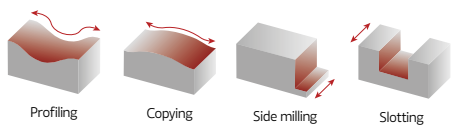


INTEG

General Purpose Endmills



INTEG

NEW

PHP
NEW
GRADE



Integral Solid Carbide Solutions



HF30GS/XL Flat Top General Purpose Endmill



All order codes are cylindrical shank.
Weldon shank available under request.

		⁽²⁾ Grade code		T1	G4	Dimensions Dimensões Dimensiones (mm)			
⁽¹⁾ Geometry code		Reference Referência Referencia		PHP920	PH7920	ØDc	Ød (h6)	ap _{max}	L
Cylindrical	HB (Weldon)								
HF30GS 2									
1180587	-	HF30GS 2 020 06	2			2	4	6	38
1180588	-	HF30GS 2 030 12	2			3	4	12	38
1180589	-	HF30GS 2 040 14	2			4	4	14	50
1180590	-	HF30GS 2 050 16	2			5	6	16	50
1180591	-	HF30GS 2 060 19	2			6	6	19	50
1180592	1180532	HF30GS 2 080 20	2			8	8	20	63
1180593	1180533	HF30GS 2 100 22	2			10	10	22	75
1180594	1180534	HF30GS 2 120 25	2			12	12	25	75
1180595	1180535	HF30GS 2 140 26	2			14	14	26	83
1180596	1180536	HF30GS 2 160 32	2			16	16	32	89
1180597	1180537	HF30GS 2 180 32	2			18	18	32	92
1180598	1180538	HF30GS 2 200 38	2			20	20	38	104
HF30GS 4									
1180262	-	HF30GS 4 020 06	4			2	4	6	38
1180219	-	HF30GS 4 030 12	4			3	4	12	38
1180215	-	HF30GS 4 040 14	4			4	4	14	50
1180195	-	HF30GS 4 050 16	4			5	6	16	50
1180263	-	HF30GS 4 060 19	4			6	6	19	50
1180223	1180605	HF30GS 4 070 19	4			7	8	19	63
1180202	1180544	HF30GS 4 080 20	4			8	8	20	63
1180224	1180606	HF30GS 4 090 22	4			9	10	22	75
1180216	1180545	HF30GS 4 100 22	4			10	10	22	75
1180264	1180546	HF30GS 4 120 25	4			12	12	25	75
1180220	1180547	HF30GS 4 140 26	4			14	14	26	83
1180129	1180548	HF30GS 4 160 32	4			16	16	32	89
1180221	1180549	HF30GS 4 180 32	4			18	18	32	92
1180222	1180550	HF30GS 4 200 38	4			20	20	38	104
HF30GXL 4									
1180708	-	HF30GXL 4 020 09	4			2	4	9	100
1180265	-	HF30GXL 4 030 12	4			3	6	12	100
1180266	-	HF30GXL 4 040 16	4			4	6	16	100
1180267	-	HF30GXL 4 050 20	4			5	6	20	100
1180268	-	HF30GXL 4 060 20	4			6	6	20	100
1180269	-	HF30GXL 4 080 20	4			8	8	20	120
1180270	-	HF30GXL 4 100 25	4			10	10	25	120
1180057	-	HF30GXL 4 120 30	4			12	12	30	120

 Stock item | Produto de stock
Itens de stock

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

 Available under request | Disponível sobre consulta
Disponível bajo consulta

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

HR30GS Round Corner General Purpose Endmill



Short



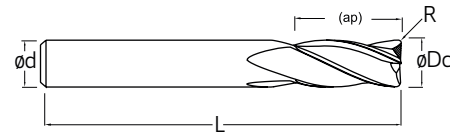
4



30°



Corner radius



All order codes are cylindrical shank.
Weldon shank available under request.

