

**SOLID CARBIDE
PRECISION TOOLS**

multidec[®]-**MICRO DRILL**

multidec[®]-**MICRO MILL**

multidec[®]-**FINECUT MILL**

multidec[®]-**MILL**



With multidec®-MICRO TOOLS, UTILIS offers a range of high-performance solid carbide micro tools for drilling and milling. The range is divided into three lines: "μ-drill" includes spot drills and twist drills. Under "μ-mill" you will find end-mills and ball nose end-mills and under the theme "μ-hexalob" you will find micro tools for milling the TORX® contour in titanium and stainless steel screws. With multidec®-MILL, UTILIS is providing a product range consisting of universal milling tools. These tools are characterized by having an excellent price/performance ratio, and are as diverse as their areas of application.

Legend

Page information

12... See page 12 and the following (example)

See other pages

Recommended usage

- Preferred application
- Possible application
- Application not recommended

Availability

- 12345 Standard articles
- 12345 Standard articles, new in this catalog
- 12345 Discontinued articles

Symbols for tool applications

	Contour milling		Front/back deburring		Helical plunge
	Full groove milling		Corner radius milling		With cooling lubricant Preferably
	Deburring		Trochoidal milling (Dynamic milling)		With air cooling Preferably
	Machining direction Example: Machining in the x and y directions				

Symbols for tool attributes

	Number of teeth Example: five teeth		Uneven tooth pitch		Cutting length Example: Drilling depth 3xD
	Shank type Straight shank DIN 6535 (HA)		Edge reinforcement Corner radius (R)		Dynamic helix angle
	Weldon DIN 6535 (HB)		Corner chamfer (C)		Helix angle Example: Helix angle 40°
	Chip breaker		Sharp-edged		Point angle Example: Point angle 90°

Material classification

The information on using multidec®-MILL tools refers to certain materials. The materials to be machined are categorized in the same color throughout the entire catalog:

Steel
Stainless steel
Cast iron
Non-ferrous metals
Hard materials

Order designation

Order designation	Application
To the designation of the selected type of product, the desired cutting material code must be added.	● ● ○ 1 HMP700
UMMS 40300 x 020 SHA06 ... 1	Art. no. 552001 2

1 Order using order designation:
UMMS 40300 x 020 SHA06 HMP700

2 Order using art. no.:
552001

Coatings

HMP700	PVD coating (AlCr)
HMP800	PVD coating (AlCr)

Machining recommendation

1 2 3 4 5 6 Roughing	1 unsuitable
1 2 3 4 5 6 Finishing	6 optimal

Dimensions

All dimensions are in millimeter (mm).

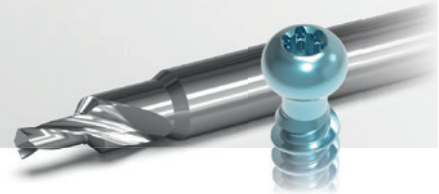
multidec®-MICRO DRILL

Solid carbide micro drills

UTILIS
μ-drill



UTILIS
μ-hexalob
drill

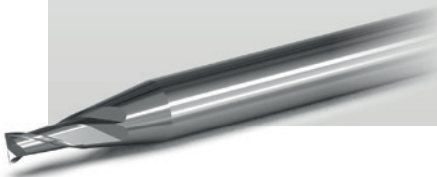


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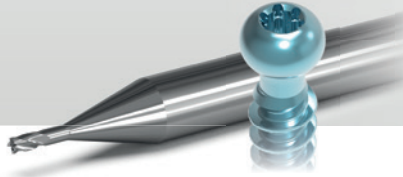
multidec®-MICRO MILL

Solid carbide micro milling cutters

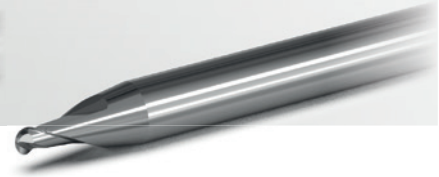
UTILIS
μ-mill



UTILIS
μ-hexalob
mill



UTILIS
μ-mill
ball

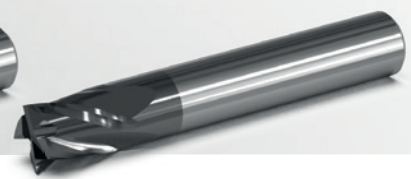
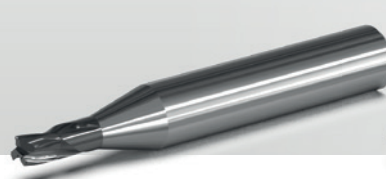
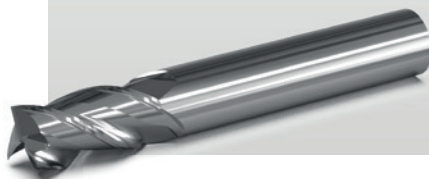


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multidec®-FINECUT MILL

Solid carbide milling cutters finecut-mill

UTILIS
finecut-mill



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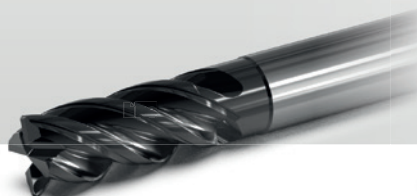
multidec®-MILL

Solid carbide milling cutters and deburring tools

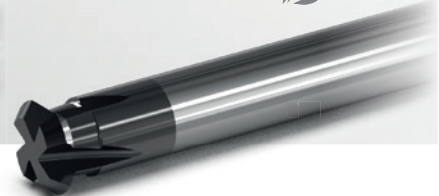
UTILIS
eagle
mill



UTILIS
wolverine
mill



UTILIS
scorpion
mill



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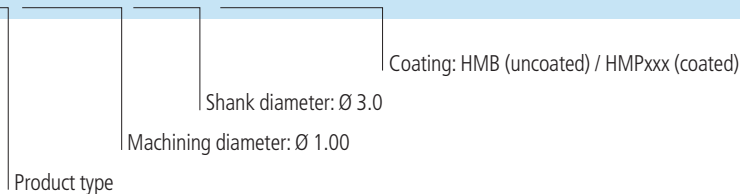
Materials	Uncoated HMB	Coated HMP...	
	Cutting speeds v_c (m/min)	Cutting speeds v_c (m/min)	Feeds f (mm/rev)
Steel non-alloyed < 600 N/mm ²	30–70	35–75	$d_1/80$
Steel low alloyed 600–800 N/mm ²	25–60	30–65	$d_1/80$
Steel high alloyed > 800 N/mm ²	20–45	25–55	$d_1/80$
Ferritic / Martensitic steel	20–40	25–50	$d_1/80$
Austenitic steel Cr-Ni alloy	15–35	20–40	$d_1/80$
Titanium	15–35	20–40	$d_1/100$
Aluminum	50–120	60–140	$d_1/60$
Brass / Lead-free brass	40–90	45–100	$d_1/80$
Copper / Bronze	35–75	40–80	$d_1/80$
Precious metals	30–70	35–80	$d_1/80$
Hard materials 45–55 HRC	–	12–25	$d_1/120$

Remarks

When using tools with very small diameter, it is possible to work with much lower cutting speed in an efficient way (for example Ø 0.30 mm by 6000 RPM = 5.7 m/min). Feed rate is a medium value for a first setup. Higher speed is possible by ideal machining conditions.

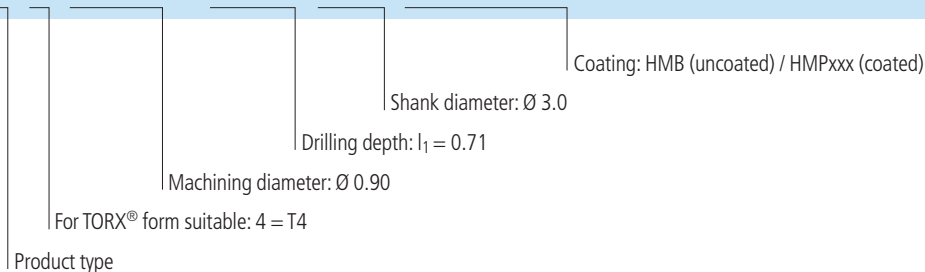
Designation system for drills

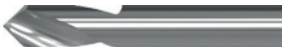
UMDLX 0100 S30 HMP700

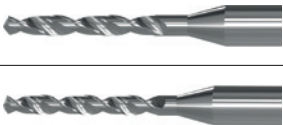


Designation system for TORX®-form drills

UMDT 4-0090 x 0071 S30 HMP700



Spot drills						
		d_1	α	D		
UMCD ... PT120°		1.00–6.00	20°	$d_1 = D$	120°	6
UMCD ... PT90°		1.00–6.00	20°	$d_1 = D$	90°	7
UMCDS ... PT90°		3.00–6.00	–	$d_1 = D$	90°	8

Twist drills						
		d_1	l_1	α	D	
UMDSX ...		0.30–6.00	$3 \times d_1$	35°	3.0	9
UMDLF ...		0.10–0.29	$7 \times d_1$	30°	3.0	11
UMDLX ...		0.30–3.00	$6-8 \times d_1$	35°	3.0	12
UMDS ...		0.10–3.00	$2-3 \times d_1$	24°	1.0 1.5 2.0 3.0	17
UMDL ...		0.10–3.00	$5-8 \times d_1$	24°	1.0 1.5 2.0 3.0	19

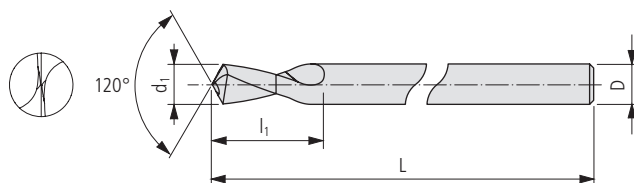
Pilot drills						
		d_1	α	D		
UMDT ...		0.90–3.90	~25°	3.0 4.0 6.0	140°	21

Solid carbide NC spot drills

Thinned drill-tip for a precise centring



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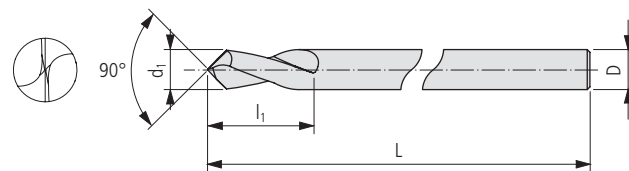


UMCD ... PT120°

Order designation	Grade		Dimensions									
	Coating		d ₁ h6	l ₁	D h6	L						
	without HMB	PVD HMP600										
Art. no.												
UMCD 0100 S10 PT120° ...	270259	270260	1.00	2.5	1.0	30						
UMCD 0150 S15 PT120° ...	270261	270262	1.50	3.8	1.5	30						
UMCD 0200 S20 PT120° ...	270263	270264	2.00	5.0	2.0	38						
UMCD 0250 S25 PT120° ...	270265	270266	2.50	6.3	2.5	38						
UMCD 0300 S30 PT120° ...	270267	270268	3.00	7.5	3.0	38						
UMCD 0400 S40 PT120° ...	270269	270270	4.00	10.0	4.0	45						
UMCD 0500 S50 PT120° ...	270271	270272	5.00	12.5	5.0	50						
UMCD 0600 S60 PT120° ...	270273	270274	6.00	15.0	6.0	60						

Solid carbide NC spot drills

Thinned drill-tip for a precise centring

**UMCD ... PT90°**

Order designation	Grade		Dimensions									
	Coating		d ₁ h6	l ₁	D h6	L						
	without	PVD										
	HMB	HMP600										
Art. no.												
UMCD 0100 S10 PT90° ...	270243	270244	1.00	2.5	1.0	30						
UMCD 0150 S15 PT90° ...	270245	270246	1.50	3.8	1.5	30						
UMCD 0200 S20 PT90° ...	270247	270248	2.00	5.0	2.0	38						
UMCD 0250 S25 PT90° ...	270249	270250	2.50	6.3	2.5	38						
UMCD 0300 S30 PT90° ...	270251	270252	3.00	7.5	3.0	38						
UMCD 0400 S40 PT90° ...	270253	270254	4.00	10.0	4.0	45						
UMCD 0500 S50 PT90° ...	270255	270256	5.00	12.5	5.0	50						
UMCD 0600 S60 PT90° ...	270257	270258	6.00	15.0	6.0	60						

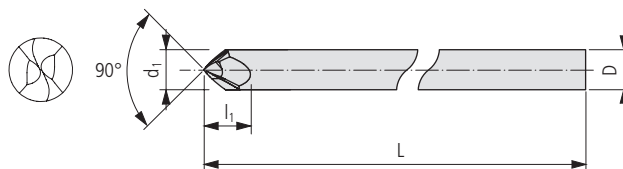
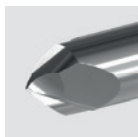
Solid carbide NC spot drills

Point relief: Conical Point: S-Gash, 90°

For centering and counter-sinking

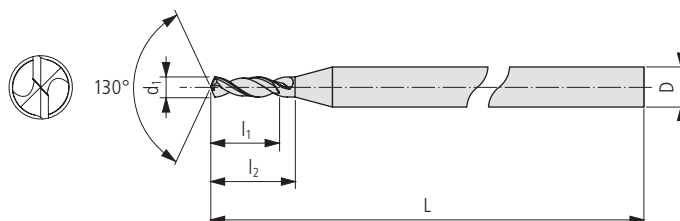


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**UMCDS ... PT90°**

Order designation	Grade		Dimensions									
	Coating		d ₁ h6	l ₁	D h6	L						
	without	PVD										
	HMB	HMP700										
Art. no.												
UMCDS 0300 S30 PT90° ...	270237	270238	3.00	3.0	3.0	38						
UMCDS 0400 S40 PT90° ...	270239	270240	4.00	4.0	4.0	38						
UMCDS 0600 S60 PT90° ...	270241	270242	6.00	6.0	6.0	45						

Solid carbide twist drills with reinforced shank
With x-point for self-centering



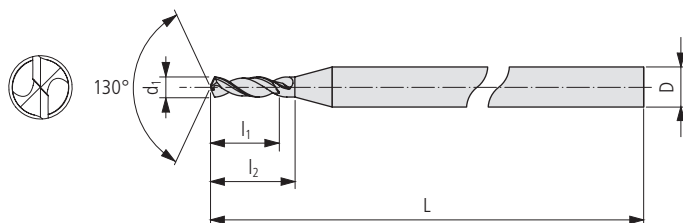
UMDSX ...

Order designation	Grade		Dimensions							
	Coating									
	without	PVD								
	d ₁ 0/-0.004	d ₁ +0.003/ -0.002								
	HMB	HMP700	d ₁	l ₁	l ₂	D h6	L			
Art. no.										
UMDSX 0030 S30 ...	270815	270816	0.30	0.9	1.4	3.0	38			
UMDSX 0035 S30 ...	270817	270818	0.35	1.1	1.6	3.0	38			
UMDSX 0040 S30 ...	270819	270820	0.40	1.2	1.8	3.0	38			
UMDSX 0045 S30 ...	270821	270822	0.45	1.4	2.0	3.0	38			
UMDSX 0050 S30 ...	270823	270824	0.50	1.5	2.2	3.0	38			
UMDSX 0055 S30 ...	270825	270826	0.55	1.7	2.4	3.0	38			
UMDSX 0060 S30 ...	270827	270828	0.60	1.8	2.6	3.0	38			
UMDSX 0065 S30 ...	270829	270830	0.65	2.0	2.7	3.0	38			
UMDSX 0070 S30 ...	270831	270832	0.70	2.1	3.0	3.0	38			
UMDSX 0075 S30 ...	270833	270834	0.75	2.3	3.2	3.0	38			
UMDSX 0080 S30 ...	270835	270836	0.80	2.4	3.4	3.0	38			
UMDSX 0085 S30 ...	270837	270838	0.85	2.6	3.5	3.0	38			
UMDSX 0090 S30 ...	270839	270840	0.90	2.7	3.7	3.0	38			
UMDSX 0095 S30 ...	270841	270842	0.95	2.9	3.9	3.0	38			
UMDSX 0100 S30 ...	270843	270844	1.00	3.0	4.2	3.0	38			
UMDSX 0110 S30 ...	270845	270846	1.10	3.3	4.6	3.0	38			
UMDSX 0120 S30 ...	270847	270848	1.20	3.6	4.9	3.0	38			
UMDSX 0130 S30 ...	270849	270850	1.30	3.9	5.3	3.0	38			
UMDSX 0140 S30 ...	270851	270852	1.40	4.2	5.8	3.0	38			
UMDSX 0150 S30 ...	270853	270854	1.50	4.5	6.2	3.0	38			
UMDSX 0160 S30 ...	270855	270856	1.60	4.8	6.6	3.0	38			
UMDSX 0170 S30 ...	270857	270858	1.70	5.1	7.0	3.0	38			
UMDSX 0180 S30 ...	270859	270860	1.80	5.4	7.3	3.0	38			
UMDSX 0190 S30 ...	270861	270862	1.90	5.7	7.7	3.0	38			
UMDSX 0200 S30 ...	270863	270864	2.00	6.0	8.2	3.0	38			
UMDSX 0210 S30 ...	270865	270866	2.10	6.3	8.6	3.0	45			
UMDSX 0220 S30 ...	270867	270868	2.20	6.6	8.9	3.0	45			
UMDSX 0230 S30 ...	270869	270870	2.30	6.9	9.4	3.0	45			
UMDSX 0240 S30 ...	270871	270872	2.40	7.2	9.8	3.0	45			
UMDSX 0250 S30 ...	270873	270874	2.50	7.5	10.2	3.0	45			
UMDSX 0260 S30 ...	270875	270876	2.60	7.8	10.6	3.0	45			
UMDSX 0270 S30 ...	270877	270878	2.70	8.1	10.9	3.0	45			
UMDSX 0280 S30 ...	270879	270880	2.80	8.4	11.4	3.0	45			
UMDSX 0290 S30 ...	270881	270882	2.90	8.7	11.7	3.0	45			
UMDSX 0300 S30 ...	270883	270884	3.00	9.0	12.2	3.0	45			
UMDSX 0310 S40 ...	554257	554258	3.10	9.3	12.4	4.0	42			
UMDSX 0320 S40 ...	554260	554261	3.20	9.6	12.8	4.0	42			
UMDSX 0330 S40 ...	554262	554263	3.30	9.9	13.2	4.0	42			
UMDSX 0340 S40 ...	554264	554265	3.40	10.2	13.6	4.0	42			
UMDSX 0350 S40 ...	554266	554268	3.50	10.5	14.0	4.0	42			
UMDSX 0360 S40 ...	554269	554270	3.60	10.8	14.4	4.0	42			

Solid carbide twist drills with reinforced shank
With x-point for self-centering

3×d₁

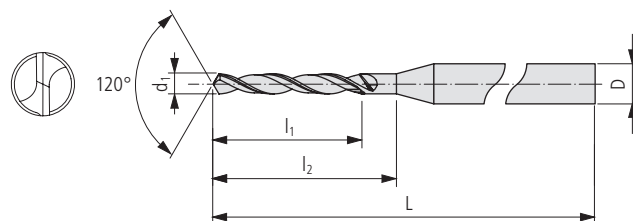
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**UMDSX ...**

Order designation	Grade		Dimensions									
	Coating											
	without	PVD										
	d ₁ 0/-0.004	d ₁ +0.003/ -0.002										
	HMB	HMP700	d ₁	l ₁	l ₂	D h6	L					
Art. no.												
UMDSX 0370 S40 ...	554271	554272	3.70	11.1	14.8	4.0	42					
UMDSX 0380 S40 ...	554273	554274	3.80	11.4	15.2	4.0	42					
UMDSX 0390 S40 ...	554275	554277	3.90	11.7	15.6	4.0	42					
UMDSX 0400 S60 ...	554278	554279	4.00	12.0	16.0	6.0	60					
UMDSX 0410 S60 ...	554280	554281	4.10	12.3	16.4	6.0	60					
UMDSX 0420 S60 ...	554282	554284	4.20	12.6	16.8	6.0	60					
UMDSX 0430 S60 ...	554285	554286	4.30	12.9	17.2	6.0	60					
UMDSX 0440 S60 ...	554287	554288	4.40	13.2	17.6	6.0	60					
UMDSX 0450 S60 ...	554289	554290	4.50	13.5	18.0	6.0	60					
UMDSX 0460 S60 ...	554291	554292	4.60	13.8	18.4	6.0	60					
UMDSX 0470 S60 ...	554293	554294	4.70	14.1	18.8	6.0	60					
UMDSX 0480 S60 ...	554295	554297	4.80	14.4	19.2	6.0	60					
UMDSX 0490 S60 ...	554298	554299	4.90	14.7	19.6	6.0	60					
UMDSX 0500 S60 ...	554300	554301	5.00	15.0	20.0	6.0	60					
UMDSX 0510 S60 ...	554302	554303	5.10	15.3	20.4	6.0	60					
UMDSX 0520 S60 ...	554304	554305	5.20	15.6	20.8	6.0	60					
UMDSX 0530 S60 ...	554306	554307	5.30	15.9	21.2	6.0	60					
UMDSX 0540 S60 ...	554308	554309	5.40	16.2	21.6	6.0	60					
UMDSX 0550 S60 ...	554310	554311	5.50	16.5	22.0	6.0	60					
UMDSX 0560 S60 ...	554312	554313	5.60	16.8	22.4	6.0	60					
UMDSX 0570 S60 ...	554315	554316	5.70	17.1	22.8	6.0	60					
UMDSX 0580 S60 ...	554317	554318	5.80	17.4	23.2	6.0	60					
UMDSX 0590 S60 ...	554319	554320	5.90	17.7	23.6	6.0	60					
UMDSX 0600 S60 ...	554321	554322	6.00	18.0	24.0	6.0	60					

Solid carbide twist drills with reinforced shank

Point relief: 4 facet, 120°



UMDLF ...

