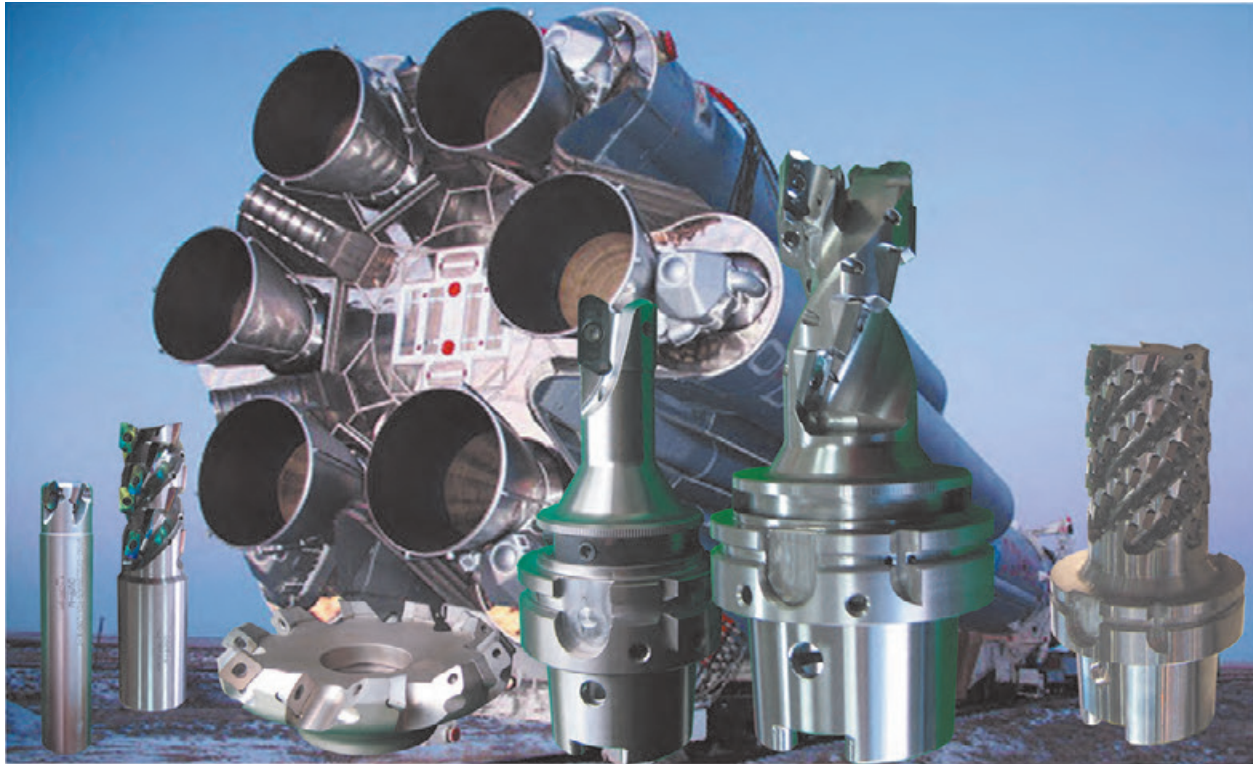


ROTATING TOOLS



G e r m a n y | I n d i a | R u s s i a





Choice of milling tools for machining Titanium alloys

Types of mills	Tool lead angle	Range Ø, mm	Depth of cut up to, mm	Insert type	S Heat resistant alloys and titanium alloys	Working areas			
						Roughing	Semi-finishing	Finishing	Plunging
Face milling  MT245...SO09-IK-T Page 6 MT245...SO19-IK-T Page 7	45°	32-125 80-160	5 10		...	...	...	...	
Square shoulder facemilling   MT290...BO12-IK-T Page 8 MT190...BO12-IK-T Page 9	90°	40-160 25-50	10		...	•	...	...	
Square shoulder facemilling   MT290...AD10-IK-T Page 10 MT190...AD10-IK-T Page 11-12	90°	40-100 16-32	10		...	•	...	...	
Slot milling, square shoulder milling and pocket  MT190L...AD10-IK-T Page 13	90°	25-40	36-83		...	...	••		
Slot milling, square shoulder milling and pocket   MT190L...SO09-IK-T MT190L...SO09+18A... Page 14-19	90°	40-50 50-80	56-100 76-149	 	...	...	•		
Slot milling and square shoulder milling  MT290L...SO09-IK-T Page 20	90°	50-100	51	 	...	...	•		
Drilling tools  DT190...SO09-IK Page 21	90°	26-63	-		...				...

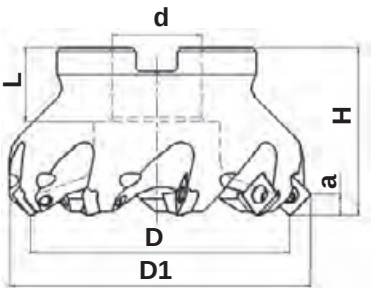
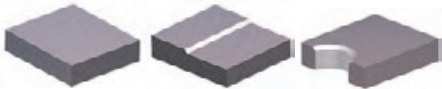
Choice of milling tools for machining Aluminium alloys

Types of mills	Tool lead angle	Range Ø, mm	Depth of cut up to, mm	Insert type	N		Working areas			
					Aluminium alloys and copper alloys		Roughing	Semi-finishing	Finishing	Plunging
Face milling and square shoulder facemilling  MT290...XD19-IK-AL-HSC MT290...XD19-IK-AL Page 22-23	90°	40-125	18		...		...	...	...	
Face milling and square shoulder facemilling  MT290...AD10-IK-AL Page 24-25	90°	32-100	10		...		...	...	...	
Slot milling, square shoulder milling and pocket  MT190...Z...XD19-IK-AL-HSC MT190...Z...XD19-IK-AL MT190...W...XD19-IK-AL Page 26-29  MT190...Z...AD10-IK-AL Page 30-31  MT190...NC...XD19-IK-AL-HSC MT190...NC...XD19-IK-AL MT190...BT...XD19-IK-AL-HSC MT190...BT...XD19-IK-AL MT190...H.A...XD19-IK-AL-HSC MT190...H.A...XD19-IK-AL Page 32-43  MT190...H.A...AD10-IK-AL Page 44-45	90°	25-50	18		...					
		25-32	10							
		25-50	18			...	...	...	...	
		25-50	10							
Slot and pocket milling and plunging  MT190B...AD10-IK-AL-HSC MT190B...AD10-IK-AL MT190B...XD19-IK-AL-HSC MT190B...XD19-IK-AL Page 46-49	90°	30-32	10		...		...	•		...
		40-50	18							
Slot and pocket milling and plunging  MT190LB...XD19-IK-AL-HSC MT190LB...XD19-IK-AL Page 50-51	90°	40-50	50-100	 	...		...	•		...
Slot milling and square shoulder milling  MT290L...XD19-IK-AL-HSC MT290L...XD19-IK-AL Page 52-53	90°	50-125	36-114		...		...	•		
Plunging cutter  MT290Z...MO-IK MT190Z...MO-IK Page 56-57	90°	32-63 16-50	8		...	...	...	••		...

MT245...SO09...T
Facemills 45° for machining titanium alloys



- *Positive geometry.
- *Low cutting forces.
- *First choice for machining centers.
- *Profitable machining titanium and heat resistant alloys.



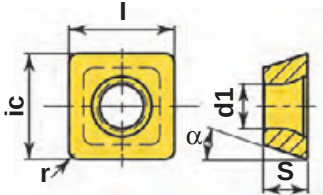
Regular pitch

Depth of cut up to 5 mm

Code key	Dimensions, mm							nmax RPM	 kg		No.		
	D	a	D1	L	H	d	Z						
MT245-032A16R04SO09-IK-T	32	5	42,5	19	40	16	4	22000	0,1	SOHW09T308EN	4	T350760-10	7010-TP 3,0 Nm
MT245-040A16R05SO09-IK-T	40	5	50,5	19	40	16	5	19500	0,2		5		
MT245-050A22R06SO09-IK-T	50	5	60,5	20	40	22	6	17500	0,4		6		
MT245-063A22R07SO09-IK-T	63	5	73,5	20	40	22	7	15500	0,6		7		
MT245-080B27R09SO09-IK-T	80	5	92,5	22	50	27	9	13500	0,8		9		
MT245-100B32R11SO09-IK-T	100	5	110,5	25	50	32	11	12000	1,4		11		
MT245-125B40R14SO09-IK-T	125	5	135,5	29	63	40	14	10500	2,8		14		

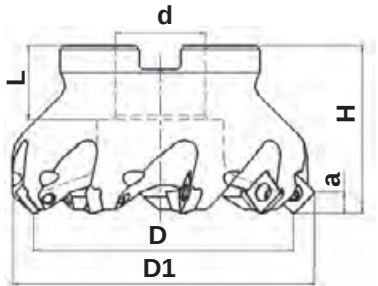
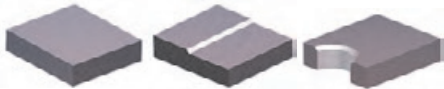
Close pitch

MT245-032A16R05SO09-IK-T	32	5	42,5	19	40	16	5	22000	0,1	SOHW09T308EN	5	T350760-10	7010-TP 3,0 Nm
MT245-040A16R06SO09-IK-T	40	5	50,5	19	40	16	6	19500	0,2		6		
MT245-050A22R07SO09-IK-T	50	5	60,5	20	40	22	7	17500	0,4		7		
MT245-063A22R09SO09-IK-T	63	5	73,5	20	40	22	9	15500	0,6		9		
MT245-080B27R11SO09-IK-T	80	5	92,5	22	50	27	11	13500	0,8		11		
MT245-100B32R13SO09-IK-T	100	5	110,5	25	50	32	13	12000	1,4		13		
MT245-125B40R16SO09-IK-T	125	5	135,5	29	63	40	16	10500	2,8		16		



Code key	Carbide grade					Dimensions				
	P	M	K	N	S					
						ic	l	S	d1	r
SOHW09T308EN						9,525	9,525	3,97	4,0	0,8

MT245...SO19...T
Facemills 45° for roughing machining titanium alloys



- *Depth of cut up to 10 mm.
- *Range of diameters from 80 mm up to 315 mm.
- *Special design for roughing titanium alloys.
- *Roughing mills for removal an high-strength alpha layer.
- * The maximal productivity for titanium makes 180 cubic centimetres per minute.

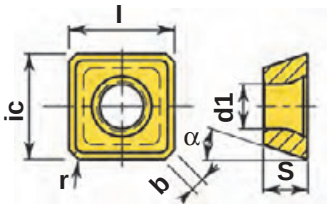
Regular pitch

Depth of cut up to 10 mm

Code key	Dimensions, mm							nmax RPM	 kg		No.		
	D	a	D1	L	H	d	Z						
MT245-080B27R05SO19-IK-T	80	10	103,5	22	50	27	5	5500	1,0	SOHT1906ADEN-T	5	T501155-20	7020-T 5,0 Nm
MT245-100B32R07SO19-IK-T	100	10	123,5	25	50	32	7	5000	1,6		7		
MT245-125B40R08SO19-IK-T	125	10	148,5	29	63	40	8	4500	3,0		8		
MT245-160C40R10SO19-IK-T	160	10	183,5	29	63	40	10	4000	4,7		10		

Close pitch

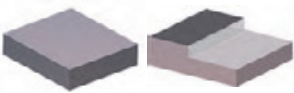
MT245-080B27R06SO19-IK-T	80	10	90,5	22	50	27	6	5500	0,9	SOHT1906ADEN-T	6	T501155-20	7020-T 5,0 Nm
MT245-100B32R08SO19-IK-T	100	10	110,5	25	50	32	8	5000	1,4		8		
MT245-125B40R10SO19-IK-T	125	10	135,5	29	63	40	10	4500	2,8		10		
MT245-160C40R12SO19-IK-T	160	10	183,5	29	63	40	12	4000	4,4		12		



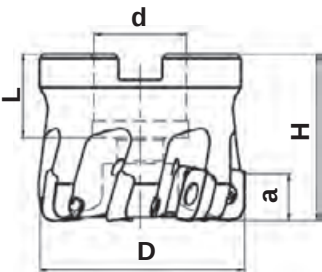
Code key	Carbide grade					Dimensions					
	P	M	K	N	S	ic	l	S	d1	r	b
SOHT1906ADEN-T						19,05	19,05	7,94	6,0	1,5	1,5

MT290...BO12...T

Square shoulder facemills for machining titanium alloys



- *Positive geometry.
- *Low cutting forces.
- *First choice for machining centers.
- *Profitable machining titanium and heat resistant alloys.
- *Standard corner radius of insert 0,8; 3,0 and 4,0 mm.



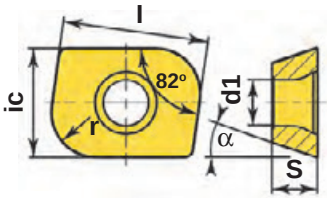
Regular pitch

Depth of cut up to 10 mm

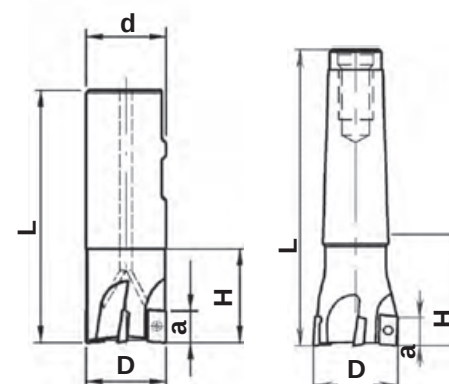
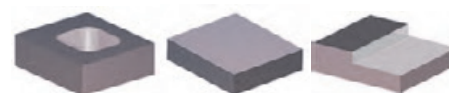
Code key	Dimensions, mm						nmax RPM	 kg		No.		
	D	a	L	H	d	Z						
MT290-040A16R03BO12-IK-T	40	10	19	40	16	3	13500	0,2	BOHW12T308ER BOHW12T330ER BOHW12T340ER	3	T350760-10	7010-TP 3,0 Nm
MT290-050A22R04BO12-IK-T	50	10	20	40	22	4	11500	0,3		4		
MT290-063A22R05BO12-IK-T	63	10	20	40	22	5	10000	0,5		5		
MT290-080B27R06BO12-IK-T	80	10	22	50	27	7	8500	0,9		6		
MT290-100B32R07BO12-IK-T	100	10	25	50	32	7	7500	1,3		7		
MT290-125B40R08BO12-IK-T	125	10	29	63	40	8	6500	2,5		8		
MT290-160C40R10BO12-IK-T	160	10	31	63	40	10	5500	3,7		10		

Close pitch

MT290-040A16R05BO12-IK-T	40	10	19	40	16	5	13500	0,2	BOHW12T308ER BOHW12T330ER BOHW12T340ER	5	T350760-10	7010-TP 3,0 Nm
MT290-050A22R07BO12-IK-T	50	10	20	40	22	7	11500	0,3		7		
MT290-063A22R08BO12-IK-T	63	10	20	40	22	8	10000	0,5		8		
MT290-080B27R10BO12-IK-T	80	10	22	50	27	10	8500	0,9		10		
MT290-100B32R12BO12-IK-T	100	10	25	50	32	12	7500	1,3		12		
MT290-125B40R14BO12-IK-T	125	10	29	63	40	14	6500	2,5		14		
MT290-160C40R18BO12-IK-T	160	10	31	63	40	18	5500	3,7		18		



Code key	Carbide grade					Dimensions				
	P	M	K	N	S	ic	l	S	d1	r
					HCS35					
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
BOHW12T330ER					●	9,525	13,0	3,97	4,0	3,0
BOHW12T340ER					●	9,525	13,0	3,97	4,0	4,0

MT190...BO12...T**Endmills 90° for machining titanium alloys**

- *Positive geometry.
- *Best productivity for machining of titanium alloys and nickel alloys in machining centers.
- *Verylight cutting.
- *Low cutting forces.

MT 190-W...BO12-IK-T

Straight shank with drive flat (Weldon)

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT190-025W25R02BO12-IK-T	25	10	39	95	25	2	20000	0,2	BOHW12T308ER BOHW12T330ER BOHW12T340ER	2	T350760-10	7010-TP 3,0 Nm
MT190-025W25R03BO12-IK-T	25	10	39	95	25	3	20000	0,2		3		
MT190-032W32R04BO12-IK-T	32	10	37	97	32	4	16000	0,4		4		
MT190-040W32R05BO12-IK-T	40	10	50	110	32	5	13500	0,6		5		
MT190-050W40R06BO12-IK-T	50	10	70	140	40	6	10000	0,7		6		

MT 190-Z...BO12-IK-T

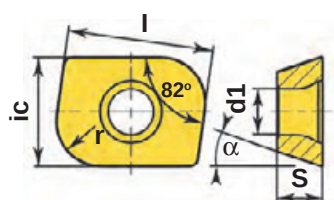
Straight shank cylindrical

MT190-025Z25R02BO12-IK-T	25	10	100	200	25	2	20000	0,4	BOHW12T308ER BOHW12T330ER BOHW12T340ER	2	T350760-10	7010-TP 3,0 Nm
MT190-025Z25R03BO12-IK-T	25	10	100	200	25	3	20000	0,4		3		
MT190-032Z32R04BO12-IK-T	32	10	100	200	32	4	12000	0,6		4		
MT190-040Z32R05BO12-IK-T	40	10	50	250	32	5	10000	0,9		5		
MT190-050Z40R06BO12-IK-T	50	10	70	250	40	6	8000	1,2		6		

MT 190-MK...BO12-T

Morse taper shank with draw-bar thread to DIN 228A/ISO296

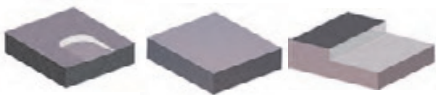
MT190-025MK3R02BO12-T	25	10	43	124	MK3	2	20000	0,3	BOHW12T308ER BOHW12T330ER BOHW12T340ER	2	T350760-10	7010-TP 3,0 Nm
MT190-025MK3R03BO12-T	25	10	43	124	MK3	3	20000	0,3		3		
MT190-032MK3R04BO12-T	32	10	43	124	MK3	4	16000	0,4		4		
MT190-040MK4R05BO12-T	40	10	54,5	157	MK4	5	13500	0,8		5		
MT190-050MK4R06BO12-T	50	10	54,5	157	MK4	6	10000	1,0		6		



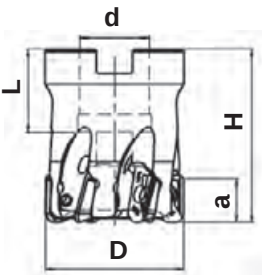
Code key	Carbide grade					Dimensions				
	P	M	K	N	S	ic	l	S	d1	r
	HCS35					mm				
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
BOHW12T330ER					●	9,525	13,0	3,97	4,0	3,0
BOHW12T340ER					●	9,525	13,0	3,97	4,0	4,0

MT290...AD10...T

Square shoulder facemills with internal coolant supply for machining titanium alloys



- *Positive geometry.
- *The best mills for face and shoulder milling in using machining centers.
- *Efficient production for low horsepower machines
- *Very low cutting forces.
- *Radius of inserts of great range 0.8; 1.6; 2.5; 3.2 and 4.0 mm.



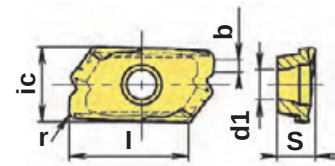
Regular pitch

Depth of cut up to 10 mm

Code key	Dimensions, mm						n_{max}			No.		
	D	a	L	H	d	Z	RPM					
MT290-040A16R04AD10-IK-T	40	10	19	40	16	4	27700	0,2	ADKT10T3..ER-T	4	T250555-08AP	7008-TP 1,6 Nm
MT290-050A22R05AD10-IK-T	50	10	20	40	22	5	25400	0,3		5		
MT290-063A22R06AD10-IK-T	63	10	20	40	22	6	23300	0,5		6		
MT290-080B27R08AD10-IK-T	80	10	22	50	27	8	21300	1,0		8		

Close pitch

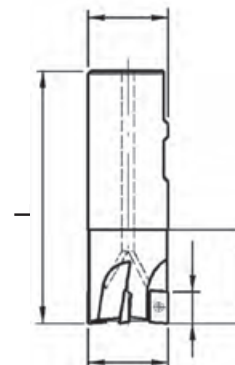
MT290-040A16R06AD10-IK-T		10	19	40	16	6	27700	0,2	ADKT10T3..ER-T	6	T250555-08AP	7008-TP 1,6 Nm
MT290-050A22R08AD10-IK-T	50	10	20	40	22	8	25400	0,3		8		
MT290-063A22R10AD10-IK-T	63	10	20	40	22	10	23300	0,5		10		
MT290-080B27R12AD10-IK-T	80	10	22	50	27	12	21300	0,9		12		
MT290-100B32R14AD10-IK-T	100	10	25	50	32	14	19600	1,3		14		



Code key	Carbide grade									Dimensions						
	P			M		K		N	S		ic	l	S	d1	r	α
	HCS30			HCS30					HCS30	HCS35						
ADKT10T304ER-T	○			●					●	●	6,8	10,0	3,97	2,8	0,4	15
ADKT10T308ER-T	○			●					●	●	6,8	10,0	3,97	2,8	0,8	15
ADKT10T316ER-T	○			●					●	●	6,8	10,0	3,97	2,8	1,6	15
ADKT10T320ER-T	○			●					●		6,8	10,0	3,97	2,8	2,0	15
ADKT10T325ER-T	○			●					●	●	6,8	10,0	3,97	2,8	2,5	15
ADKT10T332ER-T	○			●					●	●	6,8	10,0	3,97	2,8	3,2	15
ADKT10T340ER-T	○			●					●	●	6,8	10,0	3,97	2,8	4,0	15

MT190...T**Endmills with internal coolant supply
for machining titanium alloys**

- *Positive geometry.
- *The best mills for face and shoulder milling in using machining centers.
- *Efficient production for low horsepower machines
- *Very low cutting forces.
- *Radius of inserts of great range 0.8; 1.6; 2.5; 3.2 and 4.0 mm.

