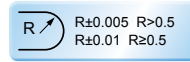
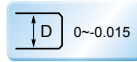
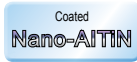
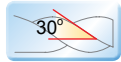
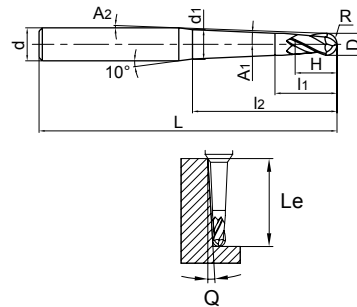


2-flute conical neck ball nose end mills 2-Schneiden Mikro Kugelkopffräser mit konischem Hals



PM-2BC



Type Typ	Dimension(mm) Abmessungen										Teeth Zähne Z	Le(Q ^Λ = Le)				Grade Sorte KMG 405						
	D	R	A1	H	l2	l1	A2	d1	L	d		Q=0.5°	Q=1°	Q=2°	Q=3°							
PM-2BC05-R0.25-M03	0.5	0.25	0.5°	0.5	3	1.5	7.8°	0.49	50	4	2	3.3	3.5	3.9	4.4	○						
PM-2BC05-R0.25-M05					5		6.8°	0.53			2	5.3	5.6	6.2	7.1	○						
PM-2BC10-R0.25-M03			1.0°		3		7.8°	0.52			2	-	3.4	3.8	4.3	○						
PM-2BC10-R0.25-M05					5		6.9°	0.59			2	-	5.4	6.0	6.8	○						
PM-2BC15-R0.25-M03			1.5°		3		7.9°	0.54			2	-	-	3.7	4.1	○						
PM-2BC15-R0.25-M05					5		7.0°	0.65			2	-	-	5.8	6.6	○						
PM-2BC05-R0.30-M05	0.6	0.30	0.5°	0.6	5	1.6	6.8°	0.62	50	4	2	5.3	5.6	6.2	7.1	○						
PM-2BC05-R0.30-M08					8		5.7°	0.68			2	8.3	8.7	9.8	11.1	○						
PM-2BC10-R0.30-M05			1.0°		5		6.8°	0.68			2	-	5.4	6.0	6.8	○						
PM-2BC10-R0.30-M08					8		5.8°	0.79			2	-	8.4	9.4	10.7	○						
PM-2BC10-R0.30-M10			1.2°		10		5.2°	0.86			2	-	10.4	11.6	13.2	○						
PM-2BC10-R0.30-M12					12		4.8°	0.93			2	-	12.4	13.9	15.8	○						
PM-2BC10-R0.30-M15			1.5°		15		4.2°	1.03			2	-	15.4	17.2	19.6	○						
PM-2BC15-R0.30-M05					5		6.9°	0.74			2	-	-	5.8	6.6	○						
PM-2BC15-R0.30-M08			1.5°		8		5.9°	0.90			2	-	-	9.0	10.2	○						
PM-2BC05-R0.40-M08					0.8		0.40	0.5°			0.8	8	1.8	5.5°	0.87	50	4	2	8.3	8.7	9.8	11.1
PM-2BC05-R0.40-M12			12									4.5°		0.94	60	2		12.3	13.0	14.5	16.5	○
PM-2BC10-R0.40-M08			1.0°					8				5.6°		0.98	50	2		-	8.4	9.4	10.7	○
PM-2BC10-R0.40-M12	12	4.6°		1.12		60		2	-	12.4		13.9		15.8	○							
PM-2BC15-R0.40-M08	1.5°	8	5.8°	1.09		50		2	-	-		9.0		10.2	○							
PM-2BC15-R0.40-M12		12	4.8°	1.30		60		2	-	-		13.2		15.0	○							

B

Solid Carbide end mills
Vollhartmetallschaftfräser

Material Overview · Material Übersicht

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

KMG405

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 wärmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✓	✓	✓	✓	✓	✓	✓	✓			✓	✓

Code key B231
ISO Kennzeichen

Cutting data B415-430
Schnittdaten

Graphics identification & application B232
Graphische Werkzeug- & Anwendungsbeschr.