Order designation	Grade		Dimensions									
	Coating											
	without d_1 0/-0.004	PVD d_1 +0.003/ -0.002	d_1	l_1	l_2	D h6	L					
	HMB	HMP700										
Art. no.												
UMDLF 0010 S30 ...	270275	270276	0.10	0.7	0.95	3.0	38					
UMDLF 0011 S30 ...	270277	270278	0.11	0.75	1.0	3.0	38					
UMDLF 0012 S30 ...	270279	270280	0.12	0.85	1.1	3.0	38					
UMDLF 0013 S30 ...	270281	270282	0.13	0.9	1.15	3.0	38					
UMDLF 0014 S30 ...	270283	270284	0.14	1.0	1.25	3.0	38					
UMDLF 0015 S30 ...	270285	270286	0.15	1.05	1.35	3.0	38					
UMDLF 0016 S30 ...	270287	270288	0.16	1.1	1.5	3.0	38					
UMDLF 0017 S30 ...	270289	270290	0.17	1.2	1.6	3.0	38					
UMDLF 0018 S30 ...	270291	270292	0.18	1.25	1.65	3.0	38					
UMDLF 0019 S30 ...	270293	270294	0.19	1.35	1.75	3.0	38					
UMDLF 0020 S30 ...	270295	270296	0.20	1.4	1.85	3.0	38					
UMDLF 0021 S30 ...	270297	270298	0.21	1.45	1.9	3.0	38					
UMDLF 0022 S30 ...	270299	270300	0.22	1.55	2.0	3.0	38					
UMDLF 0023 S30 ...	270301	270302	0.23	1.6	2.1	3.0	38					
UMDLF 0024 S30 ...	270303	270304	0.24	1.7	2.15	3.0	38					
UMDLF 0025 S30 ...	270305	270306	0.25	1.75	2.25	3.0	38					
UMDLF 0026 S30 ...	270307	270308	0.26	1.8	2.3	3.0	38					
UMDLF 0027 S30 ...	270309	270310	0.27	1.9	2.4	3.0	38					
UMDLF 0028 S30 ...	270311	270312	0.28	1.95	2.5	3.0	38					
UMDLF 0029 S30 ...	270313	270314	0.29	2.05	2.55	3.0	38					

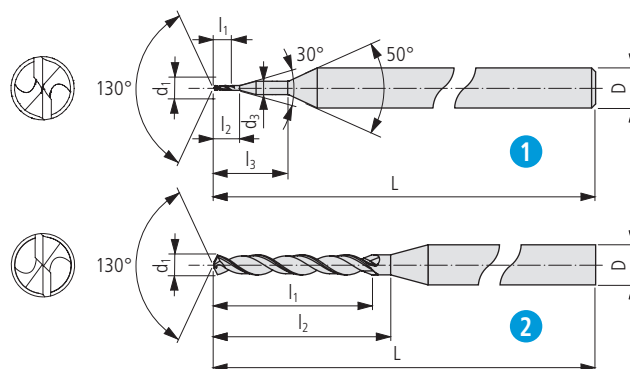
Solid carbide twist drills with reinforced shank

Point relief: 4 facet, 130°

With x-point for self-centering

6-8×d₁

UMDLX ...

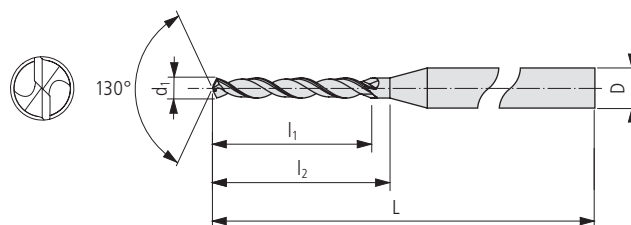


Order designation	Grade		Dimensions									
	Coating											
	without	PVD										
	d ₁ -0.001/ -0.005	d ₁ +0.001/ -0.004										
	HMB	HMP700	d ₁	l ₁	l ₂	D h6	L	d ₃	l ₃	Fig.		
Art. no.												
UMDLX 0030 S30 ...	270433	270434	0.30	2.2	2.3	3.0	38	1.0	4.7	1		
UMDLX 0031 S30 ...	270435	270436	0.31	2.2	2.3	3.0	38	1.0	4.7			
UMDLX 0032 S30 ...	270437	270438	0.32	2.2	2.3	3.0	38	1.0	4.7			
UMDLX 0033 S30 ...	270439	270440	0.33	2.2	2.3	3.0	38	1.0	4.7			
UMDLX 0034 S30 ...	270441	270442	0.34	2.2	2.3	3.0	38	1.0	4.7			
UMDLX 0035 S30 ...	270443	270444	0.35	2.2	2.3	3.0	38	1.0	4.7			
UMDLX 0036 S30 ...	270445	270446	0.36	2.2	2.3	3.0	38	1.0	4.7			
UMDLX 0037 S30 ...	270447	270448	0.37	2.5	2.7	3.0	38	1.0	5.5			
UMDLX 0038 S30 ...	270449	270450	0.38	2.5	2.7	3.0	38	1.0	5.5			
UMDLX 0039 S30 ...	270451	270452	0.39	2.5	2.7	3.0	38	1.0	5.5			
UMDLX 0040 S30 ...	270453	270454	0.40	2.5	2.7	3.0	38	1.0	5.5	2		
UMDLX 0041 S30 ...	270455	270456	0.41	2.5	2.7	3.0	38	—	—			
UMDLX 0042 S30 ...	270457	270458	0.42	3.0	3.2	3.0	38	—	—			
UMDLX 0043 S30 ...	270459	270460	0.43	3.0	3.2	3.0	38	—	—			
UMDLX 0044 S30 ...	270461	270462	0.44	3.0	3.2	3.0	38	—	—			
UMDLX 0045 S30 ...	270463	270464	0.45	3.5	4.0	3.0	38	—	—			
UMDLX 0046 S30 ...	270465	270466	0.46	3.5	4.0	3.0	38	—	—			
UMDLX 0047 S30 ...	270467	270468	0.47	3.5	4.0	3.0	38	—	—			
UMDLX 0048 S30 ...	270469	270470	0.48	3.5	4.0	3.0	38	—	—			
UMDLX 0049 S30 ...	270471	270472	0.49	4.0	4.6	3.0	38	—	—			
UMDLX 0050 S30 ...	270473	270474	0.50	4.0	4.6	3.0	38	—	—			
UMDLX 0051 S30 ...	270475	270476	0.51	4.0	4.6	3.0	38	—	—			
UMDLX 0052 S30 ...	270477	270478	0.52	4.0	4.6	3.0	38	—	—			
UMDLX 0053 S30 ...	270479	270480	0.53	4.0	4.6	3.0	38	—	—			
UMDLX 0054 S30 ...	270481	270482	0.54	4.5	5.1	3.0	38	—	—			
UMDLX 0055 S30 ...	270483	270484	0.55	4.5	5.1	3.0	38	—	—			
UMDLX 0056 S30 ...	270485	270486	0.56	4.5	5.1	3.0	38	—	—			
UMDLX 0057 S30 ...	270487	270488	0.57	4.5	5.1	3.0	38	—	—			
UMDLX 0058 S30 ...	270489	270490	0.58	4.5	5.1	3.0	38	—	—			
UMDLX 0059 S30 ...	270491	270492	0.59	4.5	5.1	3.0	38	—	—			
UMDLX 0060 S30 ...	270493	270494	0.60	4.5	5.1	3.0	38	—	—			
UMDLX 0061 S30 ...	270495	270496	0.61	5.0	5.7	3.0	38	—	—			
UMDLX 0062 S30 ...	270497	270498	0.62	5.0	5.7	3.0	38	—	—			
UMDLX 0063 S30 ...	270499	270500	0.63	5.0	5.7	3.0	38	—	—			
UMDLX 0064 S30 ...	270501	270502	0.64	5.0	5.7	3.0	38	—	—			
UMDLX 0065 S30 ...	270503	270504	0.65	5.0	5.7	3.0	38	—	—			
UMDLX 0066 S30 ...	270505	270506	0.66	5.0	5.7	3.0	38	—	—			
UMDLX 0067 S30 ...	270507	270508	0.67	5.0	5.7	3.0	38	—	—			
UMDLX 0068 S30 ...	270509	270510	0.68	5.5	6.2	3.0	38	—	—			
UMDLX 0069 S30 ...	270511	270512	0.69	5.6	6.3	3.0	38	—	—			

Solid carbide twist drills with reinforced shank

Point relief: 4 facet, 130°

With x-point for self-centering

6-8×d₁

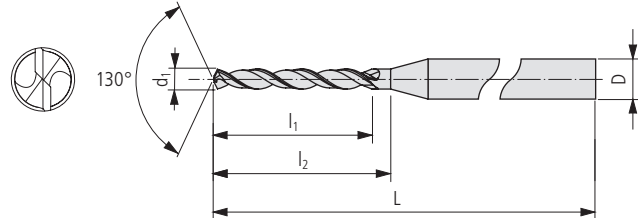
UMDLX ...

Order designation	Grade		Dimensions									
	Coating											
	without	PVD										
	d ₁ -0.001/ -0.005	d ₁ +0.001/ -0.004	d ₁	l ₁	l ₂	D h6	L					
	HMB	HMP700										
	Art. no.											
UMDLX 0070 S30 ...	270513	270514	0.70	5.6	6.3	3.0	38					
UMDLX 0071 S30 ...	270515	270516	0.71	5.6	6.3	3.0	38					
UMDLX 0072 S30 ...	270517	270518	0.72	5.6	6.3	3.0	38					
UMDLX 0073 S30 ...	270519	270520	0.73	5.6	6.3	3.0	38					
UMDLX 0074 S30 ...	270521	270522	0.74	5.6	6.3	3.0	38					
UMDLX 0075 S30 ...	270523	270524	0.75	5.6	6.3	3.0	38					
UMDLX 0076 S30 ...	270525	270526	0.76	6.5	7.3	3.0	38					
UMDLX 0077 S30 ...	270527	270528	0.77	6.5	7.3	3.0	38					
UMDLX 0078 S30 ...	270529	270530	0.78	6.5	7.3	3.0	38					
UMDLX 0079 S30 ...	270531	270532	0.79	6.5	7.3	3.0	38					
UMDLX 0080 S30 ...	270533	270534	0.80	6.5	7.3	3.0	38					
UMDLX 0081 S30 ...	270535	270536	0.81	6.5	7.3	3.0	38					
UMDLX 0082 S30 ...	270537	270538	0.82	6.5	7.3	3.0	38					
UMDLX 0083 S30 ...	270539	270540	0.83	6.5	7.3	3.0	38					
UMDLX 0084 S30 ...	270541	270542	0.84	6.5	7.3	3.0	38					
UMDLX 0085 S30 ...	270543	270544	0.85	6.5	7.3	3.0	38					
UMDLX 0086 S30 ...	270545	270546	0.86	7.0	7.9	3.0	38					
UMDLX 0087 S30 ...	270547	270548	0.87	7.0	7.9	3.0	38					
UMDLX 0088 S30 ...	270549	270550	0.88	7.0	7.9	3.0	38					
UMDLX 0089 S30 ...	270551	270552	0.89	7.0	7.9	3.0	38					
UMDLX 0090 S30 ...	270553	270554	0.90	7.0	7.9	3.0	38					
UMDLX 0091 S30 ...	270555	270556	0.91	7.0	7.9	3.0	38					
UMDLX 0092 S30 ...	270557	270558	0.92	7.0	7.9	3.0	38					
UMDLX 0093 S30 ...	270559	270560	0.93	7.0	7.9	3.0	38					
UMDLX 0094 S30 ...	270561	270562	0.94	7.0	7.9	3.0	38					
UMDLX 0095 S30 ...	270563	270564	0.95	7.0	7.9	3.0	38					
UMDLX 0096 S30 ...	270565	270566	0.96	8.0	9.0	3.0	38					
UMDLX 0097 S30 ...	270567	270568	0.97	8.0	9.0	3.0	38					
UMDLX 0098 S30 ...	270569	270570	0.98	8.0	9.0	3.0	38					
UMDLX 0099 S30 ...	270571	270572	0.99	8.0	9.0	3.0	38					
UMDLX 0100 S30 ...	270573	270574	1.00	9.0	10.1	3.0	38					
UMDLX 0101 S30 ...	270575	270576	1.01	9.0	10.1	3.0	38					
UMDLX 0102 S30 ...	270577	270578	1.02	9.0	10.1	3.0	38					
UMDLX 0103 S30 ...	270579	270580	1.03	9.0	10.1	3.0	38					
UMDLX 0104 S30 ...	270581	270582	1.04	9.0	10.1	3.0	38					
UMDLX 0105 S30 ...	270583	270584	1.05	9.0	10.1	3.0	38					
UMDLX 0106 S30 ...	270585	270586	1.06	9.0	10.1	3.0	38					
UMDLX 0107 S30 ...	270587	270588	1.07	9.0	10.1	3.0	38					
UMDLX 0108 S30 ...	270589	270590	1.08	9.0	10.1	3.0	38					
UMDLX 0109 S30 ...	270591	270592	1.09	9.0	10.1	3.0	38					

Solid carbide twist drills with reinforced shank

Point relief: 4 facet, 130°

With x-point for self-centering

6-8×d₁

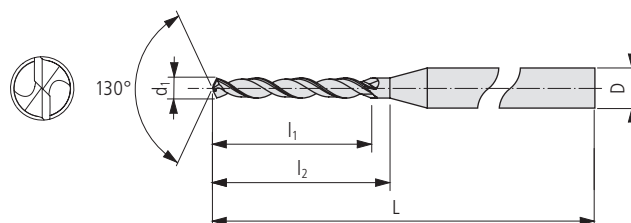
UMDLX ...

Order designation	Grade		Dimensions							
	Coating									
	without	PVD								
	d ₁ -0.001/ -0.005	d ₁ +0.001/ -0.004								
	HMB	HMP700	d ₁	l ₁	l ₂	D h6	L			
Art. no.										
UMDLX 0110 S30 ...	270593	270594	1.10	9.0	10.1	3.0	38			
UMDLX 0111 S30 ...	270595	270596	1.11	9.0	10.1	3.0	38			
UMDLX 0112 S30 ...	270597	270598	1.12	9.0	10.1	3.0	38			
UMDLX 0113 S30 ...	270599	270600	1.13	9.0	10.1	3.0	38			
UMDLX 0114 S30 ...	270601	270602	1.14	9.0	10.1	3.0	38			
UMDLX 0115 S30 ...	270603	270604	1.15	9.0	10.1	3.0	38			
UMDLX 0116 S30 ...	270605	270606	1.16	9.0	10.1	3.0	38			
UMDLX 0117 S30 ...	270607	270608	1.17	9.0	10.1	3.0	38			
UMDLX 0118 S30 ...	270609	270610	1.18	9.0	10.1	3.0	38			
UMDLX 0119 S30 ...	270611	270612	1.19	10.0	11.2	3.0	38			
UMDLX 0120 S30 ...	270613	270614	1.20	10.0	11.2	3.0	38			
UMDLX 0121 S30 ...	270615	270616	1.21	10.0	11.2	3.0	38			
UMDLX 0122 S30 ...	270617	270618	1.22	10.0	11.2	3.0	38			
UMDLX 0123 S30 ...	270619	270620	1.23	10.0	11.2	3.0	38			
UMDLX 0124 S30 ...	270621	270622	1.24	10.0	11.2	3.0	38			
UMDLX 0125 S30 ...	270623	270624	1.25	10.0	11.2	3.0	38			
UMDLX 0126 S30 ...	270625	270626	1.26	10.0	11.2	3.0	38			
UMDLX 0127 S30 ...	270627	270628	1.27	10.0	11.2	3.0	38			
UMDLX 0128 S30 ...	270629	270630	1.28	10.0	11.2	3.0	38			
UMDLX 0129 S30 ...	270631	270632	1.29	10.0	11.2	3.0	38			
UMDLX 0130 S30 ...	270633	270634	1.30	10.0	11.2	3.0	38			
UMDLX 0131 S30 ...	270635	270636	1.31	10.0	11.2	3.0	38			
UMDLX 0132 S30 ...	270637	270638	1.32	10.0	11.2	3.0	38			
UMDLX 0133 S30 ...	270639	270640	1.33	11.5	12.8	3.0	38			
UMDLX 0134 S30 ...	270641	270642	1.34	11.5	12.8	3.0	38			
UMDLX 0135 S30 ...	270643	270644	1.35	11.5	12.8	3.0	38			
UMDLX 0136 S30 ...	270645	270646	1.36	11.5	12.8	3.0	38			
UMDLX 0137 S30 ...	270647	270648	1.37	11.5	12.8	3.0	38			
UMDLX 0138 S30 ...	270649	270650	1.38	11.5	12.8	3.0	38			
UMDLX 0139 S30 ...	270651	270652	1.39	11.5	12.8	3.0	38			
UMDLX 0140 S30 ...	270653	270654	1.40	11.5	12.8	3.0	38			
UMDLX 0141 S30 ...	270655	270656	1.41	11.5	12.8	3.0	38			
UMDLX 0142 S30 ...	270657	270658	1.42	11.5	12.8	3.0	38			
UMDLX 0143 S30 ...	270659	270660	1.43	11.5	12.8	3.0	38			
UMDLX 0144 S30 ...	270661	270662	1.44	11.5	12.8	3.0	38			
UMDLX 0145 S30 ...	270663	270664	1.45	11.5	12.8	3.0	38			
UMDLX 0146 S30 ...	270665	270666	1.46	11.5	12.8	3.0	38			
UMDLX 0147 S30 ...	270667	270668	1.47	11.5	12.8	3.0	38			
UMDLX 0148 S30 ...	270669	270670	1.48	11.5	12.8	3.0	38			
UMDLX 0149 S30 ...	270671	270672	1.49	11.5	12.8	3.0	38			

Solid carbide twist drills with reinforced shank

Point relief: 4 facet, 130°

With x-point for self-centering

6-8×d₁

UMDLX ...

