

# NM series end mills for machining copper

## Serie VHM-Fräser für die Kupferbearbeitung

Extremely outstanding NM series end mills, greatly improve the machining performance in copper or copper alloy.

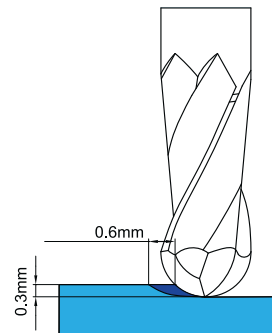
Extrem leistungsstarke NM Schaftfräser, für die wirtschaftliche Bearbeitung von Kupfer und Kupferlegierungen.

- Transcendent sharpness is very suitable for high precision machining copper or copper alloy.
- CrN coating with perfect lubricating property and minimal friction factor, achieves light and fast cutting process, extra long tool life and high surface quality.
- Hervorragende Schneidenschärfe ist besonders geeignet für die Präzisionsbearbeitung von Kupfer oder Kupferlegierungen.
- Bei Einsatz von Kühlmittel erzeugt die CrN-beschichtete Schneidplatte geringste Reibung. Das Ergebnis ist leichte und schnelle Zerspanung bei besonders langer Werkzeugstandzeit und sehr guter Werkstück-Oberflächenqualität.

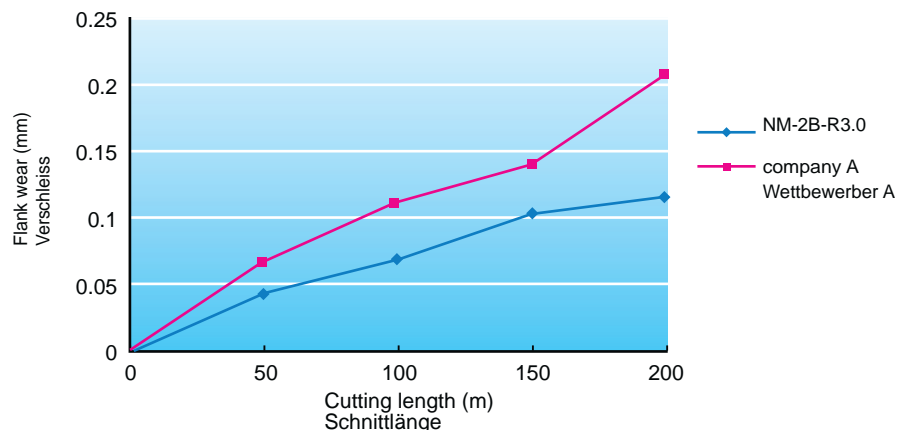
Coating Beschichtung	Micro hardness (hv) Mikrohärte	Friction factor Bruchfaktor	Initial temperature of oxidation Oxidations temperatur (°C)	Bonding strength with substrate Zähigkeit
CrN	1800	0.25	700	✓
TiN	2200	0.4	500	✓
TiCN	2700	0.3	400	✓
TiAlN	2800	0.3	800	✓

common  
excellent

- Tool type /Werkzeug: NM-2B-R3.0
- Size /Größe : R3.0mm
- Workpiece material / Werkstückstoff : C1100
- Rotating speed / Drehzahl: 8000r/min (150m/min)
- Feed / Vorschub : 1200mm/min (0.15mm/r)
- Axial cutting depth / Axiale Zustellung:  $A_p=0.3\text{mm}$
- Radial cutting depth / Radiale Zustellung:  $A_e=0.6\text{mm}$
- Cutting style / Bearbeitung: face milling / Planfräsen (down milling)
- Cooling system / Kuhlssystem : air blow
- Machine / Maschine: MIKRON UCP 1000



Ball nose end mills for machining copper alloy  
Kugelkopffräser für Kupferbearbeitung



# Milling · Fräsen

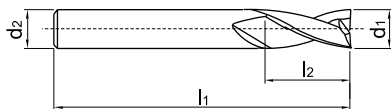
Solid Carbide end mills · Vollhartmetallschaftfräser