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

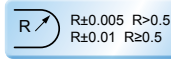
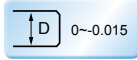
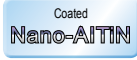
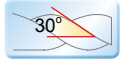
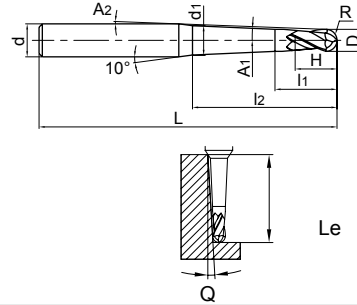
Milling · Fräsen

Solid Carbide end mills · Vollhartmetallschaftfräser

2-flute conical neck ball nose end mills 2-Schneiden Mikro Kugelkopffräser mit konischem Hals



PM-2BC



B

Solid Carbide end mills
Vollhartmetallschaftfräser

Type Typ	Dimension(mm) Abmessungen											Teeth Zähne Z	Q $\hat{=}$ Le				Grade Sorte KMG 405					
	D	R	A ₁	H	l ₂	l ₁	A ₂	d ₁	L	d	0.5°		1°	2°	3°							
PM-2BC05-R0.50-M10	1.0	0.50	0.5°	1.0	10	2.5	6.1°	1.08	60	6	2	10.4	10.9	12.2	13.9	○						
PM-2BC05-R0.50-M15					15		5.1°	1.16	60		2	15.4	16.2	18.2	20.7	○						
PM-2BC05-R0.50-M20					20		4.4°	1.25	70		2	20.4	21.5	24.1	27.4	○						
PM-2BC05-R0.50-M25					25		3.8°	1.34	70		2	25.4	26.8	30.0	34.2	○						
PM-2BC05-R0.50-M30					30		3.4°	1.42	70		2	30.4	32.0	35.9	41.0	○						
PM-2BC10-R0.50-M10					1.0°		10	6.2°	1.21		60	2	-	10.5	11.8	13.4	○					
PM-2BC10-R0.50-M15							15	5.2°	1.38		60	2	-	15.5	17.4	19.8	○					
PM-2BC10-R0.50-M20							20	4.5°	1.56		70	2	-	20.5	23.0	26.2	○					
PM-2BC10-R0.50-M25							25	3.9°	1.73		70	2	-	25.5	28.6	32.6	○					
PM-2BC10-R0.50-M30							30	3.5°	1.91		70	2	-	30.5	34.2	39.0	○					
PM-2BC10-R0.50-M35			35				3.2°	2.08	80		2	-	35.5	39.8	45.4	○						
PM-2BC15-R0.50-M10			1.5°				10	6.3°	1.34		60	2	-	-	11.3	12.8	○					
PM-2BC15-R0.50-M15							15	5.3°	1.60		60	2	-	-	16.6	18.9	○					
PM-2BC15-R0.50-M20							20	4.6°	1.86		70	2	-	-	21.9	24.9	○					
PM-2BC20-R0.50-M15							2°	15	5.4°		1.82	60	2	-	-	15.8	18.0	○				
PM-2BC20-R0.50-M20					20			4.7°	2.17		70	2	-	-	20.8	23.7	○					
PM-2BC30-R0.50-M20					3°		20	5.0°	2.78		70	2	-	-	-	21.2	○					
PM-2BC50-R0.50-M20					5°		20	5.7°	4.01		70	2	-	-	-	-	○					
PM-2BC05-R0.60-M12					1.2		0.60	0.5°	1.2		12	2.7	5.6°	1.31	60	6	2	12.4	13.1	14.6	16.6	○
PM-2BC05-R0.60-M24											24		3.8°	1.52	70		2	24.4	25.7	28.8	32.8	○
PM-2BC10-R0.60-M12	1.0°	12		5.7°		1.47		60		2	-		12.5	14.0	15.9		○					
PM-2BC10-R0.60-M24		24	3.9°	1.89		70		2		-	24.5		27.5	31.3	○							
PM-2BC15-R0.60-M12	1.5°	12	5.8°	1.63		60		2		-	-		13.4	15.2	○							
PM-2BC15-R0.60-M24		24	4.1°	2.26		70		2		-	-		26.2	29.8	○							

Material Overview · Material Übersicht

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

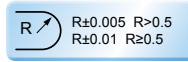
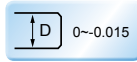
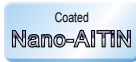
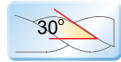
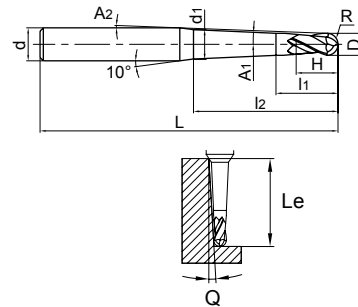
KMG405	Workpiece material Werkstückstoff											
	Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
			~40HRC	~50HRC	~55HRC	~68HRC						
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

