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TOOLING SOLUTIONS EXPERTS
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PalbitUSA.com

PILOT
Precision Products

TETRAFEED

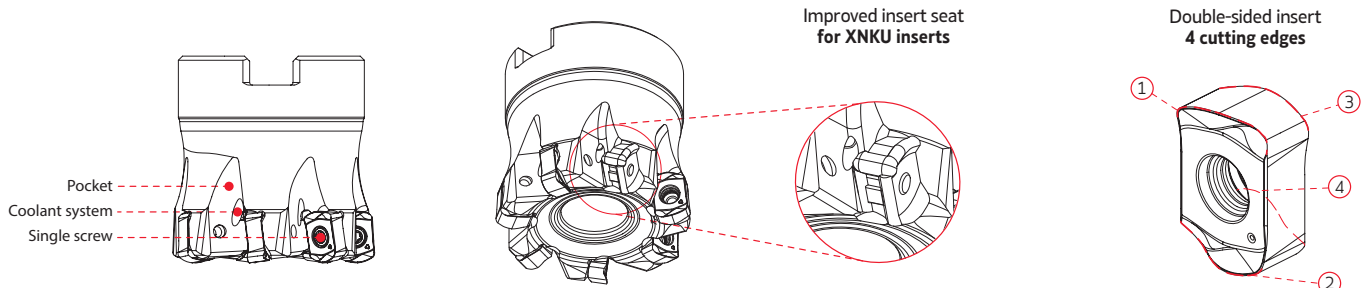
XN20-06 | XN20-12

Double-Sided
High Feed Milling Solution

TETRAFEED XN20-06 | XN20-12

NEW

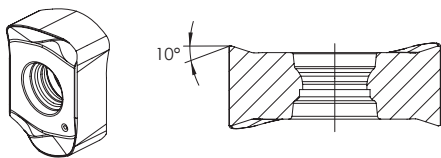
The tetrafeed line is expanding! With the XNKU 06 and XNKU 12, there are no limits for high feed machining of either small or large sized components. The 4 cutting edge negative insert allows you to achieve feeds of up to 0.059 in. and depth of cut of 0.059 in., leading to higher productivity.



