Square Shoulder Milling
New Generation

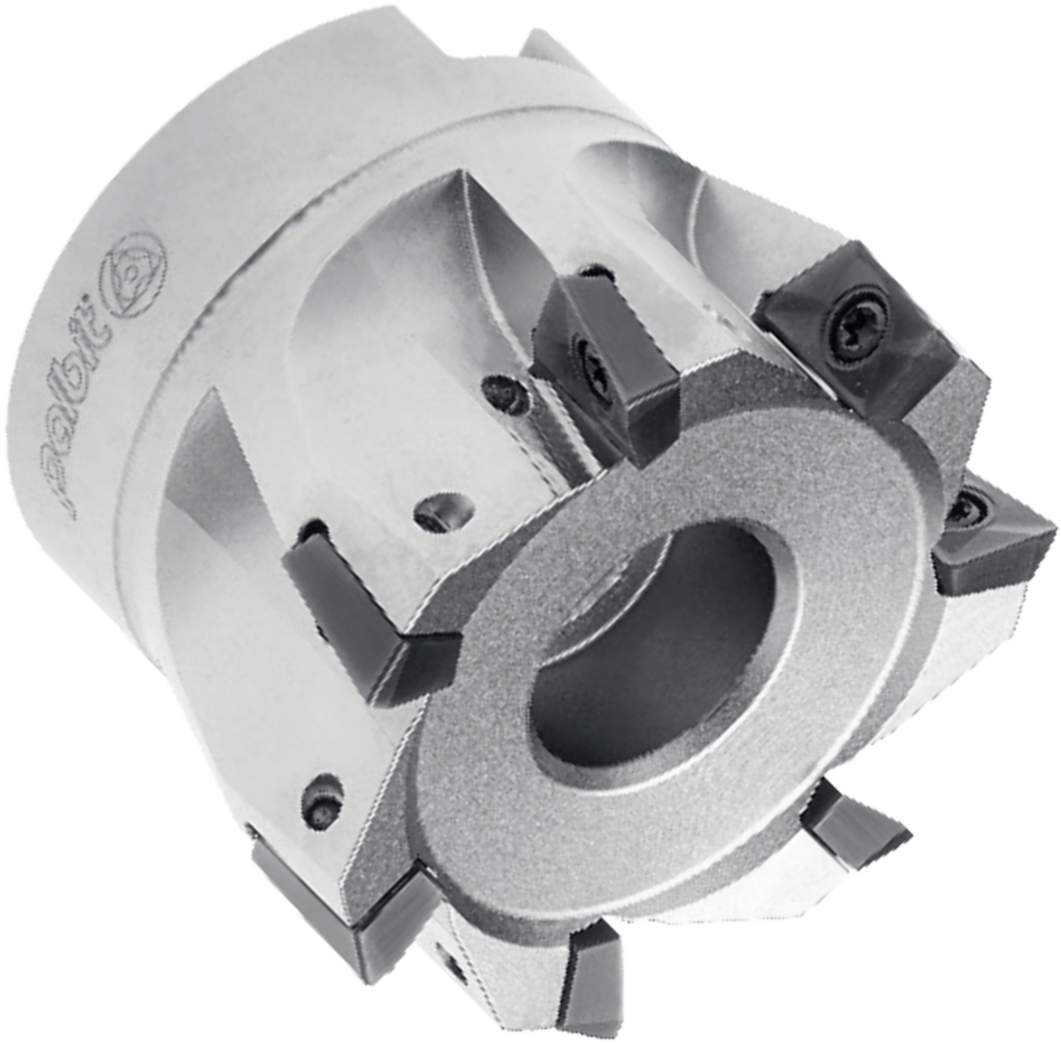
palbit TOOLING SOLUTIONS EXPERTS SINCE1916

PalbitUSA.com

PILOT Precision Products

LINEPRO

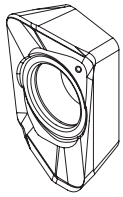
XP90-06 | XP90-10 | XP90-17

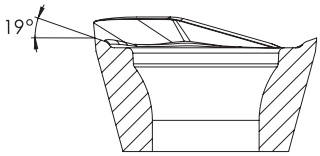


LINEPRO XP90-06

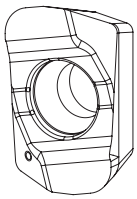
P M K S

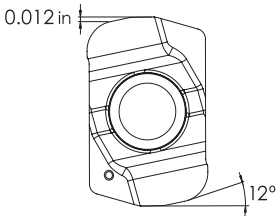
XPET-LP





XPET-HF





INSERT SIZE 06 XPET 0602...

