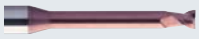
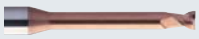
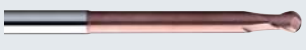
END MILLS

1FL	Z1	MG LAPPED	ALU	25°	MDCSA1	
2FL	Z2	NMG UH RED	UH RADIUS	30°	UHCS2	
	Z2	UMG ENDLESS ORANGE	MEX	30°	MEXCS2	
	Z2	UMG ENDLESS ORANGE	MEX	30°	MEXCL2	
	Z2	UMG ENDLESS ORANGE	MEX RADIUS	30°	MEXCL2R	
	Z2	UMG ENDLESS ORANGE	MEX RADIUS	40°	MEXLS2R	
	Z2	UMG ENDLESS ORANGE	VA	35°	MEFCS2	
	Z2	MG LAPPED	ALU	42°	MDCSA2	
	Z2	MG TiCN	ALU RADIUS	25°	MCA212R	
	Z2	MG	MDC	40°	MDC2202	
	Z2	MG BR	N	30°	GB205	
	Z2	MG PV200	N	30°	G2CS2	
	Z2	MG PV200	N	30°	G2WS2	
	Z2	MG PV200	N RADIUS	30°	G2CS2R	
	Z2	MG PV200	N	30°	G2210	
	Z2	MG PV200	N	30°	G2211	
	Z2	MG PV200	N	30°	G2212	
	Z2	MG PV200	N	30°	G2213	
	Z2	MG PV200	N	30°	MDTACS2	
	Z2	MG PV200	N	30°	MDTA210	

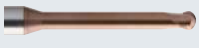
Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL ~30HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 30~45HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 45HRC~	INOX	INCONEL	TITANIO TITAN TITANIUM TITANIO ТИТАН TITANIUM	GHISA GUSS FONTE FUNDITIÓN ЧУГУН CAST IRON	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ ALUMINIUM	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ GRAPHITE
2~12	168								◉	
1~12	123			◉						
1~25	144	○	◉	◉	○			○		
1~12	144	○	◉	◉	○			○		
3~12	155	○	◉	◉	○			○		
2~16	155	○	◉	◉	○			○		
1~16	164	○	◉		◉	○	◉			
3~20	169								◉	
2~12	170								◉	
0.5~12	177									◉
1~12	180	◉	◉		○			◉	○	
1~20	180	◉	◉		○	○	○	◉	○	
3~20	186	◉	◉		○	○	○	◉	○	
1~12	189	◉	◉		○	○	○	◉	○	
2~6	180	◉	◉		○	○	○	◉	○	
5~12	180	◉	◉		○	○	○	◉	○	
8~20	180	◉	◉		○	○	○	◉	○	
16~20	180	◉	◉		○	○	○	◉	○	
1~20	192	◉	◉		○	○	○	◉	○	
3~16	192	◉	◉		○	○	○	◉	○	

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

2FL	Z2	MG / BR	N	30°	MDCL2	
	Z2	HSS-P / PV200	UM	30°	UMWS2	
	Z2	HSS/Co / BR	N	30°	WS2	
	Z2	HSS/Co / PV200	N	30°	TAWS2	
	Z2	HSS/Co / BR	ALU	45°	WSA2	
	Z2	HSS/Co / BR	N	30°	WL2	
	Z2	HSS/Co / PV200	N	30°	TAWL2	
2FL MICRO	Z2	NMG / UH RED	UH RADIUS	30°	UHM2	
	Z2	NMG / UH RED	UH	40°	UHM2-N	
	Z2	UMG / ENDLESS ORANGE	MEX	30°	MEXM2	
2FL RIB PROCESSING	Z2	NMG / UH RED	UH	30°	UHCR2	
	Z2	NMG / UH RED	UH	40°	UHLN2	
	Z2	NMG / UH RED	UH RADIUS	30°	UH211	
	Z2	NMG / UH RED	UH RADIUS	40°	UH212	
	Z2	UMG / ENDLESS ORANGE	MEX	30°	MEXCR2	
	Z2	UMG / ENDLESS ORANGE	MEX	40°	MEXLN2	
2FL BALL	Z2 BALL	NMG / UH RED	UH BALL NOSE	30°	UHCSB2	
	Z2 BALL	NMG / UH RED	UH BALL NOSE	30°	UH250	
	Z2 BALL	NMG / UH RED	UH BALL NOSE	30°	UH253	
	Z2 BALL	UMG / ENDLESS ORANGE	MEX BALL NOSE	30°	MEXCSB2	

Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL ~30HRC**	ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL 30~45HRC**	ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL 45HRC~**	**INOX**	**INCONEL**	TITANIO TITAN TITANIUM TITANIO ТИТАН **TITANIUM**	GHISA GUSS FONTE FUNDITIÓN ЧУГУН **CAST IRON**	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ **ALUMINIUM**	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ **GRAPHITE**
3~20	192	◉	◉		○			◉	○	
2~20	198	◉	○		○			◉		
1~32	202	◉	○		○			○		
1~25	202	◉	○		○			○		
2~20	204								◉	
3~40	208	◉	○		○			○		
3~20	208	◉	○		○			○		
0.3~2	123			◉						
0.1~9	123			◉						
0.1~2	144	○	◉	◉	○			○		
0.1~4	124			◉						
0.2~4	124			◉						
0.5~12	128			◉						
0.2~4	128			◉						
0.4~6	146	○	◉	◉	○			○		
0.2~4	146	○	◉	◉	○			○		
0.2~12	116			◉						
1~12	116			◉						
1~12	116			◉						
1~25	138	○	◉	◉	○			○		

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

2FL BALL	Z2 BALL	UMG ENDLESS ORANGE	MEX BALL NOSE	30°	MEXCLSB2	
	Z2 BALL	UMG ENDLESS ORANGE	MEX BALL NOSE	30°	MEX253	
	Z2 BALL	MG LAPPED	ALU BALL NOSE	40°	MDCAB2	
	Z2 BALL	MG	MDC BALL NOSE	30°	MDC2254	
	Z2 BALL	MG	MDC BALL NOSE	30°	MDC2250	
	Z2 BALL	MG	MDC BALL NOSE	30°	MDC2251	
	Z2 BALL	MG BR	N BALL NOSE	30°	GB255	
	Z2 BALL	MG PV200	N BALL NOSE	30°	G2CSB2	
	Z2 BALL	MG PV200	N BALL NOSE	30°	G2250	
	Z2 BALL	MG PV200	N BALL NOSE	30°	G2251	
	Z2 BALL	MG PV200	N BALL NOSE	30°	MDTACSB2	
	Z2 BALL	MG PV200	N BALL NOSE	30°	MDTA250	
	Z2 BALL	HSS/Co BR	N BALL NOSE	30°	WSB2	
	Z2 BALL	HSS/Co PV200	N BALL NOSE	30°	TAWSB2	
	Z2 BALL	HSS/Co BR	N BALL NOSE	30°	WLB2	
	Z2 BALL	HSS/Co PV200	N BALL NOSE	30°	TAWLB2	
2FL BALL MICRO	Z2 BALL	NMG UH RED	UH BALL NOSE	30°	UHMB2	
	Z2 BALL	UMG ENDLESS ORANGE	MEX BALL NOSE	30°	MEXMB2	
2FL BALL RIB PROCESSING	Z2 BALL	NMG UH RED	UH BALL NOSE	30°	UHCRB2	

Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL ~30HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 30~45HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 45HRC~	INOX	INCONEL	TITANIO TITAN TITANIUM TITANIO ТИТАН TITANIUM	GHISA GUSS FONTE FUNDITIÓN ЧУГУН CAST IRON	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ ALUMINIUM	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ GRAPHITE
1~20	138	○	◉	◉	○			○		
1~20	138	○	◉	◉	○			○		
1~12	173								◉	
1~6	176									◉
0.5~12	176									◉
2~6	176								○	◉
1~12	190	◉	◉		○			◉	○	
1~20	190		◉		○	○	○	◉	○	
1~12	190		◉		○	○	○	◉	○	
8~20	190		◉		○	○	○	◉	○	
1~12	196		◉		○	○	○	◉	○	
3~12	196		◉		○	○	○	◉	○	
2~30	202	◉	○		○			○		
2~20	202	◉	○		○			○		
3~20	208	◉	○		○			○		
3~20	208	◉	○		○			○		
0.2~0.9	116			◉						
0.2~2	138	○	◉	◉	○			○		
0.1~4	118			◉						

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

2FL BALL RIB PROCESSING	Z2 BALL	NMG	UH RED	UH BALL NOSE	30°	UHLNB2
	Z2 BALL	UMG	ENDLESS ORANGE	MEX BALL NOSE	30°	MEXCRB2
	Z2 BALL	UMG	ENDLESS ORANGE	MEX BALL NOSE	30°	MEXLNB2
3FL	Z3~Z4	UMG	ENDLESS	VA	50°	MEFCSH3
	Z3	MG	LAPPED	ALU	55°	MDCSA3
	Z3	MG	LAPPED	ALU	55°	MDA310
	Z3	MG	LAPPED	ALU	55°	MDA311
	Z3	MG	LAPPED	ALU	55°	MDA312
	Z3	MG		MDC RADIUS	30°	MDC3311
	Z3	MG	BR	N	45°	GB305
	Z3	MG	PV200	N	45°	G2CSH3
	Z3	MG	PV200	N	45°	G2WSH3
	Z3	MG	PV200	N	45°	G2310
	Z3	MG	PV200	N	45°	G2311
	Z3	MG	PV200	N	45°	G2312
	Z3	MG	PV200	N	30°	MDTACS3
	Z3	MG	PV200	N	50°	MDTAWSH3
	Z3	HSS-P	PV200	UM	30°	UMWS3
	Z3	HSS/Co	BR	N	30°	WS3
	Z3	HSS/Co	PV200	N	30°	TAWS3

Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL ~30HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 30~45HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 45HRC~	INOX	INCONEL	TITANIO TITAN TITANIUM TITANIO ТИТАН TITANIUM	GHISA GUSS FONTE FUNDITIÓN ЧУГУН CAST IRON	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ ALUMINIUM	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ GRAPHITE
0.2~4	118			◉						
0.4~6	140	○	◉	◉	○			○		
0.2~4	140	○	◉	◉	○			○		
6~20	164	○	◉		◉	○	◉			
1~20	171								◉	
3~6	171								◉	
3~12	171								◉	
8~20	171								◉	
2~12	178								○	◉
1~12	182	◉	◉		○			◉	○	
1~20	182	◉	◉		○	○	○	◉	○	
3~20	186	◉	◉		○	○	○	◉	○	
2~6	180	◉	◉		○	○	○	◉	○	
5~12	180	◉	◉		○	○	○	◉	○	
8~20	180	◉	◉		○	○	○	◉	○	
2~20	193	◉	◉		○	○	○	◉	○	
3~20	193	◉	◉		○	○	○	◉	○	
3~20	198	◉	○		○			◉		
1~32	205	◉	○		○			○		
1~32	205	◉	○		○			○		

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

3FL	Z3~Z4	HSS/Co PV200	N	45°	TAWSH3	
	Z3	HSS/Co BR	N	30°	WL3	
	Z3	HSS/Co PV200	N	30°	TAWL3	
4FL	Z4	NMG UH RED	UH RADIUS	30°	UHCS4	
	Z4	NMG UH RED	UH RADIUS	30°	UH411	
	Z4	NMG UH RED	UH RADIUS	30°	UH412	
	Z4	NMG UH RED	UH HIGH FEED RADIUS	30°	UHF430	
	Z4	NMG UH RED	UH HIGH FEED RADIUS	25°	UHF4	
	Z4	UMG ENDLESS ORANGE	MEX	30°	MEXCS4	
	Z4	UMG ENDLESS ORANGE	MEX RADIUS	30°	MEX410R	
	Z4	UMG ENDLESS ORANGE	MEX	30°	MEXCL4	
	Z4	UMG ENDLESS ORANGE	MEX RADIUS	30°	MEXCL4R	
	Z4	UMG ENDLESS ORANGE	MEX RADIUS	40°	MEXLS4R	
	Z4	UMG ENDLESS	VA	35°	MEFCS4	
	Z4	MG	MDC	40°	MDC2204	
	Z4	MG BR	N	30°	GB405	
	Z4	MG PV200	N	30°	G2CS4	
	Z4	MG PV200	N	30°	G2WS4	
	Z4	MG PV200	N RADIUS	30°	G2CS4R	

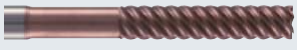
Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL ~30HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 30~45HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 45HRC~	INOX	INCONEL	TITANIO TITAN TITANIUM TITANIO ТИТАН TITANIUM	GHISA GUSS FONTE FUNDITIÓN ЧУГУН CAST IRON	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ ALUMINIUM	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ GRAPHITE
6~20	205	◉	○		○			○		
3~25	209	◉	○		○			○		
3~25	209	◉	○		○			○		
1~20	133			◉						
3~12	134			◉						
2~12	134			◉						
5~10	122			◉						
2~12	122			◉						
1~25	150	○	◉	◉	○			○		
2~12	154	○	◉	◉	○			○		
2~25	150	○	◉	◉	○			○		
3~16	155	○	◉	◉	○			○		
2~16	155	○	◉	◉	○			○		
2~20	164	○	◉		◉	○	◉			
0.5~12	177									◉
1~12	184	◉	◉		○			◉	○	
1~20	184	◉	◉		○	○	○	◉	○	
3~20	186	◉	◉		○	○	○	◉	○	
1~12	189	◉	◉		○	○	○	◉	○	

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

4FL	Z4	MG PV200	N	30°	G2410	
	Z4	MG PV200	N	30°	G2411	
	Z4	MG PV200	N	30°	G2412	
	Z4	MG PV200	N	30°	G2413	
	Z4	MG PV200	N	30°	MDTACS4	
	Z4	MG PV200	N	30°	MDTA410	
	Z4	MG BR	N	30°	MDCL4	
	Z4	HSS-P PV200	UM	30°	UMWS4	
	Z4~Z6	HSS/Co BR	N	30°	WS4/6	
	Z4~Z6	HSS/Co PV200	N	30°	TAWS4/6	
	Z4~Z6	HSS/Co BR	N	30°	WL4/6	
	Z4~Z6	HSS/Co PV200	N	30°	TAWL4/6	
4FL VARIABLE HELIX AND UNEQUAL PITCH	Z4	MG PV300	HF UNI	36°/39°	HF440	
	Z4	MG PV300	HF UNI	36°/39°	HF840	
	Z4	MG PV300	HF UNI	36°/39°	HF441	
	Z4	MG PV300	HF UNI RADIUS	36°/39°	HF442	
	Z4	MG PV300	HF UNI RADIUS	36°/39°	HF842	
	Z4	MG PV300	HF UNI RADIUS	36°/39°	HF443	
4FL UNEQUAL PITCH	Z4	MG PV300	HF HARD	40°	HF450	
	Z4	MG PV300	HF HARD	40°	HF850	

Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL ~30HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 30~45HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 45HRC~	INOX	INCONEL	TITANIO TITAN TITANIUM TITANIO ТИТАН TITANIUM	GHISA GUSS FONTE FUNDITIÓN ЧУГУН CAST IRON	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ ALUMINIUM	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ GRAPHITE
2~6	184	◉	◉		○	○	○	◉	○	
5~12	184	◉	◉		○	○	○	◉	○	
8~20	184	◉	◉		○	○	○	◉	○	
16~20	184	◉	◉		○	○	○	◉	○	
2~20	194	◉	◉		○	○	○	◉	○	
3~16	194	◉	◉		○	○	○	◉	○	
3~20	194	◉	◉		○			◉	○	
3~20	199	◉	○		○			◉		
2~30	206	◉	○		○			○		
2~40	206	◉	○		○			○		
3~25	209	◉	○		○			○		
3~40	209	◉	○		○			○		
3~20	159	◉	◉ <40HRC		◉	◉	◉	◉		
3~20	159	◉	◉ <40HRC		◉	◉	◉	◉		
3~20	159	◉	◉ <40HRC		◉	◉	◉	◉		
3~20	160	◉	◉ <40HRC		◉	◉	◉	◉		
3~20	160	◉	◉ <40HRC		◉	◉	◉	◉		
3~20	160	◉	◉ <40HRC		◉	◉	◉	◉		
3~20	159		◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC			
3~20	159		◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC			

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

4FL VARIABLE HELIX	Z4	MG PV300	HF HARD	40°	HF451	
	Z4	MG PV300	HF HARD RADIUS	40°	HF452	
	Z4	MG PV300	HF HARD RADIUS	40°	HF852	
	Z4	MG PV300	HF UNI HR	40°	HF444	
	Z4	MG PV300	HF UNI HR	40°	HF844	
	Z4	MG PV300	HF UNI HR	40°	HF445	
4FL BALL	Z4 BALL	MG PV200	N BALL NOSE	30°	G2CSB4	
MULTI FLUTES	Z6~Z8	NMG UH RED	UH	50°	UH600	
	Z6~Z8	NMG UH RED	UH	50°	UH612	
	Z6	NMG UH RED	UH RADIUS	45°	UH610R	
	Z6	NMG UH RED	UH RADIUS	45°	UH611R	
	Z6~Z8	UMG ENDLESS ORANGE	MEX	45°	MEXCSHM	
	Z6	UMG ENDLESS ORANGE	MEX	45°	MEXCLHM	
	Z6	UMG ENDLESS ORANGE	MEX RADIUS	45°	MEX610R	
	Z6	UMG ENDLESS ORANGE	MEX RADIUS	45°	MEX611R	
	Z6~Z8	UMG ENDLESS	VA	50°	MEF600	
	Z6~Z8	MG LAPPED	ALU	50°	MDCSAM	
	Z6	MG PV200	N	45°	G2CSHM	
ROUGHING	Z3~Z4	UMG ENDLESS	MEX HR FINE	20°	MEXCSFR	
	Z3~Z6	UMG ENDLESS	VA HR FINE	45°	MEF901	

Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL ~30HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 30~45HRC	ACCIAIO STAHL ACIER ACERO СТАЛЬ STEEL 45HRC~	INOX	INCONEL	TITANIO TITAN TITANIUM TITANIO ТИТАН TITANIUM	GHISA GUSS FONTE FUNDITIÓN ЧУГУН CAST IRON	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ ALUMINIUM	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ GRAPHITE
3~20	159		◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC			
3~20	160		◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC			
3~20	160		◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC	◉ 35~55HRC			
6~20	162		◉ <40HRC		◉	◉	◉	◉		
6~20	162		◉ <40HRC		◉	◉	◉	◉		
6~20	162		◉ <40HRC		◉	◉	◉	◉		
1~20	190	◉	◉		○	○	○	◉	○	
3~20	135			◉						
3~16	135			◉						
6~12	136			◉						
6~20	136			◉						
6~20	152	○	◉	◉	○			○		
6~25	152	○	◉	◉	○			○		
6~12	153	○	◉	◉	○			○		
6~12	153	○	◉	◉	○			○		
6~20	165	○	◉		◉	○	◉			
6~20	172								◉	
6~20	188	◉	◉		○	○	○	◉	○	
6~20	156	○	◉	◉	○			○		
4~20	166	○	◉		◉	○	◉			

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

ROUGHING	Z4~Z6	UMG ENDLESS	VA HR FINE	45°	MEF902	
	Z3	HSS/Co BR	ALU WR COARSE	45°	WSAR	
	Z3~Z4	MG PV200	HR FINE	30°	G2CSFR	
	Z3~Z4	MG PV200	HR FINE	30°	G2WSFR	
	Z4	MG PV200	NR COARSE	30°	MDTAWSR	
	Z3~Z5	HSS-P PV200	UM HR FINE	30°	UMWSFR	
	Z3~Z6	HSS/Co PV200	NR COARSE	30°	TAWSR	
	Z3~Z6	HSS/Co BR	HR FINE	30°	WSFR	
	Z3~Z6	HSS/Co PV200	HR FINE	30°	TAWSFR	
	Z3~Z6	HSS/Co BR	HR FINE	30°	WLFR	
	Z3~Z6	HSS/Co PV200	HR FINE	30°	TAWLFR	
VARIOUS	Z8~Z14	HSS/Co BR	N	30°	FM	
	Z8~Z14	HSS/Co PV200	N	30°	TAFM	
	Z6~Z12	HSS/Co BR	HR FINE	30°	FFR	
	Z6~Z12	HSS/Co PV200	HR FINE	30°	TAFFR	
	Z4	HSS/Co BR	N	0°	WCR	
	Z6~Z12	HSS/Co BR	N	α 45°	WDC	
	Z6~Z12	HSS/Co BR	N	α 45°	WDD	
	Z6~Z8	HSS/Co BR	N	15°	WTM	

Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL ~30HRC**	ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL 30~45HRC**	ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL 45HRC~**	**INOX**	**INCONEL**	TITANIO TITAN TITANIUM TITANIO ТИТАН **TITANIUM**	GHISA GUSS FONTE FUNDITIÓN ЧУГУН **CAST IRON**	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ **ALUMINIUM**	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ **GRAPHITE**
6~20	166	○	◉		◉	○	◉			
6~25	207								◉	
6~20	187	◉	◉		○	○	○	◉	○	
6~20	187	◉	◉		○	○	○	◉	○	
6~20	195	◉	◉		○	○	○	◉	○	
6~20	200	◉	○		○			◉		
6~20	207	◉	○		○			○		
6~20	207	◉	○		○			○		
6~40	207	◉	○		○			○		
6~20	210	◉	○		○			○		
6~40	210	◉	○		○			○		
40~160	211	◉	○		○			○		
40~160	211	◉	○		○			○		
40~160	211	◉	○		○			○		
40~160	211	◉	○		○			○		
R1~R20	212	◉	○		○			○		
16~38	213	◉	○		○			○		
16~38	213	◉	○		○			○		
12.5~40	214	◉	○		○			○		

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

VARIOUS	Z8~Z14	HSS/Co BR	N	10°	WWK	

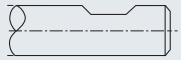
Ø RANGE		ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL** **~30HRC**	ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL** **30~45HRC**	ACCIAIO STAHL ACIER ACERO СТАЛЬ **STEEL** **45HRC~**	**INOX**	**INCONEL**	TITANIO TITAN TITANIUM TITANIO ТИТАН **TITANIUM**	GHISA GUSS FONTE FUNDITIÓN ЧУГУН **CAST IRON**	ALLUMINIO ALUMINUM ALUMINIUM ALUMINIO АЛЮМИНИЙ **ALUMINIUM**	GRAFITE GRAPHIT GRAPHITE GRAFITO ГРАФИТ **GRAPHITE**
10.5~45.5	215	◉	○		○			○		

◉ most suitable molto adatto am besten geeignete le plus indiqué más adecuado **первый выбор**
○ suitable adatto geeignet indiqué adecuado **второй выбор**

Caption

Legenda Verzeichnis Légende Leyenda Условные обозначения

STOCK		
●	stock standard stock standard Standard Lager	stock standard stock estándar складская позиция
○	non-standard stock stock non standard nicht Standard Lager	stock non standard stock no estándar не складская позиция
■	stock exhaustion esaurimento stock Vorraterschöpfung	épuisement du stock agotamiento de stock складские остатки

SHANK ATTACCO SCHAFT QUEUE MANGO ХВОСТОВИК		
	cylindrical shank attacco cilindrico zylindrischer Schaft	queue cylindrique mango cilíndrico цилиндрическое крепление
	weldon	
	Morse Taper shank attacco Cono Morse MK Schaft	queue conique mango Cono Morse конус Морзе