XNKU 06T3 | 1205

NEW

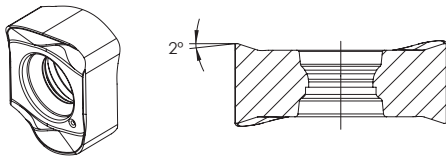
XNKU 06T310-MP



INSERT SIZE **06** XNKU 06T3

XNKU-MP

XNKU 120516-MP

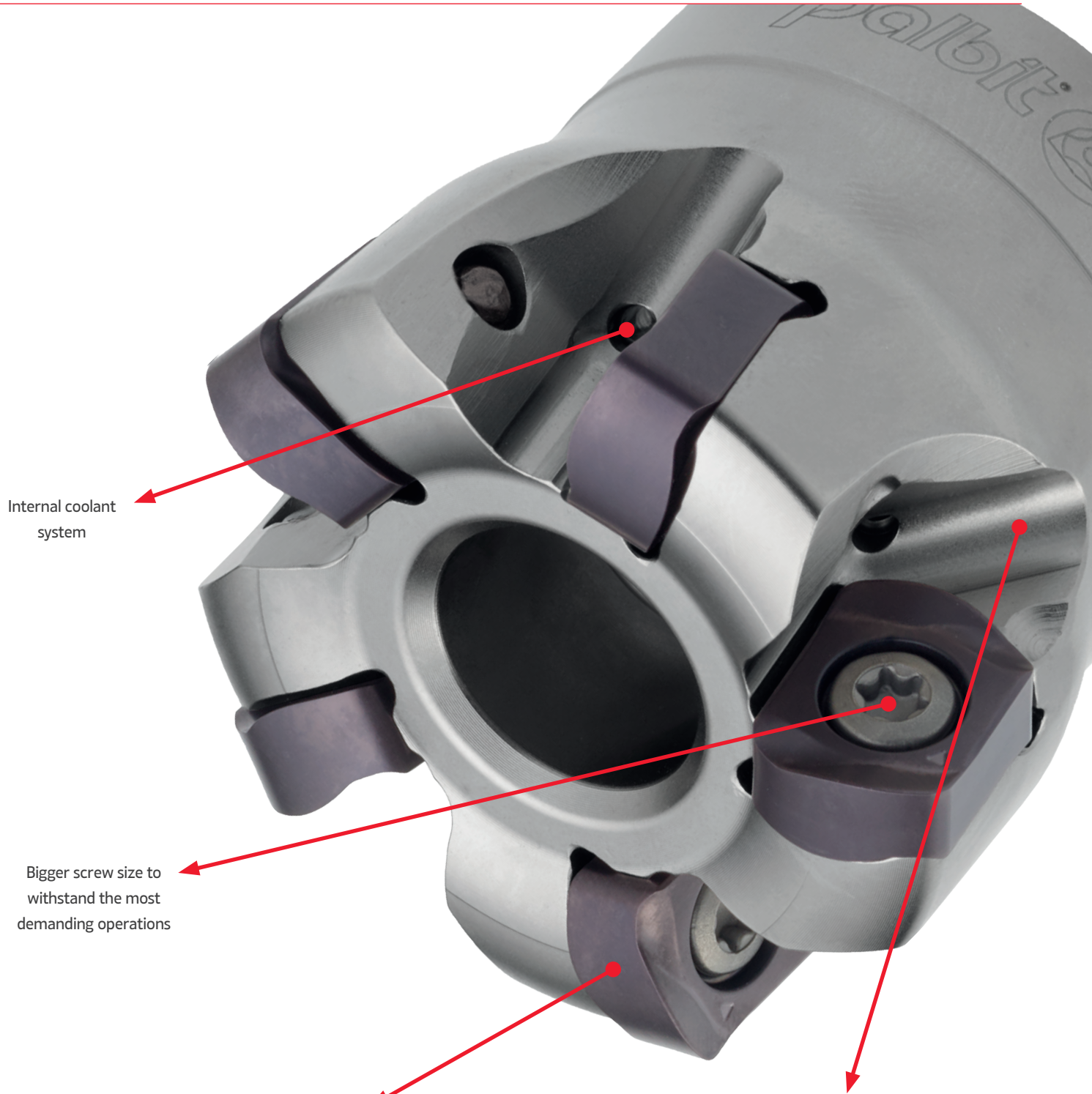


INSERT SIZE **12** XNKU 1205

XNKU-MP

GEOMETRY FEATURES

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



Internal coolant system

Bigger screw size to withstand the most demanding operations

Insert Width

- Robust insert with large cross section

Cutting Edge

- Improved cutting edge
- Improved wear resistance

Double-Sided Insert

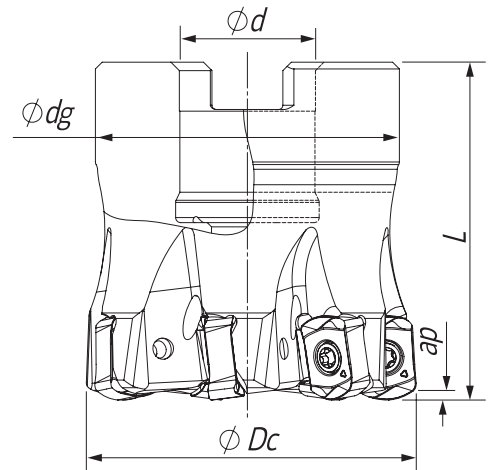
- Double-sided insert with 4 cutting edges

Design

- Optimized design for better chip evacuation

Pocket

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

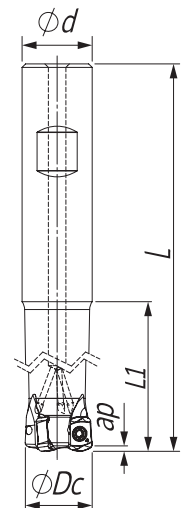


Arbor Mounting
 $\kappa_r=20^\circ$ | $\gamma_p=-7^\circ$ | $R_p=0.071$

Order Code	Reference		Dimensions (in)					Specifications		Insert	Stock
			ϕDc	$\phi d/M$	ϕdg	L		A_p max (in)	Arbor Type		
181169900	XN20 D1.50-A.500/1.50-07-06	7	1.500	0.500	1.450	1.500	0.434	0.040	A	XNKU 06...	
181170000	XN20 D2.00-A.750/1.50-08-06	8	2.000	0.750	1.770	1.500	0.725	0.040	A	XNKU 06...	
181170100	XN20 D2.50-A1.00/1.50-09-06	9	2.500	1.000	1.850	1.500	1.100	0.040	A	XNKU 06...	

