



2022

THE PROFESSIONAL ENDMILL

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CBN Line





TOWA End Mill?

TOWA ist ein weltweit bekannter Leader im ultrapräzisions Formenbau.

Es ist keine Übertreibung zu behaupten, dass die Herstellung der Ultrapräzisionsformen von TOWA nur durch die Verwendung von TOWA's eigenem TOWA Schafffräser erreicht wird.

TOWA Schafffräser sind für hohe Genauigkeit geschaffen, sowie mit ausgezeichneter Verschleissfestigkeit, excellenter Schärfe und langer Lebensdauer ausgestattet.

Die Überlegenheit des TOWA Schafffräasers zeigt sich kontinuierlich durch den Einsatz bei seinem Hauptkunden TOWA. Da TOWA sowohl Hersteller als auch Anwender ist, kann TOWA Produkte liefern, die die Bedürfnisse jedes Kunden voll erfüllen. Darüber hinaus können wir aus Sicht des Anwenders unsere langjährige Erfahrung bei Empfehlungen zum Bearbeitungsprozess des Bauteils voll ausspielen.

Als umfassender Hersteller von Zerspanungswerkzeugen in den Sektionen CBN sowie auch Vollhartmetall (ultra micrograin) sind diese Werkzeugserien als neuer Stern am Werkzeughimmel zu werten. TOWA wird auch weiterhin nach einem noch besseren Preis-Leistungs-Verhältnis im effizienten Metallbearbeitungs-Sektor streben.

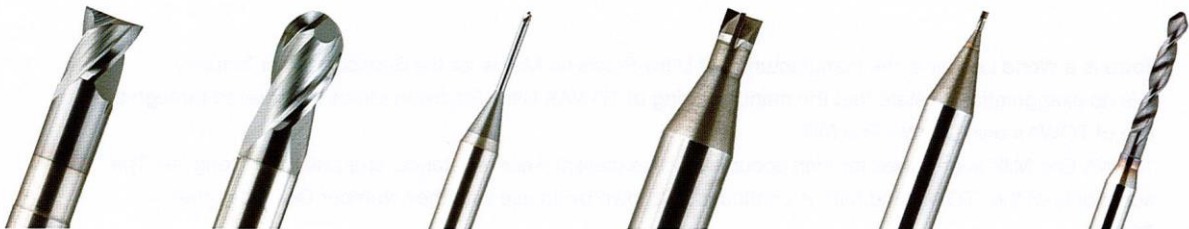


Schafffräser von TOWA für die Ultra-Präzisionsbearbeitung

CBN & Vollhartmetall

Unsere Schafffräser sind aus unseren internen Anforderungen für die ultrapräzise Formbearbeitung entstanden. Damit können wir die stetig strenger werdenden Formspezifikationen der Kunden erstklassig erfüllen. Das bewährte Design und die entwickelten Geometrien aus eigener Fertigung entsprechen den Anforderungen nach höherer Präzision und Langlebigkeit excellent.

längere Standzeiten - reduzierte Anzahl benötigter Werkzeuge = reduzierte Kosten



Höchste Präzisions-Ausführung

- Anfertigung nach Ihren Angaben werden in Toleranz von 0.003mm gefertigt
- R $\pm 2\mu\text{m}$
Radius-Toleranz +/- 0.002mm

Mehrere Schneiden

- Durch die Mehrschneiden-Ausführung von 3 - 6 Lippen wird die Bearbeitungszeit erheblich verkürzt

lange Lebensdauer

- lange Standzeiten und Lebensdauer mit den originalen Beschichtungen ebenfalls von TOWA entwickelt

Nachschleifen

- Wir können CBN Schafffräser bis zu 8 Mal nachschleifen. Dies ergibt eine Gesamtkostenreduktion von bis zu 50%
- Wir entfernen die Beschichtung vollständig und schleifen das neutrale CBN entsprechend nach und beschichten die Werkzeuge danach neu. Diese Arbeiten werden zu einem vernünftigen Preis geboten.

Schnellste Lieferung

- Katalogprodukte können meist am Tag der Bestellung oder am Folgetag versendet werden.
- Sonderanfertigungen und Nachschleifen können meist innerhalb von 10-14 Tagen versendet werden

CBN & Vollhartmetall
Schafffräser

Category				CBN End Mill	
Hardness	Mark	Classification	Material	CBN	CBN BANCERA
Hardness ~HRC50	K	Gusseisen	FCD		
		Carbon Stahl	S50C / SS400 Stahl 44		
	P	vorgehärtete Stähle	PX5 / NAK80 1.2083 / 1.2312		
		Stähle	SKD11 · SKD61 1.2379 / 1.2344		
		HSS Stähle	HAP5R · HAP72 / ASP23		
	M	Rostfreie Stähle	SUS304 1.4301		
HPM / STAVAX 1.2083					
~HRC55	H	Rostfreie Stähle	HPM	○	◎(★)
			STAVAX 1.2083	○	◎(★)
		Stähle	SKD61 1.2344		
~HRC60	H	Stähle	SKD11 1.2379	○	◎(★)
HSS Stähle		SKH51 1.3343	○	◎(★)	
HRC60 over	H	HSS Stähle	ASP23	○	◎(★)
				○	◎(★)
			HAP72 PM Stahl	○	◎(★)
Non-ferrous Metal	N	Kupferlegierungen	Kupfer Copper	○	◎(★)
			Kupfer Wolfram Copper Tungsten		
	Alulegierungen	A5000 Series			
		A7000 Series			
	Graphite	Graphite			
S	hitzebeständige Legierungen	Inconel			
		Kovar			
		Titanlegierungen Titanium Alloy			
3D Printer	P	Eisenlegierungen	Martensitische Stähle Maraging Steels		
	M		rostfreie Stähle Stainless Steels		

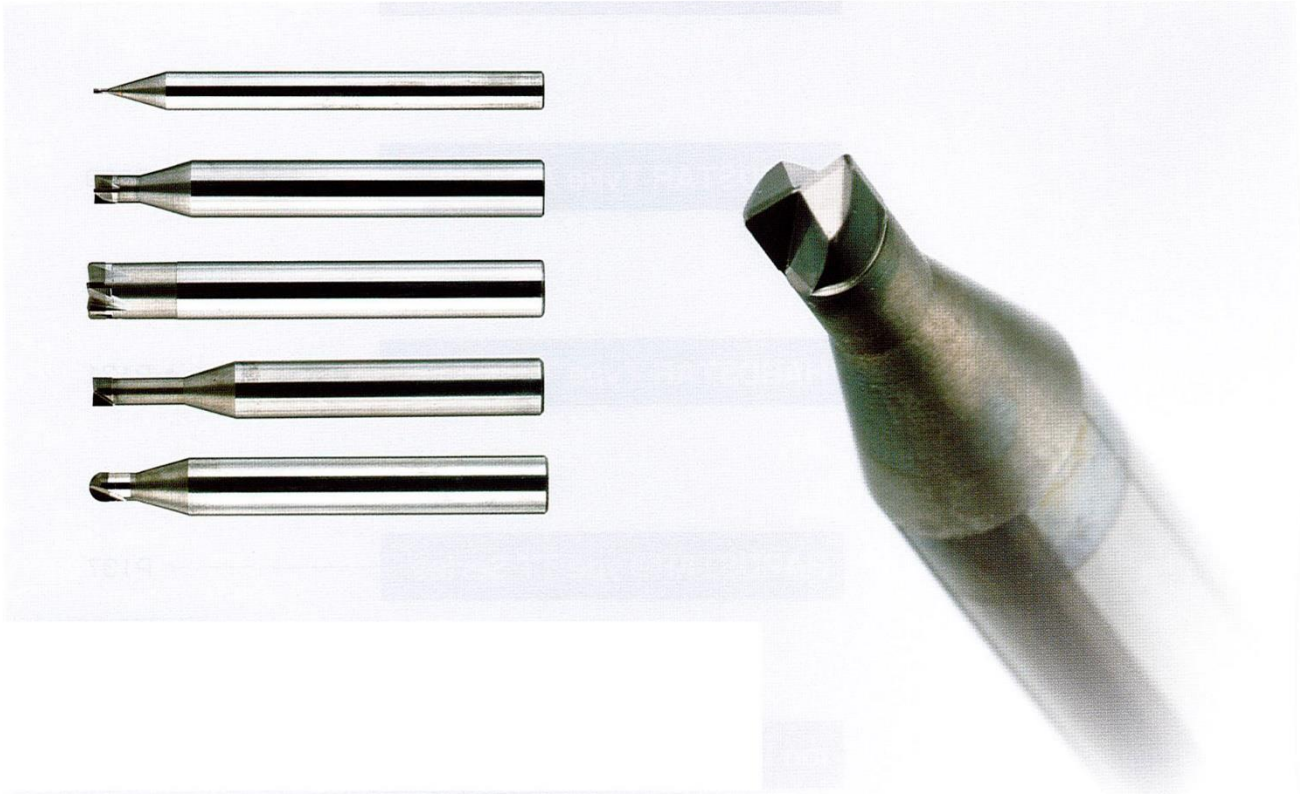
◎: Excellent ○: Good

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CBN Series

CBN End Mill

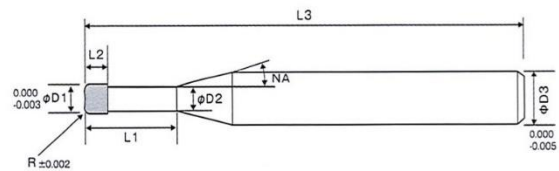


Features

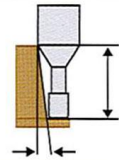
- TOWA CBN Schaftfräser ermöglichen ein ultra-präzises Arbeiten mit langen Standzeiten
- Nachschleifen ist möglich bis zu acht Mal. Dies reduziert die Werkzeugkosten erheblich
- BANCERA Beschichtung (Keramic Typ) für höchste Spanresistenz ist auf Verlangen möglich
- Standard-Ausführung zwischen \varnothing 0.1 bis \varnothing 6.0 / Weitere \varnothing auf Anfrage und Kundenwunsch kein Problem

CBN Radius End Mill

CR200 Model number:CR200

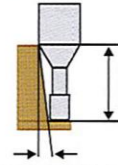


Der Hinterschliffwinkel (NA) ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie auf dem aktuellen Massblatt

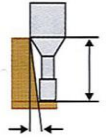


Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel Neck Taper Angle	Schaff-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
CR200-0010-0010-0020	0.1	0.01	0.2	0.07	0.08	15	4	50	0.24	0.25	0.26	0.27	0.29
CR200-0010-0020-0020		0.02	0.2	0.04	0.08	15	4	50	0.24	0.25	0.26	0.27	0.29
CR200-0010-0020-0030		0.02	0.3	0.04	0.08	15	4	50	0.35	0.36	0.37	0.38	0.41
CR200-0010-0030-0020		0.03	0.2	0.04	0.08	15	4	50	0.24	0.25	0.26	0.27	0.29
CR200-0010-0030-0030		0.03	0.3	0.04	0.08	15	4	50	0.35	0.36	0.37	0.38	0.41
CR200-0015-0020-0020	0.15	0.02	0.2	0.06	0.13	15	4	50	0.24	0.25	0.26	0.27	0.29
CR200-0015-0020-0030		0.02	0.3	0.06	0.13	15	4	50	0.35	0.36	0.37	0.38	0.41
CR200-0015-0030-0020		0.03	0.2	0.06	0.13	15	4	50	0.24	0.25	0.26	0.27	0.29
CR200-0015-0030-0030		0.03	0.3	0.06	0.13	15	4	50	0.35	0.36	0.37	0.38	0.41
CR200-0020-0010-0050	0.2	0.01	0.5	0.3	0.17	15	4	50	0.57	0.59	0.62	0.64	0.69
CR200-0020-0020-0030		0.02	0.3	0.08	0.17	15	4	50	0.37	0.38	0.39	0.41	0.44
CR200-0020-0020-0050		0.02	0.5	0.08	0.17	15	4	50	0.57	0.59	0.61	0.64	0.69
CR200-0020-0030-0030		0.03	0.3	0.08	0.17	15	4	50	0.37	0.38	0.39	0.40	0.44
CR200-0020-0030-0050		0.03	0.5	0.3	0.17	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0020-0050-0030		0.05	0.3	0.08	0.17	15	4	50	0.37	0.38	0.39	0.40	0.43
CR200-0020-0050-0050		0.05	0.5	0.08	0.17	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0030-0020-0050	0.3	0.02	0.5	0.3	0.27	15	4	50	0.57	0.59	0.61	0.64	0.69
CR200-0030-0020-0075		0.02	0.75	0.13	0.27	15	4	50	0.83	0.86	0.89	0.92	1.00
CR200-0030-0030-0050		0.03	0.5	0.13	0.27	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0030-0030-0075		0.03	0.75	0.13	0.27	15	4	50	0.83	0.86	0.89	0.92	0.99
CR200-0030-0050-0050		0.05	0.5	0.3	0.27	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0030-0050-0075		0.05	0.75	0.13	0.27	15	4	50	0.83	0.86	0.89	0.92	0.99
CR200-0040-0020-0050	0.4	0.02	0.5	0.24	0.37	15	4	50	0.57	0.59	0.61	0.64	0.69
CR200-0040-0020-0100		0.02	1	0.24	0.37	15	4	50	1.09	1.13	1.17	1.21	1.31
CR200-0040-0030-0050		0.03	0.5	0.3	0.37	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0040-0030-0100		0.03	1	0.24	0.37	15	4	50	1.09	1.13	1.17	1.21	1.31
CR200-0040-0050-0050		0.05	0.5	0.3	0.37	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0040-0050-0100		0.05	1	0.24	0.37	15	4	50	1.09	1.13	1.17	1.21	1.30
CR200-0040-0100-0050		0.1	0.5	0.3	0.37	15	4	50	0.57	0.59	0.61	0.62	0.67
CR200-0040-0100-0100		0.1	1	0.24	0.37	15	4	50	1.09	1.12	1.16	1.20	1.29
CR200-0050-0020-0050	0.5	0.02	0.5	0.3	0.47	15	4	50	0.57	0.59	0.61	0.64	0.69
CR200-0050-0020-0100		0.02	1	0.3	0.47	15	4	50	1.09	1.13	1.17	1.21	1.31
CR200-0050-0030-0050		0.03	0.5	0.3	0.47	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0050-0030-0100		0.03	1	0.3	0.47	15	4	50	1.09	1.13	1.17	1.21	1.31
CR200-0050-0050-0050		0.05	0.5	0.3	0.47	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0050-0050-0100		0.05	1	0.3	0.47	15	4	50	1.09	1.13	1.17	1.21	1.30
CR200-0050-0100-0050		0.1	0.5	0.3	0.47	15	4	50	0.57	0.59	0.61	0.62	0.67
CR200-0050-0100-0100		0.1	1	0.3	0.47	15	4	50	1.09	1.12	1.16	1.20	1.29
CR200-0060-0020-0050		0.6	0.02	0.5	0.3	0.57	15	4	50	0.57	0.59	0.61	0.64
CR200-0060-0020-0100	0.02		1	0.3	0.57	15	4	50	1.09	1.13	1.17	1.21	1.31
CR200-0060-0020-0150	0.02		1.5	0.3	0.57	15	4	50	1.61	1.66	1.72	1.79	1.93
CR200-0060-0030-0050	0.03		0.5	0.3	0.57	15	4	50	0.57	0.59	0.61	0.63	0.68
CR200-0060-0030-0100	0.03		1	0.3	0.57	15	4	50	1.09	1.13	1.17	1.21	1.31
CR200-0060-0030-0150	0.03		1.5	0.3	0.57	15	4	50	1.61	1.66	1.72	1.78	1.93
CR200-0060-0030-0170	0.03		1.7	0.7	0.57	15	4	50	1.81	1.88	1.94	2.01	2.18