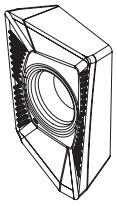
XPET-LP

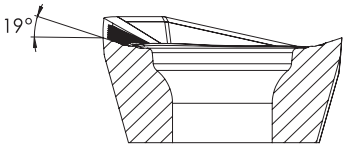
XPET-HF

LINEPRO XP90-10

P M K N S

XPET-LP





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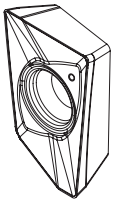
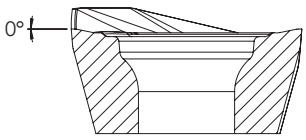
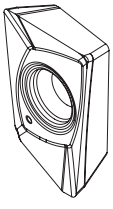
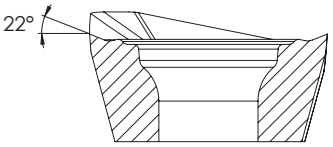




XPET-LN





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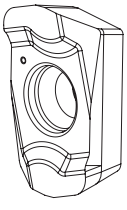

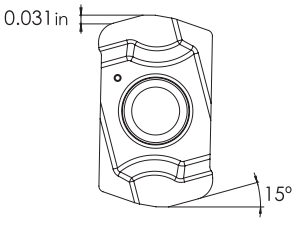

INSERT SIZE 10 XPET 1003...

XPET-LP

XPET-MP

XPET-LN

XPET-HF NEW

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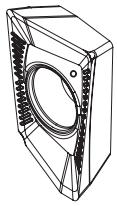
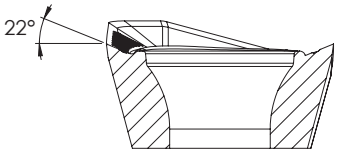
LINEPRO XP90-17

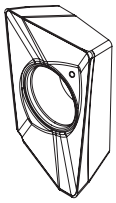
P M K N S

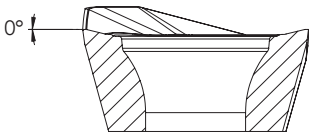
XPET-LP





XPET-MP





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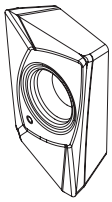
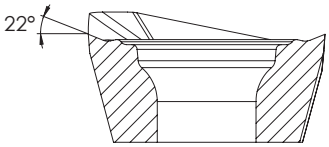




INSERT SIZE 17 XPET 1706...

XPET-LP

XPET-MP

XPET-LN

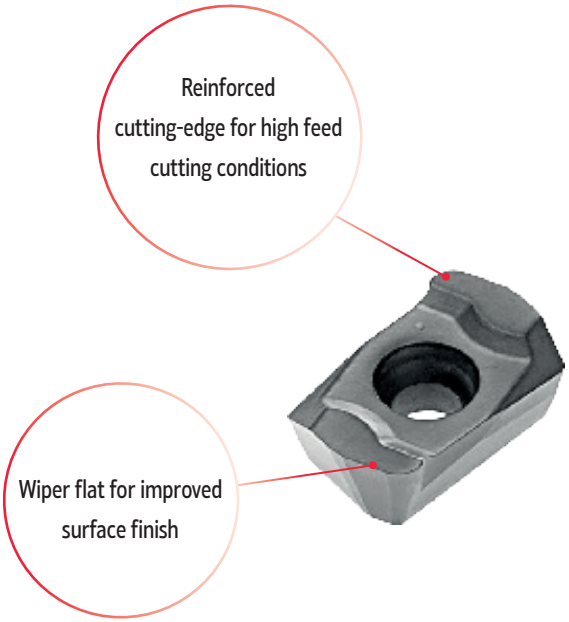
CHIP BREAKERS

Chip Breaker	Features
Geometry HF Hifeed machine	New chipbreaker HF for Hifeed machining in all materials.
Geometry LP Light machine	Positive top rake angle to promote a good chip flow and reduce power consumption on low alloy steels.
Geometry MP Light machine	Chip-breaker with a reinforced chamfer for general applications on steel and cast iron.
Geometry LN Light machine	High positive chip-breaker, polished for applications of non ferrous materials (aluminum).