Stock item

Available upon request

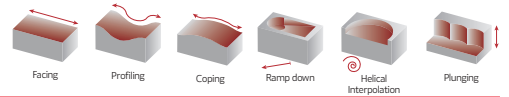


Weldon Shank
 $\kappa_r=20^\circ$ | $\gamma_p=-7^\circ$ | $R_p=0.071$

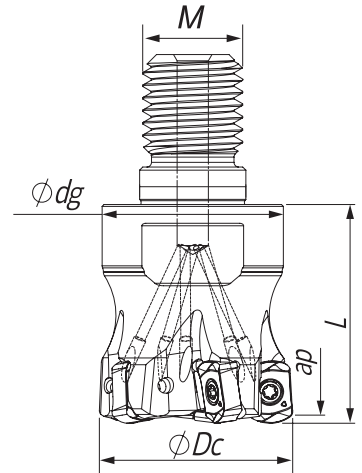
Order Code	Reference		Dimensions					Specifications		Insert	Stock
			ϕDc	$\phi d/M$	L	L1		A_p max (in)	Arbor Type		
181170200	XN20 D.625-W.625/3.50-02-06	2	0.625	0.625	3.500	1.250	0.224	0.040	XNKU 06...		
181170300	XN20 D.750-W.750/4.00-03-06	3	0.750	0.750	4.000	1.750	0.372	0.040	XNKU 06...		
181170400	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

Available upon request



Threaded Coupling
 $K_r=20^\circ$ | $\gamma_p=-7^\circ$ | $R_p=0.071$



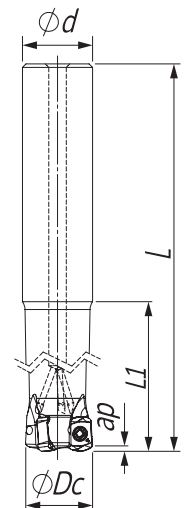
Order Code	Reference		Dimensions (in)					Specifications	Insert	Stock
			ϕDc	$\phi d/M$	ϕdg	L				
181169400	XN20 D.625-R-08/.984-02-06	2	0.625	M8	0.580	0.985	0.050	0.040	XNKU 06...	
181169500	XN20 D.750-R-10/1.18-03-06	3	0.750	M10	0.730	1.180	0.090	0.040	XNKU 06...	
181169600	XN20 D1.00-R-12/1.18-04-06	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

Available upon request



Cylindrical Shank
 $K_r=20^\circ$ | $\gamma_p=-7^\circ$ | $R_p=0.071$



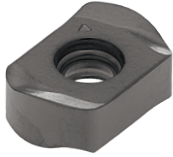
Order Code	Reference		Dimensions					Specifications	Insert	Stock
			ϕDc	$\phi d/M$	L	L1				
181170600	XN20 D.625-C.625/6.00-02-06	2	0.625	0.625	6.000	2.000	0.458	0.040	XNKU 06...	
181170700	XN20 D.750-C.750/6.50-03-06	3	0.750	0.750	6.500	2.950	0.632	0.040	XNKU 06...	
181170800	XN20 D1.00-C1.00/7.00-04-06	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

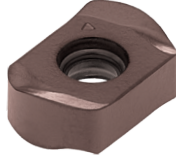
Available upon request

XNKU 06T3... | Inserts

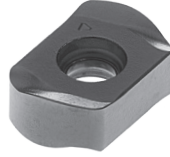
XNKU-MP
(PHP grade)



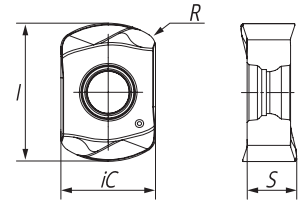
XNKU-MP
(PHH grade)



XNKU-MP
(PHS grade)



XNKU-MP



		P				M		K		S		Dimensions (in)			
		CVD	PVD			CVD	PVD	CVD	PVD	CVD	PVD				
(2) Grade Code		T9	G4	T1	P4	T9	X9	T9	T1	T9	X9	iC	S	I	R
(1) Geometry Code	ISO Reference	PHS740	PHP910	PHP920	PHP930	PHS740	PHH930	PHS740	PHP920	PHS740	PHH930				
1112802	XNKU 06T310-MP	⊗	⊗	⊗	○	⊗	⊗	⊗	⊗	⊗	⊗	0.270	0.142	0.394	0.039

