HPC Endmills
HPC Fräser

High Performance Solide Carbide Endmills
Hochleistungs-VHM-Fräser

ZCC Cutting Tools Europe GmbH

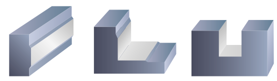
your Partner your Value

HPC Endmills / HPC Fräser

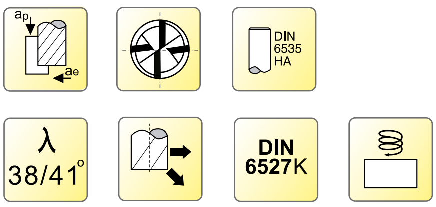
- Unique geometry design with 38°/41° helix angle in optimal combination of top grade, KMG 405.
- Suitable for roughing and finishing of steel, alloy steel and stainless steel, heat resistance super alloy.
- Effective milling with higher feed rate and bigger cutting depth.
- Quiet machining without vibration.
- Long tool life and good surface finishing.

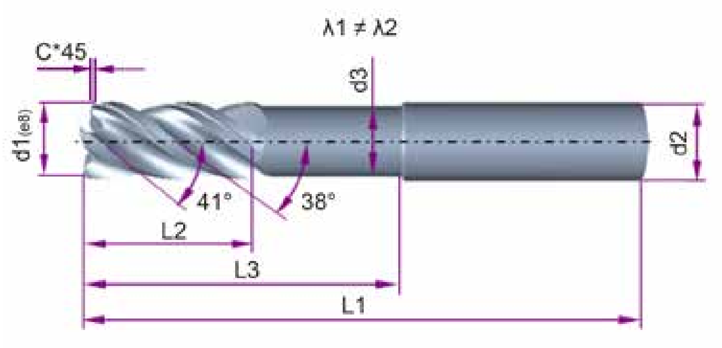
- Einzigartige Geometrie mit ungleichem Spiralwinkel (38°/41°), in Kombination mit der Hochleistungssorte KMG 405.
- Geeignet zur Schrupp- und Schlichtbearbeitung von Stahl, legiertem Stahl, rostfreiem Stahl, und warmfesten Superlegierungen.
- Effektive Fräsbearbeitung mit höheren Vorschüben und größeren Schnitttiefen.
- Ruhige Bearbeitung ohne Vibrationen.
- Höhere Standzeit und bessere Oberflächenqualität.

5501R38414GM



4-flute end mills
4-Schneiden VHM Schaftfräser





Type Typ	Dimension(mm) Abmessungen							Teeth Zähne	Application Anwendung Grade Sorte	P M K S KMG 405
	d1(e8)	d2(h6)	L1	L2	d3	L3	C*45°	Z		
5501R38414GM-0400	4	6	54	8	3.70	16	0.01-0.06	4		●
5501R38414GM-0500	5	6	54	9	4.70	17	0.01-0.06	4		●
5501R38414GM-0600	6	6	54	10	5.70	18	0.06-0.10	4		●
5501R38414GM-0800	8	8	58	12	7.70	22	0.06-0.10	4		●
5501R38414GM-1000	10	10	66	14	9.50	26	0.06-0.10	4		●
5501R38414GM-1200	12	12	73	16	11.50	28	0.10-0.15	4		●
5501R38414GM-1400	14	14	75	18	13.50	30	0.10-0.15	4		●
5501R38414GM-1600	16	16	82	22	15.50	34	0.10-0.15	4		●
5501R38414GM-1800	18	18	84	24	17.50	36	0.10-0.15	4		●
5501R38414GM-2000	20	20	92	26	19.50	42	0.15-0.20	4		●

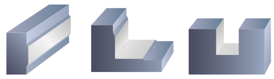
● ex stock / ab Lager ○ on demand / auf Anfrage

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

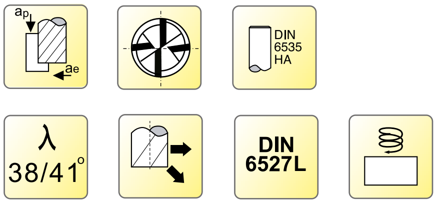
Material Overview · Material Übersicht

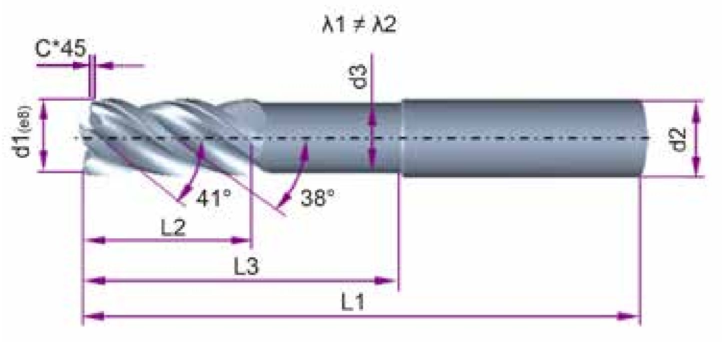
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff. Stahl	Alloy steel Legierter Stahl	Hardened steel Gehärteter Stahl				Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum alloy Alu. Leg.	Titanium alloy Titan Leg.	Heat resist.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

5502R38414GM



4-flute end mills
4-Schneiden VHM Schaftfräser





Type · Typ	Dimension(mm) Abmessungen							Teeth Zähne	Applicaion Anwendung	P M K S
	d1(e8)	d2(h6)	L1	L2	d3	L3	C*45°	Z	Grade Sorte	KMG 405
5502R38414GM-0400	4	6	57	11	3.70	19	0.01-0.06	4		●
5502R38414GM-0500	5	6	57	13	4.70	21	0.01-0.06	4		●
5502R38414GM-0600	6	6	57	13	5.70	21	0.06-0.10	4		●
5502R38414GM-0800	8	8	63	19	7.70	27	0.06-0.10	4		●
5502R38414GM-1000	10	10	72	22	9.50	32	0.06-0.10	4		●
5502R38414GM-1200	12	12	83	26	11.50	38	0.10-0.15	4		●
5502R38414GM-1400	14	14	83	26	13.50	38	0.10-0.15	4		●
5502R38414GM-1600	16	16	92	32	15.50	44	0.10-0.15	4		●
5502R38414GM-1800	18	18	92	32	17.50	44	0.10-0.15	4		●
5502R38414GM-2000	20	20	104	38	19.50	54	0.15-0.20	4		●