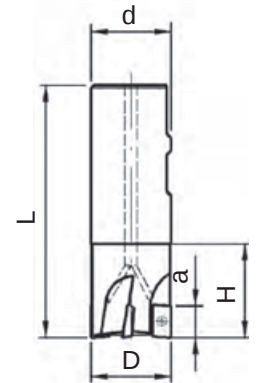
**MT 190-Z...AD10-IK-T**

Straight shank cylindrical

Code key	Dimensions, mm						n _{max}			No.		
	D	a	H	L	d	Z	RPM					
MT190-016Z16R02AD10-L090-IK-T	16	10	42	90	16	2	38500	0,2	ADKT10T3..ER-T	2	T250555-08AP	7008-TP 1,6 Nm
MT190-016Z16R02AD10-L110-IK-T	16	10	62	110	16	2	28900	0,3		2		
MT190-016Z16R02AD10-L130-IK-T	16	10	82	130	16	2	24200	0,3		2		
MT190-020Z20R03AD10-L090-IK-T	20	10	40	90	20	3	36900	0,4		3		
MT190-020Z20R03AD10-L130-IK-T	20	10	70	130	20	3	23900	0,4		3		
MT190-020Z20R03AD10-L160-IK-T	20	10	100	160	20	3	19500	0,5		3		
MT190-025Z25R04AD10-L110-IK-T	25	10	54	110	25	4	33200	0,5		4		
MT190-025Z25R04AD10-L140-IK-T	25	10	84	140	25	4	19900	0,5		4		
MT190-025Z25R04AD10-L170-IK-T	25	10	114	170	25	4	15400	0,5		4		
MT190-025Z25R05AD10-L110-IK-T	25	10	54	110	25	5	33200	0,5		5		
MT190-025Z25R05AD10-L140-IK-T	25	10	84	140	25	5	19900	0,5		5		
MT190-025Z25R05AD10-L170-IK-T	25	10	114	170	25	5	15400	0,5		5		
MT190-032Z32R04AD10-L120-IK-T	32	10	60	120	32	4	30200	0,7		4		
MT190-032Z32R04AD10-L160-IK-T	32	10	100	160	32	4	20900	0,8		4		
MT190-032Z32R04AD10-L200-IK-T	32	10	160	200	32	4	16000	0,9		4		
MT190-032Z32R05AD10-L120-IK-T	32	10	60	120	32	5	30200	0,7		5		
MT190-032Z32R05AD10-L160-IK-T	32	10	100	160	32	5	20900	0,8		5		
MT190-032Z32R05AD10-L200-IK-T	32	10	130	200	32	5	16000	0,9		5		
MT190-032Z32R06AD10-L120-IK-T	32	10	60	120	32	6	30200	0,7		6		
MT190-032Z32R06AD10-L160-IK-T	32	10	100	160	32	6	20900	0,8		6		
MT190-032Z32R06AD10-L200-IK-T	32	10	130	200	32	6	16000	0,9		6		

MT190...T**Endmills with internal coolant supply for machining titanium alloys**

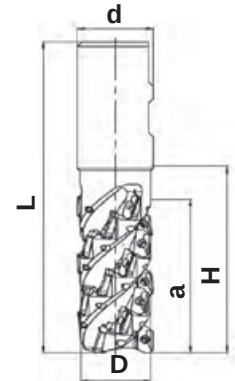
- *Positive geometry.
- *The best mills for face and shoulder milling in using machining centers.
- *Efficient production for low horsepower machines
- *Very low cutting forces.
- *Radius of inserts of great range 0.8; 1.6; 2.5; 3.2 and 4.0 mm.

**MT 190-W...AD10-IK-T****Straight shank with drive flat (Weldon)**

Code key	Dimensions, mm						n_{max}			No.		
	D	a	H	L	d	Z	RPM					
MT190-016W16R02AD10-L090-IK-T	16	10	42	90	16	2	38500	0,2	ADKT10T3..ER-T	2	T250555-08AP	7008-TP 1,6 Nm
MT190-016W16R02AD10-L110-IK-T	16	10	62	110	16	2	28900	0,3		2		
MT190-016W16R02AD10-L130-IK-T	16	10	82	130	16	2	24200	0,3		2		
MT190-020W20R03AD10-L090-IK-T	20	10	40	90	20	3	36900	0,4		3		
MT190-020W20R03AD10-L130-IK-T	20	10	70	130	20	3	23900	0,4		3		
MT190-020W20R03AD10-L160-IK-T	20	10	100	160	20	3	19500	0,5		3		
MT190-025W25R04AD10-L110-IK-T	25	10	54	110	25	4	33200	0,5		4		
MT190-025W25R04AD10-L140-IK-T	25	10	84	140	25	4	19900	0,5		4		
MT190-025W25R04AD10-L170-IK-T	25	10	114	170	25	4	15400	0,5		4		
MT190-025W25R05AD10-L110-IK-T	25	10	54	110	25	5	33200	0,5		5		
MT190-025W25R05AD10-L140-IK-T	25	10	84	140	25	5	19900	0,5		5		
MT190-025W25R05AD10-L170-IK-T	25	10	114	170	25	5	15400	0,5		5		
MT190-032W32R04AD10-L120-IK-T	32	10	60	120	32	4	30200	0,7		4		
MT190-032W32R04AD10-L160-IK-T	32	10	100	160	32	4	30900	0,8		4		
MT190-032W32R04AD10-L200-IK-T	32	10	160	200	32	4	16000	0,9		4		
MT190-032W32R05AD10-L120-IK-T	32	10	60	120	32	5	30200	0,7		5		
MT190-032W32R05AD10-L160-IK-T	32	10	100	160	32	5	20900	0,8		5		
MT190-032W32R05AD10-L200-IK-T	32	10	140	200	32	5	16000	0,9		5		
MT190-032W32R06AD10-L120-IK-T	32	10	60	120	32	6	30200	0,7		6		
MT190-032W32R06AD10-L160-IK-T	32	10	100	160	32	6	20900	0,8		6		
MT190-032W32R06AD10-L200-IK-T	32	10	140	200	32	6	16000	0,9		6		

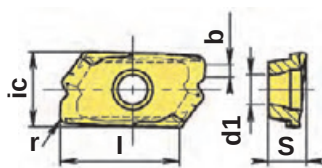
MT190L...AD10**Long edge spiral flute endmills
for machining titanium alloys**

*First choice for machining titanium alloys with internal coolant supply.
 *High spiral flute long edge endmills with fully overlapping inserts.
 *Roughing slots and peripheral cutting with lubricant.

**MT 190L-W...AD10-IK****Straight shank with drive flat (Weldon)**

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT190L-025W25R02AD10-36-IK	25	36	49	105	25	2	33200	0,3	ADKT10T3...ER-T	8	T250555-08AP	7008-TP 1,6 Nm
MT190L-030W32R03AD10-36-IK	30	36	50	110	32	3	30200	0,51		12		
MT190L-030W32R03AD10-56-IK*	30	56	68	128	32	3	26000	0,56		18		
MT190L-032W32R03AD10-36-IK	32	36	55	115	32	3	30200	0,4		12		
MT190L-032W32R03AD10-56-IK*	32	56	68	128	32	3	26000	0,4		18		
MT190L-036W40R03AD10-36-IK	36	36	55	125	40	3	28700	0,7		12		
MT190L-036W40R04AD10-36-IK	36	36	55	125	40	4	28700	0,7		16		
MT190L-036W40R04AD10-56-IK	36	56	68	138	40	4	27700	0,7		24		
MT190L-040W40R03AD10-56-IK	40	56	68	140	40	3	27700	0,75		18		
MT190L-040W40R04AD10-56-IK	40	56	68	140	40	4	27700	0,7		24		
MT190L-040W40R04AD10-83-IK	40	83	105	175	40	4	23000	1,8		36		

* For square shoulder milling only with $ae \leq 0.3 \times D$



Inserts having radius more 0.8 mm should be used only on the face of the cutter

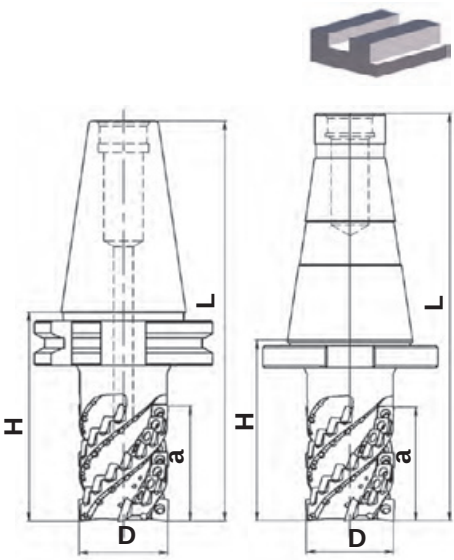
Code key	Carbide grade						Dimensions					
	P	M	K	N	S		ic	l	S	d1	r	α
	HCS30	HCS30			HCS30	HCS35	mm					o
ADKT10T304ER-T	○	●			●	●	6,8	10,0	3,97	2,8	0,4	15
ADKT10T308ER-T	○	●			●	●	6,8	10,0	3,97	2,8	0,8	15
ADKT10T316ER-T	○	●			●	●	6,8	10,0	3,97	2,8	1,6	15
ADKT10T320ER-T	○	●			●	●	6,8	10,0	3,97	2,8	2,0	15
ADKT10T325ER-T	○	●			●	●	6,8	10,0	3,97	2,8	2,5	15
ADKT10T332ER-T	○	●			●	●	6,8	10,0	3,97	2,8	3,2	15
ADKT10T340ER-T	○	●			●	●	6,8	10,0	3,97	2,8	4,0	15

MT190L...T

Long edge spiral flute endmills for machining titanium alloys



*First choice for machining titanium alloys.
 *High spiral flute long edge endmills with fully overlapping inserts.
 *Roughing slots and peripheral cutting with lubricant.



MT 190L-SK...SO09...-T

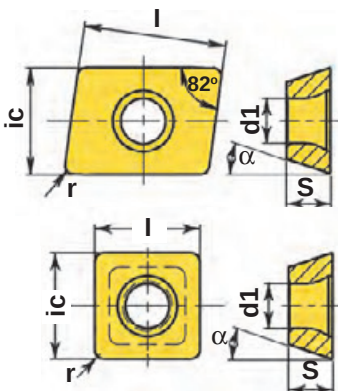
7/24 taper shank to ISO 297/ DIN 2080

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT190L-040SK50R03SO09-056-T	40	56	103	230	SK50	3	17000	2,4	BOHW12T308ER + SOHW09T308EN	3+21	T350760-10	7010-TP 3,0 Nm
MT190L-040SK50R03SO09-090-T	40	90	133	260	SK50	3	16500	2,7		3+36		
MT190L-040SK50R03SO09-100-T	40	100	143	270	SK50	3	16500	2,7		3+42		
MT190L-050SK50R04SO09-076-T	50	76	123	250	SK50	4	15500	3,7		4+40		
MT190L-050SK50R04SO09-090-T	50	90	133	260	SK50	4	15000	3,9		4+48		
MT190L-050SK50R04SO09-100-T	50	100	143	270	SK50	4	15000	3,9		4+56		

MT 190L-NC...SO09...IK-T

7/24 taper shank to DIN 69871 Form A

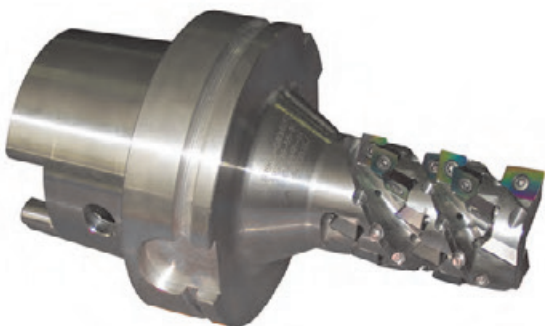
MT190L-040NC50R03SO09-056-IK-T	40	56	103	205	NC50	3	17000	2,2	BOHW12T308ER + SOHW09T308EN	3+21	T350760-10	7010-TP 3,0 Nm
MT190L-040NC50R03SO09-090-IK-T	40	90	133	235	NC50	3	16500	2,7		3+36		
MT190L-040NC50R03SO09-100-IK-T	40	100	143	245	NC50	3	16500	2,7		3+42		
MT190L-050NC50R04SO09-076-IK-T	50	76	123	225	NC50	4	15500	3,5		4+40		
MT190L-050NC50R04SO09-090-IK-T	50	90	133	235	NC50	4	15000	3,7		4+48		
MT190L-050NC50R04SO09-100-IK-T	50	100	143	245	NC50	4	15000	3,7		4+56		



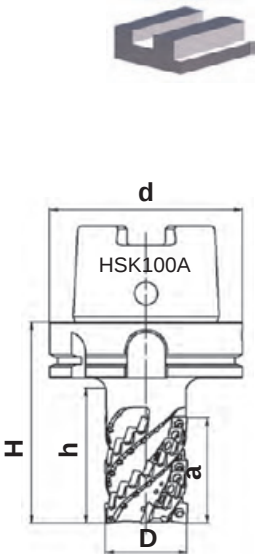
Code key	Carbide grade					Dimensions				
	P	M	K	N	S	ic	l	S	d1	r
					HCS35					
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
SOHW09T308EN					●	9,525	9,525	3,97	4,0	0,8

MT190L...T

Long edge spiral flute endmills
for machining titanium alloys



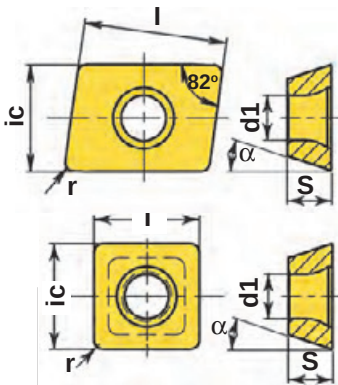
*First choice for machining titanium alloys.
*High spiral flute long edge endmills with fully overlapping inserts.
*Roughing slots and peripheral cutting with lubricant
*The permanent feed of lubricoolant at millingis necessary.



MT 190L-H100A...SO09...-T

Taper Hollow Shank HSK DIN 69893 Form A

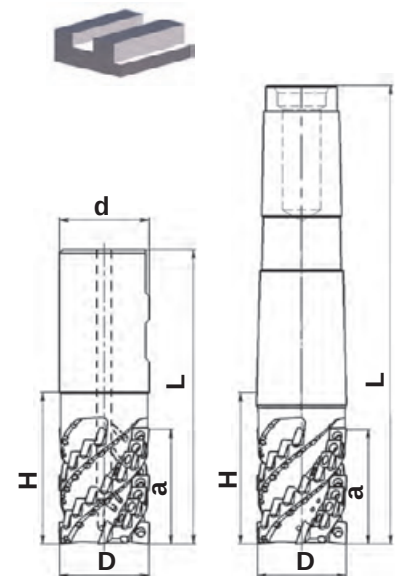
Code key	Dimensions, mm						nmax RPM	 + 	No.		
	D	a	H	h	d	Z					
MT190L-040H100AR03SO09-056-IK-T	40	56	114	70	100	3	17000	BOHW12T308ER + SOHW09T308EN	3+21	T350760-10	7010-TP 3,0 Nm
MT190L-040H100AR03SO09-090-IK-T	40	90	144	100	100	3	16500		3+36		
MT190L-040H100AR03SO09-100-IK-T	40	100	154	110	100	3	16500		3+42		
MT190L-050H100AR04SO09-076-IK-T	50	76	129	85	100	4	15500		4+40		
MT190L-050H100AR04SO09-090-IK-T	50	90	131	87	100	4	15000		4+48		
MT190L-050H100AR04SO09-100-IK-T	50	100	154	125	100	4	15000		4+56		



Code key	Carbide grade					Dimensions				
	P	M	K	N	S	ic	l	S	d1	r
					HCS35					
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
SOHW09T308EN					●	9,525	9,525	3,97	4,0	0,8

MT190L...T**Long edge spiral flute endmills
for machining titanium alloys**

*First choice for machining titanium alloys.
 *High spiral flute long edge endmills with fully overlapping inserts.
 *Roughing slots and peripheral cutting with lubricant.
 *Execution of long edge spiral flute endmills in diameter 50 mm with a cylindrical shank with a front end cutter heads.

**MT 190L-W...SO09...IK-T**

Straight shank with drive flat (Weldon)*

Code key	Dimensions, mm						nmax RPM	kg	Inserts	No.	Images	Material	Tolerance	Torque
	D	a	H	L	d	Z								
MT190L-040W40R03SO09-056-IK-T	40	56	80	150	40	3	17000	1,0	BOHW12T308ER + SOHW09T308EN	3+21	-	-	T350760-10	7010-TP 3,0 Nm
MT190L-040W40R03SO09-090-IK-T	40	90	110	180	40	3	17000	1,2		3+36	-	-		
MT190L-040W40R03SO09-100-IK-T	40	100	120	190	40	3	17000	1,3		3+42	-	-		
MT190L-050W50R04SO09-076-IK-T	50	76	100	180	50	4	13500	2,0		4+40	-	-		
MT190L-050W50R04SO09-090-IK-T	50	90	115	195	50	4	13500	2,2		4+48	-	-		
MT190L-050W50R04SO09-100-IK-T	50	100	125	205	50	4	13500	2,3		4+56	-	-		

MT 190L-W...SO09...+18A-IK-T

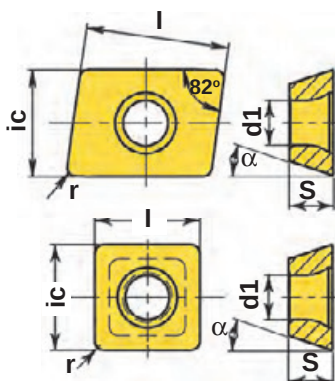
MT190L-050W50R04SO09-58+18A-IK-T	50	76	100	180	50	4	13500	2,0	BOHW12T308ER + SOHW09T308EN	4+40	E290L-X050R04SO09	H103600-08S	T350760-10	7010-TP 3,0 Nm
MT190L-050W50R04SO09-72+18A-IK-T	50	90	115	195	50	4	13500	2,2		4+48				
MT190L-050W50R04SO09-82+18A-IK-T	50	100	125	205	50	4	13500	2,3		4+56				

MT 190L-MK...SO09...-T

Morse taper shank with draw-bar thread to DIN228A

MT190L-040MK5R03SO09-056-T	40	56	80	210	MK5	3	17000	1,0	BOHW12T308ER + SOHW09T308EN	3+21	-	-	T350760-10	7010-TP 3,0 Nm
MT190L-040MK5R03SO09-090-T	40	90	120	250	MK5	3	17000	1,2		3+36	-	-		
MT190L-040MK5R03SO09-100-T	40	100	130	260	MK5	3	17000	1,3		3+42	-	-		
MT190L-050MK5R04SO09-076-T	50	76	100	230	MK5	4	13500	2,2		4+40	-	-		
MT190L-050MK5R04SO09-090-T	50	90	115	245	MK5	4	13500	2,3		4+48	-	-		
MT190L-050MK5R04SO09-100-T	50	100	125	255	MK5	4	13500	2,4		4+56	-	-		

*It is possible to design mills with drive flat (Weldon) and with sloping clamping surface Whistle Notch DIN 1835E



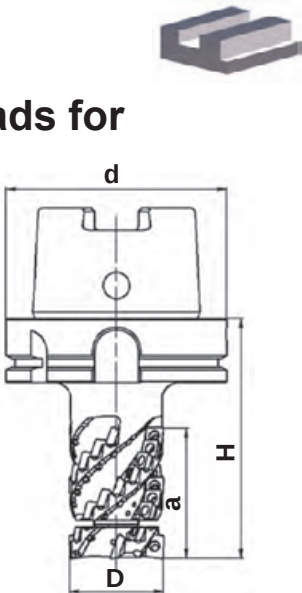
Code key	Carbide grade					Dimensions				
	P	M	K	N	S					
					HCS35	ic	l	S	d1	r
						mm				
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
SOHW09T308EN					●	9,525	9,525	3,97	4,0	0,8

MT190L...+18A...T

Long edge spiral flute endmills with front end cutter heads for machining titanium alloys



*First choice for machining titanium alloys.
*High spiral flute long edge endmills with fully overlapping inserts.
*The permanent feed of lubricoolant at milling is necessary.
Regular pitch for roughing slots.
Close pitch for peripheral cutting.



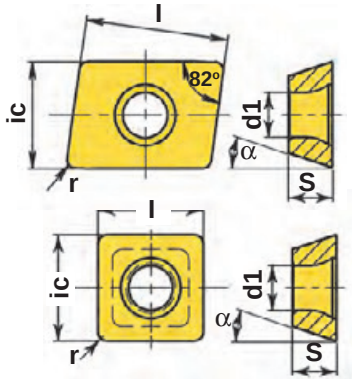
Regular pitch

Taper Hollow Shank HSK DIN 69893 Form A

Code key	Dimensions, mm					n _{max} RPM	 kg		No.				
	D	a	H	d	Z								
MT190L-050H100AR04SO09-058+18A-IK-T	50	76	109	100	4	15000	3,1	BOHW12T308ER + SOHW09T308EN	4+40				
MT190L-050H100AR04SO09-072+18A-IK-T	50	90	144	100	4	14500	3,6		4+48				
MT190L-050H100AR04SO09-082+18A-IK-T	50	100	154	100	4	14500	3,7		4+56				
MT190L-063H100AR05SO09-072+18A-IK-T	63	90	144	100	5	14000	4,1		5+60				
MT190L-063H100AR05SO09-082+18A-IK-T	63	100	154	100	5	14000	4,3		5+70				
MT190L-063H100AR05SO09-098+18A-IK-T	63	116	172	100	5	13500	4,7		5+80				
MT190L-063H125AR05SO09-072+18A-IK-T	63	90	144	125	5	12500	4,7		5+60				
MT190L-063H125AR05SO09-098+18A-IK-T	63	116	172	125	5	11500	4,7		5+80				
MT190L-080H125AR06SO09-098+18A-IK-T	80	116	172	125	6	10500	6,3		6+96				
MT190L-080H125AR06SO09-131+18A-IK-T	80	149	186	125	6	10500	8,0		6+126				

Close pitch

MT190L-063H100AR06SO09-072+18A-IK-T	63	90	144	100	6	14500	4,1	BOHW12T308ER + SOHW09T308EN	6+72				
MT190L-063H100AR06SO09-082+18A-IK-T	63	100	154	100	6	14500	4,2		6+84				
MT190L-063H100AR06SO09-098+18A-IK-T	63	116	172	100	6	13500	4,7		6+96				
MT190L-063H125AR06SO09-072+18A-IK-T	63	90	144	125	6	13500	4,8		6+72				
MT190L-063H125AR06SO09-098+18A-IK-T	63	116	172	125	6	12500	5,0		6+96				
MT190L-080H125AR07SO09-098+18A-IK-T	80	116	172	125	7	10500	6,3		7+112				
MT190L-080H125AR07SO09-131+18A-IK-T	80	149	200	125	7	10500	8,0		7+147				



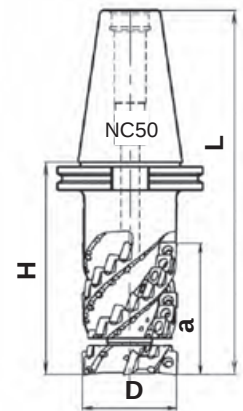
Code key	Carbide grade					Dimensions				
	P	M	K	N	S	ic	l	S	d1	r
					HCS35					
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
SOHW09T308EN					●	9,525	9,525	3,97	4,0	0,8

MT190L...NC50...+18A...T

Long edge spiral flute endmills with front end cutter heads for machining titanium alloys



*First choice for machining titanium alloys.
 *High spiral flute long edge endmills with fully overlapping inserts.
 *The permanent feed of lubricoolant at millings is necessary.
Regular pitch for roughing slots.
Close pitch for peripheral cutting.

