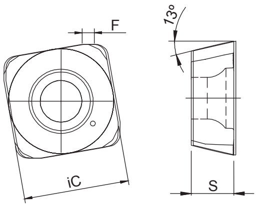
◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

SO...0803... | Inserts | Pastilhas | Plaquitas

SOEW

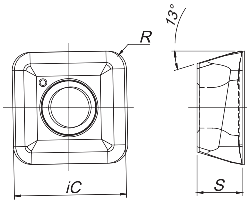
PHP
NEW
GRADE

SOEW



SOET

SOET



		P			M		K			S		Dimensions Dimensões Dimensiones (in)			
		PVD			PVD		PVD			PVD					
	(2) Grade code	X5	T1	G6	X9	G6	X5	T1	G6	X9	G6				
(1) Geometry code	ISO Reference	PHP910	PHP920	PH7740	PHH930	PH7740	PHP910	PHP920	PH7740	PHH930	PH7740	iC	S	R	F
1111884	SOEW 080310 S	◎	◉				◎	◉				0.339	0.137	0.039	0.039
1112149	SOET 080315-MS			◎	◉	◎			◎	◉	◎	0.339	0.137	0.059	-

◉ First choice | Primeira opção | 1ª opción ◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17) **Insert order code** = (1) Geometry Code + (2) Grade Code

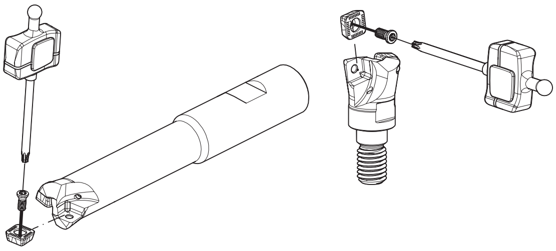
HIFEED SO10-08

SPARE PARTS | Acessórios | Repuestos

Order seperately

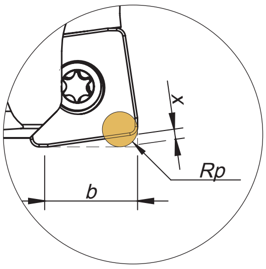
Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
SO10-W-08 - 0.75-1.25	P0300800	XT09	DT0914	12.4
SO10-R-08 - 0.75-1.25	P0300800	XT09	DT0914	12.4
SO10-A-08 - 1.50-2.00	P0300800	XT09	DT0914	12.4

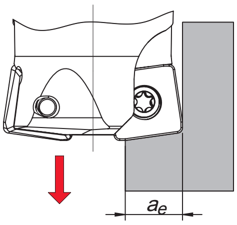
Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



PROGRAMMING DATA | Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	a_e
SO... 0803..	0.079	0.031	0.268	0.248





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 (SFM) ← Wear Resistance Toughness →				Feed fz (in/t)	
				PHP910	PHP920	PHH930	PH7740	SOEW 08...	SOET 08...
P	1	Unalloyed Steel	125-220	590-820	590-820	-	460-656	0.015-0.070	0.015-0.070
	2	Low-Alloyed Steel	220-280	525-788	525-755	-	426-590	0.015-0.070	-
	3	High-Alloyed Steel	280-380	460-755	460-722	-	328-558	0.015-0.060	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	460-690	426-590	-	0.015-0.050
	5	SS - Austenitic	200-330	-	-	394-558	360-525	-	0.015-0.050
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	328-492	-	-	0.004-0.040
K	7	Malleable Cast Iron	130-230	590-1004	525-886	-	460-722	0.015-0.070	0.015-0.070
	8	Grey Cast Iron	180-245	525-820	460-820	-	394-690	0.015-0.070	-
	9	Nodular Cast iron	160-250	492-690	394-690	-	328-624	0.015-0.070	-
S	11	Heat Resistant Super Alloys	200-320	-	-	100-360	100-328	-	0.015-0.040

(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) PH5... and PHS... can be used wet or dry. PH7... use only air.

(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.

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

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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...	-
K	7	Malleable Cast Iron	130-230	SOET 08...	SOEW 08...
	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...	-

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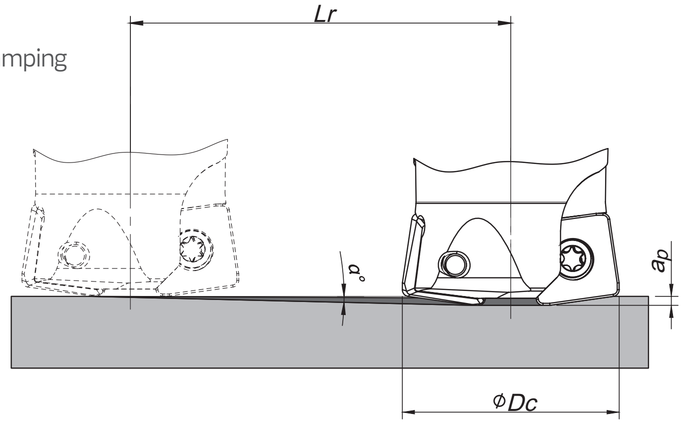
HIFEED SO10-08

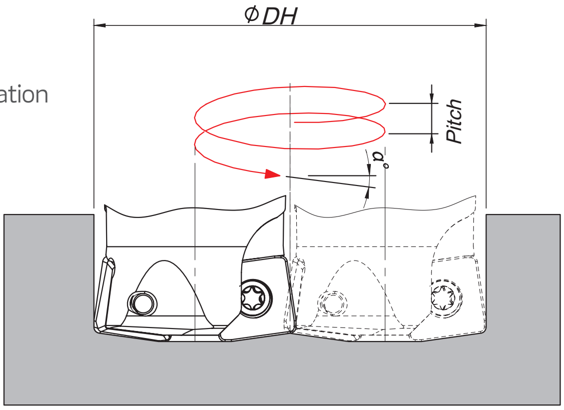
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical
Interpolation



Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
0.750	15.0	0.039	0.146	0.964 -	- 1.421	0.039 0.039
1.000	9.5	0.039	0.233	1.464 -	- 1.921	0.039 0.039
1.250	5.5	0.039	0.405	1.964 -	- 2.421	0.039 0.039
1.500	4.0	0.039	0.558	2.464 -	- 2.921	0.039 0.039
2.000	2.5	0.039	0.893	3.464 -	- 3.921	0.039 0.039

Note: During helical interpolation do not exceed max Pitch.

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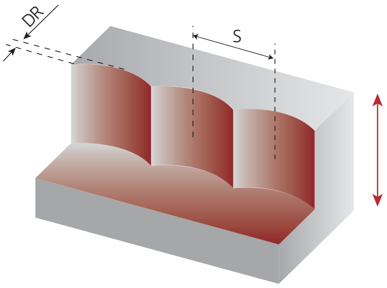
PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.004-0.006	0.002-0.004	$S_{max} = \sqrt{DC.DR-DR^2}$



S max and DR corrsponding cutting diameter Dc (in)					
DR (in)	Dc (in)				
	0.750	1.000	1.250	1.500	2.000
0.039	0.167	0.194	0.217	0.239	0.277
0.079	0.230	0.270	0.304	0.335	0.390
0.118	0.273	0.323	0.365	0.404	0.471
0.157	0.305	0.364	0.414	0.459	0.538
0.197	0.330	0.398	0.455	0.507	0.596
0.236	0.348	0.425	0.489	0.546	0.645

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

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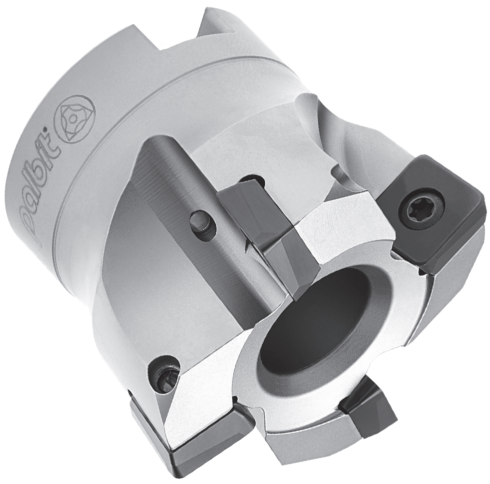
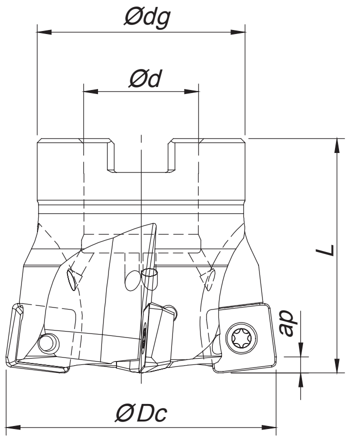
HIFEED SO10-13





Arbor Mounting

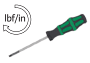
$\kappa_r=10°$ | $\gamma_p=+5°$ | $R_p=2,5$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)	Arbor Type		
181099300	SO10 D2.00-A.750/1.75-04-13	4	2.000	0.750	1.772	1.750	0.73	0.059	A	SO...13M5	◎
181139300	SO10 D2.00-A.750/1.75-05-13	5	2.000	0.750	1.772	1.750	0.70	0.059	A	SO...13M5	◎
181099400	SO10 D2.50-A1.00/2.00-05-13	5	2.500	1.000	2.205	2.000	1.32	0.059	A	SO...13M5	◎
181099500	SO10 D3.00-A1.00/2.00-06-13	6	3.000	1.000	2.205	2.000	1.98	0.059	A	SO...13M5	◎
181137800	SO10 D3.00-A1.25/2.00-06-13	6	3.000	1.250	2.441	2.000	1.82	0.059	A	SO...13M5	◎
181137900	SO10 D4.00-A1.50/2.50-08-13	8	4.000	1.500	3.150	2.500	4.41	0.059	A	SO...13M5	◎

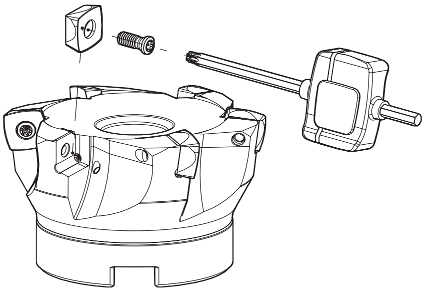
◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
			 lbf/in	lbf/in
SO10-A-13 - 2.00-3.00	P0401200	XT15	DT1530	26.6
SO10-A-13 - 4.00	P0401200	PT15	DT1530	26.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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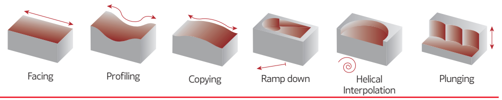


SO...13M5... ‖ Inserts | Pastilhas | Plaquitas

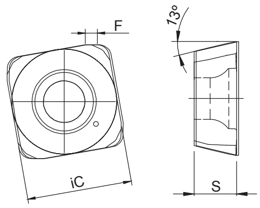
SOEW

SOEW-MD

PHH
NEW
GRADE

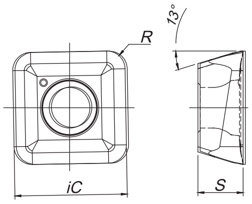
PHP
NEW
GRADE

SOEW | SOEW-MD



SOET

SOET



		P			M		K			S		Dimensions Dimensões Dimensiones (in)			
		PVD			PVD		PVD			PVD					
	(2) Grade code	X5	T1	G6	X9	G6	X5	T1	G6	X9	G6				
(1) Geometry code	ISO Reference	PHP910	PHP920	PH7740	PHH930	PH7740	PHP910	PHP920	PH7740	PHH930	PH7740	iC	S	R	F
1111906	SOEW 13M510 S	⊚	◉	⊚			⊚	◉	⊚			0.489	0.197	0.047	0.039
NEW 1112813	SOEW 13M510-MD		◉					◉				0.489	0.197	0.047	0.039
1112147	SOET 13M520-MS	○		◉	◉	⊚			◉	◉	⊚	0.489	0.197	0.079	-

◉ First choice | Primeira opção | 1ª opción

⊚ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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HIFEED SO10-13

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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance PHP910 ●	 PHP920 ◐	 PHH930 ✸	 Toughness → 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 (SFM) ← Wear Resistance PHP910	 PHP920	 PHH930	 Toughness → PH7740	Feed fz (in/t) SOEW S	 SOEW MD	 SOET MS
P	1	Unalloyed Steel	125-220	590-820	590-820	-	460-656	0.020-0.082	0.020-0.088	0.020-0.082
	2	Low-Alloyed Steel	220-280	525-788	525-755	-	426-590	0.020-0.082	0.020-0.088	-
	3	High-Alloyed Steel	280-380	460-755	460-722	-	328-558	0.020-0.080	0.020-0.082	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	460-690	426-590	-	-	0.020-0.070
	5	SS - Austenitic	200-330	-	-	394-558	360-525	-	-	0.020-0.070
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	328-492	-	-	-	0.020-0.060
K	7	Malleable Cast Iron	130-230	590-1004	525-886	-	460-722	0.020-0.082	0.020-0.088	0.020-0.082
	8	Grey Cast Iron	180-245	525-820	460-820	-	394-690	0.020-0.082	0.020-0.088	-
	9	Nodular Cast iron	160-250	492-690	394-690	-	328-624	0.020-0.082	0.020-0.088	-
S	11	Heat Resistant Super Alloys	200-320	-	-	100-360	100-328	-	-	0.016-0.050

(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.

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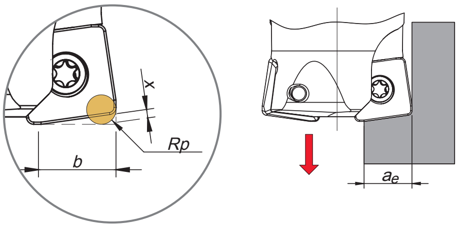
CHIPBREAKER SELECTION GUIDE | Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult Operations
P	1	Unalloyed Steel	125-220	SOEW-MD	SOEW-S
	2	Low-Alloyed Steel	220-280	SOEW-MD	SOEW-S
	3	High-Alloyed Steel	280-380	SOEW-MD	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	-
K	7	Malleable Cast Iron	130-230	SOET-MS	SOEW-S
	8	Grey Cast Iron	180-245	SOEW-MD	SOEW-S
	9	Nodular Cast iron	160-250	SOEW-MD	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	a_e
SO... 13M5..	0.098	0.043	0.038	0.394



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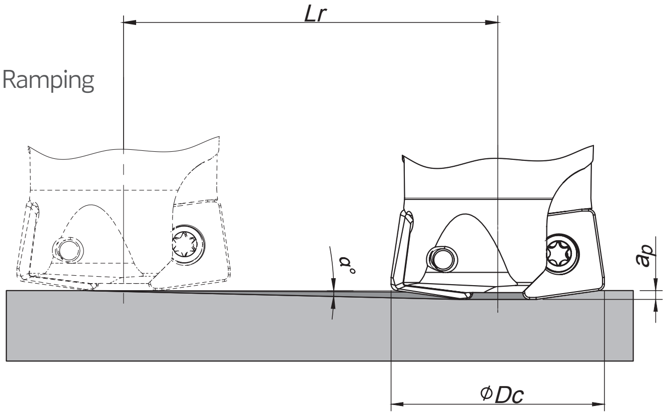
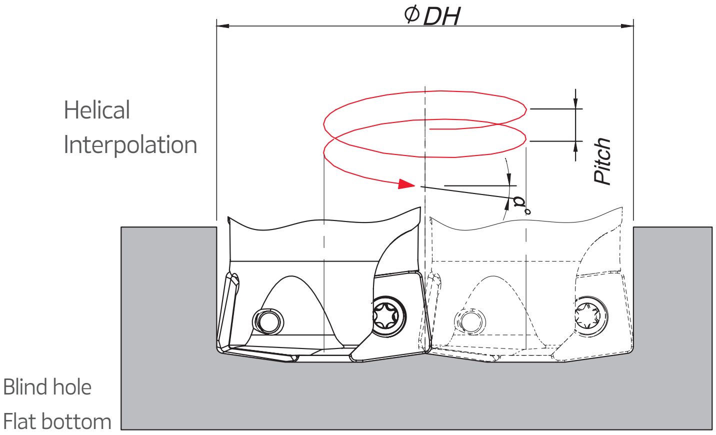
HIFEED SO10-13

RAMPING AND HELICAL INTERPOLATION

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





Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
2.000	4.3	0.059	0.785	3.924 -	- 3.921	0.059 0.059
2.500	3.0	0.059	1.126	4.924 -	- 4.921	0.059 0.059
3.000	2.0	0.059	1.690	5.924 -	- 5.921	0.059 0.059
4.000	0.7	0.059	4.829	7.924 -	- 7.921	0.059 0.059

Note: During helical interpolation do not exceed max Pitch.

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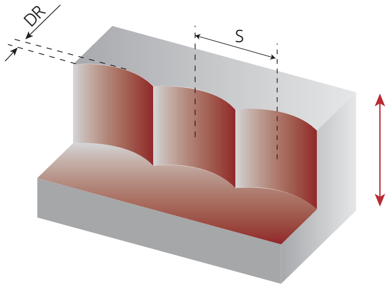
PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.004-0.008	0.003-0.006	$Smax = \sqrt{DC.DR-DR^2}$



S max and DR corresponding cutting diameter Dc (in)				
DR (mm)	Dc (in)			
	2.000	2.500	3.000	4.000
0.039	0.277	0.310	0.340	0.393
0.079	0.390	0.437	0.480	0.557
0.118	0.471	0.530	0.583	0.677
0.157	0.538	0.607	0.668	0.777
0.197	0.596	0.674	0.743	0.866
0.236	0.645	0.731	0.808	0.942
0.276	0.690	0.783	0.867	1.014
0.315	0.729	0.830	0.920	1.077
0.354	0.763	0.872	0.968	1.136
0.394	0.795	0.911	1.013	1.192

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

PDF

VIDEO

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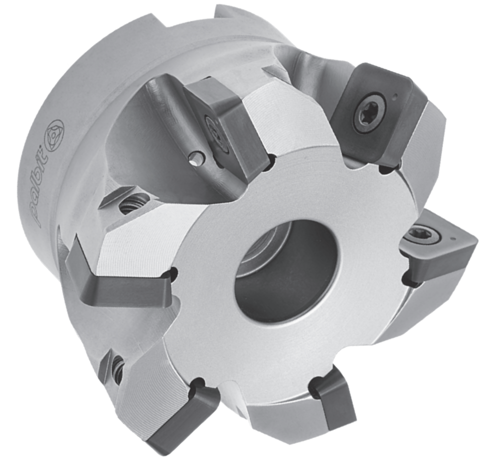
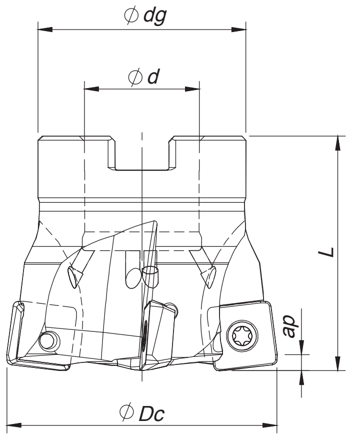
HIFEED SO15-16





Arbor Mounting

$\kappa_r=15°$ | $\gamma_p=+2°$ | $R_p=4,5$

Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)					Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L	lbs	Ap max (in)	Arbor Type		
181073900	SO15 D2.50-A1.00/1.75-05-16	5	2.500	1.000	2.205	1.750	1.42	0.138	A	SO...1605...	◎
181074000	SO15 D3.00-A1.00/2.00-06-16	6	3.000	1.000	2.205	2.000	1.69	0.138	A	SO...1605...	◎
181138400	SO15 D3.00-A1.25/2.00-06-16	6	3.000	1.250	2.441	2.000	1.69	0.138	A	SO...1605...	◎
181074100	SO15 D4.00-A1.25/2.00-08-16	8	4.000	1.250	2.874	2.000	3.19	0.138	A	SO...1605...	△
181138500	SO15 D4.00-A1.50/2.50-08-16	8	4.000	1.500	3.150	2.500	3.19	0.138	A	SO...1605...	◎
181074200	SO15 D5.00-A1.50/2.50-10-16	10	5.000	1.500	3.386	2.500	6.92	0.138	A	SO...1605...	◎
181074300	SO15 D6.00-A2.00/2.50U-12-16	12	6.000	2.000	4.882	2.500	8.22	0.138	B	SO...1605...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplezado por nuevo iten.

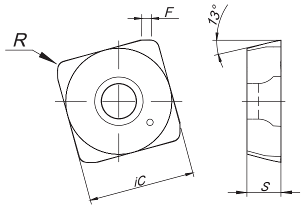
SO...1605... | Inserts | Pastilhas | Plaquitas

SOEW

PHH
NEW
GRADE

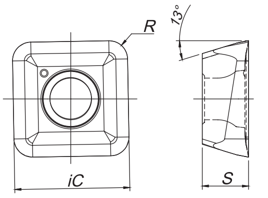
PHP
NEW
GRADE

SOEW



SOET

SOET



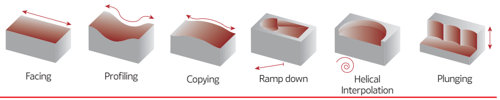
		P			M		K			S		Dimensions Dimensões Dimensiones (in)			
		PVD			PVD		PVD			PVD					
	(2) Grade code	X5	T1	G6	X9	G6	X5	T1	G6	X9	G6				
(1) Geometry code	ISO Reference	PHP910	PHP920	PH7740	PHH930	PH7740	PHP910	PHP920	PH7740	PHH930	PH7740	iC	S	R	F
1111907	SOEW 160512 S	◎	◉	◎		◎	◎	◉	◎			0.646	0.207	0.047	0.059
1112221	SOET 160520-MS			◎	◉	◎			◎	◉	◎	0.646	0.207	0.079	-

◉ First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

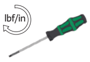
○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

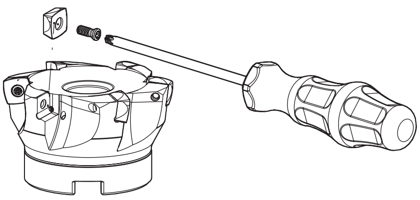


SPARE PARTS | Acessórios | Repuestos

Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			lbf/in 	lbf/in
SO15-A-16 - 2.50-6.00	P0501302	PT20	DT2050	44.3

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance PHP910 ●	 PHP920 ●	 PHH930 ●	 Toughness → 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 (SFM) ← Wear Resistance			Toughness →	Feed fz (in/t)	
				PHP910	PHP920	PHH930	PH7740	SOEW S	SOET MS
P	1	Unalloyed Steel	125-220	590-820	590-820	-	460-656	0.020-0.082	0.020-0.088
	2	Low-Alloyed Steel	220-280	525-788	525-755	-	426-590	0.020-0.082	0.020-0.088
	3	High-Alloyed Steel	280-380	460-755	460-722	-	328-558	0.020-0.080	0.020-0.070
M	4	SS - Ferritic / Martensitic	200-330	-	-	460-690	426-590	-	0.020-0.070
	5	SS - Austenitic	200-330	-	-	394-558	360-525	-	0.020-0.070
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	328-492	-	-	0.020-0.060
K	7	Malleable Cast Iron	130-230	590-1004	525-886	-	460-722	0.020-0.082	0.020-0.080
	8	Grey Cast Iron	180-245	525-820	460-820	-	394-690	0.020-0.082	0.020-0.080
	9	Nodular Cast iron	160-250	492-690	394-690	-	328-624	0.020-0.082	0.020-0.070
S	11	Heat Resistant Super Alloys	200-320	-	-	100-360	100-328	-	0.015-0.050

(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) PH5... and PHS... can be used wet or dry. PH7... use only air.

(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.

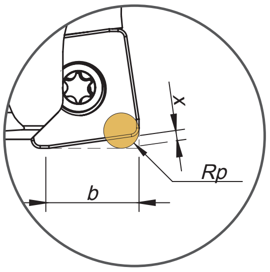
HIFEED SO15-16

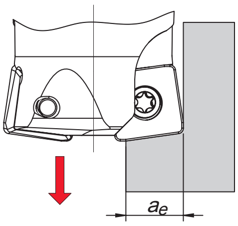
CHIPBREAKER SELECTION GUIDE | Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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...	-
K	7	Malleable Cast Iron	130-230	SOET 16...	SOEW 16...
	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...	-

PROGRAMMING DATA | Dados para programação | Datos para la programación

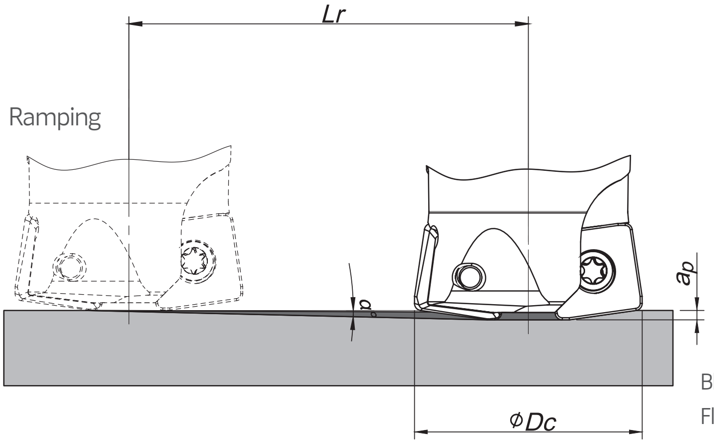
Insert	Programming Data			
	Rp	X	b	a_e
SO... 1605..	0.177	0.091	0.531	0.504

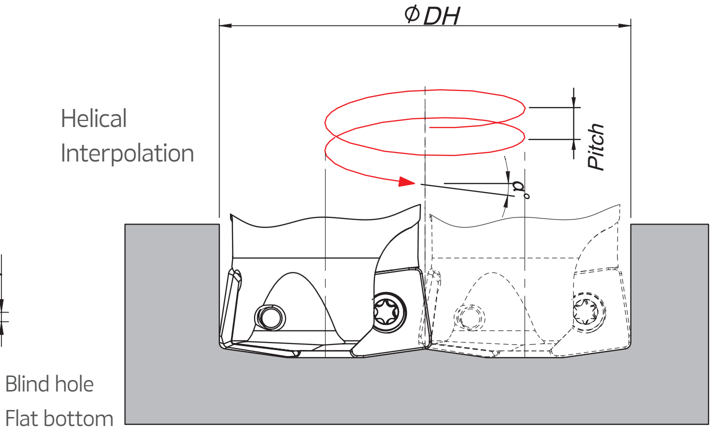




RAMPING AND HELICAL INTERPOLATION

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





Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
2.500	3.5	0.138	2.256	3.938 -	- 4.921	0.138 0.138
3.000	2.0	0.138	3.952	4.938 -	- 5.921	0.138 0.138
4.000	1.5	0.138	5.270	6.938 -	- 7.921	0.138 0.138
5.000	1.0	0.138	7.906	8.938 -	- 9.921	0.138 0.138
6.000	0.5	0.138	15.813	10.938 -	- 11.921	0.130 0.138

Note: During helical interpolation do not exceed max Pitch.

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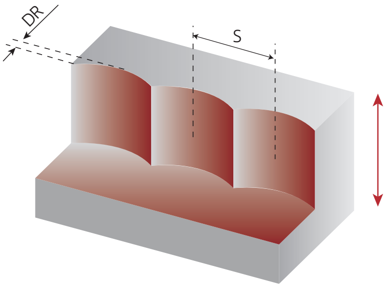
PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.004-0.008	0.003-0.006	Smax = $\sqrt{DC.DR-DR^2}$



S max and DR corrsponding cutting diameter Dc (in)					
DR (in)	Dc (in)				
	2.500	3.000	4.000	5.000	6.000
0.039	0.310	0.340	0.393	0.440	0.482
0.079	0.437	0.480	0.557	0.624	0.684
0.118	0.530	0.583	0.677	0.759	0.833
0.157	0.607	0.668	0.777	0.872	0.958
0.197	0.674	0.743	0.866	0.973	1.069
0.236	0.731	0.808	0.942	1.060	1.166
0.276	0.783	0.867	1.014	1.142	1.257
0.315	0.830	0.920	1.077	1.215	1.338
0.354	0.872	0.968	1.136	1.282	1.414
0.394	0.911	1.013	1.192	1.347	1.486
0.433	0.946	1.054	1.243	1.406	1.553
0.472	0.978	1.092	1.290	1.462	1.615

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

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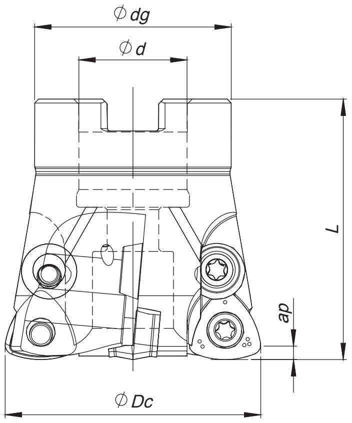
HIFEED WD60-12



Arbor Mounting

$\gamma_p=+5^{\circ}$ | $R_p=3{,}2$

Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød	Ødg	L		Ap max (in)	Arbor Type		
181134700	WD60 D2.00-A.750/2.00-04-12	4	2.000	0.750	1.772	2.000	0.93	0.059	A	WD... 1204...	◉
181139800	WD60 D2.50-A1.00/2.00-05-12	5	2.500	1.000	1.772	2.000	1.39	0.059	A	WD... 1204...	○
181139900	WD60 D3.00-A1.25/2.00-06-12	6	3.000	1.250	2.283	2.000	2.25	0.059	A	WD... 1204...	○

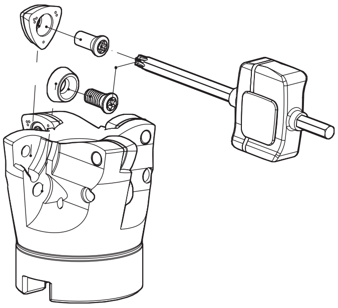
◉ Stock item | Produto de stock | Itens de stock

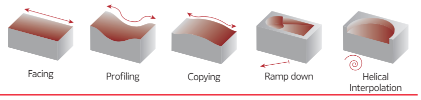
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

SPARE PARTS | Acessórios | Repuestos

			Order separately		Order separately	
Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value	Washer	Washer Screw
			lbf/in	lbf/in		
WD60-A-12 - 2.00-3.00	P0451001	XT20	DT2050	44.3	HC01200	P0451001

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

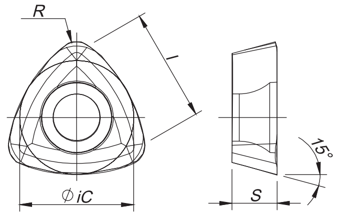




WD... 1204... | Inserts | Pastilhas | Plaquitas

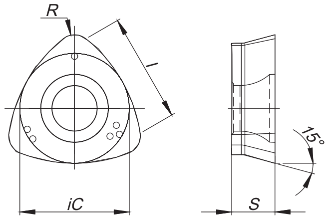
WDET

WDET



WDMW

WDMW



		P				M		K		S		Dimensions Dimensões Dimensiones (in)			
		PVD				PVD		PVD		PVD					
	(2) Grade code	G4	P3	G6	Z2	P3	G6	G4	G6	P3	G6				
(1) Geometry code	ISO Reference	PH7920	PH7930	PH7740	PHP530	PH7930	PH7740	PH7920	PH7740	PH7930	PH7740	iC	S	l	R
1112148	WDET 120420-MS	○	◉	◎	○	◉	◎	○	◎	◉	◎	0.472	0.187	0.469	0.079
1111123	WDMW 120420-T	◉		◎			◎	◉	◎		◎	0.472	0.187	0.469	0.079

◉ First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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 →
				PH7920 ◐	PH7930 ◐	PHP530 ◐	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

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HIFEED WD60-12

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance / Toughness →				Feed fz (in/t)	
				PH7920	PH7930	PHP530	PH7740	WDMW 12...	WDET 12...
P	1	Unalloyed Steel	125-220	590-788	525-722	590-1115	460-656	0.012-0.060	0.012-0.052
	2	Low-Alloyed Steel	220-280	525-722	460-656	590-1115	426-590	0.012-0.060	0.012-0.052
	3	High-Alloyed Steel	280-380	460-690	394-624	590-1082	328-558	0.012-0.052	0.012-0.040
M	4	SS - Ferritic / Martensitic	200-330	460-722	460-656	492-886	426-590	-	0.012-0.052
	5	SS - Austenitic	200-330	426-590	394-525	-	360-525	-	0.012-0.052
	6	SS - Austenitic-ferritic (Duplex)	230-260	394-525	328-460	-	-	-	0.012-0.040
K	7	Malleable Cast Iron	130-230	525-854	492-788	-	460-722	0.012-0.060	-
	8	Grey Cast Iron	180-245	460-788	460-755	-	394-690	0.012-0.060	-
	9	Nodular Cast iron	160-250	394-656	328-624	-	328-624	0.012-0.055	-
S	11	Heat Resistant Super Alloys	200-320	-	100-328	-	100-328	-	0.012-0.040

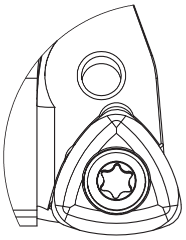
(Note 1) Cutting conditions a_e/Dc=70%.

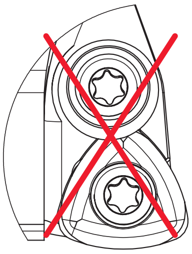
(Note 2) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

(Note 3) PH5... and PHS... can be used wet or dry. PH7... use only air.

(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.

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





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

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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...	-

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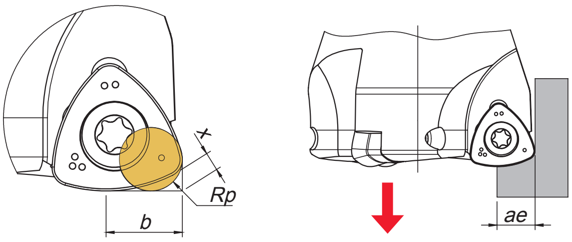
PROGRAMMING DATA | Dados para programação | Datos para la programación

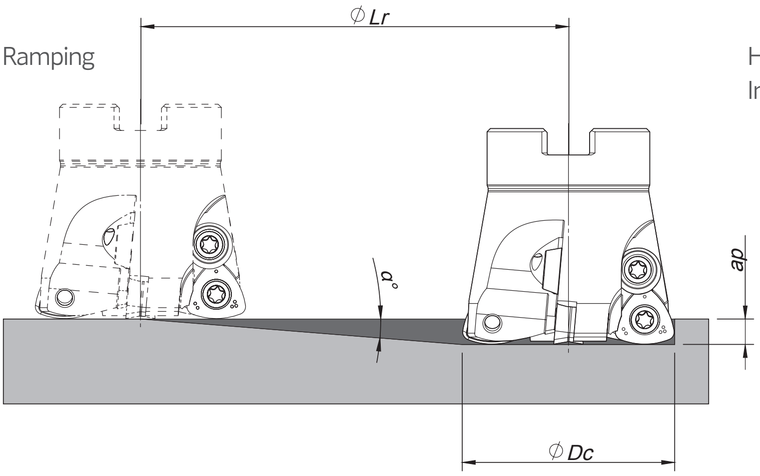
Insert	Programming Data			
	Rp	x	b	a_e
WD... 1204	0.126	0.028	0.283	0.276



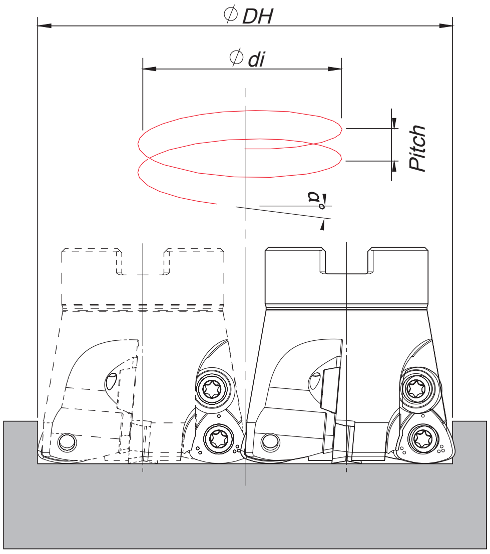
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical Interpolation



Blind hole

Flat bottom

Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
2.000	0.8	0.059	4.225	3.434 -	- 3.921	0.059 0.059
2.500	0.4	0.059	8.451	4.434 -	- 4.921	0.042 0.053
3.000	0.3	0.059	11.268	5.434 -	- 5.921	0.040 0.048

Note: During helical interpolation do not exceed max Pitch.

