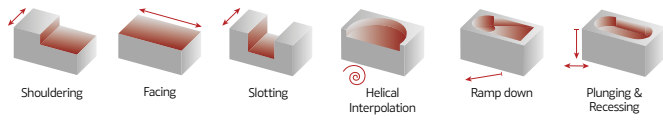


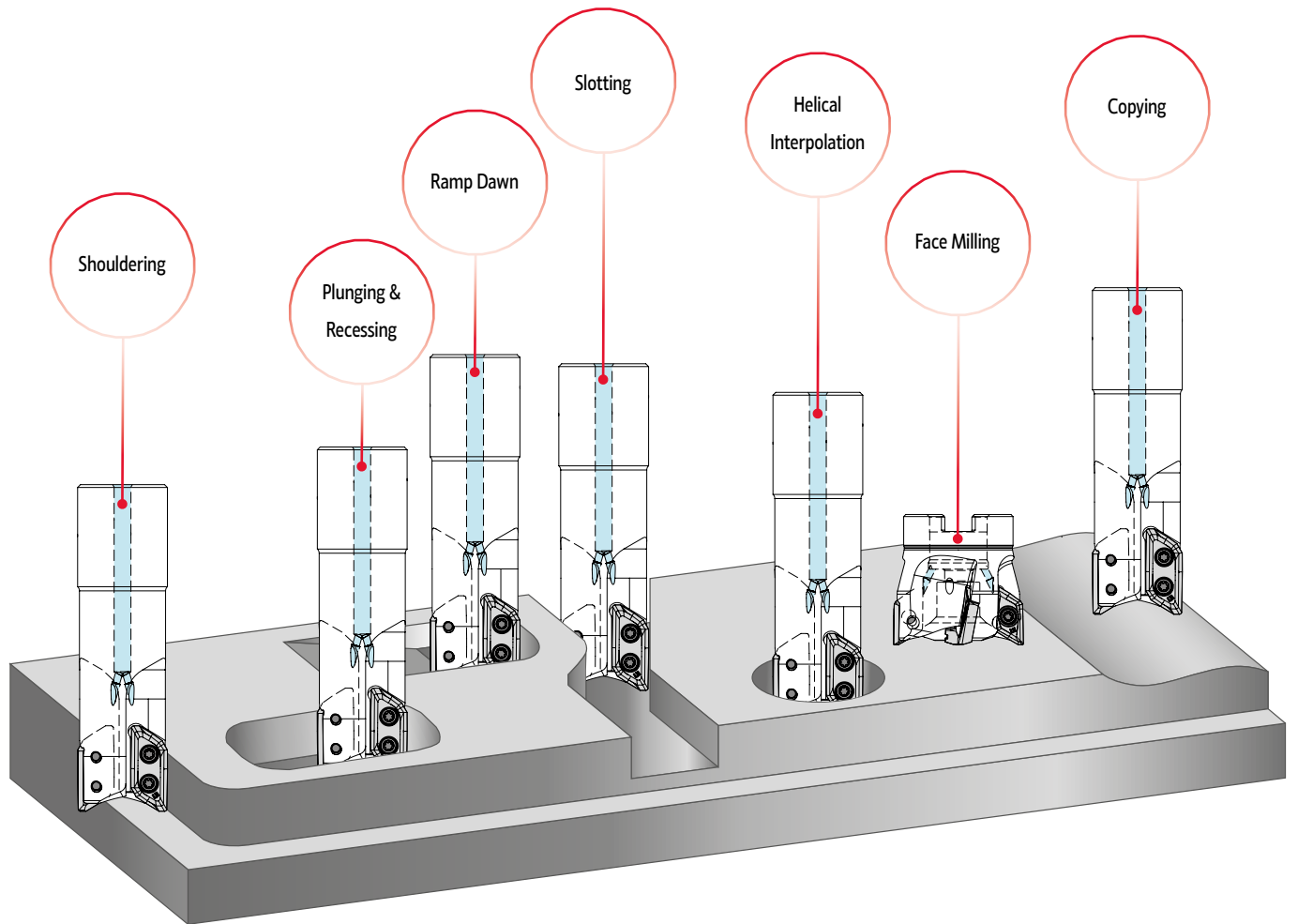
High performance milling for aluminium alloys