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Workpiece material Werkstückstoff											
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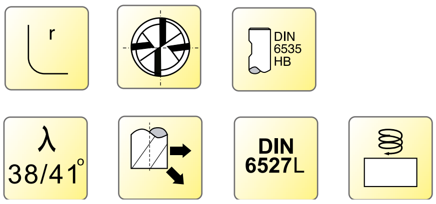
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✓			✔	✔			✓	✓

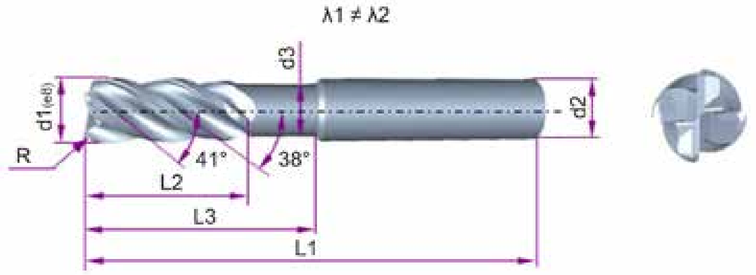
Solid Carbide end mills
Vollhartmetallschaftfräser

KMG405

5502R38414GM-R

4-flute end mills with radius
4-Schneiden VHM Schaftfräser mit Radius





Type · Typ	Dimension(mm) Abmessungen							Teeth Zähne	Application Anwendung	P M K S
	d1(e8)	R±0.01	d2(h6)	L1	L2	d3	L3	Z	Grade Sorte	KMG 405
5502R38414GM-R02-0400	4	0.2	6	57	11	3.70	19	4		●
5502R38414GM-R05-0400	4	0.5	6	57	11	3.70	19	4		●
5502R38414GM-R02-0500	5	0.2	6	57	13	4.70	21	4		●
5502R38414GM-R05-0500	5	0.5	6	57	13	4.70	21	4		●
5502R38414GM-R02-0600	6	0.2	6	57	13	5.70	21	4		●
5502R38414GM-R05-0600	6	0.5	6	57	13	5.70	21	4		●
5502R38414GM-R10-0600	6	1.0	6	57	13	5.70	21	4		●
5502R38414GM-R02-0800	8	0.2	8	63	19	7.70	27	4		●
5502R38414GM-R05-0800	8	0.5	8	63	19	7.70	27	4		●
5502R38414GM-R10-0800	8	1.0	8	63	19	7.70	27	4		●
5502R38414GM-R15-0800	8	1.5	8	63	19	7.70	27	4		●
5502R38414GM-R20-0800	8	2.0	8	63	19	7.70	27	4		●
5502R38414GM-R02-1000	10	0.2	10	72	22	9.50	32	4		●
5502R38414GM-R05-1000	10	0.5	10	72	22	9.50	32	4		●
5502R38414GM-R10-1000	10	1.0	10	72	22	9.50	32	4		●
5502R38414GM-R15-1000	10	1.5	10	72	22	9.50	32	4		●
5502R38414GM-R20-1000	10	2.0	10	72	22	9.50	32	4		●
5502R38414GM-R05-1200	12	0.5	12	83	26	11.50	38	4		●
5502R38414GM-R10-1200	12	1.0	12	83	26	11.50	38	4		●
5502R38414GM-R15-1200	12	1.5	12	83	26	11.50	38	4		●
5502R38414GM-R20-1200	12	2.0	12	83	26	11.50	38	4		●
5502R38414GM-R10-1600	16	1.0	16	92	32	15.50	44	4		●
5502R38414GM-R15-1600	16	1.5	16	92	32	15.50	44	4		●
5502R38414GM-R20-1600	16	2.0	16	92	32	15.50	44	4		●
5502R38414GM-R30-1600	16	3.0	16	92	32	15.50	44	4		●
5502R38414GM-R10-2000	20	1.0	20	104	38	19.50	54	4		●
5502R38414GM-R15-2000	20	1.5	20	104	38	19.50	54	4		●
5502R38414GM-R20-2000	20	2.0	20	104	38	19.50	54	4		●
5502R38414GM-R30-2000	20	3.0	20	104	38	19.50	54	4		●

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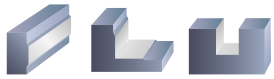
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff. Stahl	Alloy steel Legierter Stahl	Hardened steel Gehärteter Stahl				Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum alloy Alu. Leg.	Titanium alloy Titan Leg.	Heat resist.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

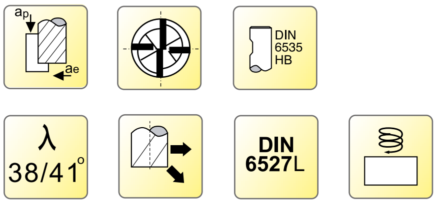
Solid Carbide end mills
Vollhartmetallschaftfräser

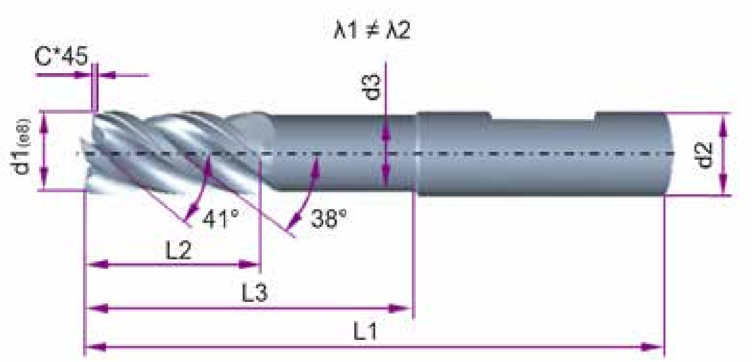
KMG405



5602R38414GM

4-flute end mills
4-Schneiden VHM Schaftfräser





Type · Typ	Dimension(mm) Abmessungen							Teeth Zähne	Application Anwendung	P M K S
	d1(e8)	d2(h6)	L1	L2	d3	L3	C*45°	Z	Grade Sorte	KMG 405
5602R38414GM-0400	4	6	57	11	3.70	19	0.01-0.06	4		●
5602R38414GM-0500	5	6	57	13	4.70	21	0.01-0.06	4		●
5602R38414GM-0600	6	6	57	13	5.70	21	0.06-0.10	4		●
5602R38414GM-0800	8	8	63	19	7.70	27	0.06-0.10	4		●
5602R38414GM-1000	10	10	72	22	9.50	32	0.06-0.10	4		●
5602R38414GM-1200	12	12	83	26	11.50	38	0.10-0.15	4		●
5602R38414GM-1400	14	14	83	26	13.50	38	0.10-0.15	4		●
5602R38414GM-1600	16	16	92	32	15.50	44	0.10-0.15	4		●
5602R38414GM-1800	18	18	92	32	17.50	44	0.10-0.15	4		●
5602R38414GM-2000	20	20	104	38	19.50	54	0.15-0.20	4		●