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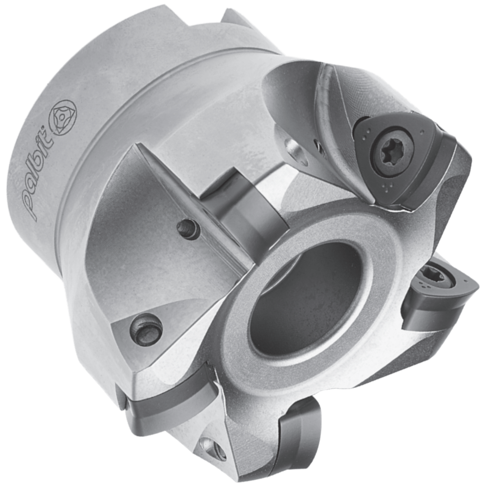
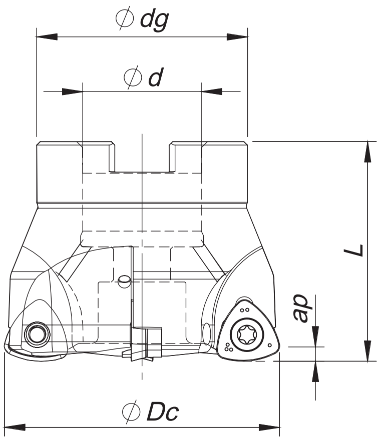
HIFEED WN60-12





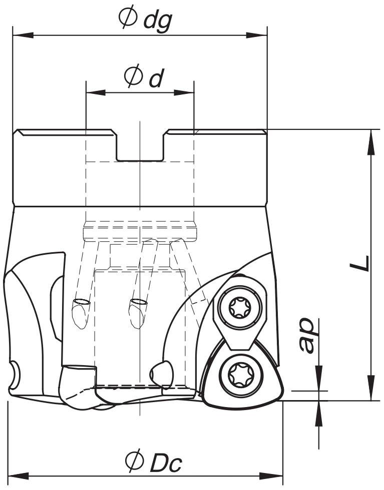
Arbor Mounting

γ_p=0° | R_p=3,5

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)	Arbor Type		
181054600	WN60 D2.00-A.750/1.75-03-12	3	2.000	0.750	1.772	1.750	0.79	0.071	A	WN... 1207	◎
181054700	WN60 D2.50-A.750/1.75-04-12	4	2.500	0.750	1.772	1.750	1.10	0.071	A	WN... 1207	○
181080700	WN60 D2.50-A1.00/1.75-04-12	4	2.500	1.000	1.772	1.750	1.08	0.071	A	WN... 1207	◎
181054800	WN60 D3.00-A1.00/2.00-05-12	5	3.000	1.000	2.283	2.000	1.99	0.071	A	WN... 1207	◎
181072900	WN60 D4.00-A1.25/2.00-05-12	5	4.000	1.250	2.874	2.000	3.30	0.071	A	WN... 1207	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Clamp Version

γ_p=0° | R_p=0.138

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)	Arbor Type		
181083700	WN60 D2.00-A.750/1.97-03-12	3	2.000	0.750	1.772	1.969	0.81	0.071	A	WN... 1207	◎
181083800	WN60 D2.50-A1.00/2.00-04-12	4	2.500	1.000	2.205	2.000	1.08	0.071	A	WN... 1207	◎
181083900	WN60 D3.00-A1.00/2.50-05-12	5	3.000	1.000	2.283	2.500	1.97	0.071	A	WN... 1207	◎
181084000	WN60 D4.00-A1.50/2.50-05-12	5	4.000	1.500	2.874	2.500	3.24	0.071	A	WN... 1207	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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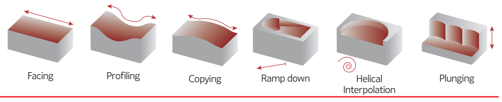
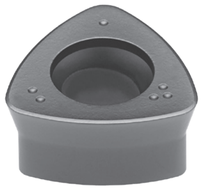
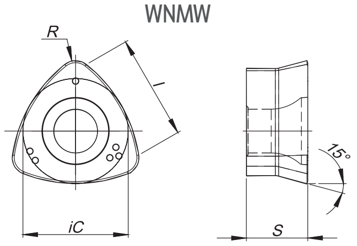


WNMW 1207 | Inserts | Pastilhas | Plaquitas

WNMW





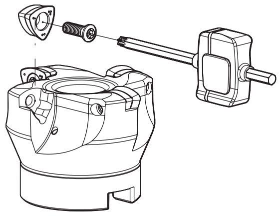
		P					K			Dimensions Dimensões Dimensiones (in)			
		PVD					PVD						
	(2) Grade code	G1	G4	78	86	G6	G1	G4	G6				
(1) Geometry code	ISO Reference	PH7910	PH7920	PH6125	PH6135	PH7740	PH7910	PH7920	PH7740	iC	S	l	R
1121148	WNMW 1207-SP	◉	◎	◉	◉	△	◉	◎	△	0.472	0.276	0.469	0.079

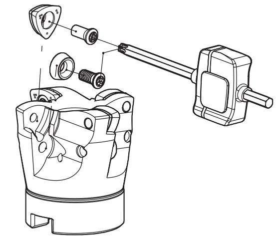
◎ First choice | 1ª Escolha | 1ª Opción
◉ Stock Itens | Itens de stock
△ Stock available until sold out | Stock disponível até acabar o stock | Stock disponible hasta acabar el stock
○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

SPARE PARTS | Acessórios | Repuestos

			Order separately		Clamp Version	
Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value	Clamp Set	Clamp Key (Torx)
WN60-A-12 - 2.00-3.00	P0451400	XT20	DT2050	44.3	GS40140	XT15
WN60-A-12 - 4.00	P0451400	XT20	DT2050	44.3	GS40140	XT15





Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

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 ✲	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

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HIFEED WN60-12

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM)					Feed fz (in/t)
				← Wear Resistance				Toughness →	
				PH7910	PH7920	PH6125	PH6135	PH7740	WNMW 12...
P	1	Unalloyed Steel	125-220	590-820	590-788	525-624	492-590	460-656	0.012-0.060
	2	Low-Alloyed Steel	220-280	525-755	525-722	460-590	460-558	426-590	0.012-0.060
	3	High-Alloyed Steel	280-380	460-722	460-690	426-525	394-492	328-558	0.012-0.050
K	7	Malleable Cast Iron	130-230	590-1004	525-854	-	-	460-722	0.012-0.060
	8	Grey Cast Iron	180-245	525-820	460-788	-	-	394-690	0.012-0.060
	9	Nodular Cast iron	160-250	492-656	394-656	-	-	328-624	0.012-0.055

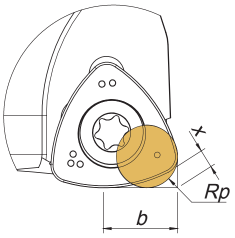
(Note 1) Cutting conditions a_e/Dc=70%.

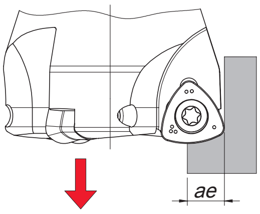
(Note 2) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

(Note 3) PH5... and PHS... can be used wet or dry. PH7... use only air.

PROGRAMMING DATA | Dados para programação | Datos para la programación

Insert	Programming Data			
	Rp	X	b	a_e
WNMW 12	0.138	0.035	0.331	0.315





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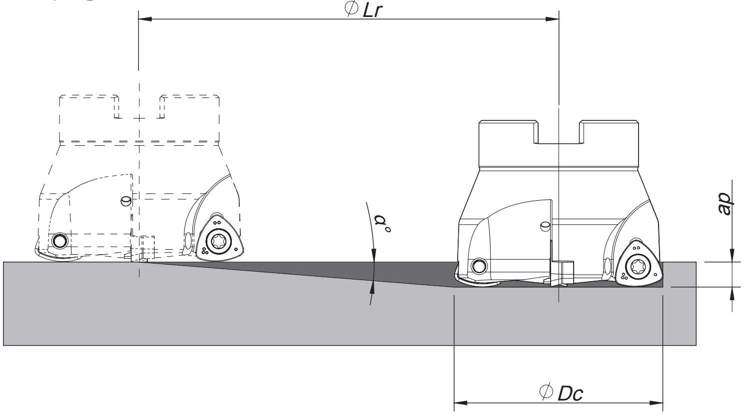
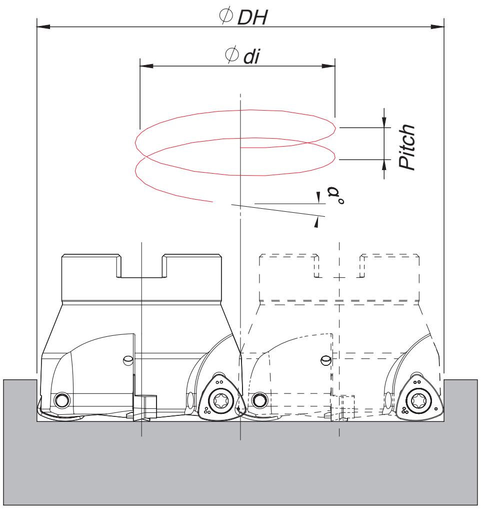
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical
Interpolation



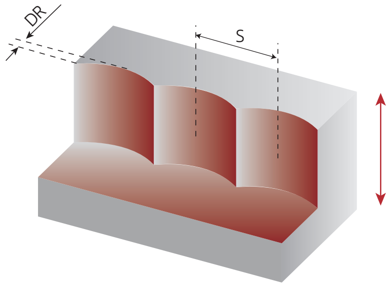
Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
2.000	1.8	0.138	4.391	3.338 -	- 3.921	0.130 0.138
2.500	1.2	0.138	6.588	4.338 -	- 4.921	0.120 0.138
3.000	0.9	0.138	8.785	5.338 -	- 5.921	0.110 0.138
4.000	0.4	0.138	19.767	7.338 -	- 7.921	0.070 0.080

Note: During helical interpolation do not exceed max Pitch.

PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.004-0.008	0.003-0.006	$S\max = \sqrt{DC.DR-DR^2}$

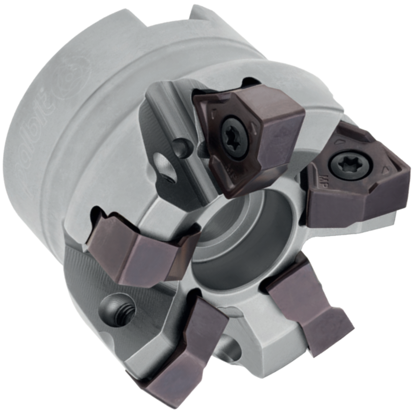


DR (in)	S max and DR corrsponding cutting diameter Dc (in)			
	Dc (in)			
	2.000	2.500	3.000	4.000
0.039	0.277	0.310	0.340	0.393
0.079	0.390	0.437	0.480	0.557
0.118	0.471	0.530	0.583	0.677
0.157	0.538	0.607	0.668	0.777
0.197	0.596	0.674	0.743	0.866
0.236	0.645	0.731	0.808	0.942
0.276	0.690	0.783	0.867	1.014
0.315	0.729	0.830	0.920	1.077

Note: Recommended for L ≤ 4 Dc, forL > 4DC steps must be reduced to 40%.

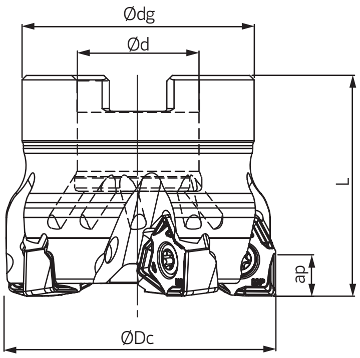
HEXAPLUS WN90-08

NEW



Arbor Mounting

$\kappa_r = 90°$ | $\gamma_p = -6°$



Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød	Ødg	L		Arbor Type	Ap max (in)		
181185300	WN90 D2.00-A.750/1.57-04-08	4	2.000	0.750	1.770	1.570	0.860	A	0.295	WNXT 0806...	◎
181185400	WN90 D2.00-A.750/1.57-05-08	5	2.000	0.750	1.770	1.570	0.838	A	0.295	WNXT 0806...	○
181185500	WN90 D2.50-A1.00/1.75-05-08	5	2.500	1.000	2.200	1.750	1.102	A	0.295	WNXT 0806...	◎
181185600	WN90 D3.00-A1.00/1.75-07-08	7	3.000	1.000	2.200	1.750	2.030	A	0.295	WNXT 0806...	◎

◎ Stock item | Produto de stock | Itens de stock

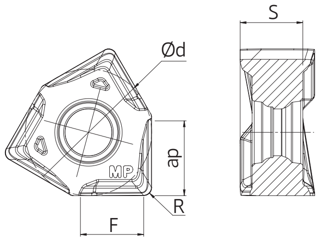
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

WNXT | Inserts | Pastilhas | Plaquitas

WNXT

NEW

PHP
NEW
GRADE



		P		K					
		PVD		PVD		Dimensions | Dimensões | Dimensiones (mm)			
	⁽²⁾ Grade code	T1	P4	T1	P4				
⁽¹⁾ Geometry code	Reference Referência Referencia	PHP920	PHP930	PHP920	PHP930	iC	S	R	F
1113000	WNXT 080608 PNSR-MP	✪	◎	✪	◎	1/2	1/4	1/32	0.161

✪ First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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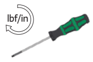
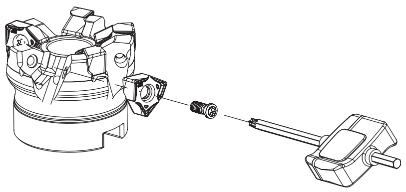
A
MILLING
News & Features
Overview
Face milling
Hifeed milling
Shoulder milling
Profile milling
Hardmill
Center & Chamfer
Engraving
Spare Parts
Technical Data

SPARE PARTS Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			Order separately	
				lbf/in
WN90-08 - 2.000-3.000	P0401200	XT15	DT1530	26.6



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

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

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HEXAPLUS WN90-08

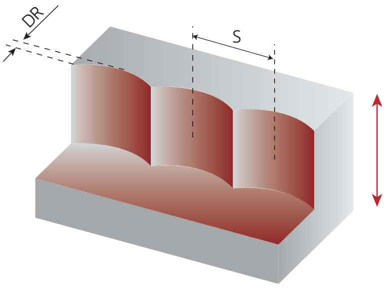
NEW

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance	Toughness →	Feed fz (in/t)
				PHP920	PHP930	WNXT
P	1	Unalloyed Steel	125-220	591-820	525-755	0.004-0.010
	2	Low-Alloyed Steel	220-280	525-755	460-689	0.004-0.010
	3	High-Alloyed Steel	280-380	460-722	394-656	0.004-0.008
K	7	Malleable Cast Iron	130-230	427-755	492-820	0.004-0.010
	8	Grey Cast Iron	180-245	591-804	460-755	0.004-0.010
	9	Nodular Cast iron	160-250	394-689	328-656	0.004-0.008

PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.004-0.006	0.003-0.005	$S_{max} = \sqrt{DC.Dr - Dr^2}$



S max and DR corresponding cutting diameter Dc (in)			
DR (in)	Dc (in)		
	2.000	2.500	3.000
0.039	0.275	0.311	0.350
0.079	0.386	0.433	0.492
0.118	0.469	0.528	0.598
0.157	0.535	0.606	0.685

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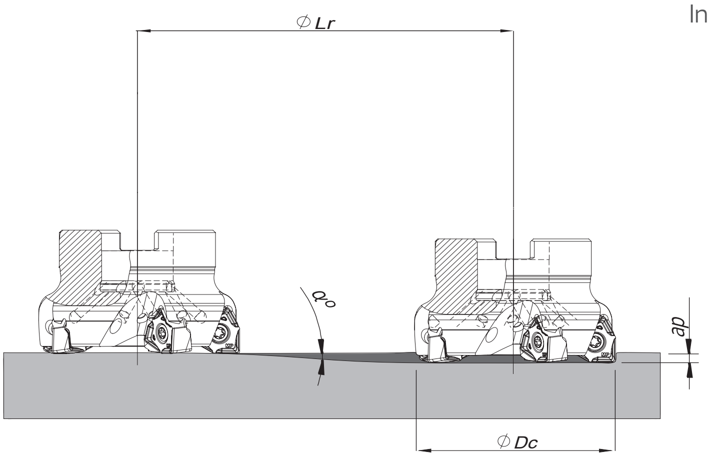
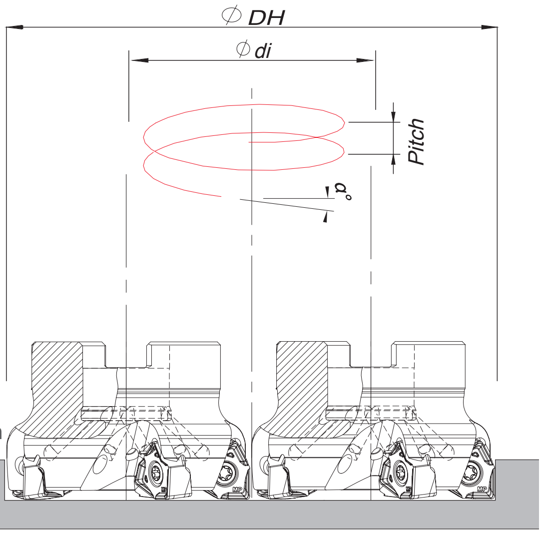
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical Interpolation



Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
2.000	3.5	0.300	4.830	3.450 -	- 3.860	0.287 0.300
2.500	3.5	0.300	4.830	4.500 -	- 4.880	0.300 0.300
3.000	3.0	0.300	5.630	5.830 -	- 6.220	0.300 0.300

Note: During helical interpolation do not exceed max Pitch.
(*) 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.

VIDEO

HEXAPLUS 49590

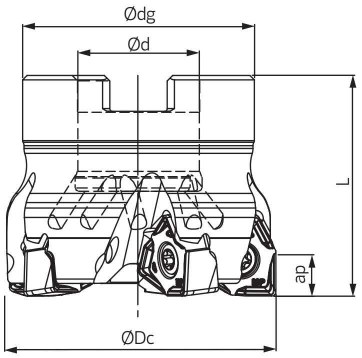
NEW

METRIC LINE

Proprietary milling line

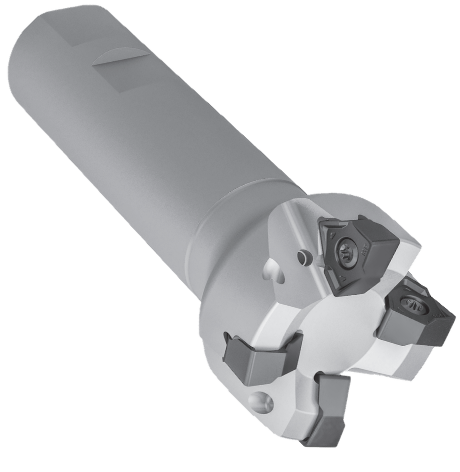
Arbor Mounting

$\kappa_r = 90°$ | $\gamma_p = -6°$



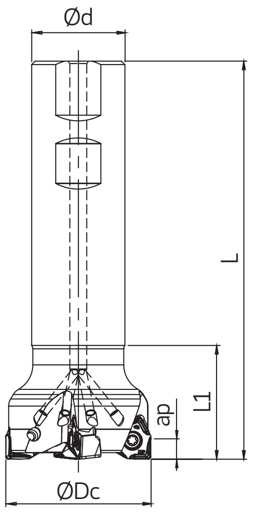
Order code Código	Reference Referência Referencia	⊕	Dimensions | Dimensões | Dimensiones (mm)				Kg	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød	Ødg	L		Arbor Type	Ap max (mm)		
181174900	040A49590-03-06-016040	3	40	16	32	40	0,15	A	7,5	WNXT 0806...	◎
181175000	040A49590-04-06-016040	4	40	16	32	40	0,13	A	7,5	WNXT 0806...	○
181173400	050A49590-04-06-022040	4	50	22	42	40	0,39	A	7,5	WNXT 0806...	◎
181165600	050A49590-05-06-022040	5	50	22	42	40	0,38	A	7,5	WNXT 0806...	◎
181173500	063A49590-05-06-022040	5	63	22	52	40	0,5	A	7,5	WNXT 0806...	◎
181173600	063A49590-06-06-022040	6	63	22	52	40	0,49	A	7,5	WNXT 0806...	○
181173700	080A49590-07-06-027050	7	80	27	60	50	1,18	B	7,5	WNXT 0806...	◎
181173800	080A49590-09-06-027050	9	80	27	60	50	1,16	B	7,5	WNXT 0806...	○
181173900	100A49590-08-06-032050	8	100	32	80	50	1,62	B	7,5	WNXT 0806...	◎
181174000	100A49590-11-06-032050	11	100	32	80	50	1,55	B	7,5	WNXT 0806...	○
181174100	125A49590-11-06-040063	11	125	40	90	63	2,82	B	7,5	WNXT 0806...	◎
181174200	125A49590-14-06-040063	14	125	40	90	63	2,76	B	7,5	WNXT 0806...	○

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Weldon Shank

$\kappa_r = 90°$ | $\gamma_p = -6°$



Order code Código	Reference Referência Referencia	⊕	Dimensions | Dimensões | Dimensiones (mm)				Kg	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød	L	L1		ap max (mm)		
181174300	032W49590-02-06-032125	2	32	32	125	40	0,65	7,5	WNXT 0806...	◎
181174400	032W49590-03-06-032125	3	32	32	125	40	0,60	7,5	WNXT 0806...	○
181174500	040W49590-03-06-032130	3	40	32	130	40	0,70	7,5	WNXT 0806...	◎
181174600	040W49590-04-06-032130	4	40	32	130	40	0,65	7,5	WNXT 0806...	○
181174700	050W49590-04-06-032140	4	50	32	140	45	0,86	7,5	WNXT 0806...	○
181174800	050W49590-05-06-032140	5	50	32	140	45	0,81	7,5	WNXT 0806...	○

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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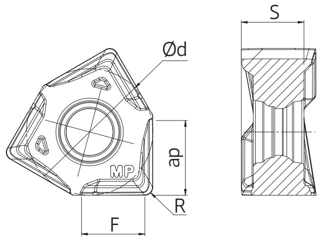
WNXT | Inserts | Pastilhas | Plaquitas

WNXT NEW

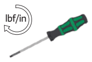
PHP
NEW
GRADE



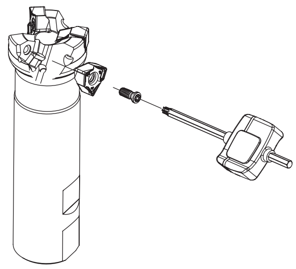
		P		K		Dimensions | Dimensões | Dimensiones (mm)			
		PVD		PVD					
	(2) Grade code	T1	P4	T1	P4				
(1) Geometry code	Reference Referência Referencia	PHP920	PHP930	PHP920	PHP930	iC	S	R	F
1113000	WNXT 080608 PNSR-MP	◈	◎	◈	◎	12,7	6,3	0,8	4,1

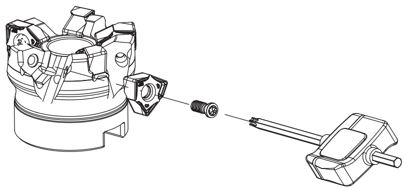
◈ First choice | Primeira opção | 1ª opción ◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17) **Insert order code** = (1) Geometry Code + (2) Grade Code

SPARE PARTS Acessórios | Repuestos

			Order separately		Order separately		
Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value	Screw	DIN 6368 Wrench	Retaining Screw
				lbf/in			
W49590 - 32 - 50	P0401200	XT15	DT1530	26.6	-	-	-
A49590 - 40	P0401200	XT15	DT1530	26.6	-		290087600
A49590 - 50 - 63	P0401200	XT15	DT1530	26.6	-	-	-
A49590 - 80	P0401200	XT15	DT1530	26.6	J0123510	SD6368-12	-
A49590 - 100	P0401200	PT15	DT1530	26.6	J0164110	SD6368-16	-
A49590 - 125	P0401200	PT15	DT1530	26.6	J0204610	SD6368-20	-

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.





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

HEXAPLUS 49590

NEW

METRIC LINE

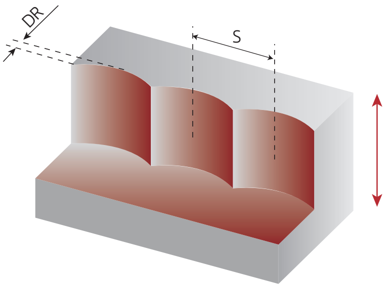
Proprietary milling line

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance	Toughness →	Feed fz (in/t)
				PHP920	PHP930	WNXT
P	1	Unalloyed Steel	125-220	591-820	525-755	0.004-0.010
	2	Low-Alloyed Steel	220-280	525-755	460-689	0.004-0.010
	3	High-Alloyed Steel	280-380	460-722	394-656	0.004-0.008
K	7	Malleable Cast Iron	130-230	427-755	492-820	0.004-0.010
	8	Grey Cast Iron	180-245	591-804	460-755	0.004-0.010
	9	Nodular Cast iron	160-250	394-689	328-656	0.004-0.008

PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.004-0.006	0.004-0.005	$\text{Smax} = \sqrt{\text{DC.Dr} - \text{Dr}^2}$



S max and DR corresponding cutting diameter Dc (in)							
DR (in)	Dc (mm)						
	32	40	50	63	80	100	125
0.039	0.220	0.244	0.276	0.311	0.350	0.390	0.437
0.079	0.303	0.343	0.386	0.433	0.492	0.551	0.618
0.118	0.366	0.413	0.469	0.528	0.598	0.673	0.752
0.157	0.417	0.472	0.535	0.606	0.685	0.772	0.866

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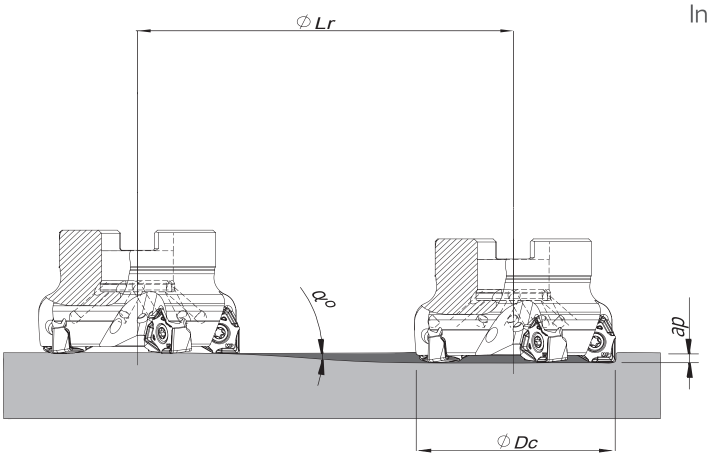
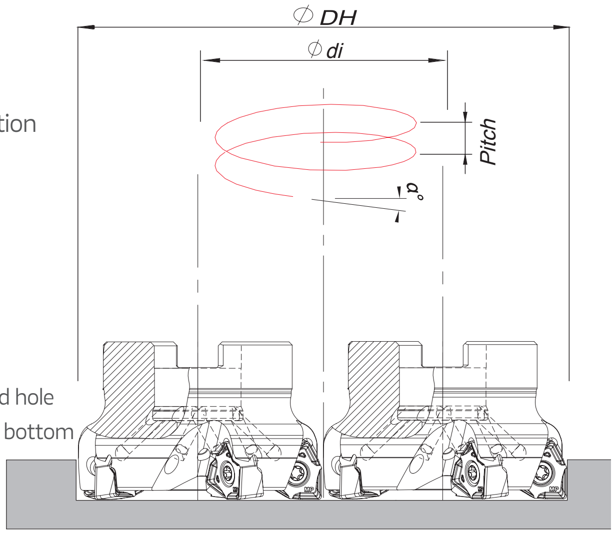
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical Interpolation



Blind hole
Flat bottom

Ødi = ØDH - ØDc

ØDc	Ramping (in)			Helical Interpolation (in)		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
32	4,0	0.295	4.224	2.047 -	- 2.441	0.169 0.260
40	3,8	0.295	4.445	2677 -	- 3.071	0.228 0.315
50	3,5	0.295	4.827	3.465 -	- 3.858	0.287 0.362
63	3,5	0.295	4.827	0.433 -	- 4.882	0.354 0.461
80	3,0	0.295	5.634	5.827 -	- 6.220	0.437 0.508
100	2,1	0.295	8.051	7.402 -	- 7.795	0.398 0.445
125	1,4	0.295	12.083	9.370 -	- 9.764	0.339 0.370

Note: During helical interpolation do not exceed max Pitch.
(*) 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.

PDF

VIDEO

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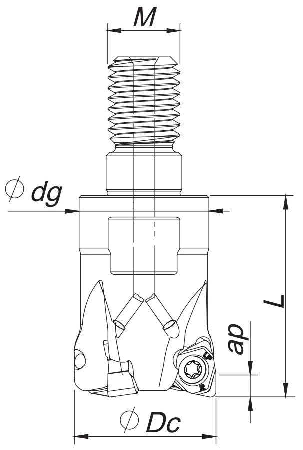
PLUS WN90-04



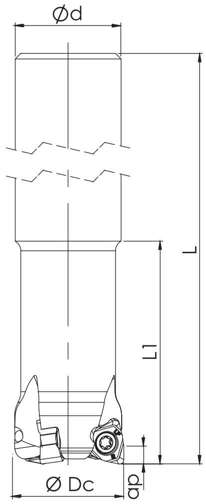
Threaded Coupling

$K_r = 90°$ | $\gamma_p = -7°$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specification	Insert Pastilha Inserto	Stock
			ØDc	M	Ødg	L		Ap max (in)		
181140000	WN90 D.625-R-08/.800-02-04	2	0.625	M8	0.512	0.800	0.09	0.118	WNHU 04T3..-LP	○
181140100	WN90 D.750-R-10/1.00-03-04	3	0.750	M10	0.709	1.000	0.18	0.118	WNHU 04T3..-LP	○
181140200	WN90 D1.00-R-12/1.25-04-04	4	1.000	M12	1.142	1.250	0.22	0.118	WNHU 04T3..-LP	○

Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Cylindrical Shank

$K_r = 90°$ | $\gamma_p = -7°$

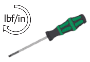
Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		Ap max		
181140300	WN90 D.625-C.625/4.00-02-04	2	0.625	0.625	4.000	2.000	0.53	0.118	WNHU 04T3..-LP	○
181140400	WN90 D.750-C.750/5.00-03-04	3	0.750	0.750	5.000	3.000	0.62	0.118	WNHU 04T3..-LP	○
181140500	WN90 D1.00-C1.00/6.00-04-04	4	1.000	1.000	6.000	3.750	0.77	0.118	WNHU 04T3..-LP	○

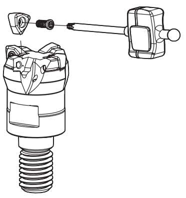
Stock item | Produto de stock | Itens de stock

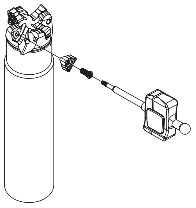
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

SPARE PARTS | Acessórios | Repuestos

Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			 lbf/in	lbf/in
WN90-R-04 - 0.625-1.00	P0250704	XT08	DT0812	10.6
WN90-C-04 - 0.625-1.00	P0250704	XT08	DT0812	10.6





Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

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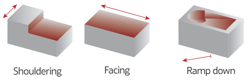
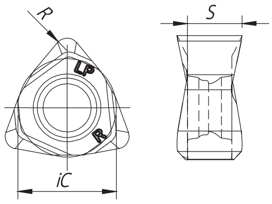


WNHU 04T308 ‖ Inserts | Pastilhas | Plaquitas

PHP
NEW
GRADE



		P			K			Dimensions Dimensões Dimensiones (in)		
		PVD			PVD					
	(2) Grade code	X5	T1	P4	X5	T1	P4			
(1) Geometry code	ISO Reference	PHP910	PHP920	PHP930	PHP910	PHP920	PHP930	iC	S	R
1112277	WNHU 04T308 PNER-LP	⊛	❂	⊛	⊛	❂	⊛	1/4	0.138	0.031
NEW 1113167	WNHU 04T316 PNER-LP		⊛			⊛		1/4	0.133	0.063

❂ First choice | Primeira opção | 1ª opción
⊛ Stock item | Produto de stock | Itens de stock
○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)
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 →
				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	✓	✓	✓

● Good Conditions
◉ Average Conditions
✤ Difficult Conditions

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance				Toughness →	Feed fz (in/t)
				PHH603	PHH910	PHP910	PHP920	PHP930	WNHU 04T3
P	1	Unalloyed Steel	125-220	-	-	590-820	590-820	525-755	0.004-0.012
	2	Low-Alloyed Steel	220-280	-	525-886	525-788	525-755	460-690	0.004-0.012
	3	High-Alloyed Steel	280-380	590-1017	460-755	460-755	460-722	394-656	0.004-0.010
K	7	Malleable Cast Iron	130-230	-	-	590-1004	525-886	492-820	0.004-0.012
	8	Grey Cast Iron	180-245	-	-	525-820	460-820	460-755	0.004-0.012
	9	Nodular Cast iron	160-250	-	-	492-690	394-690	328-656	0.004-0.010

Insert	Feed f_z (in/t)		a_p Rec.
	Roughing	Finishing	
WNHU 04T308-LP	0.006-0.012	0.004-0.010	0.020-0.120
WNHU 04T316-LP	0.006-0.012	0.004-0.010	0.063-0.118

(Note 1) Cutting conditions should be adjusted according to the machine and work rigidity.
(Note 2) If chattering occurs, reduce a_p and V_c by 30% and keep the same f_z per tooth.

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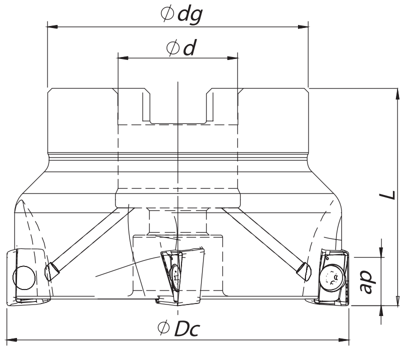
PLUS AN90-10



Arbor Mounting

$K_r = 90°$ | $\gamma_p = -7°$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	ØDg	L		Arbor Type	Ap max (in)		
181077700	AN90 D1.50-A.500/1.50-04-10	4	1.500	0.500	1.417	1.500	0.45	A	0.354	ANHX 1004...	◎
181077800	AN90 D1.50-A.500/1.50-05-10	5	1.500	0 .500	1.417	1.500	0.44	A	0.354	ANHX 1004...	○
181077900	AN90 D2.00-A.750/1.75-05-10	5	2.000	0.750	1.772	1.750	0.72	A	0.354	ANHX 1004...	◎
181078000	AN90 D2.00-A.750/1.75-07-10	7	2.000	0.750	1.772	1.750	0.70	A	0.354	ANHX 1004...	○
181078100	AN90 D2.50-A1.00/1.75-07-10	7	2.500	1.000	2.205	1.750	1.19	A	0.354	ANHX 1004...	◎
181078200	AN90 D2.50-A1.00/1.75-09-10	9	2.500	1.000	2.205	1.750	1.16	A	0.354	ANHX 1004...	○
181078300	AN90 D3.00-A1.00/2.00-08-10	8	3.000	1.000	2.205	2.000	2.18	A	0.354	ANHX 1004...	◎
181078400	AN90 D3.00-A1.00/2.00-10-10	10	3.000	1.000	2.205	2.000	2.13	A	0.354	ANHX 1004...	○
181078500	AN90 D4.00-A1.25/2.00-09-10	9	4.000	1.250	2.874	2.000	3.97	A	0.354	ANHX 1004...	△
181138000	AN90 D4.00-A1.50/2.50-09-10	9	4.000	1.500	2.874	2.500	3.88	A	0.354	ANHX 1004...	◎
181138100	AN90 D4.00-A1.50/2.50-12-10	12	4.000	1.500	2.874	2.500	3.88	A	0.354	ANHX 1004...	○

◎ Stock item | Produto de stock | Itens de stock

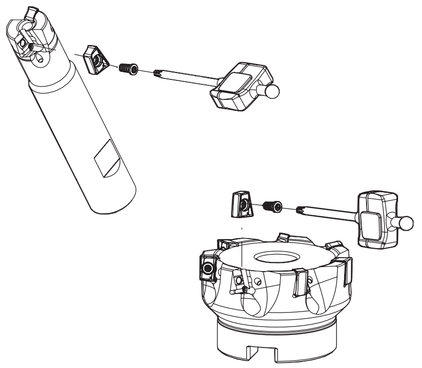
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplazado por nuevo iten.

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
				lbf/in
AN90-W-10 - 0.75-2.00	P0300800	XT09	DT0914	26.6
AN90-A-10 - 1.50-4.00	P0300800	XT09	DT0914	26.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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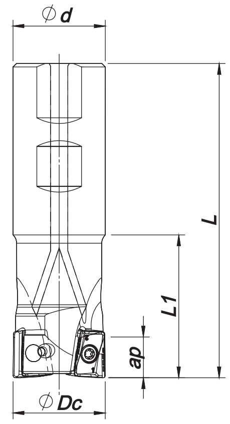
Weldon Shank

$\kappa_r = 90^\circ$ | $\gamma_p = -7^\circ\ (-6^\circ*)$



Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		Ap max (in)		
181071200	AN90 D.750-W.750/3.94-02-10*	2	0.750	0.750	3.937	1.181	0.46	0.354	ANHX 1004...	●
181071300	AN90 D.750-W.750/3.94-03-10*	3	0.750	0.750	3.937	1.181	0.44	0.354	ANHX 1004...	●
181077000	AN90 D1.00-W1.00/4.53-02-10*	2	1.000	1.000	4.528	1.378	0.86	0.354	ANHX 1004...	●
181064300	AN90 D1.00-W1.00/4.53-03-10*	3	1.000	1.000	4.528	1.378	0.85	0.354	ANHX 1004...	●
181077100	AN90 D1.25-W1.25/4.92-03-10*	3	1.250	1.250	4.921	1.575	1.54	0.354	ANHX 1004...	●
181077200	AN90 D1.25-W1.25/4.92-04-10*	4	1.250	1.250	4.921	1.575	1.53	0.354	ANHX 1004...	●
181138200	AN90 D1.50-W1.25/5.00-04-10	4	1.500	1.250	5.000	1.500	1.69	0.354	ANHX 1004...	●
181138300	AN90 D1.50-W1.25/5.00-05-10	5	1.500	1.250	5.000	1.500	1.69	0.354	ANHX 1004...	○
181077300	AN90 D1.50-W1.50/5.12-04-10	4	1.500	1.500	5.118	1.654	1.69	0.354	ANHX 1004...	△
181077500	AN90 D2.00-W1.50/5.32-05-10	5	2.000	1.500	5.315	1.772	1.72	0.354	ANHX 1004...	△

● Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplazado por nuevo iten.