Order designation	Grade		Dimensions							
	Coating									
	without	PVD								
	d ₁ -0.001/ -0.005	d ₁ +0.001/ -0.004	d ₁	l ₁	l ₂	D h6	L			
	HMB	HMP700								
Art. no.										
UMDLX 0150 S30 ...	270673	270674	1.50	11.5	12.8	3.0	38			
UMDLX 0151 S30 ...	270675	270676	1.51	12.0	13.4	3.0	38			
UMDLX 0152 S30 ...	270677	270678	1.52	12.0	13.4	3.0	38			
UMDLX 0153 S30 ...	270679	270680	1.53	12.0	13.4	3.0	38			
UMDLX 0154 S30 ...	270681	270682	1.54	12.0	13.4	3.0	38			
UMDLX 0155 S30 ...	270683	270684	1.55	12.0	13.4	3.0	38			
UMDLX 0156 S30 ...	270685	270686	1.56	12.0	13.4	3.0	38			
UMDLX 0157 S30 ...	270687	270688	1.57	12.0	13.4	3.0	38			
UMDLX 0158 S30 ...	270689	270690	1.58	12.0	13.4	3.0	38			
UMDLX 0159 S30 ...	270691	270692	1.59	12.0	13.4	3.0	38			
UMDLX 0160 S30 ...	270693	270694	1.60	12.0	13.4	3.0	38			
UMDLX 0161 S30 ...	270695	270696	1.61	12.0	13.4	3.0	38			
UMDLX 0162 S30 ...	270697	270698	1.62	12.0	13.4	3.0	38			
UMDLX 0163 S30 ...	270699	270700	1.63	12.0	13.4	3.0	38			
UMDLX 0164 S30 ...	270701	270702	1.64	12.0	13.4	3.0	38			
UMDLX 0165 S30 ...	270703	270704	1.65	12.0	13.4	3.0	38			
UMDLX 0166 S30 ...	270705	270706	1.66	12.0	13.4	3.0	38			
UMDLX 0167 S30 ...	270707	270708	1.67	12.0	13.4	3.0	38			
UMDLX 0168 S30 ...	270709	270710	1.68	12.0	13.4	3.0	38			
UMDLX 0169 S30 ...	270711	270712	1.69	12.0	13.4	3.0	38			
UMDLX 0170 S30 ...	270713	270714	1.70	12.0	13.4	3.0	38			
UMDLX 0171 S30 ...	270715	270716	1.71	12.0	13.4	3.0	38			
UMDLX 0172 S30 ...	270717	270718	1.72	12.0	13.4	3.0	38			
UMDLX 0173 S30 ...	270719	270720	1.73	12.0	13.4	3.0	38			
UMDLX 0174 S30 ...	270721	270722	1.74	12.0	13.4	3.0	38			
UMDLX 0175 S30 ...	270723	270724	1.75	12.0	13.4	3.0	38			
UMDLX 0176 S30 ...	270725	270726	1.76	12.0	13.4	3.0	38			
UMDLX 0177 S30 ...	270727	270728	1.77	12.0	13.4	3.0	38			
UMDLX 0178 S30 ...	270729	270730	1.78	12.0	13.4	3.0	38			
UMDLX 0179 S30 ...	270731	270732	1.79	12.0	13.4	3.0	38			
UMDLX 0180 S30 ...	270733	270734	1.80	12.0	13.4	3.0	38			
UMDLX 0181 S30 ...	270735	270736	1.81	12.0	13.4	3.0	38			
UMDLX 0182 S30 ...	270737	270738	1.82	12.0	13.4	3.0	38			
UMDLX 0183 S30 ...	270739	270740	1.83	12.0	13.4	3.0	38			
UMDLX 0184 S30 ...	270741	270742	1.84	12.0	13.4	3.0	38			
UMDLX 0185 S30 ...	270743	270744	1.85	12.0	13.4	3.0	38			
UMDLX 0186 S30 ...	270745	270746	1.86	12.0	13.4	3.0	38			
UMDLX 0187 S30 ...	270747	270748	1.87	12.0	13.4	3.0	38			
UMDLX 0188 S30 ...	270749	270750	1.88	12.0	13.4	3.0	38			
UMDLX 0189 S30 ...	270751	270752	1.89	12.0	13.4	3.0	38			

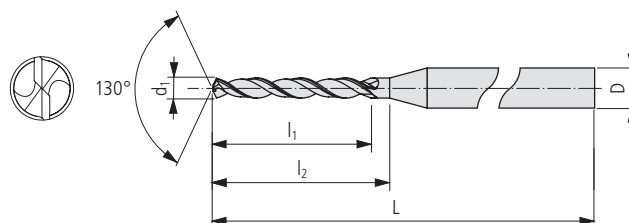
Solid carbide twist drills with reinforced shank

Point relief: 4 facet, 130°

With x-point for self-centering

6-8×d₁

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UMDLX ...

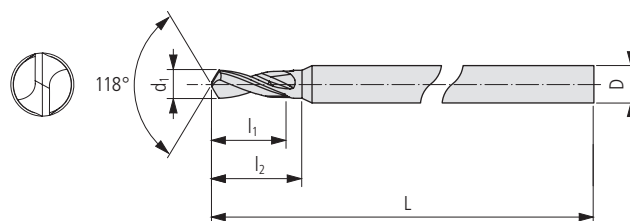
Order designation	Grade		Dimensions									
	Coating without	PVD										
	d ₁ -0.001/ -0.005	d ₁ +0.001/ -0.004										
	HMB	HMP700	d ₁	l ₁	l ₂	D h6	L					
Art. no.												
UMDLX 0190 S30 ...	270753	270754	1.90	12.0	13.4	3.0	38					
UMDLX 0191 S30 ...	270755	270756	1.91	12.0	13.4	3.0	38					
UMDLX 0192 S30 ...	270757	270758	1.92	12.0	13.4	3.0	38					
UMDLX 0193 S30 ...	270759	270760	1.93	12.0	13.4	3.0	38					
UMDLX 0194 S30 ...	270761	270762	1.94	12.0	13.4	3.0	38					
UMDLX 0195 S30 ...	270763	270764	1.95	12.0	13.4	3.0	38					
UMDLX 0196 S30 ...	270765	270766	1.96	12.0	13.4	3.0	38					
UMDLX 0197 S30 ...	270767	270768	1.97	12.0	13.4	3.0	38					
UMDLX 0198 S30 ...	270769	270770	1.98	12.0	13.4	3.0	38					
UMDLX 0199 S30 ...	270771	270772	1.99	12.0	13.4	3.0	38					
UMDLX 0200 S30 ...	270773	270774	2.00	12.0	13.4	3.0	38					
UMDLX 0205 S30 ...	270775	270776	2.05	15.0	16.7	3.0	50					
UMDLX 0210 S30 ...	270777	270778	2.10	15.0	16.7	3.0	50					
UMDLX 0215 S30 ...	270779	270780	2.15	15.0	16.7	3.0	50					
UMDLX 0220 S30 ...	270781	270782	2.20	15.0	16.7	3.0	50					
UMDLX 0225 S30 ...	270783	270784	2.25	15.0	16.7	3.0	50					
UMDLX 0230 S30 ...	270785	270786	2.30	15.0	16.7	3.0	50					
UMDLX 0235 S30 ...	270787	270788	2.35	15.0	16.7	3.0	50					
UMDLX 0240 S30 ...	270789	270790	2.40	15.0	16.7	3.0	50					
UMDLX 0245 S30 ...	270791	270792	2.45	15.0	16.7	3.0	50					
UMDLX 0250 S30 ...	270793	270794	2.50	15.0	16.7	3.0	50					
UMDLX 0255 S30 ...	270795	270796	2.55	18.0	20.0	3.0	50					
UMDLX 0260 S30 ...	270797	270798	2.60	18.0	20.0	3.0	50					
UMDLX 0265 S30 ...	270799	270800	2.65	18.0	20.0	3.0	50					
UMDLX 0270 S30 ...	270801	270802	2.70	18.0	20.0	3.0	50					
UMDLX 0275 S30 ...	270803	270804	2.75	18.0	20.0	3.0	50					
UMDLX 0280 S30 ...	270805	270806	2.80	18.0	20.0	3.0	50					
UMDLX 0285 S30 ...	270807	270808	2.85	18.0	20.0	3.0	50					
UMDLX 0290 S30 ...	270809	270810	2.90	18.0	20.0	3.0	50					
UMDLX 0295 S30 ...	270811	270812	2.95	18.0	20.0	3.0	50					
UMDLX 0300 S30 ...	270813	270814	3.00	18.0	20.0	3.0	50					

Solid carbide twist drills with reinforced shank

Point relief: 4 facet, 118°

2-3×d₁

UMDS ...



	Order designation	Grade		Dimensions									
		Coating		d ₁ 0/-0.004	l ₁	l ₂	D h6	L					
		without	PVD										
		HMB	HMP700										
Art. no.													
UMDS 0010 S10 ...	270315			0.10	0.25	0.4	1.0	30					
UMDS 0015 S10 ...	270316			0.15	0.38	0.5	1.0	30					
UMDS 0020 S10 ...	270317			0.20	0.5	0.7	1.0	30					
UMDS 0025 S10 ...	270318			0.25	0.65	0.8	1.0	30					
UMDS 0030 S10 ...	270319			0.30	0.75	0.9	1.0	30					
UMDS 0035 S10 ...	270320			0.35	0.9	1.1	1.0	30					
UMDS 0040 S10 ...	270321			0.40	1.0	1.4	1.0	30					
UMDS 0045 S10 ...	270322			0.45	1.15	1.5	1.0	30					
UMDS 0050 S10 ...	270323			0.50	1.4	2.0	1.0	30					
UMDS 0055 S10 ...	270324			0.55	1.4	2.0	1.0	30					
UMDS 0060 S10 ...	270325			0.60	1.5	2.1	1.0	30					
UMDS 0065 S10 ...	270326			0.65	1.6	2.2	1.0	30					
UMDS 0070 S10 ...	270327			0.70	1.8	2.4	1.0	30					
UMDS 0075 S10 ...	270328			0.75	1.9	2.5	1.0	30					
UMDS 0080 S15 ...	270329			0.80	2.0	2.6	1.5	30					
UMDS 0085 S15 ...	270330			0.85	2.1	2.8	1.5	30					
UMDS 0090 S15 ...	270331			0.90	2.3	3.0	1.5	30					
UMDS 0095 S15 ...	270332			0.95	2.3	3.0	1.5	30					
UMDS 0100 S15 ...	270333			1.00	2.5	3.2	1.5	30					
UMDS 0105 S15 ...	270334			1.05	2.6	3.5	1.5	30					
UMDS 0110 S15 ...	270335			1.10	2.8	3.7	1.5	30					
UMDS 0115 S15 ...	270336			1.15	3.0	3.9	1.5	30					
UMDS 0120 S15 ...	270337			1.20	3.0	3.9	1.5	30					
UMDS 0125 S15 ...	270338			1.25	3.0	3.9	1.5	30					
UMDS 0130 S15 ...	270339			1.30	3.3	4.2	1.5	30					
UMDS 0135 S15 ...	270340			1.35	3.3	4.2	1.5	30					
UMDS 0140 S15 ...	270341			1.40	3.5	4.4	1.5	30					
UMDS 0145 S15 ...	270342			1.45	3.5	4.4	1.5	30					
UMDS 0150 S20 ...	270343			1.50	3.8	4.8	2.0	38					
UMDS 0155 S20 ...	270344			1.55	3.9	5.0	2.0	38					
UMDS 0160 S20 ...	270345			1.60	4.0	5.1	2.0	38					
UMDS 0165 S20 ...	270346			1.65	4.1	5.2	2.0	38					
UMDS 0170 S20 ...	270347			1.70	4.3	5.3	2.0	38					
UMDS 0175 S20 ...	270348			1.75	4.4	5.5	2.0	38					
UMDS 0180 S20 ...	270349			1.80	4.5	5.6	2.0	38					
UMDS 0185 S20 ...	270350			1.85	4.5	5.6	2.0	38					
UMDS 0190 S20 ...	270351			1.90	4.5	5.6	2.0	38					
UMDS 0195 S20 ...	270352			1.95	4.5	5.6	2.0	38					
UMDS 0200 S30 ...	270353			2.00	4.5	5.6	3.0	38					
UMDS 0205 S30 ...	270354			2.05	4.5	5.8	3.0	38					
UMDS 0210 S30 ...	270355			2.10	4.5	5.8	3.0	38					
UMDS 0215 S30 ...	270356			2.15	4.5	5.8	3.0	38					
UMDS 0220 S30 ...	270357			2.20	4.5	5.8	3.0	38					

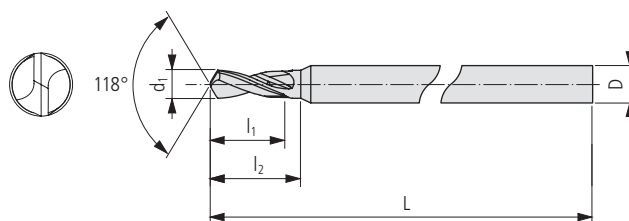
For Ø < 2.0 mm drills, intermediate dimensions are available on request.

Solid carbide twist drills with reinforced shank

Point relief: 4 facet, 118°

2-3×d₁

18



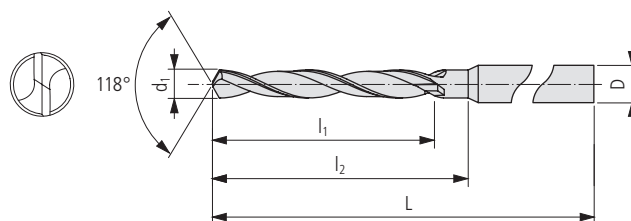
UMDS ...

Order designation	Grade		Dimensions									
	Coating		d ₁ 0/-0.004	l ₁	l ₂	D h6	L					
	without	PVD										
	HMB	HMP700										
Art. no.												
UMDS 0225 S30 ...	270358		2.25	4.5	5.8	3.0	38					
UMDS 0230 S30 ...	270359		2.30	4.5	5.8	3.0	38					
UMDS 0235 S30 ...	270360		2.35	4.5	5.8	3.0	38					
UMDS 0240 S30 ...	270361		2.40	4.5	5.8	3.0	38					
UMDS 0245 S30 ...	270362		2.45	4.5	5.8	3.0	38					
UMDS 0250 S30 ...	270363		2.50	4.5	5.8	3.0	38					
UMDS 0255 S30 ...	270364		2.55	4.5	5.8	3.0	38					
UMDS 0260 S30 ...	270365		2.60	4.5	5.8	3.0	38					
UMDS 0265 S30 ...	270366		2.65	4.5	5.8	3.0	38					
UMDS 0270 S30 ...	270367		2.70	4.5	5.8	3.0	38					
UMDS 0275 S30 ...	270368		2.75	4.5	5.8	3.0	38					
UMDS 0280 S30 ...	270369		2.80	4.5	5.8	3.0	38					
UMDS 0285 S30 ...	270370		2.85	4.5	5.8	3.0	38					
UMDS 0290 S30 ...	270371		2.90	4.5	5.8	3.0	38					
UMDS 0295 S30 ...	270372		2.95	4.5	5.8	3.0	38					
UMDS 0300 S30 ...	270373		3.00	4.5	5.8	3.0	38					

For Ø < 2.0 mm drills, intermediate dimensions are available on request.

Solid carbide twist drills long with reinforced shank

Point relief: 4 facet, 118°

5-8×d₁

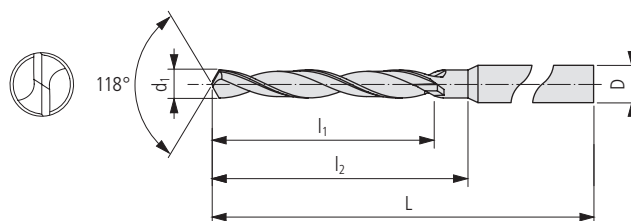
UMDL ...

Order designation	Grade		Dimensions									
	Coating		d ₁ 0/-0.004	l ₁	l ₂	D h6	L					
	without	PVD										
	HMB	HMP700										
Art. no.												
UMDL 0010 S10 ...	270374		0.10	0.6	0.8	1.0	30					
UMDL 0015 S10 ...	270375		0.15	0.8	1.0	1.0	30					
UMDL 0020 S10 ...	270376		0.20	1.0	1.3	1.0	30					
UMDL 0025 S10 ...	270377		0.25	1.0	1.3	1.0	30					
UMDL 0030 S10 ...	270378		0.30	1.5	1.8	1.0	30					
UMDL 0035 S10 ...	270379		0.35	1.5	1.8	1.0	30					
UMDL 0040 S10 ...	270380		0.40	2.0	2.4	1.0	30					
UMDL 0045 S10 ...	270381		0.45	3.5	4.0	1.0	30					
UMDL 0050 S10 ...	270382		0.50	4.0	4.9	1.0	30					
UMDL 0055 S10 ...	270383		0.55	4.5	5.4	1.0	30					
UMDL 0060 S10 ...	270384		0.60	4.5	5.4	1.0	30					
UMDL 0065 S10 ...	270385		0.65	5.0	6.0	1.0	30					
UMDL 0070 S10 ...	270386		0.70	5.6	6.7	1.0	30					
UMDL 0075 S10 ...	270387		0.75	5.6	6.7	1.0	30					
UMDL 0080 S15 ...	270388		0.80	6.5	7.6	1.5	30					
UMDL 0085 S15 ...	270389		0.85	6.5	7.6	1.5	30					
UMDL 0090 S15 ...	270390		0.90	7.0	8.2	1.5	30					
UMDL 0095 S15 ...	270391		0.95	7.0	8.2	1.5	30					
UMDL 0100 S15 ...	270392		1.00	9.0	10.4	1.5	30					
UMDL 0105 S15 ...	270393		1.05	9.0	10.4	1.5	30					
UMDL 0110 S15 ...	270394		1.10	9.0	10.4	1.5	30					
UMDL 0115 S15 ...	270395		1.15	9.0	10.4	1.5	30					
UMDL 0120 S15 ...	270396		1.20	10.0	11.5	1.5	30					
UMDL 0125 S15 ...	270397		1.25	10.0	11.5	1.5	30					
UMDL 0130 S15 ...	270398		1.30	10.0	11.5	1.5	30					
UMDL 0135 S15 ...	270399		1.35	11.5	13.1	1.5	30					
UMDL 0140 S15 ...	270400		1.40	11.5	13.1	1.5	30					
UMDL 0145 S15 ...	270401		1.45	11.5	13.1	1.5	30					
UMDL 0150 S20 ...	270402		1.50	12.0	13.6	2.0	38					
UMDL 0155 S20 ...	270403		1.55	12.0	13.8	2.0	38					
UMDL 0160 S20 ...	270404		1.60	12.0	13.8	2.0	38					
UMDL 0165 S20 ...	270405		1.65	12.0	13.8	2.0	38					
UMDL 0170 S20 ...	270406		1.70	12.0	13.8	2.0	38					
UMDL 0175 S20 ...	270407		1.75	12.0	13.8	2.0	38					
UMDL 0180 S20 ...	270408		1.80	12.0	13.8	2.0	38					
UMDL 0185 S20 ...	270409		1.85	12.0	13.8	2.0	38					
UMDL 0190 S20 ...	270410		1.90	12.0	13.8	2.0	38					
UMDL 0195 S20 ...	270411		1.95	12.0	13.8	2.0	38					
UMDL 0200 S30 ...	270412		2.00	12.0	13.8	3.0	38					
UMDL 0205 S30 ...	270413		2.05	12.0	14.0	3.0	38					
UMDL 0210 S30 ...	270414		2.10	12.0	14.0	3.0	38					
UMDL 0215 S30 ...	270415		2.15	12.0	14.0	3.0	38					
UMDL 0220 S30 ...	270416		2.20	12.0	14.0	3.0	38					

For Ø < 2.0 mm drills, intermediate dimensions are available on request.

Solid carbide twist drills long with reinforced shank

Point relief: 4 facet, 118°

5-8×d₁

UMDL ...