CBN Series



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									30°	1°	1°30'	2°	3°	
CR200-0060-0050-0050	0.6	0.05	0.5	0.3	0.57	15	4	50	0.57	0.59	0.61	0.63	0.68	
CR200-0060-0050-0100		0.05	1	0.3	0.57	15	4	50	1.09	1.13	1.17	1.21	1.30	
CR200-0060-0050-0150		0.05	1.5	0.3	0.57	15	4	50	1.61	1.66	1.72	1.78	1.92	
CR200-0060-0050-0170		0.05	1.7	0.7	0.57	15	4	50	1.81	1.87	1.94	2.01	2.17	
CR200-0060-0100-0050		0.1	0.5	0.3	0.57	15	4	50	0.57	0.59	0.61	0.62	0.67	
CR200-0060-0100-0100		0.1	1	0.3	0.57	15	4	50	1.09	1.12	1.16	1.20	1.29	
CR200-0060-0100-0150		0.1	1.5	0.3	0.57	15	4	50	1.61	1.66	1.71	1.77	1.91	
CR200-0060-0100-0170		0.1	1.7	0.7	0.57	15	4	50	1.81	1.87	1.94	2.00	2.16	
CR200-0060-0200-0170		0.2	1.7	0.7	0.57	15	4	50	1.81	1.86	1.92	1.99	2.14	
CR200-0080-0020-0150		0.8	0.02	1.5	0.56	0.77	15	4	50	1.61	1.66	1.72	1.79	1.93
CR200-0080-0030-0150	0.03		1.5	0.56	0.77	15	4	50	1.61	1.66	1.72	1.78	1.93	
CR200-0080-0050-0150	0.05		1.5	0.56	0.77	15	4	50	1.61	1.66	1.72	1.78	1.92	
CR200-0080-0100-0150	0.1		1.5	0.56	0.77	15	4	50	1.61	1.66	1.71	1.77	1.91	
CR200-0100-0020-0100	1	0.02	1	0.7	0.96	15	4	50	1.11	1.15	1.19	1.23	1.33	
CR200-0100-0020-0200		0.02	2	0.7	0.96	15	4	50	2.14	2.22	2.30	2.38	2.57	
CR200-0100-0030-0100		0.03	1	0.7	0.96	15	4	50	1.11	1.15	1.19	1.23	1.33	
CR200-0100-0030-0200		0.03	2	0.7	0.96	15	4	50	2.14	2.22	2.30	2.38	2.57	
CR200-0100-0050-0100		0.05	1	0.7	0.96	15	4	50	1.11	1.15	1.19	1.23	1.32	
CR200-0100-0050-0200		0.05	2	0.7	0.96	15	4	50	2.14	2.22	2.29	2.38	2.57	
CR200-0100-0050-0220		0.05	2.2	1.2	0.96	15	4	50	2.35	2.43	2.52	2.61	2.82	
CR200-0100-0100-0100		0.1	1	0.7	0.96	15	4	50	1.11	1.14	1.18	1.22	1.31	
CR200-0100-0100-0200		0.1	2	0.7	0.96	15	4	50	2.14	2.21	2.29	2.37	2.56	
CR200-0100-0100-0220		0.1	2.2	1.2	0.96	15	4	50	2.35	2.43	2.51	2.60	2.80	
CR200-0100-0200-0100		0.2	1	0.7	0.96	15	4	50	1.10	1.14	1.17	1.21	1.29	
CR200-0100-0200-0200		0.2	2	0.7	0.96	15	4	50	2.14	2.21	2.28	2.36	2.53	
CR200-0100-0200-0220		0.2	2.2	1.2	0.96	15	4	50	2.34	2.42	2.50	2.59	2.78	
CR200-0100-0300-0220		0.3	2.2	1.2	0.96	15	4	50	2.34	2.41	2.49	2.57	2.76	
CR200-0150-0020-0200		1.5	0.02	2	1	1.44	15	4	50	2.18	2.26	2.34	2.43	2.62
CR200-0150-0020-0300			0.02	3	1	1.44	15	4	50	3.22	3.33	3.45	3.58	3.86
CR200-0150-0030-0200	0.03		2	1	1.44	15	4	50	2.18	2.26	2.34	2.42	2.62	
CR200-0150-0030-0300	0.03		3	1	1.44	15	4	50	3.22	3.33	3.45	3.57	3.86	
CR200-0150-0050-0200	0.05		2	1	1.44	15	4	50	2.18	2.26	2.34	2.42	2.61	
CR200-0150-0050-0300	0.05		3	1.5	1.44	15	4	50	3.22	3.33	3.44	3.57	3.86	
CR200-0150-0100-0200	0.1		2	1	1.44	15	4	50	2.18	2.25	2.33	2.41	2.60	
CR200-0150-0100-0300	0.1		3	1.5	1.44	15	4	50	3.21	3.32	3.44	3.56	3.85	
CR200-0150-0200-0200	0.2		2	1	1.44	15	4	50	2.18	2.25	2.32	2.40	2.58	
CR200-0150-0200-0300	0.2		3	1.5	1.44	15	4	50	3.21	3.31	3.43	3.55	3.82	
CR200-0150-0300-0200	0.3		2	1	1.44	15	4	50	2.17	2.24	2.31	2.38	2.56	
CR200-0150-0300-0300	0.3		3	1.5	1.44	15	4	50	3.21	3.31	3.42	3.53	3.80	
CR200-0200-0020-0300	2		0.02	3	1.2	1.96	15	4	50	3.18	3.29	3.41	3.53	3.82
CR200-0200-0020-0400			0.02	4	1.2	1.96	15	4	50	4.21	4.36	4.51	4.68	5.06
CR200-0200-0030-0300		0.03	3	1.2	1.96	15	4	50	3.18	3.29	3.40	3.53	3.82	
CR200-0200-0030-0400		0.03	4	1.2	1.96	15	4	50	4.21	4.36	4.51	4.68	5.06	
CR200-0200-0050-0300		0.05	3	1.2	1.96	15	4	50	3.18	3.29	3.40	3.53	3.81	
CR200-0200-0050-0400		0.05	4	1.2	1.96	15	4	50	4.21	4.36	4.51	4.68	5.05	



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.					
									30°	1°	1°30'	2°	3°	
									CR200-0200-0050-0500	2	0.05	5	2	1.96
CR200-0200-0100-0300	0.1	3	1.2	1.96	15	4	50	3.17	3.28		3.40	3.52	3.80	
CR200-0200-0100-0400	0.1	4	1.2	1.96	15	4	50	4.21	4.35		4.51	4.67	5.04	
CR200-0200-0100-0500	0.1	5	2	1.96	15	4	50	5.24	5.42		5.61	5.82	6.29	
CR200-0200-0200-0300	0.2	3	1.2	1.96	15	4	50	3.17	3.28		3.39	3.51	3.78	
CR200-0200-0200-0400	0.2	4	1.2	1.96	15	4	50	4.21	4.34		4.49	4.66	5.02	
CR200-0200-0200-0500	0.2	5	2	1.96	15	4	50	5.24	5.41		5.60	5.81	6.26	
CR200-0200-0300-0300	0.3	3	1.2	1.96	15	4	50	3.17	3.27		3.38	3.49	3.75	
CR200-0200-0300-0400	0.3	4	1.2	1.96	15	4	50	4.20	4.34		4.48	4.64	5.00	
CR200-0200-0300-0500	0.3	5	2	1.96	15	4	50	5.24	5.41		5.59	5.79	6.24	
CR200-0200-0500-0300	0.5	3	1.2	1.96	15	4	50	3.16	3.25		3.35	3.46	3.71	
CR200-0200-0500-0400	0.5	4	1.2	1.96	15	4	50	4.20	4.32		4.46	4.61	4.95	
CR200-0300-0050-0500	3	0.05	5	2	2.92	15	6	50	5.32		5.50	5.70	5.91	6.39
CR200-0300-0100-0500		0.1	5	2	2.92	15	6	50	5.32		5.50	5.70	5.91	6.38
CR200-0300-0200-0500		0.2	5	2	2.92	15	6	50	5.32	5.49	5.69	5.89	6.35	
CR200-0300-0300-0500		0.3	5	2	2.92	15	6	50	5.31	5.49	5.67	5.88	6.33	

CBN Series

Empfohlene Einsatz-Parameter
Recommended Milling Conditions

CR200
Model number:CR200

Radius End Mill

Work Material		Copper					Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
2	0.1	0.2	0.002	0.015	200	50,000	0.002	0.015	200	50,000	0.002	0.01	150	50,000	0.001	0.01	100	50,000
		0.3	0.002	0.015	150	50,000	0.002	0.015	150	50,000	0.001	0.01	100	50,000	0.001	0.01	50	50,000
	0.15	0.2	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.003	0.02	150	50,000	0.002	0.015	100	50,000
		0.3	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.003	0.02	150	50,000	0.002	0.015	100	50,000
	0.2	0.3	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
		0.5	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
	0.3	0.5	0.003	0.05	500	50,000	0.003	0.05	500	50,000	0.003	0.05	400	50,000	0.002	0.03	300	50,000
		0.75	0.003	0.05	500	50,000	0.003	0.05	500	50,000	0.003	0.05	400	50,000	0.002	0.03	300	50,000
	0.4	0.5	0.005	0.1	700	50,000	0.005	0.1	700	50,000	0.005	0.1	600	50,000	0.003	0.03	400	50,000
		1	0.005	0.1	700	50,000	0.005	0.1	700	50,000	0.005	0.1	600	50,000	0.003	0.03	400	50,000
	0.5	0.5	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.1	700	50,000
		1	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.1	700	50,000
	0.6	0.5	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
		1	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
		1.5	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
		1.7	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
	0.8	1.5	0.02	0.3	1,400	50,000	0.02	0.3	1,400	50,000	0.02	0.2	1,200	50,000	0.01	0.1	1,000	40,000
	1	1	0.02	0.4	1,500	48,000	0.02	0.4	1,500	48,000	0.02	0.3	1,200	48,000	0.01	0.2	1,000	32,000
		2	0.02	0.4	1,500	48,000	0.02	0.4	1,500	48,000	0.02	0.3	1,200	48,000	0.01	0.2	1,000	32,000
		2.2	0.02	0.4	1,500	48,000	0.02	0.4	1,500	48,000	0.02	0.3	1,200	48,000	0.01	0.2	1,000	32,000
	1.5	2	0.03	0.5	1,000	32,000	0.03	0.5	1,000	32,000	0.03	0.4	1,000	32,000	0.01	0.2	800	20,000
		3	0.02	0.5	2,000	32,000	0.02	0.5	2,000	32,000	0.02	0.4	1,500	32,000	0.01	0.2	1,200	20,000
	2	3	0.03	0.8	2,000	24,000	0.03	0.8	2,000	24,000	0.03	0.7	1,500	24,000	0.01	0.5	1,100	16,000
		4	0.03	0.8	2,000	24,000	0.03	0.8	2,000	24,000	0.03	0.7	1,500	24,000	0.01	0.5	1,100	16,000
5		0.03	0.8	2,000	24,000	0.03	0.8	2,000	24,000	0.03	0.7	1,500	24,000	0.01	0.5	1,200	16,000	
3	5	0.03	0.6	2,000	24,000	0.03	0.6	2,000	24,000	0.03	0.5	1,500	24,000	0.01	0.3	1,200	16,000	

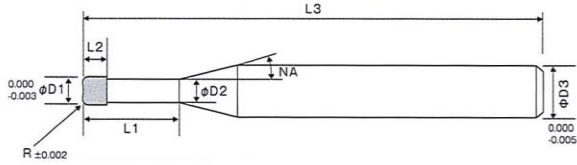
- Einschrumpfen des Werkzeugs vermindert Werkzeughalbierung
- Schnitttiefe zeigt maximaler Wert für Feinschichten
- Ap = Axial / Ae = Radial

- Empfohlene Kühlung: Ölnebel oder wasserloses Schneiden-Fluid
- Auskraglänge sollte so kurz wie möglich gehalten werden
- Anpassung der Parameter an Ihre tatsächlichen Begebenheiten empfohlen

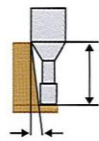
CBN Series

CBN Radius End Mill

CR300 Model number: CR300



Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechend zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.					
									30°	1°	1°30'	2°	3°	
									CR300-0060-0020-0050	0.6	0.02	0.5	0.3	0.57
CR300-0060-0020-0100	0.02	1	0.3	0.57	15	4	50	1.09	1.13		1.17	1.21	1.31	
CR300-0060-0020-0150	0.02	1.5	0.3	0.57	15	4	50	1.61	1.66		1.72	1.79	1.93	
CR300-0060-0020-0200	0.02	2	0.3	0.57	15	4	50	2.12	2.20		2.28	2.36	2.55	
CR300-0060-0020-0250	0.02	2.5	0.3	0.57	15	4	50	2.64	2.73		2.83	2.94	3.17	
CR300-0060-0030-0170	0.03	1.7	0.7	0.57	0.57	15	4	50	1.81		1.88	1.94	2.01	2.18
CR300-0060-0050-0050	0.05	0.5	0.3	0.57	0.57	15	4	50	0.57		0.59	0.61	0.63	0.68
CR300-0060-0050-0100	0.05	1	0.3	0.57	0.57	15	4	50	1.09		1.13	1.17	1.21	1.30
CR300-0060-0050-0150	0.05	1.5	0.3	0.57	0.57	15	4	50	1.61		1.66	1.72	1.78	1.92
CR300-0060-0050-0170	0.05	1.7	0.7	0.57	0.57	15	4	50	1.81		1.87	1.94	2.01	2.17
CR300-0060-0050-0200	0.05	2	0.3	0.57	0.57	15	4	50	2.12		2.20	2.27	2.36	2.54
CR300-0060-0050-0250	0.05	2.5	0.3	0.57	0.57	15	4	50	2.64		2.73	2.83	2.93	3.17
CR300-0060-0100-0050	0.1	0.5	0.3	0.57	0.57	15	4	50	0.57		0.59	0.61	0.62	0.67
CR300-0060-0100-0100	0.1	1	0.3	0.57	0.57	15	4	50	1.09		1.12	1.16	1.20	1.29
CR300-0060-0100-0150	0.1	1.5	0.3	0.57	0.57	15	4	50	1.61		1.66	1.71	1.77	1.91
CR300-0060-0100-0170	0.1	1.7	0.7	0.57	0.57	15	4	50	1.81		1.87	1.94	2.00	2.16
CR300-0060-0100-0200	0.1	2	0.3	0.57	0.57	15	4	50	2.12		2.19	2.27	2.35	2.53
CR300-0060-0100-0250	0.1	2.5	0.3	0.57	0.57	15	4	50	2.64		2.73	2.82	2.92	3.15
CR300-0060-0200-0170	0.2	1.7	0.7	0.57	0.57	15	4	50	1.81		1.86	1.92	1.99	2.14
CR300-0080-0020-0150	0.8	0.02	1.5	0.56	0.77	15	4	50	1.61		1.66	1.72	1.79	1.93
CR300-0080-0020-0250		0.02	2.5	0.56	0.77	15	4	50	2.64	2.73	2.83	2.94	3.17	
CR300-0080-0020-0500		0.02	5	0.56	0.77	15	4	50	5.23	5.41	5.60	5.81	6.28	
CR300-0080-0050-0150		0.05	1.5	0.56	0.77	15	4	50	1.61	1.66	1.72	1.78	1.92	
CR300-0080-0050-0250		0.05	2.5	0.56	0.77	15	4	50	2.64	2.73	2.83	2.93	3.17	
CR300-0080-0050-0500		0.05	5	0.56	0.77	15	4	50	5.22	5.40	5.60	5.81	6.27	
CR300-0080-0100-0150		0.1	1.5	0.56	0.77	15	4	50	1.61	1.66	1.71	1.77	1.91	
CR300-0080-0100-0250		0.1	2.5	0.56	0.77	15	4	50	2.64	2.73	2.82	2.92	3.15	
CR300-0080-0100-0500		0.1	5	0.56	0.77	15	4	50	5.22	5.40	5.59	5.80	6.26	