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KMG405

Workpiece material Werkstückstoff											
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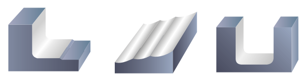
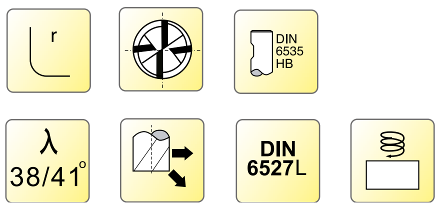
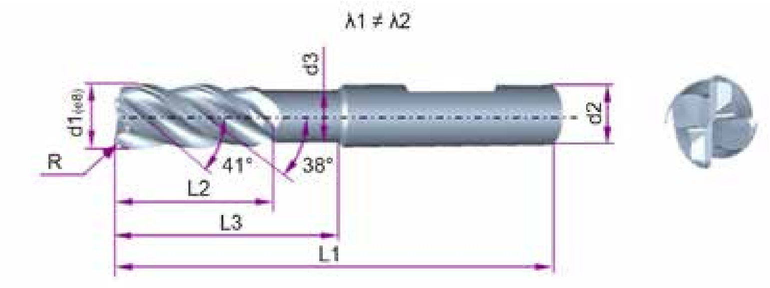
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✓			✔	✔			✓	✓

5602R38414GM-R



4-flute end mills with radius
4-Schneiden VHM Schaftfräser mit Radius





Type Typ	Dimension(mm) Abmessungen							Teeth Zähne	Application Anwendung	P M K S
	d1(e8)	R±0.01	d2(h6)	L1	L2	d3	L3	Z	Grade Sorte	KMG 405
5602R38414GM-R02-0400	4	0.2	6	57	11	3.70	19	4		●
5602R38414GM-R05-0400	4	0.5	6	57	11	3.70	19	4		●
5602R38414GM-R02-0500	5	0.2	6	57	13	4.70	21	4		●
5602R38414GM-R05-0500	5	0.5	6	57	13	4.70	21	4		●
5602R38414GM-R02-0600	6	0.2	6	57	13	5.70	21	4		●
5602R38414GM-R05-0600	6	0.5	6	57	13	5.70	21	4		●
5602R38414GM-R10-0600	6	1.0	6	57	13	5.70	21	4		●
5602R38414GM-R02-0800	8	0.2	8	63	19	7.70	27	4		●
5602R38414GM-R05-0800	8	0.5	8	63	19	7.70	27	4		●
5602R38414GM-R10-0800	8	1.0	8	63	19	7.70	27	4		●
5602R38414GM-R15-0800	8	1.5	8	63	19	7.70	27	4		●
5602R38414GM-R20-0800	8	2.0	8	63	19	7.70	27	4		●
5602R38414GM-R02-1000	10	0.2	10	72	22	9.50	32	4		●
5602R38414GM-R05-1000	10	0.5	10	72	22	9.50	32	4		●
5602R38414GM-R10-1000	10	1.0	10	72	22	9.50	32	4		●
5602R38414GM-R15-1000	10	1.5	10	72	22	9.50	32	4		●
5602R38414GM-R20-1000	10	2.0	10	72	22	9.50	32	4		●
5602R38414GM-R05-1200	12	0.5	12	83	26	11.50	38	4		●
5602R38414GM-R10-1200	12	1.0	12	83	26	11.50	38	4		●
5602R38414GM-R15-1200	12	1.5	12	83	26	11.50	38	4		●
5602R38414GM-R20-1200	12	2.0	12	83	26	11.50	38	4		●
5602R38414GM-R10-1600	16	1.0	16	92	32	15.50	44	4		●
5602R38414GM-R15-1600	16	1.5	16	92	32	15.50	44	4		●
5602R38414GM-R20-1600	16	2.0	16	92	32	15.50	44	4		●
5602R38414GM-R30-1600	16	3.0	16	92	32	15.50	44	4		●
5602R38414GM-R10-2000	20	1.0	20	104	38	19.50	54	4		●
5602R38414GM-R15-2000	20	1.5	20	104	38	19.50	54	4		●
5602R38414GM-R20-2000	20	2.0	20	104	38	19.50	54	4		●
5602R38414GM-R30-2000	20	3.0	20	104	38	19.50	54	4		●

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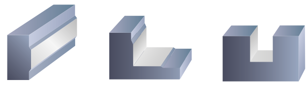
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✓			✔	✔			✓	✓

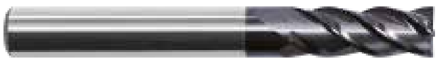
Solid Carbide end mills
Vollhartmetallschaftfräser

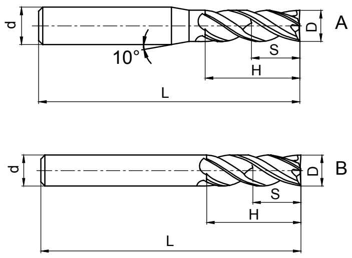
KMG405

4-flute flattened end mills with straight shank
4-Schneiden Eckfräser mit Zylinderschaft



UM-4E





38°,41°

Coated AlTiN

D≤6 -0.020~-0.038 6<D≤10 -0.025~-0.047
10<D≤18 -0.032~-0.059 18<D -0.04~-0.073

Type Typ	Dimension(mm) Abmessungen					Teeth Zähne Z	Geometry Ausführung	Stock Lager
	D	d	H	S	L			
UM-4E-D4.0S	4.0	4	11	6.00	50	4	B	●
UM-4E-D4.0	4.0	6	11	6.00	50	4	A	●
UM-4E-D4.5	4.5	6	11	6.75	50	4	A	●
UM-4E-D5.0	5.0	6	13	7.50	50	4	A	●
UM-4E-D5.5	5.5	6	16	8.25	50	4	A	●
UM-4E-D6.0	6.0	6	16	9.00	50	4	B	●
UM-4E-D7.0	7.0	8	20	10.5	60	4	A	●
UM-4E-D8.0	8.0	8	20	12.0	60	4	B	●
UM-4E-D9.0	9.0	10	22	13.5	75	4	A	●
UM-4E-D10.0	10.0	10	25	15.0	75	4	B	●
UM-4E-D11.0	11.0	12	26	16.5	75	4	A	●
UM-4E-D12.0	12.0	12	30	18.0	75	4	B	●
UM-4E-D14.0	14.0	14	32	21.0	75	4	B	●
UM-4E-D16.0	16.0	16	45	24.0	100	4	B	●
UM-4E-D18.0	18.0	18	45	27.0	100	4	B	●
UM-4E-D20.0	20.0	20	45	30.0	100	4	B	●