TYPE TIPO TYP TYPE TIPO ТИП		
	flutes number numero di taglienti Schneidenanzahl	nombre de dents número de cortes количество режущих кромок
	ball nose raggiata runder Stirn	bout hémisphérique fresa de bola сферическая
	corner radius torica Eckradius	torique radio angular с радиусом при вершине

GEOMETRY GEOMETRIA GEOMETRIE GÉOMÉTRIE GEOMETRÍA ГЕОМЕТРИЯ		
UH	50~70HRC for hardened steel 50~70HRC per acciai temprati 50~70HRC für Hartstahl	50~70HRC pour acier trempé 50~70HRC para aceros templados 50~70HRC для закалённых сталей
MEX	30~55HRC general purpose and hardened steel 30~55HRC uso generico e acciaio temprato 30~55HRC allgemeine Anwendung und gehärtete Stähle	30~55HRC utilisation générale et aciers trempés 30~55HRC Mecanizado genérico y acero templado 30~55HRC общее назначение и для закалённых сталей
HF UNI	~40HRC variable helix and unequal pitch ~40HRC elica variabile e passo differenziato ~40HRC ungleicher Teilung und Winkel	~40HRC hélice et pas variables ~40HRC helice variable y paso alterno ~40HRC переменный завиток и дифференциальная кромка
HF HARD	35~55HRC unequal pitch 35~55HRC passo differenziato 35~55HRC ungleicher Teilung	35~55HRC pas variable 35~55HRC paso alterno 35~55HRC неодинаковый шаг режущих кромок

Caption

Legenda Verzeichnis Légende Leyenda Условные обозначения

GEOMETRY GEOMETRIA GEOMETRIE GÉOMÉTRIE GEOMETRÍA ГЕОМЕТРИЯ		
MEF	for stainless steel per acciaio inossidabile für rostfreien Stahl	pour acier inoxydable para acero inoxidable для нержавеющих сталей
ALU	for aluminium per alluminio für Aluminium	pour aluminium para aluminio для алюминия
MDC	for graphite per grafite für Graphit	pour graphite para grafito для графита
UM	high performance (HSS-P) alto rendimento (HSS-P) hochleistung (HSS-P)	haute performance (HSS-P) alto rendimiento (HSS-P) высокопроизводительная (HSS-P)
N	standard	
NR COARSE	roughing coarse pitch sgrossare passo grosso Schruppfräser Regelgewinde	ébauche pas gros desbaste paso grueso черновая с крупным шагом
HR FINE	roughing fine pitch sgrossare passo fine Schruppfräser Feingewinde	ébauche pas fin desbaste paso fino черновая с мелким шагом
WR ALU	roughing for light alloy sgrossare per leghe leggere Schruppfräser für weiche Werkstoffe	ébauche pour alliages légers desbaste para aleaciones livianas черновая для легких сплавов

MATERIAL MATERIALE WERKSTOFF MATIÈRE MATERIAL МАТЕРИАЛ		
NMG ...	nano micrograin nano micrograna nano Mikrokörnung	nano micrograin nano micrograno нано микрозернистый твёрдый сплав
UMG ...	ultra fine micrograin micrograna ultra fine ultrafeine Mikrokörnung	micrograin ultra-fin micrograno ultra fino ультра микрозернистый твёрдый сплав
MG ...	micrograin micrograna Mikrokörnung	micrograin micrograno микрозернистый твёрдый сплав
HSS-P ...	powder steel acciaio sinterizzato Sinterstahl	acier fritté acero sinterizado порошковая сталь
HSS/Co ...	high speed steel 5%~8% Co acciaio super rapido 5%~8% Co Hochleistungsschnellschnittstahl 5%~8% Co	acier rapide 5%~8% Co acero súper rápido 5%~8% Co быстрорежущая сталь с кобальтом 5-8%

Caption

Legenda Verzeichnis Légende Leyenda Условные обозначения

COATINGS RIVESTIMENTI BESCHICHTUNGEN REVÊTEMENTS RECUBRIMIENTOS ПОКРЫТИЕ	... TiCN	... PV200	... PV100	... ENDLESS ORANGE	... UH RED	...
HARDNESS (HV) DURETÉ (HV) DUREZZA (HV) DUREZA (HV) HÄRTE (HV) ТВЁРДОСТЬ (HV)	3000	3500	3500	3300	4500	5000 - 8000
FRICTION COEFFICIENT COEFFICENT DE FROTTEMENT COEFFICIENTE D'ATTRITO COEFICIENTE DE ROZAMIENTO REIBUNGSKOEFFIZIENT КОЭФФИЦИЕНТ ТРЕНИЯ	0.4	0.5	0.5	0.4	0.45	
THICKNESS (µ) EPAISSEUR (µ) SPESSORE (µ) ESPESOR (µ) DICKE (µ) ТОЛЩИНА (МКМ)	1~4	1~4	1~4	1~4	1~4	
MAX WORKING (°C) TEMPÉRATURE MAXIMALE (°C) TEMPERATURA MAX (°C) TEMPERATURA MÁX (°C) HOCHSTE TEMPERATUR (°C) МАКС. ТЕМПЕРАТУРА (°C)	400	800	800	900	1200	

PARAMETERS PARAMETRI PARAMETER PARAMÉTRES PARÁMETROS ПАРАМЕТРЫ	
n Vf PAGE	parameters reference riferimento parametri Parameter Hinweis référence des paramètres referencia parámetros ссылка на параметры

UH RED

Nano micrograin for 50~70HRC

UH nano micrograin: for high-speed dry machining on hardened steel, up to 70 HRC.

UH nano micrograna: per lavorazione a secco ad alta velocità su acciaio temprato, fino a 70 HRC.

UH nano Mikrokörnung: für trockene Hochgeschwindigkeits-bearbeitungen von gehärteten Stählen bis 70 HRC.

UH nano micrograin: pour une grande vitesse d'usinage à sec de l'acier traité à 70 HRC.

UH nano micrograno para alta velocidad de corte, mecanizado en seco, y aceros con durezas por encima de 70 HRC.

UH нано –зернистый твёрдый сплав: предназначен для обработки закалённых сталей до 70 HRC без СОЖ.

UH NMG	UH RED COATING NANO MICROGRAIN 50~70HRC

n Vf
PAGE 253-254

OSAWA NORM

NEW NEW

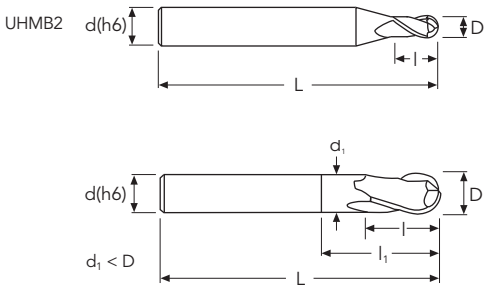
UHMB2	UHCSB2	UH250	UH253

UHMB2 - UH253

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20

UHCSB2 - UH250

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±5	±10



Z2 BALL | NMG UH RED | UH BALL NOSE | 30°

D	d	l	l1	L	Stock	Stock	Stock	Stock
mm 0.2	4	0.4		40	●			
0.2	6	0.2		40		■		
0.3	4	0.6		40	●			
0.4	4	0.8		40	●			
0.4	6	0.4		40		■		
0.5	4	1.2		40	●			
0.5	6	1.2		50		●		
0.6	4	1.4		40	●			
0.6	6	0.6		40		■		
0.6	6	1.4		50		●		
0.7	4	1.6		40	●			
0.8	4	1.8		40	●			
0.8	6	0.8		40		■		
0.8	6	1.8		50		●		
0.9	4	2		40	●			
0.9	6	0.9		40		■		
1	6	1.5		40		●		
1	4	1	2.2	50			●	
1	6	3	7	75				●
1	6	3	10	100				●
1.5	6	2.5		40		●		
1.5	4	1.5	3	50			●	
1.5	6	3	10	75				●
1.5	6	3	15	100				●
2	6	3		40		●		
2	6	2	4	50			●	
2	6	4	14	75				●
2	6	4	20	100				●
2.5	6	3		50		●		
2.5	6	4	18	75				●
2.5	6	4	25	100				○
3	6	4.5		50		●		
3	6	3	6	60			●	
3	6	5	21	75				●
3	6	5	30	100				●
4	6	6		50		●		

● stock standard ○ non-standard stock ■ stock exhaustion

PAGE 253-254

OSAWA NORM

NEW NEW

UHMB2	UHCSB2	UH250	UH253
			

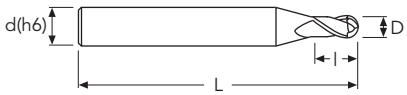
UHMB2 - UH253

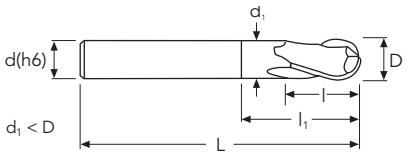
Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20

UHCSB2 - UH250

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±5	±10

UHMB2





					UHMB2	UHCSB2	UH250	UH253
D	d	l	l1	L	Stock	Stock	Stock	Stock
mm 4	6	4	8	70			●	
4	6	4	40	100				●
5	6	7.5		50		●		
5	6	5	10	80			●	
5	6	5	50	100				●
6	6	9		50		●		
6	6	6	12	90			●	
6	6	10	60	100				●
6	6	10	60	150				●
8	8	12		50		●		
8	8	8	16	100			●	
8	8	12	60	100				●
8	8	12	80	150				●
10	10	15		60		●		
10	10	10	20	100			●	
10	10	14	85	125				●
10	10	14	100	150				●
12	12	18		60		●		
12	12	12	24	110			●	
12	12	16	85	125				●
12	12	16	110	150				●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 255~257

OSAWA NORM

NEW

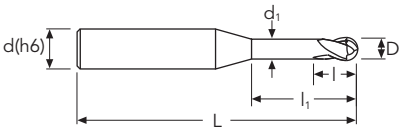
UHCRB2 UHLNB2

UHCRB2

Ø mm	~6
tol. D µ	0 / -12
tol. R µ	±5

UHLNB2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20



$d_1 < D$

Z2 BALL | NMG UH RED | UH BALL NOSE | 30°

D		d	l	l1	L	Stock	Stock
mm	0.1	4	0.1	0.3	45	■	
	0.2	4	0.2	0.5	50		●
	0.2	4	0.2	1	45	■	
	0.2	4	0.2	1	50		●
	0.2	4	0.2	1.5	50		●
	0.3	4	0.3	1	50		●
	0.3	4	0.3	2	45	■	
	0.3	4	0.3	2	50		●
	0.3	4	0.3	3	50		●
	0.4	4	0.4	1	45	■	
	0.4	4	0.4	1	50		●
	0.4	4	0.4	2	50		●
	0.4	4	0.4	3	50		●
	0.4	4	0.4	4	50		●
	0.5	6	0.5	2	45	●	
	0.5	4	0.4	2	50		●
	0.5	4	0.4	3	50		●
	0.5	6	0.5	4	45	●	
	0.5	4	0.4	4	50		
	0.5	4	0.4	5	50		●
	0.5	4	0.4	6	45	■	
	0.5	4	0.4	6	50		●
	0.5	4	0.4	8	50		●
	0.6	4	0.5	2	50		●
	0.6	4	0.5	3	50		●
	0.6	6	0.6	4	45	●	
	0.6	4	0.5	4	50		●
	0.6	4	0.5	5	50		●
	0.6	4	0.6	6	45	■	
	0.6	4	0.5	6	50		●
	0.6	4	0.5	8	50		●
	0.8	4	0.6	2	50		●
	0.8	6	0.8	2	45	●	
	0.8	4	0.6	4	50		●
	0.8	4	0.6	6	50		●
	0.8	6	0.8	6	45	●	

● stock standard ○ non-standard stock ■ stock exhaustion

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OSAWA NORM

NEW

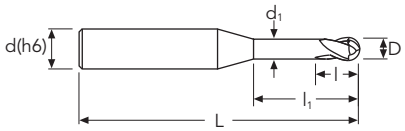
UHCRB2 UHLNB2


UHCRB2

Ø mm	~6
tol. D µ	0 / -12
tol. R µ	±5

UHLNB2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20



$d_1 < D$

Z2 BALL | NMG UH RED | UH BALL NOSE | 30°

D	d	l	l1	L	Stock	Stock
mm 0.8	4	0.6	8	50		●
0.8	4	0.8	10	45	■	
0.8	4	0.6	10	50		●
1	4	0.8	3	50		●
1	6	1	3	50	●	
1	4	0.8	4	50		●
1	4	0.8	5	50		●
1	4	0.8	6	50		●
1	6	1	6	50	●	
1	4	0.8	7	50		○
1	4	0.8	8	50		●
1	4	0.8	9	50		○
1	4	0.8	10	50	■	●
1	6	1	10	50	●	
1	4	0.8	12	50		●
1	4	0.8	14	50		●
1	4	0.8	16	50	■	●
1	4	0.8	20	50	■	●
1.2	4	1	6	50		●
1.2	4	1	8	50		●
1.2	6	1.2	8	50	●	
1.2	4	1	10	50		●
1.2	4	1	12	50		●
1.4	4	1.1	8	50		●
1.4	4	1.1	12	50		●
1.4	4	1.1	16	50		●
1.5	6	1.5	4	50	●	
1.5	4	1.2	8	50		●
1.5	6	1.5	10	50	●	
1.5	4	1.2	12	50	■	●
1.5	6	1.5	12	50	●	
1.5	4	1.2	16	50		●
1.5	4	1.2	18	60		●
1.5	4	1.5	20	55	■	
1.5	4	1.2	20	60		●
1.6	4	1.3	8	50		●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 255~257

OSAWA NORM

NEW

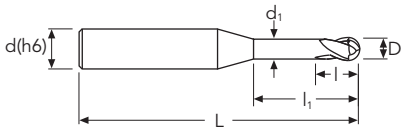
UHCRB2 UHLNB2

UHCRB2

Ø mm	~6
tol. D µ	0 / -12
tol. R µ	±5

UHLNB2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20



$d_1 < D$

Z2 BALL | NMG UH RED | UH BALL NOSE | 30°

D		d	l	l1	L	Stock	Stock
mm	1.6	4	1.3	12	50		●
	1.6	4	1.3	16	50		●
	1.6	4	1.3	20	60		○
	1.8	4	1.4	8	50		●
	1.8	4	1.4	12	50		●
	1.8	4	1.4	16	50		●
	1.8	4	1.4	20	60		○
	2	4	1.6	4	50		●
	2	4	1.6	6	50		●
	2	6	3	6	50	●	
	2	4	1.6	8	50		●
	2	4	1.6	10	50		●
	2	4	3	10	50	■	
	2	4	1.6	12	50		●
	2	6	3	12	50	●	
	2	4	1.6	14	50		●
	2	4	3	16	50	■	
	2	4	1.6	16	50		●
	2	4	1.6	18	60		●
	2	6	3	20	50	●	
	2	4	1.6	20	60		●
	2	4	1.6	22	60		●
	2	4	3	25	60	■	
	2	4	1.6	25	75		●
	2	4	3	30	70	■	
	2	4	1.6	30	75		●
	3	6	2.4	8	50		●
	3	6	2.4	10	50		●
	3	6	2.4	12	50		●
	3	6	4	12	55	■	
	3	6	2.4	16	50		●
	3	6	4	16	55	■	
	3	6	2.4	20	60		●
	3	6	4	20	60	■	
	3	6	2.4	25	75		●
	3	6	4	30	70	■	

● stock standard ○ non-standard stock ■ stock exhaustion

PAGE 255~257

OSAWA NORM

NEW

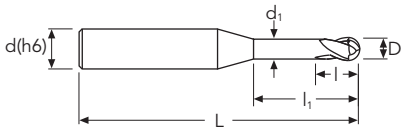
UHCRB2 UHLNB2


UHCRB2

Ø mm	~6
tol. D µ	0 / -12
tol. R µ	±5

UHLNB2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20



$d_1 < D$

Z2 BALL | NMG | UH RED | UH BALL NOSE | 30°

D	d	l	l1	L	Stock	Stock
mm 3	6	2.4	30	75		●
3	6	2.4	35	75		●
4	6	3.2	10	50		●
4	6	5	16	55	■	
4	6	3.2	16	60		●
4	6	3.2	20	60		●
4	6	3.2	25	75		●
4	6	5	30	70	■	
4	6	3.2	30	75		●
4	6	3.2	35	75		●
4	6	5	40	80	■	
4	6	3.2	40	100		●
4	6	3.2	45	100		○
4	6	3.2	50	100		○

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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OSAWA NORM

NEW

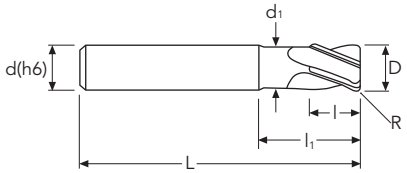
UHF430	UHF4
	

UHF430

Ø mm	~12
tol. D µ	0 / -20
tol. R µ	±5

UHF4

Ø mm	~12
tol. D µ	0 / -30
tol. R µ	0 / -20



$d_1 < D$

	UHF430	UHF4
	Z4	Z4
	NMG UH RED	NMG UH RED
	UH HIGH FEED RADIUS	UH HIGH FEED RADIUS
	30°	25°

D		d	l	l1	L	Stock	Stock
mm 2	R0.5	6	1	6	70		●
3	R0.5	6	1.2	8	70		●
4	R0.5	6	1.5	10	70		●
5	R0.5	6	2	10	70	■	●
6	R0.5	6	2.5	12	90	■	●
6	R1	6	2.5	12	90	■	●
8	R1	8	3.5	16	100	■	●
8	R2	8	3.5	16	100	■	●
10	R1	10	4	20	100	■	●
10	R2	10	4	20	100	■	●
12	R2	12	5	25	110		●
12	R3	12	5	25	110		●

● stock standard ○ non-standard stock ■ stock exhaustion

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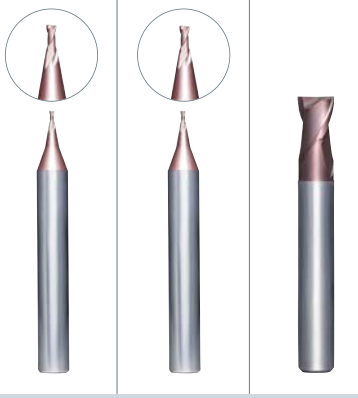
OSAWA NORM

NEW

UHM2-N	UHM2	UHCS2

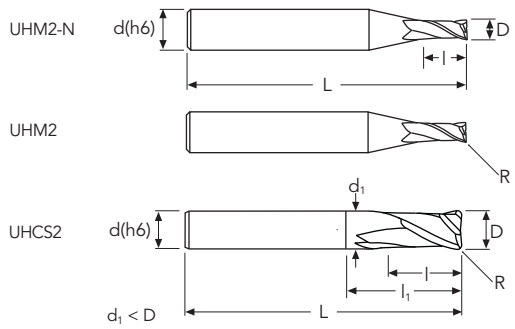


UHM2 - UHCS2

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±15

UHM2-N

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20



						Z2	Z2	Z2
						NMG UH RED	NMG UH RED	NMG UH RED
						UH	UH RADIUS	UH RADIUS
						40°	30°	30°
D		d	l	l1	L	Stock	Stock	Stock
mm	0.1	4	0.2		40	●		
	0.2	4	0.4		40	●		
	0.3	4	0.6		40	●		
	0.3	6	0.45		50		●	
	0.4	4	0.8		40	●		
	0.4	6	0.6		50		●	
	0.5	4	1		40	●		
	0.5 R0.05	6	0.7		50		●	
	0.6	4	1.2		40	●		
	0.6 R0.05	6	0.9		50		●	
	0.7	4	1.4		40	●		
	0.8	4	1.6		40	●		
	0.8 R0.05	6	1.2		50		●	
	0.9	4	1.8		40	●		
	1 R0.1	4	2	3	50			●
	1 R0.1	6	1.5		50		●	
	1.5 R0.1	4	2.5	4	50			●
	1.5 R0.15	6	2.2		50		●	
	2 R0.15	6	2.2		50		●	
	3 R0.1	6	4.5	8	55			●
	4 R0.1	6	6	10	55			●
	5 R0.2	6	6	11	50			●
	6 R0.2	6	9	15	60			●
	8 R0.2	8	12	20	65			●
	10 R0.2	10	15	25	70			●
	12 R0.3	12	18	30	80			●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 260~262

OSAWA NORM

NEW

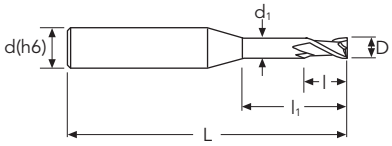
UHCR2	UHLN2
	

UHCR2

Ø mm	~4
tol. D µ	0 / -12

UHLN2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20



$d_1 < D$

Z2 | Z2

NMG UH RED | NMG UH RED

UH | UH

30° | 40°

D		d	l	l1	L	Stock	Stock
mm	0.1	4	0.15	0.3	45	■	
	0.2	4	0.3	0.5	50		●
	0.2	4	0.3	1	45	■	
	0.2	4	0.3	1	50		●
	0.2	4	0.3	1.5	50		●
	0.3	4	0.4	1	50		●
	0.3	4	0.45	1.5	45	■	
	0.3	4	0.4	2	50		●
	0.3	4	0.45	3	45	■	
	0.3	4	0.4	3	50		●
	0.4	4	0.6	2	50		●
	0.4	4	0.6	3	50		●
	0.4	4	0.6	4	50		●
	0.4	4	0.6	5	45	■	
	0.4	4	0.6	5	50		●
	0.5	4	0.7	2	45	■	
	0.5	4	0.7	2	50		●
	0.5	4	0.7	4	45	■	
	0.5	4	0.7	4	50		●
	0.5	4	0.7	6	50		●
	0.5	4	0.7	8	50		●
	0.6	4	0.9	2	50		●
	0.6	4	0.9	4	45	■	
	0.6	4	0.9	4	50		●
	0.6	4	0.9	6	45	■	
	0.6	4	0.9	6	50		●
	0.6	4	0.9	8	50		●
	0.6	4	0.9	10	50		●
	0.7	4	1	2	50		●
	0.7	4	1	4	50		●
	0.7	4	1	6	50		●
	0.7	4	1	8	50		●
	0.7	4	1	10	50		●
	0.8	4	1.2	4	50		●
	0.8	4	1.2	6	50		●
	0.8	4	1.2	8	45	■	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 260~262

