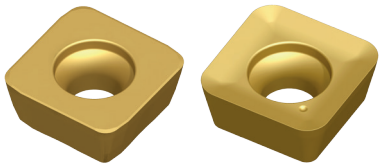


SOE...

HiFEED

06410 | 06690 | 06815

New high feed solution for high productivity milling

Cutters

- Excellent solution for roughing operations.
- Improved cutters for reduced vibration & maximum process reliability.
- High volume of metal removal.
- Very high productivity machining and modern machining technique.

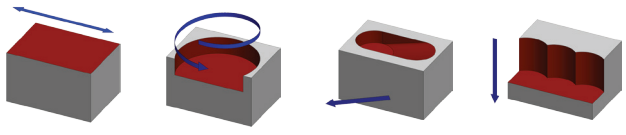
Specifications

- Geometry: 10/15º roughing operations.
- Cutter diameters:
  - Weldon Shank (W): Ø20 till Ø32.
  - Arbor Mounting (A): Ø50 till Ø160.
  - Threaded Coupling (R): Ø20 till Ø42.
- Workpiece materials: Steels, stainless steel, cast iron & HRSA.

Inserts

- New insert geometry for high feed applications.
- Positive inserts with 4 cutting edges with superior chip evacuation.
- Available 3 insert dimensions (08, 13 & 16).
- Precise position and cutting edge quality.
- Improved possibility of ramping down applications.

Applications

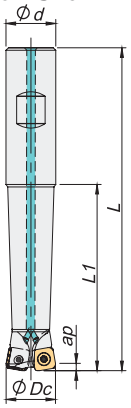


Facing | Helical Interpolation | Ramp Down | Plunging

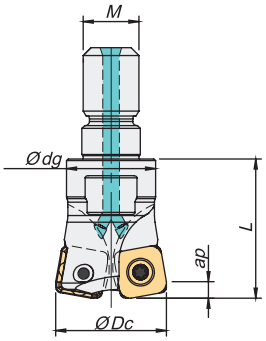
06410 Cutters

K_r = 10° | γ_p = +2° | γ_f = +2° | R_p = 2,0

Weldon Shank



Threaded Coupling

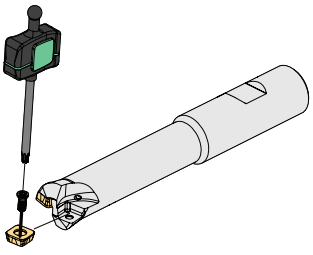


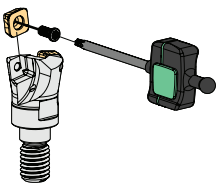
	Order Code	Reference		Dimensions (mm)					Kg	Specifications	Insert	Stock
				ØDc	Ød/M	Ødg	L	L1		a_p (mm)		
Weldon	181076300	020W06410-02-02-020130	2	20	20	-	130	75	0,360	1,0	SOE... 0803...	◈
	181080900	020W06410-02-02-020190	2	20	20	-	190	110	0,340	1,0	SOE... 0803...	◈
	181076400	025W06410-03-02-025140	3	25	25	-	140	80	0,410	1,0	SOE... 0803...	◈
	181081100	025W06410-03-02-025200	3	25	25	-	200	130	0,570	1,0	SOE... 0803...	◈
	181076500	032W06410-04-02-032150	4	32	32	-	150	90	0,760	1,0	SOE... 0803...	◈
	181081300	032W06410-04-02-032200	4	32	32	-	200	130	1,010	1,0	SOE... 0803...	◈
Threaded	181071900	020R06410-02-02-M10025	2	20	M10	16	25	-	0,040	1,0	SOE... 0803...	◈
	181076600	025R06410-03-02-M12028	3	25	M12	21	28	-	0,070	1,0	SOE... 0803...	◈
	181076700	032R06410-04-02-M16035	4	32	M16	29	35	-	0,160	1,0	SOE... 0803...	◈
	181076800	035R06410-04-02-M16035	4	35	M16	29	35	-	0,180	1,0	SOE... 0803...	◈
	181076900	042R06410-05-02-M16035	5	42	M16	29	35	-	0,220	1,0	SOE... 0803...	◈