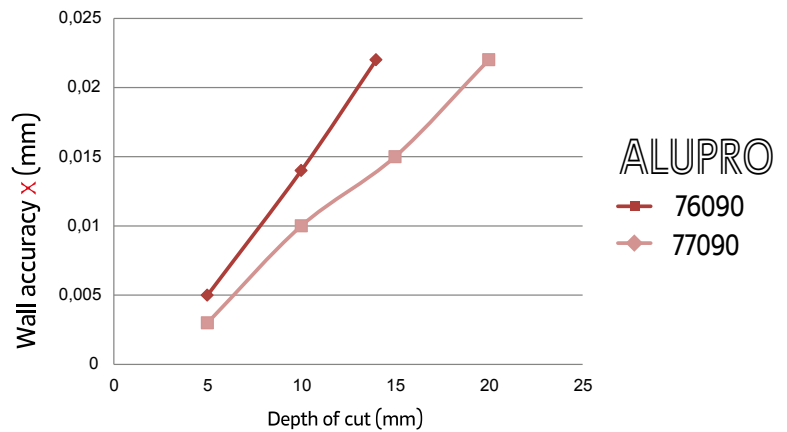
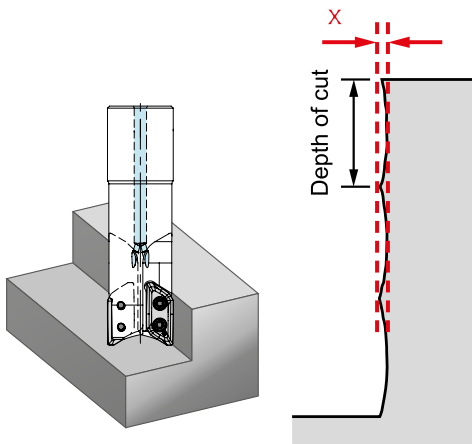
ALUPRO
76090 | 77090



MULTIFUNCTIONAL TOOL



WALL ACCURACY



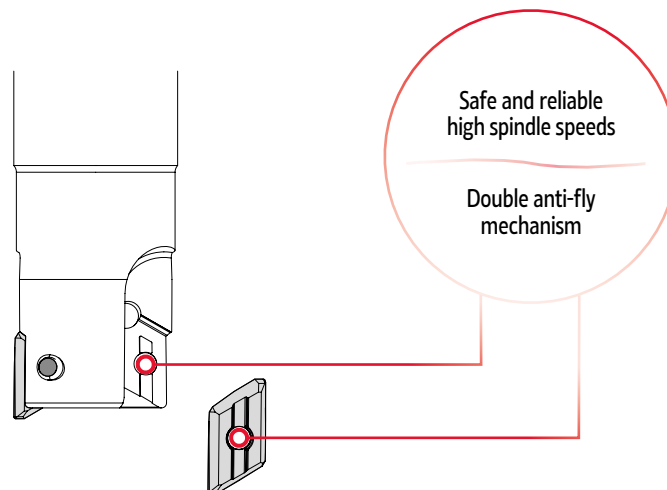
MAIN FEATURES

Cutters

Excellent multi functional milling tool for non-ferrous materials.

- High speed milling can be achieved due to double screw clamping & anti-fly system.
- High accuracy cutters to prevent vibrations at high speeds.