OSAWA NORM

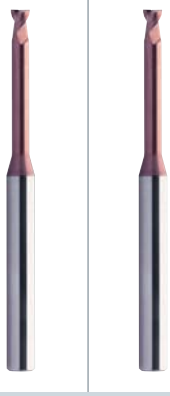
NEW

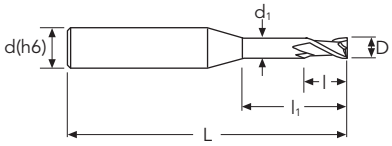
UHCR2

Ø mm	~4
tol. D µ	0 / -12

UHLN2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20





$d_1 < D$

D		d	l	l1	L	UHCR2 Stock	UHLN2 Stock
mm	0.8	4	1.2	8	50		●
	0.8	4	1.2	10	50		●
	0.8	4	1.2	12	50		●
	0.9	4	1.4	6	50		●
	0.9	4	1.4	8	50		●
	0.9	4	1.4	10	50		●
	0.9	4	1.4	15	50		●
	1	4	1.5	4	50	■	
	1	4	1.5	6	50		●
	1	4	1.5	8	50	■	●
	1	4	1.5	10	50	■	●
	1	4	1.5	12	50		●
	1	4	1.5	14	50		○
	1	4	1.5	16	50	■	●
	1	4	1.5	20	55	■	
	1.2	4	1.8	4	50	■	
	1.2	4	1.8	6	50		●
	1.2	4	1.8	8	50		●
	1.2	4	1.8	10	50	■	●
	1.2	4	1.8	12	50		●
	1.4	4	2.1	6	50		●
	1.4	4	2.1	8	50		●
	1.4	4	2.1	10	50		●
	1.4	4	2.1	12	50		●
	1.4	4	2.1	14	50		○
	1.4	4	2.1	16	50		●
	1.5	4	2.3	6	50	■	●
	1.5	4	2.3	8	50		●
	1.5	4	2.3	10	50	■	●
	1.5	4	2.3	12	50		●
	1.5	4	2.3	14	50		○
	1.5	4	2.3	16	50	■	●
	1.5	4	2.3	18	60		○
	1.5	4	2.3	20	55	■	
	1.5	4	2.3	20	60		●
	1.6	4	2.4	6	50		●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 260~262

OSAWA NORM

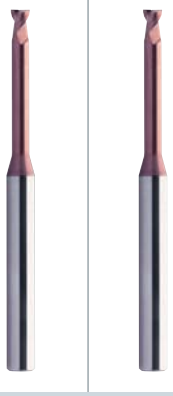
NEW

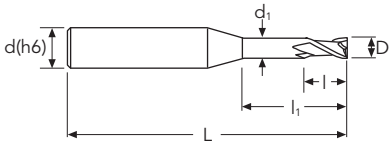
UHCR2

Ø mm	~4
tol. D µ	0 / -12

UHLN2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20





$d_1 < D$

Z2 NMG UH RED UH 30°

Z2 NMG UH RED UH 40°

D	d	l	l1	L	Stock	Stock
mm 1.6	4	2.4	8	50		●
1.6	4	2.4	10	50		●
1.6	4	2.4	12	50		●
1.6	4	2.4	14	50		○
1.6	4	2.4	16	50		●
1.6	4	2.4	18	60		○
1.6	4	2.4	20	60		●
1.8	4	2.7	6	50		●
1.8	4	2.7	8	50		●
1.8	4	2.7	10	50		●
1.8	4	2.7	12	50		●
1.8	4	2.7	14	50		○
1.8	4	2.7	16	50		●
1.8	4	2.7	18	60		●
1.8	4	2.7	20	60		●
2	4	3	6	50	■	●
2	4	3	8	50		●
2	4	3	10	50		●
2	4	3	12	50	■	●
2	4	3	14	50		○
2	4	3	16	50	■	●
2	4	3	18	60		○
2	4	3	20	55	■	
2	4	3	20	60		●
2	4	3	25	75		●
2	4	3	30	75		●
2.5	4	3.7	8	50		●
2.5	4	3.7	10	50		●
2.5	4	3.7	12	50		●
2.5	4	3.7	14	50		○
2.5	4	3.7	16	50		●
2.5	4	3.7	18	60		○
2.5	4	3.7	20	60		●
2.5	4	3.7	25	75		●
2.5	4	3.7	30	75		●
3	6	4.5	8	50		●

● stock standard ○ non-standard stock ■ stock exhaustion

PAGE 260~262

OSAWA NORM

NEW

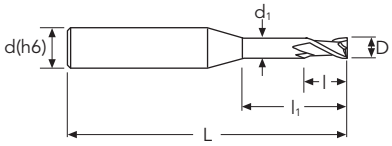
UHCR2	UHLN2
	

UHCR2

Ø mm	~4
tol. D µ	0 / -12

UHLN2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20



$d_1 < D$

						UHCR2	UHLN2
						Z2	Z2
						NMG UH RED	NMG UH RED
						UH	UH
						30°	40°
D		d	l	l1	L	Stock	Stock
mm	3	6	4.5	10	50		●
	3	6	4.5	12	50		●
	3	6	4.5	12	55	■	
	3	6	4.5	14	50		○
	3	6	4.5	16	55	■	
	3	6	4.5	16	60		●
	3	6	4.5	18	60		○
	3	6	4.5	20	60	■	●
	3	6	4.5	25	75		●
	3	6	4.5	30	70	■	
	4	6	6	10	60		●
	4	6	6	15	60		●
	4	6	6	20	60	■	●
	4	6	6	25	75		●
	4	6	6	30	75		●
	4	6	6	40	75		●
	4	6	6	40	80	■	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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OSAWA NORM

NEW

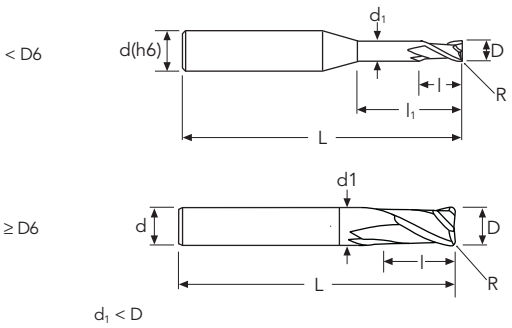
UH211	UH212
	

UH211

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±15

UH212

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	±10	±10



			d	l	l1	L	UH211 Stock	UH212 Stock
mm	0.2	R0.02	4	0.3	0.5	50		●
	0.2	R0.02	4	0.3	1	50		●
	0.2	R0.02	4	0.3	1.5	50		●
	0.3	R0.03	4	0.4	1	50		●
	0.3	R0.03	4	0.4	2	50		●
	0.3	R0.03	4	0.4	3	50		●
	0.4	R0.03	4	0.6	2	50		●
	0.4	R0.03	4	0.6	3	50		●
	0.4	R0.03	4	0.6	4	50		●
	0.4	R0.03	4	0.6	5	50		●
	0.5	R0.05	4	0.7	1.5	45	■	
	0.5	R0.05	4	0.7	2	50		●
	0.5	R0.05	4	0.7	4	45	■	
	0.5	R0.05	4	0.7	4	50		●
	0.5	R0.05	4	0.7	6	50		●
	0.5	R0.05	4	0.7	8	50		●
	0.6	R0.05	4	0.9	2	45	■	
	0.6	R0.05	4	0.9	2	50		●
	0.6	R0.05	4	0.9	4	45	■	
	0.6	R0.05	4	0.9	4	50		●
	0.6	R0.05	4	0.9	6	50		●
	0.6	R0.05	4	0.9	8	50		●
	0.6	R0.05	4	0.9	10	50		●
	0.7	R0.08	4	1	2	50		●
	0.7	R0.08	4	1	4	50		●
	0.7	R0.08	4	1	6	50		●
	0.7	R0.08	4	1	8	50		●
	0.7	R0.08	4	1	10	50		●
	0.8	R0.05	4	1.2	2	45	■	
	0.8	R0.08	4	1.2	4	50		●
	0.8	R0.05	4	1.2	6	45	■	
	0.8	R0.08	4	1.2	6	50		●
	0.8	R0.08	4	1.2	8	50		●
	0.8	R0.08	4	1.2	10	50		●
	0.8	R0.08	4	1.2	12	50		●
	0.9	R0.08	4	1.4	6	50		●

● stock standard ○ non-standard stock ■ stock exhaustion

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OSAWA NORM

NEW

UH211	UH212

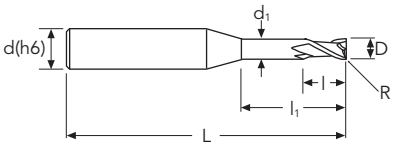
UH211

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±15

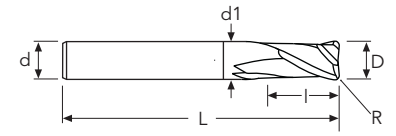
UH212

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	±10	±10

< D6



≥ D6



$d_1 < D$

Z2 | Z2

NMG UH RED | NMG UH RED

UH RADIUS | UH RADIUS

30° | 40°

D			d	l	l1	L	Stock	Stock
mm	0.9	R0.08	4	1.4	8	50		●
	0.9	R0.08	4	1.4	10	50		●
	0.9	R0.08	4	1.4	15	50		●
	1	R0.1	4	2	4	50	●	
	1	R0.1	4	2	6	50	●	
	1	R0.1	4	2	8	50	●	
	1	R0.1	4	1.5	10	50		●
	1	R0.1	4	1.5	12	50		●
	1	R0.1	4	1.5	14	50		○
	1	R0.1	4	1.5	16	50		●
	1	R0.2	4	2	4	50	●	
	1	R0.2	4	2	8	50	●	
	1	R0.3	4	2	4	50	●	
	1	R0.3	4	2	8	50	●	
	1.2	R0.1	4	1.8	6	50		●
	1.2	R0.1	4	1.8	8	50		●
	1.2	R0.1	4	1.8	10	50		●
	1.2	R0.1	4	1.8	12	50		●
	1.4	R0.15	4	2.1	6	50		●
	1.4	R0.15	4	2.1	8	50		●
	1.4	R0.15	4	2.1	10	50		●
	1.4	R0.15	4	2.1	12	50		●
	1.4	R0.15	4	2.1	14	50		○
	1.4	R0.15	4	2.1	16	50		●
	1.5	R0.1	4	2.5	6	50	●	
	1.5	R0.1	4	2.5	10	50	●	
	1.5	R0.15	4	2.3	6	50		●
	1.5	R0.15	4	2.3	8	50		●
	1.5	R0.15	4	2.3	10	50		●
	1.5	R0.15	4	2.3	12	50		●
	1.5	R0.15	4	2.3	14	50		○
	1.5	R0.15	4	2.3	16	50		●
	1.5	R0.15	4	2.3	18	60		○
	1.5	R0.15	4	2.3	20	60		●
	1.5	R0.2	4	2.5	4	50	■	
	1.5	R0.2	4	2.5	8	50	●	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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OSAWA NORM

NEW

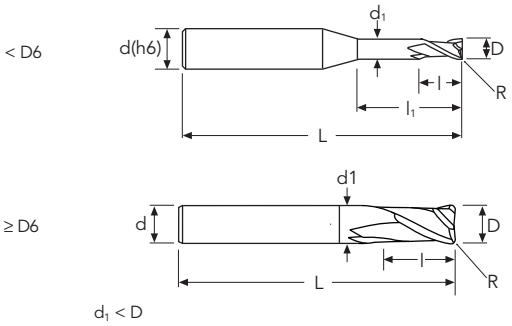
UH211

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±15

UH212

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	±10	±10

UH211	UH212
	



	UH211	UH212
Z2	Z2	Z2
NMG UH RED	NMG UH RED	NMG UH RED
UH RADIUS	UH RADIUS	UH RADIUS
30°	30°	40°

D			d	l	l1	L	Stock	Stock
mm	1.5	R0.2	4	2.5	12	50	●	
	1.5	R0.3	4	2.5	4	50	■	
	1.5	R0.3	4	2.5	8	50	■	
	1.6	R0.15	4	2.4	6	50		●
	1.6	R0.15	4	2.4	8	50		●
	1.6	R0.15	4	2.4	10	50		●
	1.6	R0.15	4	2.4	12	50		●
	1.6	R0.15	4	2.4	14	50		○
	1.6	R0.15	4	2.4	16	50		●
	1.6	R0.15	4	2.4	18	60		○
	1.6	R0.15	4	2.4	20	60		●
	1.8	R0.2	4	2.7	6	50		●
	1.8	R0.2	4	2.7	8	50		●
	1.8	R0.2	4	2.7	10	50		●
	1.8	R0.2	4	2.7	12	50		●
	1.8	R0.2	4	2.7	14	50		○
	1.8	R0.2	4	2.7	16	50		●
	1.8	R0.2	4	2.7	18	60		○
	1.8	R0.2	4	2.7	20	60		●
	2	R0.1	4	3	6	50	●	
	2	R0.1	4	3	12	50	●	
	2	R0.2	4	3	6	50	●	
	2	R0.2	4	3	8	50		●
	2	R0.2	4	3	10	50		●
	2	R0.2	4	3	12	50	●	●
	2	R0.2	4	3	14	50		○
	2	R0.2	4	3	16	50		●
	2	R0.2	4	3	18	60		○
	2	R0.2	4	3	20	60		●
	2	R0.2	4	3	25	75		●
	2	R0.2	4	3	30	75		●
	2	R0.3	4	3	8	50	●	
	2	R0.3	4	3	12	50	●	
	2	R0.3	4	3	16	50	●	
	2	R0.5	4	3	6	50	●	
	2	R0.5	4	3	12	50	●	

● stock standard ○ non-standard stock ■ stock exhaustion

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OSAWA NORM

NEW

UH211	UH212

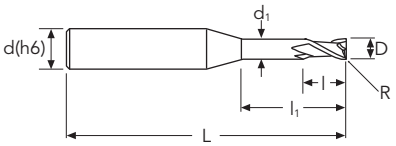
UH211

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±15

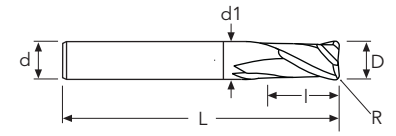
UH212

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	±10	±10

< D6



≥ D6



$d_1 < D$

Z2 | NMG UH RED | UH RADIUS | 30°

Z2 | NMG UH RED | UH RADIUS | 40°

D			d	l	l1	L	Stock	Stock
mm	2.5	R0.2	4	3.5	8	55	■	
	2.5	R0.2	4	3.5	12	55	■	
	2.5	R0.3	4	3.7	8	50		●
	2.5	R0.3	4	3.7	10	50		●
	2.5	R0.3	4	3.7	12	50		●
	2.5	R0.3	4	3.7	14	50		○
	2.5	R0.3	4	3.7	16	50		●
	2.5	R0.3	4	3.7	18	60		○
	2.5	R0.3	4	3.7	20	60		●
	2.5	R0.3	4	3.7	25	75		●
	2.5	R0.3	4	3.7	30	75		●
	3	R0.2	6	4.5	10	55	■	
	3	R0.2	6	4.5	16	55	■	
	3	R0.3	6	4.5	8	50		●
	3	R0.3	6	4.5	10	50		●
	3	R0.3	6	4.5	10	55	●	
	3	R0.3	6	4.5	12	50		●
	3	R0.3	6	4.5	14	50		●
	3	R0.3	6	4.5	16	55	●	
	3	R0.3	6	4.5	16	60		●
	3	R0.3	6	4.5	18	60		●
	3	R0.3	6	4.5	20	60		●
	3	R0.3	6	4.5	25	75		●
	3	R0.5	6	4.5	10	55	●	
	3	R0.5	6	4.5	16	55	●	
	4	R0.2	6	6	20	60	●	
	4	R0.3	6	6	12	55	●	
	4	R0.3	6	6	20	60	●	
	4	R0.4	6	4.5	10	60		●
	4	R0.4	6	4.5	15	60		●
	4	R0.4	6	4.5	20	60		●
	4	R0.4	6	4.5	25	75		●
	4	R0.4	6	4.5	30	75		●
	4	R0.4	6	4.5	40	75		●
	4	R0.5	6	6	12	55	●	
	4	R0.5	6	6	20	60	●	

● stock standard ○ non-standard stock ■ stock exhaustion

NEW

UH211	UH212
	

n Vf
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OSAWA NORM

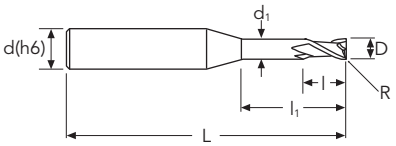
UH211

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±15

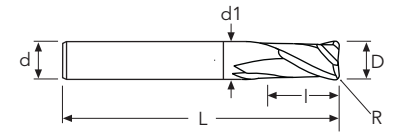
UH212

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	±10	±10

< D6



≥ D6



$d_1 < D$

Z2 | NMG UH RED | UH RADIUS | 30°

Z2 | NMG UH RED | UH RADIUS | 40°

D		d	l	l1	L	Stock	Stock
mm 4	R1.0	6	6	16	55	●	
6	R0.5	6	9	15	60	●	
6	R1	6	9	15	60	●	
6	R2	6	9	15	60	●	
8	R0.5	8	12	20	65	●	
8	R1	8	12	20	65	●	
8	R2	8	9	25	60	●	
10	R0.5	10	15	25	70	●	
10	R1	10	15	25	70	●	
10	R2	10	15	25	70	●	
12	R0.5	12	18	30	80	●	
12	R1	12	18	30	80	●	
12	R2	12	18	30	80	●	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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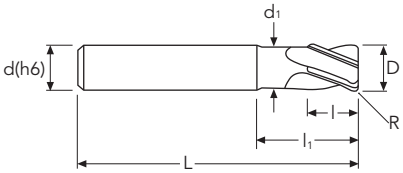
OSAWA NORM

UHCS4

UHCS4

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±15



$d_1 < D$

Z4

NMG
UH RED

UH RADIUS

30°

D			d	l	l1	L	Stock
mm	1	R0.1	4	2	3	50	●
	1.5	R0.1	4	2.5	4	50	●
	2	R0.1	4	3	6	50	●
	3	R0.1	6	4	8	55	●
	4	R0.1	6	6	10	55	●
	5	R0.2	6	6	11	50	●
	6	R0.2	6	9	15	60	●
	8	R0.2	8	12	20	70	●
	10	R0.2	10	15	25	70	●
	12	R0.3	12	18	30	80	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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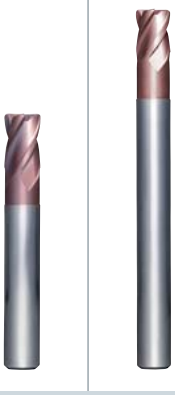
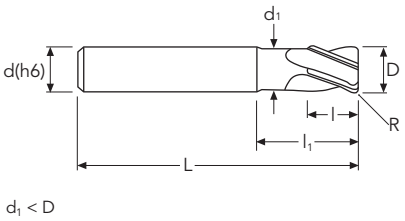
OSAWA NORM

UH411 - UH412

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±15

UH411 UH412





$d_1 < D$

Z4 | NMG UH RED | UH RADIUS | 30°

D			d	l	l1	L	Stock	Stock
mm	2	R0.3	6	4	30	75		● NEW
	2	R0.3	6	4	60	100		● NEW
	3	R0.3	6	4	12	55	●	
	3	R0.3	6	4	20	60	●	
	3	R0.3	6	5	30	75		● NEW
	3	R0.3	6	5	60	100		● NEW
	3	R0.5	6	4	10	55	●	
	3	R0.5	6	4	20	60	●	
	3	R0.5	6	5	30	75		● NEW
	3	R0.5	6	5	60	100		● NEW
	4	R0.3	6	6	12	55	●	
	4	R0.3	6	6	20	60	●	
	4	R0.3	6	8	32	75		● NEW
	4	R0.3	6	8	60	100		● NEW
	4	R0.5	6	6	12	55	●	
	4	R0.5	6	6	20	60	●	
	4	R0.5	6	8	32	75		● NEW
	4	R0.5	6	8	60	100		● NEW
	4	R1.0	6	6	12	55	●	
	6	R0.5	6	9	15	60	●	
	6	R0.5	6	9	20	90		●
	6	R1.0	6	9	15	60	●	
	6	R1.0	6	9	20	90		●
	8	R0.5	8	12	20	70	●	
	8	R0.5	8	12	25	100		●
	8	R1.0	8	12	20	70	●	
	8	R1.0	8	12	25	100		●
	8	R2.0	8	12	20	70	●	
	10	R0.5	10	15	25	70	●	
	10	R0.5	10	15	32	100		●
	10	R1.0	10	15	25	70	●	
	10	R1.0	10	15	32	100		●
	10	R2.0	10	15	25	70	●	
	10	R2.0	10	15	32	100		●
	12	R0.5	12	18	30	80	●	
	12	R0.5	12	18	38	110		●
	12	R1.0	12	18	30	80	●	
	12	R1.0	12	18	38	110		●
	12	R2.0	12	18	30	80	●	
	12	R2.0	12	18	38	110		●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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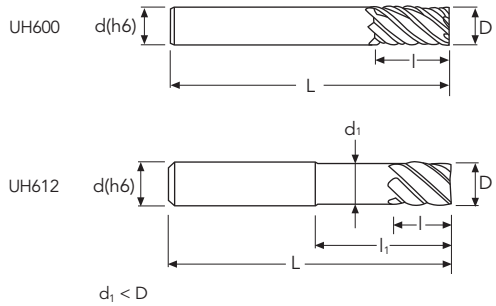
OSAWA NORM

NEW NEW

UH600	UH612
	

UH600- UH612

Ø mm	~20
tol. D µ	0 / -20



	UH600	UH612
	Z6~Z8	Z6~Z8
	NMG UH RED	NMG UH RED
	UH RADIUS	UH RADIUS
	45°	45°

D	d	l	l1	L		UH600 Stock	UH612 Stock
mm 3	6	8		50		●	
3	6	19	30	75			●
4	6	11		50		●	
4	6	19	32	75			●
5	6	13		50		●	
5	6	19	32	75			●
6	6	20		60		●	
6	6	38	60	100			●
8	8	20		64		●	
8	8	41	60	100			●
10	10	22		70		●	
10	10	57	85	125			●
12	12	25		75		●	
12	12	75	110	150			●
14	14	30		90		●	
16	16	30		90	Z8	●	
16	16	75	110	150	Z8		●
20	20	38		100	Z8	●	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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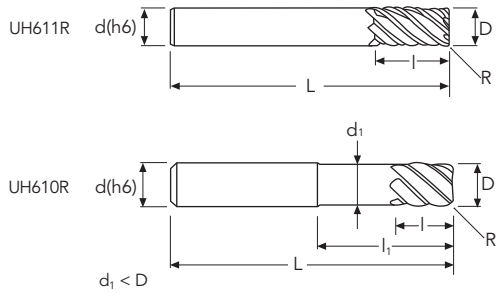
OSAWA NORM

UH610R - UH611R

Ø mm	~20
tol. D µ	0 / -30
tol. R µ	±15

UH610R UH611R



Z6 NMG UH RED UH RADIUS 45°

D		d	l	l1	L	Stock	Stock
mm 6	R0.5	6	6	15	50	●	
6	R0.5	6	15		70		●
8	R0.5	8	8	25	60	●	
8	R0.5	8	20		100		●
10	R0.5	10	25	30	100		●
10	R1.0	10	10	30	70	●	
10	R1.0	10	25		100		●
12	R1.0	12	12	30	75	●	
12	R0.5	12	30		110		●
12	R1.0	12	30		110		●
16	R1.0	16	32		130		●
20	R1.0	20	38		140		●
20	R2.0	20	38		140		●

● stock standard ○ non-standard stock ■ stock exhaustion

MEX ORANGE

Ultra-fine micrograin for 30~55HRC

MEX ultra fine micrograin: for high-performance machining on general up to hardened steel.

MEX micrograna ultra fine: per lavorazione ad alto rendimento di acciai legati e temprati.

MEX ultrafeine Mikrokörnung: für höchste Leistungen bei Bearbeitung von legierten Stählen und mittel gehärteten Stähle.

MEX ultra fine micro-grain: pour l'usinage haute performance des aciers alliés et traités.

MEX micrograno ultra fino para mecanizados generales en alta producción o aceros de alta resistencia.

MEX сверхмелкозернистый твёрдый сплав: для высокопроизводительной обработки сталей и закалённых сталей.