◈ Stock items / Itens de stock ◯ Available under request / Disponibilidade sob consulta / Disponible bajo consulta

Screws & Keys

Cutter ØDc	Insert Screw	Key (Torx)	Torque Value (Nm)
W06410 – 20-32	P0300800	XT09	1,4
R06410 – 20-42	P0300800	XT09	1,4

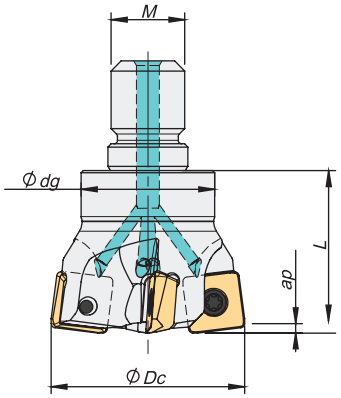




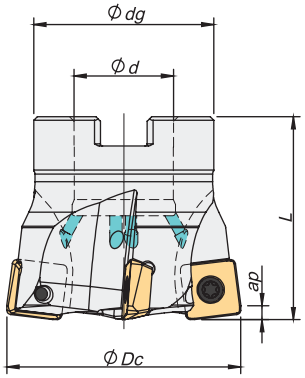
06690 Cutters

K_r = 15º | γ_p = +5º | R_p = 2,5

Threaded Coupling



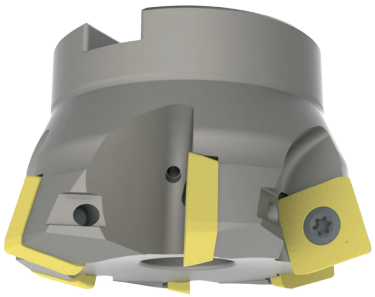
Arbor Mounting



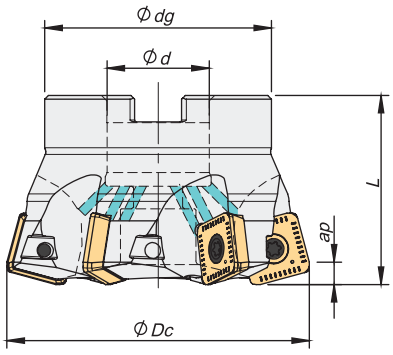
	Order Code	Reference		Dimensions (mm)				Kg	Specifications		Insert	Stock
				ØDc	Ød/M	Ødg	L		Arbor Type	a_p (mm)		
Threaded	181038700	032R06690-03-05-M16035	3	32	M16	29	35	0,160	-	1,5	SOE... 13...	
Threaded	181064600	035R06690-03-05-M16035	3	35	M16	29	35	0,180	-	1,5	SOE... 13...	
Threaded	181038800	042R06690-04-05-M16035	4	42	M16	29	35	0,210	-	1,5	SOE... 13...	
Arbor	181069100	050A06690-04-05-022045	4	50	22	40	45	0,290	A	1,5	SOE... 13...	
Arbor	181029800	052A06690-04-05-022045	4	52	22	40	45	0,300	A	1,5	SOE... 13...	
Arbor	181033500	063A06690-05-05-027050	5	63	27	48	50	0,520	A	1,5	SOE... 13...	
Arbor	181029900	066A06690-05-05-027050	5	66	27	48	50	0,570	A	1,5	SOE... 13...	
Arbor	181030000	080A06690-06-05-027050	6	80	27	60	50	0,970	A	1,5	SOE... 13...	

* **Note:** These type of cutters can be used for SPKW & SPKT inserts.