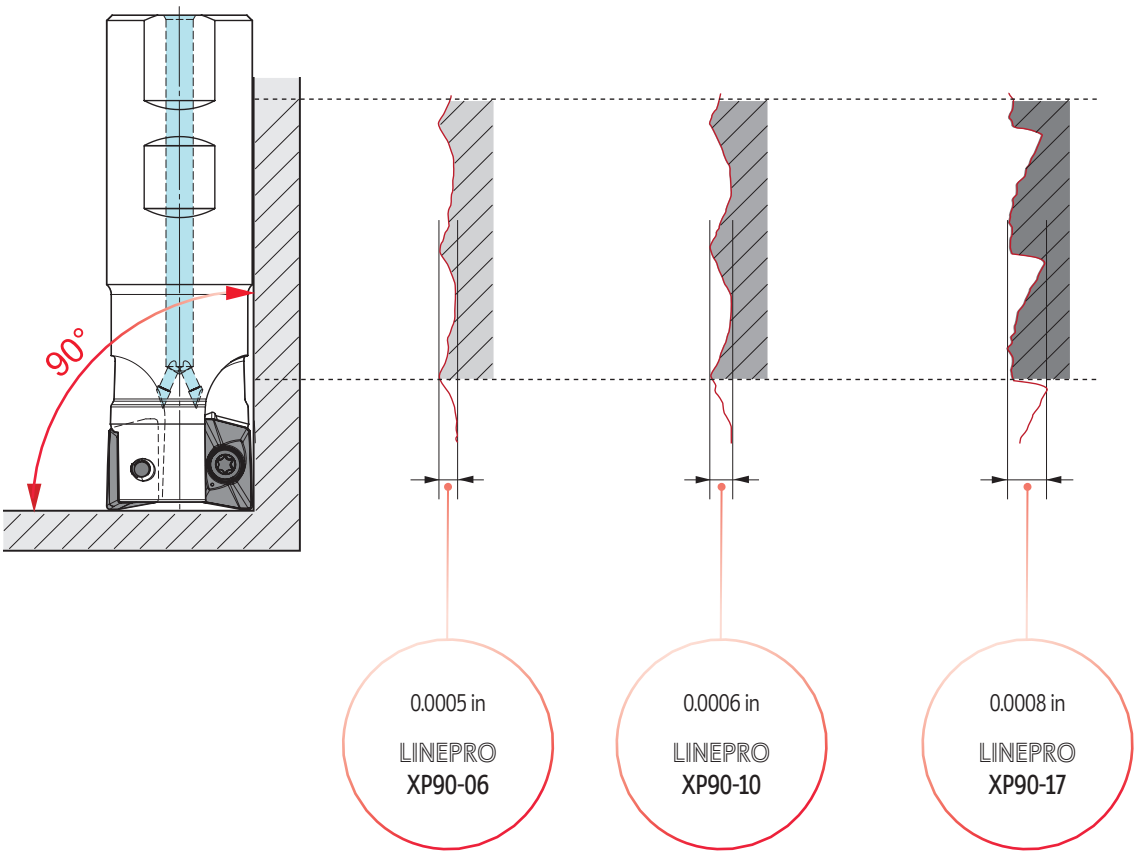
INSERTS FEATURES

Low cutting force

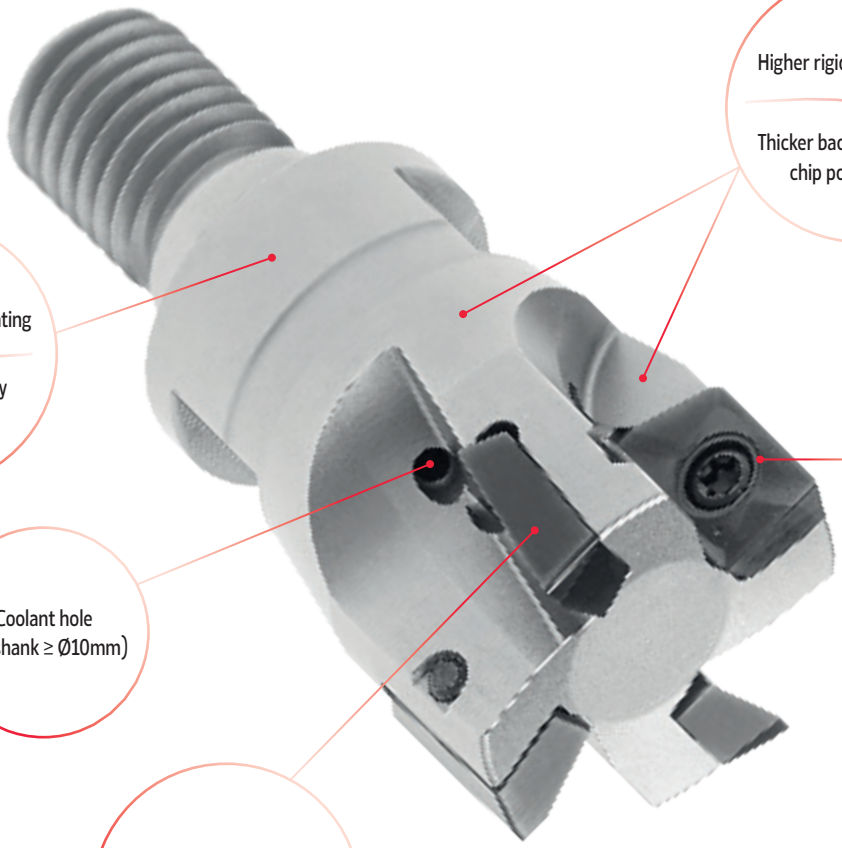
NEW



CUTTER FEATURES



CUTTER FEATURES



Higher rigidity & durability

Thicker back metal & large chip pocket radius

High hardness nickel coating

Higher body durability

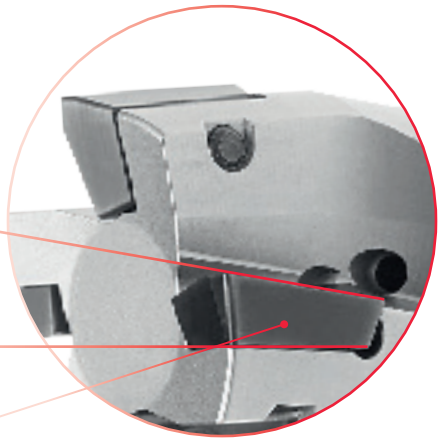
Large chip pocket & specific chipbreaker

Better chip evacuation and perfect cutter body stability

Coolant hole (for shank ≥ Ø10mm)

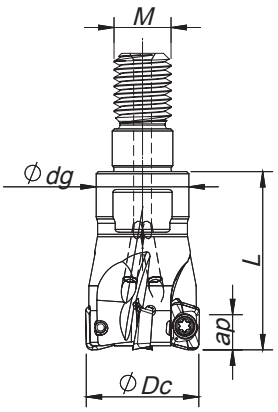
PVD coated carbide

High strength & long tool life



High Rake Angle (A.R. Max. +18º)

Low cutting forces

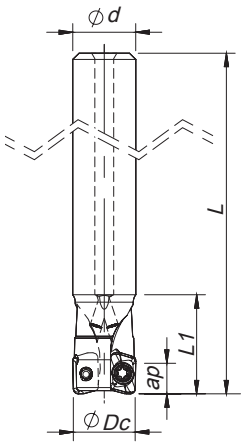


Threaded Coupling

K_r=90° | γ_p=+4°