MEX
UMG

ENDLESS ORANGE COATING
ULTRA FINE MICROGRAIN

30~55HRC

n Vf
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OSAWA NORM

MEXMB2 - MEX253

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20

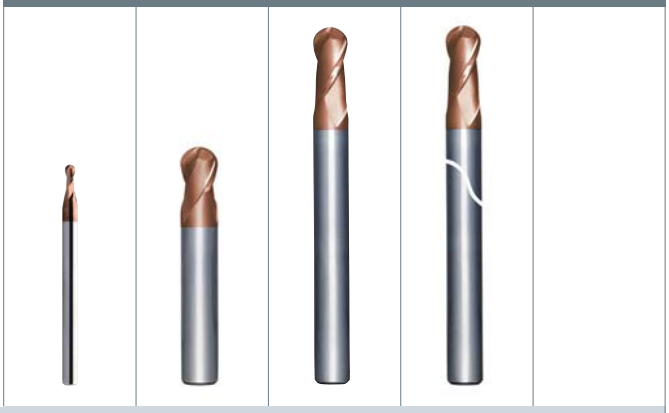
MEXCLSB2

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±10

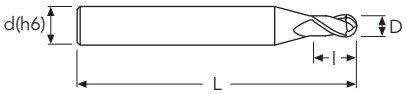
MEXCSB2

tol. D µ	0 / -30	0 / -30
tol. R µ	±10	±10

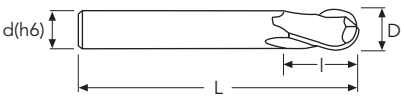
MEXMB2 MEXCSB2 MEXCLSB2 MEX253



MEXMB2



MEXCSB2
MEXCLSB2
MEX253



Z2 BALL | UMG ENDLESS ORANGE | MEX BALL NOSE | 30°

D		d	l	l1	L	Stock	Stock	Stock	Stcok
mm 0.2		4	0.4		40	●			
0.3		4	0.6		40	●			
0.4		4	0.8		40	●			
0.5		4	1.2		40	●			
0.6		4	1.4		40	●			
0.7		4	1.6		40	●			
0.8		4	1.8		40	●			
0.9		4	2		40	●			
1		3	3		38		●		
1		4	3		40	●			
1		4	2.5		50			●	
1	NEW	4	3		75				●
1	NEW	4	3		100				●
1.2		4	3		50			●	
1.5		3	3		38		●		
1.5		4	3		40	●			
1.5		4	4		50			●	
1.5	NEW	4	3		75				●
1.5	NEW	4	3		100				●
2		4	4		40	●			
2		6	3		50		●		
2		6	5		50			●	
2	NEW	4	4		75				●
2		6	4		80				■
2	NEW	4	4		100				●
2.5		4	4		40		●		
2.5		6	6		60			●	
3		6	4		50		●		
3		6	8		60			●	
3	NEW	6	5		75				●
3		6	5		100				●
4		6	5		54		●		
4		6	8		70			●	
4		6	8		100				●
5		6	6		54		●		
5		6	10		80			●	
5	NEW	6	9		100				●

● stock standard ○ non-standard stock ■ stock exhaustion

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OSAWA NORM

MEXMB2 - MEX253

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20

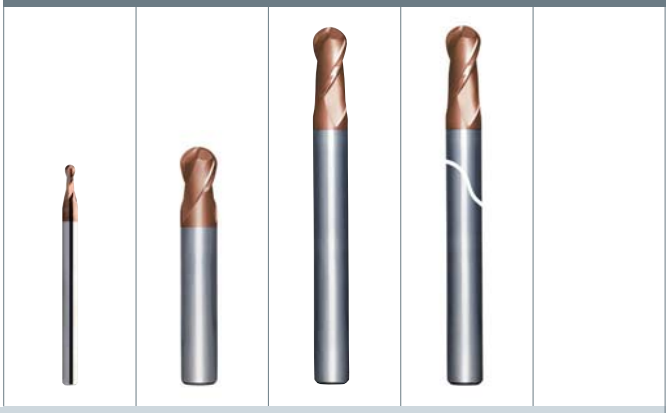
MEXCLSB2

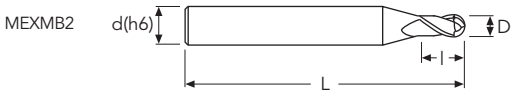
Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±10	±10

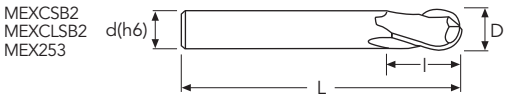
MEXCSB2

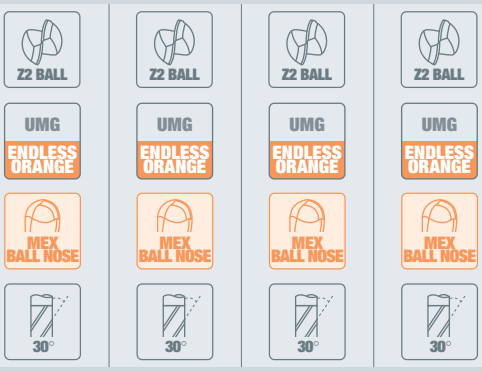
tol. D µ	0 / -30	0 / -30
tol. R µ	±10	±10

MEXMB2 MEXCSB2 MEXCLSB2 MEX253









D		d	l	l1	L	Stock	Stock	Stock	Stcok
mm 5		6	10		120				○
6		6	12		60		●		
6		6	12		90			●	
6		6	12		120				○
6	NEW	6	10		150				●
7		8	8		58		○	○	
8		8	14		60		●		
8		8	14		100			●	
8		8	12		150				●
10		10	18		70		●		
10		10	18		100			●	
10	NEW	10	14		150				●
10		10	20		180				○
12		12	22		80		●		
12		12	22		110			●	
12	NEW	12	16		150				●
12		12	24		200				○
14		14	32		90		●		
14		14	32		125			●	
16		16	32		90		●		
16		16	32		150			●	
16	NEW	16	32		200				○
18		18	38		100		○		
20		20	38		100		○		
20		20	38		150			○	
20	NEW	20	38		200				○
22		22	40		100		○		
25		25	40		100		○		

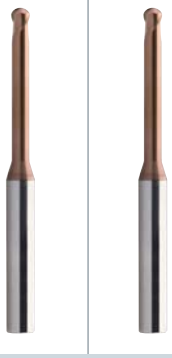
● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 268~270

OSAWA NORM

NEW

MEXCRB2 MEXLNB2

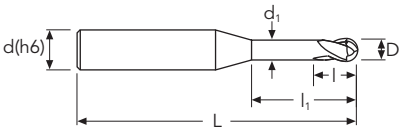


MEXCRB2

Ø mm	~6
tol. D µ	0 / -12
tol. R µ	±10

MEXLNB2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20



$d_1 < D$

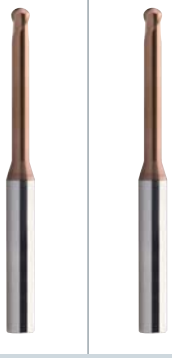
Z2 BALL | UMG ENDLESS ORANGE | MEX BALL NOSE | 30°

D	d	l	l1	L	Stock	Stock
mm 0.2	4	0.2	0.5	50		●
0.2	4	0.2	1	50		●
0.2	4	0.2	1.5	50		●
0.3	4	0.3	1	50		●
0.3	4	0.3	2	50		●
0.3	4	0.3	3	50		●
0.4	4	0.4	1	50		●
0.4	4	0.4	2	50		●
0.4	4	0.4	3	45	■	
0.4	4	0.4	3	50		●
0.4	4	0.4	4	50		●
0.4	4	0.4	5	50		●
0.5	4	0.4	2	50		●
0.5	6	0.5	2.5	60		●
0.5	4	0.4	3	50		●
0.5	4	0.4	4	50		●
0.5	4	0.4	5	50		●
0.5	4	0.5	6	45	■	
0.5	4	0.4	6	50		●
0.5	4	0.5	8	45	■	
0.5	4	0.4	8	50		●
0.6	4	0.5	2	50		●
0.6	4	0.5	3	50		●
0.6	4	0.5	4	50		●
0.6	4	0.5	5	50		●
0.6	4	0.6	6	45	■	
0.6	4	0.5	6	50		●
0.6	6	0.6	6	60		●
0.6	4	0.6	8	45	■	
0.6	4	0.5	8	50		●
0.8	4	0.6	2	50		●
0.8	4	0.6	4	50		●
0.8	6	0.8	4	60		●
0.8	4	0.8	6	45	■	
0.8	4	0.6	6	50		●
0.8	4	0.8	8	45	■	

● stock standard ○ non-standard stock ■ stock exhaustion

NEW

MEXCRB2 MEXLNB2



n Vf
PAGE 268~270

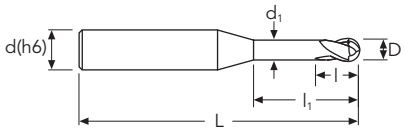
OSAWA NORM

MEXCRB2

Ø mm	~6
tol. D µ	0 / -12
tol. R µ	±10

MEXLNB2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20



$d_1 < D$

Z2 BALL | UMG ENDLESS ORANGE | MEX BALL NOSE | 30°

D		d	l	l1	L	Stock	
mm	**0.8**	4	0.6	8	50		●
	0.8	**6**	0.8	8	60		●
	0.8	4	0.6	10	50		●
	1	4	0.8	3	50		●
	1	4	0.8	4	50		●
	1	4	0.8	5	50		●
	1	**6**	1.5	5	60		●
	1	4	1	6	45	●	
	1	4	0.8	6	50		●
	1	4	1	8	45	●	
	1	4	0.8	8	50		●
	1	**6**	1.5	8	60		●
	1	4	0.8	10	50		●
	1	4	1	12	45	●	
	1	4	0.8	12	50		●
	1	**6**	1.5	12	60		●
	1	4	0.8	14	50		●
	1	4	1	16	50	●	
	1	4	0.8	16	50		●
	1	4	1	20	55	■	
	1	4	0.8	20	60		●
	1.2	4	1	6	50		●
	1.2	**6**	1.8	6	60		●
	1.2	4	1.2	8	45	■	
	1.2	4	1	8	50		●
	1.2	4	1	10	50		●
	1.2	4	1.2	12	45	■	
	1.2	4	1	12	50		●
	1.4	4	1.1	8	50		●
	1.4	4	1.4	12	45	■	
	1.4	4	1.1	12	50		●
	1.4	4	1.1	16	50		●
	1.5	4	1.5	8	45	●	
	1.5	4	1.2	8	50		●
	1.5	**6**	2.3	8	60		●
	1.5	4	1.5	12	45	●	

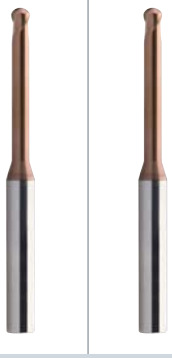
● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 268~270

OSAWA NORM

NEW

MEXCRB2 MEXLNB2

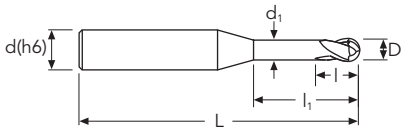


MEXCRB2

Ø mm	~6
tol. D µ	0 / -12
tol. R µ	±10

MEXLNB2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20



$d_1 < D$

Z2 BALL | UMG ENDLESS ORANGE | MEX BALL NOSE | 30°

D		d	l	l1	L	Stock	Stock
mm	1.5	4	1.2	12	50		●
	1.5	6	2.3	12	60		●
	1.5	4	1.5	16	50	●	
	1.5	4	1.2	16	50		●
	1.5	6	2.3	16	60		●
	1.5	4	1.2	18	60		●
	1.5	4	1.5	20	55	■	
	1.6	4	1.3	8	50		●
	1.6	4	1.3	12	50		●
	1.6	4	1.3	16	50		●
	1.6	6	2.4	16	60		●
	1.6	4	1.6	20	55	■	
	1.6	4	1.3	20	60		●
	1.8	4	1.4	8	50		●
	1.8	4	1.4	12	50		●
	1.8	4	1.4	16	50		●
	1.8	4	1.4	16	50	■	
	1.8	6	2.7	16	60		●
	1.8	4	1.8	20	55	■	
	1.8	4	1.4	20	60		●
	2	4	1.6	4	50		●
	2	4	1.6	6	50		●
	2	4	2	8	45	●	
	2	4	1.6	8	50		●
	2	4	1.6	10	50		●
	2	4	2	12	50	●	
	2	4	1.6	12	50		●
	2	6	3	12	60		●
	2	4	1.6	14	50		●
	2	4	2	16	50	●	
	2	4	1.6	16	50		●
	2	6	3	16	60		●
	2	4	1.6	18	60		●
	2	4	2	20	55	●	
	2	4	1.6	20	60		●
	2	6	3	20	75		●

● stock standard ○ non-standard stock ■ stock exhaustion

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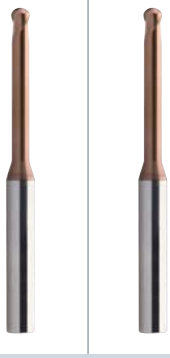
OSAWA NORM

NEW

MEXCRB2 MEXLNB2

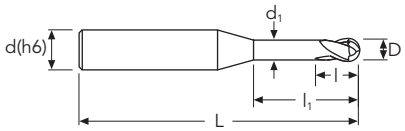


MEXCRB2

Ø mm	~6
tol. D µ	0 / -12
tol. R µ	±10

MEXLNB2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20



$d_1 < D$

Z2 BALL | UMG ENDLESS ORANGE | MEX BALL NOSE | 30°

D	d	l	l1	L	Stock	
mm 2	4	1.6	22	60		○
2	4	1.6	25	75		●
2	4	2	26	70	■	
2	4	2	30	70	■	
2	4	1.6	30	75		●
3	6	2.4	8	50		●
3	6	2.4	10	50		●
3	6	3	16	55	●	
3	6	2.4	16	60		●
3	6	3	20	60	●	
3	6	2.4	20	60		●
3	6	2.4	25	75		●
3	6	3	26	70	■	
3	6	3	30	70	●	
3	6	2.4	30	75		●
3	6	2.4	35	75		●
4	6	3.2	10	50		●
4	6	4	16	60	●	
4	6	3.2	16	60		●
4	6	3.2	20	60		●
4	6	4	20	65	●	
4	6	3.2	25	75		●
4	6	4	26	70	■	
4	6	4	30	70	■	
4	6	3.2	30	75		●
4	6	3.2	35	75		●
4	6	4	40	90	■	
4	6	3.2	40	100		●
4	6	3.2	50	100		●
5	6	5	20	60	■	
5	6	5	30	80	■	
6	6	6	30	90	■	
6	6	6	40	100	■	
6	6	6	50	110	■	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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OSAWA NORM

MEXM2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20

MEXCS2

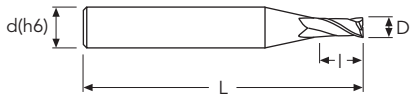
Ø mm	~25
tol. D µ	0 / -12

MEXCL2

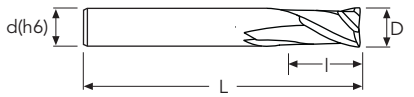
Ø mm	~16
tol. D µ	0 / -30

MEXM2 MEXCS2 MEXCL2

MEXM2



MEXCS2
MEXCL2



Z2 | UMG ENDLESS ORANGE | MEX | 40° | Z2 | UMG ENDLESS ORANGE | MEX | 30° | Z2 | UMG ENDLESS ORANGE | MEX | 30°

D		d	l	l1	L	Stock	Stock	Stock
mm 0.1		4	0.2		40	●		
0.2		4	0.4		40	●		
0.3		4	0.6		40	●		
0.4		4	0.8		40	●		
0.5		4	1		40	●		
0.6		4	1.2		40	●		
0.7		4	1.4		40	●		
0.8		4	1.6		40	●		
0.9		4	1.8		40	●		
1		3	2		40	●		
1		4	2.5		40		●	
1		6	8		60			●
1.1		3	2.2		40	●		
1.1		4	2.5		40	●		
1.2		3	2.4		40	●		
1.2		4	4		40	●		
1.3		3	2.6		40	●		
1.4		3	2.8		40	●		
1.4		4	4		40	●		
1.5	NEW	3	3		40	●		
1.5		4	4		40		●	
1.5		6	12		60			●
1.6	NEW	3	3.2		40	●		
1.7	NEW	3	3.4		40	●		
1.8	NEW	3	3.6		40	●		
1.9	NEW	3	3.8		40	●		
2	NEW	3	4		40	●		
2		4	6		40		●	
2		6	12		60			●
2.5		4	8		40		●	
3		6	8		55		●	
3		6	15		60			●
3.5		6	10		55		●	
4		6	10		55		●	
4		6	20		60			●
4.5		6	12		55		●	

● stock standard ○ non-standard stock ■ stock exhaustion

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OSAWA NORM

MEXM2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20

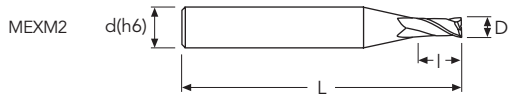
MEXCS2

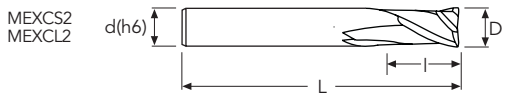
Ø mm	~25
tol. D µ	0 / -12

MEXCL2

Ø mm	~16
tol. D µ	0 / -30

MEXM2 MEXCS2 MEXCL2





Z2 · UMG ENDLESS ORANGE · MEX · 40° / 30°

D	d	l	l1	L	Stock	Stock	Stock
mm 5	6	13		55		●	
5	6	25		70			●
5.5	6	14		55		●	
6	6	15		60		●	
6	6	25		70			●
6.5	8	17		65		○	
7	8	18		65		●	
8	8	20		70		●	
8	8	30		80			●
8.5	10	21		70		●	
9	10	23		70		●	
10	10	22		75		●	
10	10	35		90			●
11	12	28		75		●	
12	12	26		80		●	
12	12	40		90			●
14	14	32		90		●	
16	16	32		90		●	
18	18	38		100		●	
20	20	38		100		●	
22	22	40		100		○	
25	25	40		100		○	

● stock standard ○ non-standard stock ■ stock exhaustion

MEXCS2 ≥ Ø14 = 40°

n Vf
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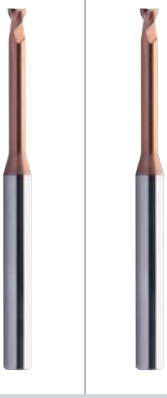
OSAWA NORM

NEW

MEXCR2 MEXLN2

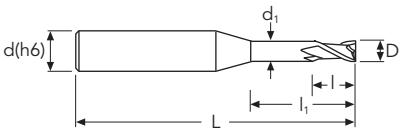


MEXCR2

Ø mm	~6
tol. D µ	0 / -12

MEXLN2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20



$d_1 < D$

Z2 Z2

UMG ENDLESS ORANGE UMG ENDLESS ORANGE

MEX MEX

30° 40°

D		d	l	l1	L	Stock	Stock
mm	**0.2**	4	0.3	0.5	50		●
	0.2	4	0.3	1	50		●
	0.2	4	0.3	1.5	50		●
	0.3	4	0.4	1	50		●
	0.3	4	0.4	2	50		●
	0.3	4	0.4	3	50		●
	0.4	4	0.6	2	50		●
	0.4	4	0.6	3	50		●
	0.4	4	0.6	4	45	■	
	0.4	4	0.6	4	50		●
	0.4	4	0.6	5	50		●
	0.5	4	0.7	2	50		●
	0.5	4	0.7	4	50		●
	0.5	4	0.7	6	45	■	
	0.5	4	0.7	6	50		●
	0.5	4	0.7	8	45	■	
	0.5	4	0.7	8	50		●
	0.6	4	0.9	2	50		●
	0.6	4	0.9	4	50		●
	0.6	4	0.9	6	45	■	
	0.6	4	0.9	6	50		●
	0.6	4	0.9	8	45	■	
	0.6	4	0.9	8	50		●
	0.6	4	0.9	10	50		●
	0.7	4	1	2	50		●
	0.7	4	1	4	50		●
	0.7	4	1	6	45	■	
	0.7	4	1	6	50		●
	0.7	4	1	8	50		●
	0.7	4	1	10	50		●
	0.8	4	1.2	4	50		●
	0.8	4	1.2	6	45	■	
	0.8	4	1.2	6	50		●
	0.8	4	1.2	8	50		●
	0.8	4	1.2	10	50		●
	0.8	4	1.2	12	45	■	
	0.8	4	1.2	12	50		●

● stock standard ○ non-standard stock ■ stock exhaustion

PAGE 273~275

OSAWA NORM

NEW

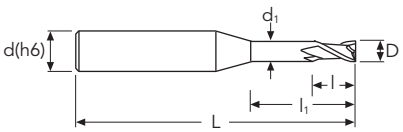
MEXCR2 MEXLN2


MEXCR2

Ø mm	~6
tol. D µ	0 / -12

MEXLN2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20



$d_1 < D$

D	d	l	l1	L	Stock	Stock
mm 0.9	4	1.4	6	50		●
0.9	4	1.4	8	50		●
0.9	4	1.4	10	50		●
0.9	4	1.4	15	45	■	
0.9	4	1.4	15	50		●
1	4	1.5	6	45	●	
1	4	1.5	6	50		●
1	4	1.5	8	45	●	
1	4	1.5	8	50		●
1	4	1.5	10	50		●
1	4	1.5	12	45	●	
1	4	1.5	12	50		●
1	4	1.5	14	50		●
1	4	1.5	16	50	■	
1	4	1.5	16	50		●
1	4	1.5	20	55	■	
1.2	4	1.8	6	50		●
1.2	4	1.8	8	50		●
1.2	4	1.8	10	50		●
1.2	4	1.8	12	45	■	
1.2	4	1.8	12	50		●
1.2	4	1.8	16	50	■	
1.4	4	2.1	6	50		●
1.4	4	2.1	8	50		●
1.4	4	2.1	10	50		●
1.4	4	2.1	12	45	■	
1.4	4	2.1	12	50		●
1.4	4	2.1	14	50		○
1.4	4	2.1	16	50	■	●
1.5	4	2.3	6	50		●
1.5	4	2.3	8	45	●	
1.5	4	2.3	8	50		●
1.5	4	2.3	10	45	●	
1.5	4	2.3	10	50		●
1.5	4	2.3	12	45	●	
1.5	4	2.3	12	50		●
1.5	4	2.3	14	50		●

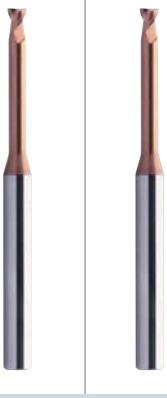
● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 273~275