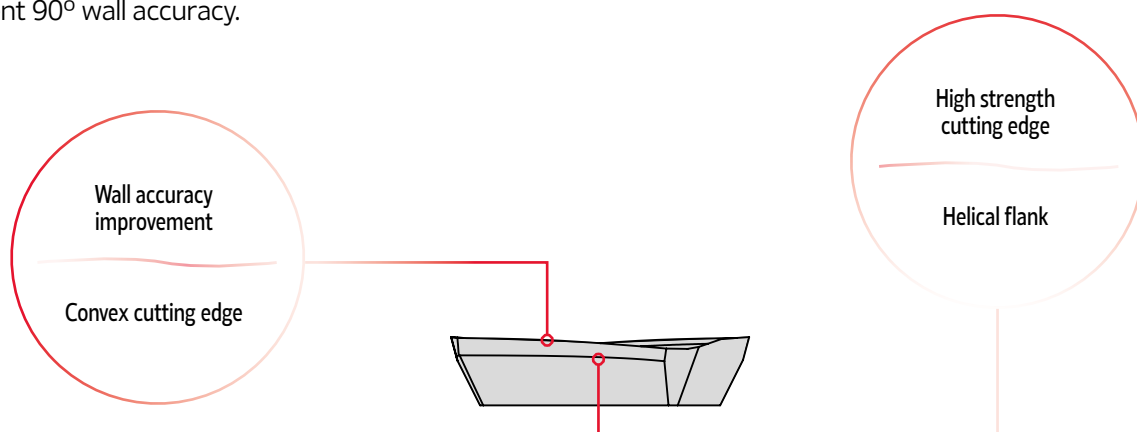
Anti-fly system



Inserts

High rake angle geometry that provides a good surface finish and low cutting forces.

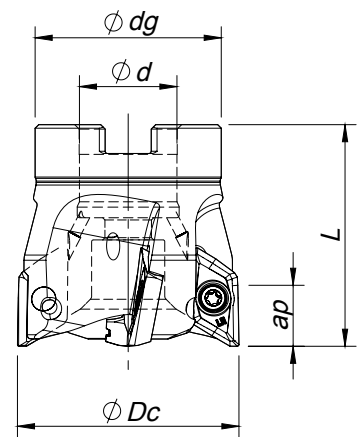
- Sharp cutting edge to produce good chip flow and reduce build up edge.
- High helical angle offers cutting edge strength.
- Excellent 90° wall accuracy.



Specifications

Geometry: 90° milling operations.

- Cutter diameters:
 - Cylindrical (C): Ø 20 till Ø 40
 - Arbor Mounting (A): Ø 40 till Ø 125
- Workpiece materials: Aluminium & Non-ferrous alloys.



Arbor Mounting

$K_r=90^\circ$ | $\gamma_p=+11^\circ$

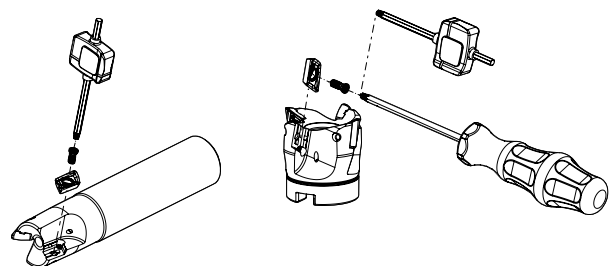
Order code Código	Reference Referência Referencia		Dimensions Dimensões Dimensiones (mm)				Kg	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			ϕDc	ϕd	ϕdg	L		Cutter Type	Max ap (mm)	rpm max		
181094200	040A76090-03-11-016050-A	3	40	16	32	50	0,3	A	14,0	29 000	0,4-3,2	
181083400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

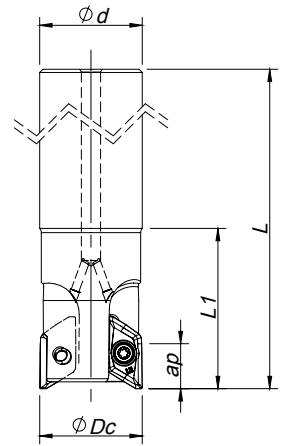
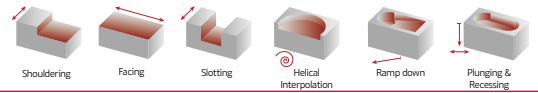
Stock item | Produto de stock | Itens de stock

Available under request | Disponível sobre consulta | Disponible bajo consulta

SPARE PARTS | Complementos | Repuestos

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





Cylindrical Shank

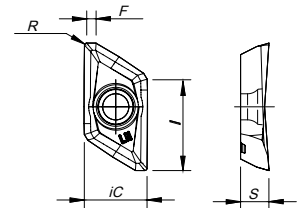
$K_r=90^\circ$ | $\gamma_p=+6^\circ \sim +11^\circ$