2-flute conical neck ball nose end mills 2-Schneiden Mikro Kugelkopffräser mit konischem Hals



PM-2BC



Type Typ	Dimension(mm) Abmessungen										Teeth Zähne Z	Q Le				Grade Sorte KMG 405	
	D	R	A1	H	l2	l1	A2	d1	L	d		0.5°	1°	2°	3°		
PM-2BC05-R0.75-M10	1.5	0.75	0.5°	1.5	10	3	5.9°	1.57	60	6	2	10.4	10.9	12.2	13.8	○	
PM-2BC05-R0.75-M15					15		4.9°	1.65			60	2	15.4	16.2	18.1	20.6	○
PM-2BC05-R0.75-M30					30		3.2°	1.92			70	2	30.4	32.0	35.9	40.9	○
PM-2BC10-R0.75-M10	1.5	0.75	1.0°	1.5	10	3	6.0°	1.69	60	6	2	-	10.5	11.8	13.3	○	
PM-2BC10-R0.75-M15					15		5.0°	1.86			60	2	-	15.5	17.4	19.7	○
PM-2BC10-R0.75-M20					20		4.2°	2.04			70	2	-	20.5	23.0	26.1	○
PM-2BC10-R0.75-M30	1.5	0.75	1.0°	1.5	30	3	3.3°	2.39	70	6	2	-	30.5	34.2	39.0	○	
PM-2BC15-R0.75-M10					10		6.1°	1.81			60	2	-	-	11.3	12.8	○
PM-2BC15-R0.75-M15					15		5.1°	2.07			60	2	-	-	16.6	18.9	○
PM-2BC15-R0.75-M30	1.5	0.75	1.5°	1.5	30	3	3.4°	2.86	70	6	2	-	-	32.5	37.0	○	
PM-2BC05-R1.0-M20					20		3.9°	2.18			60	2	20.7	21.7	24.3	27.6	○
PM-2BC05-R1.0-M30					30		2.9°	2.36			70	2	30.7	32.3	36.2	no interference	○
PM-2BC05-R1.0-M40	2.0	1.0	0.5°	2.0	40	4	2.4°	2.53	80	6	2	40.7	42.8	48.0	no interference	○	
PM-2BC10-R1.0-M20					20		4.0°	2.46			60	2	-	20.8	23.3	26.4	○
PM-2BC10-R1.0-M25					25		3.4°	2.64			60	2	-	25.8	28.9	32.9	○
PM-2BC10-R1.0-M30	2.0	1.0	1.0°	2.0	30	4	3.0°	2.81	70	6	2	-	30.8	34.5	39.3	○	
PM-2BC10-R1.0-M35					35		2.7°	2.99			80	2	-	35.8	40.1	no interference	○
PM-2BC10-R1.0-M40					40		2.5°	3.16			80	2	-	40.8	45.8	no interference	○
PM-2BC10-R1.0-M50	2.0	1.0	1.5°	2.0	50	4	2.1°	3.51	90	6	2	-	50.8	57.0	no interference	○	
PM-2BC15-R1.0-M20					20		4.1°	2.74			60	2	-	-	22.3	25.3	○
PM-2BC15-R1.0-M30					30		3.1°	3.27			70	2	-	-	32.9	37.4	○
PM-2BC15-R1.0-M40	2.0	1.0	2°	2	40	4	2.6°	3.79	80	6	2	-	-	43.5	no interference	○	
PM-2BC20-R1.0-M30					30		3.3°	3.72			70	2	-	-	31.3	35.5	○
PM-2BC20-R1.0-M40					40		2.7°	4.42			80	2	-	-	41.3	no interference	○
PM-2BC30-R1.0-M30	2.0	1.0	3°	2	30	4	3.5°	4.63	70	6	2	-	-	-	31.8	○	
PM-2BC30-R1.0-M40					40		2.9°	5.68			80	2	-	-	-	no interference	○

✓ = Very suitable · Sehr empfohlen
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Material Overview · Material Übersicht

KMG405

		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	~55HRC	~68HRC						
✓	✓	✓	✓	✓	✓	✓	✓			✓	✓

Code key B231
ISO Kennzeichen

Cutting data B415-430
Schnittdaten

Graphics identification & application B232
Graphische Werkzeug- & Anwendungsbeschr.