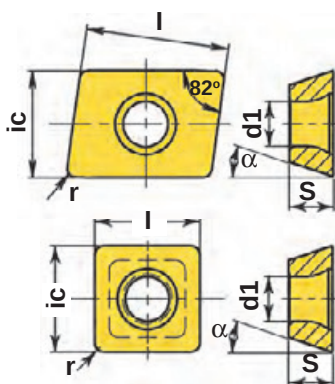
**Regular pitch**

7/24 taper shank to DIN 69871 Form A

Code key	Dimensions, mm					n _{max} RPM	kg		No.						
	D	a	H	L	Z										
MT190L-050NC50R04SO09-058+18A-IK-T	50	76	119	221	4	15000	3,1	BOHW12T308ER + SOHW09T308EN	4+40	E290L-X050R04SO09	H103600-08S			T350760-10	7010-TP 3,0 Nm
MT190L-050NC50R04SO09-072+18A-IK-T	50	90	133	235	4	14500	3,6		4+48						
MT190L-050NC50R04SO09-082+18A-IK-T	50	100	143	245	4	14500	3,7		4+56						
MT190L-063NC50R05SO09-072+18A-IK-T	63	90	133	235	5	14000	4,1		5+60	E290L-X063R05SO09	H123600-10S			T350760-10	7010-TP 3,0 Nm
MT190L-063NC50R05SO09-082+18A-IK-T	63	100	143	245	5	14000	4,3		5+70						
MT190L-063NC50R05SO09-098+18A-IK-T	63	116	163	265	5	13500	4,7		5+80						
MT190L-080NC50R06SO09-098+18A-IK-T	80	116	163	265	6	10500	6,3		6+96	E290L-X080R06SO09	H164500-14S			T350760-10	7010-TP 3,0 Nm
MT190L-080NC50R06SO09-131+18A-IK-T	80	149	186	288	6	10500	8,0		6+126						

Close pitch

MT190L-063NC50R06SO09-072+18A-IK-T	63	90	133	235	6	14500	4,1	BOHW12T308ER + SOHW09T308EN	6+72	E290L-X063R06SO09	H123600-10S			T350760-10	7010-TP 3,0 Nm
MT190L-063NC50R06SO09-082+18A-IK-T	63	100	143	245	6	14500	4,2		6+84						
MT190L-063NC50R06SO09-098+18A-IK-T	63	116	163	265	6	13500	4,7		6+96						
MT190L-080NC50R07SO09-098+18A-IK-T	80	116	163	265	7	10500	6,3		7+112	E290L-X080R07SO09	H164500-14S			T350760-10	7010-TP 3,0 Nm
MT190L-080NC50R07SO09-131+18A-IK-T	80	149	186	288	7	10500	8,0		7+147						



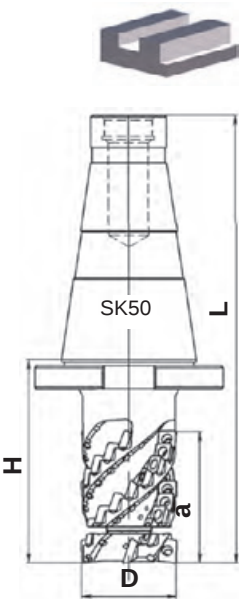
Code key	Carbide grade					Dimensions				
	P	M	K	N	S	ic	l	S	d1	r
					HCS35					
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
SOHW09T308EN					●	9,525	9,525	3,97	4,0	0,8

MT190L...SK50...+18A...T

Long edge spiral flute endmills with front end cutter heads for machining titanium alloys

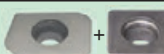


*First choice for machining titanium alloys.
*High spiral flute long edge endmills with fully overlapping inserts.
*The permanent feed of lubricoolant at milling is necessary.
Regular pitch for roughing slots.
Close pitch for peripheral cutting.

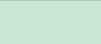


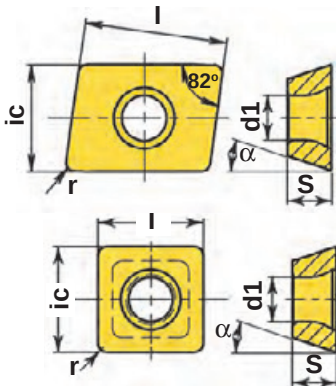
Regular pitch

7/24 taper shank to ISO 297/ DIN 2080

Code key	Dimensions, mm					nmax	 kg		No.				
	D	a	H	L	Z	RPM							
MT190L-050SK50R04SO09-058+18A-IK-T	50	76	119	236	4	15000	3,1	BOHW12T308ER + SOHW09T308EN	4+40	E290L-X050R04SO09	H103600-08S	T350760-10	7010-TP 3,0 Nm
MT190L-050SK50R04SO09-072+18A-IK-T	50	90	133	260	4	14500	3,6		4+48				
MT190L-050SK50R04SO09-082+18A-IK-T	50	100	143	270	4	14500	3,7		4+56				
MT190L-063SK50R05SO09-072+18A-IK-T	63	90	133	260	5	14000	4,1		5+60				
MT190L-063SK50R05SO09-082+18A-IK-T	63	100	143	270	5	14000	4,3		5+70				
MT190L-063SK50R05SO09-098+18A-IK-T	63	116	163	290	5	13500	4,7		5+80				
MT190L-080SK50R06SO09-098+18A-IK-T	80	116	163	290	6	10500	6,3		6+96				
MT190L-080SK50R06SO09-131+18A-IK-T	80	149	186	313	6	10500	8,0		6+126				
										E290L-X080R06SO09	H164500-14S		

Close pitch

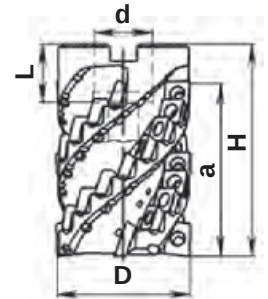
MT190L-063SK50R06SO09-072+18A-IK-T	63	90	133	260	6	14500	4,1	BOHW12T308ER + SOHW09T308EN	6+72				
MT190L-063SK50R06SO09-082+18A-IK-T	63	100	143	270	6	14500	4,2		6+84				
MT190L-063SK50R06SO09-098+18A-IK-T	63	116	163	290	6	13500	4,7		6+96				
MT190L-080SK50R07SO09-098+18A-IK-T	80	116	163	290	7	10500	6,3		7+112				
MT190L-080SK50R07SO09-131+18A-IK-T	80	149	186	313	7	10500	8,0		7+147				
										T350760-10 7010-TP 3,0 Nm			

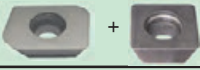


Code key	Carbide grade					Dimensions				
	P	M	K	N	S	ic	l	S	d1	r
					HCS35					
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
SOHW09T308EN					●	9,525	9,525	3,97	4,0	0,8

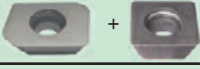
MT290L...T**Long edge milling cutter for machining titanium alloys**

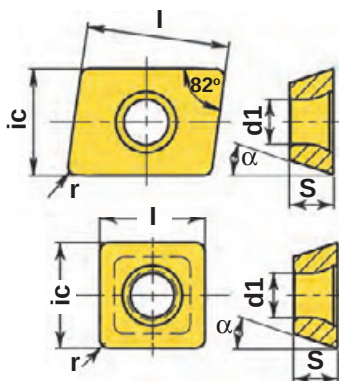
- *First choice for machining titanium alloys.
- *High spiral flute long edge endmills with fully overlapping inserts.
- *Roughing peripheral cutting with lubricant.
- *Allowed slots milling.

**Regular pitch**

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT290L-050A22R04SO09-30-IK-T	50	30	44	22	22	4	15500	0,4	BOHW12T308ER + SOHW09T308EN	4+12	T350760-10	7010-TP 3,0 Nm
MT290L-050A22R04SO09-43-IK-T	50	43	57	22	22	4	13000	0,4		4+20		
MT290L-063A27R05SO09-38-IK-T	63	38	55	25	27	5	11000	0,7		5+20		
MT290L-063A27R05SO09-56-IK-T	63	56	75	28	27	5	10000	0,7		5+35		
MT290L-080A32R06SO09-45-IK-T	80	45	61,6	34	32	6	6800	1,3		6+30		
MT290L-080A32R06SO09-70-IK-T	80	70	88	34	32	6	5900	1,3		6+54		
MT290L-084A32R06SO09-70-IK-T	84	70	88	34	32	6	5500	1,5		6+54		
MT290L-100A40R07SO09-50-IK-T	100	50	70	40	40	7	5200	1,9		7+42		
MT290L-100A40R07SO09-70-IK-T	100	70	88	40	40	7	4600	1,9		7+63		

Close pitch

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT290L-063A27R06SO09-38-IK-T	63	38	55	25	27	6	11000	0,7	BOHW12T308ER + SOHW09T308EN	6+24	T350760-10	7010-TP 3,0 Nm
MT290L-063A27R06SO09-56-IK-T	63	56	75	28	27	6	10000	0,7		6+40		
MT290L-080A32R07SO09-43-IK-T	80	45	61,6	34	32	7	6800	1,3		7+35		
MT290L-080A32R07SO09-70-IK-T	80	70	88	34	32	7	5900	1,3		7+63		
MT290L-084A32R07SO09-70-IK-T	84	70	88	34	32	7	5500	1,5		7+63		
MT290L-100A40R08SO09-50-IK-T	100	50	70	40	40	8	5200	1,9		8+48		
MT290L-100A40R08SO09-70-IK-T	100	70	88	40	40	8	4600	1,9		8+72		



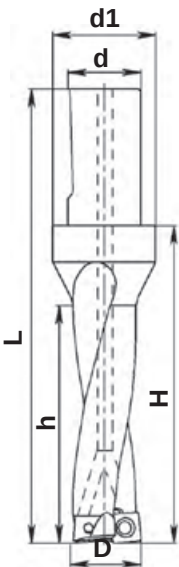
Code key	Carbide grade					Dimensions				
	P	M	K	N	S	ic	l	s	d1	r
					HCS35					
BOHW12T308ER					●	9,525	13,0	3,97	4,0	0,8
SOHW09T308EN					●	9,525	9,525	3,97	4,0	0,8

DT190

Drills for machining titanium alloys



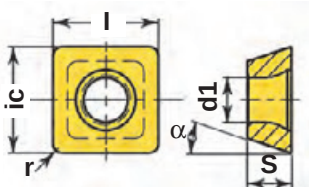
- *Size of inserts identical with long edge mills.
- *Four cutting edges per insert.
- *Special design for titanium.
- *The maximal productivity for titanium makes 100cubic centimeter per minute.
- *Range of diameters from 26 mm up to 75 mm.



DT 190-WN

Straight shank with sloping clamping surface DIN 1835E

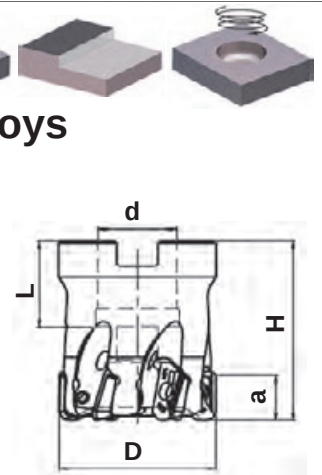
Code key	Dimensions, mm							No.		
	D	d1	h	H	L	d				
DT190-026WN32R01SO09-IK	26	42	68	100	160	32	SOHW09T308EN	2	T350760-10	7010-TP 3,0 Nm
DT190-033WN32R01SO09-IK	33	42	68	100	160	32		2		
DT190-041WN40R01SO09-IK	41	50	70	110	180	40		3		
DT190-051WN40R01SO09-IK	51	61	70	110	180	40		3		
DT190-063WN50R01SO09-IK	63	62	100	130	210	50		4		



Code key	Carbide grade					Dimensions				
	P	M	K	N	S					
					HCS35	ic	l	S	d1	r
SOHW09T308EN					●	9,525	9,525	3,97	4,0	0,8

MT290...AL**Square shoulder facemills for machining aluminium alloys**

- *Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aerospace details.
- *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
- *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 290...XD19-IK-AL-HSC**

for high speed cutting up to 5000 m/min

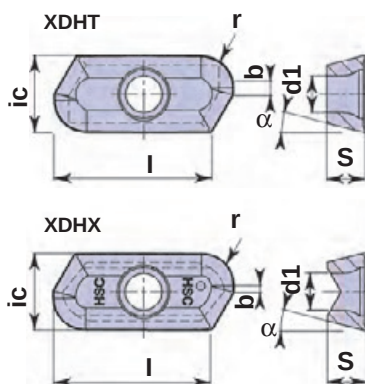
Depth of cut up to 18 mm

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	L	H	d	Z						
MT290-040A16R03XD19-IK-AL-HSC	40	18	19	50	16	3	35700	0,3	XDHX1904...FR-AL	3	T400955-15A	7015-T 5,0 Nm
MT290-040A16R04XD19-IK-AL-HSC	40	18	19	50	16	4	33500	0,3		4		
MT290-050A22R04XD19-IK-AL-HSC	50	18	20	50	22	4	31900	0,3		4		
MT290-063A22R05XD19-IK-AL-HSC	63	18	20	50	22	5	28500	0,5		5		
MT290-080A27R06XD19-IK-AL-HSC	80	18	22	50	27	6	20000	0,9		6		
MT290-100A32R07XD19-IK-AL-HSC	100	18	25	50	32	7	17000	1,3		7		
MT290-125A40R08XD19-IK-AL-HSC	125	18	27	50	40	8	14000	2,5		8		

MT 290...XD19-IK-AL

for cutting speed up to 2000 m/min

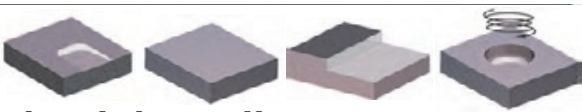
MT290-040A16R03XD19-IK-AL	50	18	19	50	16	3	24900	0,3	XDHT1904...FR-AL	3	T400955-15A	7015-T 6,0 Nm
MT290-040A16R04XD19-IK-AL	50	18	19	50	16	4	23400	0,3		4		
MT290-050A22R04XD19-IK-AL	50	18	20	50	22	4	21600	0,3		4		
MT290-063A22R05XD19-IK-AL	63	18	20	50	22	5	18800	0,5		5		
MT290-080A27R06XD19-IK-AL	80	18	22	50	27	6	16400	0,9		6		
MT290-100A32R07XD19-IK-AL	100	18	25	50	32	7	14500	1,3		7		
MT290-125A40R08XD19-IK-AL	125	18	27	50	40	8	12800	2,5		8		



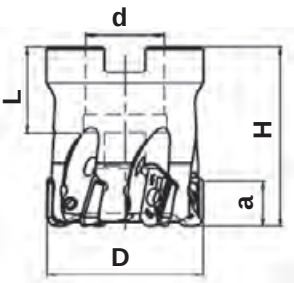
Code key		Carbide grade		Dimensions				
		N		ic	l	S	d1	r
		HWN15	HCN10	mm				
XDHT190402FR-AL	XDHX190402FR-AL	●		9,52	19,0	4,76	4,65	0,2
XDHT190404FR-AL	XDHX190404FR-AL	●	●	9,52	19,0	4,76	4,65	0,4
XDHT190408FR-AL	XDHX190408FR-AL	●	●	9,52	19,0	4,76	4,65	0,8
XDHT190412FR-AL	XDHX190412FR-AL	●		9,52	19,0	4,76	4,65	1,2
XDHT190416FR-AL	XDHX190416FR-AL	●		9,52	19,0	4,76	4,65	1,6
XDHT190420FR-AL	XDHX190420FR-AL	●	●	9,52	19,0	4,76	4,65	2,0
XDHT190425FR-AL	XDHX190425FR-AL	●		9,52	19,0	4,76	4,65	2,5
XDHT190432FR-AL	XDHX190432FR-AL	●		9,52	19,0	4,76	4,65	3,2
XDHT190440FR-AL	XDHX190440FR-AL	●	●	9,52	19,0	4,76	4,65	4,0

MT290...-R5..AL..

Square shoulder facemills for machining aluminium alloys



*Cutter body is adapted for inserts with corner radius of 5,0 mm.
*Suitable for ramping.
*Best productivity in machining Aluminium alloys from aerospace details.
*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
*Two performances:
- with inserts XDHX19... for high cutting speed up to 5000 m/min.
- with inserts XDHT19... for cutting speed up to 2000 m/min.



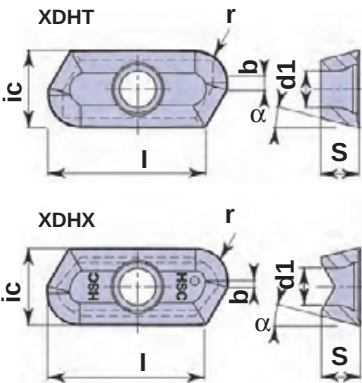
MT 290...XD19-R5-IK-AL-HSC for high speed cutting up to 5000 m/min

Depth of cut up to 18 mm

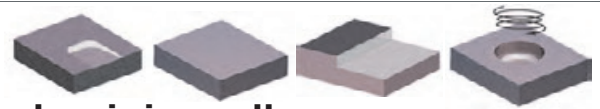
Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	L	H	d	Z						
MT290-040A16R03XD19-R5-IK-AL-HSC	40	18	19	50	16	3	35700	0,3	XDHX190450FR-AL	3	T400955-15A	7015-T 5,0 Nm
MT290-040A16R04XD19-R5-IK-AL-HSC	40	18	19	50	16	4	33500	0,3		4		
MT290-050A22R04XD19-R5-IK-AL-HSC	50	18	20	50	22	4	31900	0,3		4		
MT290-063A22R05XD19-R5-IK-AL-HSC	63	18	20	50	22	5	28500	0,5		5		
MT290-080A27R06XD19-R5-IK-AL-HSC	80	18	22	50	27	6	20000	0,9		6		
MT290-100A32R07XD19-R5-IK-AL-HSC	100	18	25	50	32	7	17000	1,3		7		
MT290-125A40R08XD19-R5-IK-AL-HSC	125	18	27	50	40	8	14000	2,5		8		

MT 290...XD19-R5-IK-AL for cutting speed up to 2000 m/min

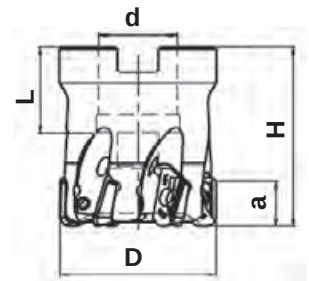
MT290-040A16R03XD19-R5-IK-AL	50	18	19	50	16	3	24900	0,3	XDHT190450FR-AL	3	T400955-15A	7015-T 6,0 Nm
MT290-040A16R04XD19-R5-IK-AL	50	18	19	50	16	4	23400	0,3		4		
MT290-050A22R04XD19-R5-IK-AL	50	18	20	50	22	4	21600	0,3		4		
MT290-063A22R05XD19-R5-IK-AL	63	18	20	50	22	5	18800	0,5		5		
MT290-080A27R06XD19-R5-IK-AL	80	18	22	50	27	6	16400	0,9		6		
MT290-100A32R07XD19-R5-IK-AL	100	18	25	50	32	7	14500	1,3		7		
MT290-125A40R08XD19-R5-IK-AL	125	18	27	50	40	8	12800	2,5		8		



Code key		Carbide grade				Dimensions				
		P	M	K	N	ic	l	S	d1	r
						mm				
XDHT190450FR-AL	XDHX190450FR-AL				●	9,52	19,0	4,76	4,65	5,0

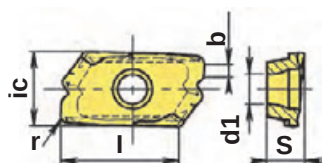
MT290...AL**Square shoulder facemills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
 *It offers a wide range of corner radius options, especially for aerospace details.
 *Cutting speed up to 3500 m/min.
 *Over 1000 m/min it is necessary a complete system, mounting tool and cutting tool, as one unit according the G2,5 nach ISO 1940 balanced.