Order code Código	Reference Referência Referencia		Dimensions Dimensões Dimensiones (mm)				Kg	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			ØDc	Ød	L	L1		Cutter Type	Max ap (mm)	rpm max		
181095000	020E76090-01-06-020150-A	1	20	20	150	60	0,2	A	15,0	40 000	0,4~3,2	
181095100	025E76090-02-09-025180-A	2	25	25	180	90	0,4	A	15,0	38 000	0,4~3,2	
181095200	032E76090-02-09-032200-A	2	32	32	200	120	0,7	A	15,0	33 000	0,4~3,2	
181095300	040E76090-03-11-032250-A	3	40	32	250	65	1,4	A	15,0	29 000	0,4~3,2	
181095400	020E76090-01-06-020150-B	1	20	20	150	60	0,2	B	15,0	40 000	4,0~5,0	
181095500	025E76090-02-09-025180-B	2	25	25	180	90	0,4	B	15,0	38 000	4,0~5,0	
181095600	032E76090-02-09-032200-B	2	32	32	200	120	0,7	B	15,0	33 000	4,0~5,0	
181095700	040E76090-03-11-032250-B	3	40	32	250	65	1,4	B	15,0	29 000	4,0~5,0	

Stock item | Produto de stock | Itens de stock

Available under request | Disponível sobre consulta | Disponible bajo consulta

XDGX 15M5... || Inserts | Pastilhas | Plaquetas



Geometry code	ISO Reference	P					M				K			N		S		H	Dimensions Dimensões Dimensiones (mm)					Cutter Type						
		CVD		PVD			CVD		PVD		CVD	PVD		UNC	PCD	PVD		PVD	iC	S	I	R	F							
		T9	P7	G1	G4	P3	R1	G4	P3	G6	L5	L6	G1	P3	G6	10	D6	P3							G6	P7				
1111624	XDGX 15M504 PDFR-LN																								11,20	5,00	16,0	0,40	1,50	A
1111625	XDGX 15M508 PDFR-LN																								11,20	5,00	16,0	0,80	1,10	A
1111626	XDGX 15M512 PDFR-LN																								11,20	5,00	16,0	1,20	0,70	A
1111627	XDGX 15M516 PDFR-LN																								11,20	5,00	16,0	1,60	0,40	A
1111628	XDGX 15M520 PDFR-LN																								11,20	5,00	16,0	2,00	0,20	A
1112154	XDGX 15M530 PDFR-LN																								11,20	5,00	16,0	3,00	0,60	A
1111629	XDGX 15M532 PDFR-LN																								11,20	5,00	16,0	3,20	0,60	A
1111630	XDGX 15M540 PDFR-LN																								11,20	5,00	16,0	4,00	0,50	B
1111631	XDGX 15M550 PDFR-LN																								11,20	5,00	16,0	5,00	0,40	B

First choice | Primeira opção | 1ª opción

Stock item | Produto de stock | Itens de stock

Available under request | Disponível sobre consulta | Disponible bajo consulta

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

ALUPRO 76090

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

SHOULDERING							
ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Width of Cut ae (mm)	Depth of Cut ap (mm)	Feed fz(mm/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	350-3000	≤ 25% ØDc	≤5.0	0,35 - 0,40
						5.0 - 10.0	0,30 - 0,35
						10.0 - 15.0	0,25 - 0,30
					< 50% ØDc	≤5.0	0,35 - 0,40
						5.0 - 10.0	0,30 - 0,35
						10.0 - 15.0	0,25 - 0,30
					≤ 75% ØDc	≤5.0	0,30 - 0,35
						5.0 - 10.0	0,25 - 0,30
						10.0 - 15.0	0,20 - 0,25

SLOTING							
ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Width of Cut ae (mm)	Depth of Cut ap (mm)	Feed fz(mm/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	350-3000	100% ØDc	≤5.0	0,25 - 0,35
						5.0 - 10.0	0,20 - 0,30
						10.0 - 15.0	0,15 - 0,25

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

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

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

(Note 3) Use internal coolant supply

OPERATIONAL GUIDE | Guia operacional | Guía operativa

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

- Even when operating under the maximum allowable spindle speed, if the spindle speed is equal or higher than the values shown in Table 2., it is recommended that the balance quality (with the arbor or chuck) according ISO 1940.