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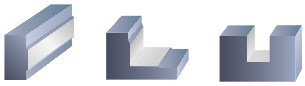
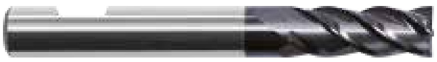
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy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

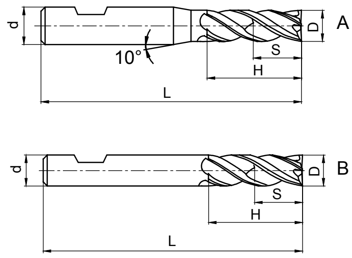
Solid Carbide end mills
Vollhartmetallschaftfräser

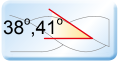
4-flute flattened end mills with weldon shank
4-Schneiden Eckfräser mit Weldonschaft



UM-4E-W







Coated AlTiN

D: D≤6 -0.020~-0.038 6<D≤10 -0.025~-0.047 10<D≤18 -0.032~-0.059 18<D -0.04~-0.073

Type Typ	Dimension(mm) Abmessungen					Teeth Zähne Z	Geometry Ausführung	Stock Lager
	D	d	H	S	L			
UM-4E-D4.0-W	4.0	6	11	6.00	50	4	A	●
UM-4E-D4.5-W	4.5	6	11	6.75	50	4	A	●
UM-4E-D5.0-W	5.0	6	13	7.50	50	4	A	●
UM-4E-D5.5-W	5.5	6	16	8.25	50	4	A	●
UM-4E-D6.0-W	6.0	6	16	9.00	50	4	B	●
UM-4E-D7.0-W	7.0	8	20	10.5	60	4	A	●
UM-4E-D8.0-W	8.0	8	20	12.0	60	4	B	●
UM-4E-D9.0-W	9.0	10	22	13.5	75	4	A	●
UM-4E-D10.0-W	10.0	10	25	15.0	75	4	B	●
UM-4E-D11.0-W	11.0	12	26	16.5	75	4	A	●
UM-4E-D12.0-W	12.0	12	30	18.0	75	4	B	●
UM-4E-D14.0-W	14.0	14	32	21.0	75	4	B	●
UM-4E-D16.0-W	16.0	16	45	24.0	100	4	B	●
UM-4E-D18.0-W	18.0	18	45	27.0	100	4	B	●
UM-4E-D20.0-W	20.0	20	45	30.0	100	4	B	●

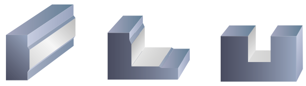
● ex stock / ab Lager ○ on demand /auf Anfrage

Material Overview · Material Übersicht

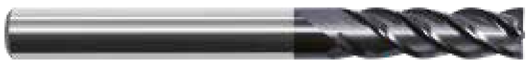
✔ = Very suitable · Sehr empfohlen
✓ = Suitable · Empfohlen

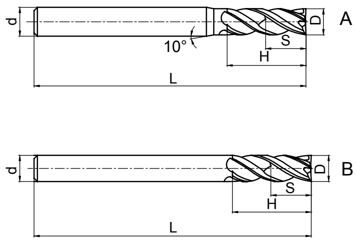
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy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

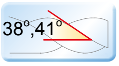
4-flute flattened end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft



UM-4EL







Coated AlTiN

D D≤6 -0.020~-0.038 6<D≤10 -0.025~-0.047 10<D≤18 -0.032~-0.059 18<D -0.04~-0.073

Type Typ	Dimension(mm) Abmessungen					Teeth Zähne Z	Geometry Ausführung	Stock Lager
	D	d	H	S	L			
UM-4EL-D4.0	4.0	6	15	6.00	75	4	A	●
UM-4EL-D5.0	5.0	6	20	7.50	75	4	A	●
UM-4EL-D6.0	6.0	6	20	9.00	75	4	B	●
UM-4EL-D8.0	8.0	8	25	12.0	100	4	B	●
UM-4EL-D10.0	10.0	10	30	15.0	100	4	B	●
UM-4EL-D12.0	12.0	12	35	18.0	100	4	B	●
UM-4EL-D14.0	14.0	14	40	21.0	100	4	B	●
UM-4EL-D16.0	16.0	16	50	24.0	150	4	B	●
UM-4EL-D20.0	20.0	20	55	30.0	150	4	B	●

● ex stock / ab Lager ○ on demand /auf Anfrage

Material Overview · Material Übersicht

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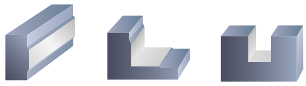
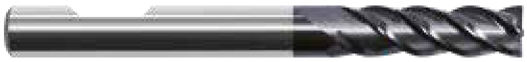
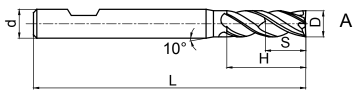
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy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

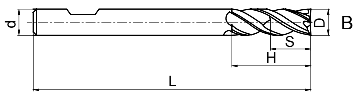
4-flute flattened end mills with weldon shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Weldonschaft



UM-4EL-W







38°,41° | Coated AlTiN | D D≤6 -0.020~-0.038 6<D≤10 -0.025~-0.047 10<D≤18 -0.032~-0.059 18<D -0.04~-0.073

Type Typ	Dimension(mm) Abmessungen					Teeth Zähne Z	Geometry Ausführung	Stock Lager
	D	d	H	S	L			
UM-4EL-D4.0-W	4.0	6	15	6.00	75	4	A	○
UM-4EL-D5.0-W	5.0	6	20	7.50	75	4	A	○
UM-4EL-D6.0-W	6.0	6	20	9.00	75	4	B	○
UM-4EL-D8.0-W	8.0	8	25	12.0	100	4	B	○
UM-4EL-D10.0-W	10.0	10	30	15.0	100	4	B	○
UM-4EL-D12.0-W	12.0	12	35	18.0	100	4	B	○
UM-4EL-D14.0-W	14.0	14	40	21.0	100	4	B	○
UM-4EL-D16.0-W	16.0	16	50	24.0	150	4	B	○
UM-4EL-D20.0-W	20.0	20	55	30.0	150	4	B	●