**MT 290...AD10-IK-AL** for high speed cutting up to 3500 m/min

Depth of cut up to 10 mm

Code key	Dimensions, mm						nmax			No.		
	D	a	L	H	d	Z	RPM					
MT290-032A16R04AD10-IK-AL	32	10	19	40	16	4	39800	0,2	AD.T10T3...FR-AL	4	T250555-08AP	7008-TP 1,8 Nm
MT290-040A16R04AD10-IK-AL	40	10	19	40	16	4	35500	0,2		4		
MT290-050A22R05AD10-IK-AL	50	10	20	40	22	5	31800	0,3		5		
MT290-063A22R06AD10-IK-AL	63	10	20	40	22	6	28300	0,5		6		
MT290-080A27R08AD10-IK-AL	80	10	22	50	27	8	25100	0,9		8		
MT290-100A32R10AD10-IK-AL	100	10	25	50	32	10	22500	1,3		10		



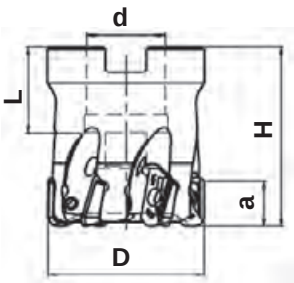
Code key	Carbide grade						Dimensions					
	P	M	K	N	S		ic	l	S	d1	r	α
				HCN15	HCN10							
							mm					o
ADHT10T302FR-AL				●			6,8	10,0	3,97	2,80	0,2	15
ADHT10T304FR-AL				●	●		6,8	10,0	3,97	2,80	0,4	15
ADHT10T308FR-AL				●	●		6,8	10,0	3,97	2,80	0,8	15
ADHT10T312FR-AL				●			6,8	10,0	3,97	2,80	1,2	15
ADHT10T316FR-AL				●			6,8	10,0	3,97	2,80	1,6	15
ADHT10T320FR-AL				●	●		6,8	10,0	3,97	2,80	2,0	15
ADHT10T325FR-AL				●			6,8	10,0	3,97	2,80	2,5	15
ADHT10T332FR-AL				●	●		6,8	10,0	3,97	2,80	3,2	15
ADHT10T340FR-AL				●	●		6,8	10,0	3,97	2,80	4,0	15
ADKT10T302FR-AL				●			6,8	10,0	3,97	2,80	0,2	15
ADKT10T304FR-AL				●			6,8	10,0	3,97	2,80	0,4	15
ADKT10T308FR-AL				●			6,8	10,0	3,97	2,80	0,8	15
ADKT10T320FR-AL				●			6,8	10,0	3,97	2,80	2,0	15
ADKT10T325FR-AL				●			6,8	10,0	3,97	2,80	2,5	15

MT290...-R5...-AL

Square shoulder facemills for machining aluminium alloys



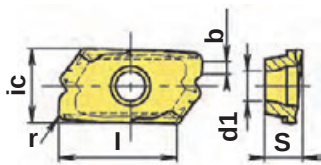
*Cutter body is adapted for inserts with corner radius of 5,0 mm.
*It offers a wide range of corner radius options, especially for aerospace details.
*Cutting speed up to 3500 m/min.
*Over 1000 m/min it is necessary a complete system, mounting tool and cutting tool, as one unit according the G2,5 nach ISO 1940 balanced.



MT 290...AD10-R5-IK-AL for high speed cutting up to 3500 m/min

Depth of cut up to 10 mm

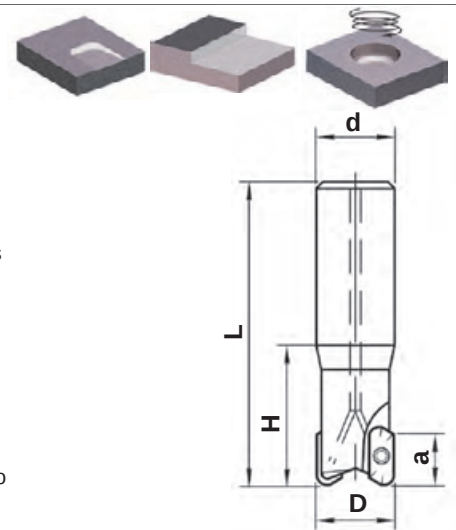
Code key	Dimensions, mm						n_{max}			No.		
	D	a	L	H	d	Z	RPM					
MT290-032A16R04AD10-R5-IK-AL	32	10	19	40	16	4	39800	0,2	ADHT10T350FR-AL	4	T250555-08AP	7008-TP 1,8 Nm
MT290-040A16R04AD10-R5-IK-AL	40	10	19	40	16	4	35500	0,2		4		
MT290-050A22R05AD10-R5-IK-AL	50	10	20	40	22	5	31800	0,3		5		
MT290-063A22R06AD10-R5-IK-AL	63	10	20	40	22	6	28300	0,5		6		
MT290-080A27R08AD10-R5-IK-AL	80	10	22	50	27	8	25100	0,9		8		
MT290-100A32R10AD10-R5-IK-AL	100	10	25	50	32	10	22500	1,3		10		



Code key	Carbide grade						Dimensions									
	P	M	K	N	S		ic	l	S	d1	r	α				
				HWN15	HCN10											
													mm			o
ADHT10T350FR-AL				●	●		6,8	10,0	3,97	2,80	5,0	15				

MT190...AL**Endmills for machining aluminium alloys**

- *Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aerospace details.
- *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
- *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-Z...XD19-IK-AL-HSC** for high speed cutting up to 5000 m/min

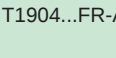
Straight shank cylindrical

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT190-025Z25R02XD19-L125-IK-AL-HSC	25	18	50	125	25	2	40000	0,3		2		
MT190-025Z25R02XD19-L200-IK-AL-HSC	25	18	65	200	25	2	18000	0,6		2		
MT190-032Z32R03XD19-L150-IK-AL-HSC	32	18	50	150	32	3	33500	0,6		3		
MT190-032Z32R02XD19-L200-IK-AL-HSC	32	18	80	200	32	2	20000	0,8		2		
MT190-040Z32R03XD19-L150-IK-AL-HSC	40	18	50	150	32	3	31300	1,0		3		
MT190-040Z32R03XD19-L200-IK-AL-HSC	40	18	65	200	32	3	26800	1,2		3		
MT190-040Z32R03XD19-L250-IK-AL-HSC	40	18	80	250	32	3	22300	1,5		3		
MT190-050Z40R04XD19-L150-IK-AL-HSC	50	18	50	150	40	4	27900	1,5		4		
MT190-050Z40R04XD19-L200-IK-AL-HSC	50	18	65	200	40	4	23900	1,7		4		
MT190-050Z40R04XD19-L250-IK-AL-HSC	50	18	80	250	40	4	20000	2,0		4		

MT 190-Z...XD19-IK-AL

for cutting speed up to 2000 m/min

Straight shank cylindrical

MT190-025Z25R02XD19-L125-IK-AL	25	18	50	125	25	2	32000	0,3		2		
MT190-025Z25R02XD19-L200-IK-AL	25	18	65	200	25	2	15000	0,6		2		
MT190-032Z32R03XD19-L150-IK-AL	32	18	50	150	32	3	25000	0,6		3		
MT190-032Z32R02XD19-L200-IK-AL	32	18	80	200	32	2	16600	0,8		2		
MT190-040Z32R03XD19-L150-IK-AL	40	18	50	150	32	3	21800	1,0		3		
MT190-040Z32R03XD19-L200-IK-AL	40	18	65	200	32	3	18700	1,2		3		
MT190-040Z32R03XD19-L250-IK-AL	40	18	80	250	32	3	15600	1,5		3		
MT190-050Z40R04XD19-L150-IK-AL	50	18	50	150	40	4	18900	1,5		4		
MT190-050Z40R04XD19-L200-IK-AL	50	18	65	200	40	4	16200	1,7		4		
MT190-050Z40R04XD19-L250-IK-AL	50	18	80	250	40	4	13500	2,0		4		

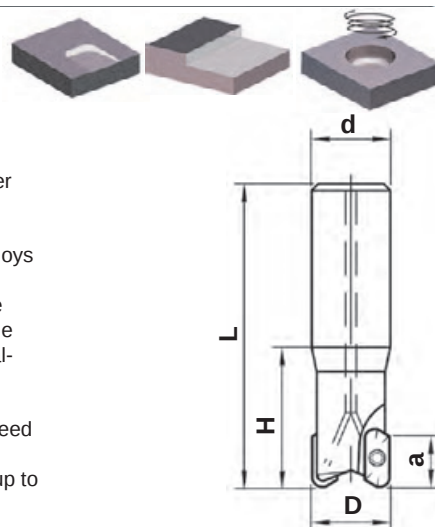
MT190...-R5..AL**Endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius of 5,0 mm.
 *Suitable for ramping.
 *Best productivity in machining Aluminium alloys from aerospace details.

*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.
- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-Z...XD19-R5-IK-AL-HSC** for high speed cutting up to 5000 m/min

Straight shank cylindrical

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT190-025Z25R02XD19-R5-L125-IK-AL-HSC	25	18	50	125	25	2	40000	0,3		2		
MT190-025Z25R02XD19-R5-L200-IK-AL-HSC	25	18	65	200	25	2	18000	0,6		2		
MT190-032Z32R03XD19-R5-L150-IK-AL-HSC	32	18	50	150	32	3	33500	0,6		3		
MT190-032Z32R02XD19-R5-L200-IK-AL-HSC	32	18	80	200	32	2	20000	0,8		2		
MT190-040Z32R03XD19-R5-L150-IK-AL-HSC	40	18	50	150	32	3	31300	1,0		3		
MT190-040Z32R03XD19-R5-L200-IK-AL-HSC	40	18	65	200	32	3	26800	1,2		3		
MT190-040Z32R03XD19-R5-L250-IK-AL-HSC	40	18	80	250	32	3	22300	1,5		3		
MT190-050Z40R04XD19-R5-L150-IK-AL-HSC	50	18	50	150	40	4	27900	1,5		4		
MT190-050Z40R04XD19-R5-L200-IK-AL-HSC	50	18	65	200	40	4	23900	1,7		4		
MT190-050Z40R04XD19-R5-L250-IK-AL-HSC	50	18	80	250	40	4	20000	2,0		4		

MT 190-Z...XD19-R5-IK-AL

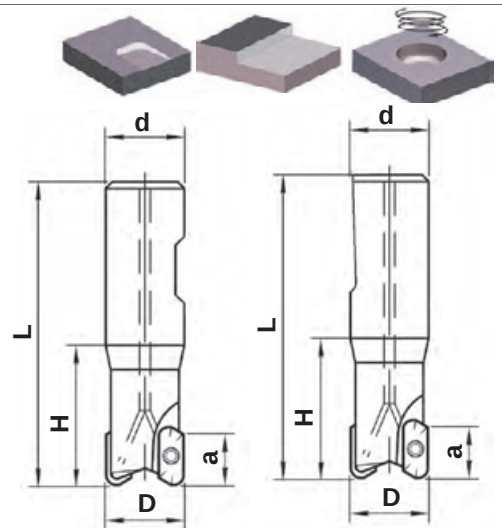
for cutting speed up to 2000 m/min

Straight shank cylindrical

MT190-025Z25R02XD19-R5-L125-IK-AL	25	18	50	125	25	2	32000	0,3		2		
MT190-025Z25R02XD19-R5-L200-IK-AL	25	18	65	200	25	2	15000	0,6		2		
MT190-032Z32R03XD19-R5-L150-IK-AL	32	18	50	150	32	3	25000	0,6		3		
MT190-032Z32R02XD19-R5-L200-IK-AL	32	18	80	200	32	2	16600	0,8		2		
MT190-040Z32R03XD19-R5-L150-IK-AL	40	18	50	150	32	3	21800	1,0		3		
MT190-040Z32R03XD19-R5-L200-IK-AL	40	18	65	200	32	3	18700	1,2		3		
MT190-040Z32R03XD19-R5-L250-IK-AL	40	18	80	250	32	3	15600	1,5		3		
MT190-050Z40R04XD19-R5-L150-IK-AL	50	18	50	150	40	4	18900	1,5		4		
MT190-050Z40R04XD19-R5-L200-IK-AL	50	18	65	200	40	4	16200	1,7		4		
MT190-050Z40R04XD19-R5-L250-IK-AL	50	18	80	250	40	4	13500	2,0		4		

MT190...AL**Endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
 *Suitable for ramping.
 *Best productivity in machining Aluminium alloys from aerospace details.
 *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
 *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-W...XD19-IK-AL**

for cutting speed up to 2000 m/min

Straight shank with drive flat (Weldon)

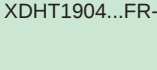
Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT190-025W25R02XD19-L125-IK-AL-HSC	25	18	50	125	25	2	40000	0,3		2		
MT190-025W25R02XD19-L200-IK-AL-HSC	25	18	65	200	25	2	18000	0,6		2		
MT190-032W32R03XD19-L150-IK-AL-HSC	32	18	50	150	32	3	33500	0,6		3		
MT190-032W32R02XD19-L200-IK-AL-HSC	32	18	80	200	32	2	20000	0,8		2		
MT190-040W32R03XD19-L150-IK-AL-HSC	40	18	50	150	32	3	31300	1,0		3		
MT190-040W32R03XD19-L200-IK-AL-HSC	40	18	65	200	32	3	26800	1,2		3		
MT190-040W32R03XD19-L250-IK-AL-HSC	40	18	80	250	32	3	22300	1,5		3		
MT190-050W40R04XD19-L150-IK-AL-HSC	50	18	50	150	40	4	27900	1,5		4		
MT190-050W40R04XD19-L200-IK-AL-HSC	50	18	65	200	40	4	23900	1,7		4		
MT190-050W40R04XD19-L250-IK-AL-HSC	50	18	80	250	40	4	20000	2,0		4		

Straight shank with sloping clamping surface

DIN 1835E

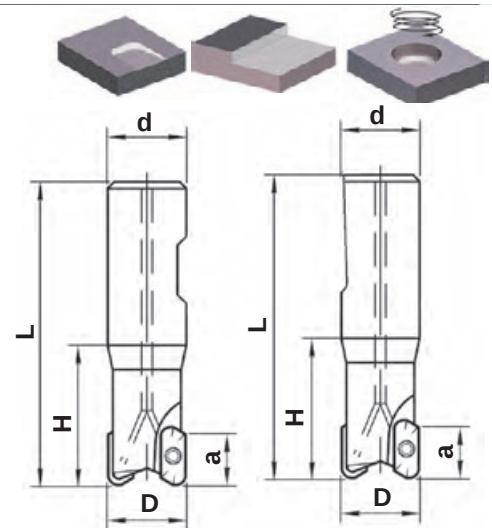
MT 190-WN...XD19-IK-AL

for cutting speed up to 2000 m/min

MT190-025WN25R02XD19-L125-IK-AL	25	18	50	125	25	2	32000	0,3		2		
MT190-025WN25R02XD19-L200-IK-AL	25	18	65	200	25	2	15000	0,6		2		
MT190-032WN32R03XD19-L150-IK-AL	32	18	50	150	32	3	25000	0,6		3		
MT190-032WN32R02XD19-L200-IK-AL	32	18	80	200	32	2	16600	0,8		2		
MT190-040WN32R03XD19-L150-IK-AL	40	18	50	150	32	3	21800	1,0		3		
MT190-040WN32R03XD19-L200-IK-AL	40	18	65	200	32	3	18700	1,2		3		
MT190-040WN32R03XD19-L250-IK-AL	40	18	80	250	32	3	15600	1,5		3		
MT190-050WN40R04XD19-L150-IK-AL	50	18	50	150	40	4	18900	1,5		4		
MT190-050WN40R04XD19-L200-IK-AL	50	18	65	200	40	4	16200	1,7		4		
MT190-050WN40R04XD19-L250-IK-AL	50	18	80	250	40	4	13500	2,0		4		

MT190...-R5..AL**Endmills for machining aluminium alloys**

- *Cutter body is adapted for inserts with corner radius of 5,0 mm.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aerospace details.
- *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
- *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-W...XD19-R5-IK-AL** for cutting speed up to 2000 m/min

Straight shank with drive flat (Weldon)

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT190-025W25R02XD19-R5-L125-IK-AL-HSC	25	18	50	125	25	2	40000	0,3	XDHT190450FR-AL	2	T400955-15A	7015-T 6,0 Nm
MT190-025W25R02XD19-R5-L200-IK-AL-HSC	25	18	65	200	25	2	18000	0,6		2		
MT190-032W32R03XD19-R5-L150-IK-AL-HSC	32	18	50	150	32	3	33500	0,6		3		
MT190-032W32R02XD19-R5-L200-IK-AL-HSC	32	18	80	200	32	2	20000	0,8		2		
MT190-040W32R03XD19-R5-L150-IK-AL-HSC	40	18	50	150	32	3	31300	1,0		3		
MT190-040W32R03XD19-R5-L200-IK-AL-HSC	40	18	65	200	32	3	26800	1,2		3		
MT190-040W32R03XD19-R5-L250-IK-AL-HSC	40	18	80	250	32	3	22300	1,5		3		
MT190-050W40R04XD19-R5-L150-IK-AL-HSC	50	18	50	150	40	4	27900	1,5		4		
MT190-050W40R04XD19-R5-L200-IK-AL-HSC	50	18	65	200	40	4	23900	1,7		4		
MT190-050W40R04XD19-R5-L250-IK-AL-HSC	50	18	80	250	40	4	20000	2,0		4		

Straight shank with sloping clamping surface

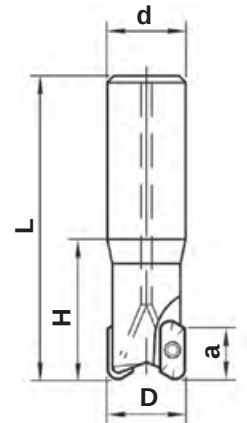
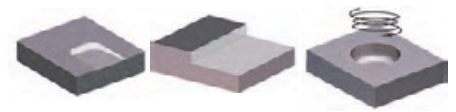
MT 190-WN...XD19-R5-IK-AL for cutting speed up to 2000 m/min

DIN 1835E

MT190-025WN25R02XD19-R5-L125-IK-AL	25	18	50	125	25	2	32000	0,3	XDHT190450FR-AL	2	T400955-15A	7015-T 6,0 Nm
MT190-025WN25R02XD19-R5-L200-IK-AL	25	18	65	200	25	2	15000	0,6		2		
MT190-032WN32R03XD19-R5-L150-IK-AL	32	18	50	150	32	3	25000	0,6		3		
MT190-032WN32R02XD19-R5-L200-IK-AL	32	18	80	200	32	2	16600	0,8		2		
MT190-040WN32R03XD19-R5-L150-IK-AL	40	18	50	150	32	3	21800	1,0		3		
MT190-040WN32R03XD19-R5-L200-IK-AL	40	18	65	200	32	3	18700	1,2		3		
MT190-040WN32R03XD19-R5-L250-IK-AL	40	18	80	250	32	3	15600	1,5		3		
MT190-050WN40R04XD19-R5-L150-IK-AL	50	18	50	150	40	4	18900	1,5		4		
MT190-050WN40R04XD19-R5-L200-IK-AL	50	18	65	200	40	4	16200	1,7		4		
MT190-050WN40R04XD19-R5-L250-IK-AL	50	18	80	250	40	4	13500	2,0		4		

MT190...AL**Endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
 *It offers a wide range of corner radius options, especially for aerospace details.
 *Cutting speed up to 3500 m/min.
 *Over 1000 m/min it is necessary a complete system, mounting tool and cutting tool, as one unit according the G2,5 nach ISO 1940 balanced.

**MT 190-Z...AD10-IK-AL**

for high speed cutting up to 3500 m/min

Straight shank cylindrical

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	L	d	Z						
MT190-016Z16R02AD10-L075-IK-AL	16	10	27	75	16	2	56200	0,1		2		
MT190-016Z16R02AD10-L090-IK-AL	16	10	42	90	16	2	49200	0,1		2		
MT190-016Z16R02AD10-L110-IK-AL	16	10	62	110	16	2	42200	0,1		2		
MT190-016Z16R02AD10-L130-IK-AL	16	10	82	130	16	2	35100	0,1		2		
MT190-018Z18R02AD10-L075-IK-AL	18	10	25	75	18	2	53100	0,1		2		
MT190-018Z18R02AD10-L110-IK-AL	18	10	60	110	18	2	40000	0,1		2		
MT190-019Z18R02AD10-L078-IK-AL	19	10	27	78	18	2	51700	0,2		2		
MT190-019Z18R02AD10-L110-IK-AL	19	10	60	110	18	2	40000	0,3		2		
MT190-020Z20R02AD10-L090-IK-AL	20	10	40	90	20	2	50100	0,2		2		
MT190-020Z20R02AD10-L110-IK-AL	20	10	60	110	20	2	43900	0,3		2		
MT190-020Z20R02AD10-L130-IK-AL	20	10	80	130	20	2	37600	0,3		2		
MT190-020Z20R02AD10-L160-IK-AL	20	10	100	160	20	2	31300	0,36		2		
MT190-022Z25R02AD10-L090-IK-AL	22	10	34	90	25	2	47900	0,2		2		
MT190-022Z25R02AD10-L110-IK-AL	22	10	54	110	25	2	42000	0,3		2		
MT190-025Z25R02AD10-L110-IK-AL	25	10	54	110	25	2	45000	0,3		2		
MT190-025Z25R02AD10-L140-IK-AL	25	10	84	140	25	2	39000	0,4		2		
MT190-025Z25R02AD10-L170-IK-AL	25	10	114	170	25	2	28000	0,5		2		
MT190-025Z25R03AD10-L110-IK-AL	25	10	54	110	25	3	45000	0,3		3		
MT190-025Z25R03AD10-L140-IK-AL	25	10	84	140	25	3	30000	0,4		3		
MT190-030Z32R03AD10-L110-IK-AL	30	10	50	110	32	3	39300	0,5		3		
MT190-032Z32R04AD10-L120-IK-AL	32	10	60	120	32	4	39800	0,5		4		
MT190-032Z25R04AD10-L120-IK-AL	32	10	60	120	25	4	39800	0,5		4		
MT190-032Z32R04AD10-L160-IK-AL	32	10	100	160	32	4	34800	0,6		4		
MT190-032Z32R04AD10-L200-IK-AL	32	10	130	200	32	4	29800	0,6		4		

AD.T10T3...FR-AL

T250555-08AP

7008-TP
1,8 Nm

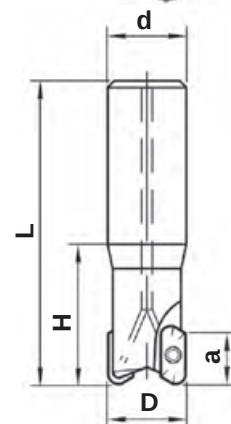
MT190...-R5...AL**Endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius of 5,0 mm.

*It offers a wide range of corner radius options, especially for aerospace details.

*Cutting speed up to 3500 m/min.

*Over 1000 m/min it is necessary a complete system, mounting tool and cutting tool, as one unit according the G2,5 nach ISO 1940 balanced.

