

GO-Line-TH

Solid Carbide End Mills

No. 417.3



HGOB-2

HGOR-4

HGOH-6

V max
High Speed

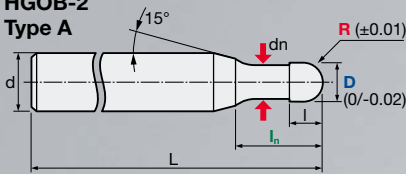
▽
Roughing

▽▽
Finishing

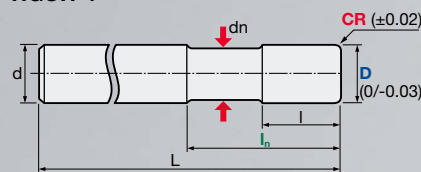
HRC
50



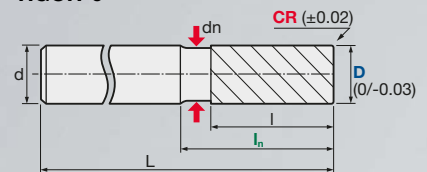
HGOB-2
Type A



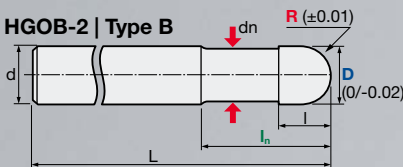
HGOR-4



HGOH-6



HGOB-2 | Type B



Carbide
Micro Grain

Type	ID Code	Item Code	Stock	Flutes	D	R	CR	l	ln	dn	L	d		
 	EL010	HGOB-2010TH	■	2	1	0.5		1	2.5	0.95	40	4		
	EL011	HGOB-2020TH			2	1		2	5	1.95	45	6		
	EL012	HGOB-2030TH			3	1.5		3	7.5	2.9				
	EL013	HGOB-2040TH			4	2		4	10	3.9	50	8		
	EL014	HGOB-2050TH			5	2.5		5	12.5	4.9				
	EL015	HGOB-2060TH			6	3		6	15	5.9				
	EL016	HGOB-2080TH			8	4		8	20	7.9	60	8		
	EL017	HGOB-2100TH			10	5		10	25	9.9	65	10		
	EL018	HGOB-2120TH			12	6		12	30	11.9	75	12		
 	EL031	HGOR-4060-03TH	■	4	6		0.3	9	18	5.7	50	6		
	EL032	HGOR-4060-10TH			1		12	24	7.6	55	8			
	EL033	HGOR-4080-03TH			0.3			15	30			9.5	70	10
	EL034	HGOR-4080-10TH			1		18		36	11.5	75	12		
	EL035	HGOR-4100-03TH			0.3				24	48				
	EL036	HGOR-4100-10TH			1		30	19		100	20			
	EL037	HGOR-4120-03TH			0.3			36	19			100	20	
	EL038	HGOR-4120-10TH			1		48			19	100			20
	EL039	HGOR-4160-05TH			0.5			60	19			100	20	
	EL040	HGOR-4160-20TH			2		60			19	100			20
	EL041	HGOR-4200-05TH			0.5			60	19			100	20	
EL042	HGOR-4200-20TH	2	60	19	100	20								
 	EL043	HGOH-6060-05TH					■	6	6		0.5	12.5	18	5.7
	EL044	HGOH-6080-05TH	8	17.0	24	7.6			65			8		
	EL045	HGOH-6100-05TH	10	21.0	30	9.5			75			10		
	EL046	HGOH-6120-10TH	12	25.0	36	11.5			85			12		
	EL047	HGOH-6160-10TH	16	34.0	48	15			100			16		
	EL048	HGOH-6200-10TH	20	42.0	60	19			115			20		