Order code	Reference		Dimensions (in)				lbs	Max ap (in)		Insert	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 ○ Available Upon Request (see page A-10)



Cylindrical Shank

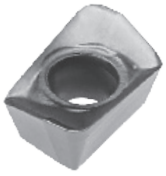
K_r=90° | γ_p=+4°

Order code	Reference		Dimensions (in)				lbs	Max ap (in)		Insert	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...	◎

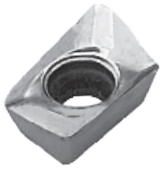
◎ Stock item ○ Available Upon Request (see page A-10)

XP... 0602...

XPET-LP



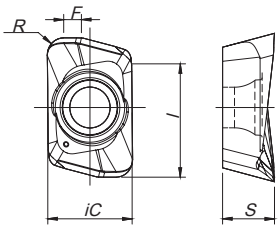
XPET-LN NEW



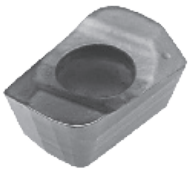
PHH NEW GRADE

PHP NEW GRADE

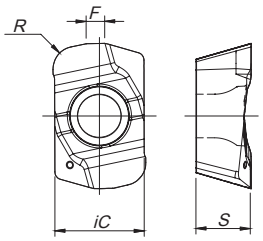
XPET-LP | LN



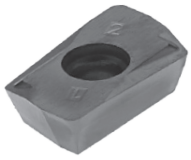
XPET-HF
(HiFeed geometry)



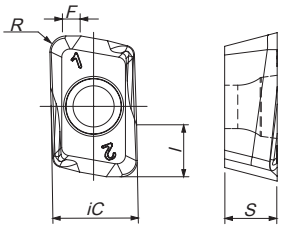
XPET-HF



XPHW-MH NEW
(finishing geometry)