**MT 190-Z...AD10-R5-IK-AL** for high speed cutting up to 3500 m/min

Straight shank cylindrical

Code key	Dimensions, mm						n _{max} RPM	 kg		No.		
	D	a	H	L	d	Z						
MT190-016Z16R02AD10-R5-L075-IK-AL	16	10	27	75	16	2	56200	0,1		2		
MT190-016Z16R02AD10-R5-L090-IK-AL	16	10	42	90	16	2	49200	0,1		2		
MT190-016Z16R02AD10-R5-L110-IK-AL	16	10	62	110	16	2	42200	0,1		2		
MT190-016Z16R02AD10-R5-L130-IK-AL	16	10	82	130	16	2	35100	0,1		2		
MT190-018Z18R02AD10-R5-L075-IK-AL	18	10	25	75	18	2	53100	0,1		2		
MT190-018Z18R02AD10-R5-L110-IK-AL	18	10	60	110	18	2	40000	0,1		2		
MT190-019Z18R02AD10-R5-L078-IK-AL	19	10	27	78	18	2	51700	0,2		2		
MT190-019Z18R02AD10-R5-L110-IK-AL	19	10	60	110	18	2	40000	0,3		2		
MT190-020Z20R02AD10-R5-L090-IK-AL	20	10	40	90	20	2	50100	0,2		2		
MT190-020Z20R02AD10-R5-L110-IK-AL	20	10	60	110	20	2	43900	0,3		2		
MT190-020Z20R02AD10-R5-L130-IK-AL	20	10	80	130	20	2	37600	0,3		2		
MT190-020Z20R02AD10-R5-L160-IK-AL	20	10	100	160	20	2	31300	0,36		2		
MT190-022Z25R02AD10-R5-L090-IK-AL	22	10	34	90	25	2	47900	0,2		2		
MT190-022Z25R02AD10-R5-L110-IK-AL	22	10	54	110	25	2	42000	0,3		2		
MT190-025Z25R02AD10-R5-L110-IK-AL	25	10	54	110	25	2	45000	0,3		2		
MT190-025Z25R02AD10-R5-L140-IK-AL	25	10	84	140	25	2	39000	0,4		2		
MT190-025Z25R02AD10-R5-L170-IK-AL	25	10	114	170	25	2	28000	0,5		2		
MT190-025Z25R03AD10-R5-L110-IK-AL	25	10	54	110	25	3	45000	0,3		3		
MT190-025Z25R03AD10-R5-L140-IK-AL	25	10	84	140	25	3	30000	0,4		3		
MT190-030Z32R03AD10-R5-L110-IK-AL	30	10	50	110	32	3	39300	0,5		3		
MT190-032Z32R04AD10-R5-L120-IK-AL	32	10	60	120	32	4	39800	0,5		4		
MT190-032Z25R04AD10-R5-L120-IK-AL	32	10	60	120	25	4	39800	0,5		4		
MT190-032Z32R04AD10-R5-L160-IK-AL	32	10	100	160	32	4	34800	0,6		4		
MT190-032Z32R04AD10-R5-L200-IK-AL	32	10	130	200	32	4	29800	0,6		4		

AD.T10T350FR-AL

T250555-08AP

7008-TP
1,8 Nm

MT190...-NC40...-AL-HSC-B**Balanced endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.

*Suitable for ramping.

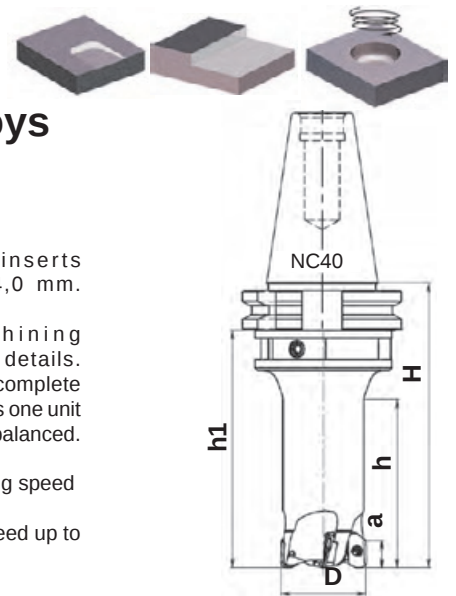
*Best productivity in machining Aluminium alloys from aerospace details.

*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.

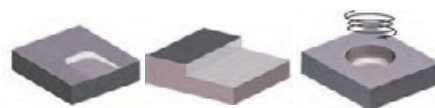
- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-NC40...XD19-IK-AL-HSC-B** for high speed cutting up to 5000 m/min

7/24 taper shank to DIN 69871A

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025NC40R02XD19-H100-IK-AL-HSC-B	25	18	100	50	81	NC40	2	42000	0,45		2		
MT190-025NC40R02XD19-H110-IK-AL-HSC-B	25	18	110	63	91	NC40	2	38400	0,48		2		
MT190-025NC40R02XD19-H130-IK-AL-HSC-B	25	18	130	80	111	NC40	2	34000	0,56		2		
MT190-025NC40R02XD19-H150-IK-AL-HSC-B	25	18	150	100	131	NC40	2	29000	0,64		2		
MT190-032NC40R02XD19-H110-IK-AL-HSC-B	32	18	110	63	81	NC40	2	37500	0,50		2		
MT190-032NC40R02XD19-H130-IK-AL-HSC-B	32	18	130	80	111	NC40	2	34300	0,63		2		
MT190-032NC40R02XD19-H150-IK-AL-HSC-B	32	18	150	100	131	NC40	2	30000	0,75		2		
MT190-032NC40R03XD19-H110-IK-AL-HSC-B	32	18	110	63	91	NC40	3	37500	0,50		3		
MT190-032NC40R03XD19-H130-IK-AL-HSC-B	32	18	130	80	111	NC40	3	34300	0,63		3		
MT190-040NC40R03XD19-H110-IK-AL-HSC-B	40	18	110	63	91	NC40	3	35700	0,50		3		
MT190-040NC40R03XD19-H130-IK-AL-HSC-B	40	18	130	80	111	NC40	3	33500	0,53		3		
MT190-040NC40R03XD19-H150-IK-AL-HSC-B	40	18	150	100	131	NC40	3	31000	0,73		3		
MT190-050NC40R03XD19-H110-IK-AL-HSC-B	50	18	110	63	91	NC40	3	31900	0,78		3		
MT190-050NC40R03XD19-H130-IK-AL-HSC-B	50	18	130	80	111	NC40	3	31900	1,10		3		
MT190-050NC40R03XD19-H150-IK-AL-HSC-B	50	18	150	100	131	NC40	3	31900	1,40		3		
MT190-050NC40R04XD19-H110-IK-AL-HSC-B	50	18	110	63	91	NC40	4	31900	0,72		4		
MT190-050NC40R04XD19-H130-IK-AL-HSC-B	50	18	130	80	111	NC40	4	31900	1,02		4		
MT190-050NC40R04XD19-H150-IK-AL-HSC-B	50	18	150	100	131	NC40	4	30000	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-NC40...-R5...-AL-HSC-B**Balanced endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius of 5,0 mm.

*Suitable for ramping.

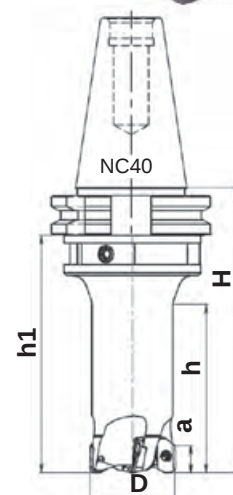
*Best productivity in machining Aluminium alloys from aerospace details.

*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.

- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-NC40...XD19-R5-IK-AL-HSC-B** for high speed cutting up to 5000 m/min

7/24 taper shank to DIN 69871A

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025NC40R02XD19-R5-H100-IK-AL-HSC-B	25	18	100	50	81	NC40	2	42000	0,45		2		
MT190-025NC40R02XD19-R5-H110-IK-AL-HSC-B	25	18	110	63	91	NC40	2	38400	0,48		2		
MT190-025NC40R02XD19-R5-H130-IK-AL-HSC-B	25	18	130	80	111	NC40	2	34000	0,56		2		
MT190-025NC40R02XD19-R5-H150-IK-AL-HSC-B	25	18	150	100	131	NC40	2	29000	0,64		2		
MT190-032NC40R02XD19-R5-H110-IK-AL-HSC-B	32	18	110	63	81	NC40	2	37500	0,50		2		
MT190-032NC40R02XD19-R5-H130-IK-AL-HSC-B	32	18	130	80	111	NC40	2	34300	0,63		2		
MT190-032NC40R02XD19-R5-H150-IK-AL-HSC-B	32	18	150	100	131	NC40	2	30000	0,75		2		
MT190-032NC40R03XD19-R5-H110-IK-AL-HSC-B	32	18	110	63	91	NC40	3	37500	0,50		3		
MT190-032NC40R03XD19-R5-H130-IK-AL-HSC-B	32	18	130	80	111	NC40	3	34300	0,63		3		
MT190-040NC40R03XD19-R5-H110-IK-AL-HSC-B	40	18	110	63	91	NC40	3	35700	0,50		3		
MT190-040NC40R03XD19-R5-H130-IK-AL-HSC-B	40	18	130	80	111	NC40	3	33500	0,53		3		
MT190-040NC40R03XD19-R5-H150-IK-AL-HSC-B	40	18	150	100	131	NC40	3	31000	0,73		3		
MT190-050NC40R03XD19-R5-H110-IK-AL-HSC-B	50	18	110	63	91	NC40	3	31900	0,78		3		
MT190-050NC40R03XD19-R5-H130-IK-AL-HSC-B	50	18	130	80	111	NC40	3	31900	1,10		3		
MT190-050NC40R03XD19-R5-H150-IK-AL-HSC-B	50	18	150	100	131	NC40	3	31900	1,40		3		
MT190-050NC40R04XD19-R5-H110-IK-AL-HSC-B	50	18	110	63	91	NC40	4	31900	0,72		4		
MT190-050NC40R04XD19-R5-H130-IK-AL-HSC-B	50	18	130	80	111	NC40	4	31900	1,02		4		
MT190-050NC40R04XD19-R5-H150-IK-AL-HSC-B	50	18	150	100	131	NC40	4	30000	1,33		4		

XDHX190450FR-AL

T400955-15A

7015-T
5,0 Nm

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-NC40...-AL-B**Balanced endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.

*Suitable for ramping.

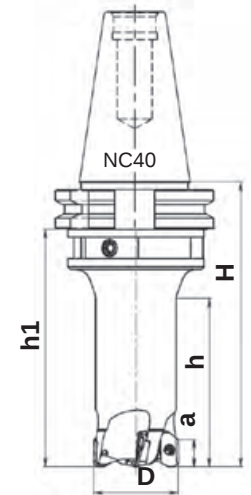
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*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.

- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-NC40...XD19-IK-AL-B** for cutting speed up to 2000 m/min

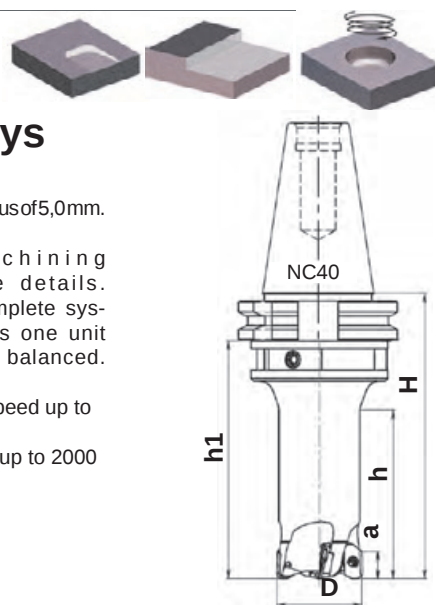
7/24 taper shank to DIN 69871A

Code key	Dimensions, mm							nmax RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025NC40R02XD19-H100-IK-AL-B	25	18	100	50	81	NC40	2	42000	0,45		2		
MT190-025NC40R02XD19-H110-IK-AL-B	25	18	110	63	91	NC40	2	38400	0,48		2		
MT190-025NC40R02XD19-H130-IK-AL-B	25	18	130	80	111	NC40	2	34000	0,56		2		
MT190-025NC40R02XD19-H150-IK-AL-B	25	18	150	100	131	NC40	2	29000	0,64		2		
MT190-032NC40R02XD19-H110-IK-AL-B	32	18	110	63	81	NC40	2	37500	0,50		2		
MT190-032NC40R02XD19-H130-IK-AL-B	32	18	130	80	111	NC40	2	34300	0,63		2		
MT190-032NC40R02XD19-H150-IK-AL-B	32	18	150	100	131	NC40	2	30000	0,75		2		
MT190-032NC40R03XD19-H110-IK-AL-B	32	18	110	63	91	NC40	3	37500	0,50		3		
MT190-032NC40R03XD19-H130-IK-AL-B	32	18	130	80	111	NC40	3	34300	0,63		3		
MT190-040NC40R03XD19-H110-IK-AL-B	40	18	110	63	91	NC40	3	35700	0,50		3		
MT190-040NC40R03XD19-H130-IK-AL-B	40	18	130	80	111	NC40	3	33500	0,53		3		
MT190-040NC40R03XD19-H150-IK-AL-B	40	18	150	100	131	NC40	3	31000	0,73		3		
MT190-050NC40R03XD19-H110-IK-AL-B	50	18	110	63	91	NC40	3	31900	0,78		3		
MT190-050NC40R03XD19-H130-IK-AL-B	50	18	130	80	111	NC40	3	31900	1,10		3		
MT190-050NC40R03XD19-H150-IK-AL-B	50	18	150	100	131	NC40	3	31900	1,40		3		
MT190-050NC40R04XD19-H110-IK-AL-B	50	18	110	63	91	NC40	4	31900	0,72		4		
MT190-050NC40R04XD19-H130-IK-AL-B	50	18	130	80	111	NC40	4	31900	1,02		4		
MT190-050NC40R04XD19-H150-IK-AL-B	50	18	150	100	131	NC40	4	30000	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-NC40...-R5..-AL...-B**Balanced endmills for machining aluminium alloys**

- *Cutter body is adapted for inserts with corner radius of 5,0mm.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aerospace details.
- *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
- *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-NC40...XD19-R5-IK-AL-B** for cutting speed up to 2000 m/min

7/24 taper shank to DIN 69871A

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025NC40R02XD19-R5-H100-IK-AL-B	25	18	100	50	81	NC40	2	42000	0,45		2		
MT190-025NC40R02XD19-R5-H110-IK-AL-B	25	18	110	63	91	NC40	2	38400	0,48		2		
MT190-025NC40R02XD19-R5-H130-IK-AL-B	25	18	130	80	111	NC40	2	34000	0,56		2		
MT190-025NC40R02XD19-R5-H150-IK-AL-B	25	18	150	100	131	NC40	2	29000	0,64		2		
MT190-032NC40R02XD19-R5-H110-IK-AL-B	32	18	110	63	81	NC40	2	37500	0,50		2		
MT190-032NC40R02XD19-R5-H130-IK-AL-B	32	18	130	80	111	NC40	2	34300	0,63		2		
MT190-032NC40R02XD19-R5-H150-IK-AL-B	32	18	150	100	131	NC40	2	30000	0,75		2		
MT190-032NC40R03XD19-R5-H110-IK-AL-B	32	18	110	63	91	NC40	3	37500	0,50		3		
MT190-032NC40R03XD19-R5-H130-IK-AL-B	32	18	130	80	111	NC40	3	34300	0,63		3		
MT190-040NC40R03XD19-R5-H110-IK-AL-B	40	18	110	63	91	NC40	3	35700	0,50		3		
MT190-040NC40R03XD19-R5-H130-IK-AL-B	40	18	130	80	111	NC40	3	33500	0,53		3		
MT190-040NC40R03XD19-R5-H150-IK-AL-B	40	18	150	100	131	NC40	3	31000	0,73		3		
MT190-050NC40R03XD19-R5-H110-IK-AL-B	50	18	110	63	91	NC40	3	31900	0,78		3		
MT190-050NC40R03XD19-R5-H130-IK-AL-B	50	18	130	80	111	NC40	3	31900	1,10		3		
MT190-050NC40R03XD19-R5-H150-IK-AL-B	50	18	150	100	131	NC40	3	31900	1,40		3		
MT190-050NC40R04XD19-R5-H110-IK-AL-B	50	18	110	63	91	NC40	4	31900	0,72		4		
MT190-050NC40R04XD19-R5-H130-IK-AL-B	50	18	130	80	111	NC40	4	31900	1,02		4		
MT190-050NC40R04XD19-R5-H150-IK-AL-B	50	18	150	100	131	NC40	4	30000	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-BT40...-AL-HSC-B**Balanced endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.

*Suitable for ramping.

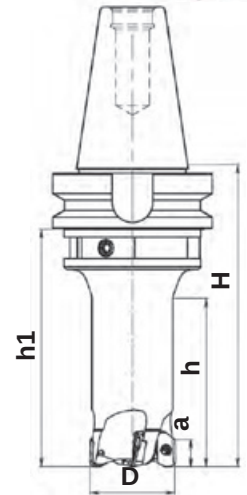
*Best productivity in machining Aluminium alloys from aerospace details.

*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.

- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-BT40...XD19-IK-AL-HSC-B**

for high speed cutting up to 5000 m/min

7/24 taper shank to MAS BT 403

Code key	Dimensions, mm							nmax RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025BT40R02XD19-H110-IK-AL-HSC-B	25	18	110	50	83	BT40	2	42000	0,45		2		
MT190-025BT40R02XD19-H120-IK-AL-HSC-B	25	18	120	63	93	BT40	2	38400	0,48		2		
MT190-025BT40R02XD19-H140-IK-AL-HSC-B	25	18	140	80	113	BT40	2	34000	0,56		2		
MT190-025BT40R02XD19-H160-IK-AL-HSC-B	25	18	160	100	133	BT40	2	29000	0,64		2		
MT190-032BT40R02XD19-H120-IK-AL-HSC-B	32	18	120	63	93	BT40	2	37500	0,50		2		
MT190-032BT40R02XD19-H140-IK-AL-HSC-B	32	18	140	80	113	BT40	2	34300	0,63		2		
MT190-032BT40R02XD19-H160-IK-AL-HSC-B	32	18	160	100	133	BT40	2	30000	0,75		2		
MT190-032BT40R03XD19-H120-IK-AL-HSC-B	32	18	120	63	93	BT40	3	37500	0,50		3		
MT190-032BT40R03XD19-H140-IK-AL-HSC-B	32	18	140	80	113	BT40	3	34300	0,63		3		
MT190-040BT40R03XD19-H120-IK-AL-HSC-B	40	18	120	63	93	BT40	3	35700	0,50		3		
MT190-040BT40R03XD19-H140-IK-AL-HSC-B	40	18	140	80	113	BT40	3	33500	0,53		3		
MT190-040BT40R03XD19-H160-IK-AL-HSC-B	40	18	160	100	133	BT40	3	31000	0,73		3		
MT190-050BT40R03XD19-H120-IK-AL-HSC-B	50	18	120	63	93	BT40	3	31900	0,78		3		
MT190-050BT40R03XD19-H140-IK-AL-HSC-B	50	18	140	80	113	BT40	3	31900	1,10		3		
MT190-050BT40R03XD19-H160-IK-AL-HSC-B	50	18	160	100	133	BT40	3	31900	1,40		3		
MT190-050BT40R04XD19-H120-IK-AL-HSC-B	50	18	120	63	93	BT40	4	31900	0,72		4		
MT190-050BT40R04XD19-H140-IK-AL-HSC-B	50	18	140	80	113	BT40	4	31900	1,02		4		
MT190-050BT40R04XD19-H160-IK-AL-HSC-B	50	18	160	100	133	BT40	4	30000	1,33		4		

XDHX1904...FR-AL

T400955-15A

7015-T
5,0 Nm

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-BT40...-R5...-AL-HSC-B**Balanced endmills for machining aluminium alloys**

*Cutterbody is adapted for inserts with corner radius of 5,0mm.

*Suitable for ramping.

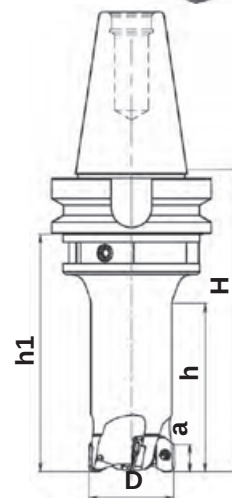
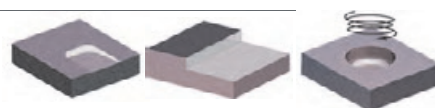
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*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.

- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-BT40...XD19-R5-IK-AL-HSC-B**

for high speed cutting up to 5000 m/min

7/24 taper shank to MAS BT 403

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025BT40R02XD19-R5-H110-IK-AL-HSC-B	25	18	110	50	83	BT40	2	42000	0,45	XDHX190450FR-AL	2	T400955-15A	7015-T 5,0 Nm
MT190-025BT40R02XD19-R5-H120-IK-AL-HSC-B	25	18	120	63	93	BT40	2	38400	0,48		2		
MT190-025BT40R02XD19-R5-H140-IK-AL-HSC-B	25	18	140	80	113	BT40	2	34000	0,56		2		
MT190-025BT40R02XD19-R5-H160-IK-AL-HSC-B	25	18	160	100	133	BT40	2	29000	0,64		2		
MT190-032BT40R02XD19-R5-H120-IK-AL-HSC-B	32	18	120	63	93	BT40	2	37500	0,50		2		
MT190-032BT40R02XD19-R5-H140-IK-AL-HSC-B	32	18	140	80	113	BT40	2	34300	0,63		2		
MT190-032BT40R02XD19-R5-H160-IK-AL-HSC-B	32	18	160	100	133	BT40	2	30000	0,75		2		
MT190-032BT40R03XD19-R5-H120-IK-AL-HSC-B	32	18	120	63	93	BT40	3	37500	0,50		3		
MT190-032BT40R03XD19-R5-H140-IK-AL-HSC-B	32	18	140	80	113	BT40	3	34300	0,63		3		
MT190-040BT40R03XD19-R5-H120-IK-AL-HSC-B	40	18	120	63	93	BT40	3	35700	0,50		3		
MT190-040BT40R03XD19-R5-H140-IK-AL-HSC-B	40	18	140	80	113	BT40	3	33500	0,53		3		
MT190-040BT40R03XD19-R5-H160-IK-AL-HSC-B	40	18	160	100	133	BT40	3	31000	0,73		3		
MT190-050BT40R03XD19-R5-H120-IK-AL-HSC-B	50	18	120	63	93	BT40	3	31900	0,78		3		
MT190-050BT40R03XD19-R5-H140-IK-AL-HSC-B	50	18	140	80	113	BT40	3	31900	1,10		3		
MT190-050BT40R03XD19-R5-H160-IK-AL-HSC-B	50	18	160	100	133	BT40	3	31900	1,40		3		
MT190-050BT40R04XD19-R5-H120-IK-AL-HSC-B	50	18	120	63	93	BT40	4	31900	0,72		4		
MT190-050BT40R04XD19-R5-H140-IK-AL-HSC-B	50	18	140	80	113	BT40	4	31900	1,02		4		
MT190-050BT40R04XD19-R5-H160-IK-AL-HSC-B	50	18	160	100	133	BT40	4	30000	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-BT40...-AL-B**Balanced endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.