● ex stock / ab Lager ○ on demand /auf Anfrage

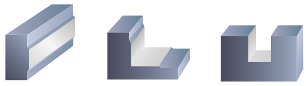
Solid Carbide end mills
Vollhartmetallschaftfräser

Material Overview · Material Übersicht

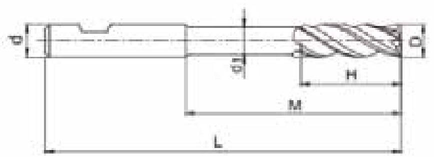
✔ = Very suitable · Sehr empfohlen
✓ = Suitable · Empfohlen

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						
✔	✔	✔	✔	✔		✓	✔			✓	✓

4-flute flattened end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft



UM-4ELP-W



38°,41°

Coated AlTiN

D≤6 -0.020~-0.038 6<D≤10 -0.025~-0.047
10<D≤18 -0.032~-0.059 18<D -0.04~-0.073

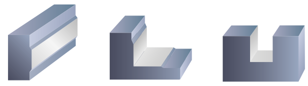
Type Typ	Dimension(mm) Abmessungen						Teeth Zähne Z	Stock Lager
	D	M	d1	H	L	d		
UM-4ELP-D4.0-W	4.0	36	3,8	15	75	6	4	●
UM-4ELP-D5.0-W	5.0	36	4,8	20	75	6	4	●
UM-4ELP-D6.0-W	6.0	36	5,7	20	75	6	4	●
UM-4ELP-D8.0-W	8.0	60	7,7	25	100	8	4	●
UM-4ELP-D10.0-W	10.0	55	9,5	30	100	10	4	●
UM-4ELP-D12.0-W	12.0	50	11,5	35	100	12	4	●
UM-4ELP-D14.0-W	14.0	50	13,5	40	100	14	4	●
UM-4ELP-D16.0-W	16.0	100	15,5	50	150	16	4	●
UM-4ELP-D20.0-W	20.0	98	19,5	55	150	20	4	●

Material Overview · Material Übersicht

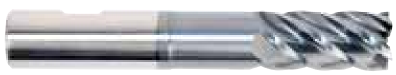
✔ = Very suitable · Sehr empfohlen
✓ = Suitable · Empfohlen

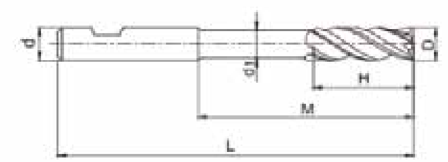
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy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

5-flute flattened end mills with Weldon shank and long cutting edge
5-Schneiden Eckfräser mit langer Schneide und Weldon-Schaft



UM-5EP-W





38°,41°

Coated AlTiN

D | D≤6 -0.020~-0.038 | 6<D≤10 -0.025~-0.047 | 10<D≤18 -0.032~-0.059 | 18<D -0.04~-0.073

Type Typ	Dimension (mm) Abmessungen						Teeth Zähne Z	Stock Lager
	D	M	d1	H	L	d		
UM-5EP-D20.0-W	20.0	72	19,5	41	126	20	5	●
UM-5EP-D25.0-W	25.0	102	24,5	51	160	25	5	●

Material Overview · Material Übersicht

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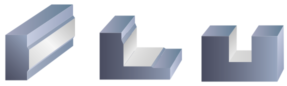
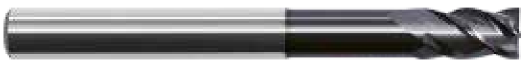
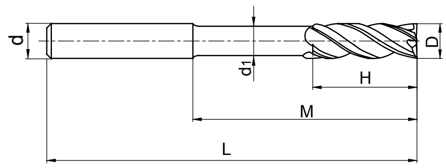
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy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

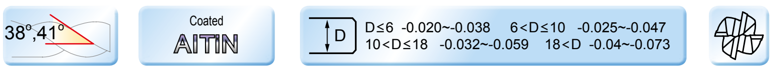
4-flute flattened end mills with short cutting edge and long neck
4-Schneiden Eckfräser mit kurzer Schneide und Zylinderschaft



UM-4EFP







Type Typ	Dimension(mm) Abmessungen						Teeth Zähne Z	Stock Lager
	D	d	H	M	d_1	L		
UM-4EFP-D6.0	6.0	6	9	30	5.8	75	4	●
UM-4EFP-D8.0	8.0	8	12	40	7.8	100	4	●
UM-4EFP-D10.0	10.0	10	15	50	9.6	100	4	●
UM-4EFP-D12.0	12.0	12	18	50	11.5	100	4	●
UM-4EFP-D16.0	16.0	16	24	50	15.5	150	4	●
UM-4EFP-D20.0	20.0	20	30	60	19.5	150	4	●

● ex stock / ab Lager ○ on demand /auf Anfrage

Material Overview · Material Übersicht

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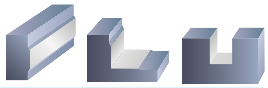
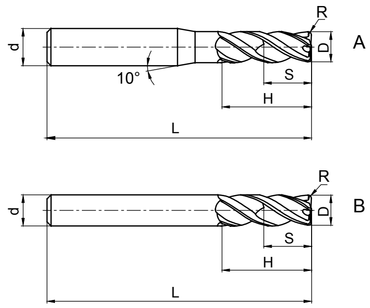
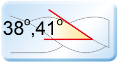
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy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

4-flute radius end mills with straight shank
4-Schneiden Radiuseckfräser mit Zylinderschaft