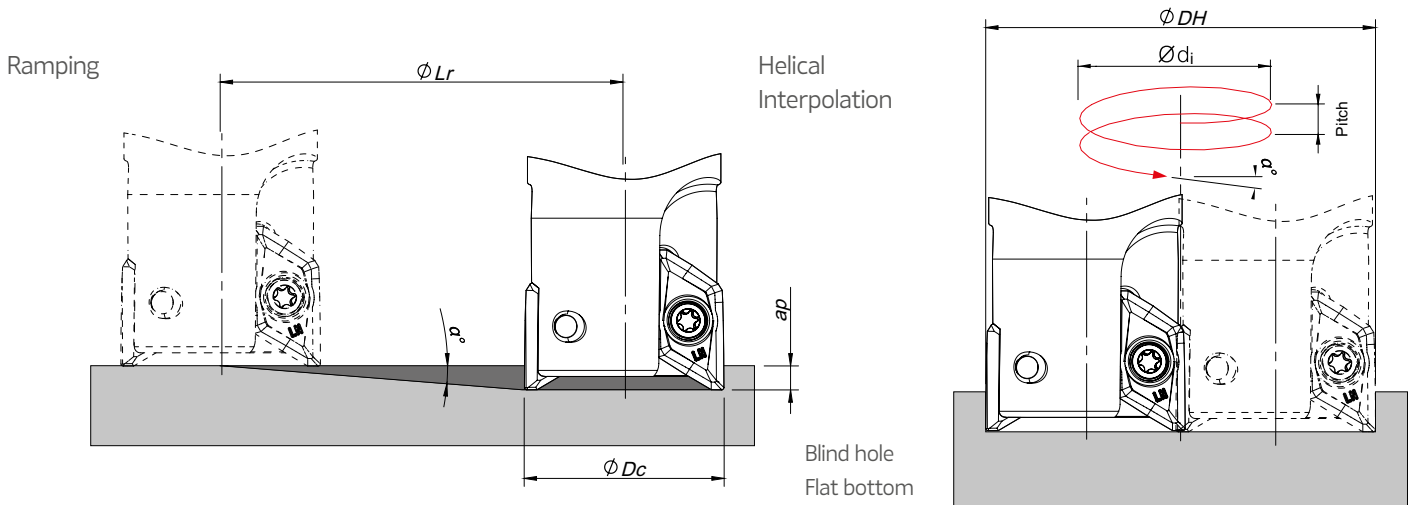
Table 2 - Maximum revolutions when balancing with the arbor or chuck has not been achieved:

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

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

RAMPING AND HELICAL INTERPOLATION

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



$$\phi_{di} = \phi_{DH} - \phi_{Dc}$$

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

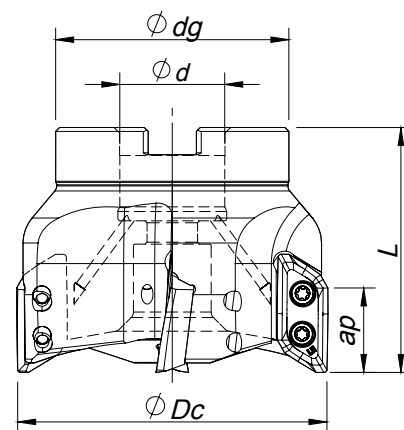
(1) using insert radius 0,8 mm

Note: During helical interpolation do not exceed maximum pitch.