■ = Stock | Germany



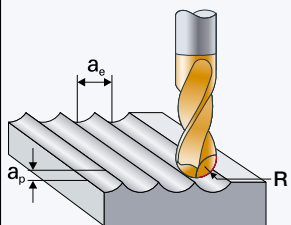
HGOB-2



		D1/R 0.5		D2/R 1.0		D3/R 1.5		D4/R 2.0		D5/R 2.5		
		▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	▽	▽▽▽	
		Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	
D 1 - 5	Mild steel, Carbon Steel & Alloy steel (HB180 ~ HRC30)	V_e (m/min)	140	120	160	140	180	160	200	180	200	180
		n (min ⁻¹)	44,580	38,210	25,470	22,300	19,100	16,980	15,920	14,330	12,740	11,470
		f_z (mm/tooth)	0.04	0.025	0.06	0.04	0.08	0.055	0.1	0.07	0.12	0.08
		V_r (mm/min)	3,570	1,910	3,060	1,780	3,060	1,870	3,190	2,000	3,060	1,840
		a_p (mm)	0.05	0.025	0.1	0.05	0.15	0.075	0.2	0.1	0.25	0.125
		a_s (mm)	0.3	0.025	0.6	0.05	0.9	0.075	1.2	0.1	1.5	0.125
	Pre-Hardened & Hardened tool steel (HRC30 ~ 50)	V_e (m/min)	120	100	140	120	160	140	180	160	180	160
		n (min ⁻¹)	38,220	31,850	22,290	19,100	16,990	14,860	14,330	12,740	11,460	10,200
		f_z (mm/tooth)	0.04	0.025	0.06	0.04	0.08	0.055	0.1	0.07	0.12	0.08
		V_r (mm/min)	3,060	1,600	2,670	1,530	2,720	1,630	2,870	1,780	2,750	1,630
		a_p (mm)	0.05	0.025	0.1	0.05	0.15	0.075	0.2	0.1	0.25	0.125
		a_s (mm)	0.3	0.025	0.6	0.05	0.9	0.075	1.2	0.1	1.5	0.125
	Copper, Aluminium & Cast Iron	V_e (m/min)	180	160	200	180	220	200	240	220	240	220
		n (min ⁻¹)	57,330	51,000	31,850	28,670	23,350	21,230	19,100	17,520	15,300	14,000
		f_z (mm/tooth)	0.04	0.025	0.06	0.04	0.08	0.055	0.1	0.07	0.12	0.08
		V_r (mm/min)	4,590	2,550	3,820	2,300	3,740	2,330	3,820	2,450	3,670	2,240
		a_p (mm)	0.05	0.025	0.1	0.05	0.15	0.075	0.2	0.1	0.25	0.125
		a_s (mm)	0.3	0.025	0.6	0.05	0.9	0.075	1.2	0.1	1.5	0.125
D 6 - 12	Mild steel, Carbon Steel & Alloy steel (HB180 ~ HRC30)	V_e (m/min)	220	220	220	220	260	240	260	240	260	240
		n (min ⁻¹)	11,680	11,680	8,760	8,760	8,280	7,640	6,900	6,370	6,370	5,760
		f_z (mm/tooth)	0.14	0.09	0.16	0.11	0.18	0.13	0.2	0.15	0.2	0.15
		V_r (mm/min)	3,270	2,100	2,800	1,930	2,980	1,990	2,760	1,910	2,760	1,910
		a_p (mm)	0.3	0.15	0.4	0.2	0.5	0.25	0.6	0.3	0.6	0.3
		a_s (mm)	1.8	0.15	2.4	0.2	3.0	0.25	3.6	0.3	3.6	0.3
	Pre-Hardened & Hardened tool steel (HRC30 ~ 50)	V_e (m/min)	200	180	200	180	220	200	220	200	220	200
		n (min ⁻¹)	10,620	9,550	7,960	7,170	7,000	6,370	5,840	5,300	5,840	5,300
		f_z (mm/tooth)	0.14	0.09	0.16	0.11	0.18	0.13	0.2	0.15	0.2	0.15
		V_r (mm/min)	2,970	1,720	2,550	1,580	2,520	1,660	2,340	1,590	2,340	1,590
		a_p (mm)	0.3	0.15	0.4	0.2	0.5	0.25	0.6	0.3	0.6	0.3
		a_s (mm)	1.8	0.15	2.4	0.2	3.0	0.25	3.6	0.3	3.6	0.3
	Copper, Aluminium & Cast Iron	V_e (m/min)	260	270	260	270	320	300	320	300	320	300
		n (min ⁻¹)	13,800	14,330	10,350	10,750	10,200	9,550	8,500	7,960	8,500	7,960
		f_z (mm/tooth)	0.14	0.09	0.16	0.11	0.18	0.13	0.2	0.15	0.2	0.15
		V_r (mm/min)	3,870	2,580	3,300	2,360	3,670	2,480	3,400	2,390	3,400	2,390
		a_p (mm)	0.3	0.15	0.4	0.2	0.5	0.25	0.6	0.3	0.6	0.3
		a_s (mm)	1.8	0.15	2.4	0.2	3.0	0.25	3.6	0.3	3.6	0.3