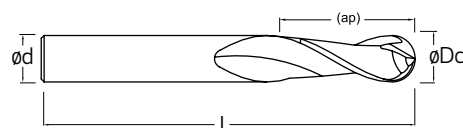
(1) Geometry code	(2) Grade code		T1	Dimensions Dimensões Dimensiones (mm)				
	Reference Referência Referencia			ØDc	Ød (h6)	ap max	R	L
1180231	HR30GS 4 030 12 R025	4		3	4	12	0,25	50
1180232	HR30GS 4 030 12 R050	4		3	4	12	0,5	50
1180233	HR30GS 4 040 14 R025	4		4	4	14	0,25	50
1180234	HR30GS 4 040 14 R050	4		4	4	14	0,5	50
1180235	HR30GS 4 050 16 R025	4		5	6	16	0,25	50
1180236	HR30GS 4 050 16 R050	4		5	6	16	0,5	50
1180237	HR30GS 4 060 19 R050	4		6	6	19	0,5	50
1180238	HR30GS 4 060 19 R100	4		6	6	19	1	50
1180239	HR30GS 4 070 19 R050	4		7	8	19	0,5	63
1180240	HR30GS 4 070 19 R100	4		7	8	19	1	63
1180241	HR30GS 4 080 20 R050	4		8	8	20	0,5	63
1180242	HR30GS 4 080 20 R100	4		8	8	20	1	63
1180243	HR30GS 4 090 22 R050	4		9	10	22	0,5	75
1180244	HR30GS 4 090 22 R100	4		9	10	22	1	75
1180245	HR30GS 4 100 22 R100	4		10	10	22	1	75
1180246	HR30GS 4 100 22 R200	4		10	10	22	2	75
1180247	HR30GS 4 120 25 R100	4		12	12	25	1	75
1180248	HR30GS 4 120 25 R200	4		12	12	25	2	75
1180249	HR30GS 4 140 26 R100	4		14	14	26	1	83
1180250	HR30GS 4 140 26 R200	4		14	14	26	2	83
1180251	HR30GS 4 160 32 R100	4		16	16	32	1	89
1180252	HR30GS 4 160 32 R200	4		16	16	32	2	89
1180253	HR30GS 4 180 32 R100	4		18	18	32	1	92
1180254	HR30GS 4 180 32 R200	4		18	18	32	2	92
1180255	HR30GS 4 200 38 R100	4		20	20	38	1	104
1180256	HR30GS 4 200 38 R200	4		20	20	38	2	104

 Stock item | Produto de stock | Itens de stock

 Available under request | Disponível sobre consulta
Disponível bajo consulta

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

HB30GS/L Ball Nose General Purpose Endmill



All order codes are cylindrical shank.
Weldon shank available under request.

(1) Geometry code	(2) Grade code		T1	G4	Dimensions Dimensões Dimensiones (mm)			
	Reference Referência Referencia		PHP920	PH7920	ØDc	Ød (h6)	ap _{max}	L
HB30GL 4								
1180273	HB30GL 4 020 04	4	⊗		2	4	4	75
1180274	HB30GL 4 030 08	4	⊗		3	4	8	75
1180275	HB30GL 4 040 11	4	○	⊗	4	4	11	75
1180150	HB30GL 4 050 13	4	⊗		5	6	13	75
1180032	HB30GL 4 060 13	4	⊗		6	6	13	75
1180064	HB30GL 4 080 16	4	⊗		8	8	16	100
1180065	HB30GL 4 100 16	4	⊗		10	10	16	100
1180071	HB30GL 4 120 25	4	⊗		12	12	25	100
1180276	HB30GL 4 160 32	4	⊗		16	16	32	120
1180277	HB30GL 4 200 38	4	⊗		20	20	38	120
HB30GS 4								
1180156	HB30GS 4 020 03	4	⊗		2	4	3	50
1180157	HB30GS 4 030 05	4	⊗		3	4	5	50
1180068	HB30GS 4 040 06	4	⊗		4	6	6	60
1180272	HB30GS 4 060 09	4	⊗		6	6	9	60
1180066	HB30GS 4 080 16	4	⊗		8	8	16	63
1180432	HB30GS 4 100 20	4	⊗		10	10	20	75
1180287	HB30GS 4 120 25	4	⊗		12	12	25	75
HB30GS 2								
1180067	HB30GS 2 020 02	2	⊗		2	3	2	20
1180278	HB30GS 2 020 06	2	○	⊗	2	3	6	38
1180279	HB30GS 2 030 12	2	○	⊗	3	3	12	38
1180280	HB30GS 2 040 14	2	○	⊗	4	4	14	50
1180281	HB30GS 2 050 16	2	⊗		5	6	16	50
1180282	HB30GS 2 060 19	2	○	⊗	6	6	19	50
1180283	HB30GS 2 080 20	2	⊗		8	8	20	63
1180284	HB30GS 2 100 22	2	⊗	⊗	10	10	22	75
1180285	HB30GS 2 120 25	2	⊗	⊗	12	12	25	75
HB30GL 2								
1180286	HB30GL 2 040 08	2	⊗		4	6	8	75
1180128	HB30GL 2 060 12	2	⊗		6	6	12	75
1180029	HB30GL 2 080 14	2	⊗		8	8	14	100
1180030	HB30GL 2 100 18	2	⊗		10	10	18	100
1180031	HB30GL 2 120 22	2	⊗		12	12	22	120