06815 Cutters



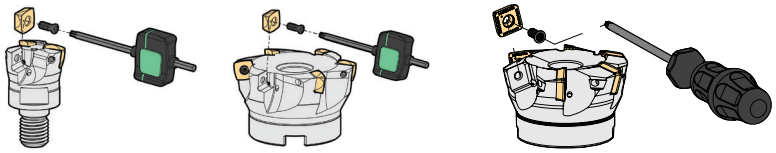
K_r = 15º | γ_p = +2º | R_p = 4,5



Order Code	Reference		Dimensions (mm)				Kg	Specifications		Insert	Stock
			ØDc	Ød	Ødg	L		Arbor Type	a_p (mm)		
181100400	063A06815-05-02-027050	5	63	27	48	50	0,460	A	3,5	SOE... 1605...	
181081900	066A06815-05-02-027050	5	66	27	48	50	0,500	A	3,5	SOE... 1605...	
181082000	080A06815-06-02-027050	6	80	27	60	50	0,900	A	3,5	SOE... 1605...	
181082100	100A06815-08-02-032050	8	100	32	80	50	1,600	B	3,5	SOE... 1605...	
181082200	125A06815-10-02-040063	10	125	40	90	63	2,900	B	3,5	SOE... 1605...	
181082300	160A06815-12-02-U040063	12	160	40	110	63	4,400	C	3,5	SOE... 1605...	

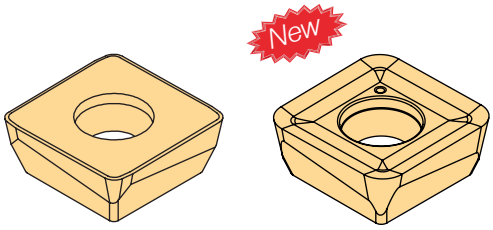
Screws & Keys

Cutter ØDc	Insert Screw	Key (Torx)	Torque Value (Nm)
R06690 – 32-42	P0401200	XT15	3,0
A06690 – 50-80	P0401200	XT15	3,0
A06815 – 63-160	P0501200	PT20	5,0

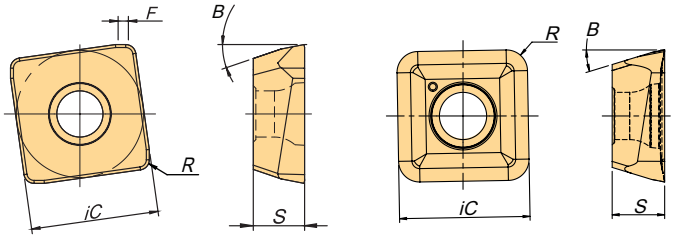


SOE... 0803.., 13M5.. & 1605.. Inserts

SOEW SOET



SOEW SOET



		Grades												Dimensions (mm)				
	(2) Grade Code	P				M		K				S						
(1) Geometry Code	ISO Ref.	G1 PH7910	G4 PH7920	P3 PH7930	G6 PH7740	P3 PH7930	G6 PH7740	G1 PH7910	G4 PH7920	P3 PH7930	G6 PH7740	P3 PH7930	G6 PH7740	iC	S	F	B	R
1111884	SOEW 080310 S	◬	◬		○			◬	◬		○			8,60	3,47	1,0	13°	1,0
1111906	SOEW 13M510 S	◬	◬		◬			◬	◬		◬			12,43	5,00	1,0	17°	1,2
1111907	SOEW 160512 S	◬	◬		◬			◬	◬		◬			16,40	5,26	1,5	13°	2,0
1112149	SOET 080315-MS		○	◬	◬	◬	◬		○	◬		◬	◬	8,60	3,47	-	13°	1,5
1112147	SOET 13M520-MS		○	◬	◬	◬	◬		○	◬		◬	◬	12,43	5,00	-	17°	2,0
1112221*	SOET 160520-MS		○	◬	◬	◬	◬		○	◬		◬	◬	16 40	5 26	-	13°	2,0