ANHX 1004.. | Inserts | Pastilhas | Plaquitas

ANHX-LP

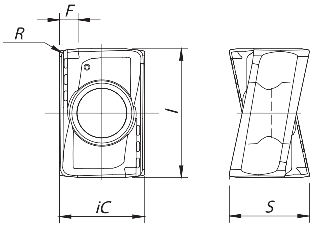
ANHX-LM

ANHX-LN

PHH NEW GRADE

PHP NEW GRADE

ANHX-LP | LM | LN



		P					M		K					N	S		Dimensions Dimensões Dimensiones (in)				
		PVD					PVD		PVD					UNC	PVD						
	(2) Grade code	G1	X5	T1	P4	G6	X9	G6	G1	X5	T1	P4	G6	10	X9	G6					
(1) Geometry code	ISO Reference	PH7910	PHP910	PHP920	PHP930	PH7740	PHH930	PH7740	PH7910	PHP910	PHP920	PHP930	PH7740	PH0910	PHH930	PH7740	iC	S	l	R	F
1111652	ANHX 100405 PNR-LP	△	●	◉	●		○		△	●	◉	●			○		0.260	0.244	0.394	0.020	0.033
1112106	ANHX 100408 PNR-LP			◉	●	○		○			◉	●	○			○	0.260	0.244	0.394	0.031	0.024
1111908	ANHX 100412 PNR-LP			◉	●						◉	●					0.260	0.244	0.394	0.047	0.012
1112005	ANHX 100405 PNER-LM			◉	●	●	◉	●			◉	●	●		◉	●	0.260	0.244	0.394	0.020	0.033
1112162	ANHX 100408 PNER-LM			◉	●	●	◉	●			◉	●	●		◉	●	0.260	0.244	0.394	0.031	0.024
1112103	ANHX 100412 PNER-LM			◉	●	●	◉	●			◉	●	●		◉	●	0.260	0.244	0.394	0.047	0.012
1111997	ANHX 100405 PNFR-LN													●			0.260	0.244	0.394	0.020	0.033
1112102	ANHX 100412 PNR-LN													●			0.260	0.244	0.394	0.047	0.012

◉ First choice | 1ª Escolha | 1ª Opción

● Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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PLUS AN90-10

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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance PH0910 ●	 PHP910 ●	 PHP920 ◉	 PHP930 ✱	 PHH930 ✱	 Toughness → 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 (SFM) ← Wear Resistance					Toughness →	Feed fz (in/t)		
				PH0910	PHP910	PHP920	PHP930	PHH930	PH7740	ANHX... LP	ANHX... LM	ANHX... LN
P	1	Unalloyed Steel	125-220	-	590-820	590-820	525-755	-	460-656	0.003-0.008	0.003-0.008	-
	2	Low-Alloyed Steel	220-280	-	525-788	525-755	460-690	-	426-590	0.003-0.008	0.003-0.006	-
	3	High-Alloyed Steel	280-380	-	460-755	460-722	394-656	-	328-558	0.003-0.006	0.003-0.006	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	460-690	426-590	-	0.003-0.008	-
	5	SS - Austenitic	200-330	-	-	-	-	394-558	360-525	-	0.003-0.006	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	328-492	-	-	0.003-0.006	-
K	7	Malleable Cast Iron	130-230	-	590-1004	525-886	492-820	-	460-722	0.003-0.010	0.003-0.008	-
	8	Grey Cast Iron	180-245	-	525-820	460-820	460-755	-	394-690	0.003-0.008	0.003-0.008	-
	9	Nodular Cast iron	160-250	-	492-690	394-690	328-656	-	328-624	0.003-0.008	0.003-0.006	-
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-	-	-	-	-	-	0.003-0.008
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	100-360	100-328	-	0.003-0.006	-

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

(Note 2)

Operation	a_e	Vc & fz	a_p (in)
Slotting	100%	<20%	0.079-0.138
Shouldering	<50%	>8%	0.118-0.236
	≤25%	>12%	0.236-0.335

(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.

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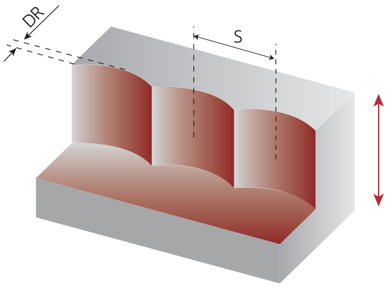
CHIPBREAKER SELECTION GUIDE | Guia de selecção do quebra-aparas | Guía de selección del rompevirutas

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

PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
fz (in/t)		
0.004-0.008	0.004-0.006	$Smax = \sqrt{DC.Dr - Dr^2}$



S max and DR corresponding cutting diameter Dc (in)								
DR (in)	Dc (in)							
	0.750	1.000	1.250	1.500	2.000	2.500	3.000	4.000
0.039	0.167	0.194	0.217	0.239	0.277	0.310	0.340	0.393
0.079	0.230	0.270	0.304	0.335	0.390	0.437	0.480	0.557
0.118	0.273	0.323	0.365	0.404	0.471	0.530	0.583	0.677

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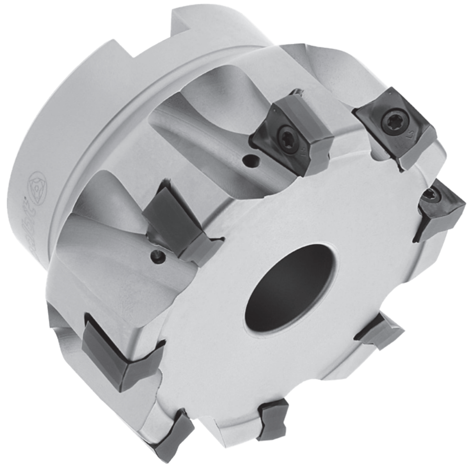
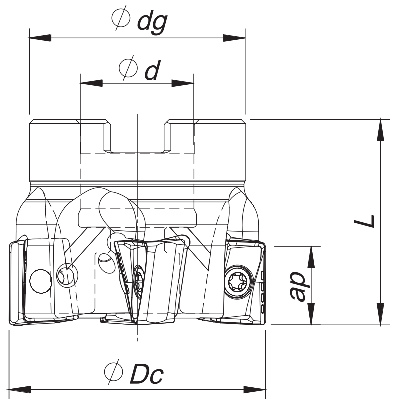
PLUS AN90-12





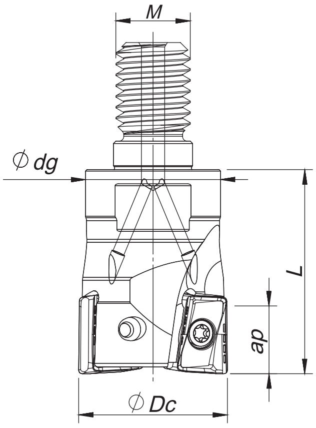
Arbor Mounting

$\kappa_r = 90°$ | $\gamma_p = -6°$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Arbor Type	Ap max (in)		
181140600	AN90 D2.00-A.750/1.57-05-12	5	2.000	0.750	1.772	1.570	0.66	A	0.433	ANHX 1206...	◎
181140700	AN90 D2.50-A.750/1.57-06-12	6	2.500	0.750	1.772	1.570	1.17	A	0.433	ANHX 1206...	○
181140800	AN90 D3.00-A1.00/1.75-07-12	7	3.000	1.000	2.283	1.750	2.09	A	0.433	ANHX 1206...	◎
181140900	AN90 D4.00-A1.50/2.38-11-12	11	4.000	1.500	2.874	2.375	3.64	A	0.433	ANHX 1206...	○

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Threaded Coupling

$\kappa_r = 90°$ | $\gamma_p = -6°$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)		
181141300	AN90 D1.00-R-12/1.50-02-12	2	1.000	M12	1.142	1.500	0.22	0.433	ANHX 1206...	◎
181141400	AN90 D1.25-R-16/1.75-03-12	3	1.250	M16	1.142	1.750	0.44	0.433	ANHX 1206...	◎
181141500	AN90 D1.50-R-16/1.75-04-12	4	1.500	M16	1.142	1.750	0.57	0.433	ANHX 1206...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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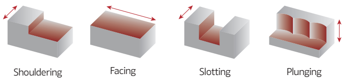
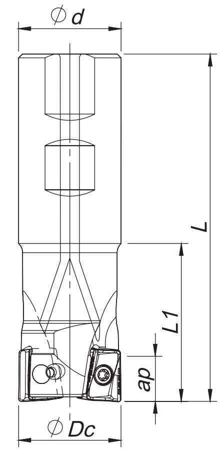
PLUS AN90-12

ANHX





Weldon Shank

$\kappa_r = 90°$ | $\gamma_p = -6°$

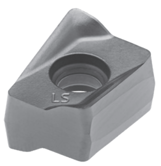
Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in) ØDc	Ød/M	L	L1	lbs	Specifications Ap max (in)	Insert Pastilha Inserto	Stock
181141000	AN90 D1.00-W1.00/6.00-02-12	2	1.000	1.000	6.000	3.550	0.82	0.433	ANHX 1206...	⊚
181141100	AN90 D1.25-W1.25/6.50-03-12	3	1.250	1.250	6.500	4.220	1.76	0.433	ANHX 1206...	⊚
181141200	AN90 D1.50-W1.25/4.50-04-12	4	1.500	1.250	4.500	2.250	1.94	0.433	ANHX 1206...	⊚

⊚ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

ANHX 1206.. | Inserts | Pastilhas | Plaquitas

ANHX-LS

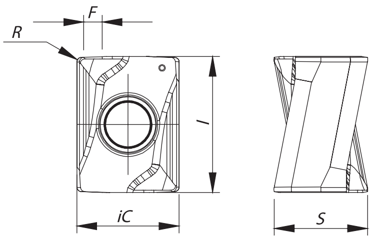


ANHX-MP

PHH
NEW
GRADE

PHP
NEW
GRADE

ANHX-LS | MP



		P						M			K						S			Dimensions Dimensões Dimensiones (in)				
		CVD	PVD					PVD			PVD						PVD							
	(2) Grade code	T9	G4	T1	P3	P4	G6	P3	X9	G6	L6	G4	T1	P3	P4	G6	P3	X9	G6					
(1) Geometry code	ISO Reference	PHS740	PH7920	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740	PH5320	PH7920	PHP920	PH7930	PHP930	PH7740	PH7930	PHH930	PH7740	iC	S	l	R	F
1112474	ANHX 120604 PNER-LS			◉	△	○	⊚	△	○	⊚			◉	△	○	⊚	△	○	⊚	0.354	0.327	0.472	0.016	0.063
1112237	ANHX 120608 PNER-LS			◉		○	⊚		◉	⊚			◉		○	⊚		◉	⊚	0.354	0.327	0.472	0.031	0.047
1112429	ANHX 120616 PNER-LS			◉	△	○	⊚	△	◉	⊚			◉	△	○	⊚	△	◉	⊚	0.354	0.327	0.472	0.063	0.016
1112473	ANHX 120604 PNSR-MP			◉			⊚			⊚	⊚	△	◉			⊚			⊚	0.354	0.327	0.472	0.016	0.063
1112238	ANHX 120608 PNSR-MP	⊚		◉			⊚			⊚	⊚	△	◉			⊚			⊚	0.354	0.327	0.472	0.031	0.047
1112430	ANHX 120616 PNSR-MP		△	⊚			◉			⊚	⊚	△	⊚			◉			⊚	0.354	0.327	0.472	0.063	0.016

◉ First choice | 1ª Escolha | 1ª Opción

⊚ Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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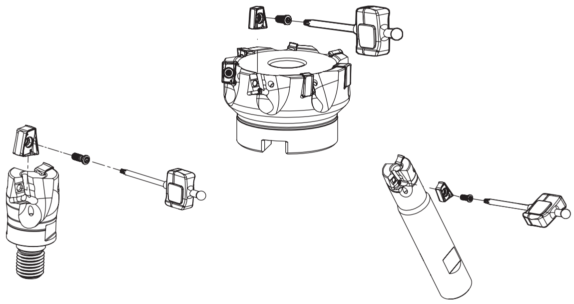
PLUS AN90-12

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
				lbf/in
AN90-A-12 - 2.00-3.00	P0350904	XT10	DT1020	26.6
AN90-A-12 - 4.00	P0350904	PT10	DT1020	26.6
AN90-R-12 - 1.00-1.50	P0350904	XT10	DT1020	26.6
AN90-W-12 - 1.00-1.50	P0350904	XT10	DT1020	26.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance							Toughness →
				PH5320	PHP920	PH7920	PHH930	PH7930	PHP930	PHS740	PH7740
P	1	Unalloyed Steel	125-220	-	590-820	590-788	-	525-722	525-755	460-722	460-656
	2	Low-Alloyed Steel	220-280	-	525-755	525-722	-	460-656	460-690	394-656	426-590
	3	High-Alloyed Steel	280-380	-	460-722	460-690	-	394-624	394-656	328-624	328-558
M	4	SS - Ferritic / Martensitic	200-330	-	-	460-722	460-690	460-656	-	-	426-590
	5	SS - Austenitic	200-330	-	-	426-590	394-558	394-525	-	-	360-525
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	394-525	328-492	328-460	-	-	-
K	7	Malleable Cast Iron	130-230	492-918	525-886	525-854	-	492-788	492-820	-	460-722
	8	Grey Cast Iron	180-245	525-1050	460-820	460-788	-	460-755	460-755	-	394-690
	9	Nodular Cast iron	160-250	328-624	394-690	394-656	-	328-624	328-656	-	328-624
S	11	Heat Resistant Super Alloys	200-320	-	-	-	100-360	100-328	-	-	100-328

ISO	PSM	Material	HB (Brinell)	Feed f_z (in/t)	
				ANHX 12... LS	ANHX 12... MP
P	1	Unalloyed Steel	125-220	0.003-0.008	0.003-0.012
	2	Low-Alloyed Steel	220-280	0.003-0.008	0.003-0.010
	3	High-Alloyed Steel	280-380	0.003-0.006	0.003-0.008
M	4	SS - Ferritic / Martensitic	200-330	0.003-0.008	-
	5	SS - Austenitic	200-330	0.003-0.006	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	0.003-0.006	-
K	7	Malleable Cast Iron	130-230	0.003-0.008	0.003-0.012
	8	Grey Cast Iron	180-245	0.003-0.008	0.003-0.010
	9	Nodular Cast iron	160-250	0.003-0.008	0.003-0.008
S	11	Heat Resistant Super Alloys	200-320	0.003-0.004	-

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

(Note 2)

Operation	ae	Vc & fz	ap (in)
Slotting	100%	<20%	0.098-0.157
Shouldering	<50%	>8%	0.157-0.276
	≤25%	>12%	0.276-0.394

(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.

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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance							Toughness →
				PH5320 ●	PHP920 ◉	PH7920 ◉	PHH930 ✤	PH7930 ✤	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				✓	✓			✓

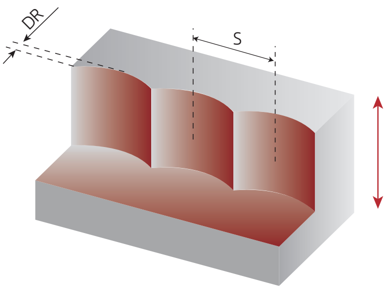
● Good Conditions ◉ Average Conditions ✤ Difficult Conditions

CHIPBREAKER SELECTION GUIDE | Guia de selecção do quebra-aparas | Guía de selección del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application 1st 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_z (in/t)		
0.004-0.008	0.004-0.006	$Smax = \sqrt{DC.Dr - Dr^2}$

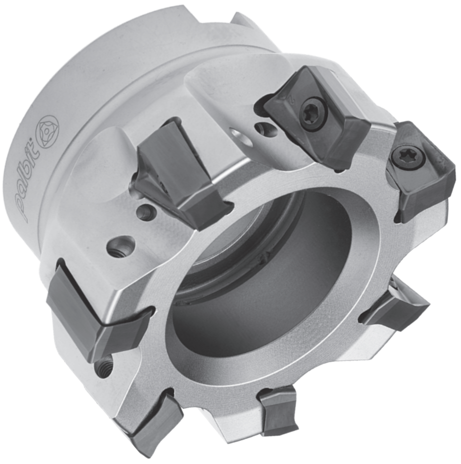


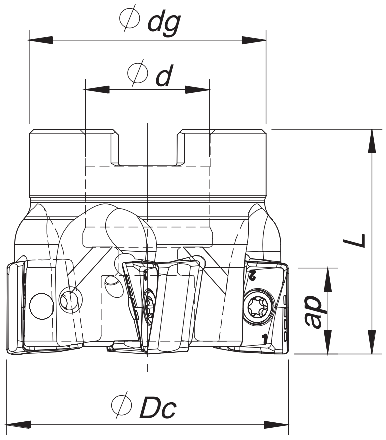
DR (in)	S max and DR corresponding cutting diameter Dc (in) Dc (in) 1.000	1.250	1.500	2.000	2.500	3.000	4.000
0.039	0.194	0.217	0.239	0.277	0.310	0.340	0.393
0.079	0.270	0.304	0.335	0.390	0.437	0.480	0.557
0.118	0.323	0.365	0.404	0.471	0.530	0.583	0.677
0.157	0.364	0.414	0.459	0.538	0.607	0.668	0.777
0.197	0.398	0.455	0.507	0.596	0.674	0.743	0.866
0.236	0.425	0.489	0.546	0.645	0.731	0.808	0.942
0.276	0.447	0.518	0.581	0.690	0.783	0.867	1.014

PDF

VIDEO

PLUS AN90-16





Arbor Mounting

κ_r = 90° | γ_p = -4°

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	ØDg	L		Arbor Type	Ap max (in)		
181058900	AN90 D2.00-A.750/1.75-03-16	3	2.000	0.750	1.772	1.750	0.77	A	0.591	ANHX 1607...	◎
181059000	AN90 D2.00-A.750/1.75-04-16	4	2.000	0.750	1.772	1.750	0.79	A	0.591	ANHX 1607...	◎
181059100	AN90 D2.50-A1.00/1.75-04-16	4	2.500	1.000	2.205	1.750	1.25	A	0.591	ANHX 1607...	◎
181059200	AN90 D2.50-A1.00/1.75-06-16	6	2.500	1.000	2.205	1.750	1.23	A	0.591	ANHX 1607...	◎
181059300	AN90 D3.00-A1.00/2.00-05-16	5	3.000	1.000	2.205	2.000	1.93	A	0.591	ANHX 1607...	◎
181059400	AN90 D3.00-A1.00/2.00-06-16	6	3.000	1.000	2.205	2.000	2.00	A	0.591	ANHX 1607...	◎
181136400	AN90 D4.00-A1.50/2.50-05-16	5	4.000	1.500	3.386	2.500	3.66	A	0.591	ANHX 1607...	◎
181136500	AN90 D4.00-A1.50/2.50-08-16	8	4.000	1.500	3.386	2.500	3.75	A	0.591	ANHX 1607...	◎
181059500	AN90 D4.00-A1.25/2.00-05-16	5	4.000	1.250	2.874	2.000	3.66	A	0.591	ANHX 1607...	△
181059600	AN90 D4.00-A1.25/2.00-08-16	8	4.000	1.250	2.874	2.000	3.75	A	0.591	ANHX 1607...	△
181059700	AN90 D5.00-A1.50/2.50-07-16	7	5.000	1.500	3.386	2.500	7.38	A	0.591	ANHX 1607...	◎
181059800	AN90 D5.00-A1.50/2.50-10-16	10	5.000	1.500	3.386	2.500	7.49	A	0.591	ANHX 1607...	◎
181059900	AN90 D6.00-A2.00/2.50U-08-16	8	6.000	2.000	4.882	2.500	8.83	B	0.591	ANHX 1607...	◎
181060000	AN90 D6.00-A2.00/2.50U-11-16	11	6.000	2.000	4.882	2.500	8.91	B	0.591	ANHX 1607...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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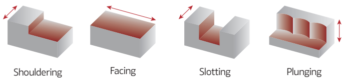
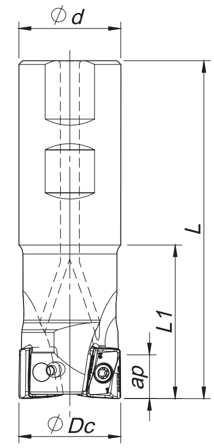
PLUS AN90-16

ANHX





Weldon Shank

$\kappa_r = 90^{\circ}$ | $\gamma_p = -4^{\circ}$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		Ap max (in)		
181060100	AN90 D1.25-W1.25/4.92-02-16	2	1.250	1.250	4.921	1.575	1.41	0.591	ANHX 1607...	◎
181060200	AN90 D1.50-W1.25/5.12-03-16	3	1.500	1.250	5.118	1.654	1.54	0.591	ANHX 1607...	◎
181060300	AN90 D2.00-W1.25/5.32-04-16	4	2.000	1.250	5.315	1.772	1.90	0.591	ANHX 1607...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

ANHX 1607... | Inserts | Pastilhas | Plaquitas

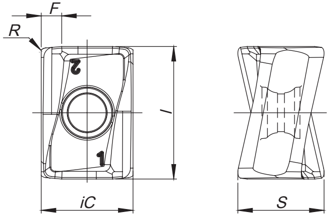
ANHX-LP

ANHX-MP

ANHX-LN

PHP
NEW
GRADE

ANHX-LP | MP | LN



		P							K						N	Dimensions Dimensões Dimensiones (in)				
		CVD	PVD						PVD						UNC					
	⁽²⁾ Grade code	T9	G1	X5	G4	T1	P3	P4	G1	X5	G4	T1	P3	P4	10					
⁽¹⁾ Geometry code	ISO Reference	PHS740	PH7910	PHP910	PH7920	PHP920	PH7930	PHP930	PH7910	PHP910	PH7920	PHP920	PH7930	PHP930	PH0910	iC	S	l	R	F
1111519	ANHX 160708 PNR-LP		△	○		◉	△	◎	△	○		◉	△	◎		11,20	10,80	16	0,8	1,4
1111596	ANHX 160712 PNR-LP			○	△	◉	△	◎		○	△	◉	△	◎		11,20	10,50	16	1,2	1,2
1111595	ANHX 160708 PNER-MP	◎	△	○		◉	△	◎	△	○		◉	△	◎		11,20	10,80	16	0,8	1,4
1111598	ANHX 160712 PNER-MP			○	△	◉		◎		○	△	◉		◎		11,20	10,50	16	1,2	1,2
1111659	ANHX 160708 PNFR-LN														◎	11,20	10,80	16	0,8	1,4
1111597	ANHX 160712 PNFR-LN														◎	11,20	10,50	16	1,2	1,2

◉ First choice | 1ª Escolha | 1ª Opción

◎ Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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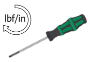
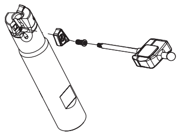
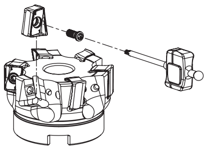
PLUS AN90-16

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
			lbf/in 	lbf/in
AN90-A-16 - 2.00-3.00	P0401200	XT15	DT1530	26.6
AN90-A-16 - 4.00-6.00	P0401200	XT15	DT1530	26.6
AN90-W-16 - 1.25-2.00	P0401200	XT15	DT1530	26.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.





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

ISO	PSM	Material	HB (Brinell)	Vc (SFM)							
				← Wear Resistance							Toughness →
				PH0910	PH7910	PHP910	PHP920	PH7920	PHP930	PH7930	PHS740
P	1	Unalloyed Steel	125-220	-	590-820	590-820	590-820	590-788	525-755	525-722	460-722
	2	Low-Alloyed Steel	220-280	-	525-755	525-788	525-755	525-722	460-690	460-656	394-656
	3	High-Alloyed Steel	280-380	-	460-722	460-755	460-722	460-690	394-656	394-624	328-624
K	7	Malleable Cast Iron	130-230	-	590-1004	590-1004	525-886	525-854	492-820	492-788	-
	8	Grey Cast Iron	180-245	-	525-820	525-820	460-820	460-788	460-755	460-755	-
	9	Nodular Cast iron	160-250	-	492-656	492-690	394-690	394-656	328-656	328-624	-
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-	-	-	-	-	-

ISO	PSM	Material	HB (Brinell)	Feed f_z (in/t)		
				ANHX 12... LP	ANHX 12... MP	ANHX 12... LN
P	1	Unalloyed Steel	125-220	0.004-0.010	0.004-0.010	-
	2	Low-Alloyed Steel	220-280	0.004-0.010	0.004-0.010	-
	3	High-Alloyed Steel	280-380	0.004-0.008	0.004-0.008	-
K	7	Malleable Cast Iron	130-230	0.004-0.010	0.004-0.010	-
	8	Grey Cast Iron	180-245	0.004-0.010	0.004-0.010	-
	9	Nodular Cast iron	160-250	0.004-0.008	0.004-0.010	-
N	10	Aluminium and Non Ferrous	30-130	-	-	0.004-0.016

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

(Note 2)

Operation	ae	Vc & fz	ap (in)
Slotting	100%	<20%	0.078-0.178
Shouldering	<50%	>8%	0.236-0.315
	≤25%	>12%	0.315-0.591

(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.

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PLUS AN90-16
ANHX

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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance							Toughness →
				PH0910 ●	PH7910 ●	PHP910 ●	PHP920 ◐	PH7920 ◐	PHP930 ✱	PH7930 ✱	PHS740 ✱
P	1	Unalloyed Steel	125-220		✓	✓	✓	✓	✓	✓	✓
	2	Low-Alloyed Steel	220-280		✓	✓	✓	✓	✓	✓	✓
	3	High-Alloyed Steel	280-380		✓	✓	✓	✓	✓	✓	✓
K	7	Malleable Cast Iron	130-230		✓	✓	✓	✓	✓	✓	
	8	Grey Cast Iron	180-245		✓	✓	✓	✓	✓	✓	
	9	Nodular Cast iron	160-250		✓	✓	✓	✓	✓	✓	
N	10	Aluminium and Non Ferrous	30-130	✓							

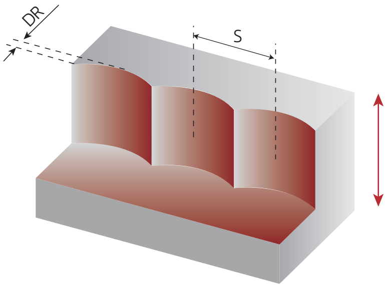
● Good Conditions ◐ Average Conditions ✱ Difficult Conditions

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

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

PLUNGING | Mergulho | Plunge

L≤3Dc	L>3Dc	S max.
f_Z (in/t)		
0.004-0.008	0.004-0.006	$Smax = \sqrt{DC.DR - DR^2}$



S max and DR corresponding cutting diameter Dc (in)

DR (in)	Dc (in) 1.250	1.500	2.000	2.500	3.000	4.000	5.000	6.000
0.039	0.217	0.239	0.277	0.310	0.340	0.393	0.440	0.482
0.079	0.304	0.335	0.390	0.437	0.480	0.557	0.624	0.684
0.118	0.365	0.404	0.471	0.530	0.583	0.677	0.759	0.833
0.157	0.414	0.459	0.538	0.607	0.668	0.777	0.872	0.958
0.197	0.455	0.507	0.596	0.674	0.743	0.866	0.973	1.069

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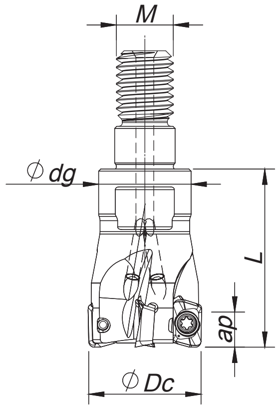
MILLING
News & Features
Overview
Face milling
Hifeed milling
Shoulder milling
Profile milling
Hardmill
Center & Chamfer
Engraving
Spare Parts
Technical Data

LINEPRO XP90-06

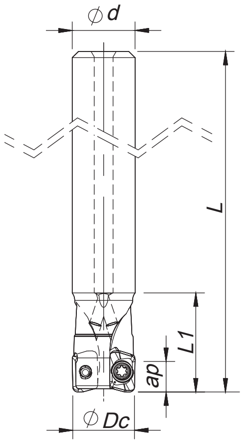


Threaded Coupling

$\kappa_r=90^\circ$ | $\gamma_p=+4^\circ$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Max ap (in)		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		LP	HF		
181105900	XP90 D.625-R-08/0.90-04-06	4	0.625	M08	0.531	0.906	0.13	0.157	0.012	XP... 0602...	◎
181106000	XP90 D.750-R-10/1.18-05-06	5	0.750	M10	0.708	1.181	0.19	0.157	0.012	XP... 0602...	◎
181106100	XP90 D1.00-R-12/1.37-07-06	7	1.000	M12	0.905	1.378	0.22	0.157	0.012	XP... 0602...	◎
181106200	XP90 D1.25-R-16/1.37-08-06	8	1.250	M16	1.102	1.378	0.39	0.157	0.012	XP... 0602...	◎

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Cylindrical Shank

$\kappa_r=90^\circ$ | $\gamma_p=+4^\circ$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Max ap (in)		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		LP	HF		
181105500	XP90 D.375-C.375/2.16-02-06	2	0.375	0.375	2.165	0.669	0.05	0.157	0.012	XP... 0602...	◎
181105600	XP90 D.500-C.500/3.15-02-06	2	0.500	0.500	3.150	0.709	0.15	0.157	0.012	XP... 0602...	◎
181105700	XP90 D.625-C.625/3.54-03-06	3	0.625	0.625	3.543	0.787	0.26	0.157	0.012	XP... 0602...	◎
181105800	XP90 D.625-C.625/3.54-04-06	4	0.625	0.625	3.543	0.787	0.25	0.157	0.012	XP... 0602...	◎

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16))

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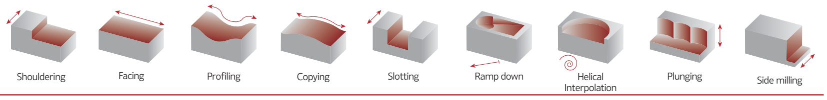
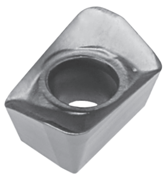
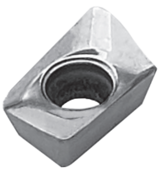


XP... 0602... | Inserts | Pastilhas | Plaquitas

XPET-LP



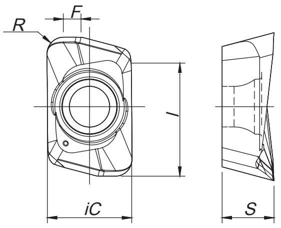
XPET-LN NEW



PHH
NEW
GRADE

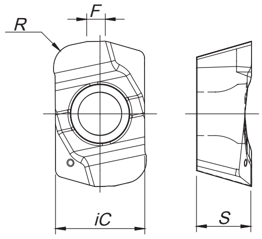
PHP
NEW
GRADE

XPET-LP | LN

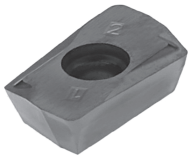


XPET-HF
(HiFeed geometry)

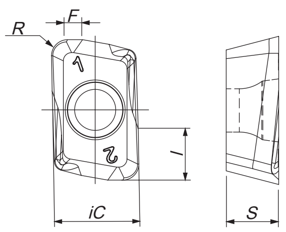
XPET-HF



XPHW-MH NEW
(finishing geometry)



XPHW-MH



		P				M	K		N	S	H		Dimensions Dimensões Dimensiones (in)				
		PVD				PVD	PVD		UNC	PVD	PVD						
	(2) Grade code	X4	X6	T1	P4	X9	T1	P4	10	X9	X4	X6					
(1) Geometry code	ISO Reference	PHH603	PHH910	PHP920	PHP930	PHH930	PHP920	PHP930	PH0910	PHH930	PHH603	PHH910	iC	S	l	R	F
1112002	XPET 060204 PDER-LP			✪	⊛	⊛	✪	⊛		⊛			0.154	0.094	0.209	0.016	0.031
1112003	XPET 060208 PDER-LP			✪	⊛	⊛	✪	⊛		⊛			0.154	0.094	0.209	0.031	0.028
1112004	XPET 060216 PDER-LP			✪	⊛	○	✪	⊛		○			0.154	0.094	0.209	0.063	0.024
NEW 1112579	XPET 060202 PDFR-LN								⊛				0.154	0.094	0.201	0.008	0.037
NEW 1112580	XPET 060204 PDFR-LN								⊛				0.154	0.094	0.201	0.016	0.031
1112049	XPET 060210 ZER-HF			✪	⊛	⊛	✪	⊛		⊛			0.154	0.094	-	0.039	0.031
NEW 1112259	XPHW 060208 ZER-MH	⊛	✪								✪	⊛	0.154	0.094	0.094	0.031	0.028

✪ First choice | Primeira opção | 1ª opción

⊛ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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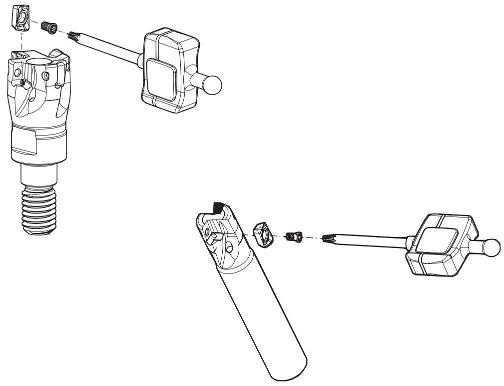
LINEPRO XP90-06

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
XP90-C-06 - 0.375	P0180300	XT06IP	DT0606IP	2.66
XP90-C-06 - 0.500-0.625	P0180400	XT06IP	DT0606IP	2.66
XP90-R-06 - 0.625-1.250	P0180400	XT06IP	DT0606IP	2.66

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance PH0910 ●	 PHH603 ●	 PHH910 ●	 PHP920 ◐	 PHP930 ✱	 Toughness → 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 (SFM)					
				← Wear Resistance					Toughness →
				PH0910	PHH603	PHH910	PHP920	PHP930	PHH930
P	1	Unalloyed Steel	125-220	-	-	-	590-820	525-755	-
	2	Low-Alloyed Steel	220-280	-	-	525-886	525-755	460-690	-
	3	High-Alloyed Steel	280-380	-	590-1017	460-755	460-722	394-656	-
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	-	460-690
	5	SS - Austenitic	200-330	-	-	-	-	-	394-558
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	328-492
K	7	Malleable Cast Iron	130-230	-	-	-	525-886	492-820	-
	8	Grey Cast Iron	180-245	-	-	-	460-820	460-755	-
	9	Nodular Cast iron	160-250	-	-	-	394-690	328-656	-
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	100-360
H	12	Hardened Steels	40-55 HRC	-	230-886	230-854	-	-	-

ISO	PSM	Material	HB (Brinell)	Feed fz (in/t)			
				XPET 06...LP	XPET 06...LN	XPET 06...HF	XPHW 06...MH
P	1	Unalloyed Steel	125-220	0.002-0.003	-	0.016-0.031	-
	2	Low-Alloyed Steel	220-280	0.002-0.003	-	0.016-0.031	0.002-0.005
	3	High-Alloyed Steel	280-380	0.002-0.003	-	0.016-0.024	0.002-0.005
M	4	SS - Ferritic / Martensitic	200-330	0.002-0.003	-	0.016-0.031	-
	5	SS - Austenitic	200-330	0.002-0.003	-	0.016-0.024	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	0.002-0.003	-	0.016-0.024	-
K	7	Malleable Cast Iron	130-230	0.002-0.003	-	0.016-0.031	-
	8	Grey Cast Iron	180-245	0.002-0.003	-	0.016-0.031	-
	9	Nodular Cast iron	160-250	0.002-0.003	-	0.016-0.031	-
N	10	Aluminium and Non Ferrous	30-130	-	0.002-0.003	-	-
S	11	Heat Resistant Super Alloys	200-320	0.002-0.003	-	0.016-0.024	-
H	12	Hardened Steels	40-55 HRC	-	-	-	0.001-0.004

(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) PH5... and PHS... can be used wet or dry. PH7... use only air.

(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.