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

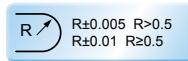
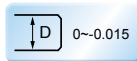
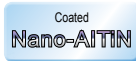
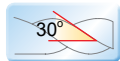
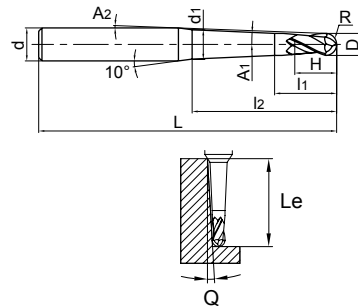
Milling · Fräsen

Solid Carbide end mills · Vollhartmetallschaftfräser

2-flute conical neck ball nose end mills 2-Schneiden Mikro Kugelkopffräser mit konischem Hals



PM-2BC



Type Typ	Dimension (mm) Abmessungen										Teeth Zähne Z	Q = Le				Grade Sorte KMG 405
	D	R	A1	H	l2	l1	A2	d1	L	d		0.5°	1°	2°	3°	
PM-2BC05-R1.5-M30	3.0	1.5	0.5°	3	30	6	2.4°	3.32	70	6	2	30.7	32.3	36.2	no interference	○
PM-2BC05-R1.5-M40					40		1.9°	3.50	80		2	40.7	42.9	no interference	no interference	○
PM-2BC05-R1.5-M50					50		1.6°	3.67	90		2	50.7	53.4	no interference	no interference	○
PM-2BC10-R1.5-M30			1.0°		30		2.5°	3.74	70		2	-	31.0	34.7	no interference	○
PM-2BC10-R1.5-M40					40		2.0°	4.09	80		2	-	41.0	45.9	no interference	○
PM-2BC10-R1.5-M50					50		1.7°	4.44	90		2	-	51.0	no interference	no interference	○
PM-2BC15-R1.5-M30			1.5°		30		2.6°	4.16	70		2	-	-	33.1	no interference	○
PM-2BC15-R1.5-M40					40		2.1°	4.69	80		2	-	-	43.8	no interference	○
PM-2BC15-R1.5-M50					50		1.7°	5.21	90		2	-	-	no interference	no interference	○
PM-2BC05-R2.0-M60			4.0		2.0		0.5°	4	60		7	1.0°	4.83	110	6	2
PM-2BC10-R2.0-M60	1.0°	60		1.0°		5.76	110	2	-	61.1		no interference	no interference	○		

B

Solid Carbide end mills
Vollhartmetallschaftfräser

Material Overview · Material Übersicht

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

KMG405	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 wärmefeste Leg
			~40HRC	~50HRC	~55HRC	~68HRC						
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

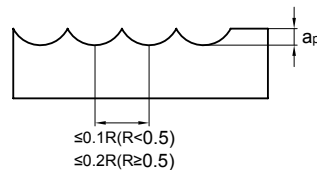
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Recommended cutting data · Empfohlene Schnittdaten

PM-2BC

Workpiece material Werkstückmaterial			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC			Hardened steel Gehärteter Stahl ~55HRC		
Diameter Ø Durchmesser (mm)	A ₁	L ₂	Rotating Drehzahl (min ⁻¹)	Feed Vorschub (mm/min)	a _p (mm)	Rotating Drehzahl (min ⁻¹)	Feed Vorschub (mm/min)	a _p (mm)	Rotating Drehzahl (min ⁻¹)	Feed Vorschub (mm/min)	a _p (mm)
R0.25	0.5°	3	30000	300	0.03	30000	270	0.03	30000	240	0.03
		5	30000	250	0.02	30000	225	0.02	30000	200	0.02
	1.0°	3	30000	330	0.03	30000	300	0.03	30000	265	0.03
		5	30000	270	0.02	30000	245	0.02	30000	215	0.02
	1.5°	3	30000	350	0.03	30000	315	0.03	30000	280	0.03
		5	30000	300	0.02	30000	270	0.02	30000	240	0.02
R0.30	0.5°	5	30000	300	0.03	30000	270	0.03	30000	240	0.03
		8	30000	250	0.02	30000	225	0.02	30000	200	0.02
	1.0°	5	30000	350	0.03	30000	315	0.03	30000	280	0.03
		8	30000	300	0.02	30000	270	0.02	30000	240	0.02
		10	30000	270	0.02	30000	245	0.02	30000	215	0.02
		12	30000	250	0.015	30000	225	0.015	30000	200	0.015
	1.5°	15	30000	250	0.01	30000	225	0.01	30000	200	0.01
		8	30000	350	0.03	30000	315	0.03	30000	280	0.03
R0.40	0.5°	8	30000	350	0.05	30000	315	0.05	30000	280	0.05
		12	30000	300	0.04	30000	270	0.04	30000	240	0.04
	1.0°	8	30000	400	0.05	30000	360	0.05	30000	320	0.05
		12	30000	350	0.04	30000	315	0.04	30000	280	0.04
	1.5°	8	30000	450	0.05	30000	405	0.05	30000	360	0.05
		12	30000	400	0.04	30000	360	0.04	30000	320	0.04
R0.50	0.5°	10	22000	450	0.05	22000	405	0.05	22000	360	0.05
		15	22000	400	0.04	22000	360	0.04	22000	320	0.04
		20	22000	370	0.03	22000	335	0.03	22000	295	0.03
		25	22000	350	0.01	22000	315	0.01	22000	280	0.01
	1.0°	30	22000	320	0.005	22000	290	0.005	22000	255	0.005
		10	22000	500	0.05	22000	450	0.05	22000	400	0.05
		15	22000	450	0.04	22000	405	0.04	22000	360	0.04
		20	22000	430	0.02	22000	390	0.02	22000	345	0.02
		25	22000	400	0.015	22000	360	0.015	22000	320	0.015
		30	22000	360	0.01	22000	325	0.01	22000	290	0.01
		35	22000	320	0.005	22000	290	0.005	22000	255	0.005