DIN 6527L 2-flute end mills · DIN 6527L 2-Schneiden VHM Schaftfräser



## 5502R402NM

YK30F: Ultrafine carbide / Ultrafeinkornhartmetall



B

Solid Carbide end mills  
Vollhartmetallschaftfräser

Type Typ	Dimension(mm) Abmessungen				Teeth Zähne	Application Anwendung	N
	d <sub>1</sub> (e <sub>8</sub> )	d <sub>2</sub> (h <sub>6</sub> )	l <sub>2</sub>	l <sub>1</sub>			
5502R402NM-0300	3.00	6	8	57	2		●
5502R402NM-0400	4.00	6	11	57	2		●
5502R402NM-0500	5.00	6	13	57	2		●
5502R402NM-0600	6.00	6	13	57	2		●
5502R402NM-0800	8.00	8	19	63	2		●
5502R402NM-1000	10.00	10	22	72	2		●
5502R402NM-1200	12.00	12	26	83	2		●
5502R402NM-1400	14.00	14	26	83	2		●
5502R402NM-1600	16.00	16	32	92	2		●
5502R402NM-1800	18.00	18	32	92	2		●
5502R402NM-2000	20.00	20	38	104	2		●

Art. Group No. / Produktgruppe Nr. :

022140

### Material Overview · Material Übersicht

✓ = Very suitable · Sehr empfohlen  
✓ = Suitable · Empfohlen

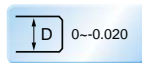
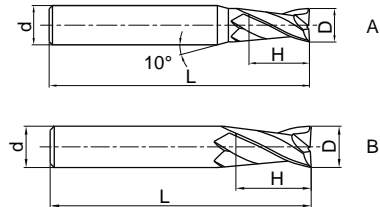
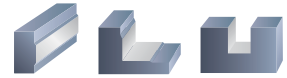
YK 30F

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✓			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

NM-2E series for machining cooper · NM-2E Serie für die Bearbeitung von Kupfer

### 2-flute end mills with straight shank 2-Schneiden Schafffräser mit Zylinderschaft



Type Typ	Dimension(mm) Abmessungen				Teeth Zähne Z	Geometry Ausführung	Grade Sorte KMG309
	D	d	H	L			
NM-2E-D1.0	1.0	4	3	50	2	A	●
NM-2E-D2.0	2.0	4	6	50	2	A	●
NM-2E-D3.0	3.0	6	8	50	2	A	●
NM-2E-D4.0	4.0	6	11	50	2	A	●
NM-2E-D5.0	5.0	6	13	50	2	A	●
NM-2E-D6.0	6.0	6	16	50	2	B	●
NM-2E-D8.0	8.0	8	20	60	2	B	●
NM-2E-D10.0	10.0	10	25	75	2	B	●
NM-2E-D12.0	12.0	12	30	75	2	B	●

# B

Solid Carbide end mills  
Vollhartmetallschaftfräser

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KMG309

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✓			

Code key  
ISO Kennzeichen

B231

Cutting data  
Schnittdaten

B472-476

Graphics identification & application  
Graphische Werkzeug- & Anwendungsbeschr.

B232

Order form for non-standard products  
Bestellformular für Sonderwerkzeuge

B497-B498

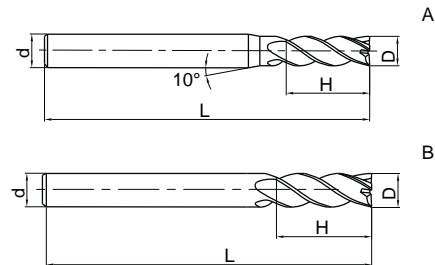
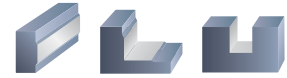
B351