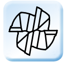
UM-4R





Coated AlTiN

D≤6 -0.020~-0.038 6<D≤10 -0.025~-0.047
10<D≤18 -0.032~-0.059 18<D -0.04~-0.073



Type Typ	Dimension(mm) Abmessungen						Teeth Zähne Z	Geometry Ausführung	Stock Lager
	D	R	d	H	S	L			
UM-4R-D4.0R0.3	4.0	0.3	6	10	6.0	50	4	A	●
UM-4R-D4.0R0.5	4.0	0.5	6	10	6.0	50	4	A	●
UM-4R-D5.0R0.5	5.0	0.5	6	13	7.5	50	4	A	●
UM-4R-D5.0R1.0	5.0	1.0	6	13	7.5	50	4	A	●
UM-4R-D6.0R0.5	6.0	0.5	6	16	9.0	50	4	B	●
UM-4R-D6.0R1.0	6.0	1.0	6	16	9.0	50	4	B	●
UM-4R-D8.0R0.5	8.0	0.5	8	20	12	60	4	B	●
UM-4R-D8.0R1.0	8.0	1.0	8	20	12	60	4	B	●
UM-4R-D10.0R0.5	10.0	0.5	10	25	15	75	4	B	●
UM-4R-D10.0R1.0	10.0	1.0	10	25	15	75	4	B	●
UM-4R-D10.0R2.0	10.0	2.0	10	25	15	75	4	B	●
UM-4R-D10.0R3.0	10.0	3.0	10	25	15	75	4	B	●
UM-4R-D12.0R0.5	12.0	0.5	12	30	18	75	4	B	●
UM-4R-D12.0R1.0	12.0	1.0	12	30	18	75	4	B	●
UM-4R-D12.0R2.0	12.0	2.0	12	30	18	75	4	B	●
UM-4R-D12.0R3.0	12.0	3.0	12	30	18	75	4	B	●
UM-4R-D16.0R1.0	16.0	1.0	16	45	24	100	4	B	●
UM-4R-D16.0R2.0	16.0	2.0	16	45	24	100	4	B	●
UM-4R-D16.0R3.0	16.0	3.0	16	45	24	100	4	B	●
UM-4R-D20.0R1.0	20.0	1.0	20	45	30	100	4	B	●
UM-4R-D20.0R2.0	20.0	2.0	20	45	30	100	4	B	●
UM-4R-D20.0R3.0	20.0	3.0	20	45	30	100	4	B	●

● ex stock / ab Lager ○ on demand /auf Anfrage

Material Overview · Material Übersicht

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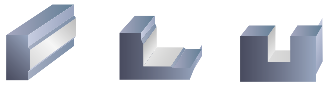
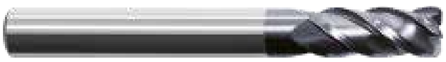
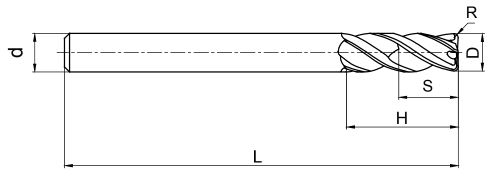
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy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

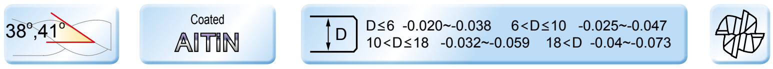
4-flute radius end mills with straight shank and long cutting edge
4-Schneiden Radiuseckfräser mit langer Schneide und Zylinderschaft



UM-4RL







Type Typ	Dimension(mm) Abmessungen						Teeth Zähne Z	Stock Lager
	D	R	d	H	S	L		
UM-4RL-D6.0R0.5	6.0	0.5	6	16	9	75	4	●
UM-4RL-D6.0R1.0	6.0	1.0	6	16	9	75	4	●
UM-4RL-D8.0R0.5	8.0	0.5	8	20	12	100	4	●
UM-4RL-D8.0R1.0	8.0	1.0	8	20	12	100	4	●
UM-4RL-D10.0R0.5	10.0	0.5	10	25	15	100	4	●
UM-4RL-D10.0R1.0	10.0	1.0	10	25	15	100	4	●
UM-4RL-D10.0R2.0	10.0	2.0	10	25	15	100	4	●
UM-4RL-D12.0R0.5	12.0	0.5	12	30	18	100	4	●
UM-4RL-D12.0R1.0	12.0	1.0	12	30	18	100	4	●
UM-4RL-D12.0R2.0	12.0	2.0	12	30	18	100	4	●
UM-4RL-D16.0R1.0	16.0	1.0	16	45	24	150	4	●
UM-4RL-D16.0R2.0	16.0	2.0	16	45	24	150	4	●

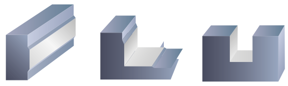
● ex stock / ab Lager ○ on demand /auf Anfrage

Material Overview · Material Übersicht

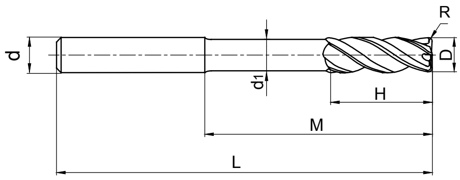
✔ = Very suitable · Sehr empfohlen
✓ = Suitable · Empfohlen

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						
✔	✔	✔	✔	✔		✓	✔			✓	✓

4-flute radius end mills with straight shank and short cutting edge and long neck
4-Schneiden Radiuseckfräser mit kurzer Schneide und Zylinderschaft



UM-4RFP



38°,41°

Coated AlTiN

D≤6 -0.020~-0.038 6<D≤10 -0.025~-0.047
10<D≤18 -0.032~-0.059 18<D -0.04~-0.073

Type Typ	Dimension(mm) Abmessungen							Teeth Zähne Z	Stock Lager
	D	R	d	d_1	H	M	L		
UM-4RFP-D6.0R0.5	6.0	0.5	6	5.8	6	18	75	4	●
UM-4RFP-D6.0R1.0	6.0	1.0	6	5.8	6	18	75	4	●
UM-4RFP-D8.0R0.5	8.0	0.5	8	7.7	8	24	100	4	●
UM-4RFP-D8.0R1.0	8.0	1.0	8	7.7	8	24	100	4	●
UM-4RFP-D10.0R0.5	10.0	0.5	10	9.6	10	30	100	4	●
UM-4RFP-D10.0R1.0	10.0	1.0	10	9.6	10	30	100	4	●
UM-4RFP-D10.0R2.0	10.0	2.0	10	9.6	10	30	100	4	●
UM-4RFP-D12.0R0.5	12.0	0.5	12	11.5	12	36	100	4	●
UM-4RFP-D12.0R1.0	12.0	1.0	12	11.5	12	36	100	4	●
UM-4RFP-D12.0R2.0	12.0	2.0	12	11.5	12	36	100	4	●
UM-4RFP-D16.0R1.0	16.0	1.0	16	15.5	16	40	150	4	●
UM-4RFP-D16.0R2.0	16.0	2.0	16	15.5	16	40	150	4	●