⊗ First choice

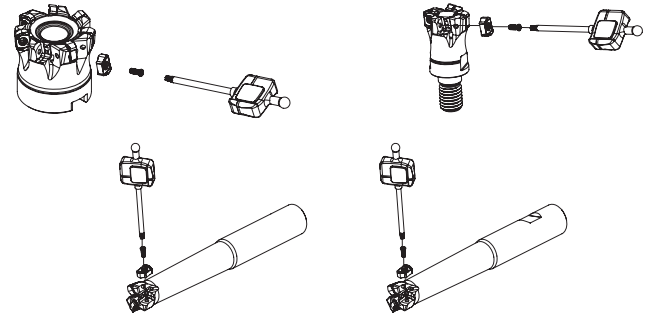
⊗ Stock item

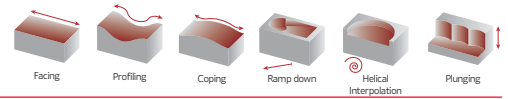
○ Available upon request

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

SPARE PARTS

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





GRADE SELECTION GUIDE

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

Good Conditions
 Average Conditions
 Difficult Conditions

RECOMMENDED CUTTING CONDITIONS

ISO	PSM	Material	HB (Brinell)	Vc (SFM)					Feed fz (in/t)
				← Wear Resistance			Toughness →		
				PHP910	PHP920	PHP930	PHH930	PHS740	
P	1	Unalloyed Steel	125-220	590-820	590-820	525-755	-	525-755	0.020-0.060
	2	Low-Alloyed Steel	220-280	525-790	560-690	490-625	-	490-620	0.020-0.060
	3	High-Alloyed Steel	280-380	460-755	525-655	460-590	-	460-590	0.020-0.060
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	425-560	395-590	0.020-0.055
	5	SS - Austenitic	200-330	-	-	-	330-525	330-490	0.020-0.055
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	260-455	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	100-230	0.020-0.050

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

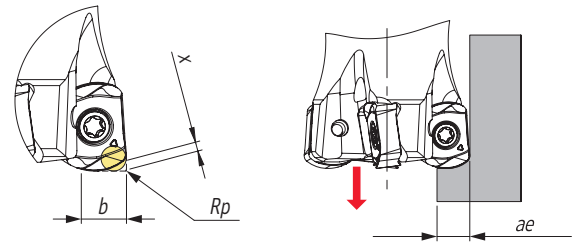
(Note 2) It's possible to experience vibration in certain cases. Please reduce depth of cut or modify cutting conditions in the following cases:

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

(Note 3) When using $\varnothing D_c=0.625$ in., apply 70% or less feed (fz) based on values in the table above.

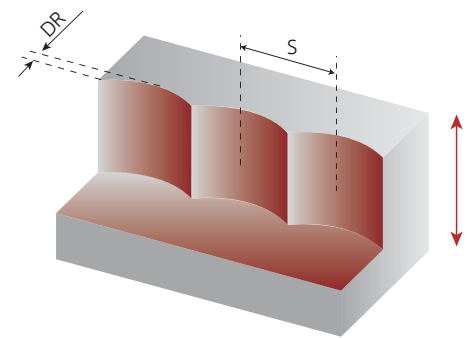
PROGRAMMING DATA

Insert	Programming Data			
	Rp	X	b	ae
XNKU 06T310-MP	0.071	0.016	0.142	0.134



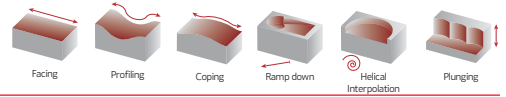
PLUNGING

L ≤ 3Dc	L > 3Dc	S max.
fz (in/t)		
0.004-0.006	0.002-0.004	$S_{max} = \sqrt{D_c \cdot D_r - D_r^2}$