# Milling · Fräsen

Solid Carbide end mills · Vollhartmetallschaftfräser

NM-4E series for machining cooper · NM-4E Serie für die Bearbeitung von Kupfer

## 4-flute end mills with straight shank 4-Schneiden Schaftfräser mit Zylinderschaft



Type Typ	Dimension(mm) Abmessungen				Teeth Zähne Z	Geometry Ausführung	Grade Sorte KMG309
	D	d	H	L			
NM-4E-D3.0	3.0	6	8	50	4	A	○
NM-4E-D4.0	4.0	6	11	50	4	A	○
NM-4E-D5.0	5.0	6	13	50	4	A	○
NM-4E-D6.0	6.0	6	16	50	4	B	○
NM-4E-D8.0	8.0	8	20	60	4	B	○
NM-4E-D10.0	10.0	10	25	75	4	B	○
NM-4E-D12.0	12.0	12	30	75	4	B	○

B

Solid Carbide end mills  
Vollhartmetallschaftfräser

## Material Overview · Material Übersicht

✓ = Very suitable · Sehr empfohlen  
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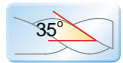
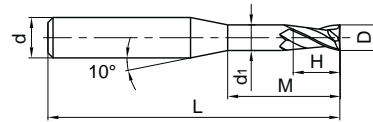
KMG309

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✓			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

NM-2EP series for machining cooper · NM-2EP Serie für die Bearbeitung von Kupfer

**2-flute short cutting edge end mills with straight shank with long neck**  
**2-Schneiden Schaftfräser mit Zylinderschaft**



Type Typ	Dimension(mm) Abmessungen						Teeth Zähne Z	Grade Sorte KMG309
	D	d	H	M	d <sub>1</sub>	L		
NM-2EP-D0.5-M04	0.5	4.0	0.7	4.0	0.45	50	2	●
NM-2EP-D0.5-M06	0.5	4.0	0.7	6.0	0.45	50	2	●
NM-2EP-D0.5-M08	0.5	4.0	0.7	8.0	0.45	50	2	●
NM-2EP-D0.8-M04	0.8	4.0	1.2	4.0	0.75	50	2	●
NM-2EP-D0.8-M06	0.8	4.0	1.2	6.0	0.75	50	2	●
NM-2EP-D0.8-M08	0.8	4.0	1.2	8.0	0.75	50	2	●
NM-2EP-D0.8-M10	0.8	4.0	1.2	10.0	0.75	50	2	●
NM-2EP-D1.0-M04	1.0	4.0	1.5	4.0	0.95	50	2	●
NM-2EP-D1.0-M06	1.0	4.0	1.5	6.0	0.95	50	2	●
NM-2EP-D1.0-M08	1.0	4.0	1.5	8.0	0.95	50	2	●
NM-2EP-D1.0-M10	1.0	4.0	1.5	10.0	0.95	50	2	●
NM-2EP-D1.0-M12	1.0	4.0	1.5	12.0	0.95	50	2	●
NM-2EP-D1.0-M14	1.0	4.0	1.5	14.0	0.95	50	2	●
NM-2EP-D1.5-M08	1.5	4.0	2.3	8.0	1.45	50	2	●
NM-2EP-D1.5-M16	1.5	4.0	2.3	16.0	1.45	50	2	●
NM-2EP-D2.0-M06	2.0	4.0	3.0	6.0	1.95	50	2	●
NM-2EP-D2.0-M08	2.0	4.0	3.0	8.0	1.95	50	2	●
NM-2EP-D2.0-M10	2.0	4.0	3.0	10.0	1.95	50	2	●
NM-2EP-D2.0-M12	2.0	4.0	3.0	12.0	1.95	50	2	●
NM-2EP-D2.0-M14	2.0	4.0	3.0	14.0	1.95	50	2	●
NM-2EP-D2.0-M16	2.0	4.0	3.0	16.0	1.95	50	2	●
NM-2EP-D2.5-M10	2.5	4.0	3.7	10.0	2.4	50	2	●
NM-2EP-D2.5-M20	2.5	4.0	3.7	20.0	2.4	60	2	●
NM-2EP-D3.0-M10	3.0	6.0	4.5	10.0	2.85	50	2	●
NM-2EP-D3.0-M20	3.0	6.0	4.5	20.0	2.85	60	2	●
NM-2EP-D4.0-M16	4.0	6.0	6.0	16.0	3.85	60	2	●
NM-2EP-D4.0-M25	4.0	6.0	6.0	25.0	3.85	60	2	●
NM-2EP-D5.0-M16	5.0	6.0	7.5	16.0	4.85	60	2	●
NM-2EP-D5.0-M25	5.0	6.0	7.5	25.0	4.85	70	2	●