When using different insert radius to calculate the ϕ_{DHmin} and ϕ_{DHmax} use the equation below:

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

- Maximum Diameter: $\phi_{DHmax} = 2 \times (\phi_{Dc} - R \text{ corner radius})$



Arbor Mounting

$K_r=90^\circ$ | $\gamma_p=+7^\circ$

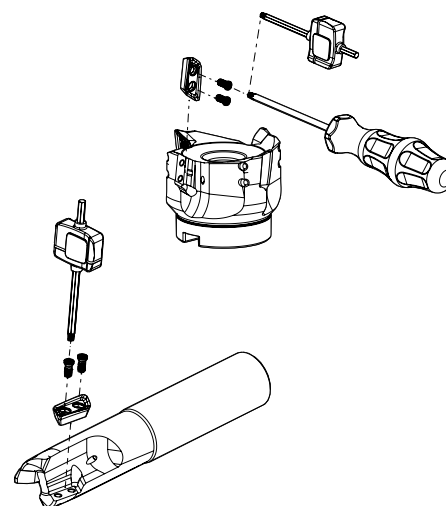
Order code Código	Reference Referência Referencia		Dimensions Dimensões Dimensiones (mm)				Kg	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			ϕDc	ϕd	ϕdg	L		Cutter Type	Max ap (mm)	rpm max		
181093000	050A77090-03-07-022050-A		50	22	42	50	0,4	A	21,5	30 000	0,8-3,2	
181093100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

Stock item | Produto de stock | Itens de stock

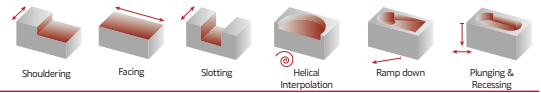
Available under request | Disponível sobre consulta | Disponible bajo consulta

SPARE PARTS | Complementos | Repuestos

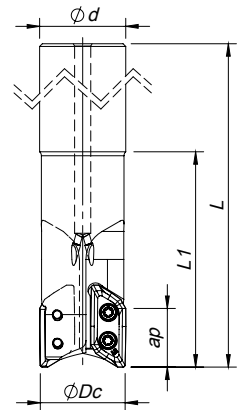
Cutter ϕDc	Order separately				Order separately	
	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value	Screw	DIN 6368 Wrench
A77090 - 50-80	P0401200	XT15	DT1530	3,0	-	-
A77090 - 100	P0401200	PT15	DT1530	3,0	J0164110	SD6368-16
A77090 - 125	P0401200	PT15	DT1530	3,0	J0204610	SD6368-20
E77090 - 32-40	P0401200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



ALUPRO 77090
XDGX



Cylindrical Shank
 $K_r=90^\circ$ | $\gamma_p=+6^\circ$

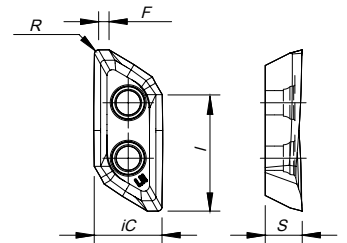


Order code Código	Reference Referência Referencia		Dimensions Dimensões Dimensiones (mm)				Kg	Specifications			Insert radius Raio da pastilha Rayo del Inserto	Stock
			ØDc	Ød	L	L1		Cutter Type	Max ap (mm)	rpm max		
181069800	032E77090-02-06-032170-A		32	32	170	80	0,8	A	21.5	41 000	0,8~3,2	
181093900	040E77090-02-06-040170-A		40	40	170	80	0,9	A	21.5	36 000	0,8~3,2	
181094000	032E77090-02-06-032170-B		32	32	170	80	0,8	B	21.0	41 000	4,0~5,0	
181094100	040E77090-02-06-040170-B		40	40	170	80	0,9	B	21.0	36 000	4,0~5,0	

Stock item | Produto de stock | Itens de stock

Available under request | Disponível sobre consulta | Disponible bajo consulta

XDGX 22M7... || Inserts | Pastilhas | Plaquetas



Geometry code	ISO Reference	P					M				K			UNC	PCD	S		H	Dimensions Dimensões Dimensiones (mm)	Cutter Type					
		CVD		PVD			CVD		PVD		CVD			PVD	UNC	PVD	PVD								
		T9	P7	G1	G4	P3	R1	G4	P3	G6	L5	L6	G1	G4	G6	10	D6	P3			G6	P7			
1111618	XDGX 22M708 PDFR-LN																			13,00	7,00	22,0	0,80	2,00	A
1111619	XDGX 22M716 PDFR-LN																			13,00	7,00	22,0	1,60	1,20	A
1111620	XDGX 22M720 PDFR-LN																			13,00	7,00	22,0	2,00	0,80	A
1111621	XDGX 22M732 PDFR-LN																			13,00	7,00	22,0	3,20	0,60	A
1111622	XDGX 22M740 PDFR-LN																			13,00	7,00	22,0	4,00	0,90	B
1111623	XDGX 22M750 PDFR-LN																			13,00	7,00	22,0	5,00	0,40	B