- Theoretical cusp height in end milling (µm)
- Die theoretische Rautiefe in der Fräsbearbeitung (µm)
- Cresta teorica di fresatura (µm)

- Cálculo de altura de la cresta teórica en fresado (mm)
- Hauteur de crête théorique en fraisage (µm)
- Altura da crista teórica em fresagem (µm)



- Feed pitch and cusp height
- a_e (mm) Zeilensprung
- Passo di avanzamento / Cresta
- Paso y altura de cresta
- Pas et hauteur de crête
- Passo lateral x/ Altura da crista

$$h = R - \sqrt{\frac{(2 \cdot R)^2 - a_{p,e}^2}{4}} \quad h = \frac{a_e^2}{8 \cdot R}$$

NOTA

- Usate centri di lavoro più precisi e rigidi possibile.
- Gli indicazioni sul passo laterale (a_e) espresso nella tabella sopra riportata sono valori generali. Per ottimizzare il processo di lavoro usate le relazioni cresta/raggio più vicine alle Vostre esigenze.
- Le condizioni di taglio indicate sono valori generali. Per ottimizzare il Vostro processo di lavoro analizzate i parametri in funzione delle geometrie che dovete generare e del centro di lavoro a disposizione.
- Se i giri del mandrino della macchina disponibili sono più bassi rispetto al valore espresso regolate l'avanzamento con lo stesso rapporto.

OBSERVACIONES

- Utilizar la máquina más rígida y precisa posible.
- El paso radial (a_p , paso) de la tabla es una información general. Hay que utilizar el paso adecuado en función del acabado superficial que se pretenda obtener según la rugosidad máxima prevista (Altura de cresta).
- Las condiciones de corte de la tabla son una orientación general. Para un trabajo específico hay que ajustar las condiciones en función de la geometría de la pieza, el resultado esperado y el tipo de máquina que vamos a utilizar.
- Si las rpm de la máquina son inferiores, hay que ajustar el avance en proporción a las mismas.

NOTE

- Utiliser une machine aussi fiable et rigide que possible.
- SVP choisissez vos conditions en fonction de l'état de surface requis.
- Les conditions de coupe du tableau sont indicatives. Pour votre application, ajuster cette base en fonction de votre machine.
- Si le nombre de tours est insuffisant ajuster les avances dans la même proportion que la rotation disponible.

NOTA

- Use a máquina disponível mais rígida e precisa possível.
- O passo lateral (a_p , incremento lateral) na tabela acima é para informação geral. Por favor selecione as condições para atender às suas exigências de acabamento de superfície real, de acordo com a altura da crista pretendida.
- As condições de corte no quadro acima são uma informação geral. Para o seu trabalho real ajuste as condições de acordo com a forma da peça, máquina e ferramenta a ser usada para objetivo pretendido.
- Se a sua rpm disponível é menor do que o recomendado, ajuste o avanço para a mesma relação com a rpm.

NOTE

- Use a highly rigid and accurate machine as available.
- The radial step over (a_p , pick feed) in the above table is for general information. Please select the conditions to suit your actual surface finish requirements, according to the cusp height stated.
- The cutting conditions in the above table are a general guide. For your actual work piece adjust the conditions according to the machining shape, purpose and the machine tool to be used.
- If the rpm speed available is lower, adjust the feed rate to the same ratio with the rpm.