Empfohlene Parameter Recommended Milling Conditions

CR300
Model number:CR300

Radius End Mill

Work Material			Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
3	0.6	0.5	0.008	0.2	1,500	50,000	0.008	0.2	1,500	50,000	0.005	0.15	800	50,000	0.003	0.1	600	50,000
		1	0.008	0.2	1,500	50,000	0.008	0.2	1,500	50,000	0.005	0.15	800	50,000	0.003	0.1	600	50,000
		1.5	0.008	0.2	1,500	50,000	0.008	0.2	1,500	50,000	0.005	0.15	800	50,000	0.003	0.1	600	50,000
		1.7	0.006	0.15	1,000	40,000	0.006	0.15	1,000	40,000	0.005	0.1	500	40,000	0.003	0.05	300	40,000
		2	0.006	0.15	1,000	40,000	0.006	0.15	1,000	40,000	0.005	0.1	500	40,000	0.003	0.05	300	40,000
		2.5	0.006	0.15	1,000	40,000	0.006	0.15	1,000	40,000	0.005	0.1	500	40,000	0.003	0.05	300	40,000
	0.8	1.5	0.012	0.4	2,000	40,000	0.012	0.4	2,000	40,000	0.007	0.25	1,000	40,000	0.006	0.15	800	35,000
		2.5	0.012	0.4	2,000	40,000	0.012	0.4	2,000	40,000	0.007	0.25	1,000	40,000	0.006	0.15	800	35,000
		5	0.008	0.3	1,500	30,000	0.008	0.3	1,500	30,000	0.005	0.15	800	30,000	0.004	0.1	400	25,000

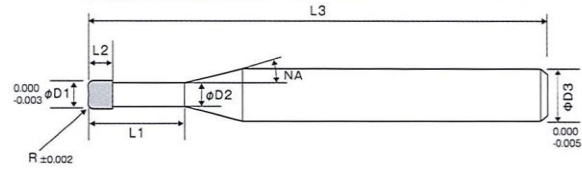
- Schrumpfen des Werkzeuges vermindert Werkzeugdurchbiegung
- Schnitttiefe zeigt max. Wert für feinschichten
- A_p = axial / A_e = radial

- Empfohlene Kühlung: Ölnebel oder wasserloses Schneid-Fluid
- Auskraglänge soll so kurz wie möglich gehalten werden
- Anpassung der Parameter an die tatsächlichen Begebenheiten ist empfohlen

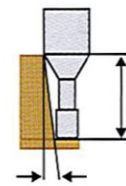
CBN Series

CBN Radius End Mill

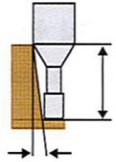
■ **CR400** Model number:CR400



Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angler	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									CR400-0100-0020-0100	1	0.02	1	0.7
CR400-0100-0020-0200	0.02	2	0.7	0.96	15	4	50	2.14	2.22		2.30	2.38	2.57
CR400-0100-0050-0100	0.05	1	0.7	0.96	15	4	50	1.11	1.15		1.19	1.23	1.32
CR400-0100-0050-0200	0.05	2	0.7	0.96	15	4	50	2.14	2.22		2.29	2.38	2.57
CR400-0100-0050-0220	0.05	2.2	1.2	0.96	15	4	50	2.35	2.43		2.52	2.61	2.82
CR400-0100-0100-0100	0.1	1	0.7	0.96	15	4	50	1.11	1.14		1.18	1.22	1.31
CR400-0100-0100-0200	0.1	2	0.7	0.96	15	4	50	2.14	2.21		2.29	2.37	2.56
CR400-0100-0100-0220	0.1	2.2	1.2	0.96	15	4	50	2.35	2.43		2.51	2.60	2.80
CR400-0100-0200-0100	0.2	1	0.7	0.96	15	4	50	1.10	1.14		1.17	1.21	1.29
CR400-0100-0200-0200	0.2	2	0.7	0.96	15	4	50	2.14	2.21		2.28	2.36	2.53
CR400-0100-0200-0220	0.2	2.2	1.2	0.96	15	4	50	2.34	2.42		2.50	2.59	2.78
CR400-0100-0300-0220	0.3	2.2	1.2	0.96	15	4	50	2.34	2.41		2.49	2.57	2.76
CR400-0150-0020-0200	1.5	0.02	2	1	1.44	15	4	50	2.18	2.26	2.34	2.43	2.62
CR400-0150-0020-0300		0.02	3	1	1.44	15	4	50	3.22	3.33	3.45	3.58	3.86
CR400-0150-0050-0200		0.05	2	1	1.44	15	4	50	2.18	2.26	2.34	2.42	2.61
CR400-0150-0050-0300		0.05	3	1.5	1.44	15	4	50	3.22	3.33	3.44	3.57	3.86
CR400-0150-0100-0200		0.1	2	1	1.44	15	4	50	2.18	2.25	2.33	2.41	2.60
CR400-0150-0100-0300		0.1	3	1.5	1.44	15	4	50	3.21	3.32	3.44	3.56	3.85
CR400-0150-0200-0200		0.2	2	1	1.44	15	4	50	2.18	2.25	2.32	2.40	2.58
CR400-0150-0200-0300		0.2	3	1.5	1.44	15	4	50	3.21	3.31	3.43	3.55	3.82
CR400-0150-0300-0300		0.3	3	1.5	1.44	15	4	50	3.21	3.31	3.42	3.53	3.80
CR400-0200-0020-0300	2	0.02	3	1.2	1.96	15	4	50	3.18	3.29	3.41	3.53	3.82
CR400-0200-0020-0400		0.02	4	1.2	1.96	15	4	50	4.21	4.36	4.51	4.68	5.06
CR400-0200-0050-0300		0.05	3	1.2	1.96	15	4	50	3.18	3.29	3.40	3.53	3.81
CR400-0200-0050-0400		0.05	4	1.2	1.96	15	4	50	4.21	4.36	4.51	4.68	5.05
CR400-0200-0050-0500		0.05	5	2	1.96	15	4	50	5.24	5.42	5.62	5.83	6.30
CR400-0200-0100-0300		0.1	3	1.2	1.96	15	4	50	3.17	3.28	3.40	3.52	3.80
CR400-0200-0100-0400		0.1	4	1.2	1.96	15	4	50	4.21	4.35	4.51	4.67	5.04
CR400-0200-0100-0500		0.1	5	2	1.96	15	4	50	5.24	5.42	5.61	5.82	6.29
CR400-0200-0200-0300		0.2	3	1.2	1.96	15	4	50	3.17	3.28	3.39	3.51	3.78



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
CR400-0200-0200-0400	2	0.2	4	1.2	1.96	15	4	50	4.21	4.34	4.49	4.66	5.02
CR400-0200-0200-0500		0.2	5	2	1.96	15	4	50	5.24	5.41	5.60	5.81	6.26
CR400-0200-0300-0500		0.3	5	2	1.96	15	4	50	5.24	5.41	5.59	5.79	6.24
CR400-0300-0050-0500	3	0.05	5	2	2.92	15	6	50	5.32	5.50	5.70	5.91	6.39
CR400-0300-0100-0500		0.1	5	2	2.92	15	6	50	5.32	5.50	5.70	5.91	6.38
CR400-0300-0200-0500		0.2	5	2	2.92	15	6	50	5.32	5.49	5.69	5.89	6.35
CR400-0300-0300-0500		0.3	5	2	2.92	15	6	50	5.31	5.49	5.67	5.88	6.33
CR400-0400-0100-1000	4	0.1	10	2	3.92	15	6	50	10.49	10.85	11.24	11.66	12.59
CR400-0400-0300-1000		0.3	10	2	3.92	15	6	50	10.48	10.84	11.22	11.63	12.55
CR400-0600-0050-1500	6	0.05	15	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE
CR400-0600-0100-1000		0.1	10	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE
CR400-0600-0100-1500		0.1	15	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE
CR400-0600-0300-1000		0.3	10	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE
CR400-0600-0300-1500		0.3	15	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE
CR400-0600-0500-1500		0.5	15	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE

CBN Series

Empfohlene Parameter Recommended Milling Conditions

CR400
Model number: CR400

Radius End Mill

Work Material			Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	1	1	0.02	0.4	2,200	40,000	0.02	0.4	2,200	40,000	0.02	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		2	0.02	0.4	2,200	40,000	0.02	0.4	2,200	40,000	0.02	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		2.2	0.02	0.3	2,200	40,000	0.02	0.3	2,200	40,000	0.02	0.2	2,000	40,000	0.01	0.1	1,500	36,000
	1.5	2	0.04	0.6	4,000	36,000	0.04	0.6	4,000	36,000	0.03	0.5	3,200	30,000	0.015	0.3	2,000	24,000
		3	0.04	0.6	3,500	36,000	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.015	0.3	1,800	24,000
	2	3	0.05	0.8	4,000	30,000	0.05	0.8	4,000	30,000	0.04	0.7	3,200	24,000	0.02	0.4	1,500	16,000
		4	0.05	0.8	3,500	30,000	0.05	0.8	3,500	30,000	0.04	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		5	0.05	0.8	3,500	30,000	0.05	0.8	3,500	30,000	0.04	0.7	2,800	24,000	0.02	0.3	1,500	16,000
	3	5	0.05	1	3,500	24,000	0.05	1	3,500	24,000	0.04	0.85	3,200	20,000	0.02	0.6	1,500	12,000
	4	10	0.05	1.5	3,500	22,000	0.05	1.5	3,500	22,000	0.04	1	2,800	18,000	0.02	0.7	1,500	10,000
	6	10	0.07	2.5	3,000	18,000	0.07	2.5	3,000	18,000	0.06	2	2,800	16,000	0.05	1.5	1,400	9,000
		15	0.07	2	2,700	18,000	0.07	2	2,700	18,000	0.06	1.5	2,500	16,000	0.05	1	1,200	9,000

- Schrumpfen des Werkzeuges vermindert Werkzeugdurchbiegung
- Schnitttiefe zeigt max. Wert für feinschlachten
- A_p = axial / A_e = radial

- Empfohlene Kühlung: Ölnebel oder wasserloses Schneid-Fluid
- Auskraglänge soll so kurz wie möglich sein
- Anpassung Parameter an die tatsächlichen Begebenheiten empfohlen

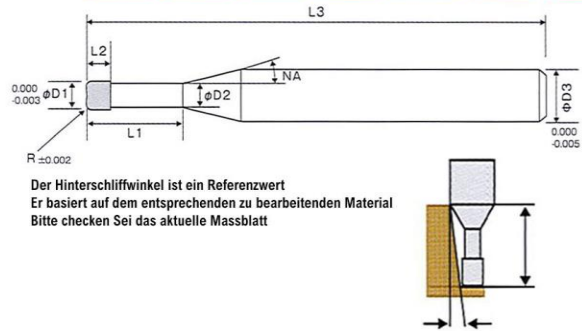
CBN Series

CBN Radius End Mill

■ **CR600** Model number:CR600



Non
BANCERA
CBN
Lippen 6
Helix 0°
Winkel NA 15°
Schaft 0/-0.005



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									CR600-0400-0050-1500	4	0.05	15	2
CR600-0400-0100-1500	0.1	15	2	3.92	15	6	50	15.66	16.20		16.78	17.40	18.81
CR600-0400-0300-1500	0.3	15	2	3.92	15	6	50	15.65	16.18		16.76	17.38	18.76
CR600-0400-0500-1500	0.5	15	2	3.92	15	6	50	15.64	16.17		16.74	17.35	18.72
CR600-0500-0050-1500	5	0.05	15	2	4.92	15	6	50	15.66	16.20	16.78	FREE	FREE
CR600-0500-0100-1500		0.1	15	2	4.92	15	6	50	15.66	16.20	16.78	FREE	FREE
CR600-0500-0300-1500		0.3	15	2	4.92	15	6	50	15.65	16.18	16.76	FREE	FREE
CR600-0500-0500-1500		0.5	15	2	4.92	15	6	50	15.64	16.17	16.74	FREE	FREE
CR600-0600-0050-1500	6	0.05	15	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE
CR600-0600-0100-1500		0.1	15	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE
CR600-0600-0300-1500		0.3	15	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE
CR600-0600-0500-1500		0.5	15	2	5.92	15	6	50	FREE	FREE	FREE	FREE	FREE

Empfohlene Schnitt-Parameter Recommended Milling Conditions

■ **CR600**
Model number:CR600

Radius End Mill

Work Material			Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min ⁻¹			∅p mm	∅e mm			mm/min	min ⁻¹		
6	4	15	0.06	1.5	3,200	18,000	0.06	1.5	3,200	18,000	0.05	1	3,000	16,000	0.04	0.7	1,600	8,000
	5	15	0.06	2	3,200	18,000	0.06	2	3,200	18,000	0.05	1.5	3,000	16,000	0.04	1	1,600	8,000
	6	15	0.07	2	2,900	16,000	0.07	2	2,900	16,000	0.06	1.5	2,700	14,000	0.05	1	1,400	7,000

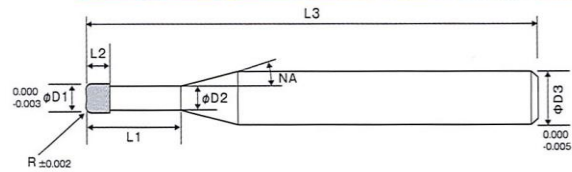
- Schrumpfen des Werkzeuges vermindert Werkzeugdurchbiegung
- Schnitttiefe zeigt max. Wert für feinschlachten
- Ap = axial / Ae = radial

- Empfohlene Kühlung; Ölnebel oder wasserlose Schneid-Emulsion
- Auskraglänge soll so kurz wie möglich sein
- Anpassung der Parameter an die tatsächlichen Begebenheiten empfohlen