◬ First choice / 1ª escolha / 1ª opción

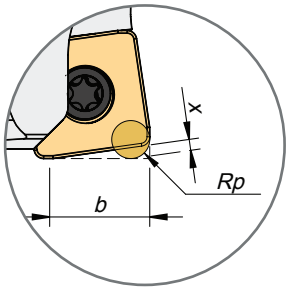
◬ Stock items / Itens de stock ○ Available under request / Disponibilidade sob consulta / Disponible bajo consulta

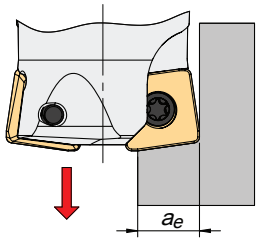
Order code = (1) Geometry Code + (2) Grade Code

* Available from December of 2014.

Programing Data

Insert	Programing Data			
	R_p	x	b	a_e
8	2,0	0,8	6,8	6,3
13	2,5	1,1	10,5	10,0
16	4,5	2,3	13,5	12,8





Rec. Cutting Conditions

ISO		HB (Brinell)	V_c (m/min)				f_z (mm/t)			Insert Selection
			PH7910	PH7920	PH7930	PH7740	Size 8	Size 13	Size 16	
P	Unalloyed Steel	125 - 220	160 - 280	150 - 230	140 - 220	100 - 180	0,4 - 1,8	0,5 - 2,2	0,6 - 2,5	SOEW...
	Low-Alloyed Steel	220 - 280	150 - 230	140 - 220	130 - 180	90 - 170	0,4 - 1,8	0,5 - 2,2	0,5 - 2,5	SOEW...
	High-Alloyed Steel	280 - 380	140 - 190	130 - 180	100 - 170	80 - 140	0,3 - 1,5	0,4 - 2,0	0,5 - 2,0	SOEW...
M	SS - Ferritic / Martensitic	200 - 330	-	-	130 - 220	100 - 180	0,4 - 1,3	0,5 - 1,8	0,5 - 1,8	SOET... -MS
	SS - Austenitic	200 - 330	-	-	120 - 180	90 - 150	0,4 - 1,3	0,5 - 1,8	0,5 - 1,8	SOET... -MS
	SS - Austenitic-Ferritic (Duplex)	230 - 260	-	-	70 - 140	70 - 140	0,4 - 1,3	0,5 - 1,8	0,5 - 1,8	SOET... -MS
K	Malleable Cast Iron	130 - 230	160 - 350	150 - 310	140 - 260	140 - 260	0,5 - 1,8	0,5 - 2,2	0,5 - 2,5	SOEW...
	Grey Cast Iron	180 - 245	150 - 300	140 - 260	130 - 220	130 - 220	0,5 - 1,8	0,5 - 2,2	0,5 - 2,5	SOEW...
	Nodular Cast Iron	160 - 250	120 - 260	100 - 220	100 - 180	100 - 180	0,5 - 1,8	0,5 - 2,2	0,5 - 2,5	SOEW...
S	Heat Resistant Super Alloys	200 - 320	-	-	35 - 65	25 - 60	0,4 - 1,0	0,5 - 1,5	0,5 - 1,5	SOET... -MS

Note: The cutting speed and feed should be reduced 20% ~ 30% of the value shown on the above table when overhang lenght of tools exceeds 3xD.

Grades Selection Guide

ISO		HB (Brinell)	PH7910	PH7920	PH7930	PH7740
P	Unalloyed Steel	125 - 220	✓	✓		✓
	Low-Alloyed Steel	220 - 280	✓	✓		✓
	High-Alloyed Steel	280 - 380		✓		✓
M	SS - Ferritic / Martensitic	200 - 330			✓	✓
	SS - Austenitic	200 - 330			✓	✓
	SS - Austenitic-Ferritic (Duplex)	230 - 260			✓	✓
K	Malleable Cast Iron	130 - 230	✓	✓		✓
	Grey Cast Iron	180 - 245	✓	✓		✓
	Nodular Cast Iron	160 - 250	✓	✓		✓
S	Heat Resistant Super Alloys	200 - 320			✓	✓