*Suitable for ramping.

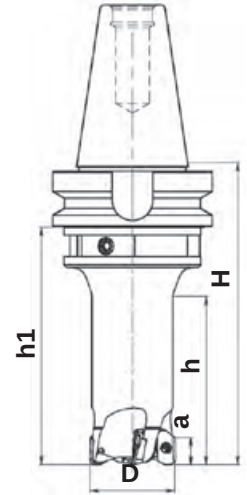
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*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.

- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-BT40...XD19-IK-AL-B**

for cutting speed up to 2000 m/min

7/24 taper shank to MAS BT 403

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025BT40R02XD19-H110-IK-AL-B	25	18	110	50	83	BT40	2	42000	0,45		2		
MT190-025BT40R02XD19-H110-IK-AL-B	25	18	120	63	93	BT40	2	38400	0,48		2		
MT190-025BT40R02XD19-H140-IK-AL-B	25	18	140	80	113	BT40	2	34000	0,56		2		
MT190-025BT40R02XD19-H160-IK-AL-B	25	18	160	100	133	BT40	2	29000	0,64		2		
MT190-032BT40R02XD19-H120-IK-AL-B	32	18	120	63	93	BT40	2	37500	0,50		2		
MT190-032BT40R02XD19-H140-IK-AL-B	32	18	140	80	113	BT40	2	34300	0,63		2		
MT190-032BT40R02XD19-H160-IK-AL-B	32	18	160	100	133	BT40	2	30000	0,75		2		
MT190-032BT40R03XD19-H120-IK-AL-B	32	18	120	63	93	BT40	3	37500	0,50		3		
MT190-032BT40R03XD19-H140-IK-AL-B	32	18	140	80	113	BT40	3	34300	0,63		3		
MT190-040BT40R03XD19-H120-IK-AL-B	40	18	120	63	93	BT40	3	35700	0,50		3		
MT190-040BT40R03XD19-H140-IK-AL-B	40	18	140	80	113	BT40	3	33500	0,53		3		
MT190-040BT40R03XD19-H160-IK-AL-B	40	18	160	100	133	BT40	3	31000	0,73		3		
MT190-050BT40R03XD19-H120-IK-AL-B	50	18	120	63	93	BT40	3	31900	0,78		3		
MT190-050BT40R03XD19-H140-IK-AL-B	50	18	140	80	113	BT40	3	31900	1,10		3		
MT190-050BT40R03XD19-H160-IK-AL-B	50	18	160	100	133	BT40	3	31900	1,40		3		
MT190-050BT40R04XD19-H120-IK-AL-B	50	18	120	63	93	BT40	4	31900	0,72		4		
MT190-050BT40R04XD19-H140-IK-AL-B	50	18	140	80	113	BT40	4	31900	1,02		4		
MT190-050BT40R04XD19-H160-IK-AL-B	50	18	160	100	133	BT40	4	30000	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

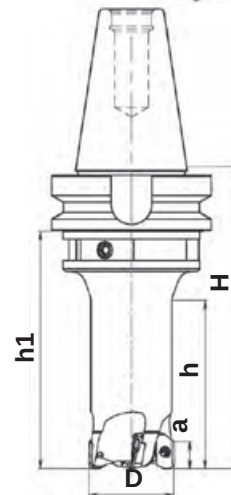
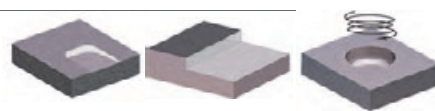
MT190...-BT40...-R5...-AL-B**Balanced endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius of 5,0 mm.
 *Suitable for ramping.

*Best productivity in machining Aluminium alloys from aerospace details.
 *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.
- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-BT40...XD19-R5-IK-AL-B**

for cutting speed up to 2000 m/min

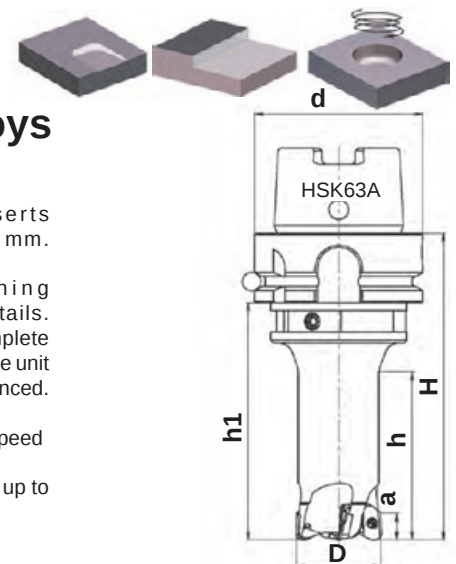
7/24 taper shank to MAS BT 403

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025BT40R02XD19-R5-H110-IK-AL-B	25	18	110	50	83	BT40	2	42000	0,45	XDHT190450FR-AL	2	T400955-15A	7015-T 6,0 Nm
MT190-025BT40R02XD19-R5-H120-IK-AL-B	25	18	120	63	93	BT40	2	38400	0,48		2		
MT190-025BT40R02XD19-R5-H140-IK-AL-B	25	18	140	80	113	BT40	2	34000	0,56		2		
MT190-025BT40R02XD19-R5-H160-IK-AL-B	25	18	160	100	133	BT40	2	29000	0,64		2		
MT190-032BT40R02XD19-R5-H120-IK-AL-B	32	18	120	63	93	BT40	2	37500	0,50		2		
MT190-032BT40R02XD19-R5-H140-IK-AL-B	32	18	140	80	113	BT40	2	34300	0,63		2		
MT190-032BT40R02XD19-R5-H160-IK-AL-B	32	18	160	100	133	BT40	2	30000	0,75		2		
MT190-032BT40R03XD19-R5-H120-IK-AL-B	32	18	120	63	93	BT40	3	37500	0,50		3		
MT190-032BT40R03XD19-R5-H140-IK-AL-B	32	18	140	80	113	BT40	3	34300	0,63		3		
MT190-040BT40R03XD19-R5-H120-IK-AL-B	40	18	120	63	93	BT40	3	35700	0,50		3		
MT190-040BT40R03XD19-R5-H140-IK-AL-B	40	18	140	80	113	BT40	3	33500	0,53		3		
MT190-040BT40R03XD19-R5-H160-IK-AL-B	40	18	160	100	133	BT40	3	31000	0,73		3		
MT190-050BT40R03XD19-R5-H120-IK-AL-B	50	18	120	63	93	BT40	3	31900	0,78		3		
MT190-050BT40R03XD19-R5-H140-IK-AL-B	50	18	140	80	113	BT40	3	31900	1,10		3		
MT190-050BT40R03XD19-R5-H160-IK-AL-B	50	18	160	100	133	BT40	3	31900	1,40		3		
MT190-050BT40R04XD19-R5-H120-IK-AL-B	50	18	120	63	93	BT40	4	31900	0,72		4		
MT190-050BT40R04XD19-R5-H140-IK-AL-B	50	18	140	80	113	BT40	4	31900	1,02		4		
MT190-050BT40R04XD19-R5-H160-IK-AL-B	50	18	160	100	133	BT40	4	30000	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-H63A...-AL-HSC-B**Balanced endmills for machining aluminium alloys**

- *Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aerospace details.
- *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
- *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.



Taper Hollow Shank HSK DIN 69893 Form A

MT 190-H63A...XD19-IK-AL-HSC-B

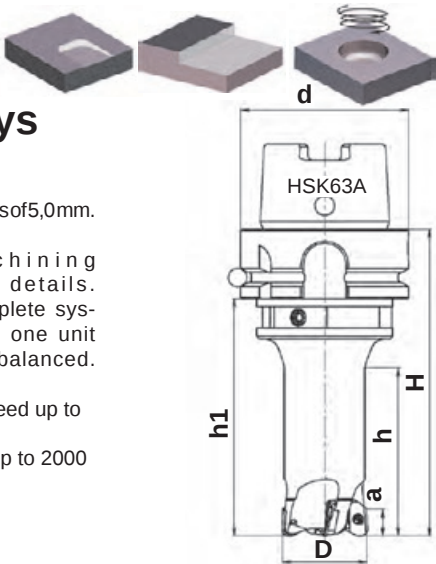
for high speed cutting up to 5000 m/min

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025H63AR02XD19-H105-IK-AL-HSC-B	25	18	105	50	79	63	2	42000	0,45		2		
MT190-025H63AR02XD19-H115-IK-AL-HSC-B	25	18	115	63	89	63	2	38400	0,48		2		
MT190-025H63AR02XD19-H135-IK-AL-HSC-B	25	18	135	80	109	63	2	34000	0,56		2		
MT190-025H63AR02XD19-H155-IK-AL-HSC-B	25	18	155	100	129	63	2	29000	0,64		2		
MT190-032H63AR02XD19-H115-IK-AL-HSC-B	32	18	115	63	79	63	2	37500	0,50		2		
MT190-032H63AR02XD19-H135-IK-AL-HSC-B	32	18	135	80	109	63	2	34300	0,63		2		
MT190-032H63AR02XD19-H155-IK-AL-HSC-B	32	18	155	100	129	63	2	30000	0,75		2		
MT190-032H63AR03XD19-H115-IK-AL-HSC-B	32	18	115	63	89	63	3	37500	0,50		3		
MT190-032H63AR03XD19-H135-IK-AL-HSC-B	32	18	135	80	109	63	3	34300	0,63		3		
MT190-040H63AR03XD19-H115-IK-AL-HSC-B	40	18	115	63	89	63	3	35700	0,50		3		
MT190-040H63AR03XD19-H135-IK-AL-HSC-B	40	18	135	80	109	63	3	33500	0,53		3		
MT190-040H63AR03XD19-H155-IK-AL-HSC-B	40	18	155	100	129	63	3	31000	0,73		3		
MT190-050H63AR03XD19-H115-IK-AL-HSC-B	50	18	115	63	89	63	3	31900	0,78		3		
MT190-050H63AR03XD19-H135-IK-AL-HSC-B	50	18	135	80	109	63	3	31900	1,10		3		
MT190-050H63AR03XD19-H155-IK-AL-HSC-B	50	18	155	100	129	63	3	31900	1,40		3		
MT190-050H63AR04XD19-H115-IK-AL-HSC-B	50	18	115	63	89	63	4	31900	0,72		4		
MT190-050H63AR04XD19-H135-IK-AL-HSC-B	50	18	135	80	109	63	4	31900	1,02		4		
MT190-050H63AR04XD19-H155-IK-AL-HSC-B	50	18	155	100	129	63	4	30000	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-H63A...-R5..AL-HSC-B

Balanced endmills for machining aluminium alloys



*Cutterbody is adapted for inserts with corner radius of 5,0mm.
*Suitable for ramping.
* Best productivity in machining Aluminium alloys from aerospace details.
*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
*Two performances:
- with inserts XDHX19... for high cutting speed up to 5000 m/min.
- with inserts XDHT19... for cutting speed up to 2000 m/min.

Taper Hollow Shank HSK DIN 69893 Form A

MT 190-H63A...XD19-R5-IK-AL-HSC-B for high speed cutting up to 5000 m/min

Code key	Dimensions, mm							nmax RPM	 kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025H63AR02XD19-R5-H105-IK-AL-HSC-B	25	18	105	50	79	63	2	42000	0,45		2		
MT190-025H63AR02XD19-R5-H115-IK-AL-HSC-B	25	18	115	63	89	63	2	38400	0,48		2		
MT190-025H63AR02XD19-R5-H135-IK-AL-HSC-B	25	18	135	80	109	63	2	34000	0,56		2		
MT190-025H63AR02XD19-R5-H155-IK-AL-HSC-B	25	18	155	100	129	63	2	29000	0,64		2		
MT190-032H63AR02XD19-R5-H115-IK-AL-HSC-B	32	18	115	63	79	63	2	37500	0,50		2		
MT190-032H63AR02XD19-R5-H135-IK-AL-HSC-B	32	18	135	80	109	63	2	34300	0,63		2		
MT190-032H63AR02XD19-R5-H155-IK-AL-HSC-B	32	18	155	100	129	63	2	30000	0,75		2		
MT190-032H63AR03XD19-R5-H115-IK-AL-HSC-B	32	18	115	63	89	63	3	37500	0,50		3		
MT190-032H63AR03XD19-R5-H135-IK-AL-HSC-B	32	18	135	80	109	63	3	34300	0,63		3		
MT190-040H63AR03XD19-R5-H115-IK-AL-HSC-B	40	18	115	63	89	63	3	35700	0,50		3		
MT190-040H63AR03XD19-R5-H135-IK-AL-HSC-B	40	18	135	80	109	63	3	33500	0,53		3		
MT190-040H63AR03XD19-R5-H155-IK-AL-HSC-B	40	18	155	100	129	63	3	31000	0,73		3		
MT190-050H63AR03XD19-R5-H115-IK-AL-HSC-B	50	18	115	63	89	63	3	31900	0,78		3		
MT190-050H63AR03XD19-R5-H135-IK-AL-HSC-B	50	18	135	80	109	63	3	31900	1,10		3		
MT190-050H63AR03XD19-R5-H155-IK-AL-HSC-B	50	18	155	100	129	63	3	31900	1,40		3		
MT190-050H63AR04XD19-R5-H115-IK-AL-HSC-B	50	18	115	63	89	63	4	31900	0,72		4		
MT190-050H63AR04XD19-R5-H135-IK-AL-HSC-B	50	18	135	80	109	63	4	31900	1,02		4		
MT190-050H63AR04XD19-R5-H155-IK-AL-HSC-B	50	18	155	100	129	63	4	30000	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

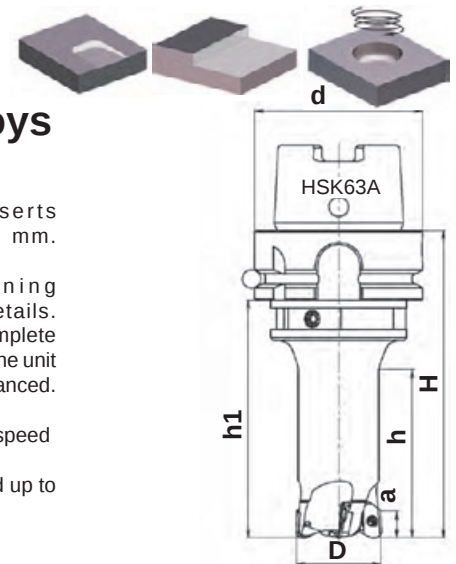
MT190...-H63A...-AL-B**Balanced endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
*Suitable for ramping.

*Best productivity in machining Aluminium alloys from aerospace details.
*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

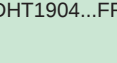
*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.
- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190-H63A...XD19-IK-AL-B**

for cutting speed up to 2000 m/min

Taper Hollow Shank HSK DIN 69893 Form A

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025H63AR02XD19-H105-IK-AL-B	25	18	105	50	79	63	2	32000	0,45		2		
MT190-025H63AR02XD19-H115-IK-AL-B	25	18	115	63	89	63	2	30000	0,48		2		
MT190-032H63AR02XD19-H115-IK-AL-B	32	18	115	63	79	63	2	27200	0,50		2		
MT190-032H63AR02XD19-H135-IK-AL-B	32	18	135	80	109	63	2	25000	0,63		2		
MT190-032H63AR03XD19-H115-IK-AL-B	32	18	115	63	89	63	3	27200	0,50		3		
MT190-032H63AR03XD19-H135-IK-AL-B	32	18	135	80	109	63	3	25000	0,63		3		
MT190-040H63AR03XD19-H115-IK-AL-B	40	18	115	63	89	63	3	24900	0,50		3		
MT190-040H63AR03XD19-H135-IK-AL-B	40	18	135	80	109	63	3	24000	0,53		3		
MT190-050H63AR03XD19-H115-IK-AL-B	50	18	115	63	89	63	3	21600	0,78		3		
MT190-050H63AR03XD19-H155-IK-AL-B	50	18	155	100	129	63	3	20300	1,40		3		
MT190-050H63AR04XD19-H115-IK-AL-B	50	18	115	63	89	63	4	21600	0,72		4		
MT190-050H63AR04XD19-H155-IK-AL-B	50	18	155	100	129	63	4	20300	1,33		4		

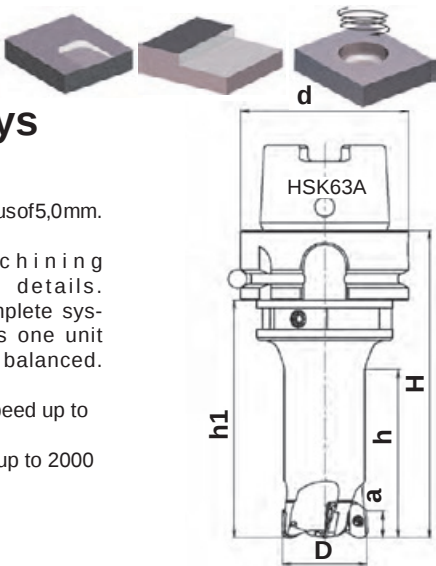
Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-H63A...-R5..AL-B

Balanced endmills for machining aluminium alloys



- *Cutter body is adapted for inserts with corner radius of 5,0 mm.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aerospace details.
- *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
- *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.



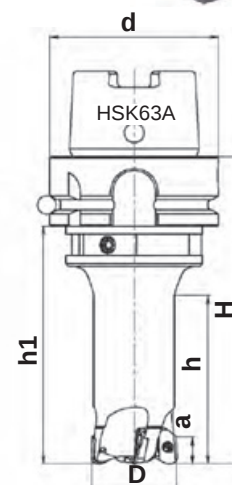
MT 190-H63A...XD19-R5-IK-AL-B for cutting speed up to 2000 m/min Taper Hollow Shank HSK DIN 69893 Form A

Code key	Dimensions, mm							nmax RPM	 kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025H63AR02XD19-R5-H105-IK-AL-B	25	18	105	50	79	63	2	32000	0,45	XDHT190450FR-AL	2	T400955-15A	7015-T 6,0 Nm
MT190-025H63AR02XD19-R5-H115-IK-AL-B	25	18	115	63	89	63	2	30000	0,48		2		
MT190-032H63AR02XD19-R5-H115-IK-AL-B	32	18	115	63	79	63	2	27200	0,50		2		
MT190-032H63AR02XD19-R5-H135-IK-AL-B	32	18	135	80	109	63	2	25000	0,63		2		
MT190-032H63AR03XD19-R5-H115-IK-AL-B	32	18	115	63	89	63	3	27200	0,50		3		
MT190-032H63AR03XD19-R5-H135-IK-AL-B	32	18	135	80	109	63	3	25000	0,63		3		
MT190-040H63AR03XD19-R5-H115-IK-AL-B	40	18	115	63	89	63	3	24900	0,50		3		
MT190-040H63AR03XD19-R5-H135-IK-AL-B	40	18	135	80	109	63	3	24000	0,53		3		
MT190-050H63AR03XD19-R5-H115-IK-AL-B	50	18	115	63	89	63	3	21600	0,78		3		
MT190-050H63AR03XD19-R5-H155-IK-AL-B	50	18	155	100	129	63	3	20300	1,40		3		
MT190-050H63AR04XD19-R5-H115-IK-AL-B	50	18	115	63	89	63	4	21600	0,72		4		
MT190-050H63AR04XD19-R5-H155-IK-AL-B	50	18	155	100	129	63	4	20300	1,33		4		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-H63A...-AL-B**Balanced endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
 *Suitable for ramping.
 *Best productivity in machining Aluminium alloys from aerospace details.
 *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

**MT 190-H...AD10-IK-AL-B** for high speed cutting up to 3500 m/min

Taper Hollow Shank HSK DIN 69893 Form A

Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025H63AR02AD10-H115-IK-AL-B	25	10	115	63	89	63	2	39000	0,48		2		
MT190-025H63AR03AD10-H105-IK-AL-B	25	10	105	50	79	63	3	42000	0,45		3		
MT190-025H63AR03AD10-H115-IK-AL-B	25	10	115	63	89	63	3	39000	0,48		3		
MT190-032H63AR03AD10-H115-IK-AL-B	32	10	115	63	89	63	3	37200	0,57		3		
MT190-032H63AR04AD10-H115-IK-AL-B	32	10	115	63	89	63	4	37200	0,50		3		
MT190-032H63AR04AD10-H135-IK-AL-B	32	10	135	80	109	63	4	34000	0,63		3		
MT190-040H63AR03AD10-H115-IK-AL-B	40	10	115	63	89	63	3	35500	0,62		3		
MT190-040H63AR04AD10-H115-IK-AL-B	40	10	115	63	89	63	4	35500	0,60		4		
MT190-040H63AR04AD10-H135-IK-AL-B	40	10	135	80	109	63	4	33000	0,70		4		
MT190-050H63AR03AD10-H115-IK-AL-B	50	10	115	63	89	63	3	31800	0,94		3		
MT190-050H63AR05AD10-H115-IK-AL-B	50	10	115	63	89	63	5	31800	0,90		5		
MT190-050H63AR05AD10-H155-IK-AL-B	50	10	155	100	129	63	5	30000	1,03		5		

AD.T10T3...FR-AL

T250555-08AP

7008-TP
1,8 Nm

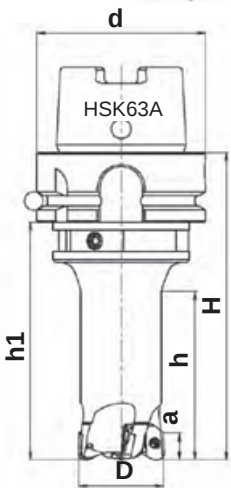
Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190...-H63A...-R5..AL-B

Balanced endmills for machining aluminium alloys



*Cutter body is adapted for inserts with corner radius of 5,0 mm.
*Suitable for ramping.
*Best productivity in machining Aluminium alloys from aerospace details.
*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.