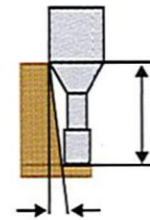
CBN Series

CBN Long Neck Radius End Mill

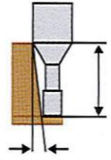
■ **CLR200** Model number: CLR200



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt

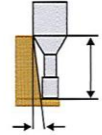


Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									CLR200-0010-0020-0050	0.1	0.02	0.5	0.04
CLR200-0010-0030-0050	0.03	0.5	0.04	0.08	15	4	50	0.55	0.57		0.59	0.61	0.66
CLR200-0015-0020-0050	0.15	0.02	0.5	0.06	0.13	15	4	50	0.55	0.57	0.59	0.61	0.66
CLR200-0015-0030-0050		0.03	0.5	0.06	0.13	15	4	50	0.55	0.57	0.59	0.61	0.66
CLR200-0020-0020-0100	0.2	0.02	1	0.08	0.17	15	4	50	1.09	1.13	1.17	1.21	1.31
CLR200-0020-0030-0100		0.03	1	0.08	0.17	15	4	50	1.09	1.13	1.17	1.21	1.31
CLR200-0020-0050-0100		0.05	1	0.08	0.17	15	4	50	1.09	1.13	1.17	1.21	1.30
CLR200-0030-0020-0100	0.3	0.02	1	0.3	0.27	15	4	50	1.09	1.13	1.17	1.21	1.31
CLR200-0030-0020-0150		0.02	1.5	0.13	0.27	15	4	50	1.61	1.66	1.72	1.79	1.93
CLR200-0030-0020-0200		0.02	2	0.13	0.27	15	4	50	2.12	2.20	2.28	2.36	2.55
CLR200-0030-0030-0100		0.03	1	0.13	0.27	15	4	50	1.09	1.13	1.17	1.21	1.31
CLR200-0030-0030-0150		0.03	1.5	0.13	0.27	15	4	50	1.61	1.66	1.72	1.78	1.93
CLR200-0030-0030-0200		0.03	2	0.13	0.27	15	4	50	2.12	2.20	2.28	2.36	2.55
CLR200-0030-0050-0100		0.05	1	0.3	0.27	15	4	50	1.09	1.13	1.17	1.21	1.30
CLR200-0030-0050-0150		0.05	1.5	0.13	0.27	15	4	50	1.61	1.66	1.72	1.78	1.92
CLR200-0030-0050-0200		0.05	2	0.13	0.27	15	4	50	2.12	2.20	2.27	2.36	2.54
CLR200-0040-0020-0150		0.4	0.02	1.5	0.24	0.37	15	4	50	1.61	1.66	1.72	1.79
CLR200-0040-0020-0200	0.02		2	0.24	0.37	15	4	50	2.12	2.20	2.28	2.36	2.55
CLR200-0040-0030-0135	0.03		1.35	0.4	0.37	15	4	50	1.45	1.50	1.56	1.61	1.74
CLR200-0040-0030-0150	0.03		1.5	0.24	0.37	15	4	50	1.61	1.66	1.72	1.78	1.93
CLR200-0040-0030-0200	0.03		2	0.24	0.37	15	4	50	2.12	2.20	2.28	2.36	2.55
CLR200-0040-0050-0135	0.05		1.35	0.4	0.37	15	4	50	1.45	1.50	1.55	1.61	1.74
CLR200-0040-0050-0150	0.05		1.5	0.24	0.37	15	4	50	1.61	1.66	1.72	1.78	1.92
CLR200-0040-0050-0200	0.05		2	0.24	0.37	15	4	50	2.12	2.20	2.27	2.36	2.54
CLR200-0040-0100-0135	0.1		1.35	0.4	0.37	15	4	50	1.45	1.50	1.55	1.60	1.72
CLR200-0040-0100-0150	0.1		1.5	0.24	0.37	15	4	50	1.61	1.66	1.71	1.77	1.91
CLR200-0040-0100-0200	0.1	2	0.24	0.37	15	4	50	2.12	2.19	2.27	2.35	2.53	
CLR200-0050-0020-0150	0.5	0.02	1.5	0.5	0.47	15	4	50	1.61	1.66	1.72	1.79	1.93
CLR200-0050-0020-0250		0.02	2.5	0.3	0.47	15	4	50	2.64	2.73	2.83	2.94	3.17
CLR200-0050-0030-0150		0.03	1.5	0.3	0.47	15	4	50	1.61	1.66	1.72	1.78	1.93



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
CLR200-0050-0030-0250	0.5	0.03	2.5	0.3	0.47	15	4	50	2.64	2.73	2.83	2.93	3.17
CLR200-0050-0050-0150		0.05	1.5	0.5	0.47	15	4	50	1.61	1.66	1.72	1.78	1.92
CLR200-0050-0050-0250		0.05	2.5	0.3	0.47	15	4	50	2.64	2.73	2.83	2.93	3.17
CLR200-0050-0100-0150		0.1	1.5	0.5	0.47	15	4	50	1.61	1.66	1.71	1.77	1.91
CLR200-0050-0100-0250		0.1	2.5	0.3	0.47	15	4	50	2.64	2.73	2.82	2.92	3.15
CLR200-0060-0020-0250	0.6	0.02	2.5	0.3	0.57	15	4	50	2.64	2.73	2.83	2.94	3.17
CLR200-0060-0030-0250		0.03	2.5	0.3	0.57	15	4	50	2.64	2.73	2.83	2.93	3.17
CLR200-0060-0050-0250		0.05	2.5	0.3	0.57	15	4	50	2.64	2.73	2.83	2.93	3.17
CLR200-0060-0100-0250		0.1	2.5	0.3	0.57	15	4	50	2.64	2.73	2.82	2.92	3.15
CLR200-0080-0020-0250	0.8	0.02	2.5	0.56	0.77	15	4	50	2.64	2.73	2.83	2.94	3.17
CLR200-0080-0020-0500		0.02	5	0.56	0.77	15	4	50	5.23	5.41	5.60	5.81	6.28
CLR200-0080-0030-0250		0.03	2.5	0.56	0.77	15	4	50	2.64	2.73	2.83	2.93	3.17
CLR200-0080-0030-0500		0.03	5	0.56	0.77	15	4	50	5.23	5.41	5.60	5.81	6.28
CLR200-0080-0050-0250		0.05	2.5	0.56	0.77	15	4	50	2.64	2.73	2.83	2.93	3.17
CLR200-0080-0050-0500		0.05	5	0.56	0.77	15	4	50	5.22	5.40	5.60	5.81	6.27
CLR200-0080-0100-0250		0.1	2.5	0.56	0.77	15	4	50	2.64	2.73	2.82	2.92	3.15
CLR200-0080-0100-0500		0.1	5	0.56	0.77	15	4	50	5.22	5.40	5.59	5.80	6.26
CLR200-0100-0020-0300	1	0.02	3	0.7	0.96	15	4	50	3.18	3.29	3.41	3.53	3.82
CLR200-0100-0020-0500		0.02	5	0.7	0.96	15	4	50	5.24	5.43	5.62	5.83	6.30
CLR200-0100-0030-0300		0.03	3	0.7	0.96	15	4	50	3.18	3.29	3.40	3.53	3.82
CLR200-0100-0030-0500		0.03	5	0.7	0.96	15	4	50	5.24	5.43	5.62	5.83	6.30
CLR200-0100-0050-0300		0.05	3	1.2	0.96	15	4	50	3.18	3.29	3.40	3.53	3.81
CLR200-0100-0050-0500		0.05	5	1.2	0.96	15	4	50	5.24	5.42	5.62	5.83	6.30
CLR200-0100-0050-1000		0.05	10	1.2	0.96	15	4	50	10.41	10.77	11.16	11.58	12.51
CLR200-0100-0100-0300		0.1	3	1.2	0.96	15	4	50	3.17	3.28	3.40	3.52	3.80
CLR200-0100-0100-0500		0.1	5	1.2	0.96	15	4	50	5.24	5.42	5.61	5.82	6.29
CLR200-0100-0100-1000		0.1	10	1.2	0.96	15	4	50	10.41	10.77	11.16	11.57	12.50
CLR200-0100-0200-0300		0.2	3	0.7	0.96	15	4	50	3.17	3.28	3.39	3.51	3.78
CLR200-0100-0200-0500		0.2	5	0.7	0.96	15	4	50	5.24	5.41	5.60	5.81	6.26
CLR200-0150-0020-0450	1.5	0.02	4.5	1	1.44	15	4	50	4.77	4.93	5.11	5.30	5.73
CLR200-0150-0020-0750		0.02	7.5	1	1.44	15	4	50	7.87	8.14	8.43	8.75	9.46
CLR200-0150-0030-0450		0.03	4.5	1	1.44	15	4	50	4.77	4.93	5.11	5.30	5.73
CLR200-0150-0030-0750		0.03	7.5	1	1.44	15	4	50	7.87	8.14	8.43	8.75	9.46
CLR200-0150-0050-0450		0.05	4.5	1	1.44	15	4	50	4.77	4.93	5.11	5.30	5.72
CLR200-0150-0050-0500		0.05	5	1.5	1.44	15	4	50	5.28	5.46	5.66	5.87	6.34
CLR200-0150-0050-0750		0.05	7.5	1	1.44	15	4	50	7.87	8.14	8.43	8.75	9.45
CLR200-0150-0050-1000		0.05	10	1.5	1.44	15	4	50	10.45	10.81	11.20	11.62	12.56
CLR200-0150-0100-0450		0.1	4.5	1	1.44	15	4	50	4.76	4.93	5.10	5.29	5.71
CLR200-0150-0100-0500		0.1	5	1.5	1.44	15	4	50	5.28	5.46	5.65	5.86	6.33
CLR200-0150-0100-0750		0.1	7.5	1	1.44	15	4	50	7.86	8.14	8.43	8.74	9.44
CLR200-0150-0100-1000		0.1	10	1.5	1.44	15	4	50	10.45	10.81	11.20	11.61	12.55
CLR200-0150-0200-0450		0.2	4.5	1	1.44	15	4	50	4.76	4.92	5.09	5.27	5.69
CLR200-0150-0200-0750		0.2	7.5	1	1.44	15	4	50	7.86	8.13	8.42	8.72	9.42
CLR200-0150-0300-0450		0.3	4.5	1	1.44	15	4	50	4.76	4.91	5.08	5.26	5.66
CLR200-0150-0300-0750		0.3	7.5	1	1.44	15	4	50	7.86	8.12	8.40	8.71	9.39

CBN Series



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.					
									30°	1°	1°30'	2°	3°	
									CLR200-0200-0020-0600	2	0.02	6	1.2	1.96
CLR200-0200-0020-1000	0.02	10	1.2	1.96	15	4	50	10.41	10.78		11.16	11.58	12.52	
CLR200-0200-0030-0600	0.03	6	1.2	1.96	15	4	50	6.28	6.50		6.73	6.98	7.54	
CLR200-0200-0030-1000	0.03	10	1.2	1.96	15	4	50	10.41	10.77		11.16	11.58	12.52	
CLR200-0200-0050-0600	0.05	6	1.2	1.96	15	4	50	6.28	6.49		6.73	6.98	7.54	
CLR200-0200-0050-1000	0.05	10	2	1.96	15	4	50	10.41	10.77		11.16	11.58	12.51	
CLR200-0200-0050-1500	0.05	15	2	1.96	15	4	50	15.58	16.12		16.70	17.33	18.73	
CLR200-0200-0100-0600	0.1	6	1.2	1.96	15	4	50	6.28	6.49		6.72	6.97	7.53	
CLR200-0200-0100-1000	0.1	10	2	1.96	15	4	50	10.41	10.77		11.16	11.57	12.50	
CLR200-0200-0100-1500	0.1	15	2	1.96	15	4	50	15.58	16.12		16.70	17.32	18.72	
CLR200-0200-0200-0600	0.2	6	1.2	1.96	15	4	50	6.27	6.48		6.71	6.96	7.51	
CLR200-0200-0300-0600	0.3	6	1.2	1.96	15	4	50	6.27	6.48		6.70	6.94	7.48	
CLR200-0200-0300-1000	0.3	10	1.2	1.96	15	4	50	10.40	10.76		11.13	11.54	12.45	
CLR200-0200-0500-0600	0.5	6	1.2	1.96	15	4	50	6.26	6.46		6.68	6.91	7.44	
CLR200-0200-0500-1000	0.5	10	1.2	1.96	15	4	50	10.40	10.74		11.11	11.51	12.41	
CLR200-0300-0050-1000	3	0.05	10	2	2.92	15	6	50	10.49		10.85	11.24	11.66	12.61
CLR200-0300-0050-1500		0.05	15	2	2.92	15	6	50	15.66		16.20	16.78	17.41	18.82
CLR200-0300-0100-1000		0.1	10	2	2.92	15	6	50	10.49		10.85	11.24	11.66	12.59
CLR200-0300-0100-1500		0.1	15	2	2.92	15	6	50	15.66	16.20	16.78	17.40	18.81	

Empfohlene Schnitt-Parameter Recommended Milling Conditions

CLR200
Model number: CLR200

Long Neck Radius End Mill

Work Material			Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm			∂p mm	∂e mm			∂p mm	∂e mm			∂p mm	∂e mm		
2	0.1	0.5	0.002	0.01	150	50,000	0.002	0.01	150	50,000	0.001	0.01	100	50,000	0.001	0.01	50	50,000
	0.15	0.5	0.002	0.02	200	50,000	0.002	0.02	200	50,000	0.002	0.02	150	50,000	0.001	0.015	100	50,000
	0.2	1	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.002	0.01	100	50,000
	0.3	1	0.003	0.05	500	50,000	0.003	0.05	500	50,000	0.003	0.05	400	50,000	0.002	0.03	300	50,000
		1.5	0.003	0.03	400	50,000	0.003	0.03	400	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
		2	0.003	0.03	400	50,000	0.003	0.03	400	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
	0.4	1.35	0.005	0.05	500	50,000	0.005	0.05	500	50,000	0.005	0.05	400	50,000	0.003	0.02	300	50,000
		1.5	0.005	0.05	500	50,000	0.005	0.05	500	50,000	0.005	0.05	400	50,000	0.003	0.02	300	50,000
		2	0.005	0.05	500	50,000	0.005	0.05	500	50,000	0.005	0.05	400	50,000	0.003	0.02	300	50,000
	0.5	1.5	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.1	700	50,000
		2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000
	0.6	2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000
	0.8	2.5	0.005	0.2	800	50,000	0.005	0.2	800	50,000	0.005	0.2	800	50,000	0.003	0.1	600	40,000
		5	0.01	0.2	1,400	50,000	0.01	0.2	1,400	50,000	0.01	0.1	1,200	50,000	0.01	0.05	1,000	40,000
	1	3	0.02	0.4	1,500	48,000	0.02	0.4	1,500	48,000	0.02	0.3	1,200	48,000	0.01	0.2	1,000	32,000
		5	0.02	0.4	1,400	48,000	0.02	0.4	1,400	48,000	0.02	0.3	1,100	48,000	0.01	0.2	1,000	32,000
		10	0.02	0.4	1,300	48,000	0.02	0.4	1,300	48,000	0.02	0.3	1,000	48,000	0.01	0.2	1,000	32,000
	1.5	4.5	0.02	0.5	2,000	32,000	0.02	0.5	2,000	32,000	0.02	0.4	1,500	32,000	0.01	0.2	1,200	20,000
		5	0.02	0.5	1,800	32,000	0.02	0.5	1,800	32,000	0.02	0.4	1,300	32,000	0.01	0.2	1,000	20,000
		7.5	0.02	0.5	1,700	32,000	0.02	0.5	1,700	32,000	0.02	0.4	1,200	32,000	0.01	0.2	900	20,000
10		0.02	0.5	1,500	32,000	0.02	0.5	1,500	32,000	0.02	0.4	1,100	32,000	0.01	0.2	800	20,000	
2	6	0.03	0.8	1,800	24,000	0.03	0.8	1,800	24,000	0.03	0.7	1,400	24,000	0.01	0.5	1,000	16,000	
	10	0.03	0.8	1,600	24,000	0.03	0.8	1,600	24,000	0.03	0.7	1,200	24,000	0.01	0.5	900	16,000	
	15	0.03	0.8	1,400	24,000	0.03	0.8	1,400	24,000	0.03	0.7	1,000	24,000	0.01	0.5	800	16,000	
3	10	0.03	0.6	2,000	24,000	0.03	0.6	2,000	24,000	0.03	0.5	1,500	24,000	0.01	0.3	1,200	16,000	
	15	0.03	0.6	1,800	22,000	0.03	0.6	1,800	22,000	0.03	0.5	1,300	22,000	0.01	0.3	1,000	16,000	