XPHW-MH



		P				M	K		N	S	H		Dimensions (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
1112579	XPET 060202 PDFR-LN								◈				0.154	0.094	0.201	0.008	0.037
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
1112259	XPHW 060208 ZER-MH	◈	◈								◈	◈	0.154	0.094	0.094	0.031	0.028

◈ First choice ◈ Stock item ○ Available Upon Request (see page A-11)

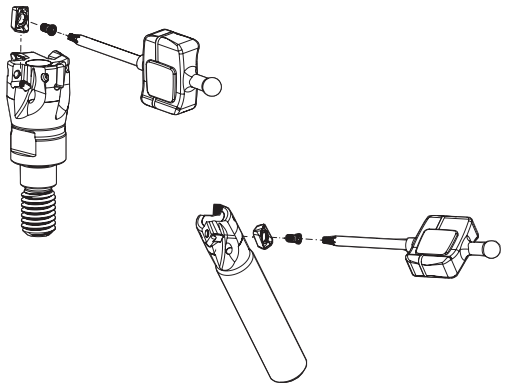
Insert order code = (1) Geometry Code + (2) Grade Code

LINEPRO XP90-06

SPARE PARTS

Order separately

Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
				lbf/in
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



GRADES SELECTION GUIDE

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

Good Conditions
Average Conditions
Difficult Conditions

RECOMMENDED CUTTING CONDITIONS

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 for vibration to occur 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 for vibration to occur 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

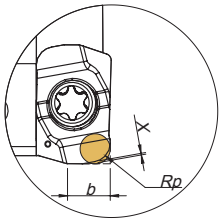
LINEPRO XP90-06

CHIP BREAKER SELECTION GUIDE

ISO	PSM	Material	HB (Brinell)	Chip breaker 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	-

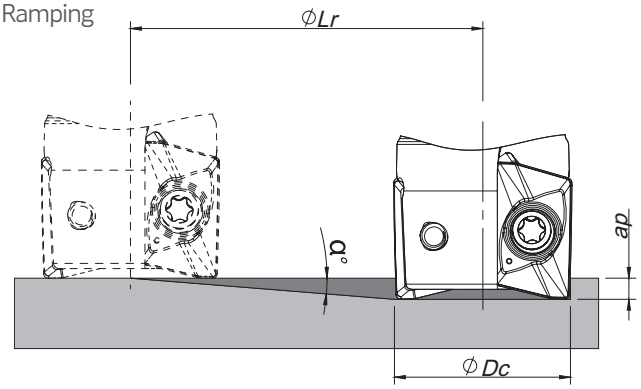
PROGRAMMING DATA

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

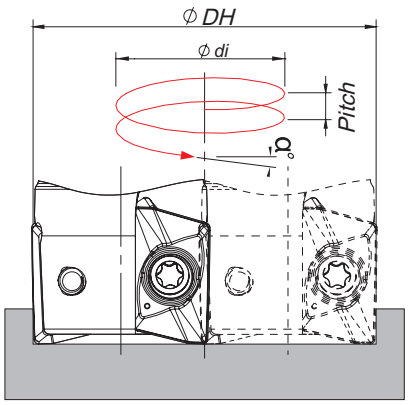


RAMPING AND HELICAL INTERPOLATION

Ramping



Helical Interpolation



Blind hole
Flat bottom

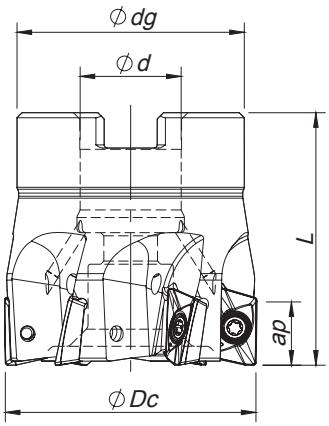
Ødi = ØDH - ØDc

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)

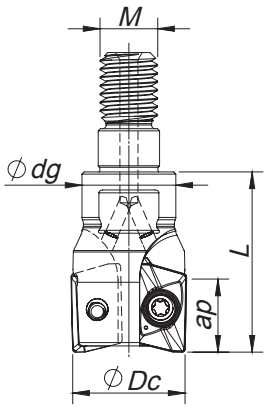


Arbor Mounting

κ_r=90° | γ_p=+8°

Order Code	Reference		Dimensions (in)				lbs	Max ap (in)			Arbor Style	Insert	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 ◯ Available Upon Request (see page A-10)