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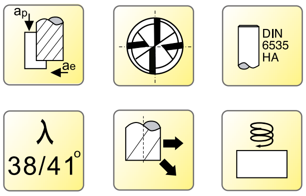
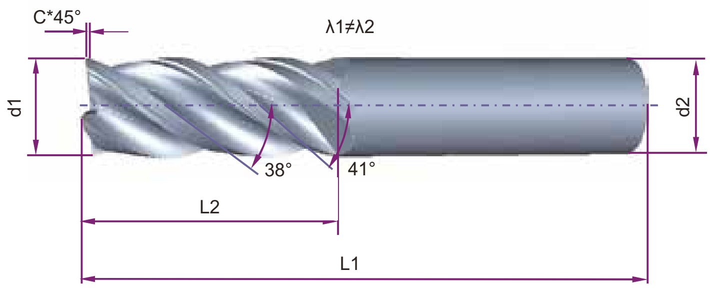
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy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

VSM-4E for difficult to machine material with sharp cutting edge
VSM-4E für schwerzerspanbares Material, mit scharfer Schneide

4-flute end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft





Type · Typ	Dimension(mm) Abmessungen					Teeth Zähne	Application Anwendung	P M S
	d1	d2	L2	L1	C*45°	Z	Grade Sorte	KMG 405
VSM-4E-D4.0	4	6	11	50	0.01-0.06	4		●
VSM-4E-D5.0	5	6	13	50	0.01-0.06	4		●
VSM-4E-D6.0	6	6	16	50	0.06-0.10	4		●
VSM-4E-D8.0	8	8	20	60	0.06-0.10	4		●
VSM-4E-D10.0	10	10	25	75	0.06-0.10	4		●
VSM-4E-D12.0	12	12	30	75	0.10-0.15	4		●
VSM-4E-D16.0	16	16	45	100	0.10-0.15	4		●
VSM-4E-D20.0	20	20	45	100	0.15-0.20	4		●

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Material Overview · Material Übersicht

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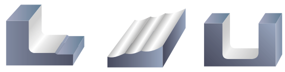
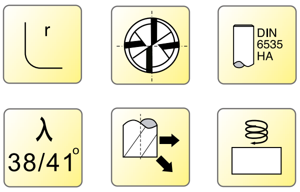
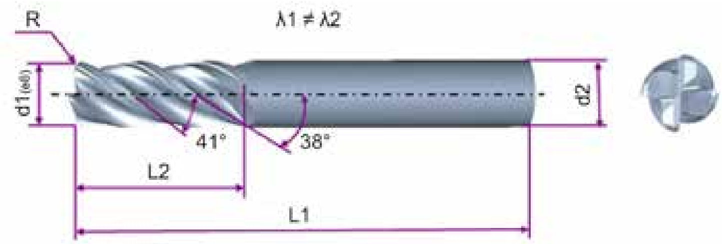
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff. Stahl	Alloy steel Legierter Stahl	Hardened steel Gehärteter Stahl ~40HRC	~50HRC	~60HRC	~68HRC	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.
✔ (Suitable)	✔ (Suitable)	✔ (Suitable)				✔ (Very suitable)				✔ (Very suitable)	✔ (Very suitable)

VSM-4R for difficult to machine material with radius
VSM-4R für schwerzerspanbares Material, mit Radius







Type Typ	Dimension(mm) Abmessungen					Teeth Zähne	Applicaion Anwendung	P M S
	d1(e8)	R±0.01	d2(h6)	L1	L2	Z	Grade Sorte	KMG 405
VSM-4R-D4.0R0.2	4	0.2	6	50	11	4		●
VSM-4R-D4.0R0.5	4	0.5	6	50	11	4		●
VSM-4R-D5.0R0.2	5	0.2	6	50	13	4		●
VSM-4R-D5.0R0.5	5	0.5	6	50	13	4		●
VSM-4R-D6.0R0.2	6	0.2	6	50	16	4		●
VSM-4R-D6.0R0.5	6	0.5	6	50	16	4		●
VSM-4R-D6.0R1.0	6	1.0	6	50	16	4		●
VSM-4R-D6.0R1.5	6	1.5	6	50	16	4		●
VSM-4R-D8.0R0.5	8	0.5	8	63	20	4		●
VSM-4R-D8.0R0.8	8	0.8	8	63	20	4		●
VSM-4R-D8.0R1.0	8	1.0	8	63	20	4		●
VSM-4R-D8.0R1.5	8	1.5	8	63	20	4		●
VSM-4R-D8.0R2.0	8	2.0	8	63	20	4		●
VSM-4R-D10.0R0.5	10	0.5	10	75	25	4		●
VSM-4R-D10.0R0.8	10	0.8	10	75	25	4		●
VSM-4R-D10.0R1.0	10	1.0	10	75	25	4		●
VSM-4R-D10.0R1.5	10	1.5	10	75	25	4		●
VSM-4R-D10.0R2.0	10	2.0	10	75	25	4		●
VSM-4R-D12.0R0.5	12	0.5	12	75	30	4		●
VSM-4R-D12.0R0.8	12	0.8	12	75	30	4		●
VSM-4R-D12.0R1.0	12	1.0	12	75	30	4		●
VSM-4R-D12.0R1.5	12	1.5	12	75	30	4		●
VSM-4R-D12.0R2.0	12	2.0	12	75	30	4		●
VSM-4R-D12.0R2.5	12	2.5	12	75	30	4		●
VSM-4R-D12.0R3.0	12	3.0	12	75	30	4		●
VSM-4R-D12.0R4.0	12	4.0	12	75	30	4		●
VSM-4R-D16.0R0.5	16	0.5	16	100	45	4		●
VSM-4R-D16.0R0.8	16	0.8	16	100	45	4		●
VSM-4R-D16.0R1.0	16	1.0	16	100	45	4		●
VSM-4R-D16.0R1.5	16	1.5	16	100	45	4		●
VSM-4R-D16.0R2.0	16	2.0	16	100	45	4		●
VSM-4R-D16.0R2.5	16	2.5	16	100	45	4		●
VSM-4R-D16.0R3.0	16	3.0	16	100	45	4		●
VSM-4R-D16.0R4.0	16	4.0	16	100	45	4		●
VSM-4R-D20.0R0.5	20	0.5	20	100	45	4		●
VSM-4R-D20.0R1.0	20	1.0	20	100	45	4		●
VSM-4R-D20.0R1.5	20	1.5	20	100	45	4		●
VSM-4R-D20.0R2.0	20	2.0	20	100	45	4		●
VSM-4R-D20.0R2.5	20	2.5	20	100	45	4		●
VSM-4R-D20.0R3.0	20	3.0	20	100	45	4		●
VSM-4R-D20.0R4.0	20	4.0	20	100	45	4		●