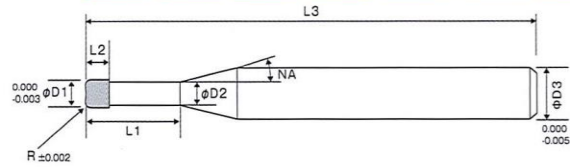
- Schrumpfen des WErkzeuges vermindert Werkzeugdurchbiegung
- Schnitttiefe zeigt max. Wert für feinschlachten
- A_p = axial / A_e = radial

- Empfohlene Kühlung: Ölnebel oder wasserlose -Schneid-Emulsion
- Auskraglänge soll so kurz wie möglich sein
- Anpassung der Parameter an die tatsächlichen Begebenheiten empfohlen

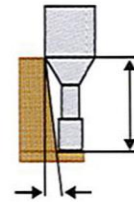
CBN Series

CBN Long Neck Radius End Mill

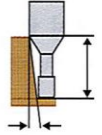
CLR400 Model number: CLR400



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte beachten Sie das aktuelle Massblatt



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
CLR400-0100-0020-0300	1	0.02	3	0.7	0.96	15	4	50	3.18	3.29	3.41	3.53	3.82
CLR400-0100-0020-0500		0.02	5	0.7	0.96	15	4	50	5.24	5.43	5.62	5.83	6.30
CLR400-0100-0050-0300		0.05	3	1.2	0.96	15	4	50	3.18	3.29	3.40	3.53	3.81
CLR400-0100-0050-0500		0.05	5	1.2	0.96	15	4	50	5.24	5.42	5.62	5.83	6.30
CLR400-0100-0050-1000		0.05	10	1.2	0.96	15	4	50	10.41	10.77	11.16	11.58	12.51
CLR400-0100-0100-0300		0.1	3	1.2	0.96	15	4	50	3.17	3.28	3.40	3.52	3.80
CLR400-0100-0100-0400		0.1	4	1.2	0.96	15	4	50	4.21	4.35	4.51	4.67	5.04
CLR400-0100-0100-0500		0.1	5	1.2	0.96	15	4	50	5.24	5.42	5.61	5.82	6.29
CLR400-0100-0100-1000		0.1	10	1.2	0.96	15	4	50	10.41	10.77	11.16	11.57	12.50
CLR400-0100-0200-0300		0.2	3	0.7	0.96	15	4	50	3.17	3.28	3.39	3.51	3.78
CLR400-0100-0200-0500	0.2	5	0.7	0.96	15	4	50	5.24	5.41	5.60	5.81	6.26	
CLR400-0150-0020-0450	1.5	0.02	4.5	1	1.44	15	4	50	4.77	4.93	5.11	5.30	5.73
CLR400-0150-0020-0750		0.02	7.5	1	1.44	15	4	50	7.87	8.14	8.43	8.75	9.46
CLR400-0150-0050-0450		0.05	4.5	1	1.44	15	4	50	4.77	4.93	5.11	5.30	5.72
CLR400-0150-0050-0500		0.05	5	1.5	1.44	15	4	50	5.28	5.46	5.66	5.87	6.34
CLR400-0150-0050-0750		0.05	7.5	1	1.44	15	4	50	7.87	8.14	8.43	8.75	9.45
CLR400-0150-0050-1000		0.05	10	1.5	1.44	15	4	50	10.45	10.81	11.20	11.62	12.56
CLR400-0150-0100-0450		0.1	4.5	1	1.44	15	4	50	4.76	4.93	5.10	5.29	5.71
CLR400-0150-0100-0500		0.1	5	1.5	1.44	15	4	50	5.28	5.46	5.65	5.86	6.33
CLR400-0150-0100-0750		0.1	7.5	1	1.44	15	4	50	7.86	8.14	8.43	8.74	9.44
CLR400-0150-0100-1000		0.1	10	1.5	1.44	15	4	50	10.45	10.81	11.20	11.61	12.55
CLR400-0150-0200-0450	0.2	4.5	1	1.44	15	4	50	4.76	4.92	5.09	5.27	5.69	
CLR400-0150-0200-0750	0.2	7.5	1	1.44	15	4	50	7.86	8.13	8.42	8.72	9.42	
CLR400-0200-0020-0600	2	0.02	6	1.2	1.96	15	4	50	6.28	6.50	6.73	6.98	7.55
CLR400-0200-0050-0600		0.05	6	1.2	1.96	15	4	50	6.28	6.49	6.73	6.98	7.54
CLR400-0200-0050-1000-00120		0.05	10	1.2	1.96	15	4	50	10.41	10.77	11.16	11.58	12.51
CLR400-0200-0050-1000-00200		0.05	10	2	1.96	15	4	50	10.41	10.77	11.16	11.58	12.51
CLR400-0200-0050-1500		0.05	15	2	1.96	15	4	50	15.58	16.12	16.70	17.33	18.73
CLR400-0200-0100-0600		0.1	6	1.2	1.96	15	4	50	6.28	6.49	6.72	6.97	7.53
CLR400-0200-0100-1000		0.1	10	2	1.96	15	4	50	10.41	10.77	11.16	11.57	12.50



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
									CLR400-0200-0100-1500	2	0.1	15	2
CLR400-0200-0200-0600	0.2	6	1.2	1.96	15	4	50	6.27	6.48		6.71	6.96	7.51
CLR400-0200-0200-1000	0.2	10	1.2	1.96	15	4	50	10.41	10.76		11.14	11.55	12.48
CLR400-0200-0300-0500	0.3	5	2	1.96	15	4	50	5.24	5.41		5.59	5.79	6.24
CLR400-0200-0300-1000	0.3	10	2	1.96	15	4	50	10.40	10.76		11.13	11.54	12.45
CLR400-0300-0050-0600	3	0.05	6	1.8	2.92	15	6	50	6.35	6.57	6.81	7.06	7.63
CLR400-0300-0050-0900		0.05	9	1.8	2.92	15	6	50	9.46	9.78	10.13	10.51	11.36
CLR400-0300-0050-1000		0.05	10	2	2.92	15	6	50	10.49	10.85	11.24	11.66	12.61
CLR400-0300-0050-1200		0.05	12	1.8	2.92	15	6	50	12.56	12.99	13.46	13.96	15.09
CLR400-0300-0050-1500-00180		0.05	15	1.8	2.92	15	6	50	15.66	16.20	16.78	17.41	18.82
CLR400-0300-0050-1500-00200		0.05	15	2	2.92	15	6	50	15.66	16.20	16.78	17.41	18.82
CLR400-0300-0100-0600		0.1	6	1.8	2.92	15	6	50	6.35	6.57	6.80	7.06	7.62
CLR400-0300-0100-0900		0.1	9	1.8	2.92	15	6	50	9.45	9.78	10.13	10.51	11.35
CLR400-0300-0100-1000		0.1	10	2	2.92	15	6	50	10.49	10.85	11.24	11.66	12.59
CLR400-0300-0100-1200		0.1	12	1.8	2.92	15	6	50	12.55	12.99	13.45	13.96	15.08
CLR400-0300-0100-1500-00180		0.1	15	1.8	2.92	15	6	50	15.66	16.20	16.78	17.40	18.81
CLR400-0300-0100-1500-00200		0.1	15	2	2.92	15	6	50	15.66	16.20	16.78	17.40	18.81
CLR400-0300-0200-0600		0.2	6	1.8	2.92	15	6	50	6.35	6.56	6.79	7.04	7.60
CLR400-0300-0200-0900		0.2	9	1.8	2.92	15	6	50	9.45	9.77	10.12	10.49	11.33
CLR400-0300-0200-1200		0.2	12	1.8	2.92	15	6	50	12.55	12.98	13.44	13.94	15.06
CLR400-0300-0200-1500		0.2	15	1.8	2.92	15	6	50	15.65	16.19	16.77	17.39	18.79
CLR400-0300-0300-1000		0.3	10	2	2.92	15	6	50	10.48	10.84	11.22	11.63	12.55
CLR400-0400-0050-1500	4	0.05	15	2	3.92	15	6	50	15.66	16.20	16.78	17.41	18.82
CLR400-0400-0100-1500		0.1	15	2	3.92	15	6	50	15.66	16.20	16.78	17.40	18.81
CLR400-0400-0300-1500		0.3	15	2	3.92	15	6	50	15.65	16.18	16.76	17.38	18.76
CLR400-0400-0500-1500		0.5	15	2	3.92	15	6	50	15.64	16.17	16.74	17.35	18.72
CLR400-0500-0050-1500	5	0.05	15	2	4.92	15	6	50	15.66	16.20	16.78	FREE	FREE
CLR400-0500-0100-1500		0.1	15	2	4.92	15	6	50	15.66	16.20	16.78	FREE	FREE
CLR400-0500-0300-1500		0.3	15	2	4.92	15	6	50	15.65	16.18	16.76	FREE	FREE
CLR400-0500-0500-1500		0.5	15	2	4.92	15	6	50	15.64	16.17	16.74	FREE	FREE

CBN Series

Empfohlene Schnitt-Parameter
Recommended Milling Conditions

CLR400
Model number: CLR400

Long Neck Radius End Mill

Work Material			Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	1	3	0.03	0.4	2,500	40,000	0.03	0.4	2,500	40,000	0.03	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		4	0.02	0.3	2,500	40,000	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.01	0.1	1,500	36,000
		5	0.02	0.3	2,500	40,000	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.007	0.1	1,500	36,000
		10	0.02	0.3	2,500	40,000	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.007	0.1	1,500	36,000
	1.5	4.5	0.04	0.6	3,500	36,000	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.015	0.3	1,800	24,000
		5	0.04	0.6	3,500	36,000	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.01	0.3	1,800	24,000
		7.5	0.03	0.5	3,000	36,000	0.03	0.5	3,000	36,000	0.02	0.4	2,500	30,000	0.01	0.2	1,600	24,000
		10	0.03	0.5	3,000	36,000	0.03	0.5	3,000	36,000	0.02	0.4	2,500	30,000	0.01	0.2	1,600	24,000
	2	5	0.04	0.8	3,500	30,000	0.04	0.8	3,500	30,000	0.03	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		6	0.04	0.8	3,500	30,000	0.04	0.8	3,500	30,000	0.03	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		10	0.03	0.6	3,000	30,000	0.03	0.6	3,000	30,000	0.02	0.5	2,400	24,000	0.01	0.3	1,300	16,000
		15	0.03	0.6	3,000	30,000	0.03	0.6	3,000	30,000	0.02	0.5	2,400	24,000	0.01	0.3	1,300	16,000
	3	6	0.05	1	4,000	24,000	0.05	1	4,000	24,000	0.04	0.85	3,200	20,000	0.02	0.6	1,500	12,000
		9	0.05	1	3,500	24,000	0.05	1	3,500	24,000	0.04	0.85	2,800	20,000	0.02	0.6	1,500	12,000
		10	0.05	1	3,500	24,000	0.05	1	3,500	24,000	0.04	0.85	2,800	20,000	0.02	0.6	1,500	12,000
		12	0.04	0.85	3,500	24,000	0.04	0.85	3,500	24,000	0.04	0.7	2,800	20,000	0.02	0.5	1,500	12,000
		15	0.03	0.85	3,000	24,000	0.03	0.85	3,000	24,000	0.03	0.7	2,400	20,000	0.015	0.5	1,300	12,000
	4	15	0.03	1	3,000	22,000	0.03	1	3,000	22,000	0.03	0.8	2,400	18,000	0.015	0.6	1,300	10,000
	5	15	0.03	2	2,300	20,000	0.03	2	2,300	20,000	0.03	1	1,800	20,000	0.03	0.75	1,000	20,000

- Schrumpfen des Werkzeuges vermindert Werkzeugdurchbiegung
- Schnitttiefe zeigt max. Wert für feinschlichten
- A_p = axial / A_e = radial

- Empfohlene Kühlung; Ölnebel oder wasserloses Schneid-Emulsion
- Auskraglänge soll so kurz wie möglich sein
- Anpassung der Parameter an die tatsächlichen Begebenheiten empfohlen

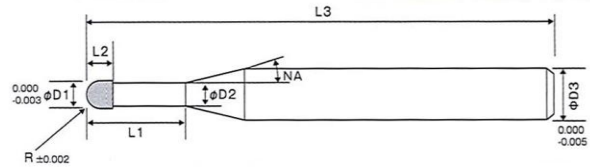
CBN Series

CBN Ball End Mill

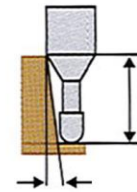
CB200 Model number:CB200



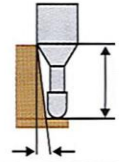
Non
BANCERA
CBN
Lippen 2
Helix 0°
Winkel NA 15°
Schaft 0/-0.005