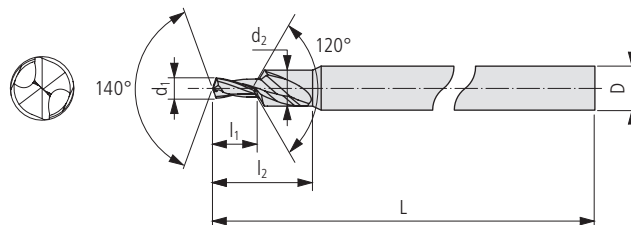
Order designation	Grade		Dimensions									
	Coating		d ₁ 0/-0.004	l ₁	l ₂	D h6	L					
	without	PVD										
	HMB	HMP700										
Art. no.												
UMDL 0225 S30 ...	270417		2.25	12.0	14.0	3.0	38					
UMDL 0230 S30 ...	270418		2.30	12.0	14.0	3.0	38					
UMDL 0235 S30 ...	270419		2.35	12.0	14.0	3.0	38					
UMDL 0240 S30 ...	270420		2.40	12.0	14.0	3.0	38					
UMDL 0245 S30 ...	270421		2.45	12.0	14.0	3.0	38					
UMDL 0250 S30 ...	270422		2.50	12.0	14.0	3.0	38					
UMDL 0255 S30 ...	270423		2.55	12.0	14.0	3.0	38					
UMDL 0260 S30 ...	270424		2.60	12.0	14.0	3.0	38					
UMDL 0265 S30 ...	270425		2.65	12.0	14.0	3.0	38					
UMDL 0270 S30 ...	270426		2.70	12.0	14.0	3.0	38					
UMDL 0275 S30 ...	270427		2.75	12.0	14.0	3.0	38					
UMDL 0280 S30 ...	270428		2.80	12.0	14.0	3.0	38					
UMDL 0285 S30 ...	270429		2.85	12.0	14.0	3.0	38					
UMDL 0290 S30 ...	270430		2.90	12.0	14.0	3.0	38					
UMDL 0295 S30 ...	270431		2.95	12.0	14.0	3.0	38					
UMDL 0300 S30 ...	270432		3.00	12.0	14.0	3.0	38					

For Ø < 2.0 mm drills, intermediate dimensions are available on request.

Solid carbide pilot drill for centering and spot drilling with 120° chamfering

Point relief: 4 facet, 140°

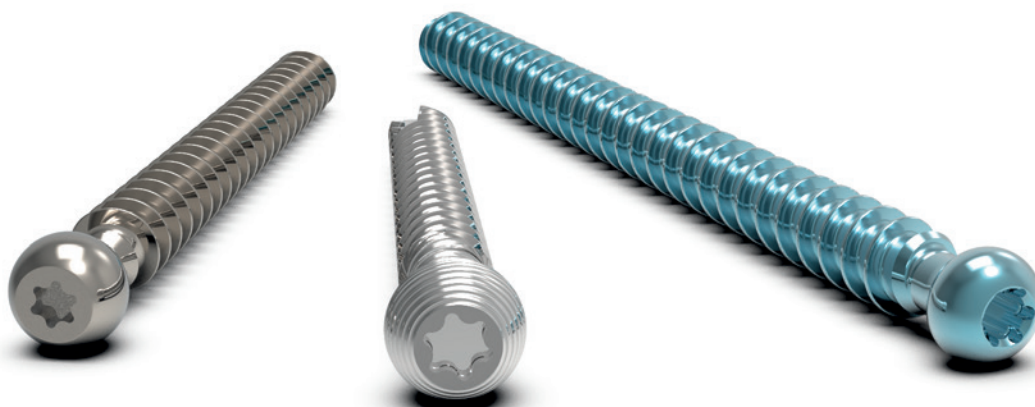
S-point: self-centering



UMDT ...

Order designation	Grade		Dimensions									
	Coating		TORX®	d ₁	l ₁	d ₂	l ₂	D h6	L			
	without	PVD										
	HMB	HMP700										
Art. no.												
UMDT 4-0090 x 0071 S30 ...		270227	T4	0.90	0.71	2.00	1.80	3.0	38			
UMDT 5-0100 x 0089 S30 ...		270228	T5	1.00	0.89	2.00	2.00	3.0	38			
UMDT 6-0120 x 0105 S30 ...		270229	T6	1.20	1.05	2.35	2.40	3.0	38			
UMDT 7-0140 x 0105 S30 ...		270230	T7	1.40	1.05	3.00	2.40	3.0	38			
UMDT 8-0162 x 0142 S30 ...		270231	T8	1.62	1.42	3.00	3.30	3.0	38			
UMDT 10-0193 x 0145 S40 ...		270232	T10	1.93	1.45	3.40	3.90	4.0	50			
UMDT 15-0231 x 0180 S40 ...		270233	T15	2.31	1.80	3.95	4.70	4.0	50			
UMDT 20-0272 x 0215 S60 ...		270234	T20	2.72	2.15	4.55	5.50	6.0	50			
UMDT 25-0312 x 0285 S60 ...		270235	T25	3.12	2.85	5.10	6.30	6.0	50			
UMDT 30-0390 x 0350 S60 ...		270236	T30	3.90	3.50	6.20	7.90	6.0	50			
UMDT 40-0470 x 0370 S60 ...		555577	T40	4.70	3.70	7.35	9.50	8.0	50			

TORX® is a registered trademark of a third party



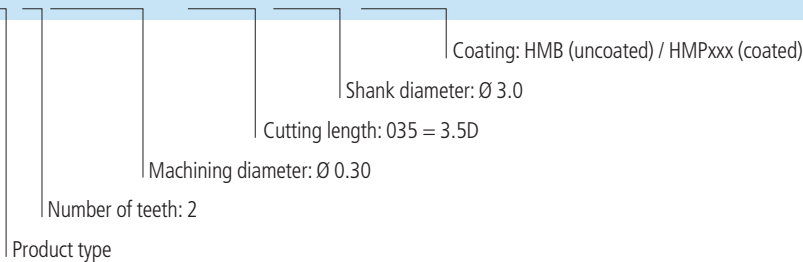
Materials	Uncoated HMB	Coated HMP...	
	Cutting speeds v_c (m/min)	Cutting speeds v_c (m/min)	Feeds f_z (mm/Z)
Steel non-alloyed < 600 N/mm ²	60–80	70–100	$d_1/150$
Steel low alloyed 600–800 N/mm ²	50–70	60–90	$d_1/150$
Steel high alloyed > 800 N/mm ²	40–60	50–80	$d_1/150$
Ferritic/Martensitic steel	35–70	40–80	$d_1/150$
Austenitic steel Cr-Ni alloy	30–60	35–70	$d_1/150$
Titanium	20–45	25–50	$d_1/180$
Aluminum	100–250	120–300	$d_1/100$
Brass / Lead-free brass	80–200	100–250	$d_1/150$
Copper / Bronze	60–140	80–160	$d_1/150$
Precious metals	80–140	100–160	$d_1/150$
Hard materials 45–55 HRC	–	25–60	$d_1/200$

Remarks

When using tools with very small diameter, it is possible to work with much lower cutting speed in an efficient way (for example Ø 0.30 mm by 6000 RPM = 5.7 m/min). Feed rate is a medium value for a first setup. Higher speed is possible by ideal machining conditions.

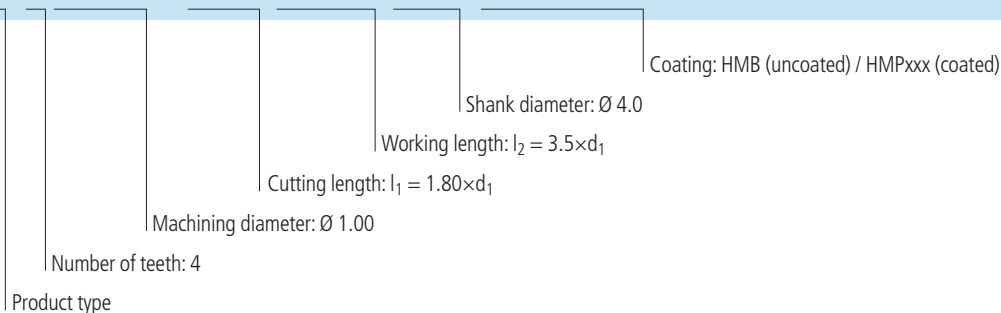
Designation system for mills

UMM 20030 x 035 S30 HMB



Designation system for TORX®-form end-mills

UMMT 40100 x 018 H035 S40 HMP600



End mills		Z	d ₁	l ₁	 α	D	
UMM 2... x 02		2	0.20–3.00	2×d ₁	30°	3.0	24
UMM 2... x 035		2	0.20–3.00	3.5×d ₁	30°	3.0	25
UMM 2... x 05		2	0.30–3.00	5×d ₁	30°	3.0	26
UMM 3... x 02	in 0.1 mm steps up to Ø2.50 mm 	3	0.30–3.00	2×d ₁	30°	3.0	27
UMM 3... x 035		3	0.30–3.00	3.5×d ₁	30°	3.0	28
UMM 3... x 05		3	0.30–3.00	5×d ₁	30°	3.0	29
UMMW 3... x 02		3	0.30–4.00	2×d ₁	38°	4.0	30

End mills		Z	d ₁	l ₂	 α	D	
UMMT ... x 018 H035 ...		3 4	0.20–0.30 0.40–1.00	3.5×d ₁	38°	4.0	31
UMMT ... x 018 H05 ...		3 4	0.20–0.30 0.40–1.00	5×d ₁	38°	4.0	32

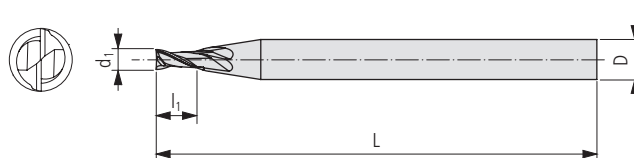
Ball nose end mills		Z	d ₁	l ₁	 α	D	
UMMB 2... x 0075		2	0.30–3.00	0.75×d ₁	30°	3.0	33
UMMB 2... x 03		2	0.30–3.00	3×d ₁	30°	3.0	34

Solid carbide micro end mill

With centre cut

 $2 \times d_1$ 

90°

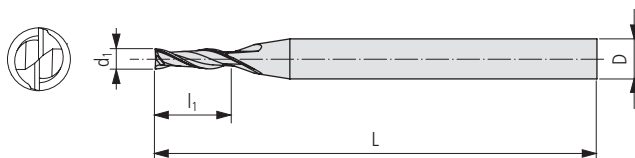


UMM 2... x 02 ...

Order designation	Grade		Dimensions									
	Coating		d ₁ 0/-0.015	l ₁	D h5	L	Z					
	without HMB	PVD HMP700										
Art. no.												
UMM 20020 x 02 S30 ...	270000	270001	0.20	0.4	3.0	38	2					
UMM 20025 x 02 S30 ...	270004	270005	0.25	0.5	3.0	38	2					
UMM 20030 x 02 S30 ...	270008	270009	0.30	0.6	3.0	38	2					
UMM 20040 x 02 S30 ...	270014	270015	0.40	0.8	3.0	38	2					
UMM 20050 x 02 S30 ...	270020	270021	0.50	1.0	3.0	38	2					
UMM 20060 x 02 S30 ...	270026	270027	0.60	1.2	3.0	38	2					
UMM 20070 x 02 S30 ...	270032	270033	0.70	1.4	3.0	38	2					
UMM 20080 x 02 S30 ...	270038	270039	0.80	1.6	3.0	38	2					
UMM 20090 x 02 S30 ...	270044	270045	0.90	1.8	3.0	38	2					
UMM 20100 x 02 S30 ...	270050	270051	1.00	2.0	3.0	38	2					
UMM 20120 x 02 S30 ...	270056	270057	1.20	2.4	3.0	38	2					
UMM 20150 x 02 S30 ...	270062	270063	1.50	3.0	3.0	38	2					
UMM 20200 x 02 S30 ...	270070	270071	2.00	4.0	3.0	38	2					
UMM 20250 x 02 S30 ...	270076	270077	2.50	5.0	3.0	38	2					
UMM 20300 x 02 S30 ...	270084	270085	3.00	6.0	3.0	38	2					

Solid carbide micro end mill

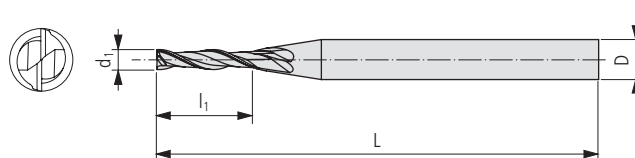
With centre cut

3.5×d₁**90°****UMM 2... x 035 ...**

Order designation	Grade		Dimensions									
	Coating		d ₁ 0/-0.015	l ₁	D h5	L	Z					
	without HMB	PVD HMP700										
Art. no.												
UMM 20020 x 035 S30 ...	270002	270003	0.20	0.7	3.0	38	2					
UMM 20025 x 035 S30 ...	270006	270007	0.25	0.9	3.0	38	2					
UMM 20030 x 035 S30 ...	270010	270011	0.30	1.1	3.0	38	2					
UMM 20040 x 035 S30 ...	270016	270017	0.40	1.4	3.0	38	2					
UMM 20050 x 035 S30 ...	270022	270023	0.50	1.8	3.0	38	2					
UMM 20060 x 035 S30 ...	270028	270029	0.60	2.1	3.0	38	2					
UMM 20070 x 035 S30 ...	270034	270035	0.70	2.5	3.0	38	2					
UMM 20080 x 035 S30 ...	270040	270041	0.80	2.8	3.0	38	2					
UMM 20090 x 035 S30 ...	270046	270047	0.90	3.2	3.0	38	2					
UMM 20100 x 035 S30 ...	270052	270053	1.00	3.5	3.0	38	2					
UMM 20120 x 035 S30 ...	270058	270059	1.20	4.2	3.0	38	2					
UMM 20150 x 035 S30 ...	270064	270065	1.50	5.2	3.0	38	2					
UMM 20200 x 035 S30 ...	270072	270073	2.00	7.0	3.0	38	2					
UMM 20250 x 035 S30 ...	270078	270079	2.50	8.8	3.0	38	2					
UMM 20300 x 035 S30 ...	270080	270081	3.00	10.5	3.0	38	2					

Solid carbide micro end mill

With centre cut

 $5 \times d_1$ 

UMM 2... x 05 ...

Order designation	Grade		Dimensions										
	Coating		d ₁ 0/-0.015	l ₁	D h5	L	Z						
	without HMB	PVD HMP700											
Art. no.													
UMM 20030 x 05 S30 ...	270012	270013	0.30	1.5	3.0	38	2						
UMM 20040 x 05 S30 ...	270018	270019	0.40	2.0	3.0	38	2						
UMM 20050 x 05 S30 ...	270024	270025	0.50	2.5	3.0	38	2						
UMM 20060 x 05 S30 ...	270030	270031	0.60	3.0	3.0	38	2						
UMM 20070 x 05 S30 ...	270036	270037	0.70	3.5	3.0	38	2						
UMM 20080 x 05 S30 ...	270042	270043	0.80	4.0	3.0	38	2						
UMM 20090 x 05 S30 ...	270048	270049	0.90	4.5	3.0	38	2						
UMM 20100 x 05 S30 ...	270054	270055	1.00	5.0	3.0	38	2						
UMM 20120 x 05 S30 ...	270060	270061	1.20	6.0	3.0	38	2						
UMM 20150 x 05 S30 ...	270066	270067	1.50	7.5	3.0	38	2						
UMM 20200 x 05 S30 ...	270068	270069	2.00	10.0	3.0	38	2						
UMM 20250 x 05 S30 ...	270074	270075	2.50	12.5	3.0	38	2						
UMM 20300 x 05 S30 ...	270082	270083	3.00	15.0	3.0	38	2						

Solid carbide micro end mill

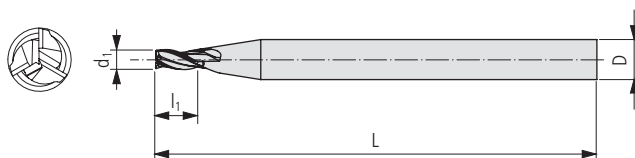
With centre cut

 $2 \times d_1$ 

90°



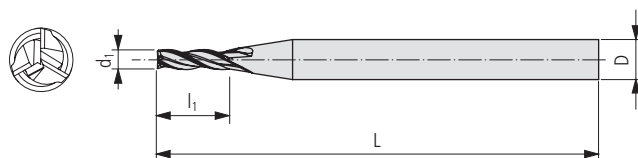
UMM 3... x 02 ...



Order designation	Grade		Dimensions										
	Coating		d ₁ 0/-0.015	l ₁	D h5	L	Z						
	without HMB	PVD HMP700											
Art. no.													
UMM 30030 x 02 S30 ...	270086	270087	0.30	0.6	3.0	38	3						
UMM 30040 x 02 S30 ...	270092	270093	0.40	0.8	3.0	38	3						
UMM 30050 x 02 S30 ...	270098	270099	0.50	1.0	3.0	38	3						
UMM 30060 x 02 S30 ...	270104	270105	0.60	1.2	3.0	38	3						
UMM 30070 x 02 S30 ...	270110	270111	0.70	1.4	3.0	38	3						
UMM 30080 x 02 S30 ...	270115	270116	0.80	1.6	3.0	38	3						
UMM 30090 x 02 S30 ...	270121	270122	0.90	1.8	3.0	38	3						
UMM 30100 x 02 S30 ...	270127	270128	1.00	2.0	3.0	38	3						
UMM 30110 x 02 S30 ...	554891	554892	1.10	2.2	3.0	38	3						
UMM 30120 x 02 S30 ...	270133	270134	1.20	2.4	3.0	38	3						
UMM 30130 x 02 S30 ...	554893	554894	1.30	2.6	3.0	38	3						
UMM 30140 x 02 S30 ...	554895	554896	1.40	2.8	3.0	38	3						
UMM 30150 x 02 S30 ...	270139	270140	1.50	3.0	3.0	38	3						
UMM 30160 x 02 S30 ...	554897	554898	1.60	3.2	3.0	38	3						
UMM 30170 x 02 S30 ...	554899	554900	1.70	3.4	3.0	38	3						
UMM 30180 x 02 S30 ...	554901	554902	1.80	3.6	3.0	38	3						
UMM 30190 x 02 S30 ...	554903	554904	1.90	3.8	3.0	38	3						
UMM 30200 x 02 S30 ...	270147	270148	2.00	4.0	3.0	38	3						
UMM 30210 x 02 S30 ...	554905	554906	2.10	4.2	3.0	38	3						
UMM 30220 x 02 S30 ...	554907	554908	2.20	4.4	3.0	38	3						
UMM 30230 x 02 S30 ...	554909	554910	2.30	4.6	3.0	38	3						
UMM 30240 x 02 S30 ...	554911	554912	2.40	4.8	3.0	38	3						
UMM 30250 x 02 S30 ...	270153	270154	2.50	5.0	3.0	38	3						
UMM 30300 x 02 S30 ...	270161	270162	3.00	6.0	3.0	38	3						

Solid carbide micro end mill

With centre cut

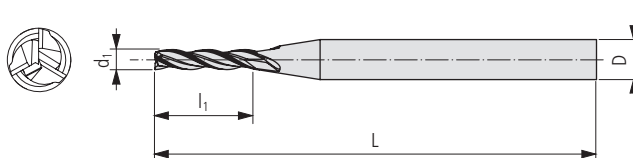
3.5×d₁

UMM 3... x 035 ...