MT 190-H...AD10-R5..-IK-AL-B for high speed cutting up to 3500 m/min

Taper Hollow Shank HSK DIN 69893 Form A

Code key	Dimensions, mm							nmax RPM	 kg		No.		
	D	a	H	h	h1	d	Z						
MT190-025H63AR02AD10-R5-H115-IK-AL-B	25	10	115	63	89	63	2	39000	0,48	AD.T10T350FR-AL	2	T250555-08AP	7008-TP 1,8 Nm
MT190-025H63AR03AD10-R5-H105-IK-AL-B	25	10	105	50	79	63	3	42000	0,45		3		
MT190-025H63AR03AD10-R5-H115-IK-AL-B	25	10	115	63	89	63	3	39000	0,48		3		
MT190-032H63AR03AD10-R5-H115-IK-AL-B	32	10	115	63	89	63	3	37200	0,57		3		
MT190-032H63AR04AD10-R5-H115-IK-AL-B	32	10	115	63	89	63	4	37200	0,50		3		
MT190-032H63AR04AD10-R5-H135-IK-AL-B	32	10	135	80	109	63	4	34000	0,63		3		
MT190-040H63AR03AD10-R5-H115-IK-AL-B	40	10	115	63	89	63	3	35500	0,62		3		
MT190-040H63AR04AD10-R5-H115-IK-AL-B	40	10	115	63	89	63	4	35500	0,60		4		
MT190-040H63AR04AD10-R5-H135-IK-AL-B	40	10	135	80	109	63	4	33000	0,70		4		
MT190-050H63AR03AD10-R5-H115-IK-AL-B	50	10	115	63	89	63	3	31800	0,94		3		
MT190-050H63AR05AD10-R5-H115-IK-AL-B	50	10	115	63	89	63	5	31800	0,90		5		
MT190-050H63AR05AD10-R5-H155-IK-AL-B	50	10	155	100	129	63	5	30000	1,03		5		

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190B...AL-B

Balanced drilling endmills for machining aluminium alloys



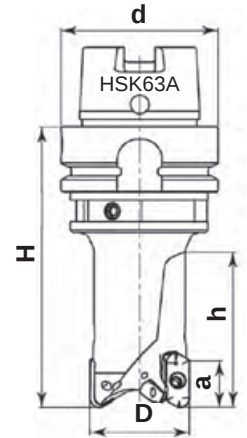
*Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
*Suitable for ramping.

*Best productivity in machining Aluminium alloys from aerospace details.
*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.

- with inserts XDHT19... for cutting speed up to 2000 m/min.



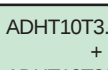
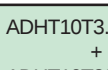
Taper Hollow Shank HSK DIN 69893 Form A

MT 190B-H63A...XD19-IK-AL-HSC-B for high speed cutting up to 5000 m/min

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	H	h	d	Z						
MT190B-040H63AR02XD19-H115-IK-AL-HSC-B	40	18	115	63	63	2	35700	1,0		2+1		
MT190B-040H63AR02XD19-H135-IK-AL-HSC-B	40	18	135	80	63	2	33500	1,1		2+1		
MT190B-040H63AR02XD19-H155-IK-AL-HSC-B	40	18	155	100	63	2	31300	1,2		2+1		
MT190B-050H63AR02XD19-H115-IK-AL-HSC-B	50	18	115	63	63	2	31900	1,2		2+2		
MT190B-050H63AR02XD19-H135-IK-AL-HSC-B	50	18	135	80	63	2	29900	1,3		2+2		
MT190B-050H63AR02XD19-H155-IK-AL-HSC-B	50	18	155	100	63	2	27900	1,4		2+2		

MT 190B-H63A...-IK-AL-B

for cutting speed up to 2000 m/min

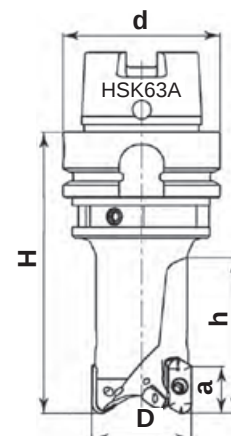
MT190B-030H63AR02AD10-H115-IK-AL-B	30	10	115	63	63	2	37200	0,9		2+1		
MT190B-032H63AR02AD10-H115-IK-AL-B	32	10	115	63	63	2	34000	0,9		2+1		
MT190B-040H63AR02XD19-H115-IK-AL-B	40	18	115	63	63	2	24900	1,0		2+1		
MT190B-040H63AR02XD19-H135-IK-AL-B	40	18	135	80	63	2	23400	1,1		2+1		
MT190B-040H63AR02XD19-H155-IK-AL-B	40	18	155	100	63	2	21800	1,2		2+1		
MT190B-050H63AR02XD19-H115-IK-AL-B	50	18	115	63	63	2	21600	1,2		2+2		
MT190B-050H63AR02XD19-H135-IK-AL-B	50	18	135	80	63	2	20300	1,3		2+2		
MT190B-050H63AR02XD19-H155-IK-AL-B	50	18	155	100	63	2	18900	1,4		2+2		

Peripheral inserts
+
Drilling inserts

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

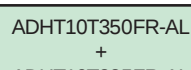
MT190B...-R5..AL...-B**Balanced drilling endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius of 5,0 mm.
 *Suitable for ramping.
 *Best productivity in machining Aluminium alloys from aerospace details.
 *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
 *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

**Taper Hollow Shank HSK DIN 69893 Form A****MT 190B-H63A...XD19-R5-IK-AL-HSC-B** for high speed cutting up to 5000 m/min

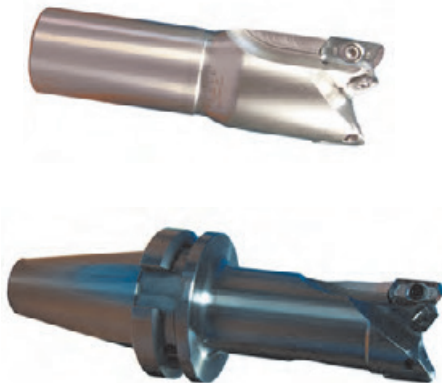
Code key	Dimensions, mm						n _{max} RPM	kg		No.	
	D	a	H	h	d	Z					
MT190B-040H63AR02XD19-R5-H115-IK-AL-HSC-B	40	18	115	63	63	2	35700	1,0		2+1	
MT190B-040H63AR02XD19-R5-H135-IK-AL-HSC-B	40	18	135	80	63	2	33500	1,1		2+1	
MT190B-040H63AR02XD19-R5-H155-IK-AL-HSC-B	40	18	155	100	63	2	31300	1,2		2+1	
MT190B-050H63AR02XD19-R5-H115-IK-AL-HSC-B	50	18	115	63	63	2	31900	1,2		2+2	
MT190B-050H63AR02XD19-R5-H135-IK-AL-HSC-B	50	18	135	80	63	2	29900	1,3		2+2	
MT190B-050H63AR02XD19-R5-H155-IK-AL-HSC-B	50	18	155	100	63	2	27900	1,4		2+2	

MT 190B-H63A...XD19-R5-IK-AL-B for cutting speed up to 2000 m/min

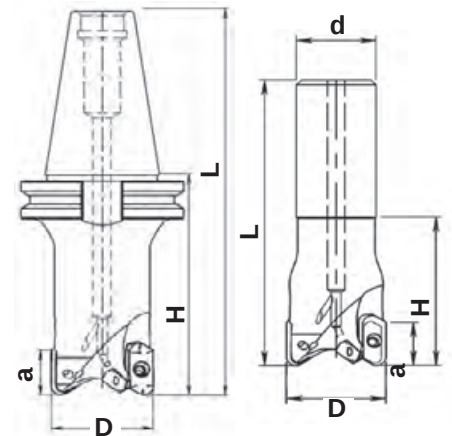
MT190B-030H63AR02AD10-R5-H115-IK-AL-B	30	10	115	63	63	2	37200	0,9		2+1	
MT190B-032H63AR02AD10-R5-H115-IK-AL-B	32	10	115	63	63	2	34000	0,9		2+1	
MT190B-040H63AR02XD19-R5-H115-IK-AL-B	40	18	115	63	63	2	24900	1,0		2+1	
MT190B-040H63AR02XD19-R5-H135-IK-AL-B	40	18	135	80	63	2	23400	1,1		2+1	
MT190B-040H63AR02XD19-R5-H155-IK-AL-B	40	18	155	100	63	2	21800	1,2		2+1	
MT190B-050H63AR02XD19-R5-H115-IK-AL-B	50	18	115	63	63	2	21600	1,2		2+2	
MT190B-050H63AR02XD19-R5-H135-IK-AL-B	50	18	135	80	63	2	20300	1,3		2+2	
MT190B-050H63AR02XD19-R5-H155-IK-AL-B	50	18	155	100	63	2	18900	1,4		2+2	

Peripheral inserts
 +
 Drilling inserts

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190B...AL**Balanced drilling endmills for machining aluminium alloys**

- *Cutter body is adapted for inserts with corner radius from 0,4 to 4,0 mm.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aerospace details.
- *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
- *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190B-Z...-IK-AL-HSC** for high speed cutting up to 5000 m/min

Straight shank cylindrical

Code key	Dimensions, mm						nmax			No.		
	D	a	H	L	d	Z	RPM					
MT190B-040Z32R02XD19-L125-IK-AL-HSC	40	18	65	125	32	2	35700	0,70	XDHX1904...FR-AL + ADHT10T304FR-AL	2+1	T400955-15A + T250555-08AP	7015-T 5,0 Nm + 7008-TP 1,8 Nm
MT190B-040Z32R02XD19-L135-IK-AL-HSC	40	18	75	135	32	2	35700	0,75		2+1		
MT190B-050Z40R02XD19-L135-IK-AL-HSC	50	18	65	135	40	2	31900	1,00		2+2		
MT190B-050Z40R02XD19-L145-IK-AL-HSC	50	18	75	145	40	2	31900	1,10		2+2		

MT 190B-W...-IK-AL for cutting speed up to 2000 m/min

Straight shank with drive flat (Weldon)

MT190B-030W25R02AD10-L125-IK-AL	30	10	69	125	25	2	37200	0,60	ADHT10T3...FR-AL + ADHT10T325FR-AL	2+1	T250555-08AP	7008-TP 1,8 Nm
MT190B-032W25R02AD10-L125-IK-AL	32	10	69	125	25	2	34000	0,60		2+1		
MT190B-040W32R02XD19-L125-IK-AL	40	18	65	125	32	2	24900	0,70	XDHT1904...FR-AL + ADHT10T304FR-AL	2+1	T400955-15A + T250555-08AP	7015-T 6,0 Nm + 7008-T 1,8 Nm
MT190B-040W32R02XD19-L135-IK-AL	40	18	75	135	32	2	23400	0,75		2+1		
MT190B-050W40R02XD19-L135-IK-AL	50	18	65	135	40	2	21600	1,00		2+2		
MT190B-050W40R02XD19-L145-IK-AL	50	18	75	145	40	2	20300	1,10		2+2		

MT 190B-Z...-IK-AL for cutting speed up to 2000 m/min

Straight shank cylindrical

MT190B-030Z25R02AD10-L125-IK-AL	30	10	69	125	25	2	37200	0,60	ADHT10T3...FR-AL + ADHT10T325FR-AL	2+1	T250555-08AP	7008-TP 1,8 Nm
MT190B-032Z25R02AD10-L125-IK-AL	32	10	69	125	25	2	34000	0,60		2+1		
MT190B-040Z32R02XD19-L125-IK-AL	40	18	65	125	32	2	24900	0,70	XDHT1904...FR-AL + ADHT10T304FR-AL	2+1	T400955-15A + T250555-08AP	7015-T 6,0 Nm + 7008-TP 1,8 Nm
MT190B-040Z32R02XD19-L135-IK-AL	40	18	75	135	32	2	23400	0,75		2+1		
MT190B-050Z40R02XD19-L135-IK-AL	50	18	65	135	40	2	21600	1,00		2+2		
MT190B-050Z40R02XD19-L145-IK-AL	50	18	75	145	40	2	20300	1,10		2+2		

MT 190B-NC...-IK-AL for cutting speed up to 2000 m/min

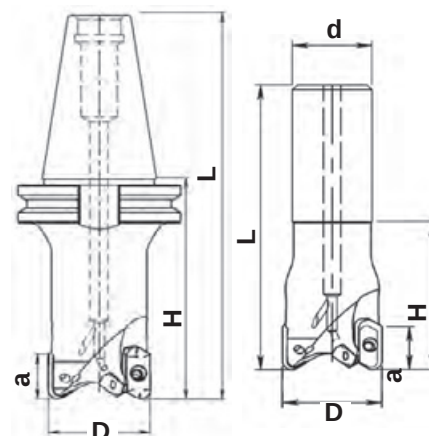
7/24 taper shank to DIN 69871 Form A

MT190B-040NC40R02XD19-L178-IK-AL	40	18	93	178	NC40	2	24900	2,00	XDHT1904...FR-AL + ADHT10T304FR-AL	2+1	T400955-15A + T250555-08AP	7015-T 6,0 Nm + 7008-TP 1,8 Nm
MT190B-040NC40R02XD19-L192-IK-AL	40	18	123	192	NC40	2	21800	2,70		2+1		
MT190B-040NC40R02XD19-L282-IK-AL	40	18	213	282	NC40	2	15600	3,70		2+1		

Peripheral inserts
+
Drilling inserts

MT190B...-R5..AL**Balanced drilling endmills for machining aluminium alloys**

*Cutter body is adapted for inserts with corner radius of 5,0mm.
 *Suitable for ramping.
 *Best productivity in machining Aluminium alloys from aerospace details.
 *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
 *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 190B-Z...-R5..-IK-AL-HSC** for high speed cutting up to 5000 m/min

Straight shank cylindrical

Code key	Dimensions, mm						n _{max}			No.		
	D	a	H	L	d	Z	RPM					
MT190B-040Z32R02XD19-R5-L125-IK-AL-HSC	40	18	65	125	32	2	35700	0,70	XDHX190450FR-AL + ADHT10T304FR-AL	2+1	T400955-15A + T250555-08AP	7015-T 5,0 Nm + 7008-TF 1,8 Nm
MT190B-040Z32R02XD19-R5-L135-IK-AL-HSC	40	18	75	135	32	2	35700	0,75		2+1		
MT190B-050Z40R02XD19-R5-L135-IK-AL-HSC	50	18	65	135	40	2	31900	1,00		2+2		
MT190B-050Z40R02XD19-R5-L145-IK-AL-HSC	50	18	75	145	40	2	31900	1,10		2+2		

MT 190B-W...-R5..-IK-AL for cutting speed up to 2000 m/min

Straight shank with drive flat (Weldon)

MT190B-030W25R02AD10-R5-L125-IK-AL	30	10	69	125	25	2	37200	0,60	ADHT10T350FR-AL + ADHT10T325FR-AL	2+1	T250555-08A	7008-TP 1,8 Nm
MT190B-032W25R02AD10-R5-L125-IK-AL	32	10	69	125	25	2	34000	0,60		2+1		
MT190B-040W32R02XD19-R5-L125-IK-AL	40	18	65	125	32	2	24900	0,70	XDHT190450FR-AL + ADHT10T304FR-AL	2+1	T400955-15A + T250555-08AP	7015-T 6,0 Nm + 7008-T 1,8 Nm
MT190B-040W32R02XD19-R5-L135-IK-AL	40	18	75	135	32	2	23400	0,75		2+1		
MT190B-050W40R02XD19-R5-L135-IK-AL	50	18	65	135	40	2	21600	1,00		2+2		
MT190B-050W40R02XD19-R5-L145-IK-AL	50	18	75	145	40	2	20300	1,10		2+2		

MT 190B-Z...-R5..-IK-AL for cutting speed up to 2000 m/min

Straight shank cylindrical

MT190B-030Z25R02AD10-R5-L125-IK-AL	30	10	69	125	25	2	37200	0,60	ADHT10T350FR-AL + ADHT10T325FR-AL	2+1	T250555-08AP	7008-TP 1,8 Nm
MT190B-032Z25R02AD10-R5-L125-IK-AL	32	10	69	125	25	2	34000	0,60		2+1		
MT190B-040Z32R02XD19-R5-L125-IK-AL	40	18	65	125	32	2	24900	0,70	XDHT190450FR-AL + ADHT10T304FR-AL	2+1	T400955-15A + T250555-08AP	7015-T 6,0 Nm + 7008-TP 1,8 Nm
MT190B-040Z32R02XD19-R5-L135-IK-AL	40	18	75	135	32	2	23400	0,75		2+1		
MT190B-050Z40R02XD19-R5-L135-IK-AL	50	18	65	135	40	2	21600	1,00		2+2		
MT190B-050Z40R02XD19-R5-L145-IK-AL	50	18	75	145	40	2	20300	1,10		2+2		

MT 190B-NC...-R5-IK-AL for cutting speed up to 2000 m/min

7/24 taper shank to DIN 69871 Form A

MT190B-040NC40R02XD19-R5-L178-IK-AL	40	18	93	178	NC40	2	24900	2,00	XDHT190450FR-AL + ADHT10T304FR-AL	2+1	T400955-15A + T250555-08AP	7015-T 6,0 Nm + 7008-TP 1,8 Nm
MT190B-040NC40R02XD19-R5-L192-IK-AL	40	18	123	192	NC40	2	21800	2,70		2+1		
MT190B-040NC40R02XD19-R5-L282-IK-AL	40	18	213	282	NC40	2	15600	3,70		2+1		

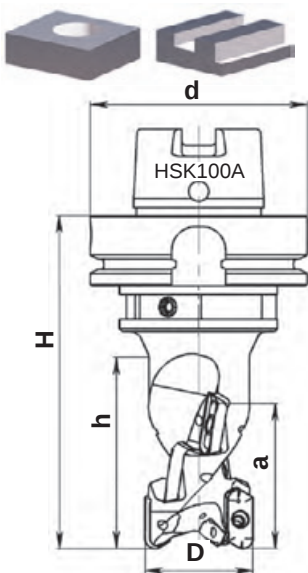
Peripheral inserts
+
Drilling inserts

MT190LB...AL-B

Balanced long edge spiral flute drilling endmill for machining aluminium alloys



- *Cutter body is adapted for face inserts with corner radius from 0,4 to 4,0 mm.
- *Inserts with corner radius $r > 0,4$ mm are established **ONLY** on face.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aerospace details.
- *High spiral flute long edge milling cutter with fully overlapping inserts.
- *It offers a wide range of corner radius options.
- *After each change of inserts or turn of a cutting edge before installation on the machine tool repeated balancing of mills is necessary.



Taper Hollow Shank HSK DIN 69893 Form A

MT 190LB-H...XD19-IK-AL-HSC-B for high speed cutting up to 5000 m/min

Code key	Dimensions, mm						n_{max} RPM	kg	peripheral inserts		face inserts		No.	No.	No.	No.	No.
	D	a	H	h	d	Z				No.		No.					
MT190LB-040H100AR02XD19-50-IK-AL-HSC-B	40	50	125	70	100	2	31300	1,20	XDHX190404FR-AL	4	XDHX1904...FR-AL	2	ADHT10T304FR-AL	1	T400955-15A + T250555-08A	6+1	7015-T 5,0 Nm + 7008-TP 1,8 Nm
MT190LB-040H100AR02XD19-70-IK-AL-HSC-B	40	70	145	90	100	2	26800	1,40		6		2		1		8+1	
MT190LB-050H100AR02XD19-70-IK-AL-HSC-B	50	70	145	90	100	2	27900	1,60		6		2		2		8+2	
MT190LB-050H100AR02XD19-85-IK-AL-HSC-B	50	85	155	100	100	2	23900	2,00		8		2		2		10+2	

MT 190LB-H...XD19-IK-AL-B for cutting speed up to 2000 m/min

Code key	Dimensions, mm						n_{max} RPM	kg	peripheral inserts		face inserts		No.	No.	No.	No.	No.
	D	a	H	h	d	Z				No.		No.					
MT190LB-040H100AR02XD19-50-IK-AL-B	40	50	125	70	100	2	21800	1,20	XDHT190404FR-AL	4	XDHT1904...FR-AL	2	ADHT10T304FR-AL	1	T400955-15A + T250555-08A	6+1	7015-T 6,0 Nm + 7008-TP 1,8 Nm
MT190LB-040H100AR02XD19-70-IK-AL-B	40	70	145	90	100	2	18700	1,40		6		2		1		8+1	
MT190LB-050H100AR02XD19-70-IK-AL-B	50	70	145	90	100	2	18900	1,60		6		2		2		8+2	
MT190LB-050H100AR02XD19-85-IK-AL-B	50	85	155	100	100	2	16200	2,00		8		2		2		10+2	

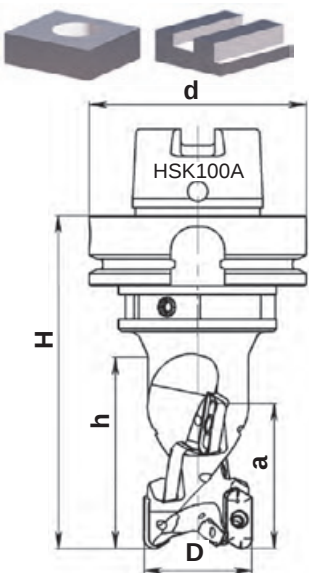
Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT190LB...-R5..AL-B

Balanced long edge spiral flute drilling endmill for machining aluminium alloys



- *Cutter body is adapted for face inserts with corner radius of 5,0 mm.
- *Inserts with corner radius $r = 5,0$ mm are established **ONLY** on face.
- *Suitable for ramping.
- *Best productivity in machining Aluminium alloys from aero-space details.
- *High spiral flute long edge milling cutter with fully overlapping inserts.
- *It offers a wide range of corner radius options.
- *After each change of inserts or turn of a cutting edge before installation on the machine tool repeated balancing of mills is necessary.