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	Vollradius Ball R	Nutzlänge Effective Length	Schneiden-L Length of Cut	WZ-Ø Tool Diameter	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									CB200-0010-0050-0020	0.05	0.2	0.07	0.1
CB200-0010-0050-0030	0.3	0.08	0.1	0.08	15	4	50	0.35	0.36		0.37	0.38	0.41
CB200-0010-0050-0050	0.5	0.08	0.1	0.08	15	4	50	0.55	0.57		0.59	0.61	0.66
CB200-0015-0075-0045	0.075	0.45	0.12	0.15	0.13	15	4	50	0.50	0.52	0.53	0.55	0.59
CB200-0015-0075-0075		0.75	0.12	0.15	0.13	15	4	50	0.81	0.84	0.86	0.89	0.96
CB200-0020-0100-0030	0.1	0.3	0.15	0.2	0.17	15	4	50	0.36	0.37	0.38	0.39	0.42
CB200-0020-0100-0050		0.5	0.3	0.2	0.17	15	4	50	0.57	0.59	0.61	0.62	0.67
CB200-0020-0100-0060		0.6	0.15	0.2	0.17	15	4	50	0.67	0.69	0.72	0.74	0.79
CB200-0020-0100-0100		1	0.15	0.2	0.17	15	4	50	1.09	1.12	1.16	1.20	1.29
CB200-0030-0150-0030	0.15	0.3	0.23	0.3	0.27	15	4	50	0.36	0.37	0.38	0.39	0.41
CB200-0030-0150-0050-00023		0.5	0.23	0.3	0.27	15	4	50	0.57	0.58	0.60	0.62	0.66
CB200-0030-0150-0050-00030		0.5	0.3	0.3	0.27	15	4	50	0.57	0.58	0.60	0.62	0.66
CB200-0030-0150-0075		0.75	0.23	0.3	0.27	15	4	50	0.83	0.85	0.88	0.90	0.97
CB200-0040-0200-0050	0.2	0.5	0.3	0.4	0.37	15	4	50	0.57	0.58	0.59	0.61	0.64
CB200-0040-0200-0075		0.75	0.3	0.4	0.37	15	4	50	0.83	0.85	0.87	0.90	0.96
CB200-0040-0200-0100		1	0.3	0.4	0.37	15	4	50	1.08	1.12	1.15	1.18	1.27
CB200-0040-0200-0120		1.2	0.3	0.4	0.37	15	4	50	1.29	1.33	1.37	1.41	1.52
CB200-0040-0200-0135		1.35	0.4	0.4	0.37	15	4	50	1.45	1.49	1.54	1.59	1.70
CB200-0040-0200-0200		2	0.3	0.4	0.37	15	4	50	2.12	2.19	2.26	2.33	2.51
CB200-0040-0200-0300		3	0.3	0.4	0.37	15	4	50	3.15	3.26	3.37	3.48	3.75
CB200-0050-0250-0100	0.25	1	0.38	0.5	0.47	15	4	50	1.08	1.11	1.14	1.18	1.26
CB200-0050-0250-0150		1.5	0.38	0.5	0.47	15	4	50	1.60	1.65	1.70	1.75	1.88
CB200-0050-0250-0250		2.5	0.38	0.5	0.47	15	4	50	2.63	2.72	2.81	2.90	3.12
CB200-0050-0250-0350		3.5	0.38	0.5	0.47	15	4	50	3.67	3.79	3.91	4.05	4.36
CB200-0060-0300-0120	0.3	1.2	0.5	0.6	0.57	15	4	50	1.29	1.32	1.36	1.40	1.49
CB200-0060-0300-0150		1.5	0.5	0.6	0.57	15	4	50	1.60	1.64	1.69	1.74	1.87
CB200-0060-0300-0170		1.7	0.7	0.6	0.57	15	4	50	1.81	1.86	1.91	1.97	2.11
CB200-0060-0300-0300		3	0.5	0.6	0.57	15	4	50	3.15	3.25	3.35	3.47	3.73
CB200-0060-0300-0400		4	0.5	0.6	0.57	15	4	50	4.18	4.32	4.46	4.62	4.97
CB200-0060-0300-0500	5	0.5	0.6	0.57	15	4	50	5.22	5.39	5.57	5.77	6.22	



Bestell-Code Code No.	Vollradius Ball R	Nutzlänge Effective Length	Schneiden-L Length of Cut	WZ-Ø Tool Diameter	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
									CB200-0060-0300-0600	0.3	6	0.5	0.6
CB200-0080-0400-0160	0.4	1.6	0.6	0.8	0.77	15	4	50	1.70	1.74	1.79	1.85	1.97
CB200-0080-0400-0200		2	0.6	0.8	0.77	15	4	50	2.11	2.17	2.24	2.31	2.46
CB200-0080-0400-0400		4	0.6	0.8	0.77	15	4	50	4.18	4.31	4.45	4.60	4.95
CB200-0080-0400-0600		6	0.6	0.8	0.77	15	4	50	6.25	6.45	6.67	6.90	7.44
CB200-0100-0500-0200	0.5	2	0.7	1	0.96	15	4	50	2.13	2.18	2.25	2.31	2.46
CB200-0100-0500-0220		2.2	1.2	1	0.96	15	4	50	2.33	2.40	2.47	2.54	2.71
CB200-0100-0500-0250		2.5	0.7	1	0.96	15	4	50	2.64	2.72	2.80	2.89	3.09
CB200-0120-0600-0240	0.6	2.4	0.8	1.2	1.16	15	4	50	2.54	2.61	2.68	2.76	2.94
CB200-0120-0600-0300		3	0.8	1.2	1.16	15	4	50	3.16	3.25	3.34	3.45	3.68
CB200-0120-0600-0600		6	0.8	1.2	1.16	15	4	50	6.26	6.46	6.67	6.90	7.41
CB200-0150-0750-0300	0.75	3	1.5	1.5	1.44	15	4	50	3.19	3.28	3.37	3.47	3.70
CB200-0200-1000-0500	1	5	2	2	1.96	15	4	50	5.21	5.36	5.52	5.69	6.08
CB200-0300-1500-0500	1.5	5	2	3	2.92	15	6	50	5.27	5.40	5.55	5.70	6.06

CBN Series

CBN CB200

Recommended Milling Conditions

Model number:CB200

Empfohlene Schnitt-Parameter

Ball End Mill

Work Material		Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
刃数 Number of Flutes	刃径 Dia.	有効長 Effective Length	切り込み量 Depth of Cut		送り速度 Feed	回転数 Spindle Speed	切り込み量 Depth of Cut		送り速度 Feed	回転数 Spindle Speed	切り込み量 Depth of Cut		送り速度 Feed	回転数 Spindle Speed	切り込み量 Depth of Cut		送り速度 Feed	回転数 Spindle Speed
			ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹
2	0.1	0.2	0.005	0.005	600	40,000	0.005	0.005	600	40,000	0.005	0.005	450	40,000	0.003	0.003	300	40,000
		0.3	0.005	0.005	600	40,000	0.005	0.005	600	40,000	0.005	0.005	450	40,000	0.003	0.003	300	40,000
		0.5	0.005	0.005	500	40,000	0.005	0.005	500	40,000	0.005	0.005	350	40,000	0.003	0.003	250	40,000
	0.15	0.45	0.005	0.005	750	40,000	0.005	0.005	750	40,000	0.005	0.005	550	40,000	0.003	0.003	400	40,000
		0.75	0.005	0.005	700	40,000	0.005	0.005	700	40,000	0.005	0.005	500	40,000	0.003	0.003	400	40,000
	0.2	0.3	0.005	0.01	1,200	40,000	0.005	0.01	1,200	40,000	0.005	0.01	900	40,000	0.005	0.005	600	40,000
		0.5	0.005	0.01	1,200	40,000	0.005	0.01	1,200	40,000	0.005	0.01	900	40,000	0.005	0.005	600	40,000
		0.6	0.005	0.01	1,100	40,000	0.005	0.01	1,100	40,000	0.005	0.01	850	40,000	0.005	0.005	550	40,000
	0.3	1	0.005	0.01	1,000	40,000	0.005	0.01	1,000	40,000	0.005	0.01	800	40,000	0.005	0.005	500	40,000
		0.3	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
		0.5	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
	0.4	0.75	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
		0.5	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
		0.75	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
		1	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
		1.2	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
		1.35	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
	0.5	2	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
		3	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
		1	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	1,800	40,000	0.01	0.02	1,200	40,000
		1.5	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	1,800	40,000	0.01	0.02	1,200	40,000
	0.6	2.5	0.02	0.04	2,000	40,000	0.02	0.04	2,000	40,000	0.02	0.03	1,500	40,000	0.01	0.02	1,000	40,000
		3.5	0.02	0.04	2,000	40,000	0.02	0.04	2,000	40,000	0.02	0.03	1,500	40,000	0.01	0.02	1,000	40,000
		1.2	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
		1.5	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
		1.7	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
		3	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
		4	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
	0.8	5	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
		6	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
1.6		0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.02	0.03	2,000	30,000	
2		0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.02	0.03	2,000	30,000	
1	4	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.02	0.03	2,000	30,000	
	6	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.02	0.03	2,000	30,000	
	2	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000	
1.2	2.2	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000	
	2.5	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000	
	2.4	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	15,000	
1.5	3	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	15,000	
	6	0.04	0.12	2,200	20,000	0.04	0.12	2,200	20,000	0.03	0.06	2,000	20,000	0.03	0.05	1,200	15,000	
2	5	0.08	0.15	2,000	17,000	0.08	0.15	2,000	17,000	0.05	0.08	1,700	15,000	0.04	0.06	1,200	12,000	
3	5	0.11	0.21	1,700	10,000	0.11	0.21	1,700	10,000	0.08	0.12	1,400	10,000	0.07	0.1	1,000	10,000	

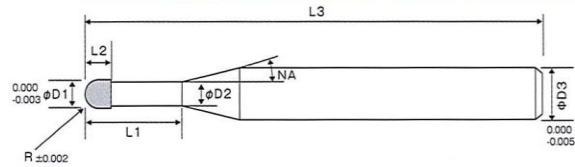
- Schrumpfen des Werkzeuges vermindert Werkzeugdurchbiegung
- Schnitttiefe zeigt max. Wert für feinschlichten
- Ap = axial / Ae = radial

- Empfohlene Kühlung: Ölnebel oder wasserlose Schneid-Emulsion
- Auskraglänge soll so kurz wie möglich sein
- Anpassung der Parameter an die tatsächlichen Begebenheiten empfohlen

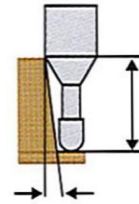
CBN Series

CBN Long Neck Ball End Mill

■ **CLB200** Model number: CLB200



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt



Bestell-Code CodeNo.	Vollradius Ball R	Nutzlänge Effective Length	Schneiden-L Length of Cut	WZ-Ø Tool Diameter	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									CLB200-0100-0500-0300	0.5	3	1.2	1
CLB200-0100-0500-0400	4	0.7	1	0.96	15	4	50	4.20	4.32		4.46	4.61	4.95
CLB200-0100-0500-0500	5	1.2	1	0.96	15	4	50	5.23	5.39		5.57	5.76	6.19
CLB200-0100-0500-0600	6	0.7	1	0.96	15	4	50	6.26	6.46		6.68	6.91	7.44
CLB200-0100-0500-0800	8	0.7	1	0.96	15	4	50	8.33	8.60		8.90	9.21	9.92
CLB200-0100-0500-1000	10	1.2	1	0.96	15	4	50	10.40	10.74		11.11	11.51	12.41
CLB200-0150-0750-0380	0.75	3.8	1	1.5	1.44	15	4	50	4.02	4.13	4.26	4.39	4.69
CLB200-0150-0750-0500		5	1.5	1.5	1.44	15	4	50	5.26	5.42	5.59	5.77	6.18
CLB200-0150-0750-0750		7.5	1	1.5	1.44	15	4	50	7.84	8.09	8.36	8.64	9.29
CLB200-0150-0750-1000		10	1.5	1.5	1.44	15	4	50	10.43	10.76	11.13	11.52	12.40
CLB200-0150-0750-1500		15	1	1.5	1.44	15	4	50	15.60	16.11	16.67	17.27	18.61
CLB200-0200-1000-0400	1	4	1.2	2	1.96	15	4	50	4.18	4.29	4.41	4.54	4.83
CLB200-0200-1000-0500		5	2	2	1.96	15	4	50	5.21	5.36	5.52	5.69	6.08
CLB200-0200-1000-0600		6	1.2	2	1.96	15	4	50	6.25	6.43	6.63	6.84	7.32
CLB200-0200-1000-0800		8	1.2	2	1.96	15	4	50	8.31	8.57	8.84	9.14	9.81
CLB200-0200-1000-1000		10	2	2	1.96	15	4	50	10.38	10.71	11.06	11.44	12.29
CLB200-0200-1000-1400		14	1.2	2	1.96	15	4	50	14.51	14.99	15.49	16.04	17.27
CLB200-0200-1000-1500		15	2	2	1.96	15	4	50	15.55	16.06	16.60	17.19	18.51
CLB200-0200-1000-2000		20	1.2	2	1.96	15	4	50	20.72	21.40	22.14	22.94	FREE
CLB200-0300-1500-0600	1.5	6	1.8	3	2.92	15	6	50	6.31	6.47	6.65	6.85	7.30
CLB200-0300-1500-0900		9	1.8	3	2.92	15	6	50	9.41	9.68	9.98	10.30	11.03
CLB200-0300-1500-1000		10	2	3	2.92	15	6	50	10.44	10.75	11.09	11.45	12.27
CLB200-0300-1500-1500		15	2	3	2.92	15	6	50	15.61	16.10	16.63	17.20	18.49

Empfohlene Schnitt-Parameter

Recommended Milling Cxonditions

CLB200
Model number:CLB200

Long Neck Ball End Mill

Work Material			Copper			Hardened Steels STAVAX/HPM(~55HRC)			Hardened Steels SKD11/SKH51(~60HRC)			Hardened Steels ASP23/HAP5R/HAP72(60HRC~)						
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅pmm	∅emm			∅pmm	∅emm			∅pmm	∅emm			∅pmm	∅emm		
2	1	3	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000
		4	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000
		5	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000
		6	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000
		8	0.04	0.09	2,800	28,000	0.04	0.09	2,800	28,000	0.02	0.04	2,800	28,000	0.02	0.02	1,800	23,000
		10	0.03	0.08	2,600	28,000	0.03	0.08	2,600	28,000	0.01	0.03	2,800	28,000	0.01	0.01	1,600	23,000
	1.5	3.8	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	16,000
		5	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	16,000
		7.5	0.07	0.12	2,100	20,000	0.07	0.12	2,100	20,000	0.04	0.065	2,000	20,000	0.03	0.05	1,200	16,000
		10	0.07	0.12	2,100	20,000	0.07	0.12	2,100	20,000	0.04	0.065	2,000	20,000	0.03	0.05	1,200	16,000
		15	0.06	0.1	2,000	18,000	0.06	0.1	2,000	18,000	0.03	0.06	1,900	18,000	0.02	0.04	1,100	15,000
	2	4	0.08	0.15	2,000	17,000	0.08	0.15	2,000	17,000	0.05	0.08	1,700	17,000	0.04	0.06	1,200	12,000
		5	0.08	0.15	2,000	17,000	0.08	0.15	2,000	17,000	0.05	0.08	1,700	17,000	0.04	0.06	1,200	12,000
		6	0.08	0.15	2,000	17,000	0.08	0.15	2,000	17,000	0.05	0.08	1,700	17,000	0.04	0.06	1,200	12,000
		8	0.07	0.13	1,800	17,000	0.07	0.13	1,800	17,000	0.04	0.06	1,500	17,000	0.03	0.04	1,100	12,000
		10	0.07	0.13	1,800	16,000	0.07	0.13	1,800	16,000	0.04	0.06	1,500	16,000	0.03	0.04	1,100	11,000
		14	0.06	0.12	1,700	16,000	0.06	0.12	1,700	16,000	0.03	0.05	1,400	16,000	0.02	0.04	1,000	11,000
		15	0.06	0.12	1,700	16,000	0.06	0.12	1,700	16,000	0.03	0.05	1,400	16,000	0.01	0.03	900	11,000
	3	6	0.1	0.2	1,700	10,000	0.1	0.2	1,700	10,000	0.08	0.12	1,400	10,000	0.07	0.1	1,000	10,000
		9	0.1	0.2	1,700	10,000	0.1	0.2	1,700	10,000	0.08	0.12	1,400	10,000	0.07	0.1	1,000	10,000
		10	0.08	0.18	1,500	10,000	0.08	0.18	1,500	10,000	0.07	0.1	1,300	10,000	0.06	0.08	800	10,000
		15	0.07	0.16	1,500	10,000	0.07	0.16	1,500	10,000	0.05	0.09	1,300	10,000	0.04	0.07	800	10,000