OSAWA NORM

NEW

MEXCR2 MEXLN2

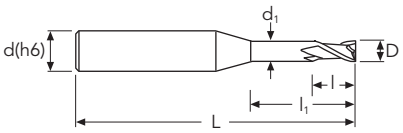


MEXCR2

Ø mm	~6
tol. D µ	0 / -12

MEXLN2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20



$d_1 < D$

D		d	l	l1	L	Stock	Stock
mm	1.5	4	2.3	16	50	●	
	1.5	4	2.3	18	60		●
	1.5	4	2.3	20	55	●	
	1.5	4	2.3	20	60		●
	1.6	4	2.4	6	50		●
	1.6	4	2.4	8	50		●
	1.6	4	2.4	10	50		●
	1.6	4	2.4	12	50		●
	1.6	4	2.4	14	50		○
	1.6	4	2.4	16	50		●
	1.6	4	2.4	18	60		○
	1.6	4	2.4	20	55	■	
	1.6	4	2.4	20	60		●
	1.8	4	2.7	6	50		●
	1.8	4	2.7	8	50		●
	1.8	4	2.7	10	50		●
	1.8	4	2.7	12	50		●
	1.8	4	2.7	14	50		○
	1.8	4	2.7	16	50		●
	1.8	4	2.7	18	60		○
	1.8	4	2.7	20	60		●
	2	4	3	6	50		●
	2	4	3	8	50		●
	2	4	3	10	50		●
	2	4	3	12	45	●	
	2	4	3	12	50		●
	2	4	3	14	50		●
	2	4	3	16	50	●	
	2	4	3	16	50		●
	2	4	3	18	60		●
	2	4	3	20	55	●	
	2	4	3	20	60		●
	2	4	3	25	75		●
	2	4	3	26	60	■	
	2	4	3	30	70	■	
	2	4	3	30	75		●
	2.5	4	3.7	8	50		●
	2.5	4	3.7	10	50		●

● stock standard ○ non-standard stock ■ stock exhaustion

PAGE 273~275

OSAWA NORM

NEW

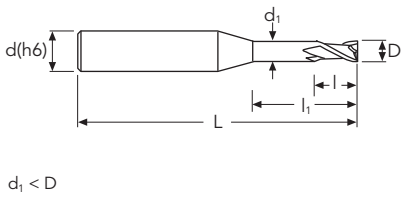
MEXCR2 MEXLN2


MEXCR2

Ø mm	~6
tol. D µ	0 / -12

MEXLN2

Ø mm	~0.8	≥0.8
tol. D µ	0 / -12	0 / -20



$d_1 < D$

D	d	l	l1	L	Stock	Stock
mm 2.5	4	3.7	12	45	■	
2.5	4	3.7	12	50		●
2.5	4	3.7	14	50		○
2.5	4	3.7	16	50		●
2.5	4	3.7	18	60		○
2.5	4	3.7	20	60	■	
2.5	4	3.7	20	60		●
2.5	4	3.7	25	60		●
2.5	4	3.7	30	75		●
2.5	4	3.7	30	80	■	
3	6	4.5	8	50		●
3	6	4.5	10	50		●
3	6	4.5	12	50		●
3	6	4.5	14	50	■	
3	6	4.5	14	50		●
3	6	4.5	16	60		●
3	6	4.5	18	55	■	
3	6	4.5	18	60		●
3	6	4.5	20	60		●
3	6	4.5	25	75		●
3	6	4.5	26	65	■	
3	6	4.5	30	70	■	
3	6	4.5	40	90	■	
4	6	4.5	10	60		●
4	6	4.5	15	60		●
4	6	4.5	20	60		●
4	6	6	20	60	■	
4	6	4.5	25	75		●
4	6	6	26	70	■	
4	6	4.5	30	75		●
4	6	4.5	40	75		●
4	6	6	40	90	■	
5	6	7.5	26	70	■	
5	6	7.5	30	80	■	
5	6	7.5	50	110	■	
6	6	9	30	90	■	
6	6	9	50	110	■	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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OSAWA NORM

NEW

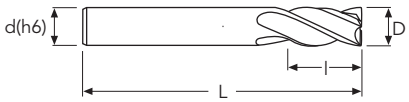
MEXCS4	MEXCL4	MEXCL4
		 L - 100 ~ L - 150

MEXCS4

Ø mm	~25
tol. D µ	0 / -30

MEXCL4

Ø mm	~20
tol. D µ	0 / -20



					Z4	Z4	Z4	
					UMG ENDLESS ORANGE	UMG ENDLESS ORANGE	UMG ENDLESS ORANGE	
					MEX	MEX	MEX	
					30°	30°	40°	
D		d	l	l1	L	Stock	Stock	Stock
mm	1	4	3		40	●		
	1.5	4	4.5		40	●		
	2	4	6		40	●		
	2	6	8		60		●	
	2.5	4	8		40	●		
	3	6	8		45	●		
	3	6	15		60		●	
	3	6	25		100			●
	3.5	6	10		45	●		
	4	6	11		45	●		
	4	6	20		60		●	
	4	6	31		100			●
	4.5	6	11		45	●		
	5	6	13		50	●		
	5	6	25		70		●	
	5	6	31		100			●
	5.5	6	13		50	●		
	6	6	13		50	●		
	6	6	25		70		●	
	6	6	38		100			●
	6.5	8	17		65	●		
	7	8	18		65	●		
	8	8	20		70	●		
	8	8	30		80		●	
	8	8	41		100			●
	9	10	23		70	●		
	10	10	22		75	●		
	10	10	35		90		●	
	10	10	57		125			●
	11	12	28		75	●		
	12	12	26		80	●		
	12	12	40		90		●	
	12	12	75		150			●
	14	12	35		90	●		
	14	16	50		110		●	
	14	14	75		150			●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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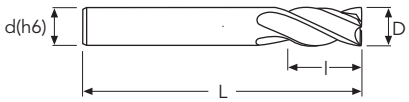
OSAWA NORM

NEW

MEXCS4	MEXCL4	MEXCL4
		 L - 100 ~ L - 150

MEXCS4 - MEXCL4

Ø mm	~25
tol. D µ	0 / -30



	MEXCS4	MEXCL4	MEXCL4
	Z4	Z4	Z4
	UMG ENDLESS ORANGE	UMG ENDLESS ORANGE	UMG ENDLESS ORANGE
	MEX	MEX	MEX
	30°	30°	30°

D	d	l	l1	L	Stock	Stockq	Stock
mm 16	16	32		100	●		
16	16	50		110		●	
16	16	75		150			●
18	20	50		110		○	
20	20	38		105	●		
20	20	55		110		●	
20	20	75		150			●
22	22	40		100	○		
25	25	40		100	●		
25	25	50		120	■		
25	25	70		130		●	

● stock standard ○ non-standard stock ■ stock exhaustion

MEXCS4 ≤ Ø1.5 =
≥ Ø22 =

n Vf
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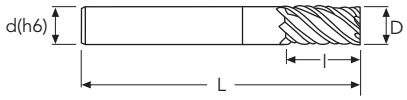
OSAWA NORM

MEXCSHM MEXCLHM

MEXCSHM - MEXCLHM

Ø mm	~25
tol. D µ	0 / -30



UMG ENDLESS ORANGE

MEX

D	d	l	l1	L		Stock	Stock
mm 6	6	15		60		●	
6	6	25		80			●
8	8	20		70		●	
8	8	40		100			●
10	10	25		80		●	
10	10	45		120			●
12	12	30		80		●	
12	12	60		120			●
14	14	30		90		●	
16	16	40		100		●	
16	16	80		150			●
18	18	35		100	Z8	●	
20	20	50		100	Z8	●	
20	20	80		150			●
25	25	90		150			○

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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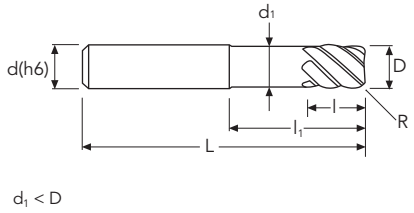
OSAWA NORM

MEX610R - MEX611R

Ø mm	~20
tol. D µ	0 / -30
tol. R µ	±20

MEX610R MEX611R



$d_1 < D$

D		d	l	l1	L	Stock	Stock
mm 6	R0.5	6	6	14	50	●	
6	R0.5	6	15		90		●
8	R0.5	8	8	24	60	●	
8	R0.5	8	20		100		●
10	R0.5	10	25		100		●
10	R1.0	10	10	30	70	●	
10	R1.0	10	25		100		●
12	R0.5	12	30		100		●
12	R1.0	12	12	30	75	●	
12	R1.0	12	30		100		●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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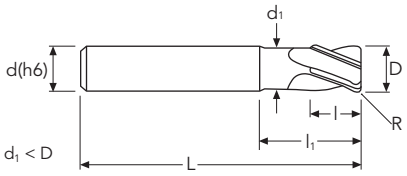
OSAWA NORM

MEX410R

MEX410R

Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±20	±20



Z4

UMG ENDLESS ORANGE

MEX RADIUS

30°

D			d	l	l1	L	Stock
mm	2	R0.2	6	2.5	5	50	●
	2.5	R0.25	6	3	6	50	●
	3	R0.3	6	4	7	50	●
	4	R0.5	6	5	9	50	●
	5	R0.5	6	6	12	50	●
	6	R0.5	6	7	14	60	●
	8	R1.0	8	10	18	70	●
	10	R1.0	10	12	25	75	●
	12	R1.0	12	15	30	80	●

● stock standard ○ non-standard stock ■ stock exhaustion

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OSAWA NORM

MEXCL2R - MEXCL4R

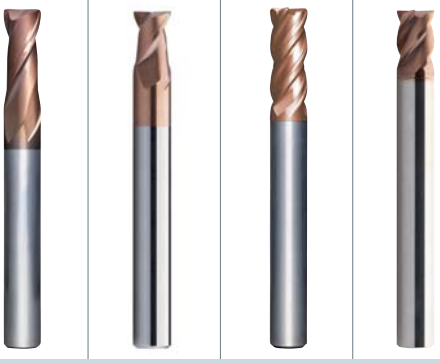
Ø mm	~6	>6
tol. D µ	0 / -12	0 / -15
tol. R µ	±20	±20

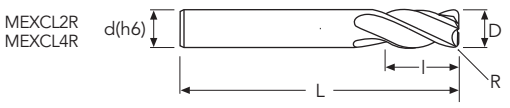
MEXLS2R - MEXLS4R

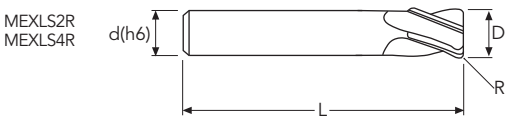
Ø mm	~16
tol. D µ	0 / -20
tol. R µ	±10

NEW NEW

MEXCL2R MEXLS2R MEXCL4R MEXLS4R







Z2 Z2 Z4 Z4

UMG ENDLESS ORANGE

MEX RADIUS

30° 40° 30° 40°

D		d	l	L	Stock	Stock	Stock	Stock
mm 2	R0.3	6	4	75		●		●
3	R0.3	6	8	50	■		■	
3	R0.3	6	5	75		●		●
3	R0.5	6	5	75		●		●
4	R0.3	6	10	50	■		■	
4	R0.3	6	8	75		●		●
4	R0.5	6	10	50	■		■	
4	R0.5	6	8	75		●		●
5	R0.3	6	13	50			■	
5	R0.3	6	9	75		●		●
5	R0.5	6	13	50	■		■	
5	R0.5	6	9	75		●		●
6	R0.3	6	15	60	■		■	
6	R0.3	6	10	75		●		●
6	R0.5	6	15	60	■		■	
6	R0.5	6	10	75		●		●
6	R1.0	6	15	60	■		■	
6	R1.0	6	10	75		●		●
8	R0.3	8	12	75		●		●
8	R0.5	8	20	70	■		■	
8	R0.5	8	12	75		●		●
8	R1.0	8	20	70	■		■	
8	R1.0	8	12	75		●		●
8	R2.0	8	25	70	■		■	
10	R0.3	10	25	90			■	
10	R0.5	10	25	90	■		■	
10	R0.5	10	14	100		●		●
10	R1.0	10	25	90	■		■	
10	R1.0	10	14	100		●		●
10	R2.0	10	25	90	■		■	
10	R2.0	10	14	100		○		○
12	R0.5	12	30	100	■			
12	R0.5	12	16	100		●		●
12	R1.0	12	30	100			■	
12	R1.0	12	16	100		●		●
12	R2.0	12	30	100	■		■	
12	R2.0	12	16	100		○		○
16	R0.5	16	22	125		●		●
16	R1.0	16	22	125		●		●
16	R2.0	16	40	110			■	
16	R2.0	16	22	125		○		○

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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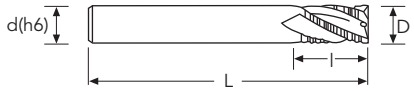
OSAWA NORM

MEXCSFR

MEXWSFR - MEXCSFR

Ø mm	~6	7~10	11~18	20
tol. D µ	0 / -48	0 / -58	0 / -70	0 / -84



Z3~Z4

UMG ENDLESS

MEX HR FINE

20°

D	d	l	l1	L	Z	Stock
mm 6	6	15		60	3	●
7	6	18		70	3	●
8	8	20		65	3	●
9	10	22		70	4	●
10	10	25		70	4	●
12	12	30		80	4	●
14	14	25		100	4	●
16	16	40		100	4	●
20	20	50		100	4	●

● stock standard ○ non-standard stock ■ stock exhaustion

HF EVOLUTION

Variable Helix and unequal pitch, solid carbide ~55HRC

Variable helix and unequal pitch for universal application, allowing a very high feed and enabling to cut 1xD slots in a single pass.

Elica variabile e passo differenziato, per applicazione universale: altissimi avanzamenti e realizzazione di cave 1xD in un'unica passata.

Hochleistungsfräser mit ungleicher Teilung und Winkel, für universellen Einsatz: ermöglichen sehr hohe Vorschübe, die Ihnen auch die Möglichkeit geben Nutenfräsen 1xD in einem Arbeitsvorgang herzustellen.

Hélice et pas variables pour une application universelle: avance très haute et réalisation de rainures 1xD dans une seule passe.

Herramienta de hélice variable y paso diferenciado, para aplicación general: avance muy alto y fresado de ranuras 1xD en una pasada.

Изменяемый угол наклона винтовой канавки и непря-мой угол между режущими кромками, предназначена для универсального применения: позволяет достичь высоких подач и глубины фрезерования канавки 1xD за один проход.

HF UNI	PV300 COATING ~40HRC
HF HARD	PV300 COATING 30~55HRC

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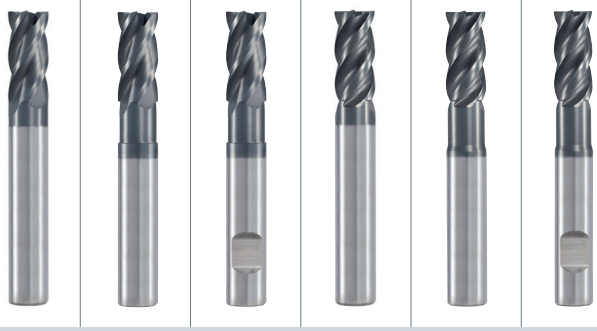
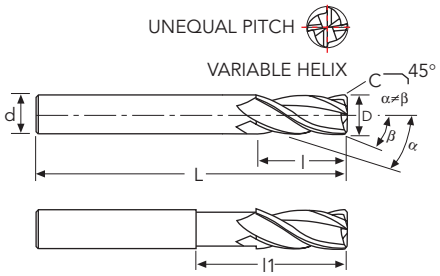
OSAWA NORM

Ø mm	3~20
tol. D µ	0 / -30
tol. R µ	±20

HF840	HF440	HF441	HF850	HF450	HF451
~40HRC	~40HRC	~40HRC	~55HRC	~55HRC	~55HRC





						HF840	HF440	HF441	HF850	HF450	HF451
						Z4	Z4	Z4	Z4	Z4	Z4
						MG PV300	MG PV300	MG PV300	MG PV300	MG PV300	MG PV300
						HF UNI	HF UNI	HF UNI	HF HARD	HF HARD	HF HARD
						36°/39°	36°/39°	36°/39°	40°	40°	40°
D		C (45°)	d(h6)	l	l1	L	Stock	Stock	Stock	Stock	Stock	Stock
mm	3	0,1	6	9		57	●			●		
		0,1	6	9	15	57		●	●		●	●
	4	0,1	6	11		57	●			●		
		0,1	6	11	18	57		●	●		●	●
	5	0,1	6	13		57	●			●		
		0,1	6	13	19	57		●	●		●	●
	6	0,1	6	13		57	●			●		
		0,1	6	13	20	57		●	●		●	●
	8	0,2	8	20		64	●			●		
		0,2	8	20	26	64		●	●		●	●
	10	0,2	10	22		72	●			●		
		0,2	10	22	30	72		●	●		●	●
	12	0,2	12	26		83	●			●		
		0,2	12	26	36	83		●	●		●	●
	14	0,3	14	26		83	●			●		
		0,3	14	26	36	83		●	●		●	●
	16	0,3	16	32		92	●			●		
		0,3	16	32	42	92		●	●		●	●
	18	0,3	18	32		92	●			○		
		0,3	18	32	42	92		○	●			
	20	0,4	20	38		104	●			●		
		0,4	20	38	50	104		●	●		●	●

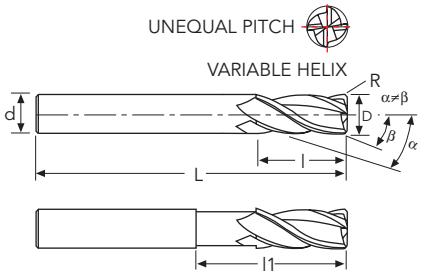
● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 284-285

OSAWA NORM

Ø mm	3~20
tol. D µ	0 / -30
tol. R µ	±10

HF842	HF442	HF443	HF852	HF452
~40HRC	~40HRC	~40HRC	35~55HRC	35~55HRC



						HF842	HF442	HF443	HF852	HF452
						Z4	Z4	Z4	Z4	Z4
						MG PV300	MG PV300	MG PV300	MG PV300	MG PV300
						HF UNI RADIUS	HF UNI RADIUS	HF UNI RADIUS	HF HARD RADIUS	HF HARD RADIUS
						36°/39°	36°/39°	36°/39°	40°	40°
D		R	d(h6)	l	l1	L	Stock	Stock	Stock	Stock	Stock
mm	3	0,3	6	9	15	57		●	●		●
		0,5	6	9	15	57		●	●		●
	4	0,3	6	11		57	●			●	
		0,3	6	11	18	57		●	●		●
		0,5	6	11		57	●			●	
		0,5	6	11	19	57		●	●		●
	5	0,3	6	13		57	●				
		0,3	6	13	19	57		●			○
		0,3	6	15		57				●	
		0,5	6	13		57	●				
		0,5	6	13	19	57		●	●		●
		0,5	6	15		57				●	
	6	0,3	6	13		57	●				
		0,3	6	13	20	57		○			
		0,3	6	16		57				●	
		0,5	6	13		57	●				
		0,5	6	13	20	57		●	●		●
		0,5	6	16		57				●	
		1	6	13		57	●				
		1	6	13	20	57		●	●		●
		1	6	16		57				●	
	8	0,3	8	20		64	○			○	
		0,5	8	20		64	●			●	
		0,5	8	20	26	64		●	●		●
		1	8	20		64	●			●	
		1	8	20	26	64		●	●		●
	10	0,3	10	22		72	○			○	
		0,5	10	22		72	●			●	
		0,5	10	22	30	72		●	●		●
		1	10	22		72	●			●	
		1	10	22	30	72		●	●		●
	12	0,5	12	26		83	●			●	
		0,5	12	26	36	83		●	●		●
		1	12	26		83	●			●	
		1	12	26	36	83		●	●		●
		2	12	26		83	●			●	

● stock standard ○ non-standard stock ■ stock exhaustion

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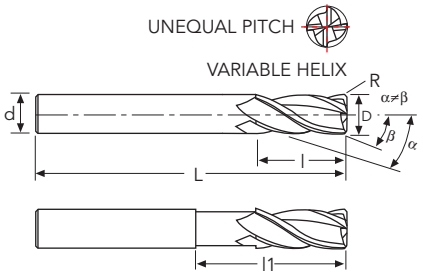
OSAWA NORM

Ø mm	3~20
tol. D µ	0 / -30
tol. R µ	±10

	HF842	HF442	HF443	HF852	HF452
	~40HRC	~40HRC	~40HRC	35~55HRC	35~55HRC
					
	Z4	Z4	Z4	Z4	Z4
	MG PV300	MG PV300	MG PV300	MG PV300	MG PV300
	HF UNI RADIUS	HF UNI RADIUS	HF UNI RADIUS	HF HARD RADIUS	HF HARD RADIUS
	36°/39°	36°/39°	36°/39°	40°	40°



D	R	d(h6)	l	l1	L	Stock	Stock	Stock	Stock	Stock
mm 12	3	12	26		83	●			●	
14	1	14	26		83	●				
	1	14	26	36	83		●	●		
	1	14	32		83				●	
	2	14	26		83	○				
	2	14	32		83				○	
	3	14	26		83	○				
16	1	16	32		92	●			●	
	1	16	32	42	92		●	●		●
	2	16	32		92	●			●	
	2	16	32	42	92		●			●
	3	16	32		92	●			○	
	4	16	32		92	○			○	
18	1	18	32		92	○				
	2	18	32		92	○				
	3	18	32		92	○				
20	1	20	38		104	●			●	
	1	20	38	50	104		●	●		●
	2	20	38		104	●			●	
	2	20	38	50	104		●			●
	3	20	38		104	○			○	
	4	20	38		104	○			○	

● stock standard ○ non-standard stock ■ stock exhaustion

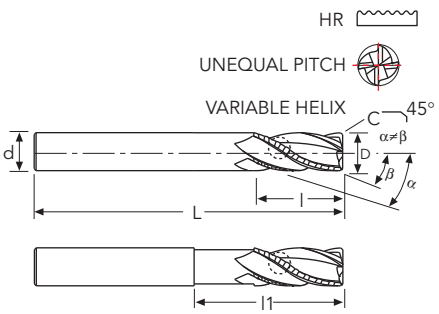
n Vf
PAGE 284-285

OSAWA NORM

Ø mm	6~20
tol. D µ	0 / -50
tol. R µ	±20

HF844	HF444	HF445
~40HRC	~40HRC	~40HRC





						HF844	HF444	HF445
						Z4	Z4	Z4
						MG PV300	MG PV300	MG PV300
						HF UNI HR	HF UNI HR	HF UNI HR
						40°	40°	40°
D		C (45°)	d(h6)	l	l1	L	Stock	Stock	Stock
mm	6	0,1	6	13	20	57		●	●
		0,1	6	16		57	●		
	8	0,2	8	20		64	●		
		0,2	8	20	26	64		●	●
	10	0,2	10	22		72	●		
		0,2	10	22	30	72		●	●
	12	0,2	12	26		83	●		
		0,2	12	26	36	83		●	●
	14	0,3	14	26		83	●		
		0,3	14	26	36	83		●	●
	16	0,3	16	32		92	●		
		0,3	16	32	42	92		●	●
	18	0,3	18	32		92	●		
	20	0,4	20	38		104	●		
		0,4	20	38	50	104		●	●

● stock standard ○ non-standard stock ■ stock exhaustion

MEF ENDLESS

Ultra-fine micrograin for stainless steel and super alloys

MEF ultra fine micrograin: high performance for stainless steel, titanium and Inconel.

MEF micrograna ultra fine: per acciaio inossidabile, titanio e Inconel.

MEF ultrafeine Mikrokörnung: für rostfreie Stähle, Titanium und Inconel.

MEF ultra fine micro-grain: pour l'acier inoxydable, titane et l'Inconel.

MEF micrograno ultra fino para mecanizados en alta producción de Inoxidables, Titanio e Inconel.

MEF сверхмелкозернистый твёрдый сплав: для обработки нержавеющих сталей, титана и закалённых сталей.