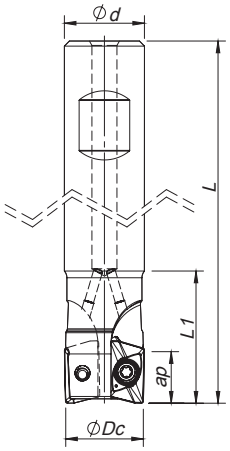


Threaded Coupling

κ_r=90° | γ_p=+5° ~+6°

Order code	Reference		Dimensions (in)				lbs	Max ap (in)			Insert	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 ◯ Available Upon Request (see page A-10)



Weldon Shank

κ_r=90° | γ_p=+5°~8°

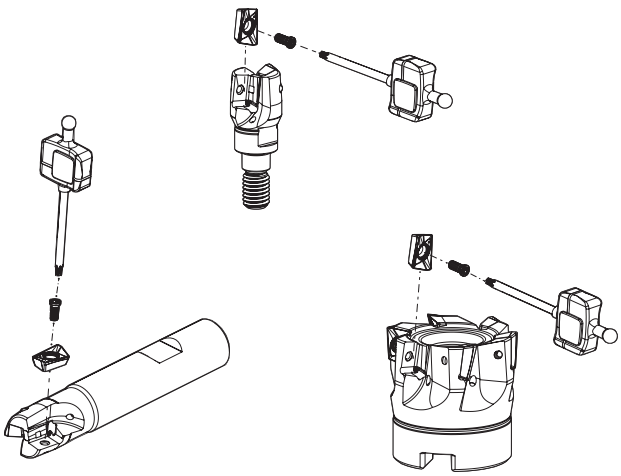
Order code	Reference		Dimensions (in)				lbs	Max ap (in)			Insert	Stock
			ØDc	Ød/M	L	L1		LP/MP	HF	MH		
181106300	XP90 D.625-W.625/3.25-02-10	2	0.625	0.625	3.252	1.083	0.23	0.394	0.031	0.118	XP... 1003...	◎
181106400	XP90 D.750-W.750/3.39-02-10	2	0.750	0.750	3.390	1.189	0.34	0.394	0.031	0.118	XP... 1003...	◎
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 ○ Available Upon Request (see page A-10)

SPARE PARTS

Order separately

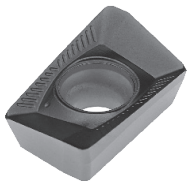
Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
			lbf/in	lbf/in
XP90-W-10 - 0.625-1.00	P0250704	XT08	DT0812	10.6
XP90-R-10 - 0.625-1.25	P0250704	XT08	DT0812	10.6
XP90-A-10 - 1.50-2.50	P0250704	XT08	DT0812	10.6



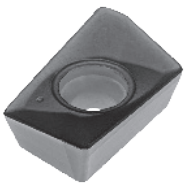
LINEPRO XP90-10

XP... 1003... | Inserts

XPET-LP
(PHH-PHP grade)



XPET-MP
(PHH-PHP grade)

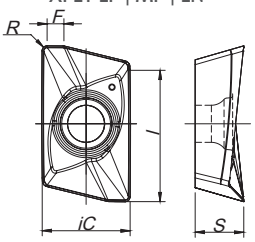


XPET-LN

PHH NEW GRADE

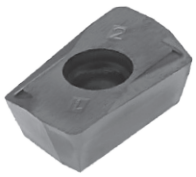
PHP NEW GRADE

XPET-LP | MP | LN

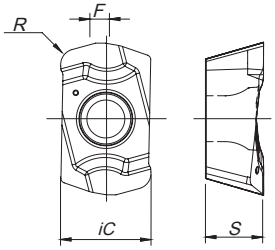


XPET-HF
(HiFeed geometry)

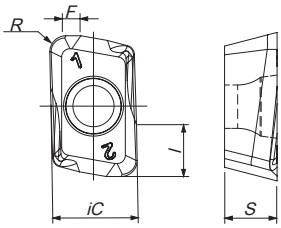
XPHW-MH NEW
(finishing geometry)



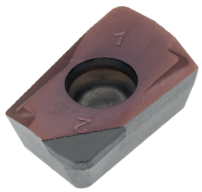
XPET-HF



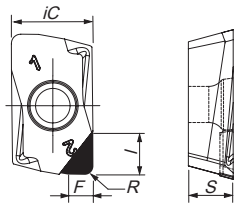
XPHW-MH



XPHW-R Z1 NEW



XPHW-R Z1



		P					M	K					N		S	H		Dimensions (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	PH5740	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
◉ Stock Items
△ Stock available until sold out
○ Available Upon Request (see page A-11)