Solid Carbide end mills  
Vollhartmetallschaftfräser

**B**

**Material Overview · Material Übersicht**

✓ = Very suitable · Sehr empfohlen  
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KMG309

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✓			

Code key B231  
ISO Kennzeichen

Cutting data B472-476  
Schnittdaten

Graphics identification & application B232  
Graphische Werkzeug- & Anwendungsbeschr.

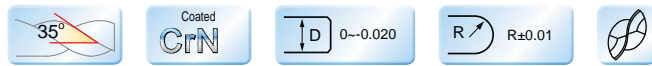
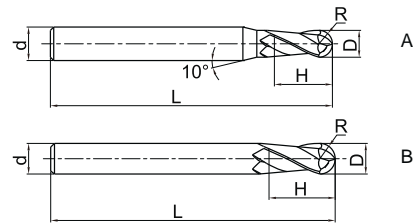
Order form for non-standard products B497-B498  
Bestellformular für Sonderwerkzeuge

# Milling · Fräsen

Solid Carbide end mills · Vollhartmetallschaftfräser

NM-2B series for machining cooper · NM-2B Serie für die Bearbeitung von Kupfer

## 2-flute ball nose mills with straight shank 2-Schneiden Kugelkopffräser mit Zylinderschaft



Type Typ	Dimension (mm) Abmessungen					Teeth Zähne Z	Geometry Ausführung	Grade Sorte KMG309
	D	R	d	H	L			
NM-2B-R0.5	1.0	0.5	4.0	2.0	50	2	A	●
NM-2B-R0.75	1.5	0.75	4.0	3.0	50	2	A	●
NM-2B-R1.0	2.0	1.0	4.0	4.0	50	2	A	●
NM-2B-R1.25	2.5	1.25	4.0	5.0	50	2	A	●
NM-2B-R1.5	3.0	1.5	6.0	6.0	50	2	A	●
NM-2B-R1.75	3.5	1.75	6.0	8.0	50	2	A	●
NM-2B-R2.0	4.0	2.0	6.0	8.0	50	2	A	●
NM-2B-R2.5	5.0	2.5	6.0	10.0	50	2	A	●
NM-2B-R3.0	6.0	3.0	6.0	12.0	50	2	B	●
NM-2B-R4.0	8.0	4.0	8.0	16.0	60	2	B	●
NM-2B-R5.0	10.0	5.0	10.0	20.0	75	2	B	●
NM-2B-R6.0	12.0	6.0	12.0	24.0	75	2	B	●

B

Solid Carbide end mills  
Vollhartmetallschaftfräser

## Material Overview · Material Übersicht

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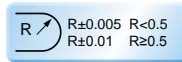
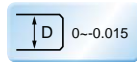
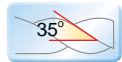
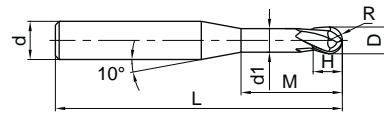
KMG309

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✓			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

NM-2BP series for machining cooper · NM-2BP Serie für die Bearbeitung von Kupfer

2-flute short cutting edge ball nose micro end mills with straight shank and long  
2-Schneiden Micro Kugelkopffräser, mit kurzer Schneide und Zylinderschaft (lang)