Operation	a_e	Vc & fz	a_p (in)
Slotting	100%	<20%	0.039-0.118
Shouldering	<50%	>8%	0.039-0.157
	≤25%	>12%	0.039-0.157

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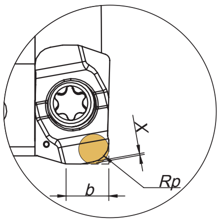
LINEPRO XP90-06

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

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

PROGRAMMING DATA | Dados para programação | Datos para la programación

Insert	Programming Data		
	Rp	X	b
XPET 06 HF	0.043	0.033	0.091



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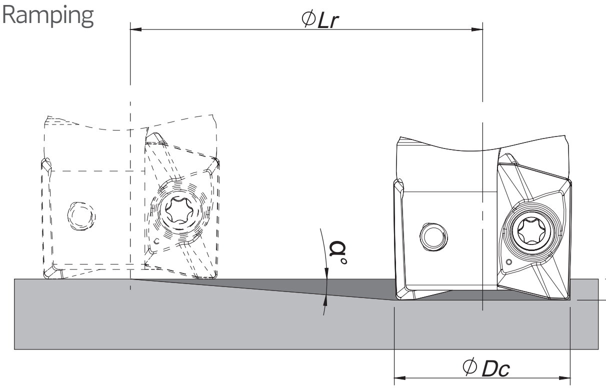
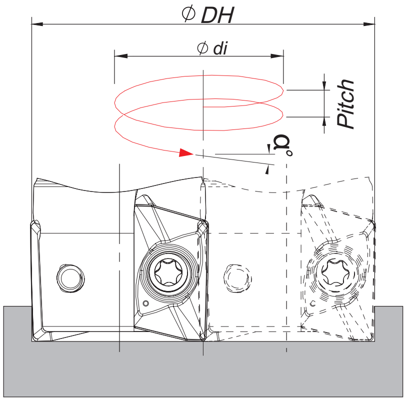
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical
Interpolation



Blind hole
Flat bottom

Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
				Diameter for Blind Hole. Flat Bottom Face (1)		Max Pitch/Rev.
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	
0.375	5.5	0.012	0.125	0.568 -	- 0.671	0.012 0.012
0.500	4.0	0.012	0.172	0.818 -	- 0.921	0.012 0.012
0.625	2.5	0.012	0.275	1.068 -	- 1.171	0.012 0.012
0.750	1.9	0.012	0.362	1.318 -	- 1.421	0.012 0.012
1.000	1.3	0.012	0.529	1.818 -	- 1.921	0.012 0.012
1.250	1.0	0.012	0.700	2.318 -	- 2.421	0.012 0.012

(1) using LP insert with radius 0.0.31 in

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: ØDHmin = 2 x (ØDc - (R corner radius + F width of edge wiper))
- Maximum Diameter: ØDHmax = 2 x (ØDc - R corner radius)
(On HF insert the corner radius should be corner radius programming)

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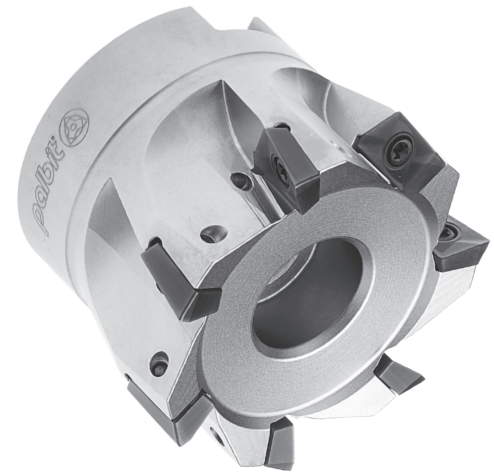
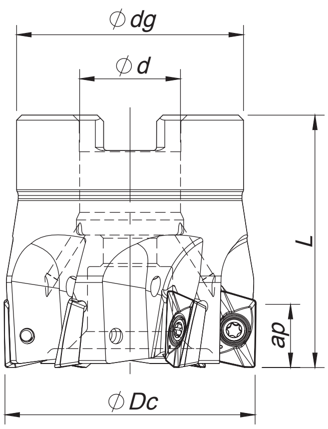
LINEPRO XP90-10



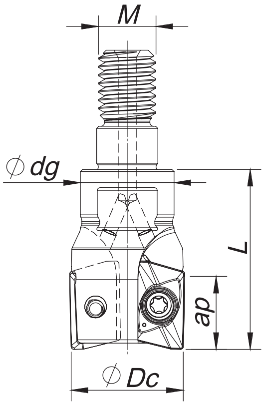


Arbor Mounting

$\kappa_r=90°$ | $\gamma_p=+8°$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Max ap (in)			Arbor Style	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		LP/MP	HF	MH			
181107000	XP90 D1.50-A.500/1.57-06-10	6	1.500	0.500	1.417	1.575	0.22	0.394	0.031	0.118	A	XP... 1003...	◎
181107100	XP90 D2.00-A.750/1.57-07-10	7	2.000	0.750	1.772	1.575	0.31	0.394	0.031	0.118	A	XP... 1003...	◎
181107200	XP90 D2.50-A.750/1.57-08-10	8	2.500	0.750	2.205	1.575	0.43	0.394	0.031	0.118	A	XP... 1003...	◎

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Threaded Coupling

$\kappa_r=90°$ | $\gamma_p=+5° \sim +6°$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Max ap (in)			Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		LP/MP	HF	MH		
181106600	XP90 D.625-R-08/1.00-02-10	2	0.625	M8	0.531	1.000	0.05	0.394	0.031	0.118	XP... 1003...	◎
181106700	XP90 D.750-R-10/1.37-03-10	3	0.750	M10	0.728	1.378	0.23	0.394	0.031	0.118	XP... 1003...	◎
181106800	XP90 D1.00-R-12/1.57-04-10	4	1.000	M12	0.906	1.575	0.27	0.394	0.031	0.118	XP... 1003...	◎
181106900	XP90 D1.25-R-16/1.57-05-10	5	1.250	M16	1.181	1.575	0.47	0.394	0.031	0.118	XP... 1003...	◎

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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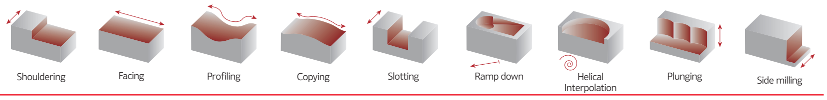
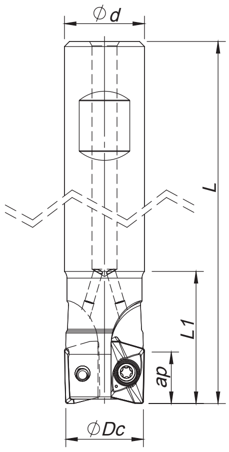
LINEPRO XP90-10

XPET | XPHW





Weldon Shank

$K_r=90°$ | $\gamma_p=+5°\sim8°$

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Max ap (in)			Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		LP/MP	HF	MH		
181106300	XP90 D.625-W.625/3.25-02-10	2	0.625	0.625	3.252	1.083	0.23	0.394	0.031	0.118	XP... 1003...	◎
181106400	XP90 D.750-W.750/3.39-02-10	2	0.750	0.750	3.390	1.189	0.34	0.394	0.031	0.118	XP... 1003...	◎
181106500	XP90 D1.00-W1.00/3.78-03-10	3	1.000	1.000	3.780	1.280	0.68	0.394	0.031	0.118	XP... 1003...	◎

◎ Stock item | Produto de stock | Itens de stock

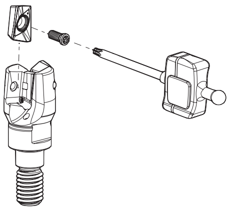
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

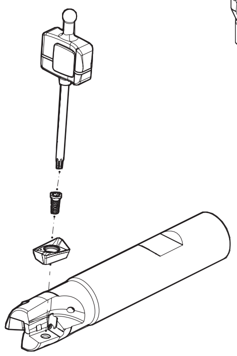
SPARE PARTS | Acessórios | Repuestos

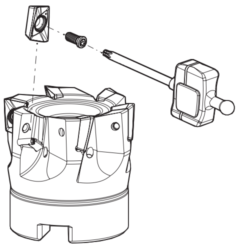
Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			lbf/in	lbf/in
XP90-W-10 - 0.625-1.00	P0250704	XT08	DT0812	10.6
XP90-R-10 - 0.625-1.25	P0250704	XT08	DT0812	10.6
XP90-A-10 - 1.50-2.50	P0250704	XT08	DT0812	10.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.







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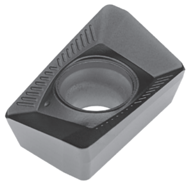
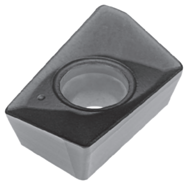
LINEPRO XP90-10

XP... 1003... | Inserts | Pastilhas | Plaquitas

XPET-LP
(PHH-PHP grade)



XPET-MP
(PHH-PHP grade)

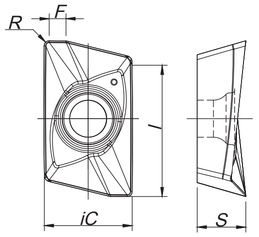


XPET-LN

PHH
NEW
GRADE

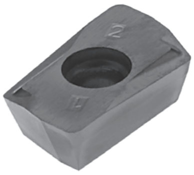
PHP
NEW
GRADE

XPET-LP | MP | LN

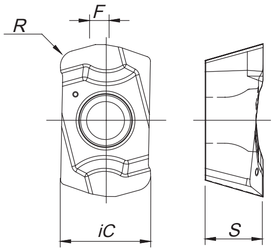


XPET-HF
(HiFeed geometry)

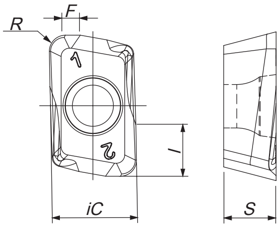
XPHW-MH NEW
(finishing geometry)



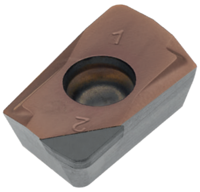
XPET-HF



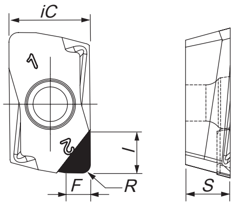
XPHW-MH



XPHW-R Z1 NEW



XPHW-R Z1



			P					M	K					N		S	H		Dimensions Dimensões Dimensiones (in)				
			CVD	PVD				PVD	CVD		PVD			UNC	PCD	PVD	PVD						
		(2) Grade code	T9	G1	X5	T1	P4	X9	L5	L9	X5	T1	P4	10	D6	X9	X4	X6					
	(1) Geometry code	ISO Reference	PHS740	PH7910	PHP910	PHP920	PHP930	PHH930	PH5705	PH5740	PHP910	PHP920	PHP930	PH0910	PDP410	PHH930	PHH603	PHH910	iC	S	l	R	F
NEW	1113132	XPET 100302 PDER-LP						◎								◎			0.274	0.156	0.413	0.008	0.059
	1111980	XPET 100304 PDER-LP				◉	◎	◎				◉	◎			◎			0.274	0.156	0.413	0.016	0.051
	1111981	XPET 100308 PDER-LP	◎			◉	◎	◎				◉	◎			◎			0.274	0.156	0.413	0.031	0.055
	1112022	XPET 100316 PDER-LP				◉	◎	◎				◉	◎			◎			0.274	0.156	0.413	0.063	0.031
	1111982	XPET 100304 PDSR-MP		△	○	◉	◎		◉	◎		◎	◎						0.274	0.156	0.413	0.016	0.043
	1111983	XPET 100308 PDSR-MP	◎	△	◎	◉	◎	○	◉	◎	◎	◎	◎			○			0.274	0.156	0.413	0.031	0.053
	1111984	XPET 100304 PDFR-LN												◎	○				0.274	0.156	0.413	0.016	0.030
	1112906	XPET 100308 PDFR-LN												◎	○				0.274	0.156	0.413	0.031	0.041
	1111985	XPET 100312 PDFR-LN												◎					0.274	0.156	0.413	0.047	0.030
	1112376	XPET 100312 ZDR-HF			◎	◉	◎	◎			◎	◉	◎			◎			0.274	0.156	-	0.047	0.059
NEW	1112500	XPHW 100308 ZER-MH			○						○						◉	◎	0.274	0.142	0.118	0.031	0.051
NEW	1112736	XPHW 100310 ZER-MH															◎		0.274	0.142	0.118	0.039	0.014
NEW	1112735	XPHW 100320 ZER-MH															◎		0.274	0.142	0.118	0.047	0.043
NEW	1112556	XPHW 100308 R Z1													◎				0.274	0.142	0.150	0.031	0.091

◉ First choice | 1ª Escolha | 1ª Opción
◎ Stock Itens | 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-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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 ... LP/HF	-
	5	SS - Austenitic	200-330	XPET 10 ... LP/HF	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	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 ... LP/HF	-
H	12	Hardened Steels	40-55 HRC	XPHW 10 ... MH	-

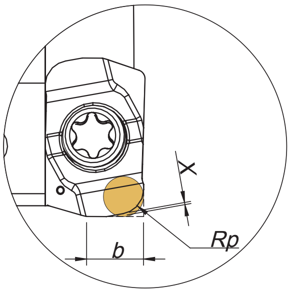
GRADES SELECTION GUIDE | Guia para selecção de graus | Tabla para selección de calidades

ISO	PSM	Material	HB (Brinell)	Grades									PCD
				← Wear Resistance								Toughness →	
				PH0910 ●	PH5705 ●	PHH603 ●	PHP910 ●	PHP920 ◐	PHP930 ✱	PHH930 ✱	PH5740 ✱	PHS740 ✱	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	0.063	0.013	0.136



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LINEPRO XP90-10

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM)								
				← Wear Resistance								Toughness →
				PH0910	PH5705	PHH603	PHP910	PHP920	PHP930	PHH930	PH5740	PHS740
P	1	Unalloyed Steel	125-220	-	-	-	590-820	590-820	525-755	-	-	460-722
	2	Low-Alloyed Steel	220-280	-	-	-	525-788	525-755	460-690	-	-	394-656
	3	High-Alloyed Steel	280-380	-	-	590-1017	460-755	460-722	394-656	-	-	328-624
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	-	-	460-690	-	-
	5	SS - Austenitic	200-330	-	-	-	-	-	-	394-558	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	-	-	328-492	-	-
K	7	Malleable Cast Iron	130-230	-	525-950	-	590-1004	525-886	492-820	-	525-854	-
	8	Grey Cast Iron	180-245	-	558-1050	-	525-820	460-820	460-755	-	460-788	-
	9	Nodular Cast iron	160-250	-	460-656	-	492-690	394-690	328-656	-	394-656	-
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-	-	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	-	-	100-360	-	-
H	12	Hardened Steels	40-55 HRC	-	-	230-886	-	-	-	-	-	-

ISO	PSM	Material	HB (Brinell)	PCD	Feed fz (in/t)				
				PDP410	XPET 10... LP	XPET 10... MP	XPET 10... LN/R Z1	XPET 10... HF	XPHW 10... MH
P	1	Unalloyed Steel	125-220	-	0.003-0.008	0.004-0.010	-	0.016-0.031	0.004-0.010
	2	Low-Alloyed Steel	220-280	-	0.003-0.008	0.004-0.008	-	0.016-0.031	0.004-0.010
	3	High-Alloyed Steel	280-380	-	0.003-0.006	0.004-0.008	-	0.016-0.024	0.004-0.010
M	4	SS - Ferritic / Martensitic	200-330	-	0.003-0.008	0.004-0.008	-	0.016-0.028	-
	5	SS - Austenitic	200-330	-	0.003-0.008	0.004-0.008	-	0.016-0.028	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	0.003-0.006	0.004-0.008	-	0.016-0.024	-
K	7	Malleable Cast Iron	130-230	-	0.003-0.008	0.004-0.010	-	0.020-0.031	-
	8	Grey Cast Iron	180-245	-	0.003-0.008	0.004-0.010	-	0.020-0.031	-
	9	Nodular Cast iron	160-250	-	0.003-0.008	0.004-0.008	-	0.020-0.024	-
N	10	Aluminium and Non Ferrous	30-130	328-9840	-	-	0.003-0.010	-	-
S	11	Heat Resistant Super Alloys	200-320	-	0.002-0.003	-	-	0.016-0.024	-
H	12	Hardened Steels	40-55 HRC	-	-	-	-	-	0.003-0.006

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

(Note 2): PH5... and PHS... can be used wet or dry. PH7... use only air.

(Note 3):

Operation	a_e	Vc & fz	a_p (in)
Slotting	100%	<20%	0.078-0.157
Shouldering	<50%	>8%	0.118-0.236
	≤25%	>12%	0.276-0.354

(Note 4):

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

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

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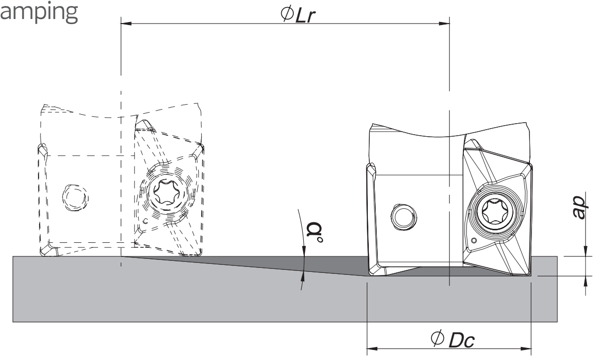
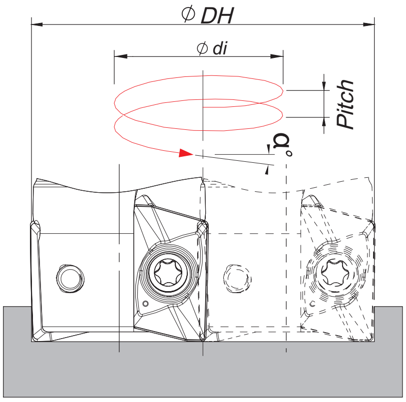
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical Interpolation



Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
				Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	
0.625	7.5	0.394	2.993	0.978 -	- 1.171	0.140 0.220
0.750	5.0	0.394	4.503	1.228 -	- 1.421	0.130 0.180
1.000	3.5	0.394	6.442	1.728 -	- 1.921	0.130 0.170
1.250	2.5	0.394	9.024	2.228 -	- 2.421	0.130 0.160
1.500	1.7	0.394	13.275	2.728 -	- 2.921	0.110 0.130
2.000	1.3	0.394	17.362	3.728 -	- 3.921	0.120 0.130
2.500	1.0	0.394	22.572	4.728 -	- 4.921	0.120 0.130

(1) using LP insert with radius 0.031 in

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: ØDHmin = 2 x (ØDc - (R corner radius + F width of edge wiper))
- Maximum Diameter: ØDHmax = 2 x (ØDc - R corner radius)

PDF

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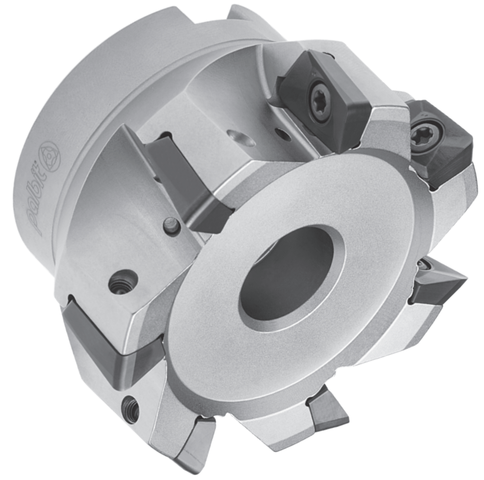
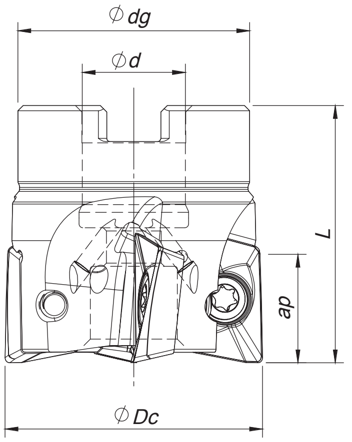
LINEPRO XP90-17





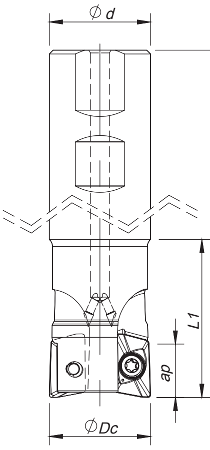
Arbor Mounting

κ_r=90° | γ_p=+7° ~+8°

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Arbor Type	Ap max (in)		
181107700	XP90 D1.50-A.500/1.57-04-17	4	1.500	0.500	1.417	1.575	0.50	A	0.669	XPET 1706...	◎
181107800	XP90 D2.00-A.750/1.57-05-17	5	2.000	0.750	1.772	1.575	0.70	A	0.669	XPET 1706...	◎
181107900	XP90 D2.50-A.750/1.57-06-17	6	2.500	0.750	2.205	1.575	1.10	A	0.669	XPET 1706...	◎
181108000	XP90 D3.00-A1.00/1.97-07-17	7	3.000	1.000	2.205	1.970	2.20	A	0.669	XPET 1706...	◎
181108100	XP90 D4.00-A1.25/1.97-08-17	8	4.000	1.250	2.874	1.970	3.74	A	0.669	XPET 1706...	◎
181108200	XP90 D5.00-A1.25/2.48-09-17	9	5.000	1.500	3.386	2.480	6.83	A	0.669	XPET 1706...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)



Weldon Shank

κ_r=90° | γ_p=+6° ~+7°

Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		Ap max (in)		
181107300	XP90 D1.25-W1.25/4.33-02-17	2	1.250	1.250	4.330	1.570	1.00	0.669	XPET 1706...	◎
181107400	XP90 D1.25-W1.25/4.33-03-17	3	1.250	1.250	4.330	1.570	1.00	0.669	XPET 1706...	◎
181107500	XP90 D1.50-W1.25/4.72-03-17	3	1.500	1.250	4.720	1.570	1.70	0.669	XPET 1706...	◎
181107600	XP90 D1.50-W1.25/4.72-04-17	4	1.500	1.250	4.720	1.570	1.70	0.669	XPET 1706...	◎

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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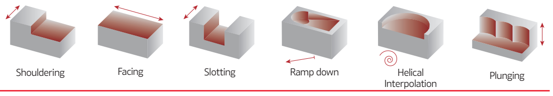
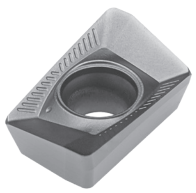


XPET 1706... | Inserts | Pastilhas | Plaquitas

XPET-LP

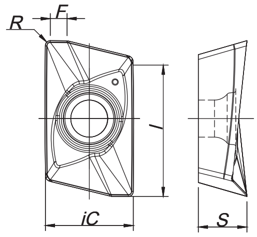


XPET-MP

PHH
NEW
GRADE

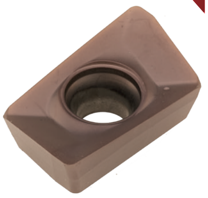
PHP
NEW
GRADE

XPET-LP | MP | LN | LS

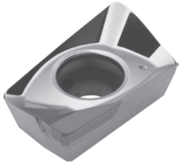


XPET-LN

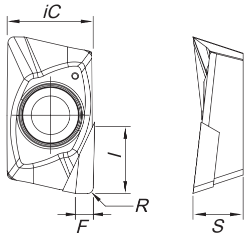
XPET-LS NEW
(PHH grade)



XPET-LN Z1 NEW

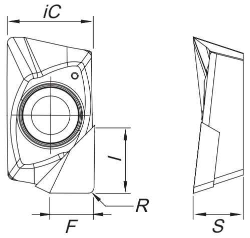


XPET-LP | MP | LN | LS



XPET-LN Z1W NEW

XPET-LP | MP | LN | LS



		P			M		K				N		S		Dimensions Dimensões Dimensiones (in)				
		CVD	PVD		PVD		CVD		PVD		UNC	PCD	PVD						
	(2) Grade code	T9	T1	G6	X9	G6	L5	L9	T1	G6	10	D6	X9	G6					
(1) Geometry code	ISO Reference	PHS740	PHP920	PH7740	PHH930	PH7740	PH5705	PH5740	PHP920	PH7740	PH0910	PDP410	PHH930	PH7740	iC	S	l	R	F
1111986	XPET 170608 PDER-LP		◉	◎		◎			◉	◎				◎	0.445	0.250	0.689	0.031	0.071
1111987	XPET 170616 PDER-LP		◉	◎		◎			◉	◎				◎	0.445	0.250	0.689	0.063	0.047
1111988	XPET 170608 PDSR-MP	◎	◉	◎		◎	◎	◎	◉	◎				◎	0.445	0.250	0.689	0.031	0.071
1111989	XPET 170616 PDSR-MP		◉	◎		◎	◎	◎	◉	◎				◎	0.445	0.250	0.689	0.063	0.039
NEW 1113085	XPET 170608 PDFR-LN Z1											◎			0.433	0.256	0.315	0.031	0.059
NEW 1113086	XPET 170608 PDFR-LN Z1W											◎			0.433	0.256	0.315	0.031	0.193
1111990	XPET 170608 PDFR-LN										◎				0.445	0.250	0.689	0.031	0.047
1111991	XPET 170620 PDFR-LN										◎				0.445	0.250	0.689	0.079	0.039
1111992	XPET 170632 PDFR-LN										◎				0.445	0.250	0.689	0.126	0.031
NEW 1112223	XPET 170608 PDER-LS			◎	◉	◎				◎			◉	◎	0.445	0.250	0.689	0.031	0.071

◉ First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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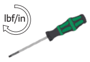
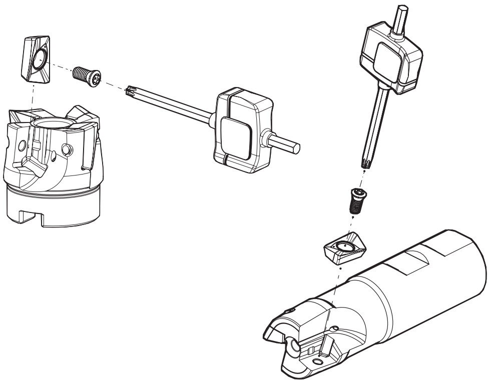
LINEPRO XP90-17

SPARE PARTS | Acessórios | Repuestos

Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			lbf/in 	lbf/in
XP90-A-17 - 1.50-3.00	P0451001	XT20	DT2050	44.3
XP90-A-17 - 4.00-5.00	P0451001	PT20	DT2050	44.3
XP-90-W-17 - 1.25-1.50	P0451001	XT20	DT2050	44.3

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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

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

● Good Conditions ◐ Average Conditions ✸ Difficult Conditions

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

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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	-
	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/R Z1/R Z1W	-
S	11	Heat Resistant Super Alloys	200-320	XPET 17... LS	XPET 17... LP

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LINEPRO XP90-17

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM)							
				← Wear Resistance							Toughness →
				PH0910	PH5705	PHP920	PHP930	PHH930	PH5740	PHS740	PH7740
P	1	Unalloyed Steel	125-220	-	-	590-820	525-755	-	-	460-722	460-656
	2	Low-Alloyed Steel	220-280	-	-	525-755	460-690	-	-	394-656	426-590
	3	High-Alloyed Steel	280-380	-	-	460-722	394-656	-	-	328-624	328-558
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	-	460-690	-	-	426-590
	5	SS - Austenitic	200-330	-	-	-	-	394-558	-	-	360-525
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	-	328-492	-	-	-
K	7	Malleable Cast Iron	130-230	-	525-950	525-886	492-820	-	525-854	-	460-722
	8	Grey Cast Iron	180-245	-	558-1050	460-820	460-755	-	460-788	-	394-690
	9	Nodular Cast iron	160-250	-	460-656	394-690	328-656	-	394-656	-	328-624
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-	-	-	-	-	-
S	11	Heat Resistant Super Alloys	200-320	-	-	-	-	100-360	-	-	100-328

ISO	PSM	Material	HB (Brinell)	PCD	Feed fz (in/t)			
				PDP410	XPET 17... LP	XPET 17... MP	XPET 17... LN/R Z1	XPET 17... LS
P	1	Unalloyed Steel	125-220	-	0.004-0.014	0.004-0.014	-	-
	2	Low-Alloyed Steel	220-280	-	0.004-0.014	0.004-0.014	-	-
	3	High-Alloyed Steel	280-380	-	0.004-0.012	0.004-0.012	-	-
M	4	SS - Ferritic / Martensitic	200-330	-	0.004-0.012	-	-	0.004-0.014
	5	SS - Austenitic	200-330	-	0.004-0.012	-	-	0.004-0.012
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	0.004-0.010	-	-	-
K	7	Malleable Cast Iron	130-230	-	0.004-0.014	0.004-0.014	-	-
	8	Grey Cast Iron	180-245	-	0.004-0.014	0.004-0.014	-	-
	9	Nodular Cast iron	160-250	-	0.004-0.012	0.004-0.012	-	-
N	10	Aluminium and Non Ferrous	30-130	330-9850	-	-	0.004-0.014	-
S	11	Heat Resistant Super Alloys	200-320	-	0.004-0.008	-	-	0.004-0.008

(Note 1) Cutting conditions ae/DC=70%
(Note 2) Cutting conditions should be ajusted according to the machine and work rigidity.
(Note 3):

Operation	a_e	Vc & fz	a_p (in)
Slotting	100%	<20%	0.079-0.236
Shouldering	<50%	>8%	0.276-0.512
	≤25%	>12%	0.512-0.630

(Note 4) It's possible to occur vibrations in certain cases.
Please reduce depth of cut and / or reduce cutting conditions in following cases:
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

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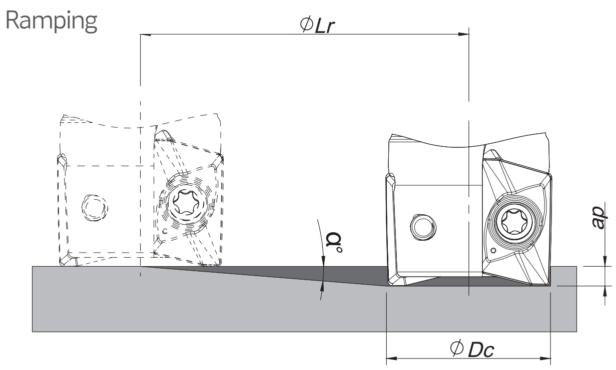
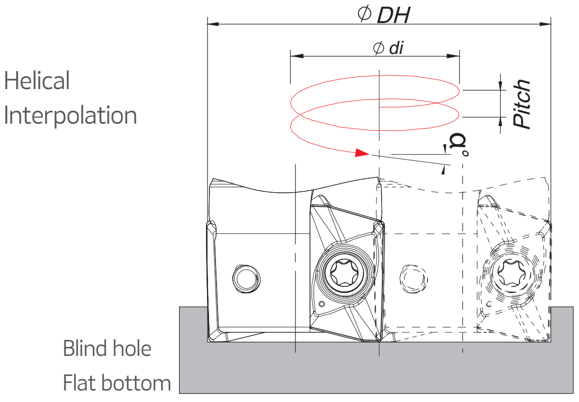
Technical Data page A - 232

RAMPING AND HELICAL INTERPOLATION

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





Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
				Diameter for Blind Hole. Flat Bottom Face (1)		Max Pitch/Rev.
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	
1.250	3.8	0.669	10.072	2.228 -	- 2.421	0.200 0.240
1.500	2.7	0.669	14.186	2.728 -	- 2.921	0.180 0.210
2.000	2.0	0.669	19.158	3.728 -	- 3.921	0.180 0.210
2.500	1.5	0.669	25.548	4.728 -	- 4.921	0.180 0.190
3.000	1.0	0.669	38.327	5.728 -	- 5.921	0.140 0.160
4.000	0.8	0.669	47.910	7.728 -	- 7.921	0.160 0.170
5.000	0.7	0.669	54.756	9.728 -	- 9.921	0.180 0.180

(1) using LP insert with radius 0.031 in

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: ØDHmin = 2 x (ØDc - (R corner radius + F width of edge wiper))
- Maximum Diameter: ØDHmax = 2 x (ØDc - R corner radius)

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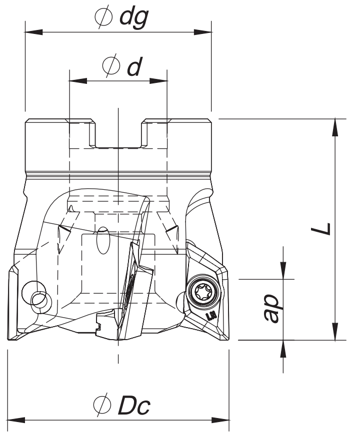
ALUPRO XD90-15



Arbor Mounting

κ_r=90° | γ_p=+11°

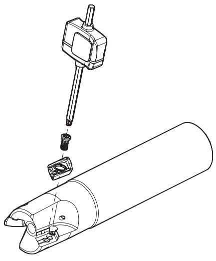
Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			ØDc	Ød	Ødg	L		Cutter Type	Max ap (in)	rpm max		
181104600	XD90 D1.50-A.500/2.00-03-15	3	1.500	0.500	1.440	2.000	0.66	A	0.551	29 000	0.016~0.126	⊛
181104700	XD90 D2.00-A.750/2.00-04-15	4	2.000	0.750	1.772	2.000	0.88	A	0.551	24 000	0.016~0.126	⊛
181104800	XD90 D2.50-A.750/2.50-05-15	5	2.500	0.750	2.205	2.500	1.54	A	0.551	21 000	0.016~0.126	⊛
181104900	XD90 D3.00-A1.00/2.50-05-15	5	3.000	1.000	2.874	2.500	2.42	A	0.551	19 000	0.016~0.126	⊛
181105000	XD90 D4.00-A1.50/2.50-06-15	6	4.000	1.500	3.180	2.500	4.41	A	0.551	16 000	0.016~0.126	⊛

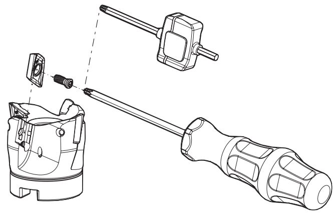
⊛ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

SPARE PARTS | Acessórios | Repuestos

Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			lbf/in	lbf/in
XD90-A-15 - 1.50-3.00	P0400900	XT15	DT1530	26.6
XD90-A-15 - 4.00	P0400900	PT15	DT1530	26.6
XD90-C-15 - 0.75-1.00	P0400803	XT15	DT1530	26.6
XD90-C-15 - 1.25-1.50	P0400900	XT15	DT1530	26.6





Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

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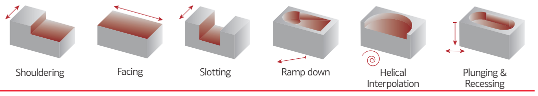
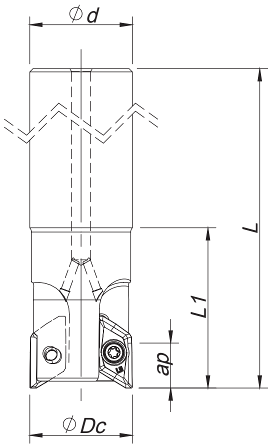
XDGX





Cylindrical Shank

$\kappa_r=90°$ | $\gamma_p=+6° \sim +11°$

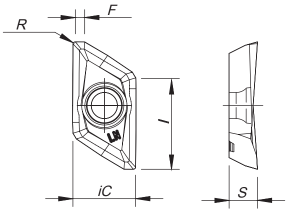
Order code Código	Reference Referência Referencia	⊕	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			ØDc	Ød	L	L1		Cutter Type	Max ap (in)	rpm max		
181105100	XD90 D0.75-C0.75/6.00-01-15	1	0.750	0.750	6.000	2.000	0.44	A	0.591	40 000	0.016~0.126	◎
181105200	XD90 D1.00-C1.00/6.00-02-15	2	1.000	1.000	6.000	2.000	0.88	A	0.591	38 000	0.016~0.126	◎
181105300	XD90 D1.25-C1.25/6.00-02-15	2	1.250	1.250	6.000	2.000	1.54	A	0.591	33 000	0.016~0.126	◎
181105400	XD90 D1.50-C1.50/6.00-03-15	3	1.500	1.500	6.000	2.000	3.08	A	0.591	29 000	0.016~0.126	△

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplezado por nuevo iten.

XDGX 15M5... | Inserts | Pastilhas | Plaquitas



		N	Dimensions Dimensões Dimensiones (in)					Cutter Type
		UNC						
	(2) Grade code	10						
(1) Geometry code	ISO Reference	PH0910	iC	S	l	R	F	
1111624	XDGX 15M504 PDFR-LN	⊛	0.441	0.197	0.630	0.016	0.059	A
1111625	XDGX 15M508 PDFR-LN	⊛	0.441	0.197	0.630	0.031	0.043	A
1111626	XDGX 15M512 PDFR-LN	⊛	0.441	0.197	0.630	0.047	0.028	A
1111627	XDGX 15M516 PDFR-LN	⊛	0.441	0.197	0.630	0.063	0.016	A
1111628	XDGX 15M520 PDFR-LN	⊛	0.441	0.197	0.630	0.079	0.008	A
1112154	XDGX 15M530 PDFR-LN	⊛	0.441	0.197	0.630	0.118	0.024	A
1111629	XDGX 15M532 PDFR-LN	⊛	0.441	0.197	0.630	0.126	0.024	A

⊛ First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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ALUPRO XD90-15

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

SHOULDERING

ISO	PSM	Material	HB (Brinell)	Vc (SFM) PH0910	Width of Cut ae	Depth of Cut ap (in)	Feed fz(in/t)
N	10	Aluminium and Non Ferrous	30-130	1148-9840	≤ 25% ØDc	≤0.197	0.014 - 0.016
						0.197 - 0.394	0.012 - 0.014
						0.394 - 0.591	0.010 - 0.012
					< 50% ØDc	≤0.197	0.014 - 0.016
						0.197 - 0.394	0.012 - 0.014
						0.394 - 0.591	0.010 - 0.012
					≤ 75% ØDc	≤0.197	0.012 - 0.014
						0.197 - 0.394	0.010 - 0.012
						0.394 - 0.591	0.008 - 0.010

SLOTTING

ISO	PSM	Material	HB (Brinell)	Vc (SFM) PH0910	Width of Cut ae	Depth of Cut ap (in)	Feed fz(in/t)
N	10	Aluminium and Non Ferrous	30-130	1148-9840	100% ØDc	≤0.197	0.010 - 0.014
						0.197 - 0.394	0.008 - 0.012
						0.394 - 0.591	0.006 - 0.010

(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

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- 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:

ØDc	Ø0.750	Ø1.000	Ø1.250	Ø1.500	Ø2.000	Ø2.500	Ø3.000	Ø4.000
RPM (min^{-1})	40 000	38 000	33 000	29 000	24 000	21 000	19 000	16 000

- 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:

ØDc	Ø0.750	Ø1.000	Ø1.250	Ø1.500	Ø2.000	Ø2.500	Ø3.000	Ø4.000
RPM (min^{-1})	15 000	12 000	9 500	8 500	7 600	6 800	6 000	5 400

- 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.

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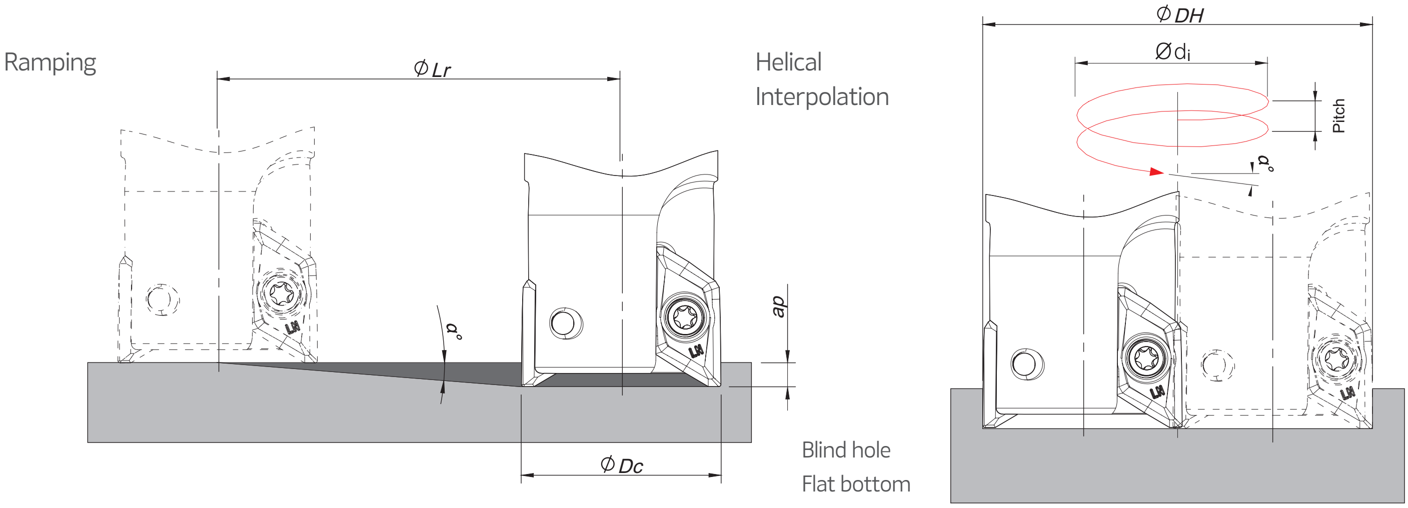
RAMPING AND HELICAL INTERPOLATION

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



Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
				Diameter for Blind Hole. Flat Bottom Face (1)		Max Pitch/Rev.
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	
0.750	23	0.551	1.299	1.342 -	- 1.421	0.551 0.551
1.000	21	0.551	1.436	1.842 -	- 1.921	0.551 0.551
1.250	15	0.551	2.057	2.342 -	- 2.421	0.551 0.551
1.500	10	0.551	3.126	2.842 -	- 2.921	0.551 0.551
2.000	8	0.551	3.922	3.842 -	- 3.921	0.551 0.551
2.500	6	0.551	5.244	4.842 -	- 4.921	0.551 0.551
3.000	4	0.551	7.883	5.842 -	- 5.921	0.551 0.551
4.000	2.5	0.551	12.625	7.842 -	- 7.921	0.520 0.530

(1) using insert radius 0.031 in.
Note: During helical interpolation do not exceed maximum pitch.
When using different insert radius to calculate the ØDHmin and ØDHmax use the equation below:
- Minimum Diameter: ØDHmin = 2 x (ØDc - (R corner radius + F width of edge wiper))
- Maximum Diameter: ØDHmax = 2 x (ØDc - R corner radius)

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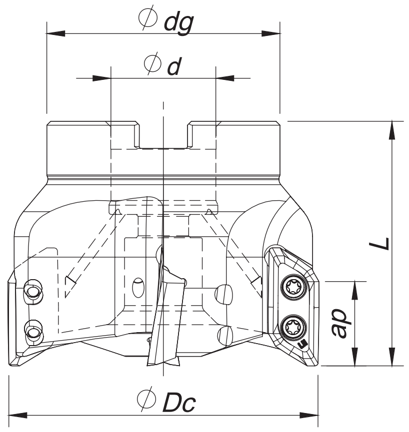
ALUPRO XD90-22

Arbor Mounting

κ_r=90° | γ_p=+7°



Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			ØDc	Ød	Ødg	L		Arbor Type	Max ap (in)	rpm max		
181079500	XD90 D2.00-A.750/2.00-03-22	3	2.000	0.750	1.772	2.000	0.98	A	0.846	30 000	0.031~0.126	◉
181079600	XD90 D2.50-A1.00/2.00-03-22	3	2.500	1.000	2.205	2.000	1.41	A	0.846	25 000	0.031~0.126	◉
181072600	XD90 D3.00-A1.00/2.00-04-22	4	3.000	1.000	2.205	2.000	1.82	A	0.846	23 000	0.031~0.126	○
181071700	XD90 D3.00-A1.00/2.50-04-22	4	3.000	1.000	2.205	2.500	2.96	A	0.846	23 000	0.031~0.126	◉
181079700	XD90 D4.00-A1.25/2.50-05-22	5	4.000	1.250	2.874	2.500	5.43	A	0.846	19 000	0.031~0.126	△
181138600	XD90 D4.00-A1.50/2.50-05-22	5	4.000	1.500	3.000	2.500	5.43	A	0.846	16 000	0.031~0.126	○
181079800	XD90 D5.00-A1.50/2.50-06-22	6	5.000	1.500	3.180	2.500	6.72	A	0.846	30 000	0.031~0.126	◉

◉ Stock item | Produto de stock | Itens de stock

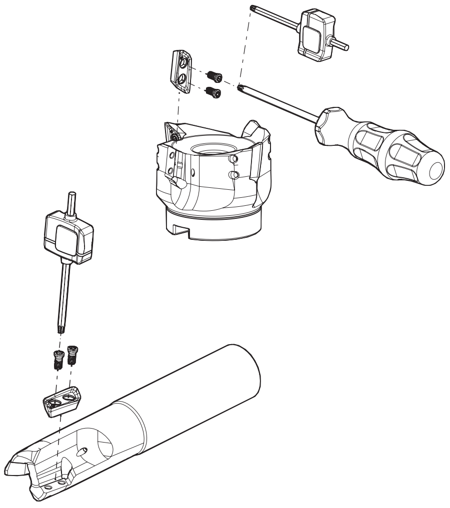
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplezado por nuevo iten.