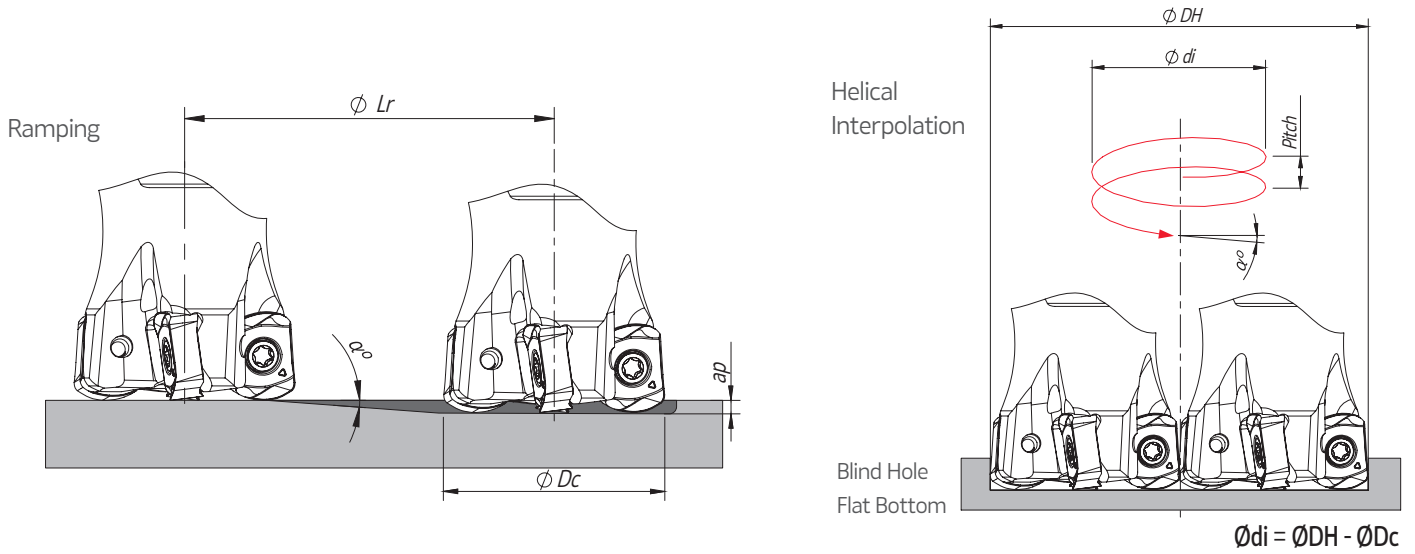


S max and DR Corresponding Cutting Diameter Dc (in)							
DR (in)	Dc (in)						
	0.625	0.750	1.000	1.250	1.500	2.000	2.500
0.039	0.151	0.167	0.194	0.217	0.239	0.277	0.310
0.079	0.208	0.230	0.270	0.304	0.335	0.390	0.437
0.118	0.245	0.273	0.323	0.365	0.404	0.471	0.530

Note: Recommended for $L \leq 4 D_c$. When using an extra long tool, this step must be modified and the side cut reduced.



RAMPING AND HELICAL INTERPOLATION

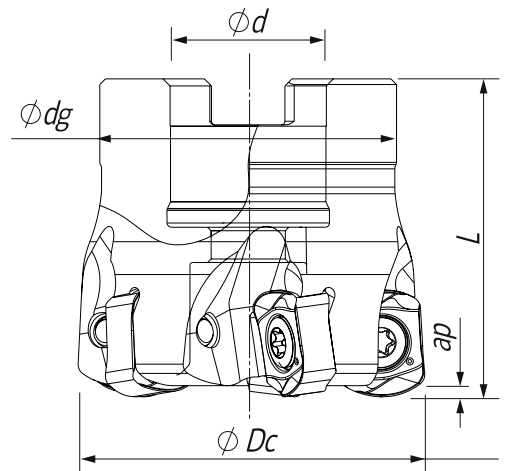
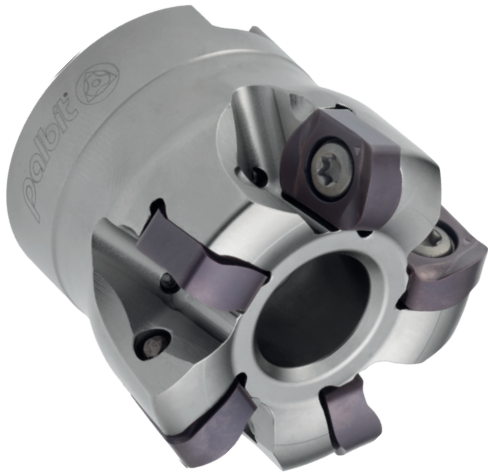


ϕD_c	Ramping			Helical Interpolation		
	Max Ramp α°	Max a_p	Min L_r	ϕD_{Hmin}	ϕD_{Hmax}	Max Pitch/Rev.
0.625	0.5	0.039	4.469	0.966	-	0.009
				-	1.171	0.014
0.750	0.5	0.039	4.469	1.216	-	0.012
				-	1.421	0.018
1.000	0.8	0.039	2.793	1.716	-	0.031
				-	1.921	0.039
1.250	0.8	0.039	2.793	2.216	-	0.039
				-	2.421	0.039
1.500	0.4	0.039	5.586	2.716	-	0.026
				-	2.921	0.031
2.000	0.3	0.039	7.448	3.716	-	0.028
				-	3.921	0.031
2.500	0.25	0.039	8.938	4.716	-	0.030
				-	4.921	0.030

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 (f_z) from recommended cutting conditions table.