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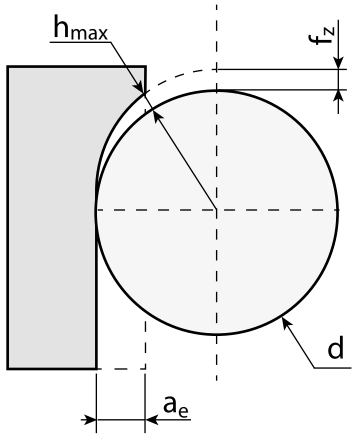
Material Overview · Material Übersicht

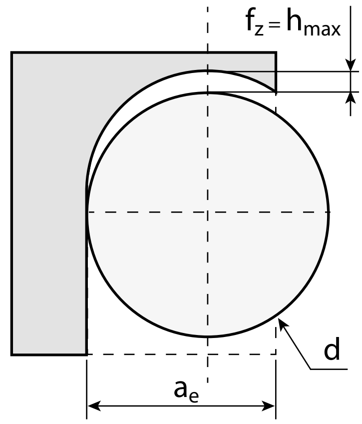
	Workpiece material Werkstückstoff											
	Carbon steel Kohlenstoff. Stahl	Alloy steel Legierter Stahl	Hardened steel Gehärteter Stahl				Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum alloy Alu. Leg.	Titanium alloy Titan Leg.	Heat resist. alloy Warmfeste Leg.
			~40HRC	~50HRC	~60HRC	~68HRC						
KMG405	✔	✔	✔				✔				✔	✔

HSC strategy/HSC-Strategie

It's important to use the right strategy. When programming make sure the width of cut is kept. The width of cut is usually not higher than 15 %. Regarding the depth of cut, the total length of the cutting edge can be used.
Wichtig ist die richtige Strategie. Bei der Programmierung muss unbedingt darauf geachtet werden, dass die seitliche Zustellung eingehalten wird. Die seitliche Zustellung sollte in der Regel nicht mehr als 15 % betragen. Bei der Zustelltiefe kann die volle Länge der Schneide genutzt werden.



$a_e < d/2 \quad h_{max} < f_z$

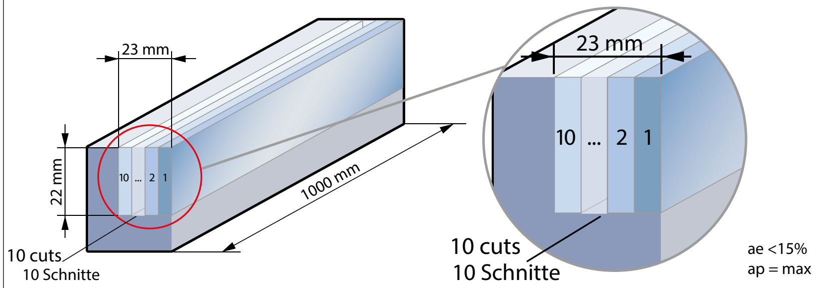


$a_e \geq d/2 \quad h_{max} = f_z$

$$h_{max} = 2f_z\sqrt{\frac{a_e}{d}\left(1-\frac{a_e}{d}\right)}$$

When changing the width of cut the cutting data needs to be adjusted.
As calculatory size applies a chip thickness from approx. 0.15 –0.2 mm on basis of the usual steel types.
Bei Veränderung der seitlichen Zustellung müssen die Schnittparameter angepasst werden.
Als kalkulatorische Größe gilt eine Spandicke von ca. 0,15–0,2 mm bei den üblichen Stahlsorten.

Example/Beispiel

Tool/Werkzeug	Machining/Bearbeitung
 UM-4E-D20.0-W KMG405	 HSC strategy/HSC-Strategie

Workpiece material/Werkstückmaterial	16MnCr5 (1.7131) ca. 700 N/mm³
Cutting data/Schnittdaten	
V_c	550 m/min
n	8750 1/min
f_z	0,3 mm (**h_{max} = 0,19 mm**)
V_f	10500 mm/min
a_p	22 mm
a_e	2,3 mm

Result/Ergebnis

Chip removal rate **530 cm³/min**! Machining time 58 seconds! The maximum chip thickness is 0.19 mm.
Zerspanungsrate **530 cm³/min**! Bearbeitungszeit 58 Sekunden! Die maximale Spandicke beträgt hier 0,19 mm.

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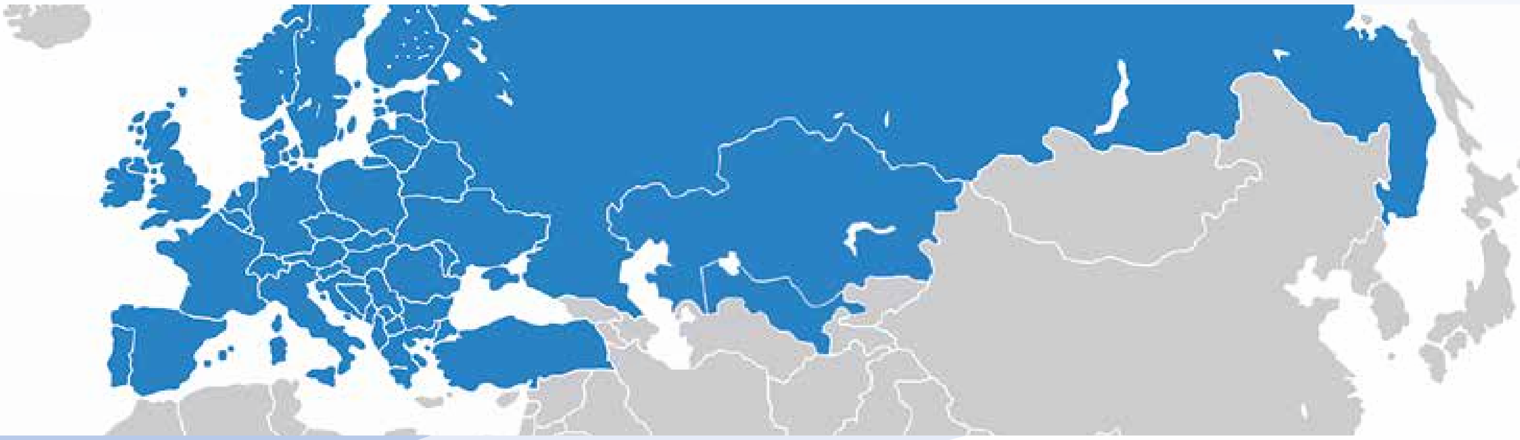
HPC Endmills
HPC Fräser



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