ANMERKUNG

- Nutzen Sie für die Bearbeitungen die Maschine mit der höchsten Genauigkeit und der höchsten Steifigkeit.
- Der in der Tabelle angegebene Zeilensprung ist eine generelle Empfehlung. Um die jeweiligen Anforderungen an die Oberflächengüte zu erreichen wählen Sie die Bedingungen entsprechend der angegebenen Rautiefe.
- Die in der Tabelle angegebenen Schnittbedingungen stellen eine generelle Empfehlung dar. Die Werte sollten immer an die jeweilige Bearbeitung, deren Form und die verwendete Maschine angepasst werden.
- Sollte die Ihnen verfügbare Drehzahl niedriger als der in der Tabelle angegebene Wert sein, sollte der Vorschub im gleichen Verhältnis reduziert werden.

HGOR-4



		D6/CR 0.3, 1.0			D8/CR 0.3, 1.0			D10/CR 0.3, 1.0			
		Slotting	Side	2D/3D HSC	Slotting	Side	2D/3D HSC	Slotting	Side	2D/3D HSC	
D 6 - 10	Mild steel, Carbon Steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	90	110	200	90	110	200	90	110	200
		n (min ⁻¹)	4,780	5,840	10,620	3,580	4,380	7,960	2,870	3,500	6,370
		f_z (mm/tooth)	0.04	0.04	0.09	0.05	0.05	0.12	0.06	0.06	0.15
		V_f (mm/min)	760	930	3,820	710	880	3,820	690	840	3,820
		a_p (mm)	3.0	6.0	0.2 - 0.5	4.0	8.0	0.2 - 0.5	5.0	10.0	0.2 - 0.5
		a_e (mm)	6.0	0.6	0.2 - 0.5	8.0	0.8	0.2 - 0.5	10.0	1.0	0.2 - 0.5
	Pre-Hardened & Hardened tool steel (HRC30 ~ 50)	V_c (m/min)	60	80	150	60	80	150	60	80	150
		n (min ⁻¹)	3,190	4,250	7,960	2,390	3,190	5,970	1,910	2,550	4,780
		f_z (mm/tooth)	0.03	0.03	0.09	0.04	0.04	0.12	0.05	0.05	0.15
		V_f (mm/min)	380	510	2,870	380	510	2,870	380	510	2,870
		a_p (mm)	1.5	3.0	0.1 - 0.3	2.0	4.0	0.1 - 0.3	2.5	5.0	0.1 - 0.3
		a_e (mm)	6.0	0.3	0.1 - 0.3	8.0	0.4	0.1 - 0.3	10.0	0.5	0.1 - 0.3
	Copper, Aluminium & Cast Iron	V_c (m/min)	180	200	250	180	200	250	180	200	250
		n (min ⁻¹)	9,550	10,620	13,270	7,170	7,960	9,950	5,730	6,370	7,960
		f_z (mm/tooth)	0.06	0.06	0.09	0.07	0.07	0.12	0.08	0.08	0.15
V_f (mm/min)		2,290	2,550	4,780	2,000	2,230	4,780	1,830	2,040	4,780	
a_p (mm)		3.0	6.0	0.2 - 0.5	4.0	8.0	0.2 - 0.5	5.0	10.0	0.2 - 0.5	
a_e (mm)		6.0	0.6	0.2 - 0.5	8.0	0.8	0.2 - 0.5	10.0	1.0	0.2 - 0.5	