⊗ Stock item | Produto de stock
Itens de stock

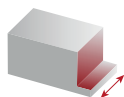
⊗ Stock available until sold out | Stock disponível até acabar o stock
Stock disponible hasta acabar el stock

○ Available under request | Disponível sobre consulta
Disponível bajo consulta

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

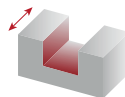
CUTTING PARAMETERS | Parâmetros de corte | Parámetros de corte

Side Milling

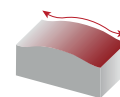


Finishing: $a_e < 0,15 \times D_c$
Semi-finishing: $0,15 \times D_c < a_e < 0,3 \times D_c$
Roughing: $a_e > 0,3 \times D_c$

Slotting



Copying



Finishing: $a_e < 0,20 \times D_c$
 $a_p < 0,03 \times D_c$
Semi-finishing: $0,20 \times D_c < a_e < 0,40 \times D_c$
 $0,03 \times D_c < a_p < 0,10 \times D_c$
Roughing: $a_e > 0,40 \times D_c$
 $a_p > 0,10 \times D_c$

α : Surface inclination angle.

ISO	Material	fz (mm/t)					
		Side Milling			Slotting	Copying	
		$a_e = 0,125 \times D_c$	$a_e = 0,25 \times D_c$	$a_e = 0,5 \times D_c$	$a_e = D_c$	$\alpha < 15^\circ$	$\alpha > 15^\circ$
P	Unalloyed Steel	$0,009 \times D_c$	$0,008 \times D_c$	$0,005 \times D_c$	$0,004 \times D_c$	$0,012 \times D_c$	$0,004 \times D_c$
	Low-Alloyed Steel	$0,008 \times D_c$	$0,007 \times D_c$	$0,004 \times D_c$	$0,003 \times D_c$	$0,010 \times D_c$	$0,003 \times D_c$
	High-Alloyed Steel	$0,007 \times D_c$	$0,006 \times D_c$	$0,004 \times D_c$	$0,003 \times D_c$	$0,009 \times D_c$	$0,003 \times D_c$
M	Stainless Steel (Ferritic / Martensitic)	$0,007 \times D_c$	$0,006 \times D_c$	$0,004 \times D_c$	$0,003 \times D_c$	$0,009 \times D_c$	$0,003 \times D_c$
	Stainless Steel (Austenitic)	$0,005 \times D_c$	$0,005 \times D_c$	$0,003 \times D_c$	$0,002 \times D_c$	$0,007 \times D_c$	$0,002 \times D_c$
	Stainless Steel (Austenitic/Ferritic/Duplex)	$0,004 \times D_c$	$0,004 \times D_c$	$0,002 \times D_c$	$0,002 \times D_c$	$0,006 \times D_c$	$0,002 \times D_c$
K	Malleable Cast Iron	$0,009 \times D_c$	$0,008 \times D_c$	$0,005 \times D_c$	$0,004 \times D_c$	$0,012 \times D_c$	$0,004 \times D_c$
	Grey Cast Iron	$0,009 \times D_c$	$0,008 \times D_c$	$0,005 \times D_c$	$0,004 \times D_c$	$0,012 \times D_c$	$0,004 \times D_c$
	Nodular Cast Iron	$0,008 \times D_c$	$0,008 \times D_c$	$0,004 \times D_c$	$0,004 \times D_c$	$0,011 \times D_c$	$0,004 \times D_c$