Order designation	Grade		Dimensions										
	Coating		d ₁ 0/-0.015	l ₁	D h5	L	Z						
	without HMB	PVD HMP700											
Art. no.													
UMM 30030 x 035 S30 ...	270088	270089	0.30	1.1	3.0	38	3						
UMM 30040 x 035 S30 ...	270094	270095	0.40	1.4	3.0	38	3						
UMM 30050 x 035 S30 ...	270100	270101	0.50	1.8	3.0	38	3						
UMM 30060 x 035 S30 ...	270106	270107	0.60	2.1	3.0	38	3						
UMM 30070 x 035 S30 ...	270112	270113	0.70	2.5	3.0	38	3						
UMM 30080 x 035 S30 ...	270117	270118	0.80	2.8	3.0	38	3						
UMM 30090 x 035 S30 ...	270123	270124	0.90	3.2	3.0	38	3						
UMM 30100 x 035 S30 ...	270129	270130	1.00	3.5	3.0	38	3						
UMM 30120 x 035 S30 ...	270135	270136	1.20	4.2	3.0	38	3						
UMM 30150 x 035 S30 ...	270141	270142	1.50	5.2	3.0	38	3						
UMM 30200 x 035 S30 ...	270149	270150	2.00	7.0	3.0	38	3						
UMM 30250 x 035 S30 ...	270155	270156	2.50	8.8	3.0	38	3						
UMM 30300 x 035 S30 ...	270157	270158	3.00	10.5	3.0	38	3						

Solid carbide micro end mill

With centre cut

5×d₁**90°****UMM 3... x 05 ...**

Order designation	Grade		Dimensions										
	Coating		d ₁ 0/-0.015	l ₁	D h5	L	Z						
	without	PVD											
	HMB	HMP700											
Art. no.													
UMM 30030 x 05 S30 ...	270090	270091	0.30	1.5	3.0	38	3						
UMM 30040 x 05 S30 ...	270096	270097	0.40	2.0	3.0	38	3						
UMM 30050 x 05 S30 ...	270102	270103	0.50	2.5	3.0	38	3						
UMM 30060 x 05 S30 ...	270108	270109	0.60	3.0	3.0	38	3						
UMM 30070 x 05 S30 ...	270114	270885	0.70	3.5	3.0	38	3						
UMM 30080 x 05 S30 ...	270119	270120	0.80	4.0	3.0	38	3						
UMM 30090 x 05 S30 ...	270125	270126	0.90	4.5	3.0	38	3						
UMM 30100 x 05 S30 ...	270131	270132	1.00	5.0	3.0	38	3						
UMM 30120 x 05 S30 ...	270137	270138	1.20	6.0	3.0	38	3						
UMM 30150 x 05 S30 ...	270143	270144	1.50	7.5	3.0	38	3						
UMM 30200 x 05 S30 ...	270145	270146	2.00	10.0	3.0	38	3						
UMM 30250 x 05 S30 ...	270151	270152	2.50	12.5	3.0	38	3						
UMM 30300 x 05 S30 ...	270159	270160	3.00	15.0	3.0	38	3						

Solid carbide micro end mill

Shank Ø 4 mm, very stable design
With centre cut

2×d₁**90°****UMMW 3... x 02 ...**

Order designation	Grade				Dimensions							
	without	PVD	PVD	DLC	d ₁	l ₁	D	L	Z			
	HMB	HMP600	HMP800	HMD65			h5					
Art. no.												
UMMW 30030 x 02 S40 ...	554204	554205	554206	554207	0.30	0.6	4.0	40	3			
UMMW 30040 x 02 S40 ...	554208	554209	554210	554211	0.40	0.8	4.0	40	3			
UMMW 30050 x 02 S40 ...	554212	554213	554214	554215	0.50	1.0	4.0	40	3			
UMMW 30060 x 02 S40 ...	554216	554217	554218	554219	0.60	1.2	4.0	40	3			
UMMW 30070 x 02 S40 ...	554220	554221	554222	554223	0.70	1.4	4.0	40	3			
UMMW 30080 x 02 S40 ...	554224	554225	554226	554227	0.80	1.6	4.0	40	3			
UMMW 30090 x 02 S40 ...	554228	554229	554230	554231	0.90	1.8	4.0	40	3			
UMMW 30100 x 02 S40 ...	554232	554233	554234	554235	1.00	2.0	4.0	40	3			
UMMW 30120 x 02 S40 ...	554236	554237	554238	554239	1.20	2.4	4.0	40	3			
UMMW 30150 x 02 S40 ...	554240	554241	554242	554243	1.50	3.0	4.0	40	3			
UMMW 30200 x 02 S40 ...	554244	554245	554246	554247	2.00	4.0	4.0	40	3			
UMMW 30250 x 02 S40 ...	554248	554249	554250	554251	2.50	5.0	4.0	40	3			
UMMW 30300 x 02 S40 ...	554252	554253	554254	554255	3.00	6.0	4.0	40	3			
UMMW 30350 x 02 S40 ...	555029	555030	555031	555032	3.50	7.0	4.0	40	3			
UMMW 30400 x 02 S40 ...	555033	555034	555035	555036	4.00	8.0	4.0	40	3			

Note concerning coating

HMB (non-coated): Sharpest cutting edge

HMP600 (PVD coated): Best universal grade

HMP800 (PVD coated): For materials that are difficult to machine and pre-hardened steel

HMD65 (DLC basis): For non-ferrous and precious metals

Solid carbide micro end mill

Perfectly suited for milling the TORX® contour

$$l_2 = 3.5 \times d_1$$

$$d_1 \leq 0.30$$

$$d_1 \geq 0.40$$

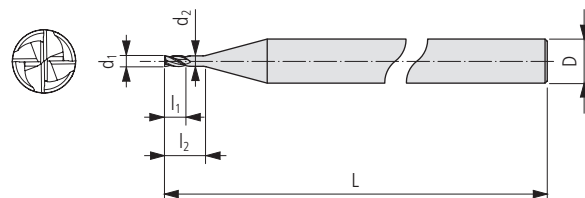
$$38^\circ$$

$$90^\circ$$

$$90^\circ$$

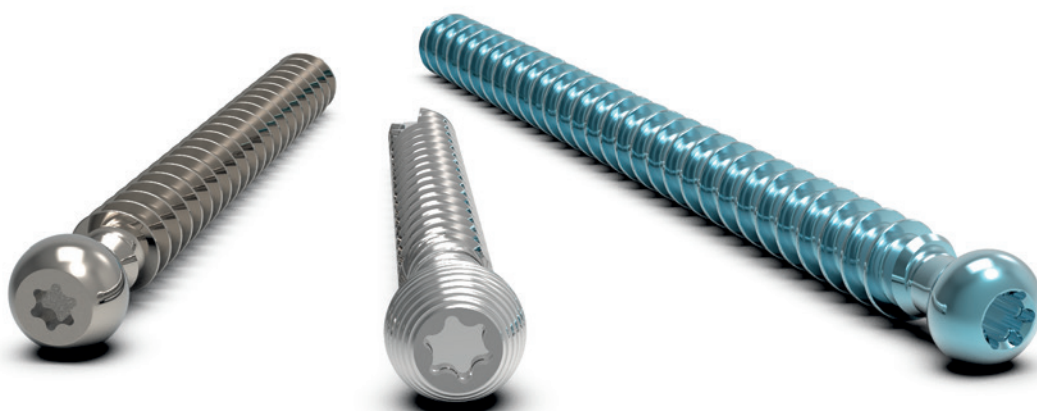


UMMT ... x 018 H035 ...



Order designation	Grade		Dimensions									
	Coating		TORX®	d ₁ 0/-0.010	l ₁	d ₂	l ₂	D h5	L	Z		
	without HMB	PVD HMP600										
Art. no.												
UMMT 30020 x 018 H035 S40 ...		270211	T4	0.20	0.36	0.19	0.7	4.0	40	3		
UMMT 30025 x 018 H035 S40 ...		270212	T5	0.25	0.45	0.23	0.9	4.0	40	3		
UMMT 30030 x 018 H035 S40 ...		270213	T6 / T7	0.30	0.54	0.28	1.1	4.0	40	3		
UMMT 40040 x 018 H035 S40 ...		215784	T8 / T10	0.40	0.72	0.38	1.4	4.0	40	4		
UMMT 40050 x 018 H035 S40 ...		270214	T10 / T15	0.50	0.90	0.47	1.8	4.0	40	4		
UMMT 40060 x 018 H035 S40 ...		270215	T15 / T20	0.60	1.08	0.56	2.1	4.0	40	4		
UMMT 40070 x 018 H035 S40 ...		270216	T20 / T25	0.70	1.26	0.65	2.5	4.0	40	4		
UMMT 40080 x 018 H035 S40 ...		270217	T25	0.80	1.44	0.75	2.8	4.0	40	4		
UMMT 40100 x 018 H035 S40 ...		270218	T30	1.00	1.80	0.95	3.5	4.0	40	4		
UMMT 40120 x 018 H035 S40 ...		554070	T40 / T45	1.20	2.16	1.15	4.2	4.0	40	4		
UMMT 40150 x 018 H035 S40 ...		554071	T50 / T55	1.50	2.70	1.45	5.25	4.0	40	4		
UMMT 40200 x 018 H035 S40 ...		554072	T60 / T70	2.00	3.60	1.95	7.0	4.0	40	4		
UMMT 40250 x 018 H035 S40 ...		554073	T70	2.50	4.50	2.45	8.75	4.0	40	4		
UMMT 40300 x 018 H035 S40 ...		554074	T80 / T100	3.00	5.40	2.95	10.5	4.0	40	4		

TORX® is a registered trademark of a third party



Solid carbide micro end mill

Perfectly suited for milling the TORX® contour

$$l_2 = 5 \times d_1$$

$$d_1 \leq 0.30$$

$$d_1 \geq 0.40$$

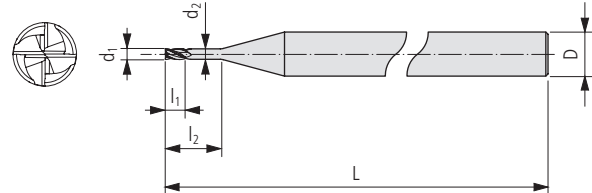
$$38^\circ$$



$$90^\circ$$



UMMT ... x 018 H05 ...



Order designation	Grade		Dimensions									
	Coating		TORX®	d ₁ 0/-0.010	l ₁	d ₂	l ₂	D h5	L	Z		
	without	PVD										
	HMB	HMP600										
Art. no.												
UMMT 30020 x 018 H05 S40 ...		270219	T4	0.20	0.36	0.19	1.0	4.0	40	3		
UMMT 30025 x 018 H05 S40 ...		270220	T5	0.25	0.45	0.23	1.3	4.0	40	3		
UMMT 30030 x 018 H05 S40 ...		270221	T6 / T7	0.30	0.54	0.28	1.5	4.0	40	3		
UMMT 40040 x 018 H05 S40 ...		270222	T8 / T10	0.40	0.72	0.38	2.0	4.0	40	4		
UMMT 40050 x 018 H05 S40 ...		270223	T10 / T15	0.50	0.90	0.47	2.5	4.0	40	4		
UMMT 40060 x 018 H05 S40 ...		215783	T15 / T20	0.60	1.08	0.56	3.0	4.0	40	4		
UMMT 40070 x 018 H05 S40 ...		270224	T20 / T25	0.70	1.26	0.65	3.5	4.0	40	4		
UMMT 40080 x 018 H05 S40 ...		270225	T25	0.80	1.44	0.75	4.0	4.0	40	4		
UMMT 40100 x 018 H05 S40 ...		270226	T30	1.00	1.80	0.94	5.0	4.0	40	4		

TORX® is a registered trademark of a third party

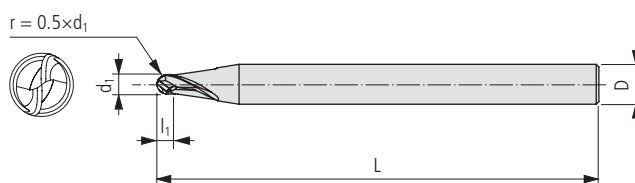


Solid carbide micro ball nose end mill
With centre cut

0.75×d₁

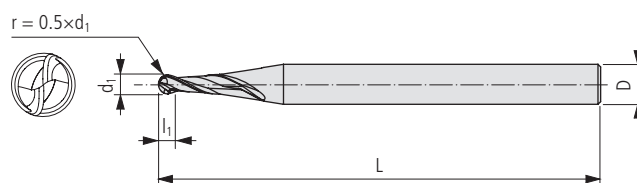


UMMB 2... x 0075 ...



Order designation	Grade		Dimensions										
	Coating		d ₁ 0/-0.015	l ₁	D h5	L	Z						
	without	PVD											
	HMB	HMP700											
Art. no.													
UMMB 20030 x 0075 S30 ...	270163	270164	0.30	0.23	3.0	38	2						
UMMB 20040 x 0075 S30 ...	270167	270168	0.40	0.30	3.0	38	2						
UMMB 20050 x 0075 S30 ...	270171	270172	0.50	0.38	3.0	38	2						
UMMB 20060 x 0075 S30 ...	270175	270176	0.60	0.45	3.0	38	2						
UMMB 20070 x 0075 S30 ...	270179	270180	0.70	0.55	3.0	38	2						
UMMB 20080 x 0075 S30 ...	270183	270184	0.80	0.60	3.0	38	2						
UMMB 20090 x 0075 S30 ...	270187	270188	0.90	0.68	3.0	38	2						
UMMB 20100 x 0075 S30 ...	270191	270192	1.00	0.75	3.0	38	2						
UMMB 20150 x 0075 S30 ...	270195	270196	1.50	1.13	3.0	38	2						
UMMB 20200 x 0075 S30 ...	270199	270200	2.00	1.50	3.0	38	2						
UMMB 20250 x 0075 S30 ...	270203	270204	2.50	1.88	3.0	38	2						
UMMB 20300 x 0075 S30 ...	270207	270208	3.00	2.25	3.0	38	2						

Solid carbide micro ball nose end mill
With centre cut



UMMB 2... x 03 ...

Order designation	Grade		Dimensions									
	Coating		d ₁ 0/-0.015	l ₁	D h5	L	Z					
	without HMB	PVD HMP700										
Art. no.												
UMMB 20030 x 03 S30 ...	270165	270166	0.30	0.9	3.0	38	2					
UMMB 20040 x 03 S30 ...	270169	270170	0.40	1.2	3.0	38	2					
UMMB 20050 x 03 S30 ...	270173	270174	0.50	1.5	3.0	38	2					
UMMB 20060 x 03 S30 ...	270177	270178	0.60	1.8	3.0	38	2					
UMMB 20070 x 03 S30 ...	270181	270182	0.70	2.1	3.0	38	2					
UMMB 20080 x 03 S30 ...	270185	270186	0.80	2.4	3.0	38	2					
UMMB 20090 x 03 S30 ...	270189	270190	0.90	2.7	3.0	38	2					
UMMB 20100 x 03 S30 ...	270193	270194	1.00	3.0	3.0	38	2					
UMMB 20150 x 03 S30 ...	270197	270198	1.50	4.5	3.0	38	2					
UMMB 20200 x 03 S30 ...	270201	270202	2.00	6.0	3.0	38	2					
UMMB 20250 x 03 S30 ...	270205	270206	2.50	7.5	3.0	38	2					
UMMB 20300 x 03 S30 ...	270209	270210	3.00	9.0	3.0	38	2					

UMMN 30100 x 03 S40 HMP600

Grade: HMP600 (AlCr-coated)

Shank diameter: $D = \varnothing 4.0$

Cutting length: $03 = 3 \times d_1$

Machining diameter: $d_1 = \varnothing 1.0$

Number of teeth: 3

Product type

UMMS 40200 x 0XS SHA06 HMP800

Grade: HMP800 (AlCr-coated)

Shank diameter: $D = \varnothing 6.0$

Shank type: HA shank (smooth shank)

Cutting length: Extra short

Machining diameter: $d_1 = \varnothing 2.0$

Number of teeth: 4

Product type

End mills		d ₁	l ₁	Z	
UMMN 3		1–12	>2×D	3	38
UMMS 3... x 0XS ...		2–12	>2×D	3	40
UMMS 4... x 0XS ...		2–12	>2×D	4	42

Superfinishing

For non-ferrous and precious metals

Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



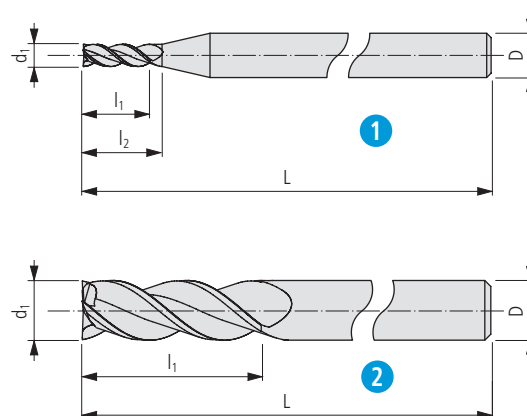
>2×D

90°



HA

UMMN 3... x 0XS ...



Order designation	Application			Dimensions							Shank
	—	○	—								
	○	●	—								
	○	●	○								
	●	○	●								
	—	—	—								
without		Coating		d ₁ h10	l ₁	l ₂	Z	L	D h5	Fig.	
HMB	PVD HMP600	DLC HMD 65									
Art. no.											
UMMN 30100 x 03 S40 ...	555504	555505	555506	1.0	3.0	3.6	3	45.0	4.0	1	HA
UMMN 30150 x 03 S40 ...	555507	555508	555509	1.5	4.5	5.7	3	45.0	4.0		
UMMN 30200 x 03 S40 ...	555510	555511	555512	2.0	6.0	7.0	3	45.0	4.0		
UMMN 30250 x 03 S40 ...	555513	555514	555515	2.5	7.5	9.0	3	45.0	4.0		
UMMN 30300 x 03 S40 ...	555516	555517	555518	3.0	9.0	11.0	3	50.0	4.0	2	
UMMN 30400 x 03 S40 ...	555519	555520	555521	4.0	12.0	—	3	50.0	4.0		
UMMN 30500 x 03 S60 ...	555522	555523	555524	5.0	15.0	18.0	3	50.0	6.0	1	
UMMN 30600 x 03 S60 ...	555525	555526	555527	6.0	18.0	—	3	50.0	6.0	2	
UMMN 30800 x 025 S80 ...	555528	555529		8.0	20.0	—	3	60.0	8.0		
UMMN 31000 x 025 S100 ...	555531	555532		10.0	25.0	—	3	75.0	10.0		
UMMN 31200 x 025 S120 ...	555533	555534		12.0	30.0	—	3	75.0	12.0		

Guideline values		Steel < 600 N/mm ²	Stainless steel	Titanium	Aluminum	Brass	Precious metals
Cutting speeds v_c (m/min)		90	55	45	250	150	110
d_1 (mm)	l_1 (mm)	Feeds f_z (mm/Z)	Feeds f_z (mm/Z)	Feeds f_z (mm/Z)	Feeds f_z (mm/Z)	Feeds f_z (mm/Z)	Feeds f_z (mm/Z)
1.0	3.0	0.005	0.004	0.004	0.006	0.005	0.005
1.5	4.5	0.007	0.006	0.006	0.010	0.008	0.008
2.0	6.0	0.010	0.008	0.008	0.013	0.010	0.010
2.5	7.5	0.012	0.010	0.010	0.016	0.013	0.013
3.0	9.0	0.015	0.012	0.012	0.019	0.015	0.015
4.0	12.0	0.019	0.016	0.016	0.026	0.021	0.021
5.0	15.0	0.024	0.020	0.020	0.033	0.026	0.026
6.0	18.0	0.028	0.024	0.024	0.041	0.032	0.032
8.0	20.0	0.037	0.032	0.032	0.056	0.043	0.043
10.0	25.0	0.045	0.040	0.040	0.071	0.056	0.056
12.0	30.0	0.054	0.048	0.048	0.088	0.068	0.068

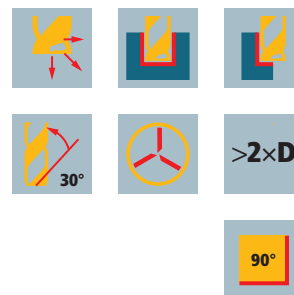
Super short version, Z=3

Cut over centre

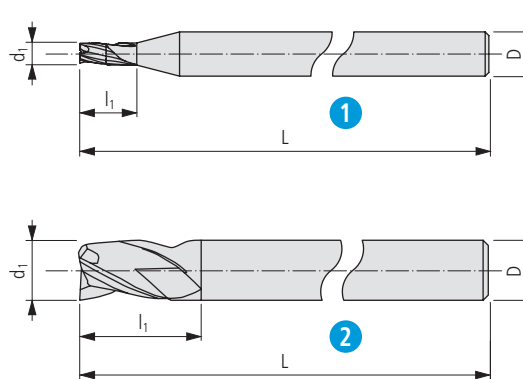
Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



UMMS 3... x OXS ...