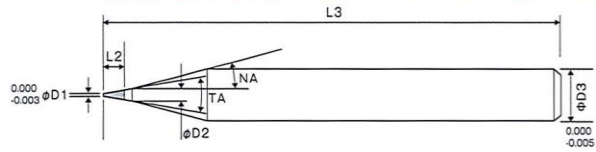
- Schrumpfen des Werkzeuges vermindert Werkzeughdurchbiegung
- Schnitttiefe zeigt max. Wert für feinschlichte
- Ap = axial / Ae = radial

- Empfohlene Kühlung: Ölnebel oder wasserlose Schneid-Emulsion
- Auskraglänge soll so kurz wie möglich sein
- Anpassung der Parameter an die tatsächlichen Begebenheiten empfohlen

CBN Series

CBN Taper End Mill (for Engraving)

■ **CTP200** Model number:CTP200



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt

Bestell-Code Code No.	WZ-Ø Tool Diameter	Flanken-Winkel Taper Angle	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length
CTP200-0005	0.05	40	0.7	0.6	15	4	50
CTP200-0010	0.1	40	0.68	0.6	15	4	50

■ **CTP200**
Model number:CTP200

Recommended Milling Conditions

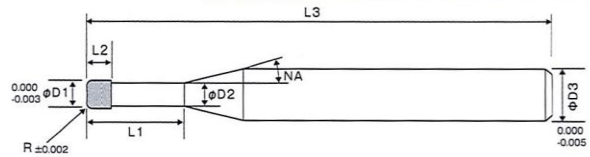
Taper End Mill

Work Material			Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ap mm	aemax mm			ap mm	aemax mm			ap mm	aemax mm			ap mm	aemax mm		
2	0.05	0.7	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.002	0.02	250	50,000
	0.1	0.68	0.003	0.03	400	50,000	0.003	0.03	400	50,000	0.003	0.03	350	50,000	0.002	0.02	300	50,000

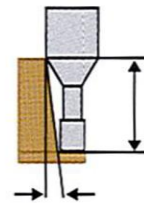
CBN Series

CBN Lapping Radius End Mill

CRL200 Model number: CRL200



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werkstück Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
CRL200-0040-0100-0135	0.4	0.1	1.35	0.4	0.37	15	4	50	1.45	1.50	1.55	1.60	1.72
CRL200-0050-0100-0150	0.5	0.1	1.5	0.5	0.47	15	4	50	1.61	1.66	1.71	1.77	1.91
CRL200-0060-0100-0170	0.6	0.1	1.7	0.7	0.57	15	4	50	1.81	1.87	1.94	2.00	2.16
CRL200-0060-0200-0170		0.2	1.7	0.7	0.57	15	4	50	1.81	1.86	1.92	1.99	2.14
CRL200-0100-0100-0220	1	0.1	2.2	1.2	0.96	15	4	50	2.35	2.43	2.51	2.60	2.80
CRL200-0100-0200-0220		0.2	2.2	1.2	0.96	15	4	50	2.34	2.42	2.50	2.59	2.78
CRL200-0100-0300-0220		0.3	2.2	1.2	0.96	15	4	50	2.34	2.41	2.49	2.57	2.76
CRL200-0150-0100-0300	1.5	0.1	3	1.5	1.44	15	4	50	3.21	3.32	3.44	3.56	3.85
CRL200-0150-0200-0300		0.2	3	1.5	1.44	15	4	50	3.21	3.31	3.43	3.55	3.82
CRL200-0150-0300-0300		0.3	3	1.5	1.44	15	4	50	3.21	3.31	3.42	3.53	3.80
CRL200-0200-0100-0500	2	0.1	5	2	1.96	15	4	50	5.24	5.42	5.61	5.82	6.29
CRL200-0200-0200-0500		0.2	5	2	1.96	15	4	50	5.24	5.41	5.60	5.81	6.26
CRL200-0200-0300-0500		0.3	5	2	1.96	15	4	50	5.24	5.41	5.59	5.79	6.24
CRL200-0300-0100-0500	3	0.1	5	2	2.92	15	6	50	5.32	5.50	5.70	5.91	6.38
CRL200-0300-0200-0500		0.2	5	2	2.92	15	6	50	5.32	5.49	5.69	5.89	6.35
CRL200-0300-0300-0500		0.3	5	2	2.92	15	6	50	5.31	5.49	5.67	5.88	6.33

Wenn die Oberfläche spiegeln soll = geläppte CBN Werkzeug
Bearbeitungs-Beispiel auf Seite 36



Empfohlene Schnitt-Parameter
Recommended Milling Conditions

■ CRL200
Model number:CRL200

Radius End Mill(for Lap)

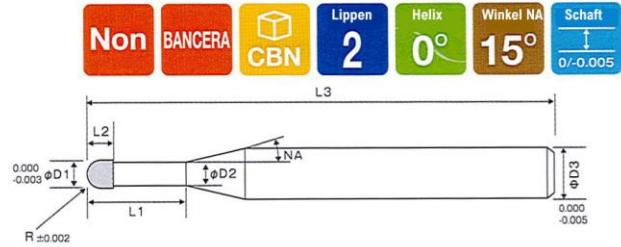
Work Material			Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)			Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹
2	0.4	1.35	0.005	0.01	900	30,000	0.005	0.05	800	30,000	0.005	0.05	700	30,000	0.005	0.05	600	30,000
	0.5	1.5	0.005	0.01	900	30,000	0.005	0.05	800	30,000	0.005	0.05	700	30,000	0.005	0.05	600	30,000
	0.6	1.7	0.005	0.01	900	30,000	0.005	0.1	800	30,000	0.005	0.1	700	30,000	0.005	0.1	600	30,000
	1	2.2	0.01	0.015	1,100	30,000	0.01	0.2	1,000	30,000	0.01	0.2	900	30,000	0.01	0.2	800	30,000
	1.5	3	0.01	0.02	1,100	20,000	0.01	0.5	1,000	20,000	0.01	0.5	900	20,000	0.01	0.5	800	20,000
	2	5	0.01	0.03	1,100	20,000	0.01	0.7	1,000	20,000	0.01	0.7	900	20,000	0.01	0.7	800	20,000
	3	5	0.01	0.04	1,100	20,000	0.01	1	1,000	20,000	0.01	1	900	20,000	0.01	1	800	20,000



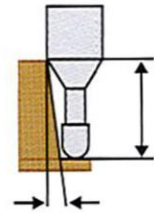
CBN Series

CBN Lapping Ball End Mill

CBL200 Model number: CBL200



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	Vollradius Ball R	Nutzlänge Effective Length	Schneiden-L Length of Cut	WZ-Ø Tool Diameter	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Werks				
									Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
CBL200-0040-0200-0135	0.2	1.35	0.4	0.4	0.37	15	4	50	1.45	1.49	1.54	1.59	1.70
CBL200-0060-0300-0170	0.3	1.7	0.7	0.6	0.57	15	4	50	1.81	1.86	1.91	1.97	2.11
CBL200-0100-0500-0220	0.5	2.2	1.2	1	0.96	15	4	50	2.33	2.40	2.47	2.54	2.71
CBL200-0150-0750-0300	0.75	3	1.5	1.5	1.44	15	4	50	3.19	3.28	3.37	3.47	3.70
CBL200-0150-0750-0500		5	1.5	1.5	1.44	15	4	50	5.26	5.42	5.59	5.77	6.18
CBL200-0150-0750-1000		10	1.5	1.5	1.44	15	4	50	10.43	10.76	11.13	11.52	12.40
CBL200-0200-1000-0500	1	5	2	2	1.96	15	4	50	5.21	5.36	5.52	5.69	6.08
CBL200-0200-1000-1000		10	2	2	1.96	15	4	50	10.38	10.71	11.06	11.44	12.29
CBL200-0200-1000-1500		15	2	2	1.96	15	4	50	15.55	16.06	16.60	17.19	18.51
CBL200-0300-1500-0500	1.5	5	2	3	2.92	15	6	50	5.27	5.40	5.55	5.70	6.06
CBL200-0300-1500-1000		10	2	3	2.92	15	6	50	10.44	10.75	11.09	11.45	12.27
CBL200-0300-1500-1500		15	2	3	2.92	15	6	50	15.61	16.10	16.63	17.20	18.49

Wenn die Oberfläche spiegeln soll = geläpptes CBN Werkzeug
Bearbeitungs-Beispiel auf Seite 36



Empfohlene Schnitt-Parameter
Recommended Milling Conditions

CBL200
Model number:CBL200

Ball End Mill(for Lap)

Work Material			Copper				Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
2	0.4	1.35	0.005	0.01	900	30,000	0.005	0.01	800	30,000	0.005	0.01	700	30,000	0.005	0.01	600	30,000
	0.6	1.7	0.005	0.01	900	30,000	0.005	0.01	800	30,000	0.005	0.01	700	30,000	0.005	0.01	600	30,000
	1	2.2	0.01	0.015	1,100	30,000	0.01	0.015	1,000	30,000	0.01	0.015	900	30,000	0.01	0.015	800	30,000
	1.5	3	0.01	0.02	1,100	30,000	0.01	0.02	1,000	30,000	0.01	0.02	900	30,000	0.01	0.02	800	30,000
		5	0.01	0.02	1,100	30,000	0.01	0.02	1,000	30,000	0.01	0.02	900	30,000	0.01	0.02	800	30,000
		10	0.01	0.015	1,100	30,000	0.01	0.015	1,000	30,000	0.01	0.015	900	30,000	0.01	0.015	800	30,000
	2	5	0.01	0.03	1,100	20,000	0.01	0.03	1,000	20,000	0.01	0.03	900	20,000	0.01	0.03	800	20,000
		10	0.01	0.03	1,100	20,000	0.01	0.03	1,000	20,000	0.01	0.03	900	20,000	0.01	0.03	800	20,000
		15	0.01	0.025	1,100	20,000	0.01	0.025	1,000	20,000	0.01	0.025	900	20,000	0.01	0.025	800	20,000
	3	5	0.01	0.04	1,100	20,000	0.01	0.04	1,000	20,000	0.01	0.04	900	20,000	0.01	0.04	800	20,000
		10	0.01	0.04	1,100	20,000	0.01	0.04	1,000	20,000	0.01	0.04	900	20,000	0.01	0.04	800	20,000
		15	0.01	0.035	1,100	20,000	0.01	0.035	1,000	20,000	0.01	0.035	900	20,000	0.01	0.035	800	20,000



Reflector Mold

Material: STAVAX (Hrc52)

Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note	
1	Rough	CBN Radius $\Phi 3.0R0.2$	2	30000	1000	0.020	1	0.025	0.025	shape outside
2	Semi-rough	CBN Radius $\Phi 1.5R0.3$	4	40000	1000	0.015	-	0.015	0.015	shape outside
3	Semi-rough	CBN Radius $\Phi 1.0R0.3$	2	40000	1000	0.015	-	0.005	0.005	shape outside
4	Semi-rough	CBN Ball R0.3BALL	2	50000	600	0.010	-	0.000	0.003	Side jagged part
5	Rough	CBN Radius $\Phi 3.0R0.2$	2	30000	1000	0.020	1	0.030	0.030	shape inside
6	Semi-rough	CBN Radius $\Phi 1.5R0.3$	4	40000	1000	0.020	0.4	0.020	0.020	shape inside
7	Semi-rough	CBN Radius $\Phi 1.0R0.3$	2	40000	1000	0.015	0.2	0.010	0.010	shape inside
8	Semi-rough	HARD STAR Carbide Ball R0.3BALL	2	37500	600	0.015	-	0.005	0.005	shape inside
9	Finish	CBN Lapping Ball R0.3BALL	2	50000	600	0.010	-	0.000	0.000	Side jagged part
10	Finish	CBN Lapping Radius $\Phi 1.5R0.3$	2	50000	1200	0.010	-	0.000	0.000	shape outside
11	Finish	CBN Radius $\Phi 3.0R0.2$	2	30000	1200	0.000	-	0.005	0.000	Bottom of base
12	Finish	CBN Taper BALL Lapping R0.2-A67	2	50000	300	0.000	-	0.000	0.000	Inside cross
13	Finish	CBN Radius $\Phi 0.6R0.1$	2	50000	600	0.010	0.05	0.000	0.000	Inner outline

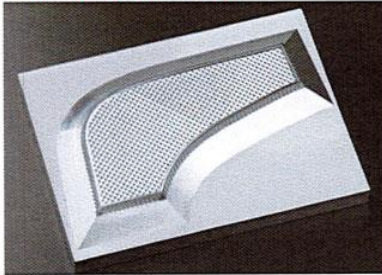
[min⁻¹] [mm/min] [mm] [mm] [mm]

【Note】

MC···HS650L【Sodick】

* Need pre-processing (before hardening)

Processing time (machine hours) ··· 110 hours 2 minutes



Connector Mold

Material: SKD11 (Hrc60)

Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note	
1	Rough	CBN Radius $\Phi 3.0R0.05$	2	30000	1000	0.010	1	0.020	0.020	
2	Semi-rough	CBN Radius $\Phi 2.0R0.05$	2	40000	1000	0.010	-	0.005	0.005	
3	Semi-rough	CBN Radius $\Phi 1.5R0.05$	2	40000	1000	0.010	-	0.005	0.005	
4	Semi-rough	CBN Radius $\Phi 1.0R0.05$	2	40000	500	0.010	-	0.005	0.005	
5	Finish	CBN Radius $\Phi 0.6R0.05$	2	50000	500	0.010	-	0.000	0.000	slit part
6	Semi-rough	CBN Radius $\Phi 1.5R0.3$	2	40000	1000	0.020	-	0.015	0.015	V slot
7	Semi-rough	CBN Radius $\Phi 1.0R0.3$	2	40000	800	0.015	-	0.010	0.010	V slot
8	Semi-rough	HARD STAR Carbide Ball R0.3BALL	2	30000	600	0.010	-	0.005	0.005	V slot
9	Finish	CBN Radius $\Phi 0.2R0.05$	2	50000	100	0.005	-	0.000	0.000	Extra-narrow slot
10	Finish	R0.1BALL-A60	2	50000	200	0.000	-	0.000	0.000	V slot
11	Finish	CBN Radius $\Phi 0.6R0.05$	2	50000	500	0.02/0.002	-	0.000	0.000	Finely mill only the R part of upper surface
12	Finish (side wall)	CBN Radius $\Phi 1.0R0.05$	2	40000	500	0.02/0.002	-	0.000	0.000	part of upper surface
13	Finish (bottom)	CBN Radius $\Phi 1.0R0.05$	2	40000	500	0.000	-	0.003	0.000	
14	Finish (side wall)	CBN Radius $\Phi 1.5R0.05$	2	40000	1000	0.02/0.002	-	0.000	0.000	Finely mill only the R part of upper surface
15	Finish (bottom)	CBN Radius $\Phi 1.5R0.05$	2	40000	1000	0.000	-	0.003	0.000	
16	Finish (side wall)	CBN Radius $\Phi 2.0R0.05$	2	40000	1000	0.02/0.002	-	0.000	0.000	Finely mill only the R part of upper surface
17	Finish (bottom)	CBN Radius $\Phi 2.0R0.05$	2	40000	1000	0.000	-	0.003	0.000	
18	Rough	CBN Radius $\Phi 1.5R0.05$	2	40000	1000	0.020	-	0.005	0.005	Dovetail grooves
19	Finish	CBN Reverse Taper Radius $\Phi 2.5R0.2A5$	2	18000	300	0.010	-	0.000	0.000	Dovetail grooves

[min⁻¹] [mm/min] [mm] [mm] [mm]

【Note】

MC···HS650L【Sodick】

※Milling from solid

Processing time (machine hours) ··· 86 hours 13 minutes



Die cut roll

Material: SKD11 (Hrc60)

Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	CBN Radius $\Phi 3.0R0.2$	2	14000	1800	0.030	1	0.020	0.020	
2	CBN Radius $\Phi 1.5R0.1$	2	40000	1500	0.020	-	0.020	0.020	
3	CBN Radius $\Phi 1.0R0.1$	2	40000	1000	0.015	-	0.020	0.020	
4	CBN Radius $\Phi 0.6R0.1$	2	40000	800	0.010	-	0.020	0.020	
5	CBN Radius $\Phi 0.4R0.1$	2	40000	500	0.010	-	0.020	0.020	
6	CBN Taper Ball R0.2BALL-A10	2	40000	500	0.010	-	0.010	0.010	
7	CBN Ball R1.0BALL	2	30000	1000	0.000	0.0005 (note)	0.010	0.010	
8	CBN Ball R0.2BALL-A10	2	40000	500	0.000	0.001 (note)	0.005	0.005	
9	CBN Ball R0.2 Lapping BALL	2	40000	500	0.000	0.001 (note)	0.000	0.000	

[min⁻¹] [mm/min] [mm] [mm] [mm]

【Note】

MC···HS430L【Sodick】



Note: Cutting amount (Rd) in steps 7, 8 and 9 are scallop blades height values.