VA UMG	ENDLESS COATING ULTRA FINE MICROGRAIN INOX VA - TITANIUM Ti - NICKEL BASE Ni

n Vf
PAGE 286-287

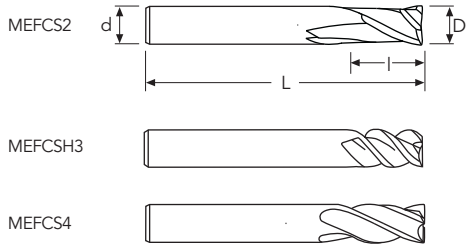
OSAWA NORM

MEFCS2 - MEFCSH3 - MEFCS4

Ø mm	1~20
tol. D µ	0 / -30

MEFCS2 MEFCSH3 MEFCS4





UMG ENDLESS | UMG ENDLESS | UMG ENDLESS

VA | VA | VA

D	d(h6)	l	L	Stock	Stock	Stock
mm 1	4	2.5	40	●		
1.5	4	4	40	●		
2	4	6	40	●		●
2.5	4	8	40	●		●
3	6	8	45	●		●
4	6	11	45	●		●
5	6	13	50	●		●
6	6	13	50	●	●	●
7	8	16	60	○		○
8	8	19	60	●	●	●
10	10	22	70	●	●	●
12	12	26	75	●	●	●
14	16	26	85	●	●	●
16	16	32	100	●	●	●
18	16	32	100		○	
20	20	38	105		● (Z4)	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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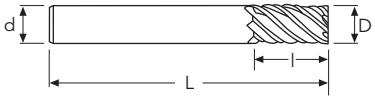
OSAWA NORM

MEF600

MEF600

Ø mm	6~20
tol. D µ	0 / -30



Z6~Z8

UMG ENDLESS

VA

50°

D		d(h6)	l	L	Z	Stock
mm	**6**	6	13	57	6	●
	8	8	19	63	6	●
	10	10	22	72	6	●
	12	12	26	83	6	●
	16	16	32	92	6	●
	20	20	38	104	8	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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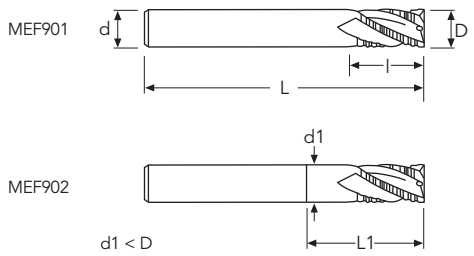
OSAWA NORM

MEF901 - MEF902 (h10)

Ø mm	~6	7~10	11~18	19~20
tol. R µ	0 / -48	0 / -58	0 / -70	0 / -84

MEF901 MEF902



D(h10)	d(h6)	l	l1	L	Z	Stock	Stock
mm 4	6	11		57	3	●	
5	6	13		57	4	●	
6	6	16		57	4	●	
6	6	16	20	57	4		●
8	8	16		63	4	●	
8	8	16	26	63	4		●
9	10	19		72	4	○	
10	10	22		72	4	●	
10	10	22	31	72	4		●
12	12	26		83	4	●	
12	12	26	37	83	4		●
14	14	26		83	5	●	
16	16	32		92	5	●	
16	16	32	51	100	5		●
20	20	38		104	6	●	
20	20	38	59	110	6		●

● stock standard ○ non-standard stock ■ stock exhaustion

ALU

Solid carbide for aluminum and alloys

ALU MILLS micrograin: high performance for aluminium and alloy with polished flutes.

ALU MILLS micrograna: per l'alluminio e le sue leghe.

ALU MILLS Mikrokörnung: für Aluminium und Alu-Legierungen.

ALU MILLS micrograin: pour l'aluminium et ses alliages avec gorges polies.

ALU Fresas de micrograno para Aluminio y aleaciones en alta producción, labios lapeados.

ALU MILLS микро-зернистый твёрдый сплав: для высокопроизводительной обработки алюминия и цветных сплавов с полированными стружечными канавками.

NEW

MDCSA1

n Vf
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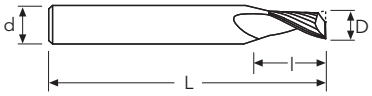
OSAWA NORM

Ø mm	2~12
tol. D µ	0 / -20



Z1

MG
LAPPED

ALU

42°

D	d(h6)	l	L	Stock
mm 2	2	10	40	●
3	3	12	40	●
4	4	15	50	●
5	5	16	50	●
6	6	20	60	●
8	8	22	63	●
10	10	25	72	●
12	12	30	83	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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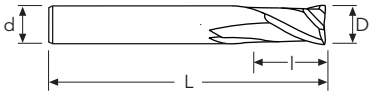
OSAWA NORM

MDCSA2

MDCSA2

Ø mm	3~20
tol. D µ	0 / -30



Z2

MG
LAPPED

ALU

42°

D	d(h6)	l	L	Stock
mm 3	6	8	57	●
4	6	11	57	●
5	6	13	57	●
6	6	13	57	●
8	8	19	63	●
10	10	22	72	●
12	12	26	83	●
14	14	26	83	●
16	16	32	92	●
18	18	32	92	●
20	20	38	104	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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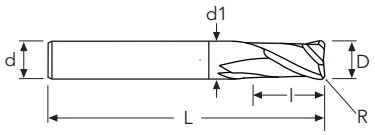
OSAWA NORM

MCA212R

MCA212R

Ø mm	2~12
tol. D µ	0 / -30
tol. R µ	±



d1 < D

D		d(h6)	l	l1	L	Stock
mm	2 xR0.2	3	3	6	40	●
	3 xR0.2	3	4	8	40	●
	4 xR0.2	4	5	12	50	●
	5 xR0.2	5	8	14	50	●
	6 xR0.2	6	8	18	65	●
	8 xR0.2	8	10	22	70	●
	10 xR0.2	10	14	28	80	●
	12 xR0.2	12	16	35	90	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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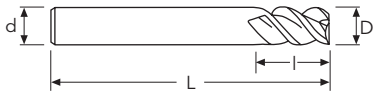
OSAWA NORM

MDCSA3

Ø mm	~6	8~12	16~20
tol. D µ	0 / -20	0 / -25	0 / -30

MDA310 - MDA311 - MDA312

Ø mm	~6	8~12	16~20
tol. D µ	0 / -30	0 / -35	0 / -40



d1 < D

MDCSA3	MDA310	MDA311	MDA312
			
Z3	Z3	Z3	Z3
MG LAPPED	MG LAPPED	MG LAPPED	MG LAPPED
ALU	ALU	ALU	ALU
55°	55°	55°	55°

D		d(h6)	l	L	Stock	Stock	Stock	Stock
mm	1	4	3	50	●			
	1.5	4	4.5	50	●			
	2	4	6	50	●			
	3	4	8	50	●			
	3	6	12	75		●		
	3	6	15	100			●	
	4	4	11	50	●			
	4	6	16	75		●		
	4	6	20	100			●	
	5	6	13	50	●			
	5	6	20	75		●		
	5	6	25	100			●	
	6	6	15	50	●			
	6	6	25	75		●		
	6	6	30	100		●		
	8	8	20	60	●			
	8	8	35	100			●	
	8	8	40	150				●
	10	10	25	75	●			
	10	10	40	100			●	
	10	10	50	150				●
	12	12	30	75	●			
	12	12	45	100			●	
	12	12	50	150				●
	16	16	40	100	●			
	16	16	70	150				●
	20	20	40	100	●			

● stock standard ○ non-standard stock ■ stock exhaustion

NEW

MDCSAM

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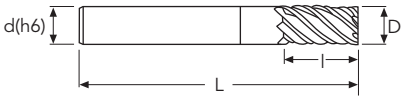
OSAWA NORM

Ø mm	6~20
tol. D µ	0 / -20



Z6~Z8

MG LAPPED

ALU

50°

D	d(h6)	l	l1	L		Stock
mm 6	6	15		57		●
8	8	20		65		●
10	10	22		75		●
12	12	25		75		●
16	16	30		90	Z8	●
20	20	38		104	Z8	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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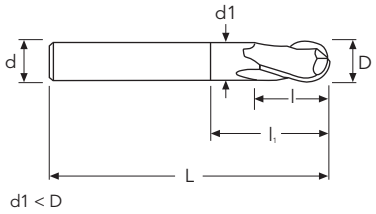
OSAWA NORM

MDCAB2

MDCAB2

Ø mm	~6	8~12
tol. D µ	0 / -20	0 / -25
tol. R µ	± 10	± 10



Z2 BALL

MG LAPPED

ALU BALL NOSE

40°

D	d(h6)	l	l1	L	Stock
mm 1	4	2		50	●
1.5	4	3		50	●
2	4	4		50	●
3	4	6		50	●
4	4	8		50	●
5	6	10		50	●
6	6	12		50	●
8	8	16		60	●
10	10	20		75	●
12	12	24		75	●

● stock standard ○ non-standard stock ■ stock exhaustion

MDC

Diamond coated, solid carbide for graphite

MDC Diamond, micro grain carbide, geometry specifically designed to machine graphite. New coating MDC-Diamond with increased thickness to achieve an even longer tool life.

MDC Diamond, metallo duro micrograna, con geometria specifica per la lavorazione della grafite. Nuovo rivestimento diamante MDC a spessore maggiorato per garantire una durata ancor più lunga.

MDC Diamond aus Hartmetall Mikrokorn, mit Spezialgeometrie entworfen für das Fresen von Graphit. Dank der neuen extra-starken MDC Diamant Beschichtung, wird eine noch längere Lebensdauer garantiert.

MDC Diamond, carbure micro grain revêtu monobloc, avec géométrie spécifique pour l'usinage de la graphite et nouveau revêtement diamant MDC à grande épaisseur, pour une durée encore plus longue.

MDC Diamond, metal duro micrograno, con geometría específica para la mecanización de grafito y nuevo recubrimiento diamante MDC de mayor espesor para garantizar una duración mayor.

MDC Diamond, микрозернистый твёрдый сплав, со специальной геометрией для обработки графита с алмазным напылением MDC повышенной толщины для обеспечения еще более длительного рабочего ресурса инструмента.

n Vf
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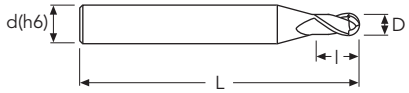
OSAWA NORM

Ø mm	<0.8	>0.8
tol. D µ	0 / -12	0 / -20
tol. R µ	0 / -20	0 / -20

NEW NEW

MDC2254 MDC2250 MDC2251



Z2 BALL | Z2 BALL | Z2 BALL
MG | MG | MG
MDC | MDC | MDC
30° | 30° | 30°

D	d	l	l1	L	Stock	Stock	Stock
mm 0.5	4	1	6	50		●	
0.6	4	1.2	6	50		●	
0.8	4	1.6	8	50		●	
1	3	3		40	●		
1	4	3	10	60		●	
1.5	3	3		40	●		
1.5	4	3	15	60		●	
2	3	4		40	●		
2	4	4	20	60		●	
2	4	10	20	80			■
2.5	3	4		40	●		
2.5	4	4	25	60		●	
3	3	5		40	●		
3	4	15	25	80			■
3	4	15	25	100			●
3	3	5	30	100		●	
4	4	8		50	●		
4	4	20	30	80			■
4	4	20	30	100			●
4	4	8	40	100		●	
5	5	9		50	●		
5	5	9	50	100		●	
5	6	30	50	100			■
5	6	30	50	120			●
6	6	10		60	●		
6	6	10	60	100		●	
6	6	30	50	100			■
6	6	30	50	150			●
8	8	12	60	100		●	
8	8	40	60	150			●
10	10	14	60	100		●	
12	12	16	60	100		●	

● stock standard ○ non-standard stock ■ stock exhaustion

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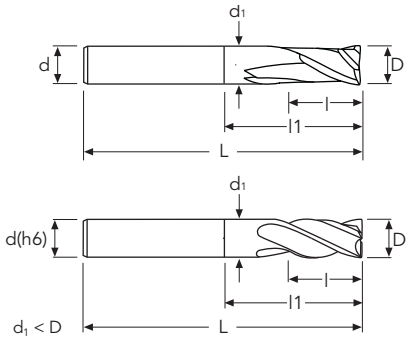
OSAWA NORM

Ø mm	<0.8	>0.8
tol. D µ	0 / -12	0 / -20

NEW NEW

MDC2202 MDC2204

D		d	l	l1	L	Stock	Stock
mm	0.5	4	1	6	50	●	●
	0.6	4	1.2	6	50	●	●
	0.8	4	1.6	8	50	●	●
	1	4	3	10	60	●	●
	1.5	4	4.5	15	60	●	●
	2	4	6.5	20	60	●	●
	2.5	4	6.5	25	60	●	●
	3	3	9	30	75	●	●
	3	3	19	30	100	●	●
	4	4	12	32	75	●	●
	4	4	25	40	100	●	●
	5	5	15	32	75	●	●
	5	5	25	60	100	●	●
	6	6	25	60	100	●	●
	8	8	25	60	100	●	●
	10	10	25	60	100	●	●
	12	12	25	60	100	●	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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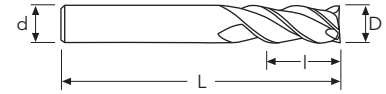
OSAWA NORM

MDC3311

MDC3311

Ø mm	~12
tol. D µ	0 / -30
tol. R µ	±10



$d_1 < D$

Z3

MG

MDC RADIUS

30°

D		d(h6)	l	l1	L	Stock
mm 2	R0.15	2	9		60	●
3	R0.15	3	30		60	●
4	R0.2	4	30		60	●
5	R0.3	5	35		70	●
6	R0.3	6	40		100	●
8	R0.5	8	40		100	●
10	R0.5	10	40		100	●
12	R0.5	12	45		100	●

● stock standard ○ non-standard stock ■ stock exhaustion

G2

Solid carbide for general purpose ~45HRC

A new generation of general-purpose endmills, featuring new cutting geometries and innovative coatings for enhanced performance. The answer given by Osawa to the market demand for higher performance tools. An extremely competitive price, thanks to a fully optimized manufacturing process and to large production batches.

Una nuova generazione di frese per uso generico, dotate di geometria di taglio e rivestimenti innovativi per garantirne prestazioni ancora più elevate. La risposta forte di Osawa a un mercato che chiede utensili sempre più performanti. Un prezzo estremamente competitivo, grazie all'ottimizzazione del processo produttivo e agli alti volumi di produzione.

Eine neue Generation von Fräsern für allegemeine Anwendung, mit neuer Schnittgeometrie und innovativen Beschichtungen für noch höheren Leistungen Die starke Entgegnung von Osawa zu einem Markt, der immer leistungsfähigere Werkzeuge erfordert. Extrem konkurrenzfähiger Preis durch optimale Produktionsprozesse und große Produktionsumfänge

Une nouvelle génération de fraises passe-partout, caractérisées par une géométrie de coupe innovante et des nouveaux revêtements, qui garantissent des performance encore plus hautes. La réponse de Osawa à un marché qui demande des outils de plus en plus performants. Un prix extrêmement compétitif, grâce à l'optimisation du procès d'affûtage et à des volumes de prodution très importants.

Nueva generación de Fresas para uso general, con nuevas geometrias de corte y recubrimientos innovadores para mejorar el rendimiento. G2: la respuesta de Osawa a la demanda del mercado de herramientas de más alto rendimiento. Gracias a un proceso de fabricación totalmente optimizado y a grandes lotes de producción, G2 combina una excelente calidad con un coste altamente competitivo.

Новое поколение концевых фрез общего назначения обладающих передовой геометрией резания и инновационными покрытиями для повышения производительности. G2: это ответ Osawa на требования рынка о необходимости высокопроизводительного инструмента. Благодаря оптимизации производства и большим производственным партиям, G2 воплощает в себе высочайшее качество и низкую стоимость.

G2	PV200 COATING
MG	MICROGRAIN
	GENERAL PURPOSE · USO GENERICO ALLGEMEINE ANWENDUNGEN · APPLICATIONS GÉNÉRIQUES UTILIZACIÓN GENERAL · ОБЩЕГО НАЗНАЧЕНИЯ

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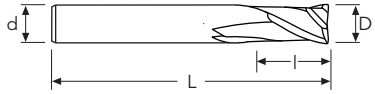
OSAWA NORM

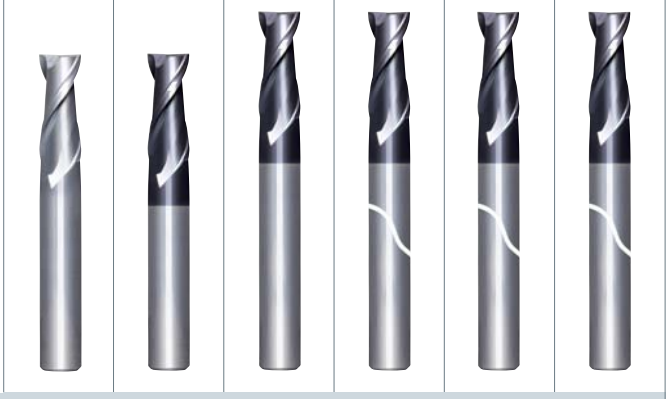
GB205 - G2CS2

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2210 - G2211 - G2212 - G2213

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40





	GB205	G2CS2	G2210	G2211	G2212	G2213
	Z2	Z2	Z2	Z2	Z2	Z2
	MG BR	MG PV200	MG PV200	MG PV200	MG PV200	MG PV200
	N	N	N	N	N	N
	30°	30°	30°	30°	30°	30°

D	d	l	L	Stock	Stock	Stock	Stock	Stock	Stock
mm 1	4	3	50	●	●				
1.5	4	4.5	50	●	●				
2	4	6	50	●	●				
2	4	9	75			●			
2.5	4	7	50		●				
3	4	8	50	●	●				
3	4	15	75			●			
3.5	4	10	50		●				
4	4	11	50	●	●				
4	4	20	75			●			
4.5	6	13	50		●				
5	6	13	50	●	●				
5	6	25	75			●			
5	6	30	100				●		
5.5	6	13	50		●				
6	6	15	50	●	●				
6	6	25	75			●			
6	6	30	100				●		
6.5	8	17	60		●				
7	8	17	60		●				
7	8	35	100				○		
7.5	8	17	60		●				
8	8	20	60	●	●				
8	8	35	100				●		
8	8	40	150					●	
8.5	10	23	75		●				
9	10	23	75		●				
9	10	40	100				○		
10	10	30	75	●	●				
10	10	40	100				●		
10	10	50	150					●	
10.5	12	25	75		●				
11	12	28	75		●				
11	12	45	100				○		
12	12	30	75	●	●				
12	12	45	100				●		

● stock standard ○ non-standard stock ■ stock exhaustion

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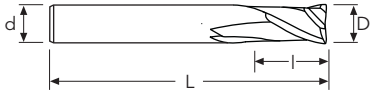
OSAWA NORM

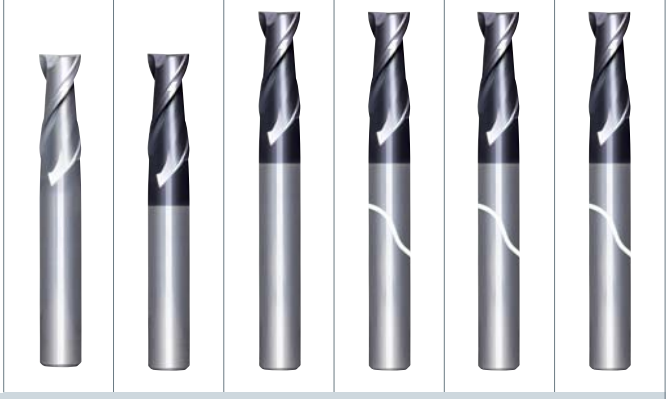
GB205 - G2CS2

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2210 - G2211 - G2212 - G2213

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40





	GB205	G2CS2	G2210	G2211	G2212	G2213
	Z2	Z2	Z2	Z2	Z2	Z2
	MG BR	MG PV200	MG PV200	MG PV200	MG PV200	MG PV200
	N	N	N	N	N	N
	30°	30°	30°	30°	30°	30°

D	d	l	L	Stock	Stock	Stock	Stock	Stock	Stock
mm **12**	12	50	150					●	
14	14	26	83		●				
16	16	32	92		●				
16	16	70	150					●	
16	16	40	200						○
18	20	40	100		●				
18	20	80	150					○	
20	20	40	100		●				
20	20	80	150					○	
20	20	40	200						○

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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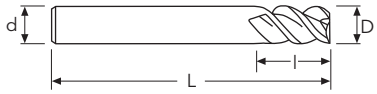
OSAWA NORM

GB305 - G2CSH3

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2310 - G2311 - G2312

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40



	GB305	G2CSH3	G2310	G2311	G2312
					
	Z3	Z3	Z3	Z3	Z3
	MG BR	MG PV200	MG PV200	MG PV200	MG PV200
	N	N	N	N	N
	45°	45°	45°	45°	45°

D		d	l	L	Stock	Stock	Stock	Stock	Stock
mm	1	4	3	50	●	●			
	1.5	4	4.5	50	●	●			
	2	4	6	50	●	●			
	2	4	9	75			●		
	2.5	4	7	50		●			
	3	4	8	50	●	●			
	3	4	15	75			●		
	3.5	4	10	50		●			
	4	4	11	50	●	●			
	4	4	20	75			●		
	4.5	6	13	50		●			
	5	6	13	50	●	●			
	5	6	25	75			●		
	5	6	30	100				●	
	5.5	6	13	50		●			
	6	6	15	50	●	●			
	6	6	25	75			●		
	6	6	30	100				●	
	6.5	8	17	60		●			
	7	8	17	60		●			
	7	8	35	100				○	
	7.5	8	17	60		●			
	8	8	20	60	●	●			
	8	8	35	100				●	
	8	8	40	150					●
	8.5	10	23	75		●			
	9	10	23	75		●			
	9	10	40	100				○	
	10	10	30	75	●	●			
	10	10	40	100				●	
	10	10	50	150					●
	10.5	12	25	75		○			
	11	12	28	75		●			
	11	12	45	100				○	
	12	12	30	75	●	●			
	12	12	45	100				●	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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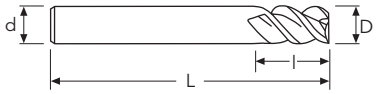
OSAWA NORM

GB305 - G2CSH3

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2310 - G2311 - G2312

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40



	GB305	G2CSH3	G2310	G2311	G2312
	Z3	Z3	Z3	Z3	Z3
	MG BR	MG PV200	MG PV200	MG PV200	MG PV200
	N	N	N	N	N
	45°	45°	45°	45°	45°

D	d	l	L	Stock	Stock	Stock	Stock	Stock
mm 12	12	50	150					●
14	14	26	83		●			
16	16	32	92		●			
16	16	70	150					●
18	20	40	100		○			
18	20	80	150					●
20	20	40	100		●			
20	20	80	150					●

● stock standard ○ non-standard stock ■ stock exhaustion

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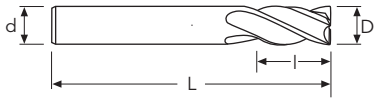
OSAWA NORM