Type Typ	Dimension(mm) Abmessungen							Teeth Zähne Z	Grade Sorte KMG309
	D	R	H	d <sub>1</sub>	M	d	L		
NM-2BP-R0.25-M04	0.5	0.25	0.7	0.45	4.0	4.0	50	2	●
NM-2BP-R0.25-M06	0.5	0.25	0.7	0.45	6.0	4.0	50	2	●
NM-2BP-R0.3-M04	0.6	0.3	0.9	0.55	4.0	4.0	50	2	●
NM-2BP-R0.3-M06	0.6	0.3	0.9	0.55	6.0	4.0	50	2	●
NM-2BP-R0.3-M08	0.6	0.3	0.9	0.55	8.0	4.0	50	2	●
NM-2BP-R0.4-M04	0.8	0.4	1.2	0.75	4.0	4.0	50	2	●
NM-2BP-R0.4-M06	0.8	0.4	1.2	0.75	6.0	4.0	50	2	●
NM-2BP-R0.4-M08	0.8	0.4	1.2	0.75	8.0	4.0	50	2	●
NM-2BP-R0.4-M10	0.8	0.4	1.2	0.75	10.0	4.0	50	2	●
NM-2BP-R0.5-M04	1.0	0.5	1.5	0.95	4.0	4.0	50	2	●
NM-2BP-R0.5-M06	1.0	0.5	1.5	0.95	6.0	4.0	50	2	●
NM-2BP-R0.5-M08	1.0	0.5	1.5	0.95	8.0	4.0	50	2	●
NM-2BP-R0.5-M10	1.0	0.5	1.5	0.95	10.0	4.0	50	2	●
NM-2BP-R0.5-M12	1.0	0.5	1.5	0.95	12.0	4.0	50	2	●
NM-2BP-R0.75-M08	1.5	0.75	2.3	1.45	8.0	4.0	50	2	●
NM-2BP-R0.75-M16	1.5	0.75	2.3	1.45	16.0	4.0	50	2	●
NM-2BP-R1.0-M06	2.0	1.0	3.0	1.95	6.0	4.0	50	2	●
NM-2BP-R1.0-M08	2.0	1.0	3.0	1.95	8.0	4.0	50	2	●
NM-2BP-R1.0-M10	2.0	1.0	3.0	1.95	10.0	4.0	50	2	●
NM-2BP-R1.0-M12	2.0	1.0	3.0	1.95	12.0	4.0	50	2	●
NM-2BP-R1.0-M16	2.0	1.0	3.0	1.95	16.0	4.0	50	2	●
NM-2BP-R1.0-M20	2.0	1.0	3.0	1.95	20.0	4.0	60	2	●
NM-2BP-R1.5-M10	3.0	1.5	4.5	2.85	10.0	6.0	50	2	●
NM-2BP-R1.5-M20	3.0	1.5	4.5	2.85	20.0	6.0	60	2	●
NM-2BP-R2.0-M10	4.0	2.0	6.0	3.85	10.0	6.0	60	2	●
NM-2BP-R2.0-M16	4.0	2.0	6.0	3.85	16.0	6.0	60	2	●
NM-2BP-R2.0-M20	4.0	2.0	6.0	3.85	20.0	6.0	60	2	●
NM-2BP-R2.0-M25	4.0	2.0	6.0	3.85	25.0	6.0	60	2	●
NM-2BP-R2.5-M16	5.0	2.5	7.5	4.85	16.0	6.0	60	2	●
NM-2BP-R2.5-M25	5.0	2.5	7.5	4.85	25.0	6.0	70	2	●

# B

Solid Carbide end mills  
Vollhartmetallschaftfräser

### Material Overview · Material Übersicht

✓ = Very suitable · Sehr empfohlen  
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KMG309

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✓			

Code key B231  
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Bestellformular für Sonderwerkzeuge