Insert Order Code: [1] Geometry code + [2] Grade code

CHIP BREAKER SELECTION GUIDE

ISO	PSM	Material	HB (Brinell)	Chip breaker 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	-

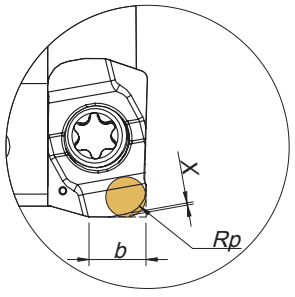
GRADES SELECTION GUIDE

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

Insert	Programming Data		
	Rp	X	b
XPET 10 HF	0.063	0.013	0.136



LINEPRO XP90-10

RECOMMENDED CUTTING CONDITIONS

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):

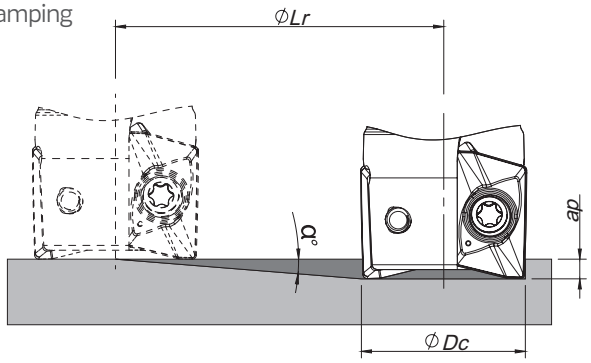
Operation	a_e	Vc & fz	a_p (in)
Slotting	100%	<20%	0.078-0.157
Shouldering	<50%	>8%	0.118-0.236
	≤25%	>12%	0.276-0.354

(Note 4):

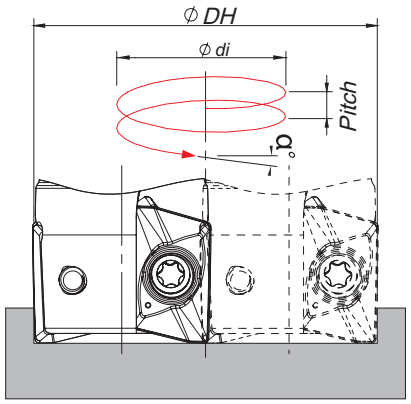
It's possible for vibration to occur in certain cases. Please reduce depth of cut and/or reduce cutting conditions in following cases:
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

RAMPING AND HELICAL INTERPOLATION

Ramping



Helical Interpolation



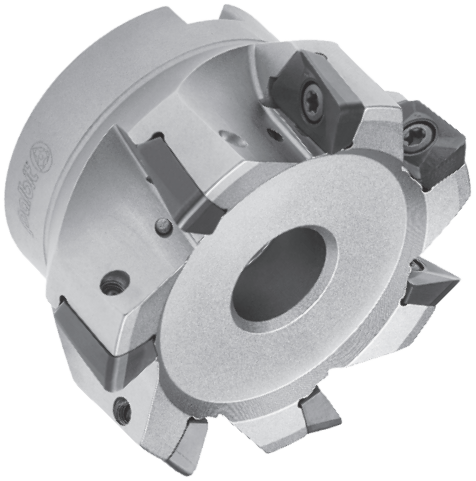
Blind hole
Flat bottom

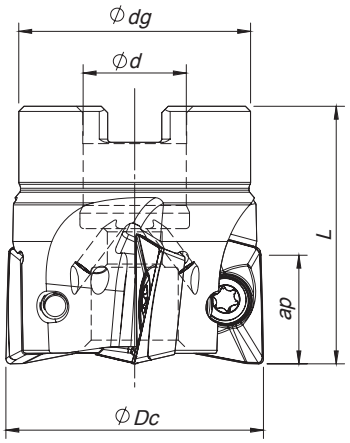
Ødi = ØDH - ØDc

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	
0.625	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)



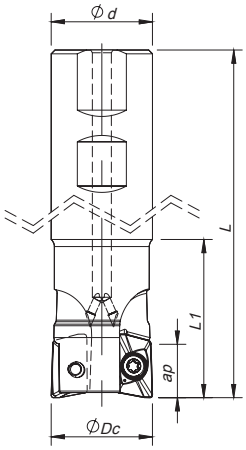


Arbor Mounting

K_r=90° | γ_p=+7° ~+8°

Order code	Reference		Dimensions (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 ○ Available Upon Request (see page A-10)



Weldon Shank

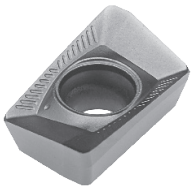
K_r=90° | γ_p=+6° ~+7°

Order code	Reference		Dimensions (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 ○ Available Upon Request (see page A-10)

XPET 1706...