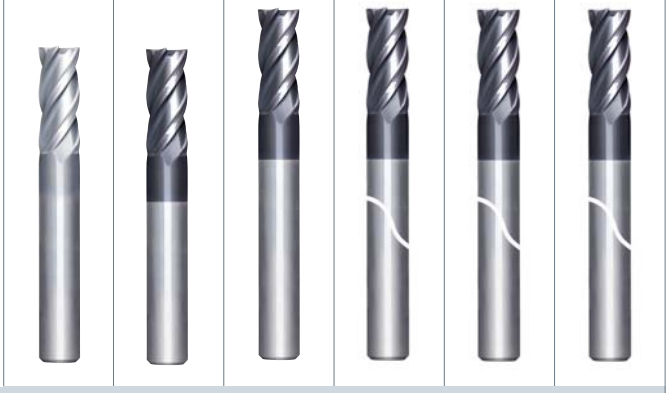
GB405 - G2CS4

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2410 - G2411 - G2412 - G2413

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40





				GB405	G2CS4	G2410	G2411	G2412	G2413
				Z4	Z4	Z4	Z4	Z4	Z4
				MG BR	MG PV200	MG PV200	MG PV200	MG PV200	MG PV200
				N	N	N	N	N	N
				30°	30°	30°	30°	30°	30°
D	d	l	L	Stock	Stock	Stock	Stock	Stock	Stock
mm 1	4	3	50	●	●				
1.5	4	4.5	50	●	●				
2	4	6	50	●	●				
2	4	9	75			●			
2.5	4	7	50		●				
3	4	8	50	●	●				
3	4	15	75			●			
3.5	4	10	50		●				
4	4	11	50	●	●				
4	4	20	75			●			
4.5	6	13	50		●				
5	6	13	50	●	●				
5	6	25	75			●			
5	6	30	100				●		
5.5	6	13	50		●				
6	6	15	50	●	●				
6	6	25	75			●			
6	6	30	100				●		
6.5	8	17	60		●				
7	8	17	60		●				
7	8	35	100				○		
7.5	8	17	60		●				
8	8	20	60	●	●				
8	8	35	100				●		
8	8	40	150					●	
8.5	10	23	75		●				
9	10	23	75		●				
9	10	40	100				○		
10	10	30	75	●	●				
10	10	40	100				●		
10	10	50	150					●	
10.5	12	25	75		●				
11	12	28	75		●				
11	12	45	100				○		
12	12	30	75	●	●				
12	12	45	100				●		

● stock standard ○ non-standard stock ■ stock exhaustion

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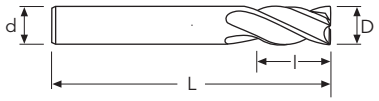
OSAWA NORM

GB405 - G2CS4

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2410 - G2411 - G2412 - G2413

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40



	GB405	G2CS4	G2410	G2411	G2412	G2413
						
	Z4	Z4	Z4	Z4	Z4	Z4
	MG BR	MG PV200	MG PV200	MG PV200	MG PV200	MG PV200
	N	N	N	N	N	N
	30°	30°	30°	30°	30°	30°
D d l L	Stock	Stock	Stock	Stock	Stock	Stock
mm 12 12 50 150					●	
14 14 26 83		●				
16 16 32 92		●				
16 16 70 150					●	
16 16 40 200						●
18 20 40 100		●				
18 20 80 150					○	
20 20 40 100		●				
20 20 80 150					●	
20 20 40 200						●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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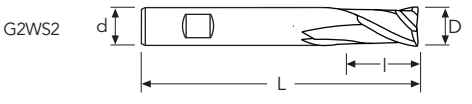
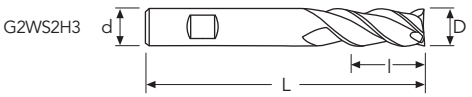
OSAWA NORM

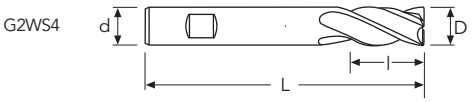
Ø mm	~6	8~12	14~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2WS2 G2WSH3 G2WS4









D	d	l	L	Stock	Stock	Stock
mm 3	6	8	57	●	●	●
4	6	11	57	●	●	●
5	6	13	57	●	●	●
6	6	13	57	●	●	●
8	8	19	63	●	●	●
10	10	22	72	●	●	●
12	12	26	83	●	●	●
14	14	26	83	●	●	●
16	16	32	92	●	●	●
20	20	38	104	●	●	●

● stock standard ○ non-standard stock ■ stock exhaustion

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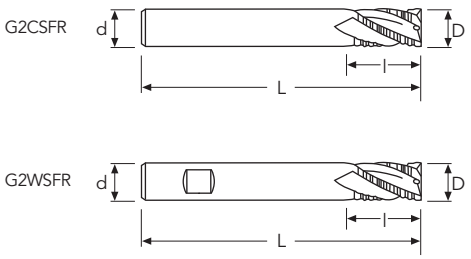
OSAWA NORM

G2CSFR - G2WSFR

Ø mm	~20
tol. D µ	0 / -50

G2CSFR G2WSFR



D	d	l	L	Z	Stock	Stock
mm 6	6	15	50	3	●	
8	8	20	60	3	●	
10	10	30	75	4	●	
12	12	30	75	4	●	
14	14	30	83	4	●	
16	16	35	92	4	●	
20	20	40	100	4	●	
6	6	13	57	3		●
8	8	19	63	3		●
10	10	22	72	4		●
12	12	26	83	4		●
14	14	26	83	4		●
16	16	32	92	4		●
20	20	38	104	4		●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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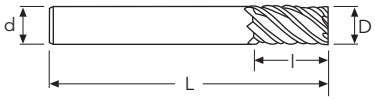
OSAWA NORM

G2CSHM

G2CSHM

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30



Z6

MG
PV200

N

45°

D	d	l	L	Stock
mm 6	6	15	50	●
8	8	20	60	●
10	10	30	75	●
12	12	30	75	●
14	14	30	83	●
16	16	35	92	●
20	20	40	100	●

● stock standard ○ non-standard stock ■ stock exhaustion

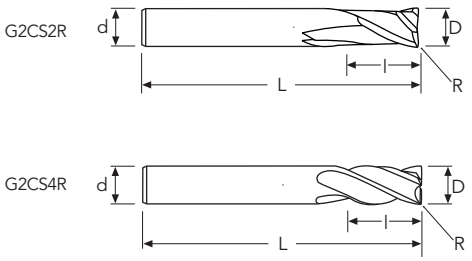
PAGE 294-295

OSAWA NORM

Ø mm	~6	8~12
tol. D µ	0 / -20	0 / -25
tol. R µ	± 10	± 10

NEW NEW

G2CS2R G2CS4R



Z2 Z4
MG PV200 MG PV200
G2 RADIUS G2 RADIUS
30° 30°

D		d	l	L	Stock	Stock
mm	1 R0.2	4	2	50	●	●
	1.5 R0.2	4	3	50	●	●
	1.5 R0.5	4	3	50	●	●
	2 R0.2	4	4	50	●	●
	2 R0.5	4	4	50	●	●
	2.5 R0.2	4	5	50	●	●
	2.5 R0.5	4	5	50	●	●
	3 R0.2	4	6	50	●	●
	3 R0.5	4	6	50	●	●
	3 R1	4	6	50	●	●
	4 R0.2	4	8	50	●	●
	4 R0.5	4	8	50	●	●
	4 R1	4	8	50	●	●
	5 R0.5	6	10	50	●	●
	5 R1	6	10	50	●	●
	6 R0.2	6	12	50	●	●
	6 R0.5	6	12	50	●	●
	6 R1	6	12	50	●	●
	6 R1.5	6	12	50	●	●
	6 R2	6	12	50	●	●
	8 R0.5	8	16	60	●	●
	8 R1	8	16	60	●	●
	8 R1.5	8	16	60	●	●
	8 R2	8	16	60	●	●
	10 R0.5	10	20	75	●	●
	10 R1	10	20	75	●	●
	10 R1.5	10	20	75	●	●
	10 R2	10	20	75	●	●
	10 R2.5	10	20	75	○	●
	10 R3	10	20	75	○	●
	12 R0.5	12	24	75	●	●
	12 R1	12	24	75	●	●
	12 R1.5	12	24	75	●	●
	12 R2	12	24	75	●	●
	12 R2.5	12	24	75	○	●
	12 R3	12	24	75	○	●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 296-297

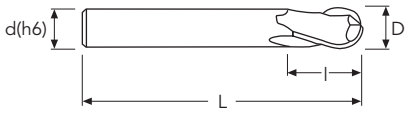
OSAWA NORM

GB255 - G2CSB2 - G2CSB4

Ø mm	~6	7~12	14~20
tol. D µ	0 / -20	0 / -25	0 / -30
tol. R µ	±15	±15	0 / -30

G2250 - G2251

Ø mm	~6	7~12	14~20
tol. D µ	0 / -25	0 / -30	0 / -35
tol. R µ	±15	±15	0 / -30



	GB255	G2CSB2	G2250	G2251	G2CSB4
					
	Z2 BALL	Z2 BALL	Z2 BALL	Z2 BALL	Z4 BALL
	MG BR	MG PV200	MG PV200	MG PV200	MG PV200
	N BALL NOSE	N BALL NOSE	N BALL NOSE	N BALL NOSE	N BALL NOSE
	30°	30°	30°	30°	30°

D	d	l	L	Stock	Stock	Stock	Stock	Stock
mm 1	4	2	50	●	●			○
1	4	2	75			●		
1.5	4	3	50	●	●			○
1.5	4	3	75			●		
2	4	4	50	●	●			●
2	4	4	75			●		
2.5	4	5	50		●			○
3	4	6	50	●	●			●
3	4	6	75			●		
4	4	8	50	●	●			●
4	4	8	75			●		
5	6	10	50	●	●			●
5	6	10	75			●		
6	6	12	50	●	●			●
6	6	12	100			●		
6	6	12	150				○	
7	8	14	60		○			○
8	8	16	60	●	●			●
8	8	16	100			●		
8	8	16	150				○	
9	10	18	75		○			○
10	10	20	75	●	●			●
10	10	20	100			●		
10	10	20	150				○	
12	12	24	75	●	●			●
12	12	24	100			●		
12	12	24	150				○	
16	16	30	92		●			○
16	16	30	150				○	
20	20	30	100		●			○
20	20	30	150				○	

● stock standard ○ non-standard stock ■ stock exhaustion

MDTA

Solid carbide for general purpose ~45HRC

MDTA is the Osawa range of micrograin carbide with PV200 coating. The MDTA endmills have been developed for general purpose milling up to 45 HRC. The exclusive and innovative PV200 coating (3500HV) ensures the best performance in dry machining (air blow or mist oil).

MDTA sono le frese Osawa in metallo duro micrograna con rivestimento PV200. Le frese della serie MDTA sono state sviluppate per la fresatura di materiali generici sino a 45HRC. L'esclusivo e innovativo rivestimento PV200 (3500HV) garantisce performance elevate nelle lavorazioni a secco (getto d'aria o nebulizzazione).

MDTA ist die Osawa Fräserreihe aus Harmetall Mikrokorn mit PV200 Beschichtung. MDTA Fräserserie ist für die Fräsarbeit von allgemeinen Materialien bis zum 45HRC entwickelt worden. Die exklusive und erneuernde PV200 Beschichtung (3500HV) garantiert ausgezeichnete Leistungen auf trockene Bearbeitungen (Luftstrahl oder Verstäubung).

MDTA est la gamme Osawa de fraises carbure micrograin avec revêtement PV200. Les fraises MDTA ont été développées pour les applications de fraisage générique et pour le fraisage des aciers jusqu'à 45HRC. L'exclusif et innovant revêtement PV200 (3500HV) garantit la meilleure performance dans l'usinage en sec (soufflage d'air ou huile atomisé).

MDTA son las fresas Osawa de metal duro micrograno con recubrimiento PV200. Las fresas de la serie MDTA han sido desarrolladas para fresar materiales genéricos hasta 45HRC. El exclusivo e innovador recubrimiento PV200 (3500HV) garantiza un elevado rendimiento de el mecanizado en seco (chorro de aire o nebulización).

MDTA **это фрезы** Osawa **из микрозернистого твёрдого сплава с покрытием** PV200. **Фрезы серии** MDTA **были разработаны для общей обработки материалов с твёрдостью до** 45HRC. **Эксклюзивное и передовое покрытие** PV200 (3500HV) **гарантирует повышенную производительность без СОЖ(поток воздушномаслянной смеси).**

MDTA
MG

PV200 COATING
MICROGRAIN
GENERAL PURPOSE · USO GENERICO
ALLGEMEINE ANWENDUNGEN · APPLICATIONS GÉNÉRIQUES
UTILIZACIÓN GENERAL · **ОБЩЕГО НАЗНАЧЕНИЯ**

n Vf
PAGE 294

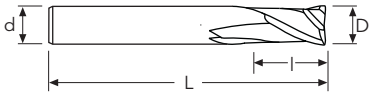
OSAWA NORM

MDTACS2 - MDTA210

Ø mm	1~20
tol. D µ	0 / -30

MDCL2 - MDTACL2 (h10)

Ø mm	1~3	3.5~6	7~10	12~18	20~30
tol. D µ	0 / -40	0 / -48	0 / -58	0 / -70	0 / -84



					MDTACS2	MDTA210	MDCL2		
									
					Z2	Z2	Z2		
					MG PV200	MG PV200	MG BR		
					N	N	N		
					30°	30°	30°		
D		d(h6)	l	L	Stock	Stock	Stock		
mm	1	4	3	40	●				
	1.5	4	4.5	40	●				
	2	2	8	32	●				
	2.5	2.5	8	32	●				
	3	3	12	32	●				
	3	3	20	60		●			
	3	3	30	75			●		
	4	4	12	40	●				
	4	4	20	60		●			
	4	4	30	75			●		
	5	5	14	50	●				
	5	5	25	75		●			
	5	5	40	100			●		
	6	6	16	50	●				
	6	6	30	75		●			
	6	6	50	150			●		
	7	7	20	60	●				
	8	8	20	60	●				
	8	8	30	75		●			
	8	8	50	150			●		
	9	9	20	60	●				
	10	10	22	70	●				
	10	10	40	100		●			
	10	10	60	150			●		
	12	12	22	70	●				
	12	12	45	100		●			
	12	12	75	150			●		
	14	14	25	75	●				
	14	14	45	100		●			
	14	14	65	150			○		
	16	16	25	75	●				
	16	16	45	100		●			
	16	16	65	150			○		
	20	20	32	100	●				
	20	20	65	150			○		

● stock standard ○ non-standard stock ■ stock exhaustion

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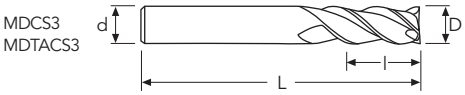
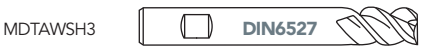
OSAWA NORM

MDTACS3 - MDTAWSH3

Ø mm	1~20
tol. D µ	0 / -30

MDTACS3 MDTAWSH3





MG PV200

MG PV200

N

N

D		d(h6)	l	L	Stock	Stock
mm	2	2	8	32	●	
	3	3	12	32	●	
	3	6	7	57		●
	4	4	12	40	●	
	4	6	8	57		●
	5	5	14	50	●	
	5	6	10	57		●
	6	6	16	50	●	
	6	6	10	57		●
	7	7	20	60	●	
	8	8	20	60	●	
	8	8	16	63		●
	9	9	20	60	●	
	10	10	22	70	●	
	10	10	19	72		●
	12	12	22	70	●	
	12	12	22	83		●
	14	14	25	75	●	
	14	14	22	83		●
	16	16	25	75	●	
	16	16	26	92		●
	20	20	32	100	●	
	20	20	32	104		●

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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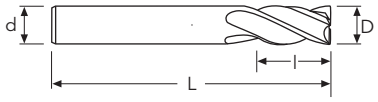
OSAWA NORM

MDTACS4 - MDTA410

Ø mm	1~20
tol. D µ	0 / -30

MDCL4 - MDTACL4 (h10)

Ø mm	1~3	3.5~6	7~10	12~18	20~30
tol. D µ	0 / -40	0 / -48	0 / -58	0 / -70	0 / -84



	MDTACS4	MDTA410	MDCL4
			
	Z4	Z4	Z4
	MG PV200	MG PV200	MG BR
	N	N	N
	30°	30°	30°

D(h10)	d(h6)	l	L	Stock	Stock	Stock
mm 2	2	8	32	●		
2.5	2.5	8	32	●		
3	3	12	32	●		
3	3	20	60		●	
3	3	30	75			●
4	4	12	40	●		
4	4	20	60		●	
4	4	30	75			●
5	5	14	50	●		
5	5	25	75		●	
5	5	40	100			●
6	6	16	50	●		
6	6	30	75		●	
6	6	50	150			●
7	7	20	60	●		
8	8	20	60	●		
8	8	30	75		●	
8	8	50	150			●
9	9	20	60	●		
10	10	22	70	●		
10	10	40	100		●	
10	10	60	150			●
12	12	22	70	●		
12	12	45	100		●	
12	12	75	150			●
14	14	25	75	●		
14	14	45	100		●	
14	14	65	150			○
16	16	25	75	●		
16	16	45	100		●	
16	16	65	150			●
20	20	32	100	●		
20	20	65	150			●

● stock standard ○ non-standard stock ■ stock exhaustion

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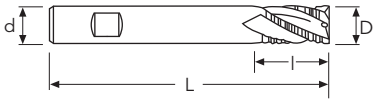
OSAWA NORM

MDTAWSR

MDTAWSR (h10)

Ø mm	1~3	3.5~6	7~10	12~18	20~30
tol. D µ	0 / -40	0 / -48	0 / -58	0 / -70	0 / -84



Z3~Z4

MG
PV200

NR
COARSE

30°

D(h10)	d(h6)	l	L	Z	Stock
mm 6	6	16	57	3	●
8	8	16	63	3	●
10	10	22	72	4	●
12	12	26	83	4	●
14	14	26	83	4	●
16	16	32	92	4	●
20	20	38	104	4	●

● stock standard ○ non-standard stock ■ stock exhaustion

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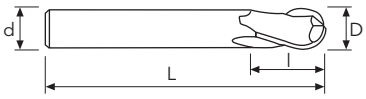
OSAWA NORM

MDTACSB2 - MDTA250

Ø mm	1~20
tol. D µ	0 / -30
tol. R µ	±20

MDTACSB2 MDTA250



Z2 BALL | MG PV200 | N BALL NOSE | 30°

D(h10)	d (h6)	l	L	Stock	Stock
mm 1	3	3	39	●	
1.5	3	5	39	●	
2	3	7	39	●	
2.5	3	8	39	●	
3	3	10	39	●	
3	3	5	75		●
4	4	12	40	●	
4	4	8	75		●
5	5	14	50	●	
5	5	9	75		●
6	6	7	51	●	
6	6	10	100		●
8	8	9	59	●	
8	8	12	100		●
10	10	10	60	●	
10	10	14	100		●
12	12	14	71	●	
12	12	16	100		●

● stock standard ○ non-standard stock ■ stock exhaustion

ULTRA MILLS

HSS-P for general purpose

Ultra Mills, made of powder HSS, can meet the highest requirements whenever the use of solid carbide end mills is not allowed.

La linea di fresatura Ultra Mills in HSS sinterizzato soddisfa le esigenze di alto rendimento in tutte le applicazioni in cui l'utilizzo del metallo duro non sia consentito.

Die Ultra Mills Produktpalette wird aus gesintertem HSS hergestellt. Sie befriedigt damit alle Bedürfnisse der Anwendungen, wo Vollhartmetall nicht verwendet werden kann.

La gamme de fraisage Ultra Mills, en acier fritté, satisfait toutes exigences de haute performance quand l'utilisation du carbure n'est pas possible.

La línea de fresado Ultra Mills de HSS sinterizado satisface las exigencias de alto rendimiento para todas las aplicaciones en las cuales el uso del metal duro no está permitido.

Фрезы Ultra mills, **изготовленные из порошкового** HSS, **дают возможность получить высокую эффективность фрезерования в ситуациях, когда твёрдосплавные фрезы не могут быть использованы**.

UM
HSSP

PV200 COATING
POWDER STEEL
HIGH PERFORMANCE · ALTO RENDIMENTO
HOCHLEISTUNG · HAUTE PERFORMANCE
ALTO RENDIMIENTO · **ВЫСОКОПРОИЗВОДИТЕЛЬНАЯ**

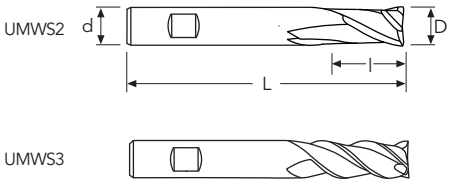
n Vf
PAGE 298-299

DIN 327

UMWS2 - UMWS3 (e8)

Ø mm	1~3	4~6	7~10	12~18	20~25
tol. D µ	-14 / -28	-20 / -38	-25 / -47	-32 / -59	-40 / -73

UMWS2 UMWS3



HSS-P PV200

HSS-P PV200

UM

UM

D(e8)	d(h6)	l	L	Stock	Stock
mm 2	6	4	48	●	●
3	6	5	49	●	●
4	6	7	51	●	●
5	6	8	52	●	●
6	6	8	52	●	●
7	10	10	60	●	○
8	10	11	61	●	●
9	10	11	61	●	○
10	10	13	63	●	●
12	12	16	73	●	●
14	12	16	73	●	●
16	16	19	79	●	●
18	16	19	79	●	●
20	20	22	88	●	●

● stock standard ○ non-standard stock ■ stock exhaustion

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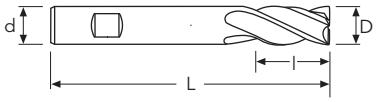
DIN 844

UMWS4

UMWS4	
Ø mm	1~20
tol. D µ	0 / +30



Z4

HSS-P
PV200

UM

30°

D	d(h6)	l	L	Stock
mm 3	6	8	52	●
4	6	11	55	●
5	6	13	57	●
6	6	13	57	●
8	10	19	69	●
10	10	22	72	●
12	12	26	83	●
14	12	26	83	●
16	16	32	92	●
18	16	32	92	●
20	20	38	104	●

● stock standard ○ non-standard stock ■ stock exhaustion

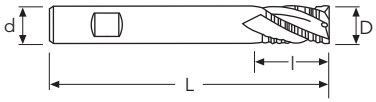
n Vf
PAGE 300

DIN 844

UMWSFR

UMWSFR (js12)

Ø mm	3~6	7~10	12~18	20~25
tol.D µ	±60	±75	±90	±105



Z3~Z4

HSS-P
PV200

UM HR FINE

30°

D(js12)	d(h6)	l	L	Z	Stock
mm **6**	6	13	57	3	●
7	10	16	66	3	●
8	10	19	69	3	●
9	10	19	69	3	●
10	10	22	72	4	●
12	12	26	83	4	●
14	12	26	83	4	●
16	16	32	92	4	●
18	16	32	92	4	●
20	20	38	104	4	●

● stock standard ○ non-standard stock ■ stock exhaustion

HSS/CO

General purpose

The Osawa catalogue also includes a wide range of HSS/Co end mills, both coated and uncoated.

Il catalogo Osawa include un'ampia scelta di frese in HSS/Co nudo e rivestito.

Der Osawa Katalog umfasst eine große Auswahl an beschichteten und unbeschichteten Fräsern aus HSS/Co.

Le catalogue Osawa inclut une large gamme de fraises en HSS/Co, soit revêtues, soit non revêtues.

El catálogo Osawa incluye una amplia variedad de fresas de HSS/Co con o sin recubrimiento.

В каталоге Osawa также представлена широкая гамма концевых фрез изготовленных из HSS/Co с покрытием и без покрытия.