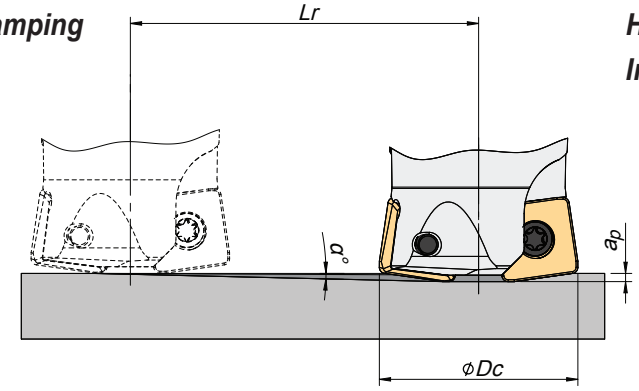
: Good Conditions
: Average Conditions
: Difficult Conditions

Grades Specifications

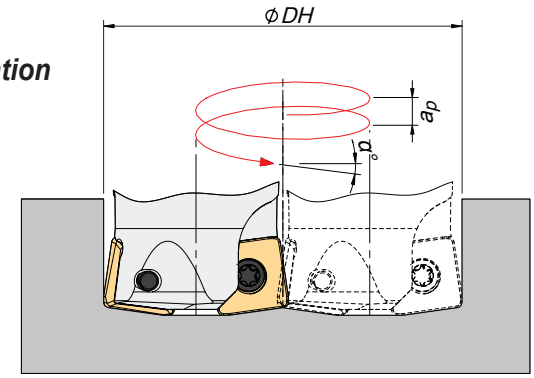
Grades	Information
New PH7910	PVD coated carbide with micro-grain substrate for light applications of steels or hardened steels. Excellent for cast iron at high cutting speeds with stable conditions.
New PH7920	Advanced AlTiN-PVD coated carbide grade over a tough wear resistance submicro susbtrate for general machining of steels and cast irons at high cutting speeds.
New PH7930	AlTiN-PVD coated carbide developed to provide better performance in general machining of stainless-steel and high temperature alloys. Resistant to breakage and offers improved wear resistance and increased strength.
New PH7740	Very tough, general-purpose PVD coated carbide grade (AlTiN) for medium to heavy milling applications and instable conditions. Recomended for High resistant super alloys, all steels and cast irons. Can be used either in wet or dry conditions.