Arbor Mounting
 $K_r=20^\circ$ | $\gamma_p=-7^\circ$ | $R_p=0.130$

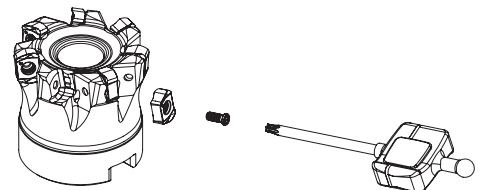
Order Code	Reference		Dimensions					Specifications		Insert	Stock
			ϕDc	ϕd	ϕdg	L		A_p max (in)	Arbor Type		
181187500	XN20 D2.00-A.750/1.97-05-12	5	2.000	0.750	1.772	1.969	0.919	0.059	A	XNKU 12...	<input type="radio"/>
181187600	XN20 D2.50-A.750/1.97-06-12	6	2.500	0.750	1.772	1.969	1.247	0.059	A	XNKU 12...	<input type="radio"/>
181187700	XN20 D3.00-A1.00/2.48-07-12	7	3.000	1.000	2.205	2.480	2.330	0.059	A	XNKU 12...	<input type="radio"/>
181187800	XN20 D4.00-A1.50/2.48-10-12	10	4.000	1.500	3.386	2.480	4.884	0.059	A	XNKU 12...	<input type="radio"/>

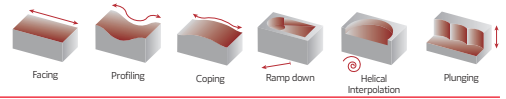
Stock item

Available upon request

SPARE PARTS

Cutter ϕDc	Order separately			
	Insert Screw	Key (Torx)	Key (Torx - lbf/in)	Torque Value
XN20-12 - 2.00-4.00				43.3

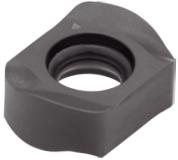




XNKU 1205... || Inserts



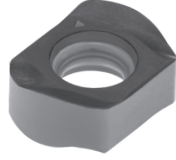
XNKU-MP
(PHP grade)



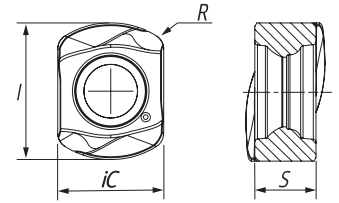
XNKU-MP
(PHH grade)



XNKU-MP
(PHS grade)



XNKU-MP



		P				M		K			S		Dimensions (in)			
		CVD	PVD			CVD	PVD	CVD	PVD		CVD	PVD				
(1) Grade Code	(2) ISO Reference	T9	X5	T1	P4	T9	X9	T9	X5	T1	T9	X9	iC	S	I	R
1113071	XNKU 120516-MP	⊗	⊗	⊗	○	⊗	○	⊗	⊗	⊗	⊗	○	0.461	0.232	0.591	0.063

⊗ First choice

⊗ Stock item

○ Available upon request

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

GRADE SELECTION GUIDE

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

 Good Conditions
 Average Conditions
 Difficult Conditions

RECOMMENDED CUTTING CONDITIONS

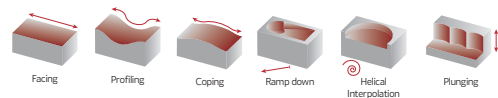
ISO	PSM	Material	HB (Brinell)	Vc (SFM)					Feed fz (in/t)
				← Wear Resistance			Toughness →		
				PHP910	PHP920	PHP930	PHH930	PHS740	
P	1	Unalloyed Steel	125-220	591-820	591-820	525-755	-	525-755	0.020-0.060
	2	Low-Alloyed Steel	220-280	525-788	558-689	492-624	-	492-624	0.020-0.060
	3	High-Alloyed Steel	280-380	460-755	525-656	460-591	-	460-591	0.020-0.060
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	427-558	394-591	0.020-0.056
	5	SS - Austenitic	200-330	-	-	-	328-525	328-492	0.020-0.056
	6	SS - Austenitic-ferritic (Duplex)	230-260	-	-	-	263-460	230-427	0.020-0.056
K	7	Malleable Cast Iron	130-230	591-984	591-1050	-	-	525-984	0.020-0.060
	8	Grey Cast Iron	180-245	525-820	558-919	-	-	492-853	0.020-0.060
	9	Nodular Cast iron	160-250	492-689	328-788	-	-	263-722	0.020-0.060
S	11	Heat Resistant Super Alloys	200-320	-	-	-	99-246	99-230	0.020-0.052