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
			lbf/in	lbf/in
XD90-A-22 - 2.00-3.00	P0401200	XT15	DT1530	26.6
XD90-A-22 - 4.00-5.00	P0401200	PT15	DT1530	26.6
XD90-C-22 - 1.25-1.50	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-231.
Check the procedures for the clamping screws on the page A-231.



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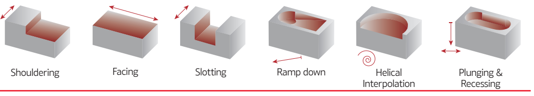
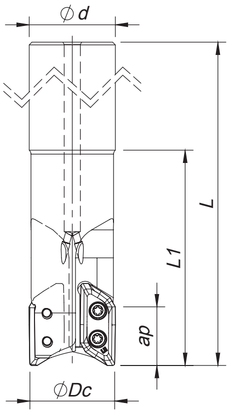
XDGX





Cylindrical Shank

$\kappa_r=90°$ | $\gamma_p=+6°$

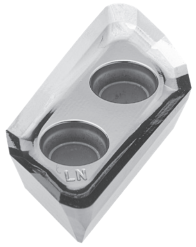
Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			ØDc	Ød	L	L1		Arbor Type	Max ap (in)	rpm max		
181069900	XD90 D1.25-C1.25/6.69-02-22	2	1.250	1.250	6.693	3.150	1.67	A	0.846	41 000	0.031~0.126	⊛
181079900	XD90 D1.50-C1.50/6.69-02-22	2	1.500	1.500	6.693	3.150	1.82	A	0.846	36 000	0.031~0.126	△
181138700	XD90 D1.50-C1.25/8.00-02-22	2	1.500	1.250	8.000	3.000	1.82	A	0.846	41 000	0.031~0.126	○

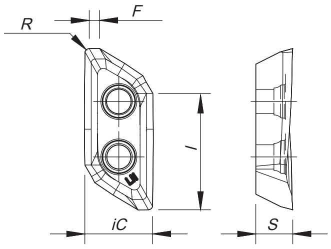
⊛ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

△ Inventory maintained. To be replaced by new item. | Iten em stock. Será substituido por novo item | Iten en stock. Será reemplezado por nuevo iten.

XDGX 22M7... | Inserts | Pastilhas | Plaquitas





		N	Dimensions Dimensões Dimensiones (in)					Cutter Type
		UNC						
	(2) Grade code	10						
(1) Geometry code	ISO Reference	PH0910	iC	S	l	R	F	
1111618	XDGX 22M708 PDFR-LN	✪	0.512	0.276	0.866	0.031	0.079	A
1111619	XDGX 22M716 PDFR-LN	✪	0.512	0.276	0.866	0.063	0.047	A
1111620	XDGX 22M720 PDFR-LN	✪	0.512	0.276	0.866	0.079	0.031	A
1111621	XDGX 22M732 PDFR-LN	✪	0.512	0.276	0.866	0.126	0.024	A

✪ First choice | Primeira opção | 1ª opción

⊛ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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ALUPRO XD90-22

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

SHOULDERING

ISO	PSM	Material	HB (Brinell)	Vc (SFM)	Width of Cut ae	Depth of Cut ap (in)	Feed fz(in/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	1148-9840	≤ 25% ØDc	≤0.197	0.014-0.016
						0.197 - 0.394	0.012-0.014
						0.394 - 0.591	0.010-0.012
						0.591 - 0.787	0.008-0.010
					< 50% ØDc	≤0.197	0.014-0.016
						0.197 - 0.394	0.012-0.014
						0.394 - 0.591	0.010-0.012
						0.591 - 0.787	0.008-0.010
					≤ 75% ØDc	≤0.197	0.012-0.014
						0.197 - 0.394	0.010-0.012
						0.394 - 0.591	0.008-0.010
						0.591 - 0.787	0.006-0.008

SLOTTING

ISO	PSM	Material	HB (Brinell)	Vc (SFM)	Width of Cut ae (mm)	Depth of Cut ap (in)	Feed fz(in/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	1148-9840	100% ØDc	≤0.197	0.010-0.014
						0.197 - 0.394	0.008-0.012
						0.394 - 0.591	0.006-0.010
						0.591 - 0.787	0.004-0.008

(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.

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- 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).

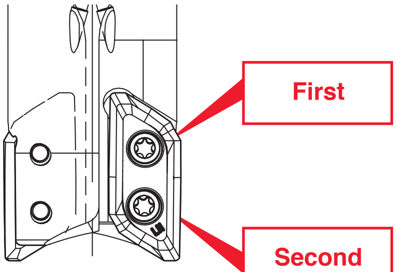

Figure 1

Table 1 - Maximum allowable revolutions:

ØDc	Ø1.250	Ø1.500	Ø2.000	Ø2.500	Ø3.000	Ø4.000	Ø5.000
RPM (min^{-1})	41 000	36 000	30 000	25 000	23 000	19 000	16 000

- 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:

ØDc	Ø1.250	Ø1.500	Ø2.000	Ø2.500	Ø3.000	Ø4.000	Ø5.000
RPM (min^{-1})	9 500	7 600	6 000	4 800	3 800	3 000	2 400

- 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.

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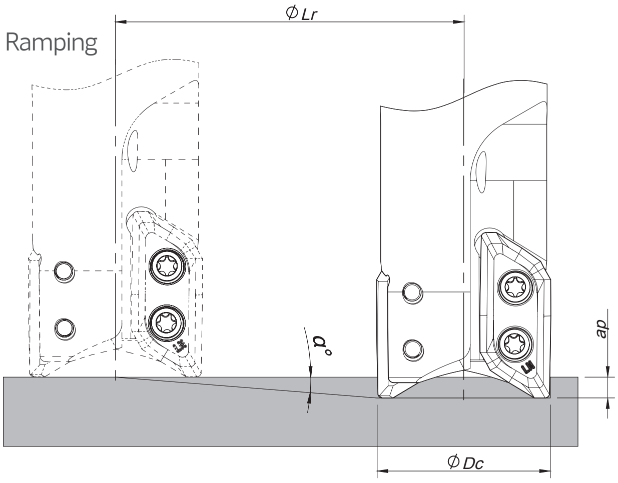
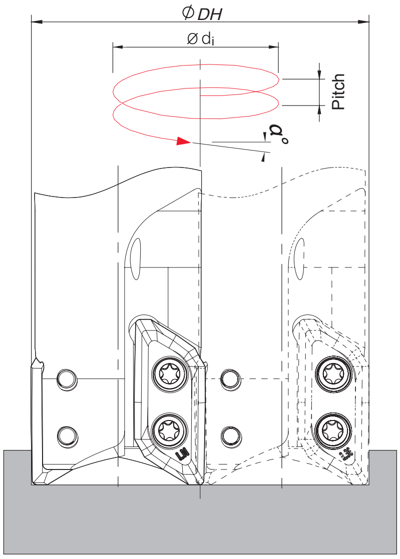
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical
Interpolation



$Ødi = ØDH - ØDc$

ØDc	Ramping			Helical Interpolation		
				Diameter for Blind Hole. Flat Bottom Face (1)		Max Pitch/Rev.
	Max Ramp a°	Max ap	Min Lr	ØDHmin	ØDHmax	
1.250	19.0	0.827	2.401	2.303 -	- 2.421	0.827 0.827
1.500	13.0	0.827	3.581	2.803 -	- 2.921	0.827 0.827
2.000	9.0	0.827	5.220	3.803 -	- 3.921	0.827 0.827
2.500	7.0	0.827	6.734	4.803 -	- 4.921	0.827 0.827
3.000	5.0	0.827	9.450	5.803 -	- 5.921	0.770 0.800
4.000	4.0	0.827	11.824	7.803 -	- 7.921	0.827 0.827
5.000	3.0	0.827	15.776	9.803 -	- 9.921	0.790 0.810

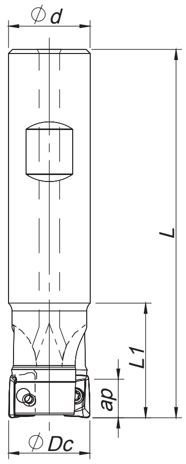
(1) using insert radius 0.031 in.
Note: During helical interpolation do not exceed maximum pitch.
When using different insert radius to calculate the ØDHmin and ØDHmax use the equation below:
- Minimum Diameter: ØDHmin = 2 x (ØDc - (R corner radius + F width of edge wiper))
- Maximum Diameter: ØDHmax = 2 x (ØDc - R corner radius)

PDF

LINEPRO AP90-10

Weldon Shank

$\kappa_r=90^\circ$ | $\gamma_p=+7^\circ \sim +9^\circ$



Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		Ap max (in)		
181060400	AP90 D.500-W.500/3.94-01-10	1	0.500	0.500	3.937	0.850	0.40	0.354	AP... 1003...	○
181060500	AP90 D.625-W.625/3.94-02-10	2	0.625	0.625	3.937	1.024	0.28	0.354	AP... 1003...	◎
181060700	AP90 D.750-W.750/3.94-02-10	2	0.750	0.750	3.937	1.181	0.40	0.354	AP... 1003...	◎
181064500	AP90 D.750-W.750/3.94-03-10	3	0.750	0.750	3.937	1.181	0.37	0.354	AP... 1003...	○
181060800	AP90 D.750-W.750/7.87-02-10	2	0.750	0.750	7.874	1.575	0.85	0.354	AP... 1003...	◎
181068800	AP90 D1.00-W1.00/4.53-03-10	3	1.000	1.000	4.528	1.378	0.84	0.354	AP... 1003...	◎
181060900	AP90 D1.00-W1.00/5.91-03-10	3	1.000	1.000	5.910	1.432	1.08	0.354	AP... 1003...	○
181068900	AP90 D1.00-W1.00/4.53-04-10	4	1.000	1.000	4.528	1.378	0.83	0.354	AP... 1003...	○
181061000	AP90 D1.00-W1.00/9.84-03-10	3	1.000	1.000	9.843	1.575	1.95	0.354	AP... 1003...	◎
181069000	AP90 D1.25-W1.25/4.92-04-10	4	1.250	1.250	4.921	1.575	1.46	0.354	AP... 1003...	○
181061100	AP90 D1.25-W1.25/6.30-03-10	3	1.250	1.250	6.300	1.575	1.15	0.354	AP... 1003...	○
181061200	AP90 D1.25-W1.25/9.84-04-10	4	1.250	1.250	9.843	1.575	3.11	0.354	AP... 1003...	○
181061300	AP90 D1.50-W1.25/7.87-03-10	3	1.500	1.250	7.874	1.575	2.57	0.354	AP... 1003...	○
181061400	AP90 D1.50-W1.25/9.84-05-10	5	1.500	1.250	9.843	1.575	3.20	0.354	AP... 1003...	○

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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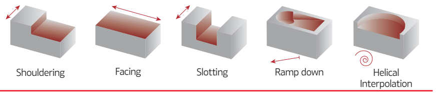
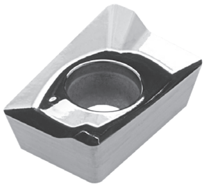
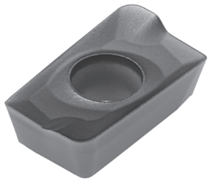


AP... 1003... ‖ Inserts | Pastilhas | Plaquitas

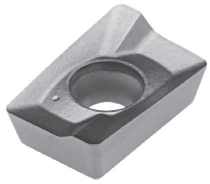
APET - LN



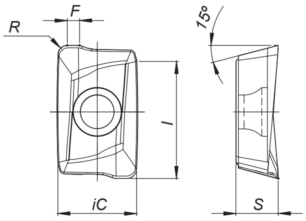
APKT - X



APKT - X1



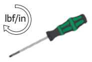
APET-LN | APKT-X | APKT-X1



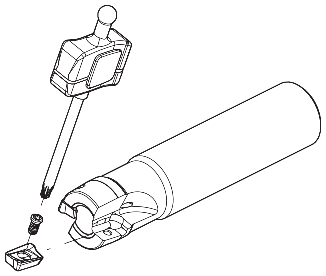
		P		M	K		N	Dimensions Dimensões Dimensiones (in)				
		PVD		PVD	PVD		UNC					
	(2) Grade code	68	66	66	68	66	10					
(1) Geometry code	ISO Reference	PH6920	PH6930	PH6930	PH6920	PH6930	PH0910	iC	S	l	R	F
1112043	APET 100305 PDFR-LN						◉	0.264	0.138	0.394	0.020	0.047
1112168	APKT 100305 PDER-X1	◉	◎	◎	◉	◎		0.264	0.138	0.394	0.020	0.047
1112167	APKT 100305 PDSR-X1	◉	◎	◎	◉	◎		0.264	0.138	0.394	0.020	0.047
1111071	APKT 100308 PDER-X	◉	◎	◎	◉	◎		0.264	0.138	0.394	0.031	0.035
1111044	APKT 100308 PDSR-X	◉	○	○	◉	○		0.264	0.138	0.394	0.031	0.035
1111042	APKT 100308 PDTR-X	◉	◎	◎	◉	◎		0.264	0.138	0.394	0.031	0.035
1111072	APKT 100312 PDER-X	◉	◎	◎	◉	◎		0.264	0.138	0.394	0.047	-
1110987	APKT 100312 PDSR-X	◉	○	○	◉	○		0.264	0.138	0.394	0.047	-
1111045	APKT 100312 PDTR-X	◉	◎	◎	◉	◎		0.264	0.138	0.394	0.047	-

◉ First choice | Primeira opção | 1ª opción   ◎ Stock item | Produto de stock | Itens de stock   ○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)   **Insert order code** = (1) Geometry Code + (2) Grade Code

SPARE PARTS ‖ Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
			lbf/in 	lbf/in
AP90-W-10 - 0.50-1.50	P0250503	XT08	DT0812	10.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.



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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance	Grades	Grades 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

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance	Vc (SFM)	Vc (SFM) Toughness →	Feed fz (in/t)		
				PH0910	PH6920	PH6930	APKT 10... PDER-X/X1	APKT 10... PDS(T)R-X/X1	APET 10... PDFR-LN
P	1	Unalloyed Steel	125-220	-	590-788	525-722	0.003-0.006	0.004-0.010	-
	2	Low-Alloyed Steel	220-280	-	525-722	460-656	0.003-0.004	0.004-0.008	-
	3	High-Alloyed Steel	280-380	-	460-690	394-624	0.003-0.004	0.004-0.008	-
M	4	SS - Ferritic / Martensitic	200-330	-	460-722	460-656	0.003-0.004	-	-
	5	SS - Austenitic	200-330	-	426-590	394-525	0.003-0.004	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	394-525	328-460	0.003-0.004	-	-
K	7	Malleable Cast Iron	130-230	-	525-854	492-788	0.003-0.006	0.004-0.010	-
	8	Grey Cast Iron	180-245	-	460-788	460-755	0.003-0.006	0.004-0.010	-
	9	Nodular Cast iron	160-250	-	394-656	328-624	-	0.004-0.008	-
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-	-	-	0.003-0.008

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

Operation	a_e	Vc & fz	a_p (in)
Slotting	100%	<20%	0.118-0.157
Shouldering	<50%	>8%	0.197-0.236
	≤25%	>12%	0.276-0.315

(Note 3) Cutting conditions should be adjusted according to the machine and work rigidity.
(Note 4) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

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

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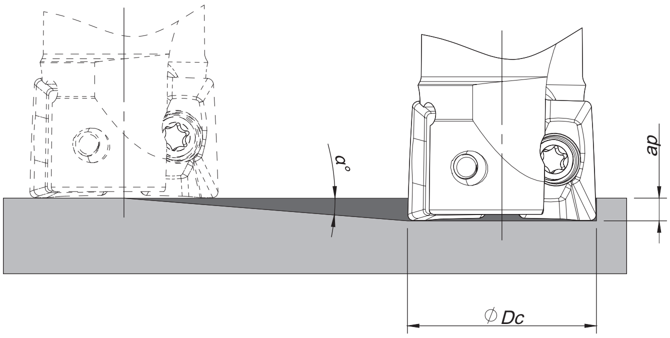
CHIPBREAKER SELECTION GUIDE | Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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	-

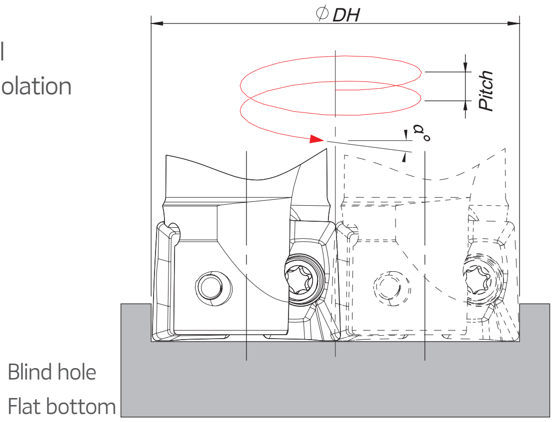
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical Interpolation



Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
				Diameter for Blind Hole. Flat Bottom Face (1)		Max Pitch/Rev.
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	
0.500	1.5	0.354	13.519	0.866 -	- 0.921	0.030 0.034
0.625	1.4	0.354	14.485	1.116 -	- 1.171	0.037 0.041
0.750	1.0	0.354	20.281	1.366 -	- 1.421	0.033 0.036
1.000	0.7	0.354	28.974	1.866 -	- 1.921	0.033 0.035
1.250	0.6	0.354	33.803	2.366 -	- 2.421	0.036 0.038
1.500	0.5	0.354	40.564	2.866 -	- 2.921	0.037 0.038

(1) using LP insert with radius 0.031 in
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: ØDHmin = 2 x (ØDc - (R corner radius + F width of edge wiper))
- Maximum Diameter: ØDHmax = 2 x (ØDc - R corner radius)

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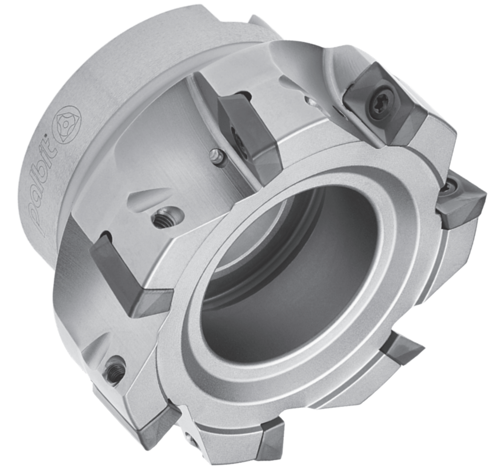
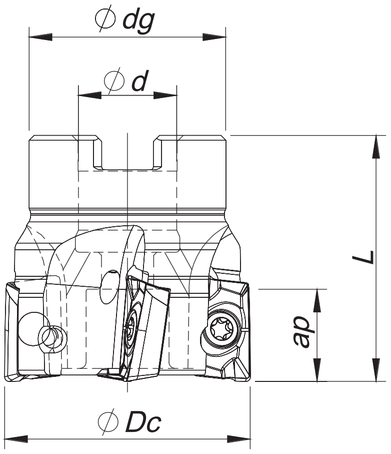


Arbor Mounting

$K_r=90°$ | $\gamma_p=+8° \sim +10°$



Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød	Ødg	L		Arbor Type	Ap max (in)		
181137100	AP90 D1.50-A.500/1.50-04-16	4	1.500	0.500	1.417	1.500	0.37	A	0.571	AP... 1604	○
181137200	AP90 D2.00-A.750/1.75-05-16	5	2.000	0.750	1.772	1.750	0.66	A	0.571	AP... 1604	◎
181137300	AP90 D2.50-A.750/1.75-06-16	6	2.500	0.750	1.772	1.750	1.17	A	0.571	AP... 1604	○
181137400	AP90 D3.00-A1.00/2.00-07-16	7	3.000	1.000	2.205	2.000	1.87	A	0.571	AP... 1604	◎
181137500	AP90 D4.00-A1.25/2.00-08-16	8	4.000	1.250	2.874	2.000	3.75	A	0.571	AP... 1604	◎
181137600	AP90 D5.00-A1.50/2.50-09-16	9	5.000	1.500	3.386	2.500	6.94	A	0.571	AP... 1604	○
181137700	AP90 D6.00-A2.00/2.50-10-16	10	6.000	2.000	4.882	2.500	9.37	A	0.571	AP... 1604	○

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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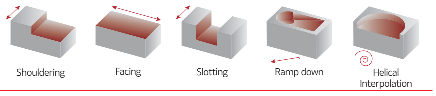
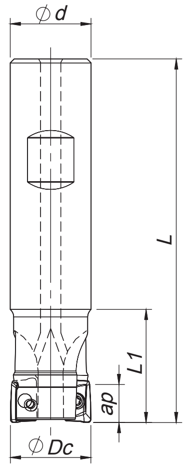
APKT | APHT



Weldon Shank

$\kappa_r = 90°$ | $\gamma_p = +6° \sim +8°$



Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød	L	L1		Ap max (in)		
181061500	AP90 D.875-W.750/3.94-02-16	2	0.875	0.750	3.937	1.378	0.39	0.571	AP... 1604	◎
181136800	AP90 D1.00-W1.00/4.00-02-16	2	1.000	1.000	4.000	1.750	0.67	0.571	AP... 1604	◎
181136900	AP90 D1.00-W1.00/6.00-02-16	2	1.000	1.000	6.000	3.750	1.02	0.571	AP... 1604	◎
181137000	AP90 D1.00-W1.00/8.00-02-16	2	1.000	1.000	8.000	5.750	1.48	0.571	AP... 1604	◎
181062000	AP90 D1.00-W1.00/5.91-02-16	2	1.000	1.000	5.906	3.150	1.02	0.571	AP... 1604	△
181061900	AP90 D1.00-W1.00/7.87-02-16	2	1.000	1.000	7.874	1.968	1.48	0.571	AP... 1604	△
181061800	AP90 D1.25-W1.00/4.92-03-16	3	1.250	1.000	4.921	1.575	0.93	0.571	AP... 1604	◎
181061700	AP90 D1.25-W1.25/4.92-03-16	3	1.250	1.250	4.921	1.968	1.37	0.571	AP... 1604	◎
181062200	AP90 D1.25-W1.25/6.30-03-16	3	1.250	1.250	6.300	3.937	1.74	0.571	AP... 1604	◎
181062100	AP90 D1.25-W1.25/9.84-03-16	3	1.250	1.250	9.843	1.968	3.02	0.571	AP... 1604	◎
181062300	AP90 D1.50-W1.25/7.87-03-16	3	1.500	1.250	7.874	1.575	2.51	0.571	AP... 1604	◎
181062400	AP90 D1.50-W1.25/9.84-03-16	3	1.500	1.250	9.843	1.575	3.16	0.571	AP... 1604	◎

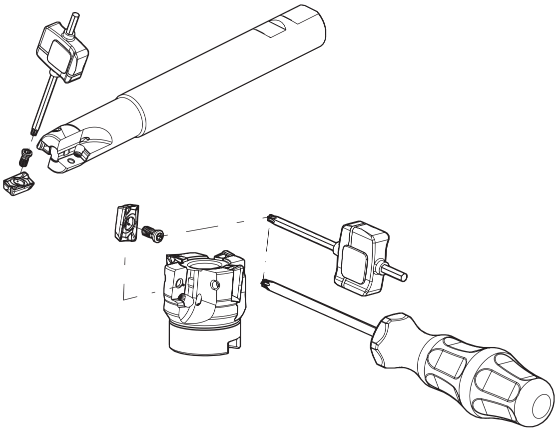
◎ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

△ Inventory maintained. To be replaced by new item. | Item em stock. Será substituido por novo item | Iten en stock. Será reemplezado por nuevo iten.

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
			 lbf/in	lbf/in
AP90-A-16 - 1.50-3.00	P0400900	XT15	DT1530	26.6
AP90-A-16 - 4.00-6.00	P0400900	PT15	DT1530	26.6
AP90-W-16 - 0.875-1.50	P0400900	XT15	DT1530	26.6



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

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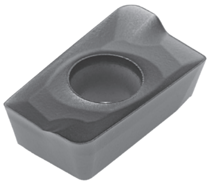
AP... 1604... ‖ Inserts | Pastilhas | Plaquitas

APKT - X

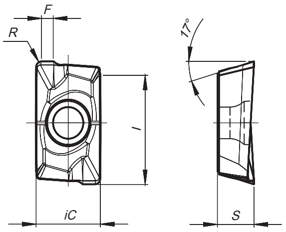


APKT - X1

APKT - X2

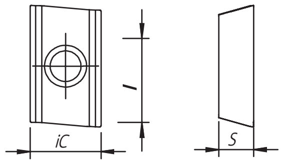
APKT - LN

APKT-X | X1 | X2 | LN



APHT - LN

APHT-LN



		P				M		K				N	Dimensions Dimensões Dimensiones (in)				
		PVD				PVD		PVD				UNC					
	(2) Grade code	68	G4	66	P3	66	P3	68	G4	66	P3	10					
(1) Geometry code	ISO Reference	PH6920	PH7920	PH6930	PH7930	PH6930	PH7930	PH6920	PH7920	PH6930	PH7930	PH0910	iC	S	l	R	F
1112159	APKT 160408 PDER-X1	●		◎		◎		●		◎			0.372	0.211	0.630	0.031	0.071
1112464	APKT 160408 PDER-X2		●		◎		◎		●		◎		0.372	0.211	0.630	0.031	0.071
1112158	APKT 160408 PDSR-X1	●		◎		◎		●		◎			0.372	0.211	0.630	0.031	0.071
1112367	APKT 160408 PDSR-X2		●		◎		◎		●		◎		0.372	0.211	0.630	0.031	0.071
1111923	APKT 160408 PDFR-LN											●	0.372	0.211	0.630	0.031	0.031
1111074	APKT 160416 PDER-X	●						●					0.372	0.211	0.630	0.063	0.047
1111050	APKT 160416 PDSR-X	●		◎				●		◎			0.372	0.211	0.630	0.063	0.047
1111075	APKT 160432 PDER-X*	●						●					0.372	0.211	0.630	0.126	-
1111052	APKT 160432 PDSR-X*	●						●					0.372	0.211	0.630	0.126	-
1111924	APHT 1604 PDFR-LN											●	0.372	0.211	0.630	-	-

● First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

*For inserts with radius above 0.079 in, the cutter must be adjusted

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LINEPRO AP90-16

APKT | APHT

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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance PH0910 ●	 PH7(6)920 ◉	 Toughness → 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

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

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application 1st choise	 Dificult 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

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LINEPRO AP90-16

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM) ← Wear Resistance		Toughness →
				PH0910	PH7(6)920	PH7(6)930
P	1	Unalloyed Steel	125-220	-	590-788	525-722
	2	Low-Alloyed Steel	220-280	-	525-722	460-656
	3	High-Alloyed Steel	280-380	-	460-690	394-624
M	4	SS - Ferritic / Martensitic	200-330	-	460-722	460-656
	5	SS - Austenitic	200-330	-	426-590	394-525
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	394-525	328-460
K	7	Malleable Cast Iron	130-230	-	525-854	492-788
	8	Grey Cast Iron	180-245	-	460-788	460-755
	9	Nodular Cast iron	160-250	-	394-656	328-624
N	10	Aluminium and Non Ferrous	30-130	328-6560	-	-

ISO	PSM	Material	HB (Brinell)	Feed fz (in/t)		
				APKT 16... PDER-X/X2	APKT 16... PDS(T)R-X/X2	AP..T 16... PDFR-LN
P	1	Unalloyed Steel	125-220	0.003-0.006	0.004-0.010	-
	2	Low-Alloyed Steel	220-280	0.003-0.004	0.004-0.008	-
	3	High-Alloyed Steel	280-380	0.003-0.004	0.004-0.008	-
M	4	SS - Ferritic / Martensitic	200-330	0.003-0.004	-	-
	5	SS - Austenitic	200-330	0.003-0.004	-	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	0.003-0.004	-	-
K	7	Malleable Cast Iron	130-230	0.003-0.006	0.004-0.010	-
	8	Grey Cast Iron	180-245	0.003-0.006	0.004-0.010	-
	9	Nodular Cast iron	160-250	-	0.004-0.008	-
N	10	Aluminium and Non Ferrous	30-130	-	-	0.003-0.008

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

Operation	a_e	Vc & fz	a_p (in)
Slotting	100%	<20%	0.197-0.236
Shouldering	<50%	>8%	0.236-0.354
	≤25%	>12%	0.393-0.472

(Note 3) Cutting conditions should be adjusted according to the machine and work rigidity.
(Note 4) It's possible to occur vibrations in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:

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

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Technical Data
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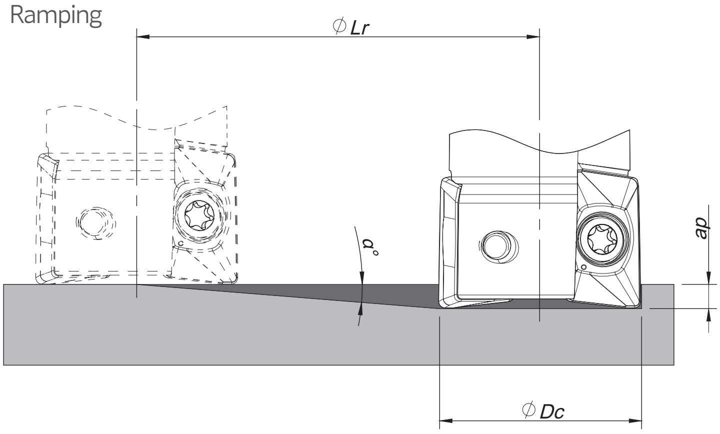
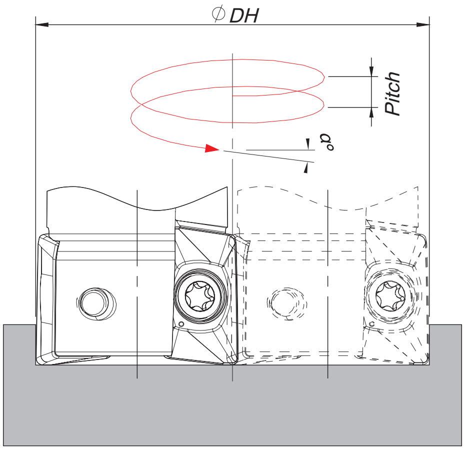
RAMPING AND HELICAL INTERPOLATION

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

Ramping



Helical
Interpolation



Blind hole
Flat bottom

Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
				Diameter for Blind Hole, Flat Bottom Face (1)		Max Pitch/Rev.
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	
0.875	3.4	0.571	9.611	1.596 -	- 1.671	0.134 0.148
1.000	3.0	0.571	10.895	1.846 -	- 1.921	0.139 0.151
1.250	2.1	0.571	15.572	2.346 -	- 2.421	0.126 0.134
1.500	1.6	0.571	20.442	2.846 -	- 2.921	0.118 0.124
2.000	1.1	0.571	29.738	3.846 -	- 3.921	0.111 0.115
2.500	0.85	0.571	38.486	4.846 -	- 4.921	0.109 0.112
3.000	0.70	0.571	46.735	5.846 -	- 5.921	0.100 0.110
4.000	0.50	0.571	65.430	7.846 -	- 7.921	0.100 0.100
5.000	0.35	0.571	93.473	9.846 -	- 9.921	0.093 0.094

(1) Using insert radius 0.031 in
Note: During helical interpolation do not exceed maximum pitch
When using different insert radius to calculate the ØDHmin and ØDHmax use the equation below:
- Minimum Diameter: ØDHmin = 2 x (ØDc - (R corner radius + F width of edge wiper))
- Maximum Diameter: ØDHmax = 2 x (ØDc - R corner radius)

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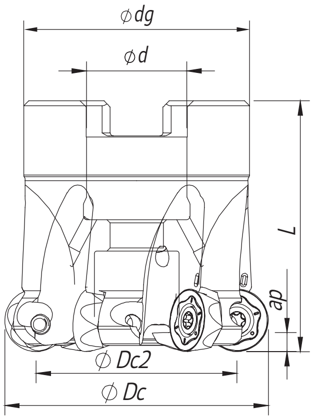
TOROMILL RP90-10 | RP90-12 | RP90-16

Arbor Mounting

$\gamma_p = +5°$

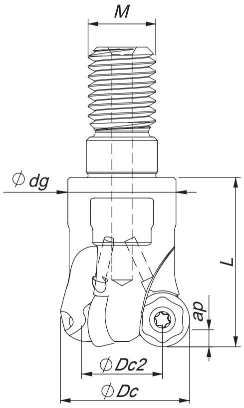


Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)					lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	ØDc2	Ød/M	Ødg	L		Arbor Type	Ap max (in)		
	RP90-10											
181141600	RP90 D1.50-A.500/1.75-05-10	5	1.500	1.110	0.500	1.420	1.750	0.31	A	0.197	RP...10T3 M0E	○
181141700	RP90 D2.00-A.750/1.75-06-10	6	2.000	1.610	0.750	1.750	1.750	0.57	A	0.197	RP...10T3 M0E	◎
	RP90-12											
181142300	RP90 D2.00-A.750/1.75-05-12	5	2.000	1.530	0.750	1.750	1.750	0.44	A	0.236	RP...1204 M0E	◎
181142400	RP90 D2.50-A1.00/2.00-06-12	6	2.500	2.030	1.000	2.250	2.000	0.79	A	0.236	RP...1204 M0E	○
181142500	RP90 D3.00-A1.00/2.00-07-12	7	3.000	2.530	1.000	2.250	2.000	1.50	A	0.236	RP...1204 M0E	◎
181142600	RP90 D4.00-A1.25/2.00-10-12	10	4.000	3.530	1.250	2.750	2.000	1.87	A	0.236	RP...1204 M0E	○
	RP90-16											
181142700	RP90 D3.00-A1.00/2.00-06-16	6	3.000	2.370	1.000	2.250	2.000	1.87	A	0.315	RP...1605 M0E	◎
181142800	RP90 D5.00-A1.50/2.00-08-16	8	5.000	4.370	1.500	3.750	2.000	4.67	A	0.315	RP...1605 M0E	○

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

Threaded Coupling

$\gamma_p = +5°$



Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	ØDc2	Ød/M	L		Ap max (in)		
	RP90-10									
181142100	RP90 D1.00-R-12/1.25-03-10	3	1.000	0.610	M12	1.250	0.42	0.197	RP...10T3 M0E	○
181142200	RP90 D1.50-R-16/1.75-05-10	5	1.500	1.110	M16	1.750	0.68	0.197	RP...10T3 M0E	○

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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TOROMILL RP90-10 | RP90-12 | RP90-16

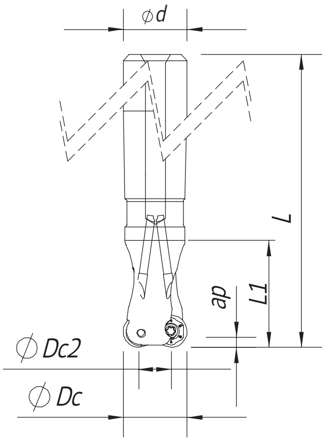
RDHT | RPHT

Profiling Copying Facing Slotting Ramp down Helical Interpolation

A
MILLING
News & Features
Overview
Face milling
Hifeed milling
Shoulder milling
Profile milling
Hardmill
Center & Chamfer
Engraving
Spare Parts
Technical Data

Cylindrical Shank

$\gamma_p = +5°$



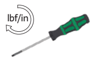
Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)					lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	ØDc2	Ød/M	L	L1		Ap max (in)		
RP90-10											
181141800	RP90 D1.00-W1.00/4.50-03-10	3	1.000	0.610	1.000	4.500	2.250	0.75	0.197	RP...10T3 M0E	○
181141900	RP90 D1.25-W1.25/5.25-04-10	4	1.250	0.860	1.250	5.250	2.750	1.23	0.197	RP...10T3 M0E	○
181142000	RP90 D1.50-W1.25/6.00-05-10	5	1.500	1.110	1.250	6.000	3.250	1.65	0.197	RP...10T3 M0E	○

Stock item | Produto de stock | Itens de stock

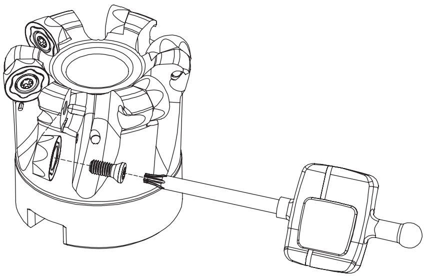
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

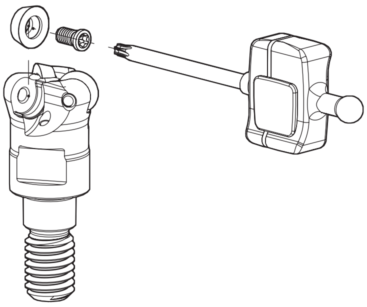
SPARE PARTS | Acessórios | Acessórios

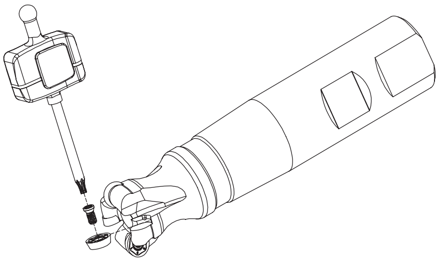
Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
				lbf/in
RP90-10 - 1.00-2.00	P0300800	XT09	DT0914	12.4
RP90-12 - 2.00-4.00	P0350800	XT15	DT1530	26.6
RP90-16 - 3.00-5.00	P0451100	XT20	DT2050	44.3

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.