Ramping & Helical Interpolation

Ramping

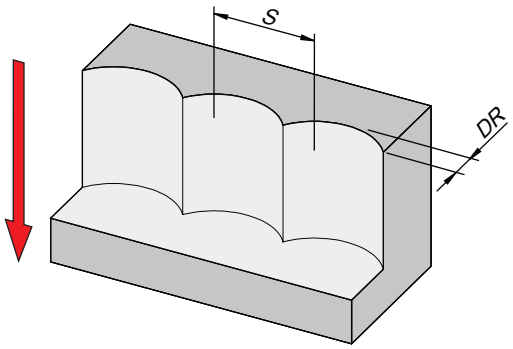


Helical Interpolation



Insert Size	Ø Dc	Ramping			Helical Interpolation		
		Max. Ramp α°	Max. a_p	Min. Lr	Ø DH (min)	Ø DH (max)	Max. Pitch/Rev.
8	20	17,5	1,0	3,,2	26,4	-	6
					-	38	17
	25	9,5	1,0	6,0	36,4	-	5
					-	48	12
	32	5,5	1,0	10,4	50,4	-	5
					-	62	9
	35	4,5	1,0	12,7	56,4	-	5
					-	68	8
	42	3,5	1,0	16,3	70,4	-	5
					-	82	7
13	32	14,0	1,5	6,0	43	-	8
					-	62	23
	35	9,0	1,5	9,5	49	-	6
					-	68	16
	42	6,4	1,5	13,4	63	-	7
					-	82	14
	50	4,3	1,5	19,9	79	-	6
					-	98	11
	52	4,0	1,5	21,5	83	-	6
					-	102	10
	63	3,0	1,5	28,6	105	-	6
					-	124	10
	66	2,6	1,5	33,0	111	-	6
					-	130	9
	80	2,0	1,5	43,0	139	-	6
					-	158	8
16	63	3,5	3,5	57,2	99,0	-	6
					-	123,6	11
	66	3,0	3,5	66,8	105	-	6
					-	129,6	10
	80	2,0	3,5	100,2	133	-	5
					-	157,5	8
	100	1,5	3,5	133,7	173	-	6
					-	197,5	8
	125	1,0	3,5	200,5	223	-	5
					-	247,5	6
	160	0,5	3,5	401,1	293	-	3
					-	317,5	4

Plunging



L < = 3 D_C			L > 3 D_C			S Max.
Feed f_Z (mm/t)			Feed f_Z (mm/t)			
Insert Size 8	Insert Size 13	Insert Size 16	Insert Size 8	Insert Size 13	Insert Size 16	
0,08 - 0,15	0,10 - 0,20	0,10 - 0,20	0,05 - 0,10	0,07 - 0,14	0,07 - 0,14	$Smax. = \sqrt{Dc \cdot a_e - a_e^2}$

S Máx. and DR corresponding Cutting Diameter D_C (mm)																		
DR (mm)	D_C (mm)																	
	Insert Size 8					Insert Size 13								Insert Size 16				
	20	25	32	35	42	32	35	42	50	52	63	66	80	63	66	80		
1,0	4,4	4,9	5,6	5,8	6,4	5,6	5,8	6,4	7,0	7,1	7,9	8,1	8,9	7,9	8,1	8,9		
2,0	6,0	6,8	7,7	8,1	8,9	7,7	8,1	8,9	9,8	10,0	11,0	11,3	12,5	11,0	11,3	12,5		
3,0	7,1	8,1	9,3	9,8	10,8	9,3	9,8	10,8	11,9	12,1	13,4	13,7	15,2	13,4	13,7	15,2		
4,0	8,0	9,2	10,6	11,1	12,3	10,6	11,1	12,3	13,6	13,9	15,4	15,7	17,4	15,4	15,7	17,4		
5,0	8,7	10,0	11,6	12,2	13,6	11,6	12,2	13,6	15,0	15,3	17,0	17,5	19,4	17,0	17,5	19,4		
6,0	9,2	10,7	12,5	13,2	14,7	12,5	13,2	14,7	16,2	16,6	18,5	19,0	21,1	18,5	19,0	21,1		
7,0						13,2	14,0	15,7	17,3	17,7	19,8	20,3	22,6	19,8	20,3	22,6		
8,0						13,9	14,7	16,5	18,3	18,8	21,0	21,5	24,0	21,0	21,5	24,0		
9,0						14,4	15,3	17,2	19,2	19,7	22,0	22,6	25,3	22,0	22,6	25,3		
10,0						14,8	15,8	17,9	20,2	20,5	23,0	23,7	26,5	23,0	23,7	26,5		
11,0														23,9	24,6	27,5		
12,0														24,7	25,5	28,6		