(Note 1) Side milling and slotting feed valid for when the endmill works with its whole a_p , for when the endmill is working with lower depths of cut consider increasing the feed up to 25%.

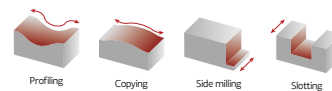
(Note 2) Copying feed valid for low a_p ($a_p / D < 0,1$), for higher a_p consider decreasing the feed by 50%.

ISO	Material	Vc (m/min)							
		Side Milling			Slotting	Copying			
		$a_e = 0,125 \times D_c$	$a_e = 0,25 \times D_c$	$a_e = 0,5 \times D_c$	$a_e = D_c$	$a_p = 0,05 \times D_c$ $\alpha < 15^\circ$	$a_p = 0,25 \times D_c$ $\alpha < 15^\circ$	$a_p = 0,05 \times D_c$ $\alpha > 15^\circ$	$a_p = 0,25 \times D_c$ $\alpha > 15^\circ$
P	Unalloyed Steel	200	190	180	150	480	240	320	160
	Low-Alloyed Steel	190	180	160	130	440	220	290	150
	High-Alloyed Steel	170	160	150	120	400	200	260	130
M	Stainless Steel (Ferritic / Martensitic)	150	140	130	110	360	180	240	120
	Stainless Steel (Austenitic)	120	110	100	80	290	140	190	100
	Stainless Steel (Austenitic/Ferritic/Duplex)	100	100	80	70	250	120	160	80
K	Malleable Cast Iron	240	230	220	170	580	290	380	190
	Grey Cast Iron	230	230	210	170	560	280	380	190
	Nodular Cast Iron	220	210	190	160	520	260	350	170

(Note 3) Table valid for PHP920 grade, for PH7920 consider reducing the cutting velocity by 10 m/min.

(Note 4) Cutting speeds selected for an economic use of the tool, for higher productivity consider increasing up to 70%.

(Note 5) For copying, spindle speed is calculated as follows: $n = \frac{V_c \times 1000}{\pi \times 2 \sqrt{a_p(D_c - a_p)}}$



TEST REPORT || Relatório de teste | Informes de prueba

Operation: Roughing / Profiling

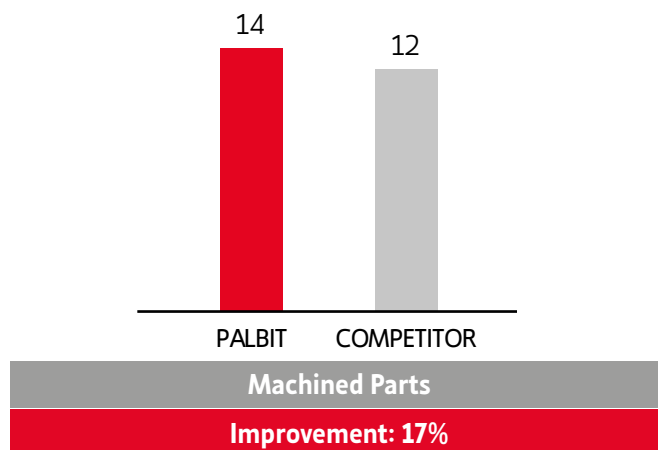
Material: Nodular Cast Iron

Tool: HB30GS 4 120 25

Grade: PHP920



Workpiece Material: Nodular Cast Iron	
Cutting speed: V_c	271 m/min
Feed per tooth: f_z	0,1 mm/t
Depth of cut: a_p	3,0 mm
Stepover : a_e	1,5 mm
Operation	Finishing / Profiling
Coolant	Emulsion



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