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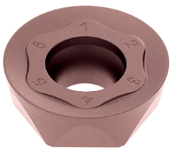
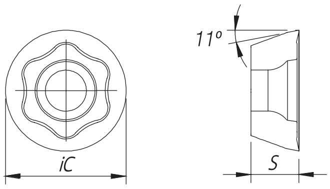
TOROMILL RP90-10 | RP90-12 | RP90-16

RPHT | Inserts | Pastilhas | Plaquitas

RPHT-MS

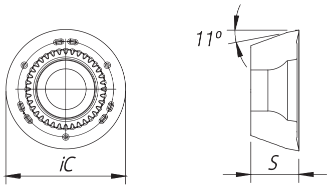


RPHT-MS



RPHT-LS NEW

RPHT-LS



		P				M				S			Dimensions Dimensões Dimensiones (in)	
		CVD	PVD			PVD				PVD				
	(2) Grade code	T9	T1	Z1	Z2	X9	Y2	Z2	Z3	X9	Y2	Z3		
(1) Geometry code	ISO Reference	PHS740	PHP920	PHP808	PHP530	PHH930	PHH808	PHP530	PHH530	PHH930	PHH808	PHH530	iC	S
1112253	RPHT 10T3 M0E-MS		◎			◎				◎			0.394	0.156
NEW 1112772	RPHT 10T3 M0E-LS	◎		◎	◉		◎	◎	◉		◎	◉	0.394	0.156
1112186	RPHT 1204 M0E-MS		◎			◎				◎			0.472	0.187
NEW 1112766	RPHT 1204 M0E-LS	◎		◎	◉		◎	◎	◉		◎	◉	0.472	0.187
1112254	RPHT 1605 M0E-MS		◎			◎				◎			0.630	0.219
1112951	RPHT 1605 M0E-LS			◎	◉		◎	◎	◉		◎	◉	0.630	0.219

◉ First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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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 (SFM) ← Wear Resistance						Toughness →
				PHP920	PHH930	PHP530	PHH530	PHP808	PHH808	PHS740
P	1	Unalloyed Steel	125-220	590-820	-	590-1115	-	590-1115	-	460-722
	2	Low-Alloyed Steel	220-280	525-755	-	590-1115	-	590-1115	-	394-656
	3	High-Alloyed Steel	280-380	460-722	-	590-1082	-	590-1082	-	328-624
M	4	SS - Ferritic / Martensitic	200-330	-	460-690	492-886	558-918		525-885	-
	5	SS - Austenitic	200-330	-	394-558	-	525-918		525-885	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	328-492	-	492-854		492-820	-
S	11	Heat Resistant Super Alloys	200-320	-	100-360	-	100-492		100-460	-

ISO	PSM	Material	HB (Brinell)	Feed fz (in/t)		
				RPHT 10...	RPHT 12...	RPHT 16...
P	1	Unalloyed Steel	125-220	0.002-0.016	0.002-0.018	0.003-0.022
	2	Low-Alloyed Steel	220-280	0.002-0.016	0.002-0.018	0.003-0.022
	3	High-Alloyed Steel	280-380	0.002-0.014	0.002-0.016	0.003-0.02
M	4	SS - Ferritic / Martensitic	200-330	0.002-0.012	0.002-0.014	0.003-0.018
	5	SS - Austenitic	200-330	0.002-0.012	0.002-0.014	0.003-0.018
	6	SS - Austenitic-ferritic (Duplex)	230-260	0.002-0.012	0.002-0.014	0.003-0.018
S	11	Heat Resistant Super Alloys	200-320	0.002-0.010	0.002-0.012	0.003-0.014

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

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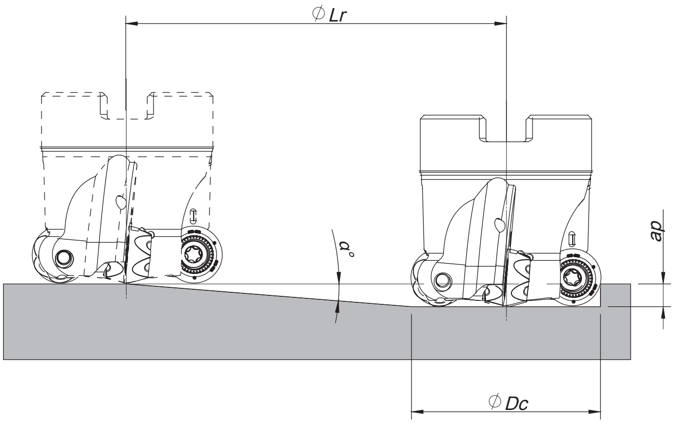
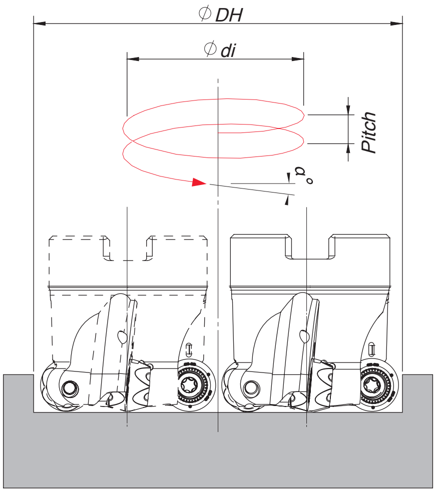
TOROMILL RP90-10 | RP90-12 | RP90-16

RAMPING AND HELICAL INTERPOLATION

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





Blind hole

Flat bottom

Ødi = ØDH - ØDc

Insert	ØDc	Ramping			Helical Interpolation		
		Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
RP90-10							
RP... 10	1.00	6	0.197	1.874	1.606 -	- 2.0	0.197 0.197
	1.25	6	0.197	1.874	2.106 -	- 2.5	0.197 0.197
	1.50	5	0.197	2.252	2.606 -	- 3.0	0.197 0.197
	2.00	4	0.197	2.817	3.606 -	- 4.0	0.197 0.197
RP90-12							
RP... 12	2.00	3.5	0.236	3.859	3.528 -	- 4.0	0.236 0.236
	2.50	2.5	0.236	5.405	4.528 -	- 5.0	0.236 0.236
	3.00	2	0.236	6.758	5.528 -	- 6.0	0.236 0.236
	4.00	1.5	0.236	9.012	7.528 -	- 8.0	0.236 0.236
RP90-16							
RP... 16	3.00	3	0.315	6.011	5.370 -	- 6.0	0.315 0.315
	5.00	2.5	0.315	7.215	9.370 -	- 10.0	0.315 0.315

Note: During helical interpolation do not exceed max Pitch.

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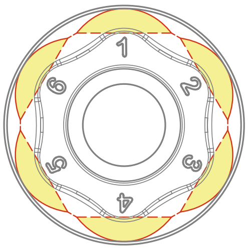
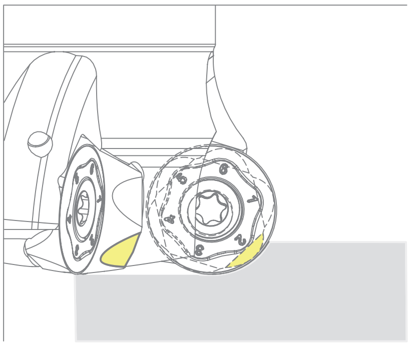
INSERT INFORMATION | Informação de pastilha | Información del inserto

The maximum depth of cut using 6 cutting edges

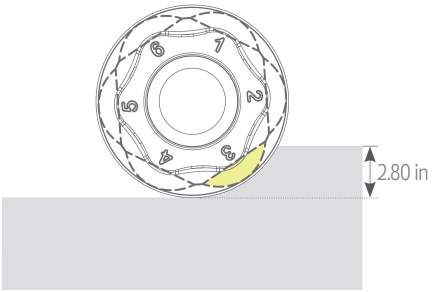


6 cutting edges



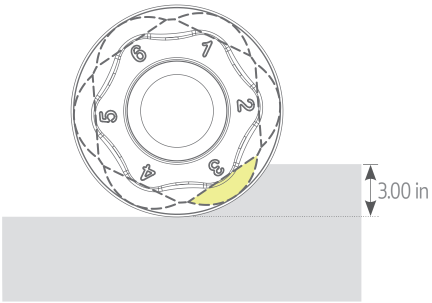
TOROMILL RP90-10

RPHT 10T3...



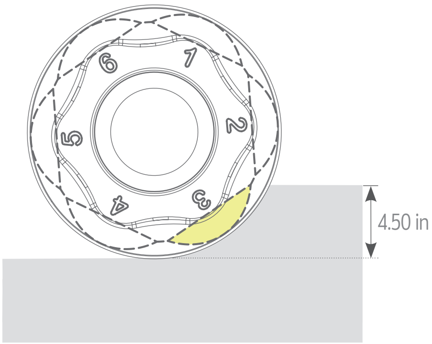
TOROMILL RP90-12

RPHT 1204...



TOROMILL RP90-16

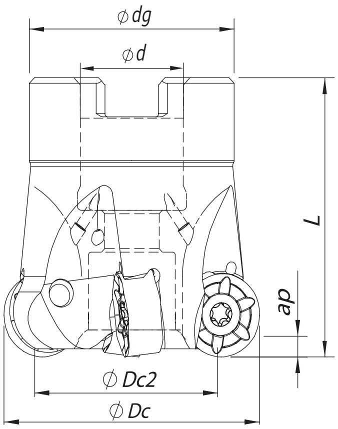
RPHT 1605...



TOROMILL RN90-12

Arbor Mounting

γ_p=-7°

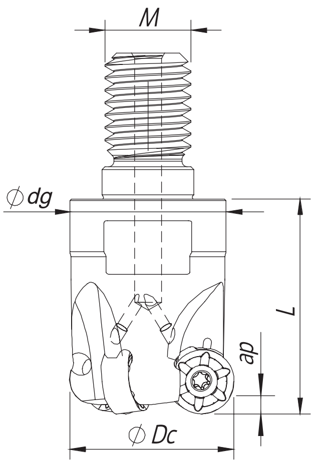


Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)					lbs	Specifications		Insert Pastilha Inserto	Stock
			ØDc	ØDc2	Ød/M	Ødg	L		Arbor Type	Ap max (in)		
181142900	RN90 D1.50-A0.50/1.57-04-12	4	1.500	1.030	0.500	1.300	1.570	0.44	A	0.118	RNHX 1204 M0E...	○
181143000	RN90 D2.00-A0.75/2.00-05-12	5	2.000	1.530	0.750	1.750	2.000	0.55	A	0.118	RNHX 1204 M0E...	○
181143100	RN90 D2.50-A0.75/2.00-06-12	6	2.500	2.030	0.750	1.750	2.000	1.21	A	0.118	RNHX 1204 M0E...	○
181143200	RN90 D3.00-A1.00/2.00-07-12	7	3.000	2.530	1.000	2.189	2.000	1.72	A	0.118	RNHX 1204 M0E...	○

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

Threaded Coupling

γ_p=-7°



Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)		
181143400	RN90 D1.25-R-M16/1.50-03-12	3	1.250	M16	1.142	1.500	0.35	0.118	RNHX 1204 M0E...	○
181143500	RN90 D1.50-R-M16/1.50-04-12	4	1.500	M16	1.142	1.500	0.44	0.118	RNHX 1204 M0E...	○

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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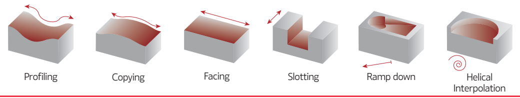
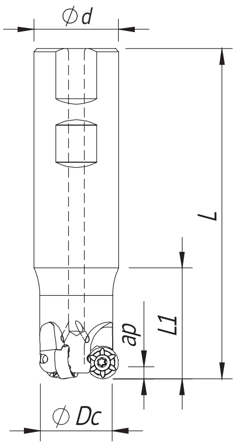


Weldon Shank

γ_p=-7°

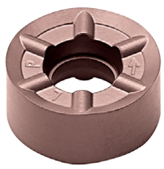


Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)				lbs	Specifications	Insert Pastilha Inserto	Stock
			ØDc	Ød/M	L	L1		Ap max (in)		
181143300	RN90 D1.25-W1.00/4.28-03-12	3	1.250	1.000	4.280	2.117	2.16	0.118	RNHX 1204 M0E...	○

◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

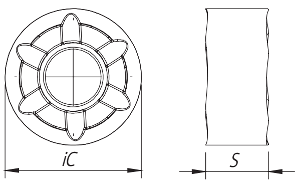
RNHX 1204... | Inserts | Pastilhas | Plaquitas

RNHX-LP



RNHX-MP

RNHX-LP | MP



		P			M			K		S		Dimensions Dimensões Dimensiones (in)	
		PVD			PVD			PVD		PVD			
	(2) Grade code	T1	P4	Z2	X9	Z2	Z3	T1	P4	X9	Z3		
(1) Geometry code	ISO Reference	PHP920	PHP930	PHP530	PHH930	PHP530	PHH530	PHP920	PHP930	PHH930	PHH530	IC	S
1112030	RNHX 1204 M0E-LP	◉		◎	◉	◎	◎	◎		◉	◎	0.472	0.187
1112052	RNHX 1204 M0E-MP	◉	◎					◉	◎			0.472	0.187

◉ First choice | Primeira opção | 1ª opción ◎ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17) **Insert order code** = (1) Geometry Code + (2) Grade Code

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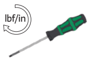
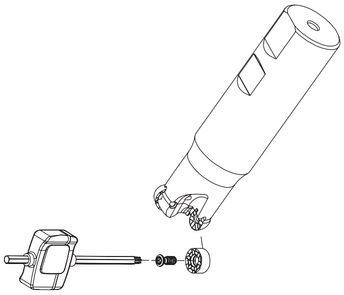
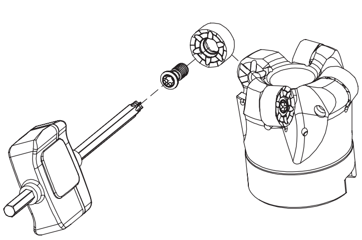
TOROMILL RN90-12

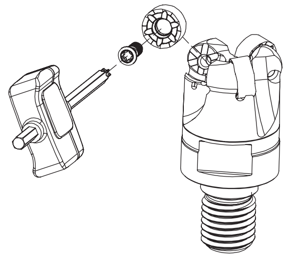
SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
				lbf/in
RN90-A-12 - 1.50-3.00	P0401065	XT15	DT1530	26.6
RN90-R-12 - 1.25-1.50	P0401065	XT15	DT1530	26.6
RN90-W-12 - 1.25	P0401065	XT15	DT1530	26.6

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.







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

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance PHP920 ◉	Toughness → 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 (SFM) ← Wear Resistance PHP920	 PHP930	 PHH930	 Toughness → PHP530	 PHH530	Feed fz (in/t) RNHX 12... LP	 RNHX 12... MP
P	1	Unalloyed Steel	125-220	590-820	525-755	-	590-1115	-	0.006-0.018	0.006-0.020
	2	Low-Alloyed Steel	220-280	525-755	460-690	-	590-1115	-	0.006-0.018	0.006-0.020
	3	High-Alloyed Steel	280-380	460-722	394-656	-	590-1082	-	0.006-0.018	0.006-0.018
M	4	SS - Ferritic / Martensitic	200-330	-	-	460-690	492-886	558-918	0.004-0.014	-
	5	SS - Austenitic	200-330	-	-	394-558	-	525-918	0.004-0.014	-
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	328-492	-	492-854	0.004-0.014	-
K	7	Malleable Cast Iron	130-230	525-886	492-820	-	-	-	-	0.006-0.022
	8	Grey Cast Iron	180-245	460-820	460-755	-	-	-	-	0.006-0.022
	9	Nodular Cast iron	160-250	394-690	328-656	-	-	-	-	0.006-0.020
S	11	Heat Resistant Super Alloys	200-320	-	-	100-360	-	100-492	0.002-0.012	-

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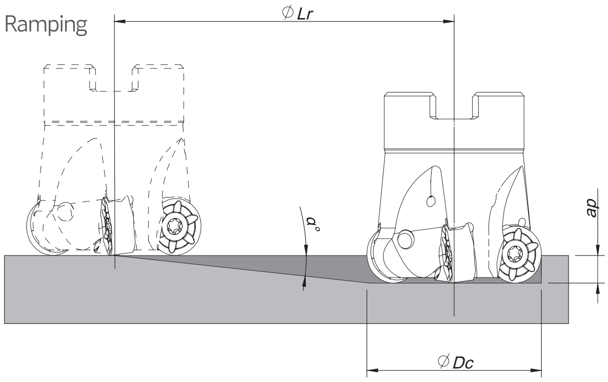
CHIPBREAKER SELECTION GUIDE | Guia para aplicações do quebra-aparas | Guía para aplicación del rompevirutas

ISO	PSM	Material	HB (Brinell)	Chipbreaker Application	
				1st choise	Dificult 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	-
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	LP	-

RAMPING | Descida em rampa | Bajada en rampa



Insert	ØDc	Ramping		
		Max Ramp a°	Max a_p	Min Lr
RNHX 1204	1.25	1.0	0.118	6.8
	1.50	0.8	0.118	8.5
	2.00	0.8	0.118	8.5
	2.50	0.6	0.118	11.3
	3.00	0.5	0.118	13.5

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W-PRO 62090

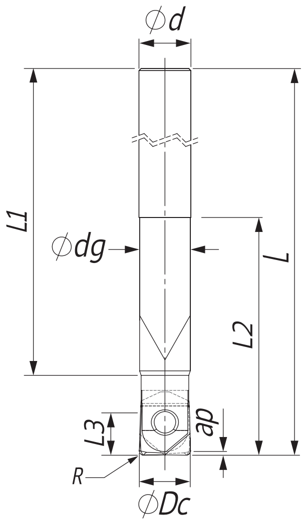
NEW

METRIC LINE

Proprietary milling line

Cylindrical Carbide Shank

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

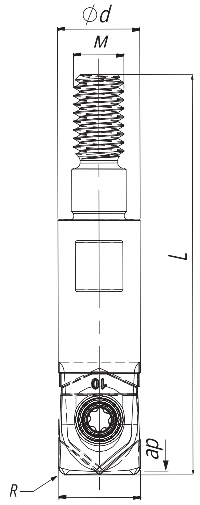


Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (mm) ØDc	Ød	Ødg	L	L1	L2	Kg	Specifications Ap max (mm)		Ae max (mm)		Insert	Stock
181156600	008E62090-02-U008140	2	8	8	7,7	140	128	35	0,09	4,0	2,5	0,8	0,8	WCR 08../WCL 08...	◉
181156700	010E62090-02-U010150	2	10	10	9,7	150	136	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	166	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	147	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	182	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	180	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	230	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	193	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	223	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	273	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-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

Threaded Steel Shank

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



Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (mm) ØDc	R	Ød	L	M	Kg	Specifications Ap max (mm)		Ae max (mm)		Insert	Stock
181167000	010R62090-02-UM06030	2	10	5	6,5	30	M6	0,011	5	3,0	1,0	1,0	WCR 10.../WCL 10...	◉
181167100	012R62090-02-UM06030	2	12	6	6,5	30	M6	0,016	6	4,0	1,2	1,2	WCR 12.../WCL 12...	◉
181167200	016R62090-02-UM08030	2	16	8	8,5	30	M8	0,028	8	5,0	1,6	1,6	WCR 16.../WCL 16...	◉
181167300	020R62090-02-UM10035	2	20	10	10,5	35	M10	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-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

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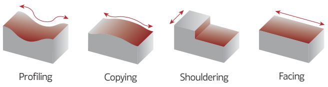
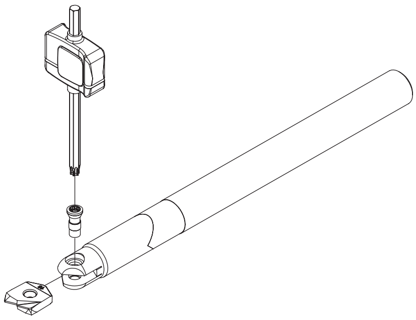


SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
			lbf/in 	lbf/in
E62090 - 8	P0300726	XT08	DT0812	23.4
E62090 - 10	P0350825	XT10	DT1020	39.0
E62090 - 12	P0501025	XT20	DT2050	97.6
E62090 - 16	P0501326	XT20	DT2050	97.6
E62090 - 20	P0601725	XT25	-	134.7



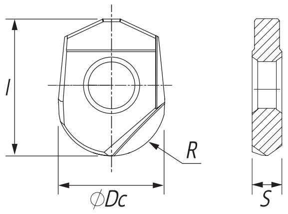
Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

WCR | Inserts | Pastilhas | Plaquitas

WCR NEW

PHH
NEW
GRADE

WCR



		P		M		K		H		Dimensions Dimensões Dimensiones (mm)			
		PVD		PVD		PVD		PVD					
	(2) Grade code	X4	X6	X4	X6	X4	X6	X4	X6				
(1) Geometry code	ISO Reference	PHH603	PHH910	PHH603	PHH910	PHH603	PHH910	PHH603	PHH910	l	R	S	Dc
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 | Primeira opção | 1ª opción
◎ Stock item | Produto de stock | Itens de stock
○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)
Insert order code = (1) Geometry Code + (2) Grade Code

PDF

VIDEO

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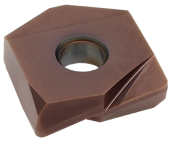
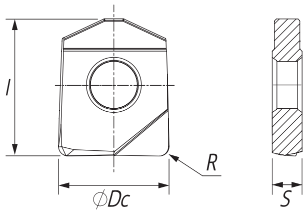
WCL ‖ Inserts | Pastilhas | Plaquitas

WCL NEW



PHH
NEW
GRADE

WCL



		P		M		K		H		Dimensions Dimensões Dimensiones (mm)			
		PVD		PVD		PVD		PVD					
	(2) Grade code	X4	X6	X4	X6	X4	X6	X4	X6				
(1) Geometry code	ISO Reference	PHH603	PHH910	PHH603	PHH910	PHH603	PHH910	PHH603	PHH910	l	R	S	Dc
1112879	WCL-08 R0.3	◎	◉	◎	◉	◎	◉	◉	◎	9,7	0,3	2,1	8
1112880	WCL-08 R0.5	◎	◉	◎	◉	◎	◉	◉	◎	9,7	0.5	2,1	08
1112853	WCL-08 R1.0	◎	◉	◎	◉	◎	◉	◉	◎	9,7	1.0	2,1	08
1112881	WCL-10 R0.3	◎	◉	◎	◉	◎	◉	◉	◎	12,0	0.3	2,7	10
1112882	WCL-10 R0.5	◎	◉	◎	◉	◎	◉	◉	◎	12,0	0.5	2,7	10
1112848	WCL-10 R1.0	◎	◉	◎	◉	◎	◉	◉	◎	12,0	1.0	2,7	10
1112883	WCL-10 R1.5	◎	◉	◎	◉	◎	◉	◉	◎	12,0	1.5	2,7	10
1112884	WCL-10 R2.0	◎	◉	◎	◉	◎	◉	◉	◎	12,0	2.0	2,7	10
1112885	WCL-12 R0.3	◎	◉	◎	◉	◎	◉	◉	◎	14,6	0.3	3,2	12
1112886	WCL-12 R0.5	◎	◉	◎	◉	◎	◉	◉	◎	14,6	0.5	3,2	12
1112096	WCL-12 R1.0	◎	◉	◎	◉	◎	◉	◉	◎	14,6	1.0	3,2	12
1112887	WCL-12 R1.5	◎	◉	◎	◉	◎	◉	◉	◎	14,6	1.5	3,2	12
1112888	WCL-12 R2.0	◎	◉	◎	◉	◎	◉	◉	◎	14,6	2.0	3,2	12
1112889	WCL-12 R3.0	◎	◉	◎	◉	◎	◉	◉	◎	14,6	3.0	3,2	12
1112890	WCL-16 R0.3	◎	◉	◎	◉	◎	◉	◉	◎	16,6	0.3	4,2	16
1112891	WCL-16 R0.5	◎	◉	◎	◉	◎	◉	◉	◎	16,6	0.5	4,2	16
1112097	WCL-16 R1.0	◎	◉	◎	◉	◎	◉	◉	◎	16,6	1.0	4,2	16
1112892	WCL-16 R1.5	◎	◉	◎	◉	◎	◉	◉	◎	16,6	1.5	4,2	16
1112893	WCL-16 R2.0	◎	◉	◎	◉	◎	◉	◉	◎	16,6	2.0	4,2	16
1112894	WCL-16 R3.0	◎	◉	◎	◉	◎	◉	◉	◎	16,6	3.0	4,2	16
1112895	WCL-20 R0.3	◎	◉	◎	◉	◎	◉	◉	◎	20,0	0.3	5,2	20
1112896	WCL-20 R0.5	◎	◉	◎	◉	◎	◉	◉	◎	20,0	0.5	5,2	20
1112098	WCL-20 R1.0	◎	◉	◎	◉	◎	◉	◉	◎	20,0	1.0	5,2	20
1112897	WCL-20 R1.5	◎	◉	◎	◉	◎	◉	◉	◎	20,0	1.5	5,2	20
1112898	WCL-20 R2.0	◎	◉	◎	◉	◎	◉	◉	◎	20,0	2.0	5,2	20
1112899	WCL-20 R3.0	◎	◉	◎	◉	◎	◉	◉	◎	20,0	3.0	5,2	20

◉ First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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

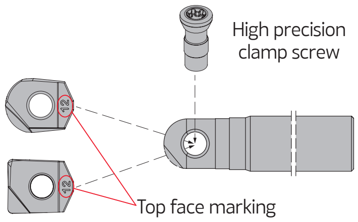
ISO	PSM	Material	HB (Brinell)	Grades	
				← Wear Resistance	Toughness →
				PHH603	PHH910
				●	◐
P	1	Unalloyed Steel	125-220	✓	✓
	2	Low-Alloyed Steel	220-280	✓	✓
	3	High-Alloyed Steel	280-380	✓	✓
M	4	SS - Ferritic / Martensitic	200-330	✓	✓
	5	SS - Austenitic	200-330	✓	✓
	6	SS - Austenitic-ferritic (Duplex)	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 (SFM)		Feed fz (in/t)	
				← Wear Resistance	Toughness →		
				PHH603	PHH910	WCR	WCL
P	1	Unalloyed Steel	125-220	591-1017	460-886	0.006-0.018	0.004-0.012
	2	Low-Alloyed Steel	220-280	591-984	460-853	0.006-0.016	0.004-0.010
	3	High-Alloyed Steel	280-380	591-919	460-722	0.004-0.016	0.004-0.010
M	4	SS - Ferritic / Martensitic	200-330	558-984	427-853	0.006-0.014	0.004-0.010
	5	SS - Austenitic	200-330	525-952	394-820	0.006-0.014	0.004-0.010
	6	SS - Austenitic-ferritic (Duplex)	230-260	492-886	361-755	0.006-0.012	0.004-0.008
K	7	Malleable Cast Iron	130-230	656-1247	591-1214	0.004-0.020	0.004-0.014
	8	Grey Cast Iron	180-245	591-1181	591-1148	0.004-0.018	0.004-0.012
	9	Nodular Cast iron	160-250	525-1017	525-952	0.004-0.016	0.004-0.012
H	12	Hardened Steels	46-54 HRC	296-886	263-853	0.002-0.008	0.002-0.006
	13	Hardened Steels	55-62 HRC	263-656	230-591	0.002-0.006	0.002-0.005
	14	Hardened Steels	63-70 HRC	230-591	230-525	0.002-0.005	0.002-0.004

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. Unsufficient 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.

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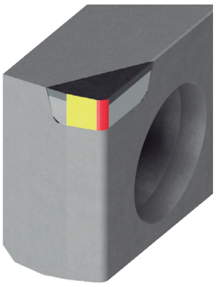
HARDMILL XN90-12

INSERTS CODIFICATION SYSTEM | Sistema de codificação de pastilhas | Sistema de codificación de insertos

ISO CODE	Insert size (mm)	Insert thickness (mm)	Insert radius (mm)	Cutting edge position angle	Cutting edge relief angle	Cutting edge conditions	Cut direction		Wiper edge lenght (mm)	Máx. Ap (mm)
XNHW	12	05	04	P	Z	F	R	-	015	030

PCD RANGE | Gama de produtos PCD | Rango de productos PCD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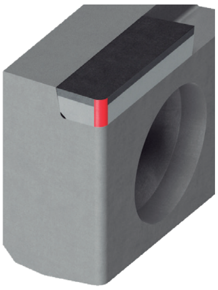
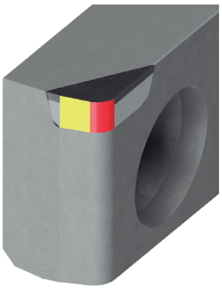
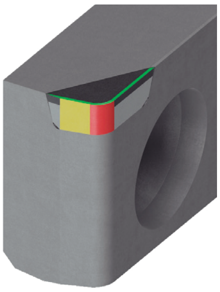
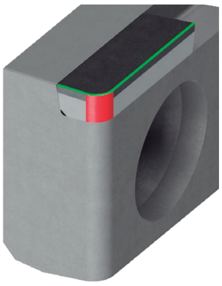

XNHW 120504 PZFR-000080


XNHW 120508 PZFR-015045


XNHW 120508 PZTR-015045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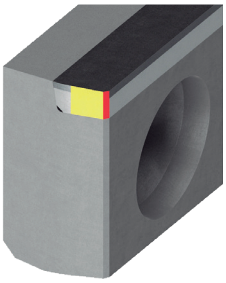
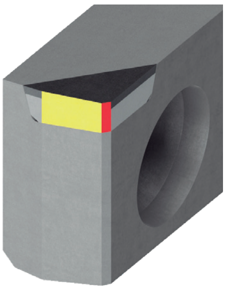
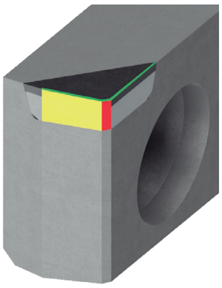

XNHW 1205 PZFR-020120


XNHW 1205 PZFR-030045


XNHW 1205 PZTR-030045

🟥 Cutting edge Type (radius, chamfer)

🟨 Wiper cutting edge

🟩 Edge Preparation (F, T)

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HARDMILL

PCD

XNHW 1205
PZFR-020120

XNHW 120508
PZTR-000080

XNHW 120508
PZTR-015045

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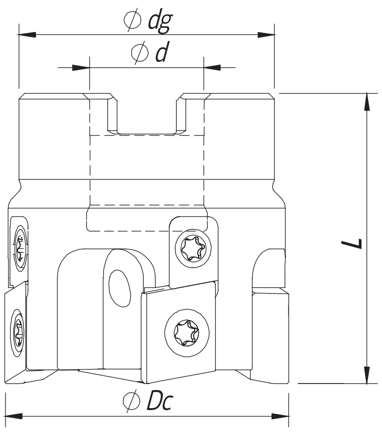
HARDMILL XN90-12



Arbor Mounting

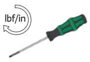
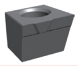
$\kappa_r=90°$ | $\gamma_p=0°$

Order code Código	Reference Referência Referencia		Dimensions | Dimensões | Dimensiones (in)					Specifications		Insert Pastilha Inserto	Stock
			ØDc	Ød	Ødg	L	lbs	Arbor Type	N max (in)		
181143600	XN90 D1.50-A0.50/1.57-04-12	4	1.500	0.500	1.300	1.570	0.66	A	32 000	XNHW 1205...	○
181143700	XN90 D2.00-A0.75/1.57-04-12	4	2.000	0.750	1.750	1.570	0.86	A	32 000	XNHW 1205...	○
181143800	XN90 D2.50-A0.75/1.57-05-12	5	2.500	0.750	1.750	1.570	1.39	A	29 000	XNHW 1205...	○
181143900	XN90 D3.00-A1.00/2.00-06-12	6	3.000	1.000	2.189	2.000	2.64	A	26 000	XNHW 1205...	○
181144000	XN90 D4.00-A1.25/2.00-07-12	7	4.000	1.250	2.750	2.000	4.08	A	24 000	XNHW 1205...	○

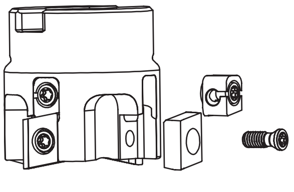
Stock item | Produto de stock | Itens de stock

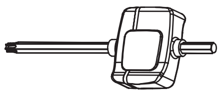
○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value	Wedge
				lbf/in	
XN90-A-12 - 1.50-4.00	P0401100	XT15	DT1530	26.6	SETDEV AS 04 00

Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.





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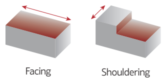
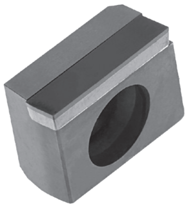
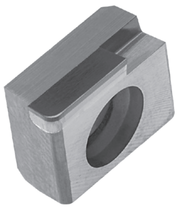


XNHW 1205... | Inserts | Pastilhas | Plaquitas

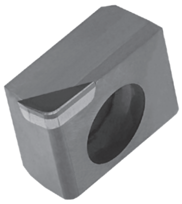
XNHW 1205 PZFR-020120



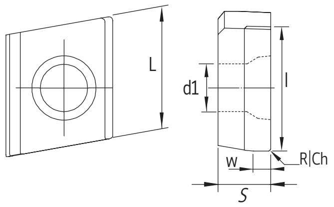
XNHW 120508 PZTR-000080



XNHW 120508 PZTR-015045



XNHW



		N		Dimensions Dimensões Dimensiones (in)					
		PCD							
	(2) Grade code	I3	D6						
(1) Geometry code	ISO Reference	PDP403	PDP410	L	S	l	d1	r	W
1112564	XNHW 120504 PZFR-015045	○	○	0.482	0.213	0.177	0.189	0.016	0.059
1112565	XNHW 120504 PZFR-000080	○	○	0.482	0.213	0.315	0.189	0.016	-
1112566	XNHW 120508 PZFR-015045	◎	○	0.482	0.213	0.177	0.189	0.031	0.059
1112551	XNHW 120508 PZTR-015045	◎	○	0.482	0.213	0.177	0.189	0.031	0.059
1112552	XNHW 120508 PZTR-000080	◎	○	0.482	0.213	0.315	0.189	0.031	-
1112553	XNHW 1205 PZFR-020120	◎	○	0.482	0.213	0.472	0.189	-	0.079
1112567	XNHW 1205 PZFR-030045	○	○	0.482	0.213	0.177	0.189	-	0.118
1112568	XNHW 1205 PZTR-030045	○	○	0.482	0.213	0.177	0.189	-	0.118

◉ First choice | Primeira opção | 1ª opción

◎ Stock item | Produto de stock | Itens de stock

○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17)

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

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

ISO	Material		HB (Brinell)	Vc (SFM)	Feed fz (in/t)
	Work piece material	Type of treatment / alloy		PDP403	XNHW 12...
N	Aluminium wrought alloys		80	984 - 13120	0.002 - 0.016
			90	984 - 4920	
	Aluminium cast alloys	< 12% Si	130	984 - 16400	
		< 12% Si	90	984 - 9840	
		> 12% Si	100	984 - 3280	
		brass, red bronze	100	328 - 2296	
		bronze	-	328 - 4920	
		lead-free copper and electrolytic copper	-	984 - 9840	
	Non-metallic materials	thermosetting plastics	-	263-984	
		fibre-reinforced plastics	200-320	263-984	
		hard rubber		263-984	

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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:

D	S	N	S	2	050	080	010	060
1	2	3	4	5	6	7	8	9

1 - Tool type

D - Diamond (PCD tipped)

2 - Design

B - Ball nose
S - Straight

3 - Application

N - Non-ferrous materials

4 - Length of Shank (mm)

S - Short length
L - Long length
XL - Extra long length

5 - Flutes number (Z)

Example: Z = 1 ; Z = 2 ; Z = 3

6 - Cutting diameter (ØDc - mm)

Example: 120 = 12,0 mm ; 008 = 0,8 mm

7 - Max cutting depth (mm)
(L2 - on straight flute solid carbide)

060 = 6 mm ; 080 = 8 mm

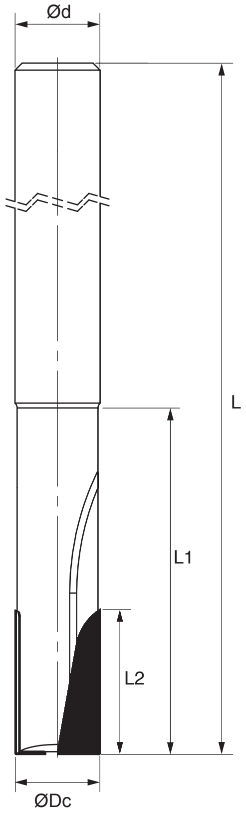
8 - Corner radius (mm) (Suppressed when it doesn't exist)

R... Example: R150 = 1,5 mm ; R015 = 0,15 mm

9 - Shank diameter (mm) (only on straight flute solid carbide)

Example: 060 = 6 mm

Straight Flute
technical drawing example



ØDc	Tool diameter
Ød	Shank diameter
L	Overall length
L1	Neck length
L2	Tip length
r	Corner form (radius or chamfer)

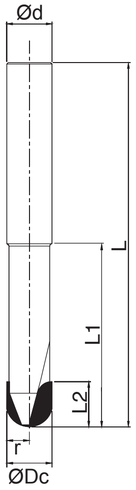
PCD TIPPED ENDMILLS

NEW

Fresas de metal duro com pontas de PCD | Fresas de carburo con puntas de PCD

HARDMILL BALL NOSE

NEW



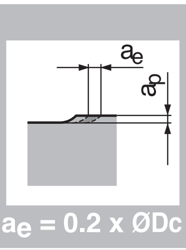
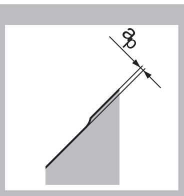
	$^{(2)}$ Grade code		N PCD D6	Dimensions | Dimensões | Dimensiones (mm)					
(1) Geometry code	Reference Referência Referencia	⌖	PDP410	ØDc	Ød	L	L1	L2	r
1180079	DBNS 1 030 050 150 060	1	◎	3	3	60	30	5	1,50
1180080	DBNS 1 040 100 200 040	1	◎	4	4	60	30	10	2,00
1180081	DBNS 2 060 100 300 060	2	◎	6	6	80	40	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_C (SFM)
Aluminium cast alloys 5% < Si ≤ 12%	1.6	2592-3280
Aluminium cast alloys 12% < Si	1.5	2592-3280
Fibre-reinforced synthetics	1.0	1312-1640
Graphite	1.0	2296-2788

ØD (in)	 $a_e = 0.2 \times ØDc$ $a_p = 0.1 \times ØDc$	 $a_p = 0.05 \times ØDc$
	f_z (in/t)	f_z (in/t)
0.118	0.001	0.001
0.157	0.001	0.001
0.236	0.001	0.002
0.315	0.002	0.002
0.394	0.002	0.003
0.472	0.003	0.003

Please note that the value fz from the table above must be multiplied with the corresponding correction factor.