First choice | Primeira opção | 1ª opción

Stock item | Produto de stock | Itens de stock

Available under request | Disponível sobre consulta | Disponible bajo consulta

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

ALUPRO 77090

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

SHOULDERING							
ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Width of Cut ae (mm)	Depth of Cut ap (mm)	Feed fz(mm/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	350-3000	≤ 25% ØDc	≤5.0	0,35 - 0,40
						5.0 - 10.0	0,30 - 0,35
						10.0 - 15.0	0,25 - 0,30
						15.0 - 20.0	0,20 - 0,25
					< 50% ØDc	≤5.0	0,35 - 0,40
						5.0 - 10.0	0,30 - 0,35
						10.0 - 15.0	0,25 - 0,30
						15.0 - 20.0	0,20 - 0,25
					≤ 75% ØDc	≤5.0	0,30 - 0,35
						5.0 - 10.0	0,25 - 0,30
						10.0 - 15.0	0,20 - 0,25
						15.0 - 20.0	0,15 - 0,20

SLOTING							
ISO	PSM	Material	HB (Brinell)	Vc (m/min)	Width of Cut ae (mm)	Depth of Cut ap (mm)	Feed fz(mm/t)
				PH0910			
N	10	Aluminium and Non Ferrous	30-130	350-3000	100% ØDc	≤5.0	0,25 - 0,35
						5.0 - 10.0	0,20 - 0,30
						10.0 - 15.0	0,15 - 0,25
						15.0 - 20.0	0,10 - 0,20

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

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

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

(Note 3) Use internal coolant supply.

OPERATIONAL GUIDE | Guia operacional | Guía operativa

- Only use the inserts and parts provided by Palbit with this tool. Use of the correct insert clamp screws is especially important to ensure overall tool safety. Do not use damaged or worn clamp screws.

- When tightening the clamp screws, follow the order in Figure 1. The recommended torque value is 3.5Nm.

- The maximum allowable revolutions are shown in Table 1. Ensure that the cutter operates under the maximum allowable revolutions.

The maximum allowable revolutions for safety purposes are determined in accordance with ISO 15641 (Milling Cutters for high speed machining–Safety requirements).

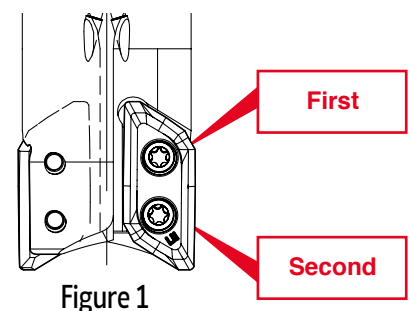


Table 1 - Maximum allowable revolutions:

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

- Even when operating under the maximum allowable spindle speed, if the spindle speed is equal or higher than the values shown in Table 2., it is recommended that the balance quality (with the arbor or chuck) according ISO 1940.