Order designation	Application	Dimensions										Shank
		d_1 h10	l_1	Z	L	D h6	Fig.					
	HMP700											
	Art. no.											
UMMS 30200 x OXS SHA06 ...	553609	2.0	4.0	3	38.0	6.0	1					HA
UMMS 30250 x OXS SHA06 ...	553610	2.5	4.0	3	38.0	6.0						
UMMS 30300 x OXS SHA06 ...	553611	3.0	5.0	3	38.0	6.0						
UMMS 30350 x OXS SHA06 ...	553612	3.5	6.0	3	38.0	6.0						
UMMS 30400 x OXS SHA06 ...	553613	4.0	7.0	3	38.0	6.0						
UMMS 30450 x OXS SHA06 ...	553614	4.5	8.0	3	38.0	6.0						
UMMS 30500 x OXS SHA06 ...	553618	5.0	8.0	3	38.0	6.0	2					
UMMS 30600 x OXS SHA06 ...	553619	6.0	8.0	3	38.0	6.0						
UMMS 30700 x OXS SHA08 ...	553620	7.0	11.0	3	43.0	8.0						
UMMS 30800 x OXS SHA08 ...	553621	8.0	11.0	3	43.0	8.0						
UMMS 30900 x OXS SHA10 ...	553622	9.0	13.0	3	50.0	10.0						
UMMS 31000 x OXS SHA10 ...	553623	10.0	13.0	3	50.0	10.0						
UMMS 31200 x OXS SHA12 ...	553624	12.0	14.0	3	63.0	12.0						

Guideline values			Steel		Stainless steel	Non-ferrous metals	Cast iron
							
Tensile strength (N/mm²)			<800	<1300	<850	<600	<1000
Cutting speeds v_c (m/min)			120	75	50	250	100
d ₁ (mm)	l ₁ (mm)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)
2.0	4.0	 Full groove milling a _p = 0.5×D a _e = 1×D	0.010	0.009	0.007	0.012	0.011
2.5	4.0		0.012	0.011	0.009	0.015	0.014
3.0	5.0		0.015	0.013	0.011	0.018	0.016
3.5	6.0		0.017	0.015	0.013	0.021	0.019
4.0	7.0		0.019	0.018	0.014	0.025	0.021
4.5	8.0		0.022	0.020	0.016	0.028	0.024
5.0	8.0		0.024	0.022	0.018	0.031	0.026
6.0	8.0		0.028	0.026	0.021	0.038	0.031
7.0	11.0		0.033	0.030	0.025	0.045	0.036
8.0	11.0		0.037	0.034	0.029	0.052	0.041
9.0	13.0		0.041	0.038	0.032	0.059	0.045
10.0	13.0		0.045	0.042	0.036	0.067	0.050
12.0	14.0	0.054	0.049	0.043	0.082	0.059	
Tensile strength (N/mm²)			<800	<1300	<850	<600	<1000
Cutting speeds v_c (m/min)			135	90	55	270	110
2.0	4.0	 Contour milling a _p = 1×D a _e = 0.2×D	0.012	0.011	0.008	0.014	0.012
2.5	4.0		0.015	0.014	0.010	0.017	0.015
3.0	5.0		0.018	0.016	0.013	0.021	0.018
3.5	6.0		0.021	0.019	0.015	0.024	0.021
4.0	7.0		0.024	0.021	0.017	0.028	0.024
4.5	8.0		0.027	0.024	0.019	0.032	0.027
5.0	8.0		0.029	0.026	0.021	0.036	0.029
6.0	8.0		0.035	0.031	0.025	0.043	0.035
7.0	11.0		0.040	0.036	0.029	0.051	0.040
8.0	11.0		0.045	0.041	0.033	0.060	0.045
9.0	13.0		0.051	0.045	0.038	0.068	0.051
10.0	13.0		0.056	0.050	0.042	0.077	0.056
12.0	14.0	0.065	0.059	0.050	0.095	0.065	

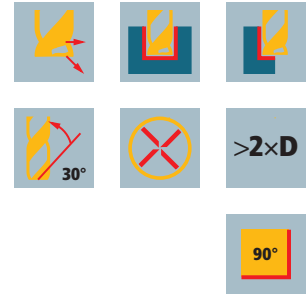
Super short version, Z=4

Cut over centre

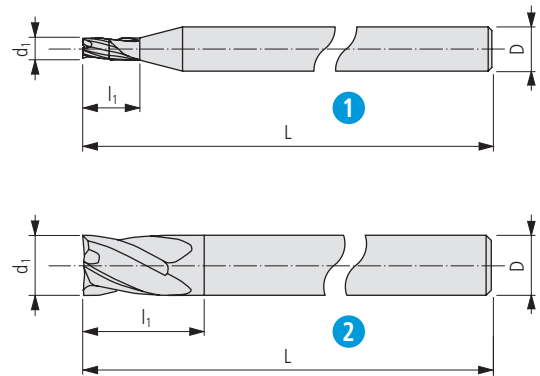
Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



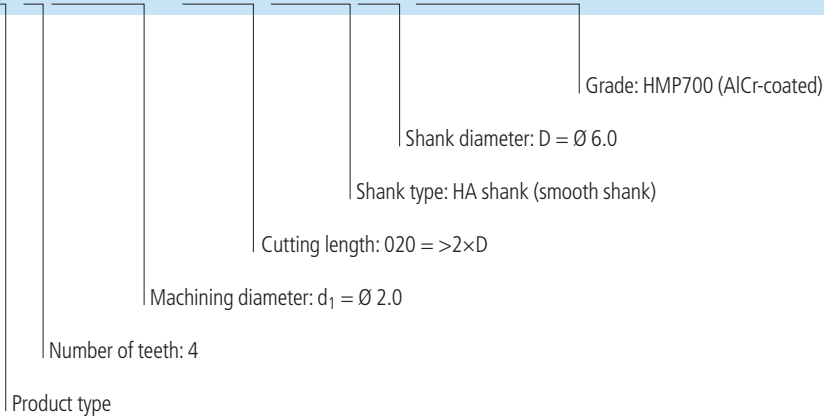
UMMS 4... x OXS ...



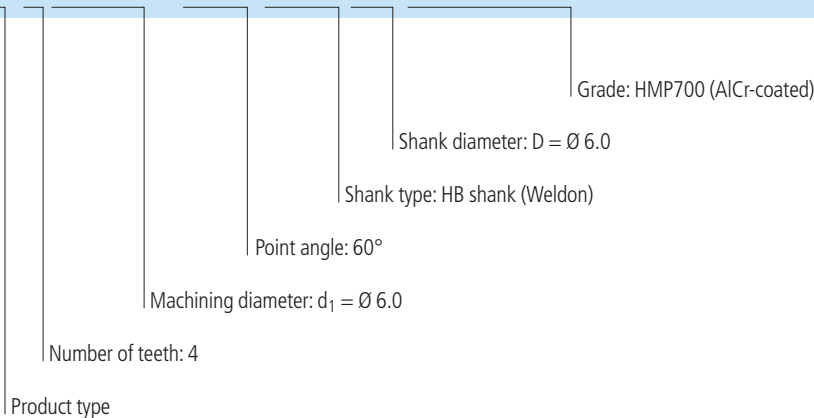
Order designation	Application	Dimensions										Shank
												
												
												
												
												
	HMP800	d ₁ h10	l ₁	Z	L	D h6	Fig.					
Art. no.												
UMMS 40200 x OXS SHA06 ...	552126	2.0	4.0	4	38.0	6.0	1					HA
UMMS 40300 x OXS SHA06 ...	552127	3.0	5.0	4	38.0	6.0						
UMMS 40400 x OXS SHA06 ...	552128	4.0	7.0	4	38.0	6.0						
UMMS 40500 x OXS SHA06 ...	552129	5.0	8.0	4	38.0	6.0						
UMMS 40600 x OXS SHA06 ...	552130	6.0	8.0	4	38.0	6.0	2					
UMMS 40800 x OXS SHA08 ...	552131	8.0	11.0	4	43.0	8.0						
UMMS 41000 x OXS SHA10 ...	552132	10.0	13.0	4	50.0	10.0						
UMMS 41200 x OXS SHA12 ...	552133	12.0	14.0	4	63.0	12.0						

Guideline values			Steel		Stainless steel	Non-ferrous metals	Cast iron
							
Tensile strength (N/mm²)			<800	<1300	<850	<600	<1000
Cutting speeds v_c (m/min)			120	75	50	250	100
d ₁ (mm)	l ₁ (mm)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)
2.0	4.0	 Full groove milling a _p = 0.5×D a _e = 1×D	0.010	0.009	0.007	0.012	0.011
3.0	5.0		0.015	0.013	0.011	0.018	0.016
4.0	7.0		0.019	0.018	0.014	0.025	0.021
5.0	8.0		0.024	0.022	0.018	0.031	0.026
6.0	8.0		0.028	0.026	0.021	0.038	0.031
8.0	11.0		0.037	0.034	0.029	0.052	0.041
10.0	13.0		0.045	0.042	0.036	0.067	0.050
12.0	14.0		0.054	0.049	0.043	0.082	0.059
Tensile strength (N/mm²)			<800	<1300	<850	<600	<1000
Cutting speeds v_c (m/min)			135	90	55	270	110
2.0	4.0	 Contour milling a _p = 1×D a _e = 0.2×D	0.012	0.011	0.008	0.014	0.012
3.0	5.0		0.018	0.016	0.013	0.021	0.018
4.0	7.0		0.024	0.021	0.017	0.028	0.024
5.0	8.0		0.029	0.026	0.021	0.036	0.029
6.0	8.0		0.035	0.031	0.025	0.043	0.035
8.0	11.0		0.045	0.041	0.033	0.060	0.045
10.0	13.0		0.056	0.050	0.042	0.077	0.056
12.0	14.0		0.065	0.059	0.050	0.095	0.065

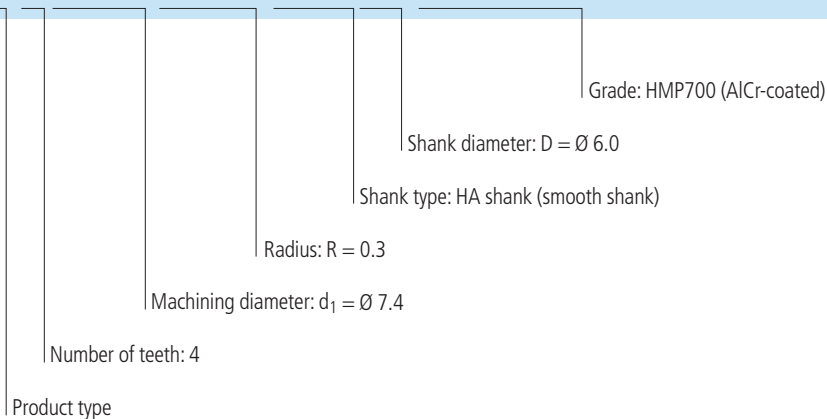
UMMS 40200 x 020 SHA06 HMP700



UMME 40600 x 60° SHB06 HMP700



UMMVKL 40740 R030 SHA06 HMP700





End mills

		d_1	l_1	Z	C
UMMS 4... x 020 ...		2–20	$>2 \times D$	4	0.1–0.3

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Trochoidal end mills

		d_1	l_1	Z	R
UMMTR 5... x 030 ...		6–20	$>3 \times D$	5	0.2–0.3
UMMTR 5... x 040 ...		6–20	$>4 \times D$	5	0.2–0.3
UMMTR 5... x 050 ...		6–20	$>5 \times D$	5	0.2–0.3

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50

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Deburring tools

		d_1	Z	
UMME ... x 60° ...		1–3 4–16	3 4	60°
UMME ... x 90° ...		1–3 4–16	3 4	90°

54

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Front/back deburring tools

		d_1	Z
UMMVR 4... x 90° ...		2–12	4
UMMVRL 4... x 90° ...		3–12	4

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Concave quarter radius mills

		d_2	d_1	Z	R
UMMVK 4... R...		3–10	4–25	4	0.2–10

62

Front/back concave quarter radius mills

		d_2	l_1	d_1	Z	R
UMMVKL 4... R...		5–8.4	2–8	6–12	4	0.2–2.5

64

Technical formulas

66

Remark concerning recommended cutting data

66

Success stories

67

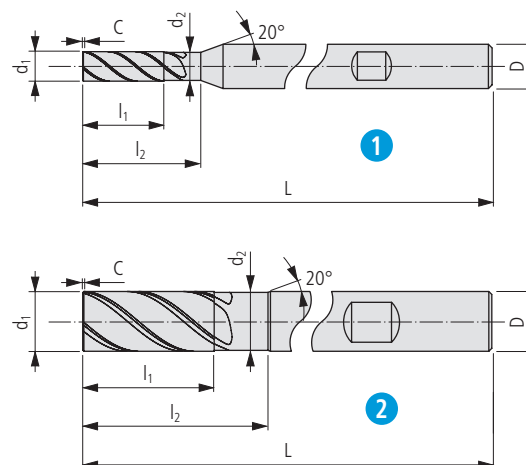
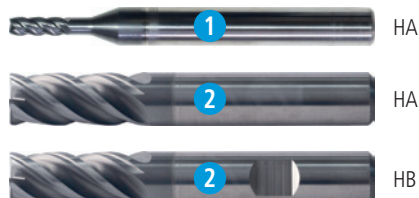
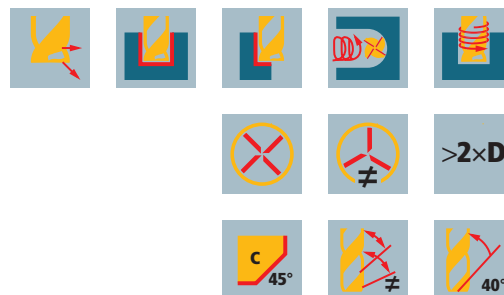
Solid carbide end mill

Universal use
Uneven tooth pitch
Cut over centre

Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing

**UMMS 4... x 020 ...**

Order designation	Application	Dimensions									Shank
											
											
											
											
HMP700											
Art. no.											
UMMS 40200 x 020 SHA06 ...	552000	2.0	5.0	1.8	9.0	0.1	4	57.0	6.0	1	
UMMS 40300 x 020 SHA06 ...	552001	3.0	8.0	2.8	12.0	0.1	4	57.0	6.0		
UMMS 40400 x 020 SHA06 ...	552002	4.0	11.0	3.8	16.0	0.1	4	57.0	6.0		
UMMS 40500 x 020 SHA06 ...	552003	5.0	13.0	4.8	19.0	0.2	4	57.0	6.0		
UMMS 40600 x 020 SHA06 ...	552004	6.0	13.0	5.8	19.0	0.2	4	57.0	6.0	2	
UMMS 40800 x 020 SHA08 ...	552005	8.0	20.0	7.7	26.0	0.2	4	63.0	8.0		
UMMS 41000 x 020 SHA10 ...	552006	10.0	22.0	9.7	31.0	0.2	4	72.0	10.0		
UMMS 41200 x 020 SHA12 ...	552007	12.0	26.0	11.6	38.0	0.2	4	83.0	12.0		
UMMS 41600 x 020 SHA16 ...	552008	16.0	32.0	15.5	42.0	0.3	4	92.0	16.0	2	
UMMS 42000 x 020 SHA20 ...	552009	20.0	42.0	19.5	52.0	0.3	4	104.0	20.0		
UMMS 40200 x 020 SHB06 ...	552010	2.0	5.0	1.8	9.0	0.1	4	57.0	6.0		1
UMMS 40300 x 020 SHB06 ...	552011	3.0	8.0	2.8	12.0	0.1	4	57.0	6.0		
UMMS 40400 x 020 SHB06 ...	552012	4.0	11.0	3.8	16.0	0.1	4	57.0	6.0		
UMMS 40500 x 020 SHB06 ...	552013	5.0	13.0	4.8	19.0	0.2	4	57.0	6.0		
UMMS 40600 x 020 SHB06 ...	552014	6.0	13.0	5.8	19.0	0.2	4	57.0	6.0	2	
UMMS 40800 x 020 SHB08 ...	552015	8.0	20.0	7.7	26.0	0.2	4	63.0	8.0		
UMMS 41000 x 020 SHB10 ...	552016	10.0	22.0	9.7	31.0	0.2	4	72.0	10.0		
UMMS 41200 x 020 SHB12 ...	552017	12.0	26.0	11.6	38.0	0.2	4	83.0	12.0		
UMMS 41600 x 020 SHB16 ...	552018	16.0	32.0	15.5	42.0	0.3	4	92.0	16.0	2	
UMMS 42000 x 020 SHB20 ...	552019	20.0	42.0	19.5	52.0	0.3	4	104.0	20.0		

Guideline values				Steel		Stainless steel	Non-ferrous metals	Cast iron	
									
Tensile strength (N/mm ²)				<850		<1100	<850	<600	<1000
Cutting speeds v _c (m/min)				185		165	85	360	200
d ₁ (mm)	l ₁ (mm)	Plunge angle (°)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	
2.0	5.0	0.4	 Full groove milling a _p = 1×D a _e = 1×D	0.010	0.010	0.008	0.013	0.013	
3.0	8.0	0.4		0.013	0.013	0.010	0.013	0.015	
4.0	11.0	0.4		0.018	0.018	0.013	0.015	0.020	
5.0	13.0	0.4		0.022	0.022	0.017	0.025	0.025	
6.0	13.0	0.7		0.030	0.030	0.024	0.030	0.035	
8.0	20.0	0.8		0.040	0.040	0.032	0.045	0.045	
10.0	22.0	1.2		0.045	0.045	0.035	0.065	0.050	
12.0	26.0	1.8		0.050	0.050	0.040	0.085	0.055	
16.0	32.0	2.4		0.055	0.055	0.045	0.100	0.060	
20.0	42.0	3.0		0.065	0.065	0.055	0.110	0.070	
2.0	5.0	0.4	 Helical milling ⚠ Helical plunge and ramping = 50% of the full groove feed values	0.013	0.013	0.010	0.015	0.015	
3.0	8.0	0.4		0.015	0.015	0.013	0.020	0.018	
4.0	11.0	0.4		0.020	0.020	0.020	0.025	0.022	
5.0	13.0	0.4		0.025	0.025	0.025	0.030	0.030	
6.0	13.0	0.7		0.035	0.035	0.030	0.050	0.040	
8.0	20.0	0.8		0.045	0.045	0.040	0.065	0.050	
10.0	22.0	1.2		0.055	0.055	0.045	0.085	0.060	
12.0	26.0	1.8		0.065	0.065	0.050	0.100	0.070	
16.0	32.0	2.4		0.070	0.070	0.055	0.110	0.075	
20.0	42.0	3.0		0.085	0.085	0.065	0.125	0.090	
2.0	5.0	0.4	 Contour milling a _p = l ₁ max a _e = 0.2×D	0.028	0.022	0.020	0.045	0.025	
3.0	8.0	0.4		0.040	0.032	0.028	0.064	0.036	
4.0	11.0	0.4		0.055	0.044	0.039	0.088	0.050	
5.0	13.0	0.4		0.065	0.052	0.046	0.104	0.059	
6.0	13.0	0.7		0.085	0.068	0.060	0.136	0.077	
8.0	20.0	0.8		0.100	0.080	0.070	0.160	0.090	
10.0	22.0	1.2		0.120	0.096	0.084	0.192	0.108	
12.0	26.0	1.8		0.140	0.112	0.098	0.224	0.126	
16.0	32.0	2.4		0.160	0.128	0.112	0.256	0.144	
20.0	42.0	3.0		0.185	0.148	0.130	0.296	0.167	
2.0	5.0	0.4	 Trochoidal milling a _p = l ₁ max a _e = 0.08×D	0.028	0.022	0.020	0.045	0.025	
3.0	8.0	0.4		0.040	0.032	0.028	0.064	0.036	
4.0	11.0	0.4		0.055	0.044	0.039	0.088	0.050	
5.0	13.0	0.4		0.065	0.052	0.046	0.104	0.059	
6.0	13.0	0.7		0.085	0.068	0.060	0.136	0.077	
8.0	20.0	0.8		0.100	0.080	0.070	0.160	0.090	
10.0	22.0	1.2		0.120	0.096	0.084	0.192	0.108	
12.0	26.0	1.8		0.140	0.112	0.098	0.224	0.126	
16.0	32.0	2.4		0.160	0.128	0.112	0.256	0.144	
20.0	42.0	3.0		0.185	0.148	0.130	0.296	0.167	