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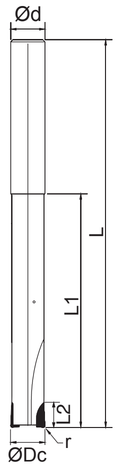
HARDMILL BULL NOSE

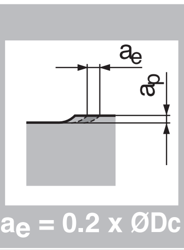
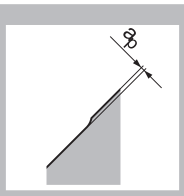
NEW



			N PCD	Dimensions | Dimensões | Dimensiones (mm)					
	[2] Grade code		D6						
[1] Geometry code	Reference Referência Referencia	⌖	PDP410	ØDc	Ød	L	L1	L2	r
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_C (SFM)
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

ØD	 $a_e = 0.2 \times ØDc$ $a_p = 0.1 \times ØDc$	 $a_p = 0.05 \times ØDc$
	f_z (in/t)	f_z (in/t)
0.118	0.001	0.001
0.157	0.001	0.001
0.236	0.001	0.002
0.315	0.002	0.002
0.394	0.002	0.003
0.472	0.003	0.003

Please note that the value fz from the table above must be multiplied with the corresponding correction factor.

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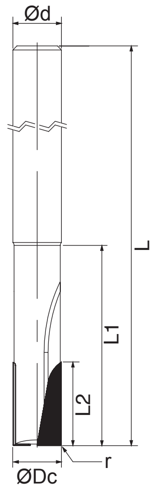
HARDMILL STRAIGHT EDGE

NEW



(1) Geometry code	(2) Grade code Reference Referência Referencia		N PCD D6 PDP410	Dimensions | Dimensões | Dimensiones (mm) ØDc	Ød	L	L1	L2	r
1180011	DSNS 2 040 060 010 060	2	◉	4	6	51	6,40	6	0,10
1180012	DSNS 2 050 080 010 060	2	◉	5	6	51	8,40	8	0,10
1180006	DSNS 2 060 080 010 060	2	◉	6	6	63	21	8	0,10
1180013	DSNS 2 080 080 010 080	2	◉	8	8	63	27	8	0,10
1180014	DSNS 2 080 120 010 080	2	◉	8	8	63	27	12	0,10
1180015	DSNS 2 100 080 010 100	2	◉	10	10	72	32	8	0,10
1180016	DSNS 2 100 160 010 100	2	◉	10	10	72	32	16	0,10
1180017	DSNS 2 120 080 010 120	2	◉	12	12	83	38	8	0,10
1180018	DSNS 2 120 160 010 120	2	◉	12	12	83	38	16	0,10
1180019	DSNS 3 140 080 010 140	3	◉	14	14	83	38	8	0,10
1180020	DSNS 3 140 160 010 140	3	◉	14	14	83	38	16	0,10
1180021	DSNS 3 160 120 010 160	3	◉	16	16	100	52	12	0,10
1180022	DSNS 3 160 200 010 160	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 | Materiais não ferrosos | Materiales no ferrosos

ISO	Workpiece Material	Vc (SFM)		fz (in/t)		Coolant
		min	max	min	max	
N	Aluminium <6%Si	656	19680	0.002	0.012	Emulsion / MQL
	Aluminium <12%Si	656	13120	0.002	0.010	
	Aluminium >12%Si	646	6560	0.002	0.008	
	Cooper/Cooper Alloys	820	9840	0.001	0.012	

SYNTHETICS MATERIALS | Materiais sintéticos | Materiales sintéticos

ISO	Workpiece Material	Vc (SFM)		fz (in/t)		Coolant
		min	max	min	max	
N	Graphit	492	8200	0.002	0.016	Dry/ Air
	GFRP, CFRP	656	9840	0.002	0.016	Dry/ Air
	Plastics (Termo/Duroplast)	328	8200	0.002	0.012	Emulsion/MQL
	Acrylic (PMMA)	328	3936	0.000	0.010	Emulsion /MQL
	Laminate	328	3936	0.001	0.020	Dry/Air

These recommended parameters are only approximate values. It can be necessary to adjust them regarding to the specific machining operation.

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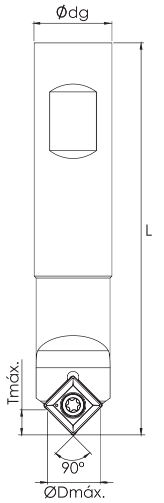


Order code Código	Reference Referência Referencia	⌖	Dimensions | Dimensões | Dimensiones (in)					lbs	Insert Pastilha Inserto	Stock
			ØMáx.	Tmáx.	Ødg	L	Angle º			
181147600	CHT S.625H N11-45	1	0.512	0.256	5/8	3.937	45	0.322	SO.. 11T3..	⊛
181147700	CHT S.625M N11-45	1	0.512	0.256	5/8	5.906	45	0.397	SO.. 11T3..	⊛

⊛ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-16) | Disponível sobre consulta (consulte a página A-16) | Disponible bajo consulta (mire pagina A-16)

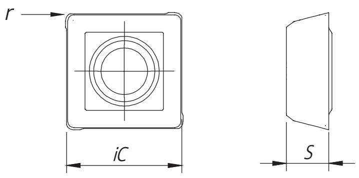
SO...T 11T3.. ‖ Inserts | Pastilhas | Plaquitas

SOMT

SOGT

NEW

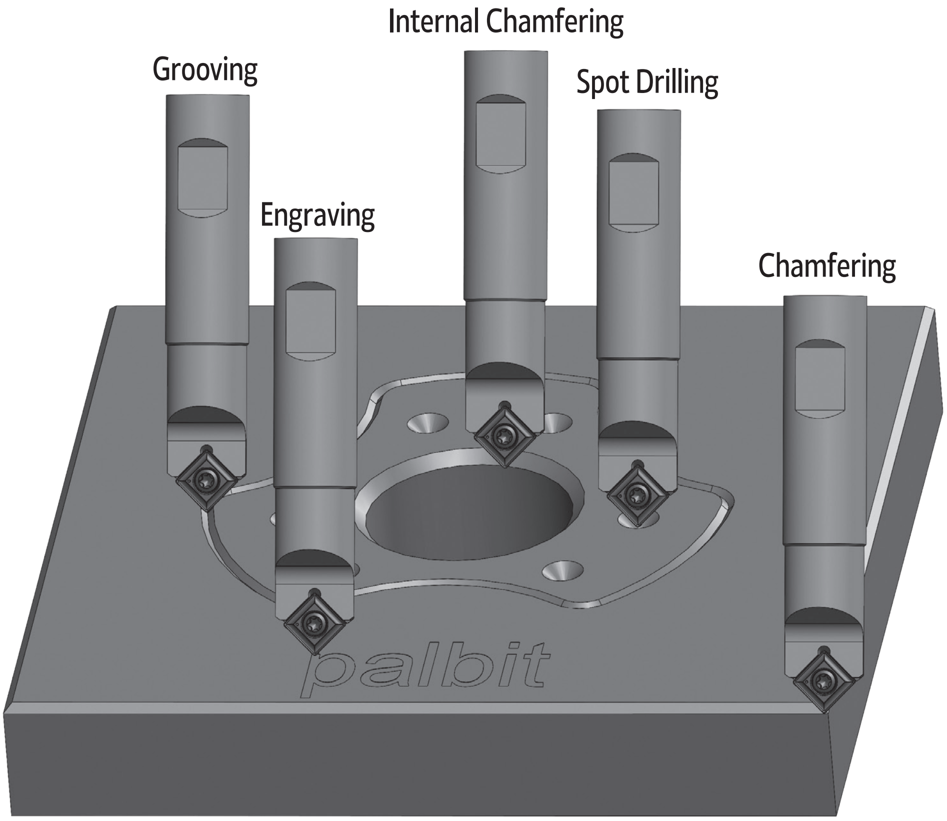
SOMT | SOGT



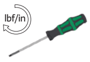
		P	M	K	Dimensions Dimensões Dimensiones (in)			
		PVD	PVD	PVD				
	(2) Grade code	G4	G4	G4				
(1) Geometry code	ISO Reference	PH7920	PH7920	PH7920	iC	S	l	r
1112425	SOMT 11T308	◉	⊛	◉	0.428	0.156	0.433	0.031
1112973	SOGT 11T303	⊛	◉	⊛	0.428	0.156	0.433	(0.012)

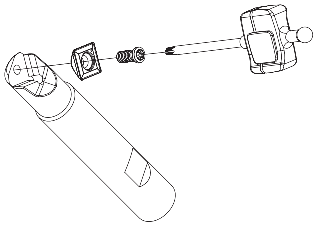
◉ First choice | Primeira opção | 1ª opción ⊛ Stock item | Produto de stock | Itens de stock ○ Available under request (see page A-17) | Disponível sobre consulta (consulte a página A-17) | Disponible bajo consulta (mire pagina A-17) **Insert order code** = (1) Geometry Code + (2) Grade Code

TOOL SELECTION | Selecção de ferramenta | Selección de herramienta



SPARE PARTS | Acessórios | Repuestos

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			Order separately lbf/in 	lbf/in
CHT S.625...	P0350800	XT15	DT1530	26.6



Note: The toolholder is supplied with the XT/PT key. To order the DT key please check the page A-231.
Check the procedures for the clamping screws on the page A-231.

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

ISO	PSM	Material	HB (Brinell)	Vc (SFM)	Feed fz (in/t)	
				PH7920	SOMT 11T308	SOGT 11T303
P	1	Unalloyed Steel	125-220	394-492	0.002-0.004	0.002-0.004
	2	Low-Alloyed Steel	220-280	328-394	0.002-0.003	0.002-0.004
	3	High-Alloyed Steel	280-380	197-328	0.002-0.003	0.002-0.004
M	4	SS - Ferritic / Martensitic	200-330	328-492	0.002-0.003	0.002-0.003
	5	SS - Austenitic	200-330	263-394	0.002-0.003	0.002-0.003
	6	SS - Austenitic-ferritic (Duplex)	230-260	164-296	0.002-0.003	0.002-0.004
K	7	Malleable Cast Iron	130-230	296-492	0.002-0.004	0.002-0.004
	8	Grey Cast Iron	180-245	263-394	0.002-0.004	0.002-0.004
	9	Nodular Cast iron	160-250	230-361	0.002-0.004	0.002-0.004

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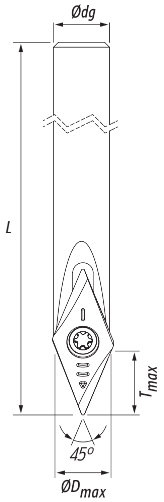
ENGRAVING 64067

NEW



Type A: Steel Shank
Type B: Carbide Shank

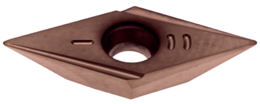
Order code Código	Reference Referência Referencia	⌖	Type	Dimensions | Dimensões | Dimensiones (mm)							Kg	Insert Pastilha Inserto	Stock
				ØDmin	ØDmax	Tmin	Tmax	Ødg	L	Angle º			
181168500	002E64067-01-10-U006040	1	A	0,45~0,65	2,10	0,05~0,20	2,00	6	40	45º	0,011	VPGT 0602...	◈
181168600	002E64067-01-10-U006060	1	B	0,45~0,65	2,10	0,05~0,20	2,00	6	60	45º	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	45º	0,050	VPGT 0602...	◈

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

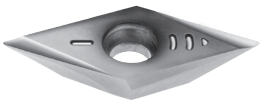
***Note:** Recommended only for non-ferrous materials machinning

VPGT 0602.. | Inserts | Pastilhas | Plaquitas

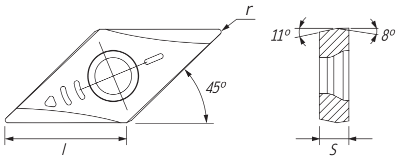
VPGT-45LM

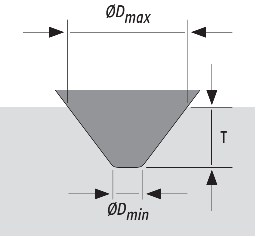


VPGT-45LN



VPGT-45LM | 45LN





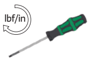
		P	M	N	S	Dimensions Dimensões Dimensiones (mm)						
		PVD	PVD	UNC	PVD							
	(2) Grade code	Y3	Y3	Z5	Y3							
(1) Geometry code	ISO Reference	PHH920	PHH920	PH0610	PHH920	l	S	r	ØDmin	ØDmax	Tmin	Tmax
1113054	VPGT 060202-45LM	◉	◉		◉	6,35	2,00	0,20	0,65	2,10	0,20	2,00
1113055	VPGT 060202-45LN			◉	○	6,35	2,00	0,20	0,45	2,10	0,05	2,00

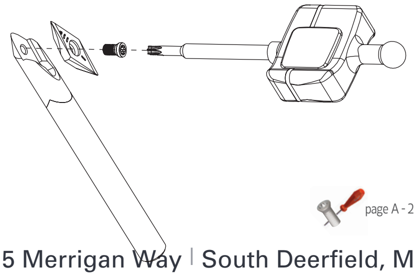
◉ First choice | Primeira opção | 1ª opción ◈ Stock item | Produto de stock | Itens de stock ○ Available under request | Disponível sobre consulta | Disponible bajo consulta

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

SPARE PARTS | Acessórios | Repuestos

Order separately

Cutter	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
				lbf/in
002E64067	P0220401	XT06	DT0606	5.3



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RECOMMENDED CONDITIONS | Condições recomendadas | Condiciones recomendables

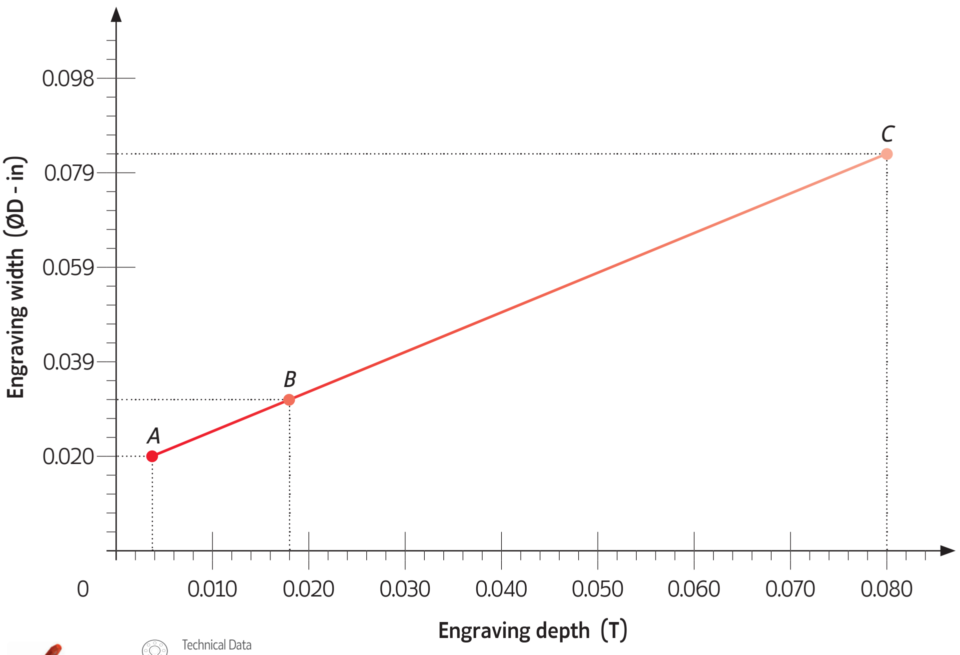
ISO	Material	n (RPM)	f (in/rev)	
			VPGT 060602-45LM	VPGT 060602-45LN
P	Carbon Steel	5 000 - 40 000	0.0003 - 0.002	-
	Alloy Steel	5 000 - 40 000	0.0003 - 0.001	-
M	SS - Austenitic	5 000 - 40 000	0.0003 - 0.002	-
N	Aluminium and Non Ferrous	5 000 - 40 000	-	0.0003 - 0.002
S	Heat Resistant Super Alloys	5 000 - 30 000	0,005 - 0.001	-

a_p per step:

ISO	Material	a_p (in) Tmax: 0.079in							
		1st	2nd	3rd	4th	5th	6th	Next steps	Fine finishing
P	Carbon Steel	0.031	0.024	0.012	0.008	0.004	-	-	0.004
	Alloy Steel	0.020	0.016	0.012	0.012	0.008	0.008	0.004	0.004
M	SS - Austenitic	0.020	0.016	0.008	0.012	0.008	0.008	0.004	0.002
N	Aluminium and Non Ferrous	0.039	0.031	0.008	-	-	-	-	0.004
S	Heat Resistant Super Alloys	0.020	0.016	0.008	0.012	0.008	0.008	0.004	0.002

(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.

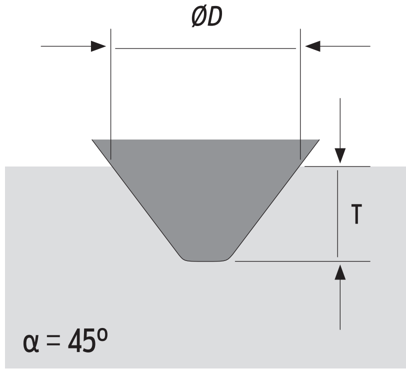
REFERENCE CHART | Gráfico de referência | Tabla de referencia



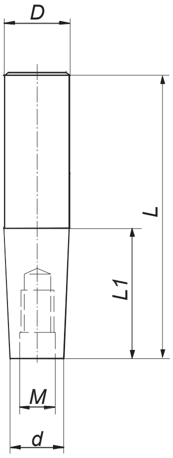
● *Point A:*
Width= 0.020 in x Depth = 0.033 in

● *Point B:*
Width= 0.031 in x Depth = 0.018 in

● *Point C:*
Width= 0.083 in x Depth = 0.079 in



MULTIFIT DENSIMET ANTI-VIBRATION | Shank | Adaptador | Fijación

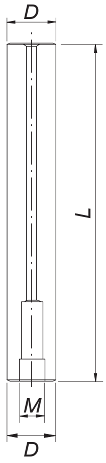


order code	Reference	Dimensions (mm)					Stock
		D	L1	L	d	M	
1191008A0	AC-RI-D12-M06-L040-AV	12	40	90	9,8	M6	◎
1191009A0	AC-RI-D12-M06-L060-AV	12	60	110	9,8	M6	◎
1191021A0	AC-RI-D12-M06-L080-AV	12	80	130	9,8	M6	◎
1191010A0	AC-RI-D16-M08-L040-AV	16	40	95	12,8	M8	◎
1191011A0	AC-RI-D16-M08-L060-AV	16	60	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	◎

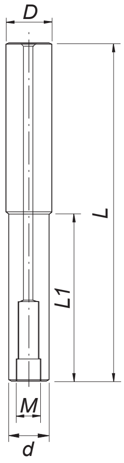
◎ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

MULTIFIT CARBIDE ANTI-VIBRATION | Shank | Adaptador | Fijación



Standard Version



Customized Version

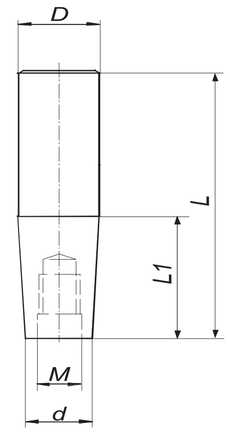
order code	Reference	Dimensions (mm)					Stock
		D	L	M	d*	L1*	
219102600	AC-RI-D12-M06-L100-HW	12	100	M6	-	-	◎
219102700	AC-RI-D12-M06-L150-HW	12	150	M6	-	-	◎
219102800	AC-RI-D16-M08-L100-HW	16	100	M8	-	-	◎
219102900	AC-RI-D16-M08-L150-HW	16	150	M8	-	-	◎
219103000	AC-RI-D20-M10-L150-HW	20	150	M10	-	-	◎
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

* Costumized versions under request

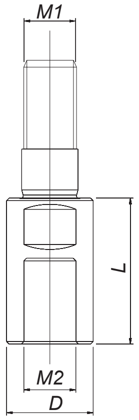
MULTIFIT CYLINDRICAL IN STEEL | Shank | Adaptador | Fijación



order code	Reference	Dimensions (mm)					Stock
		D	L1	L	d	M	
229000500	AC-RI-D12-M06-L020	12	20	65	9,8	M6	◉
229000600	AC-RI-D16-M08-L040	16	40	88	12,8	M8	◉
229000700	AC-RI-D20-M10-L045	20	45	95	17,8	M10	◉
229000800	AC-RI-D25-M12-L050	25	50	106	20,8	M12	◉
229000900	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

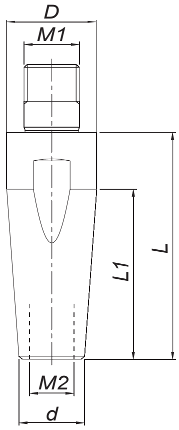
MULTIFIT EXTENSIONS FOR THREADED TYPE CUTTER | Shank | Adaptador | Fijación



order code	Reference	Dimensions (mm)				Stock
		D	M1	M2	L	
229003200	AL-M08-L040-M08	13,8	M8	M8	40	◉
229003600	AL-M10-L060-M10	18,0	M10	M10	60	◉
229003700	AL-M12-L060-M12	21,0	M12	M12	60	◉
229003100	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

MULTIFIT REDUCERS FOR THREADED TYPE CUTTER | Shank | Adaptador | Fijación



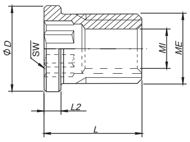
order code	Reference	Dimensions (mm)						Stock
		M1	M2	D	d	L	L1	
229012100	AL-M08-L040-M06	M8	M6	13,8	10,0	40	25	◉
229012200	AL-M10-L040-M08	M10	M8	18,0	13,8	40	25	◉
229012300	AL-M12-L040-M10	M12	M10	21,0	18,0	40	15	◉
229012400	AL-M16-L040-M12	M16	M12	29,0	21,0	40	19	◉

◉ Stock item | Produto de stock | Itens de stock

○ Available under request | Disponível sobre consulta | Disponible bajo consulta

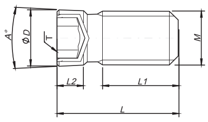
SPARE PARTS | Acessórios | Repuestos

SHIM SCREW



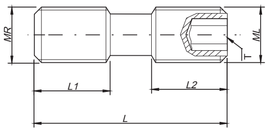
order code	Screw	Dimensions (in)					
		SW	MI (mm)	ME (mm)	ØD	L	L2
290030400	T0503509	0.138	M3,5 x 0,6	M5,0 x 0,5	0.248	0.276	0.047

ADJUSTMENT SCREW



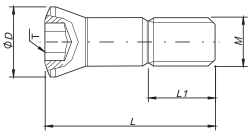
order code	Screw	T (torx)	Dimensions (in)					
			M (mm)	ØD	Aº	L	L1	L2
290051500	F0601441	T-20	M6 x 1,0	0.248	5º	0.535	0.335	0.126

DIFFERENTIAL SCREW



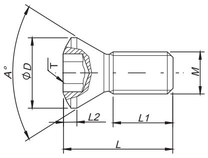
order code	Screw	T (torx)	Dimensions (in)				
			MR (mm)	ML (mm)	L	L1	L2
290016300	F0701800	T-20	M7 x 0,75	M7 x 0,75	0.709	0.295	0.295

INSERT SCREW



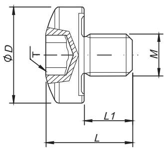
order code	Screw	T (torx)	Dimensions (in)			
			M	ØD	L	L1
290013900	P0400925	T-15	M4 x 0,5	0.228	0.339	0.138
290010600	P0500925	T-20	M5 x 0,5	0.264	0.374	0.134
290014400	P0501325	T-20	M5 x 0,5	0.295	0.504	0.177
290014000	P0501525	T-20	M5 x 0,5	0.295	0.610	0.177

INSERT SCREW



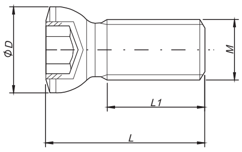
order code	Screw	T (torx)	Dimensions (mm)					
			M	ØD	A°	L	L1	L2
290078800	P0180300	T-GIP	M1,8 x 0,35	0.096	60°	0.134	0.059	0.020
290058400	P0180400	T-GIP	M1,8 x 0,35	0.096	60°	0.146	0.071	0.020
290011300	P0180401	T-6	M1,8 x 0,35	0.108	55°	0.142	0.075	0.016
290031400	P0200500	T-6	M2 x 0,4	0.110	60°	0.185	0.114	0.024
290030600	P0220500	T-7	M2,2 x 0,45	0.126	60°	0.197	0.118	0.024
290033100	P0250503	T-8	M2,5 x 0,45	0.136	60°	0.217	0.110	0.028
290048900	P0250601	T-8	M2,5 x 0,45	0.136	60°	0.236	0.138	0.031
290013400	P0250700	T-8	M2,5 x 0,45	0.130	55°	0.276	0.157	0.031
290031300	P0250704	T-8	M2,5 x 0,45	0.136	60°	0.256	0.157	0.028
290084200	P0300726	T-8	M3 x 0,35	0.173	60°	0.264	0.067	0.028
290009100	P0300800	T-9	M3 x 0,5	0.173	60°	0.291	0.165	0.031
290081700	P0350702	T-15	M3,5	0.209	55°	0.276	0.122	0.079
290019900	P0350800	T-15	M3,5 x 0,6	0.217	60°	0.303	0.146	0.039
290084300	P0350825	T-10	M3,5 x 0,35	0.224	54°	0.331	0.110	0.039
290027100	P0350902	T-10	M3,5 x 0,6	0.185	60°	0.354	0.217	0.016
290030900	P0350903	T-15	M3,5 x 0,6	0.215	60°	0.354	0.236	0.024
290075200	P0350904	T-15	M3,5 x 0,6	0.189	60°	0.354	0.197	0.031
290005800	P0351200	T-15	M3,5 x 0,6	0.209	60°	0.472	0.315	0.055
119198800	P0400803	T-15	M4 x 0,7	0.217	60°	0.315	0.217	0.039
290048200	P0400900	T-15	M4 x 0,7	0.217	60°	0.354	0.217	0.039
290075600	P0401065	T-15	M4 x 0,6	0.224	60°	0.394	0.236	0.039
290007000	P0401100	T-15	M4 x 0,7	0.209	55°	0.433	0.315	0.079
290047500	P0401200	T-15	M4 x 0,7	0.217	60°	0.433	0.236	0.047
290026900	P0451001	T-20	M4,5 x 0,75	0.260	55°	0.413	0.217	0.039
290006700	P0451400	T-20	M4,5 x 0,75	0.283	60°	0.551	0.354	0.039
290084400	P0501025	T-20	M5 x 0,5	0.276	60°	0.390	0.102	0.035
290084500	P0501326	T-20	M5 x 0,5	0.264	42°	0.524	0.150	0.045
290017500	P0501100	T-20	M5 x 0,8	0.252	43°	0.433	0.232	0.020
290031700	P0501300	T-20	M5 x 0,8	0.276	60°	0.504	0.315	0.051
290078900	P0501302	T-20	M5 x 0,8	0.276	60°	0.512	0.323	0.031
290048300	P0601402	T-20	M6 x 1,0	0.331	60°	0.551	0.354	0.035
290084600	P0601725	T-25	M6 x 0,75	0.313	44°	0.661	0.224	0.045

ADJUSTMENT SCREW



order code	Screw	T (torx)	Dimensions (in)			
			M (mm)	ØD	L	L1
290014200	P0350750	T-15	M3,5 x 0,6	0.315	0.283	0.157

WASHER SCREW

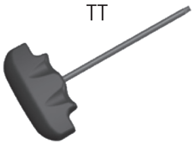


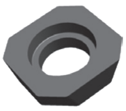
order code	Screw	Dimensions (in)			
		M (mm)	ØD	L	L1
290075600	P0401065	M4 x 0,6	0.224	0.394	0.236
290018500	P0601265	M6 x 1,0	0.354	0.488	0.256
290011000	P0601765	M6 x 1,0	0.354	0.669	0.433
290028400	P0802265	M8 x 1,25	0.433	0.866	0.591

OTHERS

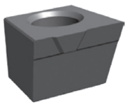
Washer	Order Code	Reference
	119200900	HC01200
	290060200	HC01400
	290002900	HC01800

Cartridge Screw	Order Code	Reference
	119169600	D0602096

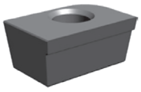
Torx Keys	Order Code	Reference
XT 	290058600	XT 06IP
	290011400	XT 06
	290012900	XT07
PT 	290011700	XT 08
	290025700	XT 09
	290013100	XT 10
TT 	290012400	XT 15
	290013200	XT 20
	290014800	PT 15
LT 	290014900	PT 20
	290056000	TT 20
	290059500	LT 30

Shim	Order Code	Reference
	160022218	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
SS 	290021200	SS40
	290021300	SS50
TS 	290058700	TS40

Screw for Coolant Supply	Order Code	Reference	M (mm)	Ø Ext. (in)
	119163000	J0123510	12	1.492
	119163100	J0164110	16	1.772
	119163200	J0204610	20	2.157

Clamp Set	Order Code	Reference
	290074600	GS40140

Tork Keys	Order Code	Reference	Torx	Lbf/in
lbf/in 	290078300	DT0606IP	6IP	5.3
	290059600	DT0606	6	5.3
	290059700	DT0709	7	8.0
	290059800	DT0812	8	10.6
	290059900	DT0914	9	12.4
	290060000	DT1020	10	17.7
	290047800	DT1530	15	26.6
	290078400	DT2050	20	44.3

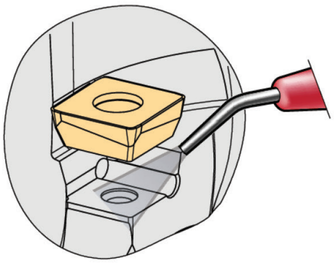
DIN 6368 Wrench	Order Code	Reference
	290058000	SD6368-12
	290058100	SD6368-16
	290058200	SD6368-20

Retaining Screw	Order Code	Reference
	290087700	D1603500
	290087800	D2004000

PROCEDURES FOR CLAMPING SCREWS

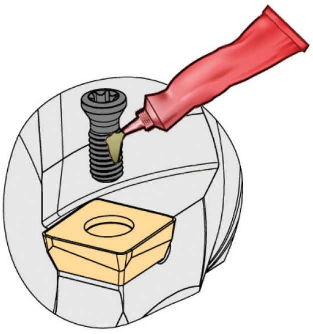
1. Always use a torque wrench to ensure that screws are correctly tightened (please confirm torques data on catalogue). Torque that is too high will negatively affect the performance of the tool and can cause screw and insert breakage. Torque that is too low will cause insert movement, vibration and 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.



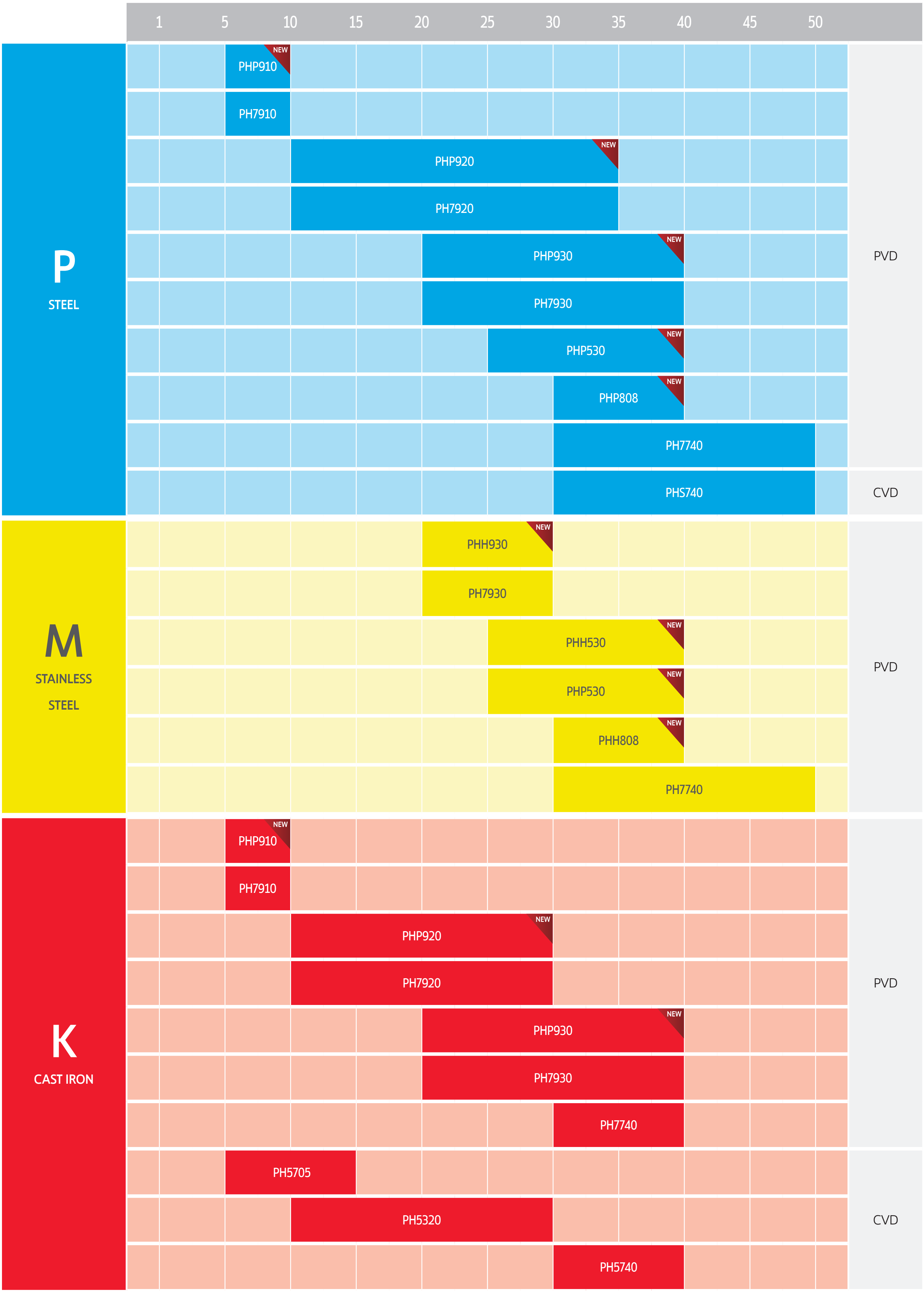
3. Check the insert seat.
Before assembly cutter it is important to ensure that the insert seat has not been damaged during machining or handling.

4. Apply sufficient screw lubrication to prevent seizure. Lubricant should be applied to the screw threads as well as to the screw head face.