		D12/CR 0.3, 1.0			D16/CR 0.5, 2.0			D20/CR 0.5, 2.0			
		D 12 - 20	Mild steel, Carbon Steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	90	110	200	90	110	200	90
n (min ⁻¹)	2,390			2,920	5,300	1,790	2,190	3,980	1,430	1,750	3,190
f_z (mm/tooth)	0.07			0.07	0.18	0.09	0.09	0.22	0.11	0.11	0.25
V_f (mm/min)	670			820	3,820	640	790	3,500	630	770	3,190
a_p (mm)	6.0			12.0	0.2 - 0.5	8.0	16.0	0.2 - 0.5	10.0	20.0	0.2 - 0.5
a_e (mm)	12.0			1.2	0.2 - 0.5	16.0	1.6	0.2 - 0.5	20.0	2.0	0.2 - 0.5
Pre-Hardened & Hardened tool steel (HRC30 ~ 50)	V_c (m/min)		60	80	150	60	80	150	60	80	150
	n (min ⁻¹)		1,590	2,120	3,980	1,200	1,590	2,990	950	1,270	2,390
	f_z (mm/tooth)		0.06	0.06	0.18	0.08	0.08	0.22	0.09	0.09	0.25
	V_f (mm/min)		380	510	2,870	380	510	2,630	340	460	2,390
	a_p (mm)		3.0	6.0	0.1 - 0.3	4.0	8.0	0.1 - 0.3	5.0	10.0	0.1 - 0.3
	a_e (mm)		12.0	0.6	0.1 - 0.3	16.0	0.8	0.1 - 0.3	20.0	1.0	0.1 - 0.3
Copper, Aluminium & Cast Iron	V_c (m/min)		180	200	250	180	200	250	180	200	250
	n (min ⁻¹)		4,780	5,300	6,640	3,580	3,980	4,980	2,870	3,190	3,980
	f_z (mm/tooth)		0.09	0.09	0.18	0.1	0.1	0.22	0.12	0.12	0.25
	V_f (mm/min)	1,720	1,900	4,780	1,430	1,590	4,380	1,380	1,530	3,980	
	a_p (mm)	6.0	12.0	0.2 - 0.5	8.0	16.0	0.2 - 0.5	10.0	20.0	0.2 - 0.5	
	a_e (mm)	12.0	1.2	0.2 - 0.5	16.0	1.6	0.2 - 0.5	20.0	2.0	0.2 - 0.5	

HGOH-6



		D6/CR 0.5			D8/CR 0.5			D10/CR 0.5			
		Side	Side HSC	2D/3D HSC	Side	Side HSC	2D/3D HSC	Side	Side HSC	2D/3D HSC	
D 6 - 10	Mild steel, Carbon steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	110	200	200	110	200	200	110	200	200
		n (min ⁻¹)	5,800	10,600	10,600	4,400	8,000	8,000	3,500	6,400	6,400
		f_z (mm/tooth)	0.06	0.06	0.09	0.07	0.07	0.12	0.08	0.08	0.15
		V_f (mm/min)	2,090	3,820	5,720	1,850	3,360	5,760	1,680	3,070	5,760
		a_p (mm)	9.0	9.0	0.2 - 0.5	12.0	12.0	0.2 - 0.5	15.0	15.0	0.2 - 0.5
		a_e (mm)	0.3	0.3	0.2 - 0.5	0.4	0.4	0.2 - 0.5	0.5	0.5	0.2 - 0.5
	Pre-Hardened & Hardened tool steel (HRC30~50)	V_c (m/min)	80	180	180	80	180	180	80	180	180
		n (min ⁻¹)	4,200	9,500	9,500	3,200	7,200	7,200	2,500	5,700	5,700
		f_z (mm/tooth)	0.06	0.06	0.09	0.07	0.07	0.12	0.08	0.08	0.15
		V_f (mm/min)	1,510	3,420	5,130	1,340	3,020	5,180	1,200	2,740	5,130
		a_p (mm)	9.0	9.0	0.1 - 0.3	12.0	12.0	0.1 - 0.3	15.0	15.0	0.1 - 0.3
		a_e (mm)	0.06	0.06	0.1 - 0.3	0.08	0.08	0.1 - 0.3	0.1	0.1	0.1 - 0.3
	Cast Iron (HB150 ~ 200) GG, GGG	V_c (m/min)	160	250	250	160	250	250	160	250	250
		n (min ⁻¹)	8,500	13,200	13,200	6,400	9,900	9,900	5,100	8,000	8,000
		f_z (mm/tooth)	0.08	0.08	0.09	0.1	0.1	0.12	0.12	0.12	0.15
V_f (mm/min)		4,080	6,340	7,130	3,840	5,940	7,130	3,670	5,760	7,200	
a_p (mm)		9.0	9.0	0.2 - 0.5	12.0	12.0	0.2 - 0.5	15.0	15.0	0.2 - 0.5	
a_e (mm)		0.6	0.6	0.2 - 0.5	0.8	0.8	0.2 - 0.5	1.0	1.0	0.2 - 0.5	