XPET-LP

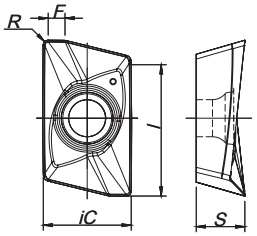


XPET-MP

PHH NEW GRADE

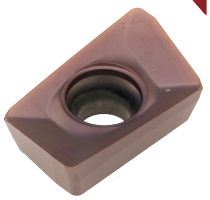
PHP NEW GRADE

XPET-LP | MP | LN | LS

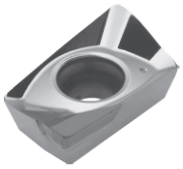


XPET-LN

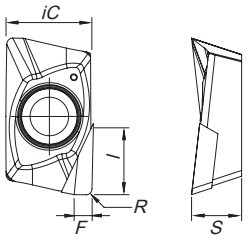
XPET-LS (PHH grade) NEW



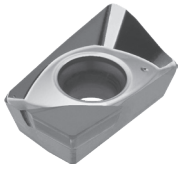
XPET-LN Z1 NEW



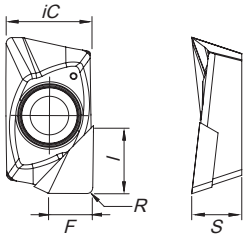
XPET-LP | MP | LN | LS



XPET-LN Z1W NEW



XPET-LP | MP | LN | LS



		P			M		K				N		S		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

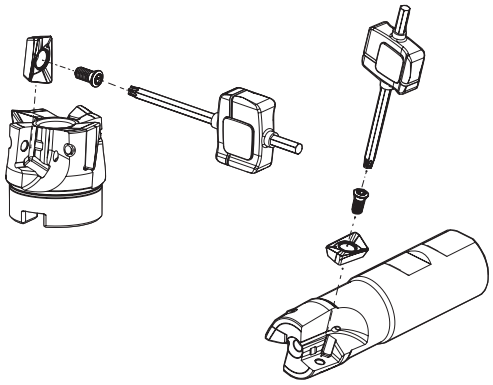
◬ First choice ◬ Stock item ◯ Available under request (see page A-11)

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

LINEPRO XP90-17

SPARE PARTS

Cutter ØDc	Insert Screw	Key (Torx)	Order separately Key (Torx - lbf/in)	Torque Value
				
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



GRADES SELECTION GUIDE

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

Good Conditions Average Conditions Difficult Conditions

CHIP BREAKER SELECTION GUIDE

ISO	PSM	Material	HB (Brinell)	Chip breaker 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

LINEPRO XP90-17

RECOMMENDED CUTTING CONDITIONS

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	-	0.004-0.01	-	-	-
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

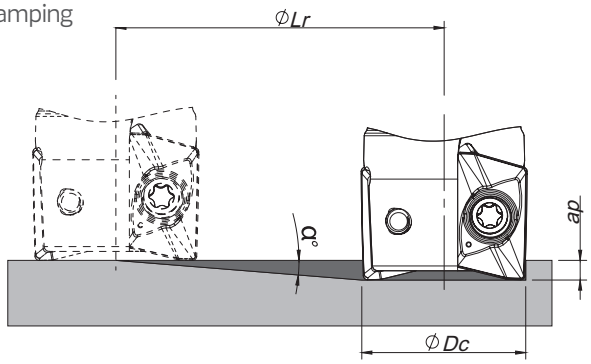
(Note 1) Cutting conditions ae/DC=70%
(Note 2) Cutting conditions should be ajusted according to the machine and work rigidity.
(Note 3):

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

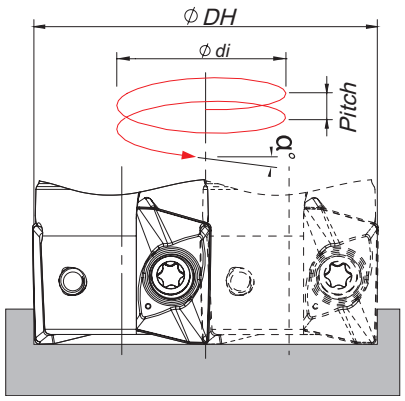
(Note 4) It's possible for vibration to occur in certain cases.
Please reduce depth of cut and/or reduce cutting conditions in following cases:
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

RAMPING AND HELICAL INTERPOLATION

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	
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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