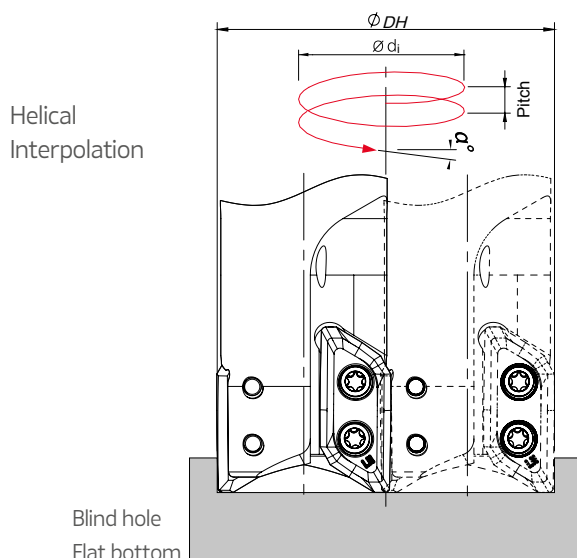
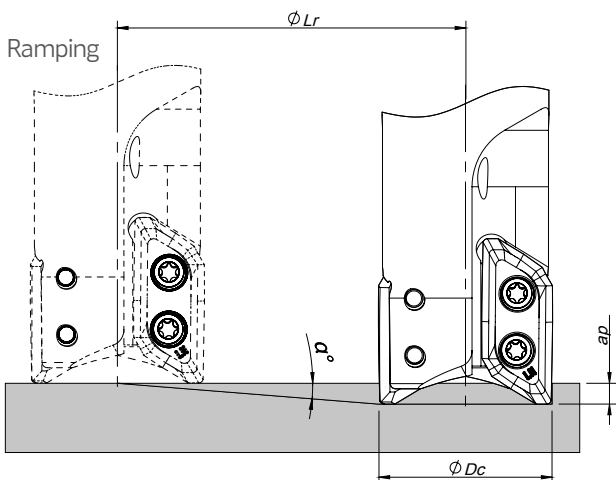
Table 2 - Maximum revolutions when balancing with the arbor or chuck has not been achieved:

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

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

RAMPING AND HELICAL INTERPOLATION

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



$$\phi d_i = \phi DH - \phi D_c$$

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

(1) using insert radius 0,8 mm

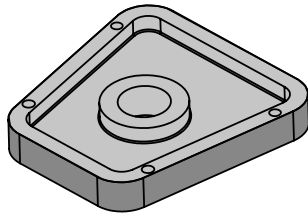

Note: During helical interpolation do not exceed maximum pitch.

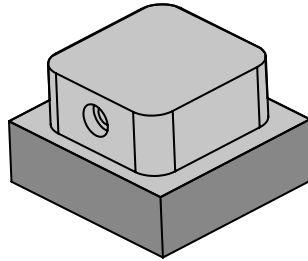
When using different insert radius to calculate the ϕDH_{min} and ϕDH_{max} use the equation below:

- Minimum Diameter: $\phi DH_{min} = 2 \times (\phi D_c - (R \text{ corner radius} + F \text{ width of edge wiper}))$

- Maximum Diameter: $\phi DH_{max} = 2 \times (\phi D_c - R \text{ corner radius})$

Improved productivity and Tool Life / Shortened Machining Time

<p>ALUPRO 76090</p>	<p>G-ALSi5Mg (3.2341)</p>	
<p>Plunging & Recessing</p> <p>Dc = 25,4 mm 2 flutes Vc = 900 m/min (n = 11275 min⁻¹) fz = 0,198 mm/t (Vf = 5,72 mm/min) apxae = 8 x 20 mm Wet XDGX 15M508 PDFR-LN (PH0910)</p>		
<p>XD 76090</p>	<p>9 workpieces done</p>	
<p>Competitor A</p>	<p>4 workpieces done</p>	
<p>[Competitor A]</p> <p>Dc = 25,4 mm 2 flutes Vc = 750 m/min (n = 9397 min⁻¹) fz = 0,198 mm/t (Vf = 5,72 mm/min) apxae = 5 x 15 mm</p>	<p>[User Comments]</p> <p><i>“Compared with conventional products, tool rigidity is high, obtaining an excellent surface finish as well as cutting performance.”</i></p>	

<p>ALUPRO 77090</p>	<p>G-ALSi5Mg (3.2341)</p>	
<p>Shouldering</p> <p>Dc = 31,75 mm 2 flutes Vc = 1000 m/min (n = 10022min⁻¹) fz = 0,198 mm/t (Vf = 5,72 mm/min) apxae = 15 x 8 mm Wet XDGX 22M708 PDFR-LN (PH0910)</p>		

[User Comments]

“With this solution we achieved excellent results in wall accuracy. The accuracy of under 0,01 mm”

Cofinanciado por:



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