		D12/CR 1.0			D16/CR 1.0			D20/CR 1.0			
		D 12 - 20	Mild steel, Carbon steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	110	200	200	110	200	200	110
n (min ⁻¹)	2,900			5,300	5,300	2,200	4,000	4,000	1,800	3,200	3,200
f_z (mm/tooth)	0.1			0.1	0.18	0.12	0.12	0.22	0.13	0.13	0.25
V_f (mm/min)	1,740			3,180	5,720	1,580	2,880	5,280	1,400	2,500	4,800
a_p (mm)	18.0			18.0	0.2 - 0.5	24.0	24.0	0.2 - 0.5	30.0	30.0	0.2 - 0.5
a_e (mm)	0.6			0.6	0.2 - 0.5	0.8	0.8	0.2 - 0.5	1.0	1.0	0.2 - 0.5
Pre-Hardened & Hardened tool steel (HRC30~50)	V_c (m/min)		80	180	180	80	180	180	80	180	180
	n (min ⁻¹)		2,100	4,800	4,800	1,600	3,600	3,600	1,300	2,900	2,900
	f_z (mm/tooth)		0.1	0.1	0.18	0.12	0.12	0.22	0.13	0.13	0.25
	V_f (mm/min)		1,260	2,880	5,180	1,150	2,590	4,750	1,010	2,260	4,350
	a_p (mm)		18.0	18.0	0.1 - 0.3	24.0	24.0	0.1 - 0.3	30.0	30.0	0.1 - 0.3
	a_e (mm)		0.12	0.12	0.1 - 0.3	0.16	0.16	0.1 - 0.3	0.2	0.2	0.1 - 0.3
Cast Iron (HB150 ~ 200) GG, GGG	V_c (m/min)		160	250	250	160	250	250	160	250	250
	n (min ⁻¹)		4,200	6,600	6,600	3,200	5,000	5,000	2,500	4,000	4,000
	f_z (mm/tooth)		0.13	0.13	0.18	0.13	0.13	0.22	0.14	0.14	0.25
	V_f (mm/min)	3,280	5,150	7,130	2,500	3,900	6,600	2,100	3,360	6,000	
	a_p (mm)	18.0	18.0	0.2 - 0.5	24.0	24.0	0.2 - 0.5	30.0	30.0	0.2 - 0.5	
	a_e (mm)	1.2	1.2	0.2 - 0.5	1.6	1.6	0.2 - 0.5	2.0	2.0	0.2 - 0.5	

Always up to date: Please check our P50 QuickFinder

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UK Note: For finishing and precise tool definition for the CAM system please download DXF data (QuickFinder), or contact your local Hitachi Tool staff for more details.

Germany Achtung: Bitte laden Sie sich für die Schlichtbearbeitung und die präzise Definition der Werkzeuge die DXF Daten herunter (QuickFinder) oder wenden Sie sich an Ihren Hitachi Anwendungstechniker.

Italy Nota: Per lavorazioni di finitura e per una precisa e corretta definizione del profilo dell'utensile per l'utilizzo CAM si prega di richiedere file DXF tramite QuickFinder o rivolgendosi al personale Hitachi Tool.

Spain Nota: En procesos de acabado y para una más precisa definición de la herramienta en el sistema de CAM por favor solicite los ficheros DXF (QuickFinder), o póngase en contacto con Hitachi Tool para obtener más detalles.

France Remarque : Pour les opérations de finition et une définition précise de l'outil dans votre système FAO, demandez nous le fichier DXF des outils, téléchargez les via notre logiciel QuickFinder, ou contactez votre interlocuteur commercial pour plus de détails.

Portugal Nota: Para o acabamento e precisão assim como melhor definição da ferramenta para o sistema CAM por favor solicitar dados DXF (QuickFinder), ou entre em contato com sua equipe de ferramentas Hitachi local para obter mais detalhes.

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Hitachi Tool Engineering Europe GmbH

Itterpark 12 · 40724 Hilden · Germany · Phone +49 (0) 21 03 – 24 82-0 · Fax +49 (0) 21 03 – 24 82-30

e-Mail info@hitachitool-eu.com · Internet www.hitachitool-eu.com

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