Max. cutting depth
max Schnitttiefe



Recommended cutting data - Empfohlene Schnittdaten

PM-2BC

Workpiece material Werkstück-material			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC			Hardened steel Gehärteter Stahl ~55HRC		
Diameter Ø Durchmesser (mm)	A1	L2	Rotating Drehzahl (min ⁻¹)	Feed Vorschub (mm/min)	a _p (mm)	Rotating Drehzahl (min ⁻¹)	Feed Vorschub (mm/min)	a _p (mm)	Rotating Drehzahl (min ⁻¹)	Feed Vorschub (mm/min)	a _p (mm)
R1.0	1.5°	20	18000	1000	0.05	18000	900	0.05	18000	800	0.05
		30	18000	900	0.03	18000	810	0.03	18000	720	0.03
		40	18000	750	0.03	18000	675	0.03	18000	600	0.03
	2°	30	18000	900	0.04	18000	810	0.04	18000	720	0.04
		40	18000	850	0.03	18000	765	0.03	18000	680	0.03
	3°	30	18000	1000	0.04	18000	900	0.04	18000	800	0.04
40		18000	900	0.03	18000	810	0.03	18000	720	0.03	
R1.5	0.5°	30	16000	1100	0.1	16000	990	0.1	16000	880	0.1
		40	16000	950	0.06	16000	855	0.06	16000	760	0.06
		50	16000	800	0.03	16000	720	0.03	16000	640	0.03
	1.0°	30	16000	1200	0.1	16000	1080	0.1	16000	960	0.1
		40	16000	1000	0.06	16000	900	0.06	16000	800	0.06
		50	16000	850	0.03	16000	765	0.03	16000	680	0.03
R1.5	1.5°	30	16000	1300	0.1	16000	1170	0.1	16000	1040	0.1
		40	16000	1100	0.06	16000	990	0.06	16000	880	0.06
		50	16000	950	0.03	16000	855	0.03	16000	760	0.03
R2.0	0.5°	60	14000	1100	0.1	14000	990	0.1	14000	880	0.1
	1.0°	60	14000	1100	0.1	14000	990	0.1	14000	880	0.1

Max. cutting depth
max Schnitttiefe

$\le 0.1R (R < 0.5)$
 $\le 0.2R (R \ge 0.5)$

1. Please select high precise machine and tool holder. If vibration and unusual noise occurs please reduce the a_p and check the stability of machine and clamping system.
2. Please use air blow or MQL (minimum oil mist cooling).
3. Please reduce the feed rate when rotating speed is low.
4. The above table shows parameter for ideal condition. Please check your system and adapt the parameter.

1. Bitte präzise Maschinen und Werkzeughalter verwenden. Bei Vibrationen oder ungewöhnlichen Geräuschen reduzieren Sie a_p.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Bitte Vorschub entsprechend reduzieren, wenn die Drehzahlen niedrig ist.
4. Die Angaben in der Tabelle beziehen sich auf ideale Bearbeitungsbedingungen. Bitte Ihr System überprüfung und die Werte gegebenenfalls anpassen.