HSS/Co
HIGH SPEED STEEL

n Vf
PAGE 301~303

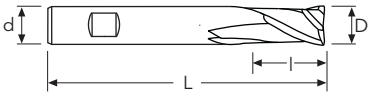
DIN 327

WS2 - TAWS2 - WSB2 - TAWSB2 (e8)

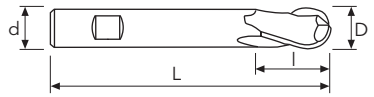
Ø mm	1~3	3.5~6	6.5~10	10.5~18	19~30	32~40
tol. D µ	-14 / -28	-20 / -38	-25 / -47	-32 / -59	-40 / -73	-50 / -89
tol. R µ	±20					

WS2	TAWS2	WSB2	TAWSB2
			

WS2
TAWS2



WSB2
TAWSB2



	Z2	Z2	Z2 BALL	Z2 BALL
	HSS/Co BR	HSS/Co PV200	HSS/Co BR	HSS/Co PV200
	N	N	N BALL NOSE	N BALL NOSE
	30°	30°	30°	30°

D(e8)	d(h6)	l	L	Stock	Stock	Stock	Stock
mm 1	6	2.5	47	●	●		
1.5	6	3	47	●	●		
2	6	4	48	●	●	●	○
2.5	6	5	49	●	●		
3	6	5	49	●	●	●	●
3.5	6	6	50	●	●		
4	6	7	51	●	●	●	●
4.5	6	7	51	●	●		
5	6	8	52	●	●	●	●
5.5	6	8	52	●	●		
6	6	8	52	●	●	●	●
6.5	10	10	60	●	●		
7	10	10	60	●	●	○	
7.5	10	10	60	●	●		
8	10	11	61	●	●	●	●
8.5	10	11	61	●	●		
9	10	11	61	●	●		
9.5	10	11	61	●	●		
10	10	13	63	●	●	●	●
10.5	12	13	70	●	●		
11	12	13	70	●	●		
11.5	12	13	70	●	●		
12	12	16	73	●	●	●	●
12.5	12	16	73	●	●		
13	12	16	73	●	●		
13.5	12	16	73	●	●		
14	12	16	73	●	●	●	●
15	12	16	73	●	●		
16	16	19	79	●	●	●	●
17	16	19	79	●	●		
18	16	19	79	●	●	●	●
19	16	19	79	●	●		
20	20	22	88	●	●	●	●
21	20	22	88	○			
22	20	22	88	●	●	○	
24	25	26	102	●	○		

● stock standard ○ non-standard stock ■ stock exhaustion

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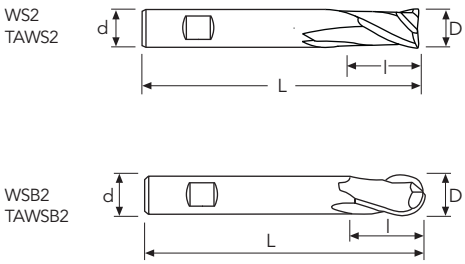
DIN 327

WS2 - TAWS2 - WSB2 - TAWSB2 (e8)

Ø mm	1~3	3.5~6	6.5~10	10.5~18	19~30	32~40
tol. D µ	-14 / -28	-20 / -38	-25 / -47	-32 / -59	-40 / -73	-50 / -89
tol. R µ	±20					



	WS2	TAWS2	WSB2	TAWSB2
	Z2	Z2	Z2 BALL	Z2 BALL
	HSS/Co BR	HSS/Co PV200	HSS/Co BR	HSS/Co PV200
	N	N	N BALL NOSE	N BALL NOSE
	30°	30°	30°	30°

D(e8)	d(h6)	l	L	Stock	Stock	Stock	Stock
mm 25	25	26	102	●	●	○	○
26	25	26	102	●			
28	25	26	102	●		○	○
30	25	26	102	●		○	○
32	32	32	112	○			

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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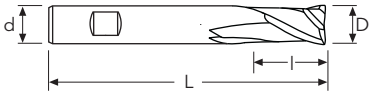
DIN 844

WSA2

WSA2

Ø mm	3~6	7~10	12~18	20~25
tol.D µ	±60	±75	±90	±105



D(e8)	d(h6)	l	L	Stock
mm **2**	6	7	51	●
2.5	6	8	52	●
3	6	8	52	●
4	6	11	55	●
5	6	13	57	●
6	6	13	57	●
8	10	19	69	●
10	10	22	72	●
12	12	26	83	●
14	12	26	83	●
16	16	32	92	●
18	16	32	92	●
20	20	38	104	●

● stock standard ○ non-standard stock ■ stock exhaustion

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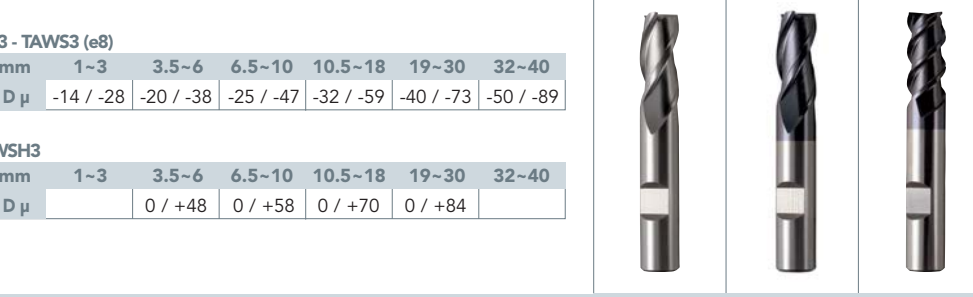
DIN 844

WS3 - TAWS3 (e8)

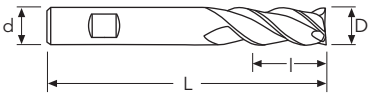
Ø mm	1~3	3.5~6	6.5~10	10.5~18	19~30	32~40
tol. D µ	-14 / -28	-20 / -38	-25 / -47	-32 / -59	-40 / -73	-50 / -89

TAWSH3

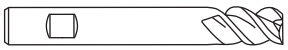
Ø mm	1~3	3.5~6	6.5~10	10.5~18	19~30	32~40
tol. D µ		0 / +48	0 / +58	0 / +70	0 / +84	



WS3
TAWS3



WSH3
TAWSH3



	WS3	TAWS3	TAWSH3
	Z3	Z3	Z3~Z4
	HSS/Co BR	HSS/Co PV200	HSS/Co PV200
	N	N	N
	30°	30°	45°

D	d(h6)	l	L	Stock	Stock	Stock
mm 1	6	3	47	●	○	
1.5	6	7	51	●	○	
2	6	7	51	●	●	
2.5	6	8	52	●	●	
3	6	8	52	●	●	
3.5	6	10	54	●	●	
4	6	11	55	●	●	
4.5	6	11	55	●	●	
5	6	13	57	●	●	
5.5	6	13	57	●	●	
6	6	13	57	●	●	●
6.5	10	16	66	●	●	
7	10	16	66	●	●	
8	10	19	69	●	●	●
8.5	10	19	69	●	●	
9	10	19	69	●	●	
10	10	22	72	●	●	●
11	12	22	79	●	●	
12	12	26	83	●	●	●
13	12	26	83	●	●	
14	12	26	83	●	●	●
15	12	26	83	●	●	
16	16	32	92	●	●	●
18	16	32	92	●	●	●
20	20	38	104	●	●	●
22	20	38	104	●	●	
25	25	45	121	●	●	
30	25	45	121	●	○	
32	32	53	133	●	○	

● stock standard ○ non-standard stock ■ stock exhaustion

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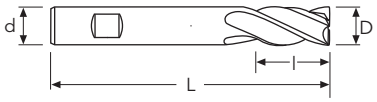
DIN 844

WS4 (6) TAWS4 (6)

WS4 - TAWS4

Ø mm	2~40
tol. D µ	0 / +40



Z4~Z6 | HSS/Co BR | N | 30°

Z4~Z6 | HSS/Co PV200 | N | 30°

D	d(h6)	l	L	Stock	Stock
mm 2	6	7	51	●	●
3	6	8	52	●	●
4	6	11	55	●	●
5	6	13	57	●	●
6	6	13	57	●	●
7	10	16	66	●	●
8	10	19	69	●	●
9	10	19	69	●	●
10	10	22	72	●	●
11	12	22	79	●	●
12	12	26	83	●	●
13	12	26	83	●	●
14	12	26	83	●	●
15	12	26	83	●	●
16	16	32	92	●	●
17	16	32	92		●
18	16	32	92	●	●
19	16	32	92		○
20	20	38	104	●	●
22	20	38	104	●	●
24	25	45	121	● (Z6)	○ (Z6)
25	25	45	121	●	●
26	25	45	121		○ (Z6)
28	25	45	121	● (Z6)	○ (Z6)
30	25	45	121	● (Z6)	● (Z6)
32	32	53	133		● (Z6)
36	32	53	133		● (Z6)
40	32	63	143		● (Z6)

● stock standard ○ non-standard stock ■ stock exhaustion

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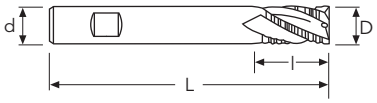
DIN 844

TAWSR ≤ Ø20
WSFR ≤ Ø20
TAWSFR ≤ Ø40

TAWSR ≥ Ø22
WSFR ≥ Ø22

TAWSR - WSFR - TAWSFR (js12)

Ø mm	~6	6.5~10	10.5~18	19~30	32~40
tol. D µ	±60	±75	±90	±105	±125



	TAWSR	WSFR	TAWSFR	WSAR
	Z3~Z6	Z3~Z6	Z3~Z6	Z3
	HSS/Co PV200	HSS/Co BR	HSS/Co PV200	HSS/Co BR
	NR COARSE	HR FINE	HR FINE	ALU WR COARSE
	30°	30°	30°	45°

D(js12)	d(h6)	l	L	Z	Stock	Stock	Stock	Stock
mm 6	6	13	57	3	●	●	●	●
7	10	16	66	3	●	○	●	
8	10	19	69	3	●	●	●	●
9	10	19	69	3	●	○	●	
10	10	22	72	4	●	●	●	●
11	12	22	79	4	●	○	●	
12	12	26	83	4	●	●	●	●
13	12	26	83	4	●	○	●	
14	12	26	83	4	●	●	●	●
15	12	26	83	4	●	○	●	
16	16	32	92	4	●	●	●	●
17	16	32	92	4	●		●	
18	16	32	92	4	●	●	●	●
19	16	32	92	4	○			
20	20	38	104	4	●	●	●	●
22	20	38	104	5			●	
25	25	45	121	5			●	●
28	25	45	121	6			●	
30	25	45	121	6			●	
32	32	53	133	6			●	
36	32	53	133	6			●	
38	32	63	155	6				
40	32	63	155	6			●	

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
PAGE 301~303

DIN 844 1889

WL2 - TAWL2 - WLB2 - TAWLB2 (e8)

Ø mm	1~3	3.5~6	6.5~10	10.5~18	19~30	32~40
tol. D µ	-14 / -28	-20 / -38	-25 / -47	-32 / -59	-40 / -73	-50 / -89
tol. R µ	±20					

WL2	TAWL2	WLB2	TAWLB2
			

WL2
TAWL2

WLB2
TAWLB2

	WL2	TAWL2	WLB2	TAWLB2
	Z2	Z2	Z2 BALL	Z2 BALL
	HSS/Co BR	HSS/Co PV200	HSS/Co BR	HSS/Co PV200
	N	N	N BALL NOSE	N BALL NOSE
	30°	30°	30°	30°

D(e8)	d(h6)	l	L	Stock	Stock	Stock	Stock
mm 3	6	8	56	●	●	●	○
4	6	11	63	●	●	●	○
5	6	13	68	●	●	●	○
6	6	13	68	●	●	●	○
7	10	16	80	●	○		
8	10	19	88	●	●	●	○
9	10	19	88	●	○		
10	10	22	95	●	●	●	○
11	12	22	102	●	○		
12	12	26	110	●	●	●	○
13	12	26	110	●	○		
14	12	26	110	●	●	●	○
15	12	26	110	●	○		
16	16	32	123	●	●	●	○
17	16	32	123	●	○		
18	16	32	123	●	●	●	○
20	20	38	141	●	●	●	○
22	20	38	141	●			
24	25	45	166	○			
25	25	45	166	●			
28	25	45	166	●			
30	25	45	166	●			
32	32	53	186	○			
36	32	53	186	○			
40	32	63	207	○			

● stock standard ○ non-standard stock ■ stock exhaustion

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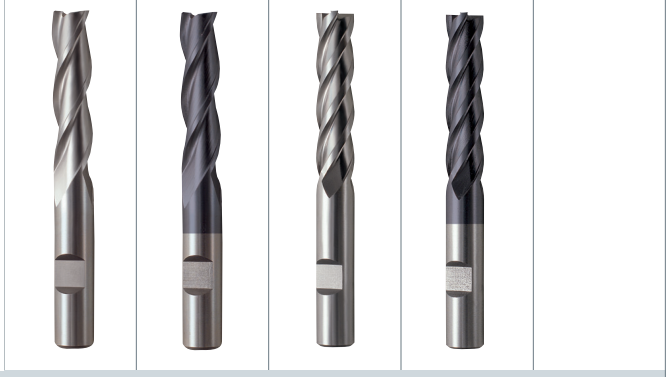
DIN 844

WL3 - TAWL3 (e8)

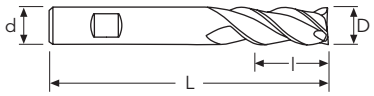
Ø mm	~3	3.5~6	6.5~10	10.5~18	19~30	32~40
tol. D µ	-14 / -28	-20 / -38	-25 / -47	-32 / -59	-40 / -73	-50 / -89

WL4 - TAWL4

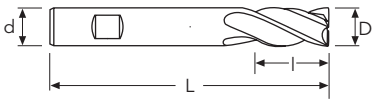
Ø mm	3~6	7~40
tol. D µ	0 / +40	0 / +50



WL3
TAWL3



WL4
TAWL4



D		d(h6)	l	L	WL3 Stock	TAWL3 Stock	WL4 (6) Stock	TAWL4 (6) Stock
mm	3	6	12	56	●	●	●	○
	4	6	19	63	●	●	●	○
	5	6	24	68	●	●	●	○
	6	6	24	68	●	●	●	●
	7	10	30	80			●	○
	8	10	38	88	●	●	●	●
	9	10	38	88			●	○
	10	10	45	95	●	●	●	●
	11	12	45	102			●	○
	12	12	53	110	●	●	●	●
	13	12	53	110			●	○
	14	12	53	110	●	●	●	●
	15	12	53	110			●	○
	16	16	63	123	●	●	●	●
	17	16	63	123				
	18	16	63	123	●	●	●	●
	19	16	63	123			●	○
	20	20	75	141	●	●	●	●
	22	20	75	141	●	○	● (Z6)	● (Z6)
	25	25	90	166	●	○	● (Z6)	● (Z6)
	30	25	90	166				● (Z6)
	32	32	106	186				● (Z6)
	36	32	106	186				● (Z6)
	40	40	125	217			○	● (Z6)

● stock standard ○ non-standard stock ■ stock exhaustion

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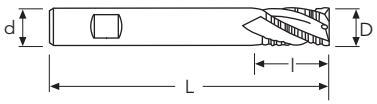
DIN 844

WLFR - TAWLFR (j12)

Ø mm	~6	6.5~10	10.5~18	19~30	32~40
tol. D µ	±60	±75	±90	±105	±125



	WLFR	TAWLFR
	Z3~Z6	Z3~Z6
	HSS/Co BR	HSS/Co PV200
	HR FINE	HR FINE
	30°	30°

D(js 12)	d(h6)	l	L	Z	Stock	Stock
mm 6	6	24	68	3	●	●
8	10	38	88	3	●	●
10	10	45	95	4	●	●
12	12	53	110	4	●	●
14	12	53	110	4	●	●
16	16	63	123	4	●	●
18	16	63	123	4	●	●
20	20	75	141	4	●	●
22	20	75	141	5		●
25	25	90	166	5		●
30	25	90	166	6		●
32	32	106	186	6		●
36	32	106	186	6		●
40	32	125	217	6		●

● stock standard ○ non-standard stock ■ stock exhaustion

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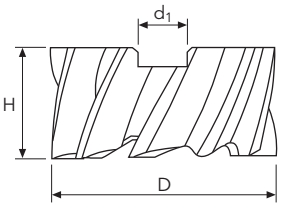
DIN 1880

FM - TAFM - FFR - TAFFR

tol. D mm	+0.25 / -0.15
tol. d1 mm	+0.02 / -0
tol. H mm	+0.5 / -0



			FM	TAFM	FFR	TAFFR
			Z8~Z14	Z8~Z14	Z6~Z12	Z6~Z12
			HSS/Co BR	HSS/Co PV200	HSS/Co BR	HSS/Co PV200
			N	N	HR FINE	HR FINE
			30°	30°	30°	30°
D	d1	H	Stock	Stock	Stock	Stock
mm 40	16	32	● (Z8)	● (Z8)	● (Z6)	● (Z6)
50	22	36	● (Z8)	● (Z8)	● (Z8)	● (Z8)
63	27	40	● (Z8)	● (Z8)	● (Z8)	● (Z8)
80	27	45	○ (Z10)	○ (Z10)	○ (Z10)	○ (Z10)
100	32	50	○ (Z10)	○ (Z10)	○ (Z10)	○ (Z10)
160	50	63	○ (Z14)	○ (Z14)	○ (Z12)	○ (Z12)

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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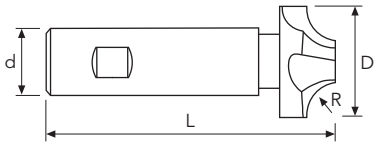
DIN 6518

WCR

WCR (H11)

Ø mm	8~12	13~20	21~28	31~52
tol. R µ	+60 / 0	+75 / 0	+90 / 0	+110 / 0



Z4

HSS/Co
BR

N

0°

D	R(H11)	d(h6)	L	Stock
mm 8	1.0	10	60	●
9	1.5	10	60	●
10	2.0	10	60	●
11	2.5	10	60	●
12	3.0	12	60	●
13	3.5	12	60	●
14	4.0	12	60	●
15	4.5	12	60	●
16	5.0	12	60	●
19	5.5	16	67	●
20	6.0	16	67	●
21	6.5	16	71	●
22	7.0	16	71	●
23	7.5	16	71	●
24	8.0	16	71	●
25	8.5	25	85	●
26	9.0	25	85	●
27	9.5	25	85	●
28	10.0	25	85	●
31	10.5	25	90	○
32	11.0	25	90	●
34	12.0	25	90	●
41	12.5	25	100	○
42	13.0	25	100	○
44	14.0	25	100	○
46	15.0	25	100	○
48	16.0	25	100	○
52	18.0	32	112	○
56	20	32	112	○

● stock standard ○ non-standard stock ■ stock exhaustion

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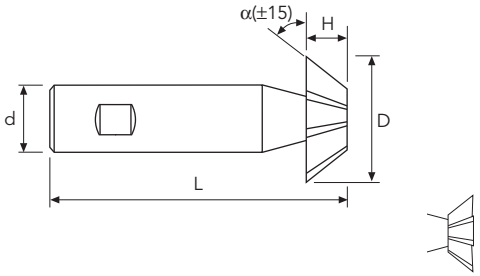
DIN 1833

WDC45 - WDC60 - WDD45 - WDD60 (js16)

Ø mm	~18	20~30	32~38
tol. D mm	±0.65	±0.65	±0.80



	WDC45	WDC60	WDD45	WDD60
	Z6~Z12	Z6~Z12	Z6~Z12	Z6~Z12
	HSS/Co BR	HSS/Co BR	HSS/Co BR	HSS/Co BR
	N	N	N	N
	α 45°	α 60°	α 45°	α 60°

D(js16)	d(h6)	H	L	Z	Stock	Stock	Stcok	Stock
mm 16	12	4	60	6	●		●	
20	12	5	63	6	●		●	
22	12	6	67	6	●		●	
25	16	6.3	67	8	●		●	
28	16	7.5	67	8	●		●	
32	16	8	71	10	●		●	
38	16	10	80	12	○		○	
mm 16	12	6.3	60	6		●		●
20	12	8	63	6		●		●
22	12	9	67	6		●		●
25	16	10	67	8		●		●
28	16	11	67	8		●		●
32	16	12.5	71	10		●		●
38	16	16	80	12		○		○

● stock standard ○ non-standard stock ■ stock exhaustion

n Vf
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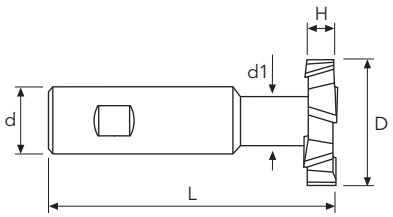
DIN 851

WTM

WTM (d11)

Ø mm	10~18	19~30	32~40
tol. D µ	-50 / -160	-65 / -195	-80 / -240



Z6~Z8

HSS/Co
BR

N

15°

D(d11)	d(h6)	d1	H(d11)	L	Z	Stock
mm 12.5	10	5	6	57	6	●
16	10	6.5	8	62	6	●
18	12	8	8	70	6	●
19	12	8	9	71	6	●
21	12	10	9	74	6	●
22	12	10	10	75	6	●
25	16	12	11	82	6	●
28	16	13	12	83	6	●
32	16	15	14	90	8	●
36	25	17	16	103	8	●
40	25	19	18	108	8	○

● stock standard ○ non-standard stock ■ stock exhaustion

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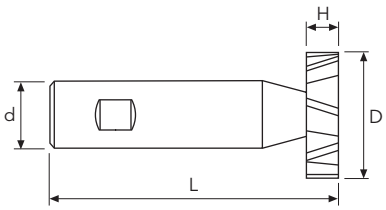
DIN 850

WWK

WWK (h11 - e8)

Ø mm	10~18	19~30	32~50
tol. D µ	0 / -110	0 / -130	0 / -160
tol. H µ	-32 / -59	-40 / -73	-50 / -89



Z8~Z14

HSS/Co
BR

N

10°

D(h11)	d(h6)	H(e8)	L	Z	Stock
mm 10.5	6	2	50	8	●
10.5	6	2.5	50	8	●
10.5	6	3	50	8	●
13.5	10	2	56	8	●
13.5	10	2.5	56	8	●
13.5	10	3	56	8	●
13.5	10	4	56	8	●
16.5	10	2.5	56	8	●
16.5	10	3	56	8	●
16.5	10	4	56	8	●
16.5	10	5	56	8	●
19.5	10	3	63	8	●
19.5	10	4	63	8	●
19.5	10	5	63	8	●
19.5	10	6	63	8	●
22.5	10	4	63	10	●
22.5	10	5	63	10	●
22.5	10	6	63	10	●
22.5	10	8	63	10	●
25.5	10	5	63	10	●
25.5	10	6	63	10	●
25.5	10	7	63	10	●
25.5	10	8	63	10	●
28.5	10	5	63	10	●
28.5	10	6	63	10	●
28.5	10	7	63	10	○
28.5	10	8	63	10	○
32.5	12	5	71	12	●
32.5	12	6	71	12	●
32.5	12	7	71	12	○
32.5	12	8	71	12	●
32.5	12	10	71	12	●
38.5	12	7	71	12	●
38.5	12	8	71	12	○
38.5	12	9	71	12	○
38.5	12	10	71	12	○
45.5	12	10	71	14	○

● stock standard ○ non-standard stock ■ stock exhaustion