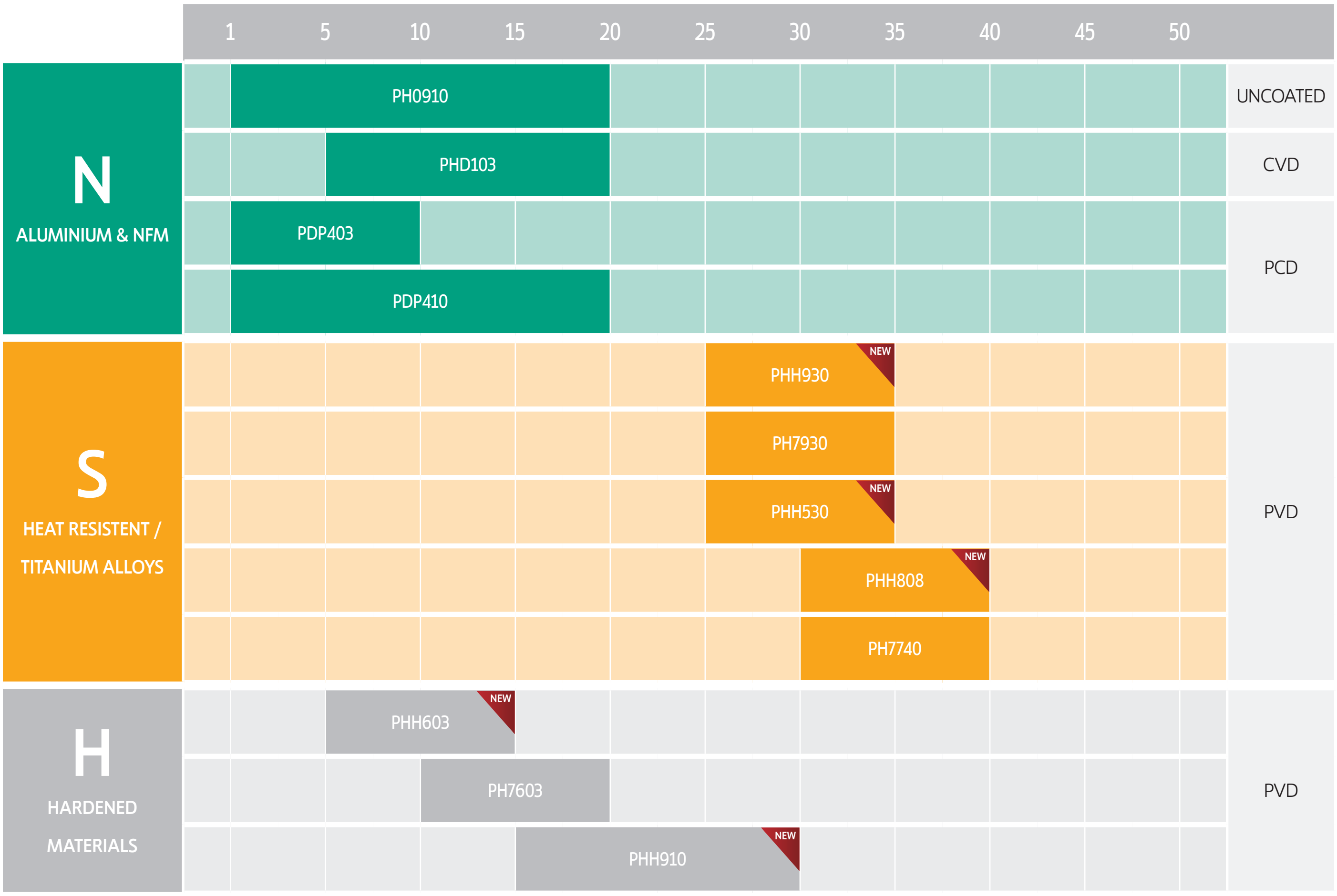


5. Replace worn or damaged screws.

MILLING GRADES | Graus de fresagem | Calidades de fresado



MILLING GRADES | Graus de fresagem | Calidades de fresado

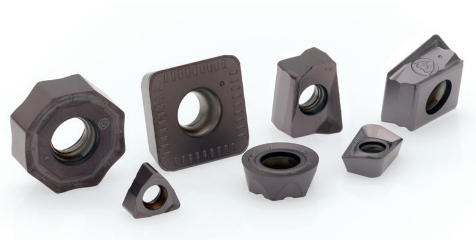


MILLING GRADES

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.



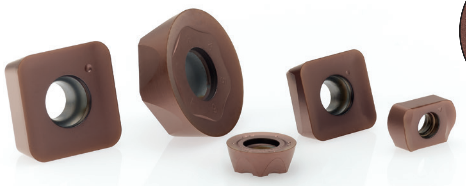
PHP
NEW
GRADE

WEAR RESISTANCE — TOUGHNESS

PHP910 NEW	PHP920 NEW	PHP930 NEW	PHP530 NEW	PHP808 NEW
P05-P10 K05-K10	P10-P35 K10-K30	P20-P40 K20-K40	P25-P40 M25-M40	P30-P40
Recommended for light operations in steels.	Recommended for General Steel & Cast Iron Milling.	Recommended for medium to roughing operations in steels and cast irons.	Extremely heat resistant grade. First choice in cold-section turbine blade milling.	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 unmatched heat resistance.
It's structure contains refractory materials which allows it to work at the highest temperature and the hardest conditions.



PHH
NEW
GRADE

WEAR RESISTANCE — TOUGHNESS

PHH603 NEW	PHH910 NEW	PHH930 NEW	PHH530 NEW	PHH808 NEW
H05-H15 P01-P05	P05-P10 H15-H30	M20-M40 S20-S30	M25-M40 S25-S35	M30-M40 S30-S40
Recommended for finishing operations in steels and hardened steels. First choice in mold and die finishing applications.	Recommended for finishing operations in steels and hardened steels in unstable conditions.	Recommended for general purpose milling of stainless steels and HRSA.	Extremely heat resistant grade. First choice in hot-section turbine blade milling.	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	PH7910	PH7920	PH7930	PH7740
(PH6103)	(PH6910)	(PH6920)	(PH6930)	(PH6740)
H01-H20	P05-P10 K05-K10	P10-P35 K10-K30	P20-P40 M20-M30 K20-K40 S25-S35	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.

CVD GRADES

PHS740...

A though substract combined with a thin CVD coating with excellent thermical 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 aplications).

PHS740
P30-P50

PHS

PH5...

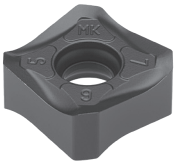
A thick CVD coating with very smooth surface. Can be used wet or dry. Ideal for machining cast irons.

WEAR RESISTANCE ← → TOUGHNESS

PH5705
K05-K10

PH5320
K10-K30

PH5740
K20-K40



PHD103

A carbide substract with high abrasion resistance coated with crystalline diamond CVD coating. Ideal for graphite machining.

PHD103
N05-N15

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.

PH0910
N01-N05

PCD GRADE

PDP4...

Carbide insert with Polycrystaline Diamond tip for finishing operations on aluminums and non-ferrous metallic materials.

PDP403
N01-N10

PDP410
N01-N20

PCD

COMPARATIVE GRADES CHART

PVD COATED GRADES | GRAUS REVESTIDOS A PVD | GRADOS CON RECUBRIMIENTO PVD

ISO Material		Palbit	Sandvik	Kennametal	Iscar	Seco	Mitsubishi	Sumitomo	Hitachi	Walter	Kyocera	Taegutec	Dijet	Ceratizit
P STEEL	P01	**PH7603** **PH6103**	GC1010	KC505M KC510M KC515M	IC903				ATH80D JP4105			TT2510 TT5505	JC8003	
	P10	**PH7910** **PH6910** **PHP910**	GC1010 GC1025	KC505M KC510M KC515M KC610M KC715M	IC903 IC907 IC950 IC908 IC910 IC380 IC900	CP200 TS2001	MP6120 VP15TF	ACP200	ATH80D PN08M ATH10E PN15M JP4105 JP4115 JP4120	WHH15 WXM15	PR830 PR1225 PR1230 PR1525	TT2510 TT5505 TT5515 TT7080	JC8003 JC8015 JC5015 JC5118	
	P20	**PH7920** **PH6920** **PH6125** **PHP920**	GC1025 GC1030 GC2030	KC522M KC525M KC527M KC530M KC610M KC620M KC635M KC715M KC720M KC730M	IC907 IC950 IC908 IC910 IC380 IC900 IC830 IC928 IC1008	CP250 TS2500	MP6120 VP15TF MP6130 UP20M VP20RT	ACP200 ACP300	JP4120 JS4045 CY250	WHH15 WXM15	PR830 PR1225 PR1230 PR1525	TT2510 TT5505 TT5525 TT7080 TT9030 TT9080	JC8015 JC5015 JC5118 JC5040	CTP1235 CTP1625
	P30	**PHP808** **PHP530** **PH7930** **PH6930** **PH6135** **PHP930**	GC1025 GC1125	KC525M KC527M KC530M KC537M KC610M KC620M KC720M KC725M KC730M KC735M	IC907 IC950 IC908 IC910 IC380 IC900 IC830 IC928 IC1008	MP3000 F25M F30M F40M	MP6120 VP15TF MP6130 UP20M VP20RT VP30RT	ACP200 ACP300	JS4045 CY250 JM4160	WSP45 WSP46	PR830 PR1225 PR1230 PR1525	TT5525 TT7080 TT8020 TT8080 TT9030 TT9080	JC5118 JC5040 JC8050 JC7560	CTP1235 CTP1625 CTP2235
	P40	**PH7740** **PH6740**		KC537M KC720M KC725M KC735M	IC830 IC928 IC1008	MP3000 F40M T60M	VP30RT	ACP300	JM4160	WSP45 WSP46		TT8020	JC5118 JC5040 JC8050 JC7560	CTP1235 CTP2235
M STAINESS STEEL	M01		GC1010		IC907 IC903			ACM100 ACK300	PCS08M					
	M10	**PH7910** **PH6910**	GC1010 GC1025 GC1030 GC2030	KC515M KC610M KC635M KC720M	IC907 IC903		VP15TF	ACM100 ACK300 ACP300	PCS08M CY150	WXM15	PR830 PR1225 PR1525 PR1535			
	M20	**PH7920** **PH6920**	GC1025 GC1030 GC1040 GC2030	KC522M KC525M KC530M KC610M KC635M KC720M KC730M	IC380 IC900 IC908 IC928 IC1008	MP3000 MS2050 F25M F30M	VP15TF MP7130 MP7030 UP20M VP20RT	ACM300 ACP300	CY150 CY250	WXM15 WSM35 WSM36	PR830 PR1225 PR1525 PR1535	TT8020 TT8080	JC8015 JC5015 JC5118	CTP1235 CTP1625
	M30	**PH7930** **PH6930** **PH6135** **PHH530** **PHH930**	GC1040 GC2030	KC522M KC525M KC530M KC537M KC725M KC730M KC735M	IC380 IC900 IC908 IC928 IC1008 IC328 IC330	MP3000 MS2050 F30M F40M	VP15TF MP7130 MP7030 UP20M VP20RT MP7140 VP30RT	ACM300	CY250 JM4160	WSM35 WSM36 WSP45 WSP46	PR830 PR1225 PR1525 PR1535	TT8020 TT8080	JC8015 JC5015 JC5118 JC8050 JC7560	CTP1235 CTP2235
	M40	**PH7740** **PH6740** **PHH808**	GC1040	KC725M	IC1008 IC328 IC330	MS2050 F40M	MP7140 VP30RT	ACM300	JM4160	WSM35 WSM36 WSP45 WSP46	PR1225 PR1525 PR1535	TT8020	JC5015 JC5118 JC8050 JC7560	CTP2235
K CAST IRON	K01		GC1010		IC380 IC900		MP8010		ATH80D JP4105		PR1510	TT6080	JC8003	AMZ
	K10	**PH7910** **PH6910** **PHP910**	GC1010 GC1020	KC514M KC515M KC520M KC620M	IC380 IC900 IC810 IC910	MK2050	MP8010 VP15TF		ATH80D JP4105 JP4120 CY150	WHH15 WXM15 WKK25	PR1210 PR1510	TT6080	JC8015	AMZ CTP3220 CTP6215
	K20	**PHP920** **PH7920** **PH6920**	GC1020	KC514M KC520M KC522M KC524M KC527M KC610M KC620M KC635M	IC810 IC910 IC950 IC350 IC830 IC928	MK2050	MP8010 VP15TF VP20RT	ACK300	JP4120 CY150 CY250	WHH15 WXM15 WKK25	PR1210 PR1510		JC8015 JC5015	CTP3220 CTP1625
	K30	**PH7740** **PH6740**		KC522M KC524M KC527M KC537M KC610M KC620M KC635M	IC830 IC928 IC1008 IC808 IC908	MK2050	VP15TF VP20RT	ACK300	CY250	WKK25	PR1510		JC8015 JC5015	

PVD COATED GRADES | GRAUS REVESTIDOS A PVD | GRADOS CON RECUBRIMIENTO PVD

ISO		Palbit	Sandvik	Kennametal	Iscar	Seco	Mitsubishi	Sumitomo	Hitachi	Walter	Kyocera	Taegutec	Dijet	Ceratizit
Material														
N ALUMINIUM	N01			KC410M KC510M KC5410								TT6080		AMZ
	N10		GC1025 GC1030	KC410M KC510M KC5410 KC620M				DL1000	SD5010 HD7010	WXN15		TT6080 TT8020		AMZ
	N20		GC1025 GC1030	KC422M KC620M		F15M	LC15TF	DL1000	SD5010 HD7010	WXN15		TT8020		
S HEAT RESISTENT / TITANIUM ALLOYS	S01		GC1010	KC510M	IC808 IC907 IC908			ACM100 ACK300			PR905 PR1210 PR1535		JC8003 JC8015	AMZ
	S10	**PH7910** **PH6910**	GC1010 GC1030 GC2030	KC510M KC610M	IC808 IC907 IC908 IC903	MS2050	MP9120 VP15TF MP9130 MP9030	ACM100 ACK300	PTH13S JS1025		PR905 PR1210 PR1535	TT9030 TT9080 TT8080	JC8003 JC8015 JC5015 JC5118	AMZ CTP1625
	S20	**PH7920** **PH6920**	GC1030 GC1040 GC2030 GC2040	KC522M KC525M KC610M	IC300 IC900 IC830 IC928	MS2050 F40M	MP9120 VP15TF MP9130 MP9030	ACM300	PTH13S JS1025	WSM35 WSM36	PR905 PR1210 PR1535	TT8080 TT8020	JC8015 JC5015 JC5118 JC8050 JC7560	CTP1235 CTP1625
	S30	**PH7930** **PH6930** **PHH930** **PHH530**	S30T GC1040 GC2040	KC522M KC525M KC725M	IC830 IC928	MS2050 F40M	MP9130 MP9030	ACM300		WSM35 WSM36 WSP45 WSP46	PR1535	TT8020	JC5118 JC8050 JC7560	CTP1235 CTP2235
	S40	**PH7740** **PH6740** **PHH808**	GC2040 GC1040	KC725M	IC830 IC928	MS2050 F40M				WSP45 WSP46			JC5118 JC8050 JC7560	
H HARDENED MATERIAL	H01	**PH7603** **PH6103** **PHH603**	GC1010	KC510M	IC903		MP8010					TT2510 TT5505	DH102 JC6102 JC8003 JC8008	
	H10	**PHH603** **PH7603** **PH6103** **PH7910** **PHH910**	GC1010 GC1025 GC1030	KC505M KC510M KC635M	IC903 IC808 IC907 IC908	MH1000 F15M	MP8010 VP15TF		PTH08M JP4105	WHH15		TT5515 TT6080	JC6102 JC8003 JC8008 JC8015 JC5118	CTP6215
	H20		GC1025 GC1030	KC635M	IC808 IC907 IC908 IC380 IC900	F15M	VP15TF		JP4105	WHH15		TT5515 TT6080	JC8015 JC5118	CTP6215
	K10				IC380 IC900 IC1008	MP3000 F30M								

COMPARATIVE GRADES CHART

CVD COATED GRADES | GRAUS REVESTIDOS A CVD | GRADOS CON RECUBRIMIENTO CVD

ISO Material		Palbit	Sandvik	Kennametal	Iscar	Seco	Mitsubishi	Sumitomo	Hitachi	Walter	Kyocera	Taegutec	Dijet	Ceratizit
P STEEL	P40	**PHS740**				MP2500				WKP35S				
M STAINESS STEEL	M10		GC2015	KCPM20	IC9250 IC520M IC9350			ACM200					JC730U	
	M20		GC4230	KCPM20 KCPM30 KC927M	IC9250 IC520M IC9350 IC4050 IC635	MP2500 T350M T25M	F7030	ACM200			CA6535	TT7800	JC730U	CTC5235 GM226+
	M30		GC2040 GC4230 GC4240 S40T	KCPM30 KC927M	IC9350 IC4050 IC635	MP2500 T350M T25M	F7030	ACM200	GX2160		CA6535	TT7800	JC730U	CTC5235 CTC5240 GM226+ GM246 GM43+
	M40		GC2040 GC4240 S40T		IC635	In4500 T350M			GX2160		CA6535			CTC5235 CTC5240 GM246 GM43+
K CAST IRON	K01	**PH5705**		KC907M	IC8080 IC4100 IC5100 IC9150		MC5020	ACK200		WKP15	CA420M		JC605W	CTC3215
	K10	**PH5705**	GC3220	KC907M KC914M KC917M KC924M KCK15	IC8080 IC4100 IC5100 IC9150 IC9080 IC520M	MK1500	MC5020	ACK200	GX2120	WKP15 WKP25	CA420M	TT6800	JC605W JC608X JC610	CTC3215 SR216 SR226+
	K20	**PH5320**	GC3220 GC3330 GC3040 GC4220 GC4230	KC917M KC924M KCK15 KCPM20 KCPK30 KC927M	IC5100 IC9150 IC9080 IC520M IC4050	MK1500 MP1500	MC5020	ACK200	GX2120 GX2140	WKP15 WKP25 WKP35 WKP35S	CA420M	TT6800	JC605W JC608X JC610	SR216 SR226+
	K30	**PH5740**	GC3330 GC3040 GC4220 GC4230 GC4240	KCPM20 KCPK30 KC927M	IC520M IC4050	MK1500 MP1500	MC5020		GX2140	WKP25 WKP35 WKP35S			JC610	

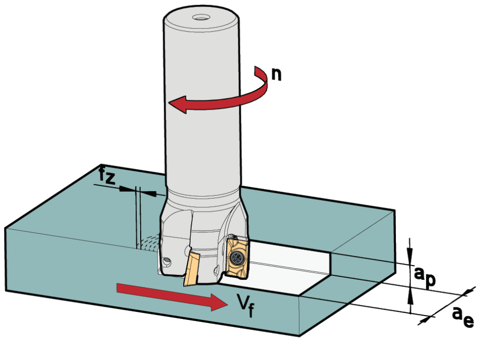
UNCOATED GRADES | GRAUS NÃO REVESTIDOS | GRADOS SÍN RECUBRIMIENTO

ISO Material		Palbit	Sandvik	Kennametal	Iscar	Seco	Mitsubishi	Sumitomo	Hitachi	Walter	Kyocera	Taegutec	Dijet	Ceratizit
N ALUMINIUM	N01	**PH0910**	H10	K115M KC313	IC20		HTi 10	H1 G10E	PCS08M CY100H		PCS08M CY100H			H210T
	N10	**PH0910**	H13A H10F	K115M KC313	IC08	H15	HTi 10	H1 G10E	PCS08M CY100H CY10H	WK10	PCS08M CY100H CY10H	K10 UF10		H210T
	N20	**PH0910**	H13A H10F	K125M	IC08 IC28	HX H15 H25	HTi 10					K10		H216T

CUTTING DATA CALCULATION

Cálculo de condições de corte | Cálculo de datos de corte

Formulas



Spindle Speed (rev/min)

$$n = \frac{v_c \cdot 12}{\pi \cdot D_c}$$

Cutting Speed (SFM)

$$v_c = \frac{n \cdot \pi \cdot D_c}{12}$$

Feed Speed (inch/min)

$$v_f = n \cdot Z_n \cdot f_z$$

Feed per Revolution (inch/rev)

$$f = Z_n \cdot f_z$$

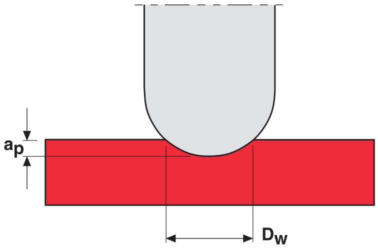
Feed per Tooth (inch/tooth)

$$f_z = \frac{v_f}{n \cdot Z_n}$$

Metal removal Rate (in³/min)

$$Q = a_e \cdot a_p \cdot v_f$$

Cutting Speed and Spindle Speed for Copying



$$v_c = \frac{n \cdot \pi \cdot D_w}{12} \quad \text{(SFM)}$$

$$n = \frac{v_c \cdot 12}{\pi \cdot D_w} \quad \text{(RPM)}$$

$$D_w = 2 \cdot \sqrt{a_p (D_c - a_p)} \quad \text{(inch)}$$

Nomenclature

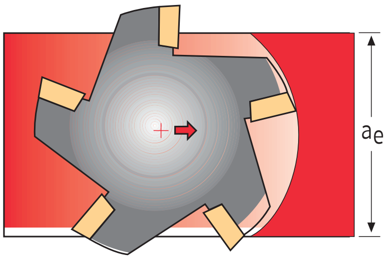
a_e	- Width of cut inch/radial depth of cut	(inch)
a_p	- Depth of cut inch/radial depth of cut	(inch)
D_c	- Cutter diameter	(inch)
f	- Feed per Revolution	(inch/rev)
f_z	- Feed per Tooth	(inch/tooth)
n	- Spindle Speed	(rev/min)
Q	- Material removal Rate	(in³/min)
V_c	- Cutting Speed	(SFM)
V_f	- Feed Speed	(inch/min)
Z_n	- Nº of theeth	

POWER REQUIREMENT CALCULATION

Cálculo de potência requerida | Cálculo del requerimiento de potencia

Calculating the power demand

$$P_c = \frac{a_p \times a_e \times v_f}{396{,}000 \times \eta} \cdot k_c$$



P_c - Power (kW)
a_p - Depth of cut (inch)
a_e - Width of cut (inch)
v_f - Feed speed (inch/min)
η - Efficiency
k_c - Cutting force per inch² (Lbf/inch²)

Calculating average chip thickness (h_m) and cutting force per inch² (k_c)

$$h_m = \frac{360 \times f_z \times a_e}{\pi \times Dc \times \omega_e} \cdot \sin k_r$$

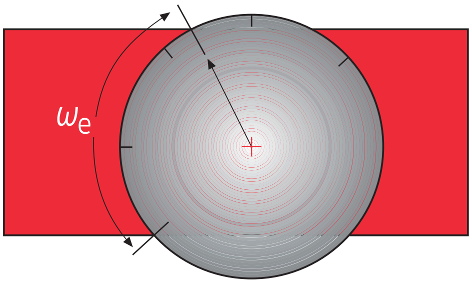
h_m - Average chip thickness (inch)
f_z - Feed per tooth (inch/tooth)
D_c - Cutter diameter (inch)
ω_e - Engagement angle
k_r - Lead angle

$$k_c = \frac{1}{\left(\frac{h_m}{0.04}\right)^{m_c}} \cdot k_cx$$

m_c^* - Exponent
k_cx^* - Cutting force for 0.04 inch chip thickness (Lbf/inch²)

* Please see these values on page 687.

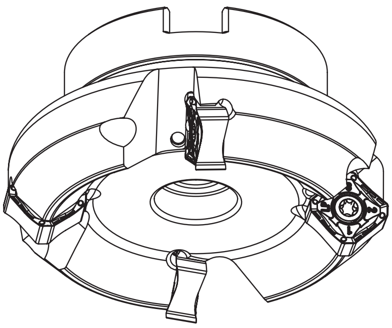
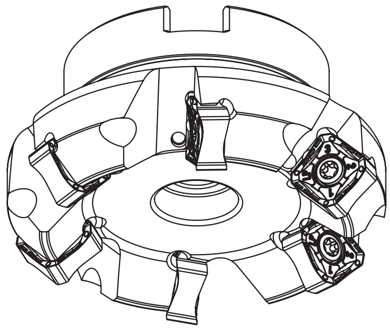
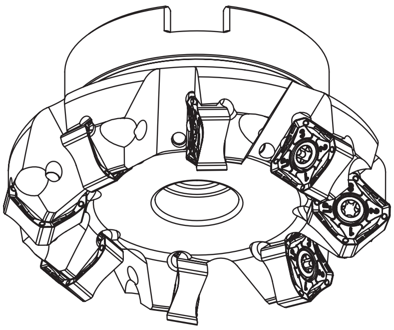
Engagement angle



Engagement a_e / D_c	Engagement angle ω_e
70%	89º
100%	180º

Engagement a_e / D_c	Engagement angle ω_e
5%	26º
10%	37º
75%	60º

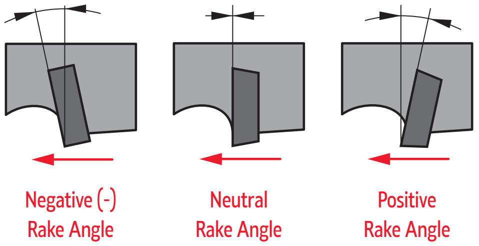
TECHNICAL DATA

Coarse Pitch Type	Normal Pitch Type	Fine Pitch Type
First choice for cutting aluminium (long-chipping material - ISO N). First choice for unstable operations due to lowest cutting forces. Smooth cutting allows longer overhang applications. First choice for deep cutting and high feed rates.	First choice for roughing in stable conditions. Good productivity. Good chip space for roughing in steels, stainless steel and super alloys. First choice for shallow cutting with low feed rates.	First choice for cast iron. First choice for high productivity with low width of cut (Ae). Roughing in super alloys materials in combination with round inserts. For cutting operations where chip discharge volume is small and high table feed is desired.
		

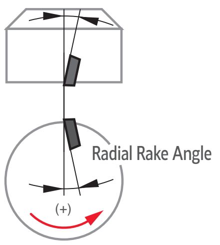
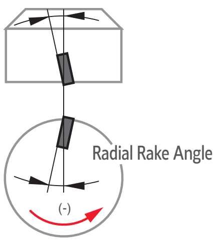
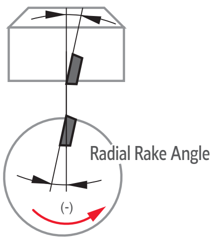
Standard inserts

Positive and Negative Rake Angle

- Insert shape whose cutting edge precedes is a positive rake angle.
- Insert shape whose cutting edge follows is a negative rake angle.



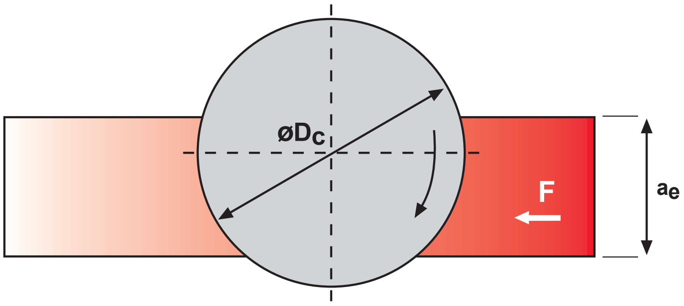
Standard Cutting Edge Shape

	Standard Cutting Edge Combinations	(+) Axial Rake Angle  Radial Rake Angle (+)	(-) Axial Rake Angle  Radial Rake Angle (-)	(+) Axial Rake Angle  Radial Rake Angle (-)
		Double Positive (DP Edge Type)	Double Negative (DN Edge Type)	Negative / Positive (NP Edge Type)
	Axial Rake Angle γp	Positive (+)	Negative (-)	Positive (+)
	Radial Rake Angle γf	Positive (+)	Negative (-)	Negative (-)
	Insert Used	Positive Insert (One Sided Use)	Negative Insert (Double Sided Use)	Positive Insert (One Sided Use)
Work Material	Steel	◎	-	◎
	Cast Iron	-	◎	◎
	Aluminium Alloy	◎	-	-
	Hardened Materials	◎	-	◎

Choosing Cutter Diameter

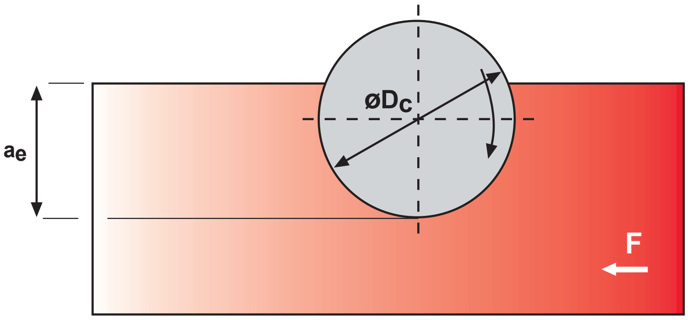
The Best Cutter Diameter (ØDc) should be selected upon the workpiece dimensions

$D_c = 1{,}3 - 1{,}5\ a_e$



If the machine power is limited or the workpiece is too wide, select a cutter diameter that takes more than two passes or that matches the power of machine. When the appropriate cutter diameter is not available, proper cutter position will give good results.

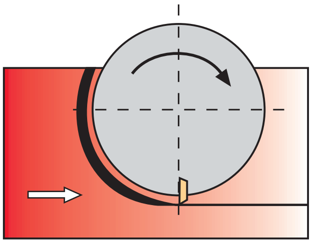
$a_e = 3/4\ D_c$



Cutter Position

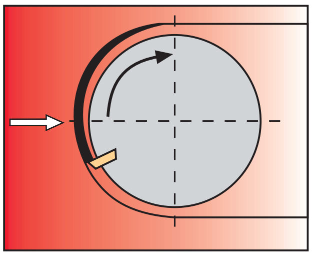
Conventional Milling (Up Milling)

The feed direction of the workpiece is opposite to that of cutter rotation. The chip thickness starts at zero and increases to the maximum at the end of cut. In Up Milling, the insert wear is severe with excessive friction and high temperature caused by the rubbing or burnishing effect in the insert.



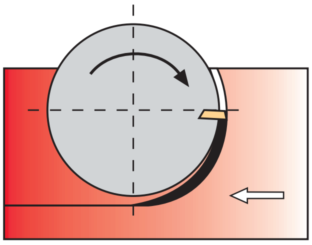
Channel Milling (Up and Down Milling)

The cutter position is in the middle of the workpiece and the cutting force is alternately changed in the radial direction. It causes vibration when the spindle structure is weak. Channel Milling is a combination of conventional and climb milling. When Channel Milling is necessary use positive geometry cutters at reduced speeds and feeds with coolant.

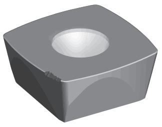


Climb Milling (Down Milling)

Climb Milling is normally recommended.
The feed direction of workpiece is the same as that of cutter rotation. So the chip thickness starts from the maximum and decreases to zero at the end of cut. The tool life is long with less heat and minimum work hardening of workpiece.



TROUBLESHOOTING



EDGE WEAR

Corrective action:
- Increase feed rate
- Reduce cutting speed
- Use more wear resistant grade
- Apply coated grade

DESGASTE DA ARESTA

Possível solução:
- Aumentar o avanço
- Reduzir a Vc
- Usar grau mais resistente ao desgaste
- Aplicar grau revestido

DESGASTE DEL FLANCO

Solución posible:
- Aumentar el avance
- Reduzca la velocidad de corte
- Seleccione una calidade más resistente al desgaste
- Utilice metales duros recubiertos

HEAT DEFORMATION (UPSET)

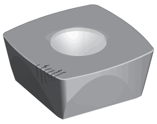
Corrective action:
- Reduce cutting speed
- Reduce feed
- Reduce depth of cut
- Use grade with higher hot hardness

DEFORMAÇÃO ARESTA

Possível solução:
- Reduzir a Vc
- Reduzir o avanço
- Reduzir a profundidade corte
- Usar grau com maior dureza a quente

DEFORMACIÓN PLÁSTICA

Solución posible:
- Reduzca la velocidad de corte
- Seleccione una calidade más resistente al desgaste
- Reduzca el ap



THERMAL CRACKING

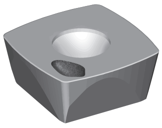
Corrective action:
- Properly apply coolant
- Reduce cutting speed
- Reduce feed
- Apply coated grade

FENDAS TÉRMICAS

Possível solução:
- Aplicação correcta do fluido de corte
- Reduzir a Vc
- Reduzir o avanço
- Aplicar grau revestido

FISSURAS TÉRMICAS

Solución posible:
- Preste atención al uso del refrigerante
- Reduzca la velocidad de corte
- Reduzca el avance
- Utilice metales duros recubiertos



CRATER

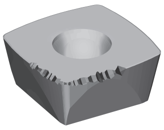
Corrective action:
- Reduce feed rate
- Reduce speed
- Apply coated grades
- Apply coolant

CRATERA FACE ATAQUE

Possível solução:
- Reduzir o avanço
- Reduzir a Vc
- Aplicar grau revestido
- Usar fluido de corte

DESGASTE DE CRÁTER

Solución posible:
- Reduzca el avance
- Reduzca la velocidad de corte
- Utilice metales duros recubiertos
- Preste atención al uso del refrigerante



CHIPPING

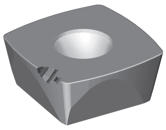
Corrective action:
- Use a tougher grade
- Consider edge preparation
- Check rigidity of system
- Increase lead angle

ESMILHAMENTO

Possível solução:
- Usar um grau mais tenaz
- Considerar a preparação da aresta
- Verificar a rigidez do sistema
- Aumentar o ângulo de ataque

FILOS ASTILLADOS

Solución posible:
- Seleccione una calidade más resistente al desgaste
- Utilice un inserto con una geometria de filo de corte más estable
- Modifique el ángulo de posicion
- Modifique la geometria de rompevirutas



DEPTH-OF-CUT NOTCHING

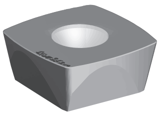
Corrective action:
- Change lead angle
- Consider edge preparation
- Apply different grade
- Adjust feed

FRACTURA

Possível solução:
- Alterar o ângulo de ataque
- Considerar a preparação da aresta
- Aplicar outro grau
- Ajustar o avanço

DESGASTE POR ENTALLA

Solución posible:
- Escoja un ángulo de posición mas pequeño
- Ajuste el avance
- Cambie de calidad
- Utilice un inserto con una geometria de filo de corte más estable



BUILT-UP EDGE

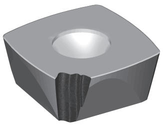
Corrective action:
- Increase cutting speed
- Increase feed rate
- Apply PVD coated grades
- Use coolant
- Edge preparation (smaller hone)

ARESTA POSTIÇA CORTE

Possível solução:
- Aumentar a Vc
- Aumentar o avanço
- Aplicar grau revestido
- Usar fluido de corte
- Reduzir boleamento

FILOS RECRECIDOS

Solución posible:
- Aumentar la velocidad de corte
- Aumentar el avance
- Utilice metales duros recubiertos
- Aplique refrigerante con mayor concentración de aceite
- Seleccione una geometría de corte positiva



CATASTROPHIC BREAKAGE

Corrective action:
- Utilize stronger grade / geometry
- Reduce feed rate
- Reduce depth of cut
- Check rigidity of system
- Examine edge prep / nose radius

FRACTURA CATASTRÓFICA

Possível solução:
- Aplicar grau / geometria mais resistente
- Reduzir o avanço
- Reduzir a profundidade de corte
- Aplicar grau revestido
- Usar fluido de corte

ROTURA DE INSERTO

Solución posible:
- Seleccione un material más tenaz
- Utilice insertos más robustos con ángulos de arista más grandes
- Selecione una geometria de rompe virutas para secciones de corte más amplias
- Reduzca en avance

		Possible causes and areas of investigation Causas possíveis e áreas de intervenção Possibles causas y las áreas de intervención	cutting speed | velocidade de corte | velocidad corte	feed | avanço | avance	depth-of-cut | profundidade de corte | profundidad de corte	grade | grau da pastilha | calidad inserto	coolant | óleo de corte | refrigerante	rake angle | ângulo de ataque | ángulo de posición	edge preparation | preparação da aresta | preparacion del filo	material (type / condition) | material (tipo / condições) | material	center height | altura do centro | altura al cientro	geometry (insert) | geometria da pastilha | geometria del inserto	insert finish | acabamento na pastilha | acabado del inserto	insert thickness | espessura da pastilha | espessura inserto	nose radius | raio de canto | radio punta	lead angle | ângulo da aresta de ataque | ángulo filo corte	holder (type / condition) | suporte (tipo / condições) | soporte (condiciónes)	machine condition | estado do equipamento - torno | condición de maquina	chip flow direction | direcção de fluxo da apara | dirección de la viruta	horsepower | potência | fuerza	excessive overhang | excessivo comprimento livre da ferramenta | sobreendeudamiento excessivo	spindle bearings | rolamentos do eixo | cojinetes del husillo	turret | torreta | torreta	machine anchored | fundações da máquina | anclada de la maquina	workholding | fixação da peça | sujeción peça	rigidity | rigidez | estabilidad	chatter | vibração | vibraciones
PROBLEMS | PROBLEMAS | PROBLEMAS	• UNACCEPTABLE CHIPS • APARA DESADEQUADA • VIRUTA INACEPTABLE	• stringer / ribbons (light silver colo) • demasiado longas (cor de prata suave) • mucho larga (color plata suave)	P↑	P↑	◎		◎	◎	◎	◎		P			◎	◎			◎								
		• scorrugated / tight (dark blue or black color) • ondulado / firme (cor azul escuro ou preto) • corrugado / firme (azul / negra)	◎	P↓	◎	◎	◎	◎	◎	◎		P			◎	◎											
	• WORKPIECE CONCERNS • MATERIAL • MATERIAL	• finish / rms tolerance • tolerância e rugosidades • tolerancia y rugosidades	P	P	◎	◎	◎	◎	◎	◎	◎		◎		P			◎	◎								
		• interrupted cuts • corte interrompido • corte interrumpido	P↑	P↓	P↓	◎		◎	◎	◎		◎		◎	◎	↑		◎		◎	◎	◎			◎	◎	◎
	• MACHINE CONCERNS • MÁQUINA FERRAMENTA • MAQUINA HERRAMIENTA	• areas of investigation • áreas de intervenção • áreas de intervención	◎	◎	◎	◎	◎				◎							◎		◎	◎	◎	◎	◎	◎	P	
	• INSERTS FAILURE MODES • MODOS DE RUPTURA DA PASTILHA • MODOS DE RUPTURA DE INSERTO	• edge wear • desgaste da aresta • desgaste de flanco	P	P	◎	P	◎				◎																
		• heat deformation (upset) • deformação plástica • deformación plástic	P↓	P↓	P↓	◎	◎	◎						◎	◎												
		• thermal cracking • fendas térmicas • fissuras térmicas	◎	◎	◎	P	P	◎						◎													
		• crater • cratera na face de ataque • cráter en la pared de ataque	P↓	P↓		◎	◎	◎				◎							◎								
		• chipping • esmilhamento • filos astillados	◎	◎		P	◎	◎	P	◎	◎	◎		◎	◎	◎	◎	◎							◎	◎	◎
		• depth-of-cut notching • fractura • desgaste por entalla	◎	◎		◎		◎	◎	P				◎	P												
		• built-up edge • aresta postiça de corte • filos recrescidos	P↑	P↑		PVD	◎	◎	P	P	◎	◎	◎														
		• catastrophic breakage • fractura catastrófica • rotura de inserto	◎	◎	◎	◎	◎	◎	◎	◎		◎		◎	◎	◎	◎	◎			◎				◎	P	P

↑↓ *Arrows indicate direction of adjustment | As setas indicam a direcção do ajustamento | Las flechas indican la dirección de ajuste*

P *Indicate areas of primary investigation | Indica as áreas de primeira intervenção | Indica las áreas de intervención primaria*