About Cutting amount (Rd)

Value of Step 7 is smaller than 8 and 9 is aim to make same surface quality of base to cutting blade shape.

Each side (4 sides in total) is processed under the same conditions.

Processing time (machine hours) ··· 126 hours 10 minutes

Heat sink

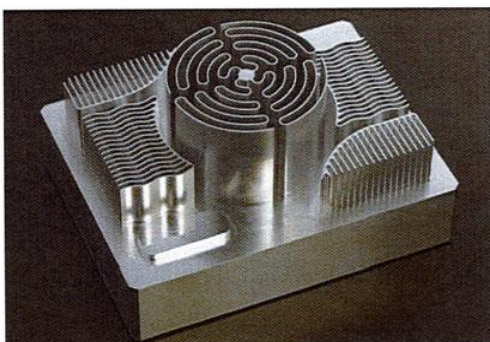
Material: Aluminum alloy

Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	ion Depo Carbide $\Phi 6.0$	2	6000	800	0.500	-	0.500	0.050	
2			6000	1600	0.200	4	0.500	0.050	
3	ion Depo Carbide $\Phi 4.0$	2	6000	800	0.500	2.4	0.500	0.050	
4	ion Depo Carbide $\Phi 2.0$	2	6000	250	0.200	-	0.400	0.050	To maintain shape resistance, do not process the inside of the higher shape
5			6000	400	0.020	0.75	0.010	0.010	
6	ion Depo Carbide $\Phi 1.0$	2	9000	400	0.050	-	0.100	0.010	Only lower shape (for $\Phi 1.0$)
7	ion Depo Carbide $\Phi 1.0$	2	12000	100	0.005	0.4	0.000	0.000	Upper surface of the shape
8	ion Depo Carbide $\Phi 1.0$	2	12000	200	0.050	-	0.000	0.000	
9	ion Depo Carbide $\Phi 2.0$	2	12000	400	0.025	-	0.000	0.000	Outside of higher shape (for $\Phi 2.0$)
10	ion Depo Carbide $\Phi 2.0$	2	12000	200	0.030	-	0.000	0.000	Inside of higher shape (for $\Phi 2.0$)
11	ion Depo Carbide $\Phi 1.0$	2	12000	100	0.000	0.25	0.000	0.000	Remove burrs of the upper surface

[min⁻¹] [mm/min] [mm] [mm] [mm]

【Note】

MC···HS430L【Sodick】



※Need pre-rough processing (pre-processed to approximate shape)

Processing time (machine hours) ··· 275 hours 51 minutes

Pocket cavity (mirror surface)

Material: modified SKD11 (Hrc63)

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	Rough	CBN Radius ϕ 3.0R0.2	2	30000	2000	0.030	1	0.020	0.020	
2	Rough	CBN Radius ϕ 3.0R0.2 (bottom)	2	30000	1600	0.020	1	0.020	0.020	
3	Semi-rough (side wall)	CBN Radius ϕ 1.5R0.3	4	40000	800	0.025	-	0.005	0.010	
	Semi-rough (bottom)		4	40000	800	0.010	0.5	0.005	0.010	
4	Finish (side wall)	CBN Radius ϕ 1.0R0.1	2	40000	500	0.010	-	0.000	0.005	
	Semi-finish (bottom)		2	40000	500	-	0.2	-	0.003	
5	Finish (bottom)	CBN Radius ϕ 1.0R0.1	2	40000	500	Note1	0.15	-	0.000	
				[min ⁻¹]	[mm/min]	[mm]	[mm]	[mm]		

【Note】

MC···HS430L【Sodick】



Note1

Cutting Ad: 0.0031→0.0003→0.0003→0.0003

Addition

General cutting parameter above.

Process 5 were repeated several times for better surface.

LED shape

Material: STAVAX (Hrc55)

Standard CBN

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	Rough	CBN Radius ϕ 3.0R0.2	2	30000	1600	0.020	1	0.040	0.040	
2	Semi-rough	CBN Radius ϕ 1.5R0.5	2	40000	1600	0.020	-	0.040	0.040	
3	Semi-rough (side wall)	CBN Ball R0.5BALL	2	40000	1600	0.010	-	0.010	0.010	
	Semi-rough (bottom)		2	40000	1600	0.010	0.01	0.010	0.010	
4	Finish	CBN Ball R0.5BALL	2	30000	1000	0.012	0.012	0.000	0.000	
				[min ⁻¹]	[mm/min]	[mm]	[mm]	[mm]		

Standard CBN + Lapping CBN

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	Rough	CBN Radius ϕ 3.0R0.2	2	30000	1600	0.020	1	0.040	0.040	
2	Semi-rough	CBN Radius ϕ 1.5R0.5	2	40000	1600	0.020	-	0.040	0.040	
3	Semi-rough (side wall)	CBN Ball R0.5BALL	2	40000	1600	0.010	-	0.010	0.010	
	Semi-rough (bottom)		2	40000	1600	0.010	0.01	0.010	0.010	
4	Semi-finish	CBN Ball R0.5BALL	2	30000	1000	0.012	0.012	0.003	0.003	
5	Finish	CBN Ball R0.5 Lapping BALL	2	20000	1000	0.012	0.012	0.000	0.000	
				[min ⁻¹]	[mm/min]	[mm]	[mm]	[mm]		

【Note】

MC···HS430L【Sodick】



Shell

Material: STAVAX (Hrc55)

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1								0.100	0.100	
2	Rough	CBN Radius Φ 3.0R0.2	2	30000	2000	0.030	-	0.070	0.070	
3	Semi-rough	R1.5BALL	2	30000	1500	0.020	-	0.030	0.030	
4				30000	1500	0.020	-	0.012	0.012	
5	Semi-rough	R1.5BALL	2	30000	1500	-	0.05	0.012	0.012	Only around the shape bottom part
6	Semi-finish	R1.5BALL	2	20000	1000	0.012	0.012	0.003	0.003	Cross
7	Finish	CBN Lapping Ball R1.5 BALL	2	20000	1000	0.012	0.012	0.000	0.000	Cross

[min⁻¹] [mm/min] [mm] [mm] [mm]

[Note]

MC•••HS430L[Sodick]



Use Carbide mill cut to stock 0.1mm
(0.1mm remaining before rough process)

Donut shape

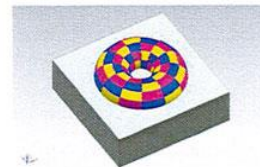
Material: STAVAX (Hrc55)

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1								0.040	0.040	Use carbide end mill cut to 0.04mm remain
2	Rough	CBN Radius Φ 3.0R0.3 (side wall)	2	30000	2000	0.020	-	0.020	0.020	Overall
3	Rough	CBN Radius Φ 3.0R0.3 (bottom)	2	30000	2000	0.020	1	0.020	0.020	Overall
4	Semi-rough	CBN Ball R1.0BALL	2	30000	1000	0.050	0.05	0.010	0.010	Projection machining (overall)
5	Finish	CBN Radius Φ 3.0R0.3 (bottom)	2	30000	1000	-	0.25	0.000	0.000	bottom surface (textured machining)
6	Finish	R1.0BALL	2	30000	1000	0.013	0.013	0.000	0.000	Projection processing (partial)
7	Finish	CBN Lapping Ball R1.0BALL	2	20000	1000	0.013	0.013	0.000	0.000	Projection processing (partial)

[min⁻¹] [mm/min] [mm] [mm] [mm]

[Note]

MC•••HS430L[Sodick]



3 patterns of lapping CBN end mill,
CBN end mill, electric discharge machining

Gear parts (Titanium alloy)

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	Rough	Φ6.0R1.0	2	5000	800	0.100	1.5	0.100	0.100	
2	Semi-rough	Φ3.0R1.0	2	8000	800	0.100	1.5	0.050	0.050	side wall
				8000	800	0.050	0.75	0.050	0.050	bottom
3	Semi-rough	Φ2.0R0.5	2	8000	800	0.060	1	0.020	0.020	side wall
				8000	800	0.050	0.75	0.020	0.020	bottom
4	Finish	R1.0BALL	2	20000	600	0.010	-	0.000	0.000	side wall
5	Finish	Φ2.0R0.5	2	8000	600	0.010	0.5	0.000	0.000	bottom
6										
7										

[min⁻¹] [mm/min] [mm] [mm] [mm]

[Note]

MC···HS430L[Sodick]



Lattice shape

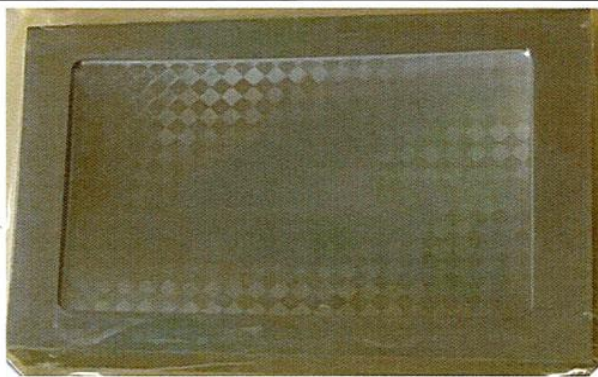
Material: ELMAX (Hrc60)

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	Rough (overall)	CBN Radius φ 3.0R0.2	2	30000	1500	0.020	1.3	0.050	0.050	
2	Rough (bottom)	CBN Radius φ 3.0R0.2	2	30000	1500	0.020	1	0.050	0.020	
3	Semi-rough (overall)	CBN Radius φ 1.5R0.3	4	50000	4000	0.018	-	0.020	0.020	
3	Semi-rough (bottom)	CBN Radius φ 1.5R0.3	4	50000	4000	0.010	0.5	0.020	0.020	
4	Semi-rough (overall)	CBN Ball R0.5BALL	2	50000	1500	0.020	-	0.010	0.020	
5	Semi-rough (bottom)	CBN Ball R0.5BALL	2	50000	1500	-	0.1	0.010	0.010	
4	Finish (side wall)	CBN Ball R0.5BALL	2	50000	1000	0.010	-	0.000	0.000	
5	Finish (bottom)	CBN Ball R0.5BALL	2	50000	1000	-	0.05	0.000	0.000	upper lattice
5	Finish (bottom)	CBN Ball R0.5BALL	2	50000	1000	-	0.05	0.000	0.000	lower lattice

[min⁻¹] [mm/min] [mm] [mm] [mm]

[Note]

MC···HS650L[Sodick]



Hairline pattern

Material: ELMAX (Hrc60)

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	Rough	CBN Radius ϕ 3.0R0.2	2	30000	1500	0.020	1.500	0.050	0.050	
2	Semi-rough	CBN Radius ϕ 1.5R0.3	4	50000	4000	0.020	0.500	0.020	0.020	
3	Semi-rough	CBN Ball R0.5BALL	2	50000	1500	0.020	0.100	0.010	0.010	
4	Finish	CBN Ball R0.5BALL	2	50000	1000	0.010	0.050	0.000	0.000	

【Note】

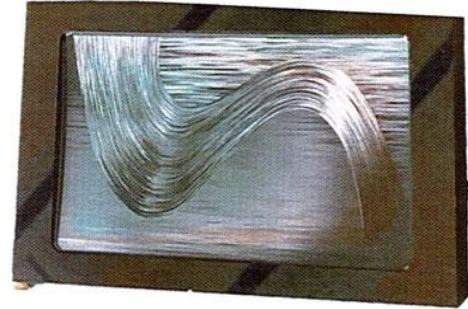
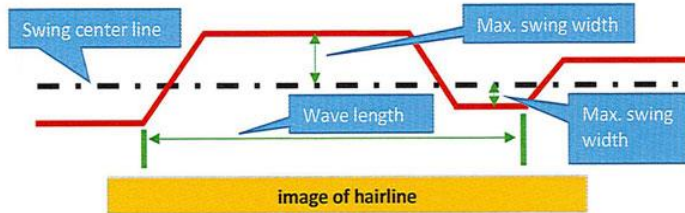
MC···HS650L【Sodick】

Process 4, other necessary values beside above. (see below)

Wave length · · · 25.0~50.0mm

Swing width (wave height): 0 to 0.005 mm

* Swing width is counted from the center.



R shape (Milling·EDM·Grinding)

Material: modified SKD11 (Hrc63)

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	Finish	R0.5BALL	2	40000	500	-	0.02	0.000	0.000	
2										

[min⁻¹] [mm/min] [mm] [mm] [mm]

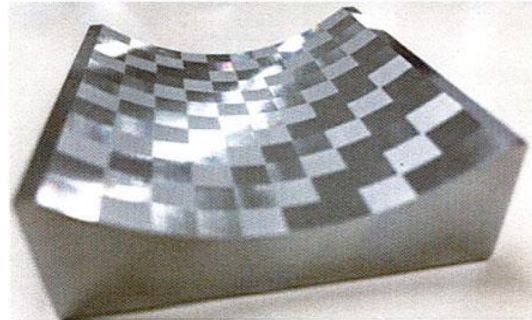
【Note】

MC···HS430L【Sodick】

* 3 different machining method (surface quality) on a curve surface.

* Finish the curve shape by grinding, milling 0.001 mm only on the milling area.

* Scanning-line processing along the curve shape.



Corner R shape (convex) *Catalog lapping page

Material: modified SKD11 (Hrc63)

	Process	Tool Type	Flutes	RPM	Feed	Cutting Amount (Ad)	Cutting Amount (Rd)	Stock / Rest amount (side wall)	Stock / Rest amount (bottom)	Note
1	Finish	Φ 1.0R0.1 Lapping	2	50000	550	Note 1	-	0.000	0.000	
2										

[min⁻¹] [mm/min] [mm] [mm] [mm]

【Note】

MC···HS650L【Sodick】

Note 1

The stock of R part on the upper surface range from 0.001 to 0.01mm.

Side wall finished with one shot and is driven 0.0002 in the side direction.