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

(Note 2) It's possible for vibration to occur in certain cases. Please reduce depth of cut or modify cutting conditions in the following cases:

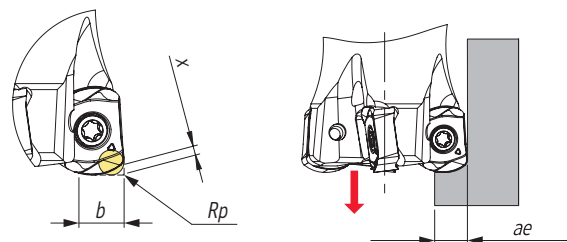
- When using long shank;
- When using long tool overhang with arbor type; and
- When application has poor clamping rigidity or when using a low rigidity machine.

(Note 3) When using $\varnothing D_c=16\text{mm}$ apply 70% or less feed (fz) based on values in the table above.



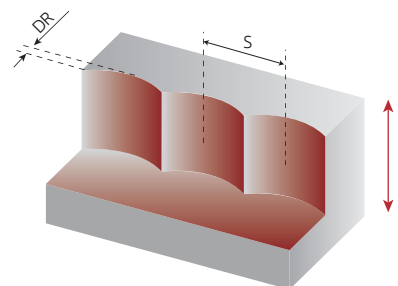
PROGRAMMING DATA

Insert	Programming Data			
	Rp	X	b	ae
XNKU 120516-MP	0.130	0.026	0.296	0.280



PLUNGING

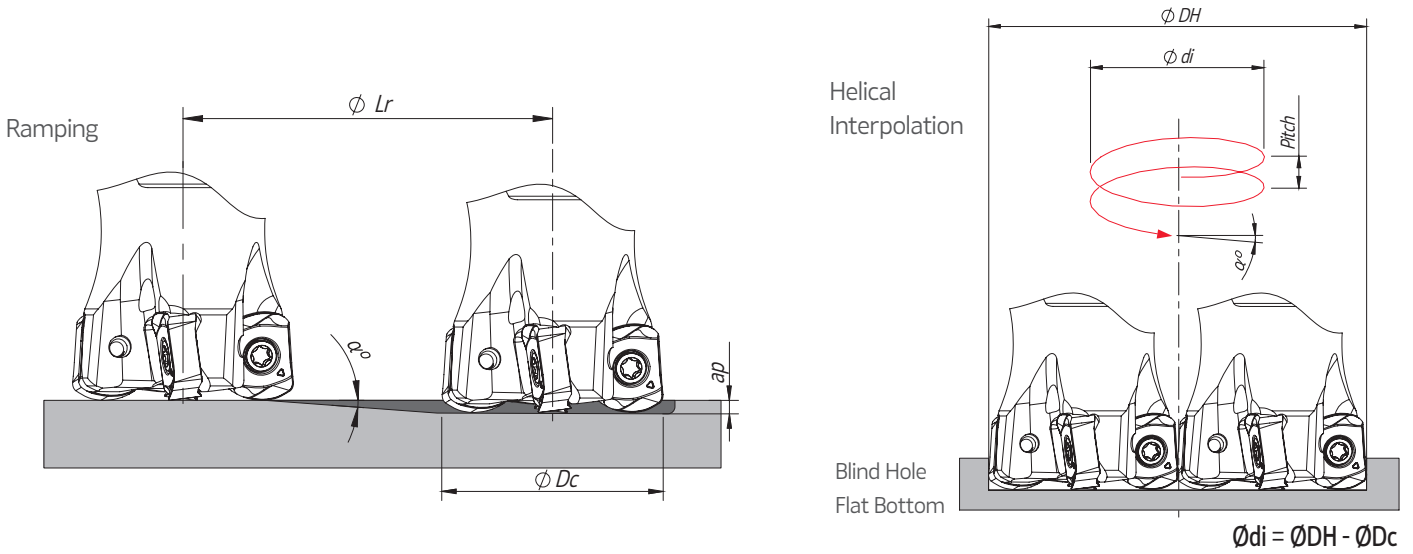
L ≤ 3Dc	L > 3Dc	S max.
fz (in/t)		
0.004-0.006	0.004-0.005	$S_{max} = \sqrt{DC \cdot DR - DR^2}$



S max and DR Corresponding Cutting Diameter Dc (in)				
DR (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

Note: Recommended for L ≤ 4 Dc. When using an extra long tool, this step must be modified and the side cut reduced.