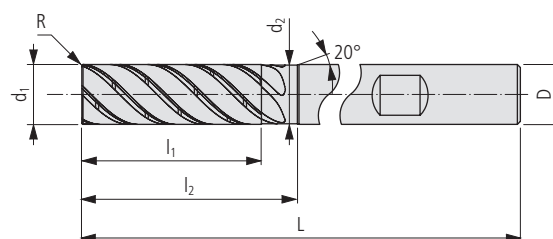
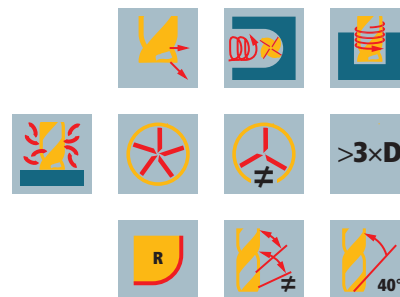
Solid carbide trochoidal end mill

Universal use
Uneven tooth pitch
Cut over centre

Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing

**UMMTR 5... x 030 ...**

Order designation	Application	Dimensions										Shank
		d ₁ e8	l ₁	d ₂	l ₂	R	Z	L	D h6			
	HMP700											
	Art. no.											
UMMTR 50600 x 030 SHA06 ...	552020	6.0	19.0	5.8	23.0	0.2	5	65.0	6.0			HA
UMMTR 50800 x 030 SHA08 ...	552021	8.0	25.0	7.8	29.0	0.2	5	70.0	8.0			
UMMTR 51000 x 030 SHA10 ...	552022	10.0	31.0	9.8	36.0	0.2	5	80.0	10.0			
UMMTR 51200 x 030 SHA12 ...	552023	12.0	37.0	11.8	42.0	0.2	5	93.0	12.0			
UMMTR 51600 x 030 SHA16 ...	552024	16.0	49.0	15.8	56.0	0.3	5	110.0	16.0			
UMMTR 52000 x 030 SHA20 ...	552025	20.0	61.0	19.8	70.0	0.3	5	126.0	20.0			HB
UMMTR 50600 x 030 SHB06 ...	552026	6.0	19.0	5.8	23.0	0.2	5	65.0	6.0			
UMMTR 50800 x 030 SHB08 ...	552027	8.0	25.0	7.8	29.0	0.2	5	70.0	8.0			
UMMTR 51000 x 030 SHB10 ...	552028	10.0	31.0	9.8	36.0	0.2	5	80.0	10.0			
UMMTR 51200 x 030 SHB12 ...	552029	12.0	37.0	11.8	42.0	0.2	5	93.0	12.0			
UMMTR 51600 x 030 SHB16 ...	552030	16.0	49.0	15.8	56.0	0.3	5	110.0	16.0			HB
UMMTR 52000 x 030 SHB20 ...	552031	20.0	61.0	19.8	70.0	0.3	5	126.0	20.0			

Guideline values				Steel		Stainless steel	Non-ferrous metals	Cast iron
								
Tensile strength (N/mm ²)				<850	<1100	<850	<600	<1000
Cutting speeds v _c (m/min)				270	200	135	440	220
d ₁ (mm)	l ₁ (mm)	Plunge angle (°)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)
6.0	19.0	0.7	 Trochoidal milling a _p = l ₁ max a _e = 0.08×D	0.090	0.072	0.072	0.135	0.081
8.0	25.0	0.9		0.105	0.084	0.084	0.158	0.095
10.0	31.0	0.9		0.120	0.096	0.096	0.180	0.108
12.0	37.0	1.2		0.138	0.110	0.110	0.207	0.124
16.0	49.0	1.2		0.165	0.132	0.132	0.248	0.149
20.0	61.0	1.5		0.192	0.154	0.154	0.288	0.173
6.0	19.0	0.7	 Helical milling	0.049	0.039	0.039	0.073	0.044
8.0	25.0	0.9		0.057	0.046	0.046	0.086	0.051
10.0	31.0	0.9		0.065	0.052	0.052	0.098	0.059
12.0	37.0	1.2		0.075	0.060	0.060	0.112	0.067
16.0	49.0	1.2		0.090	0.072	0.072	0.134	0.081
20.0	61.0	1.5		0.104	0.083	0.083	0.156	0.094

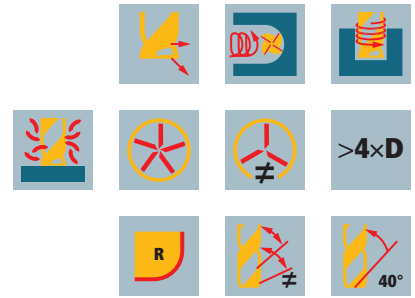
Solid carbide trochoidal end mill

Universal use
Uneven tooth pitch
Cut over centre

Machining recommendation

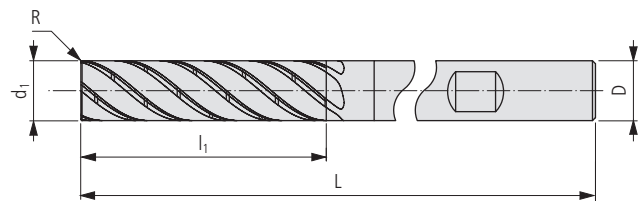
1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



HA

HB

**UMMTR 5... x 040 ...**

Order designation	Application	Dimensions										Shank
		d ₁ e8	I ₁	R	Z	L	D h6					
	HMP700											
	Art. no.											
UMMTR 50600 x 040 SHA06 ...	552032	6.0	25.0	0.2	5	70.0	6.0					HA
UMMTR 50800 x 040 SHA08 ...	552033	8.0	33.0	0.2	5	75.0	8.0					
UMMTR 51000 x 040 SHA10 ...	552034	10.0	41.0	0.2	5	90.0	10.0					
UMMTR 51200 x 040 SHA12 ...	552035	12.0	49.0	0.2	5	100.0	12.0					
UMMTR 51600 x 040 SHA16 ...	552036	16.0	65.0	0.3	5	130.0	16.0					
UMMTR 52000 x 040 SHA20 ...	552037	20.0	81.0	0.3	5	150.0	20.0					HB
UMMTR 50600 x 040 SHB06 ...	552038	6.0	25.0	0.2	5	70.0	6.0					
UMMTR 50800 x 040 SHB08 ...	552039	8.0	33.0	0.2	5	75.0	8.0					
UMMTR 51000 x 040 SHB10 ...	552040	10.0	41.0	0.2	5	90.0	10.0					
UMMTR 51200 x 040 SHB12 ...	552041	12.0	49.0	0.2	5	100.0	12.0					
UMMTR 51600 x 040 SHB16 ...	552042	16.0	65.0	0.3	5	130.0	16.0					HB
UMMTR 52000 x 040 SHB20 ...	552043	20.0	81.0	0.3	5	150.0	20.0					

Guideline values				Steel		Stainless steel	Non-ferrous metals	Cast iron
								
Tensile strength (N/mm ²)				<850	<1100	<850	<600	<1000
Cutting speeds v _c (m/min)				270	200	135	440	220
d ₁ (mm)	l ₁ (mm)	Plunge angle (°)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)
6.0	25.0	0.7	 Trochoidal milling a _p = l ₁ max a _e = 0.06×D	0.080	0.064	0.064	0.120	0.072
8.0	33.0	0.9		0.095	0.076	0.076	0.143	0.086
10.0	41.0	0.9		0.110	0.088	0.088	0.165	0.100
12.0	49.0	1.2		0.125	0.100	0.100	0.188	0.113
16.0	65.0	1.2		0.150	0.120	0.120	0.225	0.135
20.0	81.0	1.5		0.170	0.136	0.136	0.255	0.153
6.0	25.0	0.7	 Helical milling	0.038	0.030	0.030	0.057	0.034
8.0	33.0	0.9		0.045	0.036	0.036	0.068	0.041
10.0	41.0	0.9		0.052	0.042	0.042	0.078	0.047
12.0	49.0	1.2		0.059	0.048	0.048	0.089	0.053
16.0	65.0	1.2		0.071	0.057	0.057	0.107	0.064
20.0	81.0	1.5		0.081	0.065	0.065	0.121	0.073

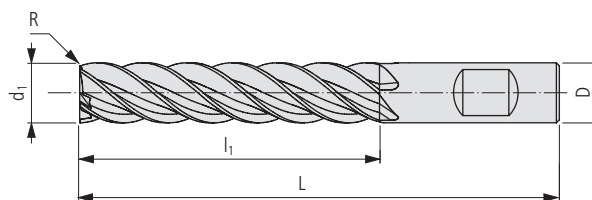
Solid carbide trochoidal end mill

Universal use
Uneven tooth pitch
Cut over centre

Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing

**UMMTR 5... x 050 ...**

Order designation	Application	Dimensions										Shank
		d ₁ e8	I ₁	R	Z	L	D h6					
	HMP 700											
	Art. no.											
UMMTR 50600 x 050 SHA06	553626	6.0	31.0	0.2	5	75.0	6.0					HA
UMMTR 50800 x 050 SHA08	553627	8.0	41.0	0.2	5	90.0	8.0					
UMMTR 51000 x 050 SHA10	553628	10.0	51.0	0.2	5	100.0	10.0					
UMMTR 51200 x 050 SHA12	553629	12.0	61.0	0.2	5	120.0	12.0					
UMMTR 51600 x 050 SHA16	553630	16.0	81.0	0.3	5	134.0	16.0					
UMMTR 52000 x 050 SHA20	553631	20.0	101.0	0.3	5	160.0	20.0					HB
UMMTR 50600 x 050 SHB06	553632	6.0	31.0	0.2	5	75.0	6.0					
UMMTR 50800 x 050 SHB08	553633	8.0	41.0	0.2	5	90.0	8.0					
UMMTR 51000 x 050 SHB10	553634	10.0	51.0	0.2	5	100.0	10.0					
UMMTR 51200 x 050 SHB12	553635	12.0	61.0	0.2	5	120.0	12.0					
UMMTR 51600 x 050 SHB16	553636	16.0	81.0	0.3	5	134.0	16.0					HB
UMMTR 52000 x 050 SHB20	553637	20.0	101.0	0.3	5	160.0	20.0					

Guideline values				Steel		Stainless steel	Non-ferrous metals	Cast iron
								
Tensile strength (N/mm²)				<850	<1100	<850	<600	<1000
Cutting speeds v _c (m/min)				240	180	120	400	200
d ₁ (mm)	l ₁ (mm)	Plunge angle (°)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)
6.0	31.0	0.5	 Trochoidal milling a _p = l ₁ max a _e = 0.06×D	0.070	0.054	0.054	0.110	0.062
8.0	41.0	0.7		0.085	0.066	0.066	0.133	0.076
10.0	51.0	0.7		0.100	0.078	0.078	0.155	0.089
12.0	61.0	1.0		0.115	0.900	0.900	0.178	0.103
16.0	81.0	1.0		0.140	0.110	0.110	0.215	0.125
20.0	101.0	1.3		0.160	0.126	0.126	0.245	0.143
6.0	31.0	0.5	 Helical milling	0.028	0.020	0.020	0.047	0.024
8.0	41.0	0.7		0.035	0.026	0.026	0.058	0.031
10.0	51.0	0.7		0.042	0.032	0.032	0.068	0.037
12.0	61.0	1.0		0.059	0.038	0.038	0.079	0.043
16.0	81.0	1.0		0.061	0.047	0.047	0.097	0.054
20.0	101.0	1.3		0.071	0.055	0.055	0.110	0.063



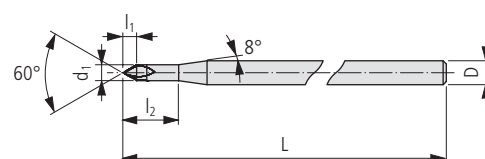
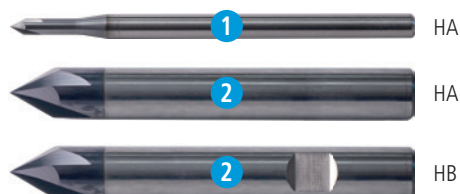
Solid carbide deburring tool 60°

Universal use

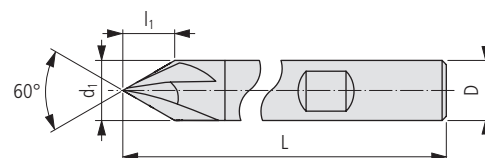
Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



1



2

UMME ... x 60° ...

Order designation	Application	Dimensions										Shank
		d ₁ e9	l ₁	l ₂	L	Z	D h6	Fig.				
	HMP700											
	Art. no.											
UMME 30100 x 60° SHA03 ...	552044	1.0	0.9	5.0	50.0	3	3.0	1				HA
UMME 30200 x 60° SHA03 ...	552045	2.0	1.9	8.0	50.0	3	3.0					
UMME 30300 x 60° SHA03 ...	552046	3.0	2.9	—	50.0	3	3.0	2				
UMME 40400 x 60° SHA04 ...	552047	4.0	3.9	—	50.0	4	4.0					
UMME 40600 x 60° SHA06 ...	552048	6.0	5.9	—	50.0	4	6.0					
UMME 40800 x 60° SHA08 ...	552049	8.0	7.9	—	58.0	4	8.0					
UMME 41000 x 60° SHA10 ...	552050	10.0	9.9	—	66.0	4	10.0					
UMME 41200 x 60° SHA12 ...	552051	12.0	11.9	—	73.0	4	12.0					
UMME 41600 x 60° SHA16 ...	552052	16.0	15.8	—	82.0	4	16.0					
UMME 40600 x 60° SHB06 ...	552053	6.0	5.9	—	50.0	4	6.0	2				HB
UMME 40800 x 60° SHB08 ...	552054	8.0	7.9	—	58.0	4	8.0					
UMME 41000 x 60° SHB10 ...	552055	10.0	9.9	—	66.0	4	10.0					
UMME 41200 x 60° SHB12 ...	552056	12.0	11.9	—	73.0	4	12.0					
UMME 41600 x 60° SHB16 ...	552057	16.0	15.8	—	82.0	4	16.0					

Guideline values		Steel		Stainless steel	Non-ferrous metals	Cast iron
						
Tensile strength (N/mm²)		<850 <1100		<850	<600	<1000
Cutting speeds v_c (m/min)		100 65		60	250	90
d_1 (mm)	Application	Feeds f_z (mm/Z)		Feeds f_z (mm/Z)	Feeds f_z (mm/Z)	Feeds f_z (mm/Z)
1.0	 Deburring $a_p = l_1 \max$ $a_e = 0.1 \times D$	0.010	0.010	0.008	0.015	0.013
2.0		0.013	0.013	0.010	0.018	0.015
3.0		0.015	0.015	0.012	0.025	0.020
4.0		0.020	0.020	0.015	0.030	0.025
6.0		0.030	0.030	0.022	0.040	0.035
8.0		0.035	0.035	0.028	0.050	0.040
10.0		0.045	0.045	0.035	0.060	0.050
12.0		0.055	0.055	0.045	0.080	0.060
16.0		0.075	0.075	0.055	0.100	0.080



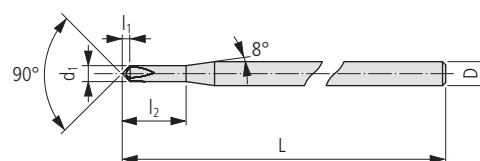
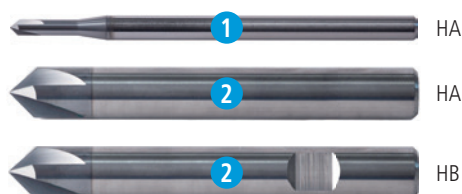
Solid carbide deburring tool 90°

Universal use

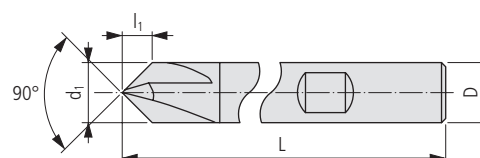
Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



1



2

UMME ... x 90° ...

Order designation	Application	Dimensions										Shank
												
												
												
												
												
	HMP700	d ₁ e9	l ₁	l ₂	L	Z	D h6	Fig.				
Art. no.												
UMME 30100 x 90° SHA03 ...	552058	1.0	0.7	5.0	50.0	3	3.0	1				
UMME 30200 x 90° SHA03 ...	552059	2.0	1.4	8.0	50.0	3	3.0					
UMME 30300 x 90° SHA03 ...	552060	3.0	2.1		50.0	3	3.0	2				
UMME 40400 x 90° SHA04 ...	552061	4.0	2.8		50.0	4	4.0					
UMME 40600 x 90° SHA06 ...	552062	6.0	4.2		50.0	4	6.0					
UMME 40800 x 90° SHA08 ...	552063	8.0	5.6		58.0	4	8.0					
UMME 41000 x 90° SHA10 ...	552064	10.0	7.0		66.0	4	10.0					
UMME 41200 x 90° SHA12 ...	552065	12.0	8.5		73.0	4	12.0					
UMME 41600 x 90° SHA16 ...	552066	16.0	11.2		82.0	4	16.0					
UMME 40600 x 90° SHB06 ...	552067	6.0	4.2		50.0	4	6.0	2				
UMME 40800 x 90° SHB08 ...	552068	8.0	5.6		58.0	4	8.0					
UMME 41000 x 90° SHB10 ...	552069	10.0	7.0		66.0	4	10.0					
UMME 41200 x 90° SHB12 ...	552070	12.0	8.5		73.0	4	12.0					
UMME 41600 x 90° SHB16 ...	552071	16.0	11.2		82.0	4	16.0					

Guideline values		Steel		Stainless steel	Non-ferrous metals	Cast iron
						
Tensile strength (N/mm²)		<850 <1100		<850	<600	<1000
Cutting speeds v_c (m/min)		100 65		60	250	90
d_1 (mm)	Application	Feeds f_z (mm/Z)		Feeds f_z (mm/Z)	Feeds f_z (mm/Z)	Feeds f_z (mm/Z)
1.0	 Deburring $a_p = l_1 \max$ $a_e = 0.1 \times D$	0.010	0.010	0.013	0.008	0.015
2.0		0.013	0.013	0.015	0.010	0.018
3.0		0.015	0.015	0.020	0.012	0.025
4.0		0.020	0.020	0.025	0.015	0.030
6.0		0.030	0.030	0.022	0.040	0.035
8.0		0.035	0.035	0.028	0.050	0.040
10.0		0.045	0.045	0.035	0.060	0.050
12.0		0.055	0.055	0.045	0.080	0.060
16.0		0.075	0.075	0.055	0.100	0.080

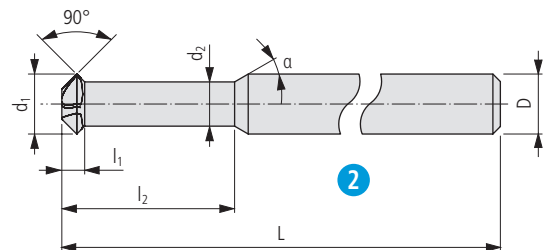
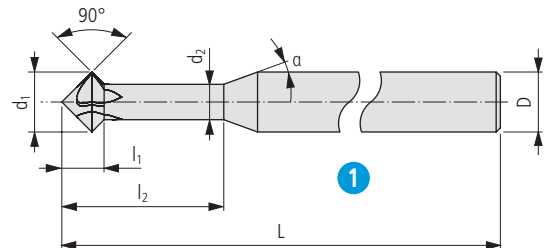
Solid carbide front/back deburring tool, standard length

Universal use

Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



UMMVR 4... x 90° ...