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

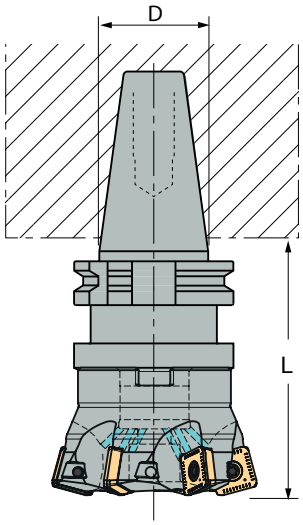
Tool Overhang

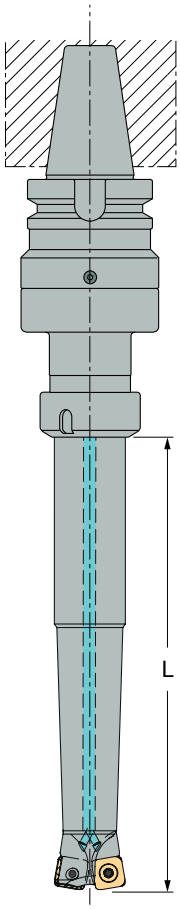
The overhang of a milling tool is an important factor of the tool stiffness and machining stability. The tool overhang being 5% less reduces the tool deflection by 15%, 10% less – by 27% and 20% less – already by 50%. Minimizing the overhang substantially improves operational efficiency, allowing for increased cutting conditions and good surface finish.

Generally, in case of the milling cutters mounted on arbors, the correct way is to measure the overhang for the whole assembly, which is to say from the gauge line (D) of the arbor shank (Figure on the left).

For the weldon shanks that are clamped into holders with spring collets or adapter-style holders with side screws, the overhang is measured from the holder (Figure on the right).

Please check the table below to see our recommendations.





Insert Size 8		Insert Size 13		Insert Size 16	
Recommended	Recommended	Recommended	Recommended	Recommended	Not Recommended
L=<4D	L>4D	L<4D	L>4D	L<4D	L>4D

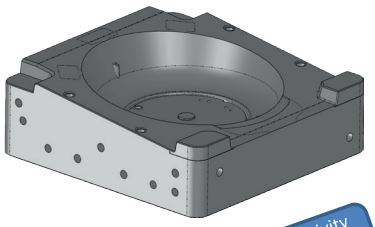
* for L => 4D a_p must be less than 2 mm.

Case Studies

40CrMnNiMo6 (1.2738)

Mould Cavity

D_c = 80 | 6 Flutes
V_c = 180 m/min (n=721 min^{-1})
f_z = 1 mm/t (Vf=4300mm/min)
a_p x a_e = 2,5 x 56 mm
Dry
SOEW 160512 S PH6920
Tool Overhang: L = 300 mm
Tool Life Time: 120 min



Productivity improved by 3 times!

HiFEED 068

Metal removal rate 602cm^{-3}/min

Competitor A

Metal removal rate 240cm^{-3}/min

[Competitor A]

D_c = 8 | 6 Flutes
V_c = 180 m/min (n=721 min^{-1})
f_z = 1 mm/t (Vf=4300mm/min)
a_p x a_e = 2,5 x 56 mm

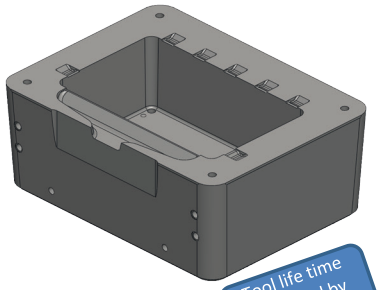
[User Comments]

Before the ap could not be increased due to limit geometry, but with HiFEED 068 can be increased and the productivity improved by 3 times.

40CrMnNiMo6 (1.2738)

Mould Cavity

D_c = 80 | 6 Flutes
V_c = 150 m/min (n=597 min^{-1})
f_z = 1,7 mm/t (Vf=6100mm/min)
a_p x a_e = 1,0 x 56 mm
Dry
SOEW 13M510 S PH6920
Tool Overhang: L = 350 mm



Tool life time improved by 60%!

HiFEED 066

Tool life time 90 min per edge

Competitor B

Tool life time 55 min per edge

[Competitor B]

D_c = 8 | 6 Flutes
V_c = 180 m/min (n=597 min^{-1})
f_z = 1,7 mm/t (Vf=6100mm/min)
a_p x a_e = 1,0 x 56 mm

[User Comments]

This solution allow us to increase the time per edge and reduce machining costs.

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