RAMPING AND HELICAL INTERPOLATION



ϕD_c	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min L_r	ϕD_{Hmin}	ϕD_{Hmax}	Max Pitch/Rev.
2.000	0.8	0.059	4.225	3.716	-	0.059
				-	3.921	0.059
2.500	0.6	0.059	5.634	4.716	-	0.059
				-	4.921	0.059
3.000	0.5	0.059	6.761	5.716	-	0.059
				-	5.921	0.059
4.000	0.35	0.059	9.658	7.716	-	0.059
				-	7.921	0.059

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 (f_z) from recommended values in the cutting conditions table.

TEST REPORTS

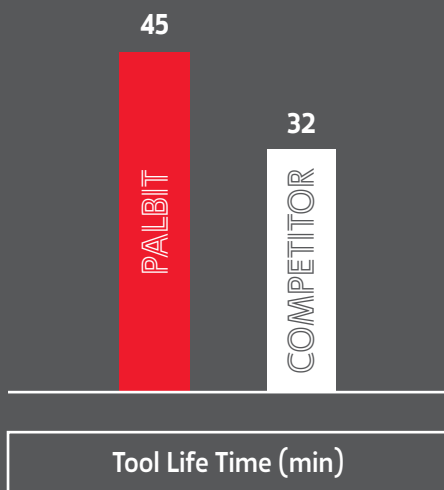
TETRAFEED XN20-06 - TEST REPORT

Toolholder: XN20 D1.25-R-16/1.38-05-06

Insert: XNKU 06T310-MP

Grade: PHH930

**40%
More Tool
Life**



Workpiece material: stainless steel, AISI 316

Cutting Speed (Vc):	394 SFM
Feed per Tooth (fz):	0.039 in/t
Depth of Cut (ap):	0.020 in
Width of Cut (ae):	0.945 in
Method of Machining:	Ramping and Helical Interpolation
Coolant:	Dry

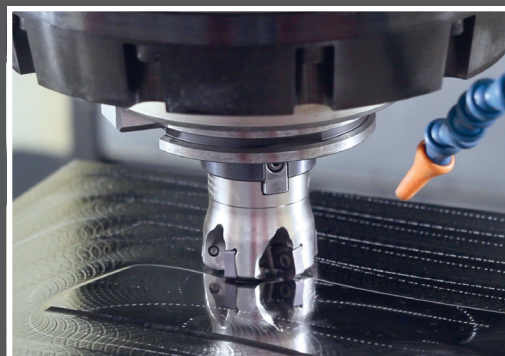
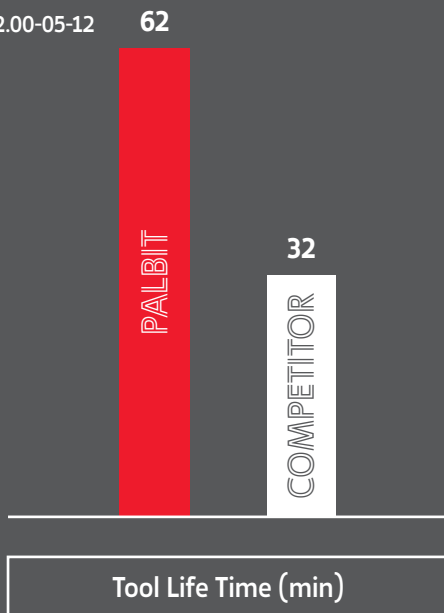
TETRAFEED XN20-12 - TEST REPORT

Toolholder: XN20 D2.00-A.750/2.00-05-12

Insert: XNKU 120516-MP

Grade: PHP920

**94%
More Tool
Life**



Workpiece material: 1.2738 | 34-36 HRC, Mould Steel

Cutting Speed (Vc):	656 SFM
Feed per Tooth (fz):	0.047 in/t
Depth of Cut (ap):	0.039 in
Width of Cut (ae):	60%
Method of Machining:	Facing
Coolant:	Air



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