Order designation	Application	Dimensions										Shank
												
												
												
												
												
	HMP700	d ₁	l ₁	l ₂	d ₂	Z	L	D h6	α	Fig.		
Art. no.												
UMMVR 40200 x 90° SHA04 ...	552072	2.0	1.5	8.0	1.0	4	50.0	4.0	20°	1		
UMMVR 40300 x 90° SHA04 ...	552073	3.0	2.0	10.0	2.2	4	50.0	4.0	20°			
UMMVR 40400 x 90° SHA04 ...	552074	4.0	2.5	10.0	2.9	4	50.0	4.0	20°			
UMMVR 40500 x 90° SHA06 ...	552075	5.0	3.0	15.0	3.9	4	65.0	6.0	20°			
UMMVR 40600 x 90° SHA06 ...	552076	6.0	4.0	15.0	3.9	4	65.0	6.0	20°	2		
UMMVR 40800 x 90° SHA08 ...	552077	8.0	2.5	20.0	5.9	4	70.0	8.0	30°			
UMMVR 41000 x 90° SHA10 ...	552078	10.0	4.0	23.0	5.9	4	72.0	10.0	30°			
UMMVR 41200 x 90° SHA12 ...	552079	12.0	6.0	23.0	5.9	4	73.0	12.0	30°			

Guideline values		Steel		Stainless steel	Non-ferrous metals	Cast iron
						
Tensile strength (N/mm ²)		<850		<850	<600	<1000
Cutting speeds v_c (m/min)		70		30	150	45
d_1 (mm)	Application	Feeds f_z (mm/Z)		Feeds f_z (mm/Z)	Feeds f_z (mm/Z)	Feeds f_z (mm/Z)
2.0	 Deburring $a_p = 0.1 \times D$ $a_e = 0.1 \times D$	0.011	0.010	0.009	0.019	0.012
3.0		0.014	0.013	0.011	0.024	0.015
4.0		0.017	0.015	0.014	0.029	0.019
5.0		0.019	0.017	0.015	0.032	0.021
6.0		0.022	0.020	0.018	0.037	0.024
8.0		0.028	0.025	0.022	0.048	0.031
10.0		0.033	0.030	0.026	0.056	0.036
12.0		0.038	0.034	0.030	0.065	0.042

Solid carbide front/back deburring tool, long version

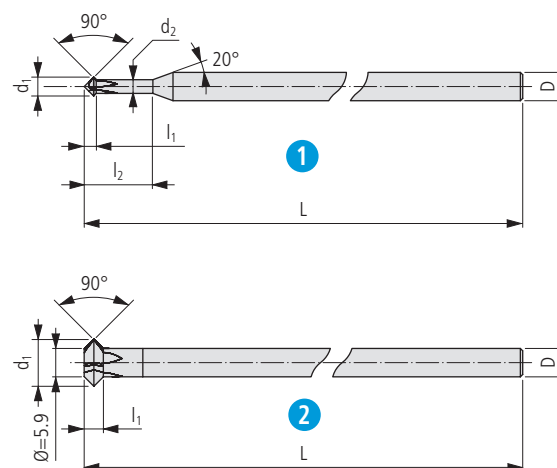
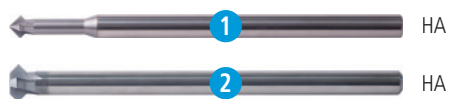
Universal use



Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



UMMVRL 4... x 90° ...

Order designation	Application	Dimensions										Shank
		d ₁	l ₁	d ₂	l ₂	Z	L	D h6	Fig.			
	HMP700											
	Art. no.											
UMMVRL 40300 x 90° SHA04 ...	552080	3.0	2.0	2.2	10.0	4	75.0	4.0	1			HA
UMMVRL 40380 x 90° SHA04 ...	552081	3.8	2.7	2.9	13.0	4	75.0	4.0				
UMMVRL 40400 x 90° SHA04 ...	552082	4.0	2.7	2.9	13.0	4	75.0	4.0				
UMMVRL 40480 x 90° SHA05 ...	552083	4.8	3.0	3.9	15.0	4	75.0	5.0				
UMMVRL 40500 x 90° SHA05 ...	552084	5.0	3.0	3.9	15.0	4	75.0	5.0				
UMMVRL 40580 x 90° SHA06 ...	552085	5.8	4.0	3.9	15.0	4	100.0	6.0	2			
UMMVRL 40600 x 90° SHA06 ...	552086	6.0	4.0	3.9	15.0	4	100.0	6.0				
UMMVRL 40780 x 90° SHA06 ...	552087	7.8	2.0	—	—	4	100.0	6.0				
UMMVRL 40800 x 90° SHA06 ...	552088	8.0	2.0	—	—	4	100.0	6.0				
UMMVRL 40980 x 90° SHA06 ...	552089	9.8	4.0	—	—	4	100.0	6.0				
UMMVRL 41000 x 90° SHA06 ...	552090	10.0	4.0	—	—	4	100.0	6.0				
UMMVRL 41180 x 90° SHA06 ...	552091	11.8	6.0	—	—	4	100.0	6.0				
UMMVRL 41200 x 90° SHA06 ...	552092	12.0	6.0	—	—	4	100.0	6.0				

Guideline values		Steel		Stainless steel	Non-ferrous metals	Cast iron
						
Tensile strength (N/mm ²)		<850 <1100		<850	<600	<1000
Cutting speeds v _c (m/min)		70 38		30	150	45
d ₁ (mm)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)
3.0	 Deburring a _p = 0.1×D a _e = 0.1×D	0.014	0.013	0.011	0.024	0.015
3.8		0.017	0.015	0.014	0.029	0.019
4.0		0.017	0.015	0.014	0.029	0.019
4.8		0.019	0.017	0.015	0.032	0.021
5.0		0.019	0.017	0.015	0.032	0.021
5.8		0.022	0.020	0.018	0.037	0.024
6.0		0.022	0.020	0.018	0.037	0.024
7.8		0.028	0.025	0.022	0.048	0.031
8.0		0.028	0.025	0.022	0.048	0.031
9.8		0.033	0.030	0.026	0.056	0.036
10.0		0.033	0.030	0.026	0.056	0.036
11.8		0.038	0.034	0.030	0.065	0.042
12.0		0.038	0.034	0.030	0.065	0.042

Solid carbide concave quarter radius mill

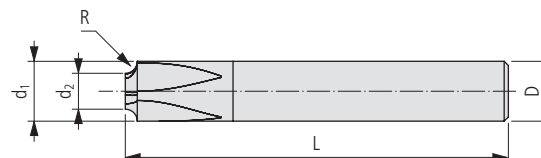
Universal use



Machining recommendation

1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



UMMVK 4... R...

Order designation	Application	Dimensions										Shank
												
												
												
												
		R ±0.01	d ₁	d ₂	Z	L	D h6					
Art. no.												
UMMVK 40360 R020 SHA04 ...	552096	0.2	4.0	3.6	4	50.0	4.0					
UMMVK 40340 R030 SHA04 ...	552095	0.3	4.0	3.4	4	50.0	4.0					
UMMVK 40320 R040 SHA04 ...	552094	0.4	4.0	3.2	4	50.0	4.0					
UMMVK 40300 R050 SHA04 ...	552093	0.5	4.0	3.0	4	50.0	4.0					
UMMVK 40480 R060 SHA06 ...	552099	0.6	6.0	4.8	4	50.0	6.0					
UMMVK 40440 R080 SHA06 ...	552098	0.8	6.0	4.4	4	50.0	6.0					
UMMVK 40400 R100 SHA06 ...	552097	1.0	6.0	4.0	4	50.0	6.0					
UMMVK 40500 R150 SHA10 ...	552100	1.5	10.0	5.0	4	55.0	10.0					
UMMVK 40600 R200 SHA10 ...	552102	2.0	10.0	6.0	4	66.0	10.0					
UMMVK 40700 R250 SHA12 ...	552104	2.5	12.0	7.0	4	73.0	12.0					
UMMVK 40600 R300 SHA12 ...	552103	3.0	12.0	6.0	4	73.0	12.0					
UMMVK 40900 R350 SHA16 ...	552108	3.5	16.0	9.0	4	80.0	16.0					
UMMVK 40800 R400 SHA16 ...	552106	4.0	16.0	8.0	4	80.0	16.0					
UMMVK 40700 R450 SHA16 ...	552105	4.5	16.0	7.0	4	80.0	16.0					
UMMVK 41000 R500 SHA20 ...	552110	5.0	20.0	10.0	4	80.0	20.0					
UMMVK 40800 R600 SHA20 ...	552107	6.0	20.0	8.0	4	80.0	20.0					
UMMVK 40900 R800 SHA25 ...	552109	8.0	25.0	9.0	4	100.0	25.0					
UMMVK 40500 R1000 SHA25	552101	10.0	25.0	5.0	4	100.0	25.0					

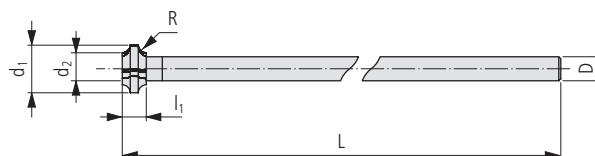
Guideline values				Steel		Stainless steel	Non-ferrous metals	Cast iron
								
Tensile strength (N/mm²)				<850	<1100	<850	<600	<1000
Cutting speeds v _c (m/min)				155	95	70	450	115
R (mm)	d ₁ (mm)	d ₂ (mm)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)
0.2	4.0	3.6	 Corner radius milling	0.022	0.020	0.018	0.037	0.024
0.3	4.0	3.4		0.022	0.020	0.018	0.037	0.024
0.4	4.0	3.2		0.022	0.020	0.018	0.037	0.024
0.5	4.0	3.0		0.022	0.020	0.018	0.037	0.024
0.6	6.0	4.8		0.026	0.023	0.021	0.044	0.029
0.8	6.0	4.4		0.026	0.023	0.021	0.044	0.029
1.0	6.0	4.0		0.026	0.023	0.021	0.044	0.029
1.5	10.0	5.0		0.028	0.025	0.022	0.048	0.031
2.0	10.0	6.0		0.032	0.029	0.026	0.054	0.035
2.5	12.0	7.0		0.035	0.032	0.028	0.060	0.039
3.0	12.0	6.0		0.035	0.032	0.028	0.060	0.039
3.5	16.0	9.0		0.038	0.034	0.030	0.065	0.042
4.0	16.0	8.0		0.038	0.034	0.030	0.065	0.042
4.5	16.0	7.0		0.038	0.034	0.030	0.065	0.042
5.0	20.0	10.0		0.040	0.036	0.032	0.068	0.044
6.0	20.0	8.0		0.040	0.036	0.032	0.068	0.044
8.0	25.0	9.0		0.043	0.039	0.034	0.073	0.047
10.0	25.0	5.0		0.043	0.039	0.034	0.073	0.047

Universal use



1 2 3 4 5 6 Roughing

1 2 3 4 5 6 Finishing



Order designation	Application	Dimensions										Shank
												
												
												
												
		R ±0.01	d ₁	l ₁	d ₂	Z	L	D h ₆				
Art. no.												
UMMVKL 40560 R020 SHA04 ...	552114	0.2	6.0	2.0	5.6	4	75.0	4.0				
UMMVKL 40760 R020 SHA06 ...	552120	0.2	8.0	2.0	7.6	4	100.0	6.0				
UMMVKL 40540 R030 SHA04 ...	552113	0.3	6.0	2.0	5.4	4	75.0	4.0				
UMMVKL 40740 R030 SHA06 ...	552119	0.3	8.0	2.0	7.4	4	100.0	6.0				
UMMVKL 40520 R040 SHA04 ...	552112	0.4	6.0	2.0	5.2	4	75.0	4.0				
UMMVKL 40720 R040 SHA06 ...	552118	0.4	8.0	2.0	7.2	4	100.0	6.0				
UMMVKL 40500 R050 SHA04 ...	552111	0.5	6.0	2.0	5.0	4	75.0	4.0				
UMMVKL 40700 R050 SHA06 ...	552115	0.5	8.0	2.0	7.0	4	100.0	6.0				
UMMVKL 40840 R080 SHA06 ...	552124	0.8	10.0	4.0	8.4	4	100.0	6.0				
UMMVKL 40800 R100 SHA06 ...	552122	1.0	10.0	4.0	8.0	4	100.0	6.0				
UMMVKL 40760 R120 SHA06 ...	552121	1.2	10.0	5.0	7.6	4	100.0	6.0				
UMMVKL 40700 R150 SHA06 ...	552116	1.5	10.0	5.0	7.0	4	100.0	6.0				
UMMVKL 40840 R180 SHA06 ...	552125	1.8	12.0	6.0	8.4	4	100.0	6.0				
UMMVKL 40800 R200 SHA06 ...	552123	2.0	12.0	7.0	8.0	4	100.0	6.0				
UMMVKL 40700 R250 SHA06 ...	552117	2.5	12.0	8.0	7.0	4	100.0	6.0				

Guideline values				Steel		Stainless steel	Non-ferrous metals	Cast iron
								
Tensile strength (N/mm²)				<850	<1100	<850	<600	<1000
Cutting speeds v _c (m/min)				65	32	27	110	36
R (mm)	d ₁ (mm)	d ₂ (mm)	Application	Feeds f _z (mm/Z)		Feeds f _z (mm/Z)	Feeds f _z (mm/Z)	Feeds f _z (mm/Z)
0.2	6.0	5.6	 Corner radius milling	0.011	0.010	0.009	0.019	0.012
0.2	8.0	7.6		0.014	0.013	0.011	0.024	0.015
0.3	6.0	5.4		0.011	0.010	0.009	0.019	0.012
0.3	8.0	7.4		0.014	0.013	0.011	0.024	0.015
0.4	6.0	5.2		0.011	0.010	0.009	0.019	0.012
0.4	8.0	7.2		0.014	0.013	0.011	0.024	0.015
0.5	6.0	5.0		0.011	0.010	0.009	0.019	0.012
0.5	8.0	7.0		0.014	0.013	0.011	0.024	0.015
0.8	10.0	8.4		0.017	0.015	0.014	0.029	0.019
1.0	10.0	8.0		0.017	0.015	0.014	0.029	0.019
1.2	10.0	7.6		0.017	0.015	0.014	0.029	0.019
1.5	10.0	7.0		0.017	0.015	0.014	0.029	0.019
1.8	12.0	8.4		0.019	0.017	0.015	0.032	0.021
2.0	12.0	8.0		0.019	0.017	0.015	0.032	0.021
2.5	12.0	7.0		0.019	0.017	0.015	0.032	0.021

Technical formulas

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Cutting speed (v_c)

$$v_c = \frac{d_1 \cdot \pi \cdot n}{1000} \text{ [m/min]}$$

Revolutions per minute (n)

$$n = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \text{ [min}^{-1}\text{]}$$

Feedrate (v_f)

$$v_f = f_z \cdot Z \cdot n \text{ [mm/min]}$$

Feed per tooth (f_z)

$$f_z = \frac{v_f}{Z \cdot n} \text{ [mm]}$$

Material removal rate (Q)

$$Q = \frac{a_p \cdot a_e \cdot v_f}{1000} \text{ [cm}^3\text{/mm]}$$

Average chip thickness (h_m)

$$h_m = f_z \cdot \frac{\sqrt{a_e}}{d_1} \text{ [mm]}$$

Explanation

- a_e Radial depth of cut (mm)
- a_p Axial depth of cut (mm)
- f_z Feed per tooth (mm)
- d_1 Tool diameter (mm)
- n Rotation speed (min^{-1})
- h_m Average chip thickness (mm)
- Q Material removal rate ($\text{cm}^3\text{/mm}$)
- v_f Machining feedrate (mm/min)
- v_c Cutting speed (m/min)
- Z Number of teeth

Remark concerning recommended cutting data

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Recommended cutting specifications

Both the cutting speed and the feed are important parameters during cutting, since they influence the machining time and the workpiece quality. All of the parameters which we have specified must be considered as guideline values. These depend on the respective workpiece clamping, tool clamping, machine performance, machine stability and not least the tool itself and much more. Each cutting value recommendation is therefore just a rough guideline. You should therefore not hesitate to contact our application engineers in cases of doubt.

ISO designation system

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All ISO 13399 parameters of the multidec®-MILL range are available on our web site.

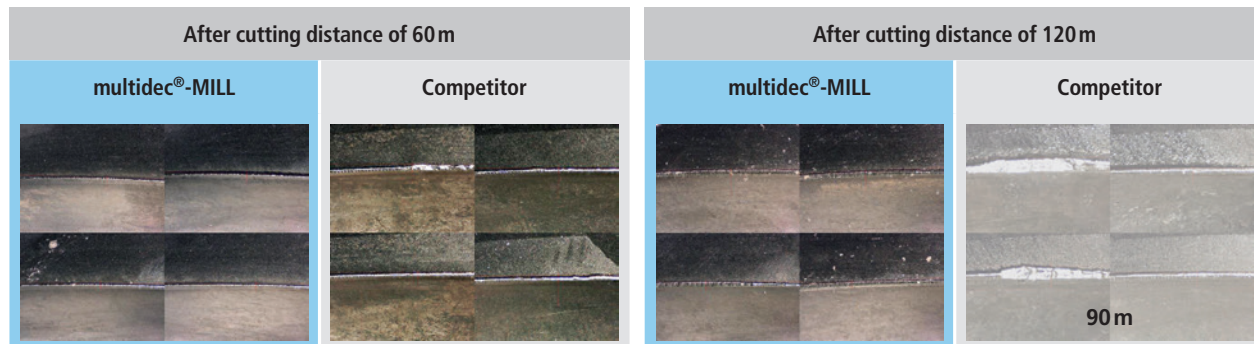
UTILIS parameters	ISO parameters	Definitions
l_1	APMX	Maximum machining depth
C	CHW	Corner chamfer width
d_1	DC	Tool diameter
D	DCONMS	Holding diameter at machine side
d_2	DN	Clearance diameter

UTILIS parameters	ISO parameters	Definitions
l_2	LH	Head length / clearance length
L	OAL	Total length
R	RE	Corner radius
Z	ZEFP	Number of cutting edges (teeth) on circumference

Application Parameters – Cutting distance determination 2xD UMMS 4120...

A milling tool with Ø 12 mm was used for contour milling in order to determine the cutting distance in metres.

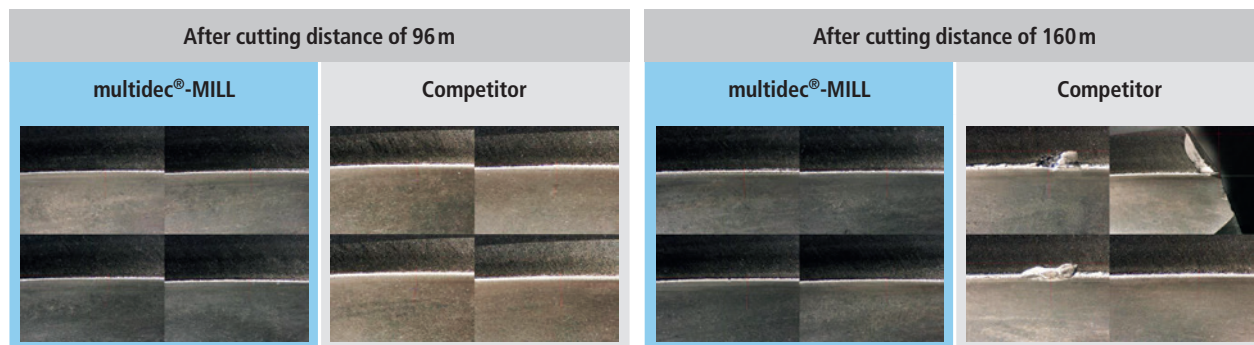
Machine model	Hermle C32U / HSK63	Cutting speed (v_c)	160 m/min
Material No.	1.7225 / 42CrMo4+QT	Feed per tooth (f_z)	0.075 mm/Z
Operation	contour milling	Axial cutting depth (a_p)	15 mm
Cooling	external air blow	Radial cutting depth (a_e)	2.4 mm



Application Parameters – Cutting distance determination 2xD UMMS 4120...

A milling tool with Ø 12 mm was used for contour milling in order to determine the cutting distance in metres.

Machine model	Hermle C32U / HSK63	Cutting speed (v_c)	85 m/min
Material No.	1.4571 / X6CrNiMoTi (V4A)	Feed per tooth (f_z)	0.062 mm/Z
Operation	contour milling	Axial cutting depth (a_p)	12 mm
Cooling	external cooling lubricant	Radial cutting depth (a_e)	2.4 mm





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