Taper Hollow Shank HSK DIN 69893 Form A

MT 190LB-H...XD19-R5-IK-AL-HSC-B for high speed cutting up to 5000 m/min

Code key	Dimensions, mm						n _{max} RPM	kg	peripheral inserts		face inserts		No.	No.	No.	No.
	D	a	H	h	d	Z			No.	No.	No.	No.				
MT190LB-040H100AR02XD19-R5-050-IK-AL-HSC-B	40	50	125	70	100	2	31300	1,20	XDHX190404FR-AL	4	XDHX190450FR-AL	2	ADHT10T304FR-AL	1	T400955-15A + T250555-08AP	6+1
MT190LB-040H100AR02XD19-R5-070-IK-AL-HSC-B	40	70	145	90	100	2	26800	1,40		6		2		1		8+1
MT190LB-050H100AR02XD19-R5-070-IK-AL-HSC-B	50	70	145	90	100	2	27900	1,60		6		2		2		8+2
MT190LB-050H100AR02XD19-R5-085-IK-AL-HSC-B	50	85	155	100	100	2	23900	2,00		8		2		2		10+2

MT 190LB-H...XD19-R5-IK-AL-B for cutting speed up to 2000 m/min

Code key	Dimensions, mm						n _{max} RPM	kg	peripheral inserts		face inserts		No.	No.	No.	No.
	D	a	H	h	d	Z			No.	No.	No.	No.				
MT190LB-040H100AR02XD19-R5-050-IK-AL-B	40	50	125	70	100	2	21800	1,20	XDHT190404FR-AL	4	XDHT190450FR-AL	2	ADHT10T304FR-AL	1	T400955-15A + T250555-08AP	6+1
MT190LB-040H100AR02XD19-R5-070-IK-AL-B	40	70	145	90	100	2	18700	1,40		6		2		1		8+1
MT190LB-050H100AR02XD19-R5-070-IK-AL-B	50	70	145	90	100	2	18900	1,60		6		2		2		8+2
MT190LB-050H100AR02XD19-R5-085-IK-AL-B	50	85	155	100	100	2	16200	2,00		8		2		2		10+2

Balancing equipment	Balancing screw	Balancing screwdriver
		
B510805	H600500-30	7003H

MT290L...AL**Long edge milling cutter for machining aluminium alloys**

*Cutter body is adapted for face inserts with corner radius from 0,4 to 4,0 mm.

*Inserts with corner radius $r > 0,4$ mm are established ONLY on a face.

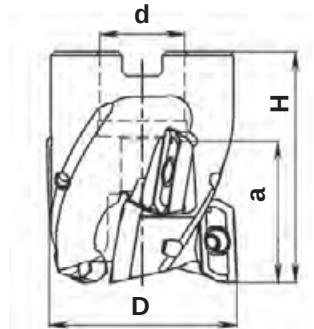
*High spiral flute long edge milling cutter with fully overlapping inserts.

*It offers a wide range of corner radius options, especially for aerospace details.

*Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.

*Two performances:

- with inserts XDHX19... for high cutting speed up to 5000 m/min.
- with inserts XDHT19... for cutting speed up to 2000 m/min.

**MT 290L...XD19-IK-AL-HSC** for high speed cutting up to 5000 m/min

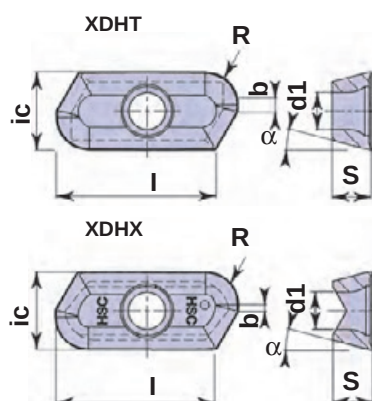
Code key	Dimensions, mm					n _{max} RPM	kg		No.		No.		
	D	a	H	d	Z								
MT290L-050A22R03XD19-36-IK-AL-HSC	50	36	60	22	3	20000	0,3	XDHX190404FR-AL	3	XDHX1904...FR-AL	3	T400955-15A	7015-T
MT290L-063A27R03XD19-50-IK-AL-HSC	63	50	75	27	3	15000	0,5		6		3		
MT290L-080A32R04XD19-66-IK-AL-HSC	80	66	88	32	4	12000	0,9		12		4		
MT290L-100A40R04XD19-85-IK-AL-HSC	100	85	105	40	4	10000	1,3		16		4		
MT290L-125A50R05XD19-114-IK-AL-HSC	125	114	140	50	5	8000	2,5		30		5		

peripheral
inserts

face
inserts

MT 290L...XD19-IK-AL for cutting speed up to 2000 m/min

Code key	Dimensions, mm					n _{max} RPM	kg		No.		No.		
	D	a	H	d	Z								
MT290L-050A22R03XD19-36-IK-AL	50	36	60	22	3	13000	0,3	XDHT190404FR-AL	3	XDHT1904...FR-AL	3	T400955-15A	7015-T
MT290L-063A27R03XD19-50-IK-AL	63	50	75	27	3	10000	0,5		6		3		
MT290L-080A32R04XD19-66-IK-AL	80	66	88	32	4	8000	0,9		12		4		
MT290L-100A40R04XD19-85-IK-AL	100	85	105	40	4	6000	1,3		16		4		
MT290L-125A50R05XD19-114-IK-AL	125	114	140	50	5	5000	2,5		30		5		



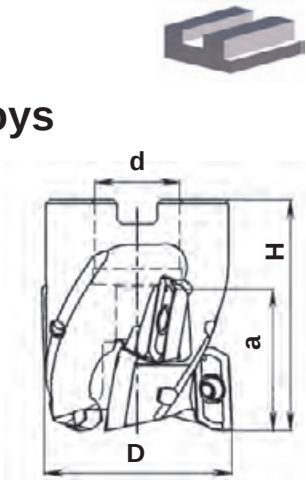
Code key		Carbide grade					Dimensions				
		P	M	K	N						
					HWN15	HCN10	ic	I	S	d1	r
							mm				
XDHT190402FR-AL	XDHX190402FR-AL				●		9,52	19,0	4,76	4,65	0,2
XDHT190404FR-AL	XDHX190404FR-AL				●	●	9,52	19,0	4,76	4,65	0,4
XDHT190408FR-AL	XDHX190408FR-AL				●	●	9,52	19,0	4,76	4,65	0,8
XDHT190412FR-AL	XDHX190412FR-AL				●		9,52	19,0	4,76	4,65	1,2
XDHT190416FR-AL	XDHX190416FR-AL				●		9,52	19,0	4,76	4,65	1,6
XDHT190420FR-AL	XDHX190420FR-AL				●	●	9,52	19,0	4,76	4,65	2,0
XDHT190425FR-AL	XDHX190425FR-AL				●		9,52	19,0	4,76	4,65	2,5
XDHT190432FR-AL	XDHX190432FR-AL				●		9,52	19,0	4,76	4,65	3,2
XDHT190440FR-AL	XDHX190440FR-AL				●	●	9,52	19,0	4,76	4,65	4,0

MT290L...-R5..AL

Long edge milling cutter for machining aluminium alloys



- *Cutter body is adapted for face inserts with corner radius of 5,0 mm.
- *Inserts with corner radius $r = 5,0$ mm are established ONLY on a face.
- *High spiral flute long edge milling cutter with fully overlapping inserts.
- *It offers a wide range of corner radius options, especially for aerospace details.
- *Over 1000 m/min it is necessary a complete system, tool mounting and cutting tool, as one unit according the G2,5 class ISO 1940 is balanced.
- *Two performances:
 - with inserts XDHX19... for high cutting speed up to 5000 m/min.
 - with inserts XDHT19... for cutting speed up to 2000 m/min.

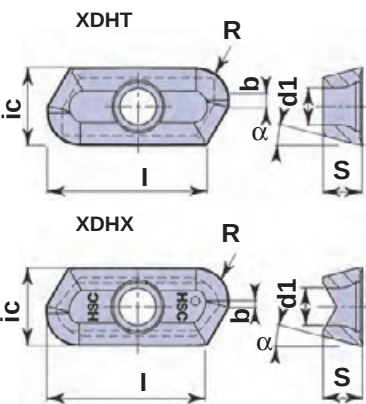


MT 290L...XD19-R5-IK-AL-HSC for high speed cutting up to 5000 m/min

Code key	Dimensions, mm					n_{max} RPM	kg		No.		No.		
	D	a	H	d	Z								
MT290L-050A22R03XD19-R5-36-IK-AL-HSC	50	36	60	22	3	20000	0,3	XDHX190404FR-AL	3	XDHX190450FR-AL	3	T400955-15A	7015-T
MT290L-063A27R03XD19-R5-50-IK-AL-HSC	63	50	75	2272	3	15000	0,5		6		3		
MT290L-080A32R04XD19-R5-66-IK-AL-HSC	80	66	88	32	4	12000	0,9		12		4		
MT290L-100A40R04XD19-R5-85-IK-AL-HSC	100	85	105	40	4	10000	1,3		16		4		
MT290L-125A50R05XD19-R5-114-IK-AL-HSC	125	114	140	50	5	8000	2,5		30		5		

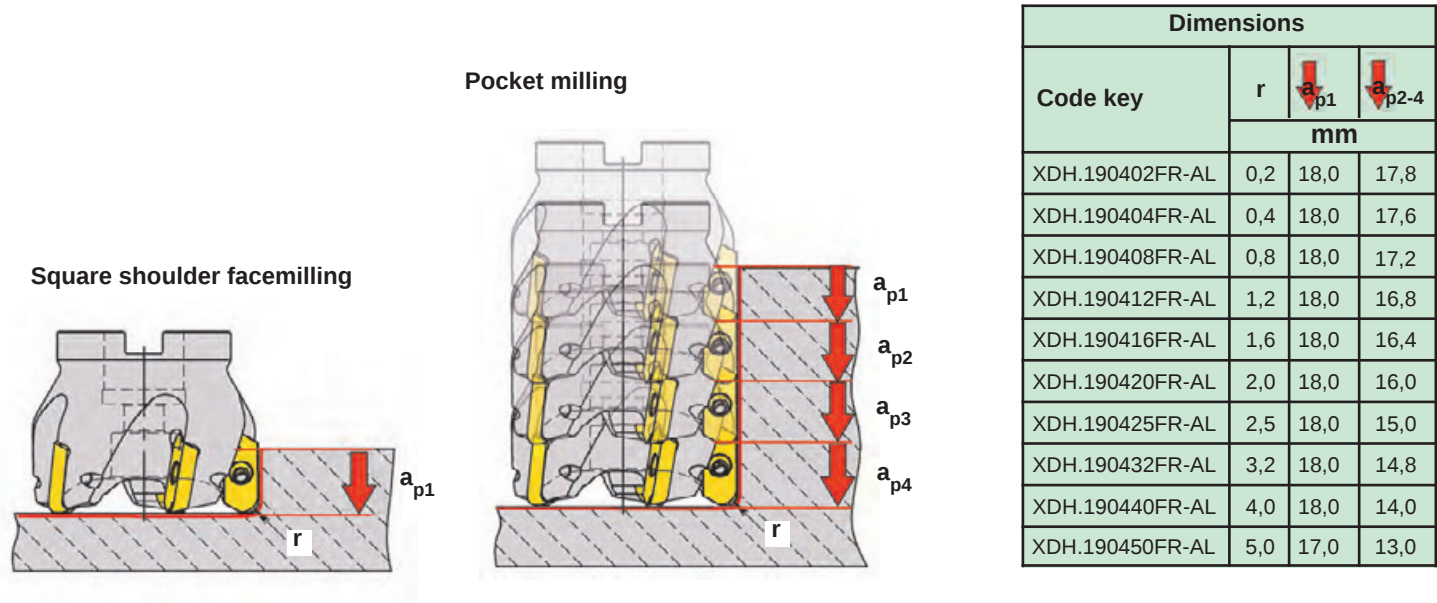
MT 290L...XD19-IK-AL-R5 for cutting speed up to 2000 m/min

Code key	Dimensions, mm					n_{max} RPM	kg	peripheral inserts	No.	face inserts	No.		
	D	a	H	d	Z								
MT290L-050A22R03XD19-R5-36-IK-AL	50	36	60	22	3	13000	0,3	XDHT190404FR-AL	3	XDHT1904FR-AL	3	T400955-15A	7015-T
MT290L-063A27R03XD19-R5-50-IK-AL	63	50	75	27	3	10000	0,5		6		3		
MT290L-080A32R04XD19-R5-66-IK-AL	80	66	88	32	4	8000	0,9		12		4		
MT290L-100A40R04XD19-R5-85-IK-AL	100	85	105	40	4	6000	1,3		16		4		
MT290L-125A50R05XD19-R5-114-IK-AL	125	114	140	50	5	5000	2,5		30		5		

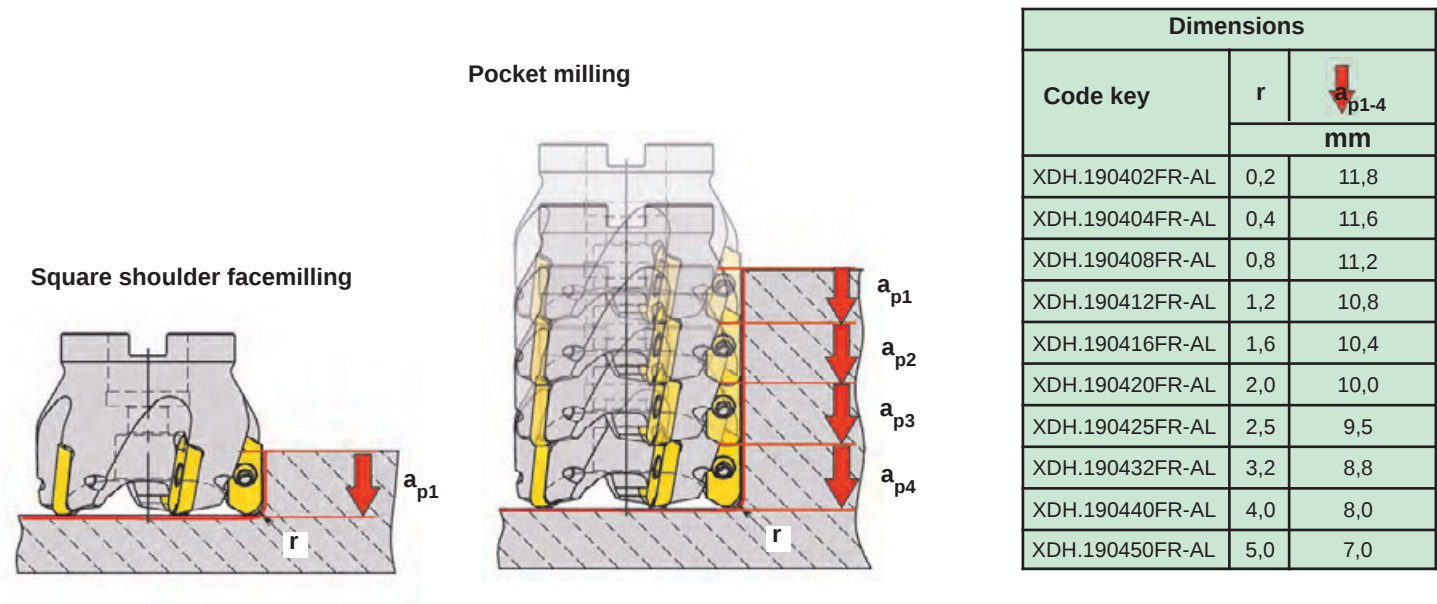


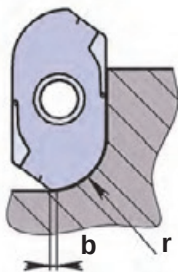
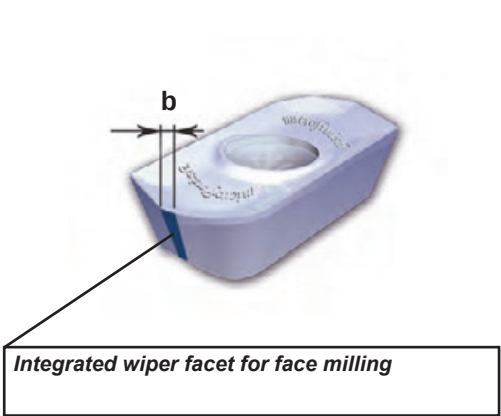
Code key		Carbide grade				Dimensions				
		P	M	K	N	ic	I	S	d1	r
					HWN15					
XDHT190450FR-AL	XDHX190450FR-AL				●	9,52	19,0	4,76	4,65	5,0

Strategy of semi-finishing operation for maximum productivity



Strategy of semi-finishing for high-quality surfaces of walls

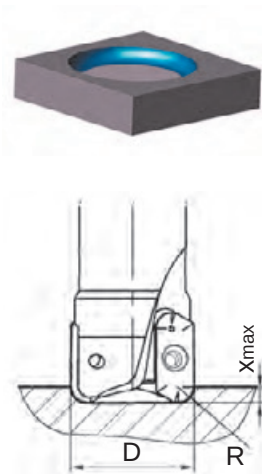




r, mm	b, mm
0,2	2,0
0,4	1,8
0,8	1,4
1,2	1,4
1,6	1,4
2,0	1,4
2,5	1,4
3,2	0,8
4,0	-
5,0	-

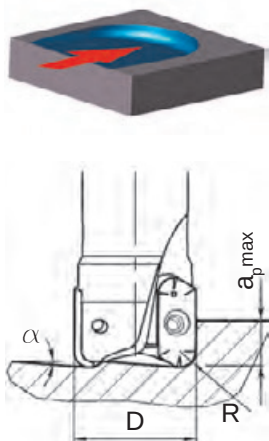
Application data for pocket milling

Axial plunging



AD10...	
D (mm)	X _{max} (mm) R0,2-4,0
16	1,70
18	2,11
19	2,24
20	2,39
22	2,70
25	2,55
32	2,40
40	2,28
50	2,26
63	2,10
80	1,75
100	1,79

Angled ramping



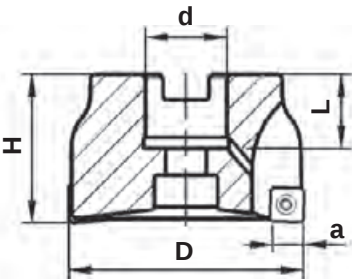
AD10...		
D (mm)	a _{p,max} (mm)	α (°)
R0,2-4,0		
16	10	18° 45'
18	10	16° 15'
19	10	15° 15'
20	10	14° 45'
22	10	13° 45'
25	10	10° 15'
32	10	6° 45'
40	10	4° 45'
50	10	3° 30'
63	10	2° 30'
80	10	1° 45'
100	10	1° 15'

MT290Z

Plunge facemills for machining titanium and aluminium alloys



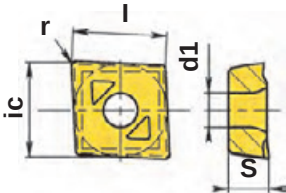
*Best solution for deep pocket.



MT 290Z-MO..-IK

Depth of cut up to 8 mm

Code key	Dimensions, mm						nmax RPM	 kg		No.		
	D	a	L	H	d	Z						
MT290Z-032A16R04MO09-IK	32	8	19	40	16	4	27000	0,1	MOET09T304..	4	T300755-08	7008-T 2,0 Nm
MT290Z-040A16R05MO09-IK	40	8	19	40	16	5	25000	0,2		5		
MT290Z-050A22R06MO09-IK	50	8	20	40	22	6	22000	0,4		6		
MT290Z-063A22R07MO09-IK	63	8	20	40	22	7	20000	0,6		7		



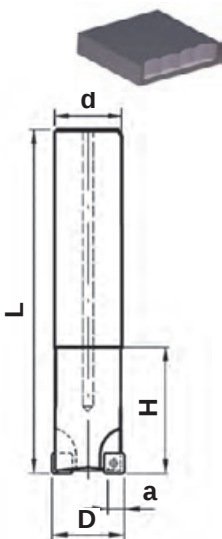
Code key	Carbide grade							Dimensions						
	P			M	K	S	N	H	ic	l	S	d1	r	
	HCP25C	HCP35		HCP35	HCP25C	HCS15	HCS35	HWN15						HCP25C
	mm													
MONT060202SN-S	●	●		○	●				○	6	6,5	2,38	2,5	0,2
MOET060202FN-AL								●		6	6,5	2,38	2,5	0,2
MOET060202FN-T						●	●			6	6,5	2,38	2,5	0,2
MOET060204EN-AL								●		6	6,5	2,38	2,5	0,4
MOET060204EN-T						●	●			6	6,5	2,38	2,5	0,4
MONT09T304SN-S		●		○						9	9,6	3,97	3,4	0,4
MOET09T304FN-AL								●		9	9,6	3,97	3,4	0,4
MOET09T304EN-T						●	●			9	9,6	3,97	3,4	0,4

MT190Z

Plunge endmills for machining titanium and aluminium alloys



*Best solution for deep pocket.

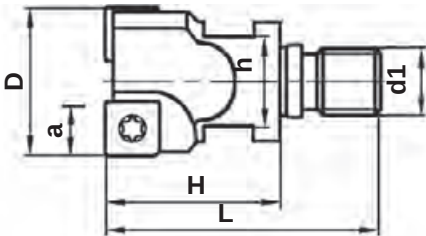


MT 190Z-Z...MO..-IK

Straight shank cylindrical

Code key	Dimensions, mm						nmax RPM	 kg		No.		
	D	a	H	L	d	Z						
MT190Z-016Z16R02MO06-IK	16	5	90	140	16	2	24000	0,3	MOET0602..	2	T220555-07	7008-T 0,8 Nm
MT190Z-020Z20R03MO06-IK	20	5	130	180	20	3	22000	0,3		3		
MT190Z-025Z25R02MO09-IK	25	8	144	200	25	2	20000	0,4	MOET09T304..	2	T300755-08	7008-T 2,0 Nm
MT190Z-032Z25R04MO09-IK	32	8	144	200	25	4	17000	0,7		4		
MT190Z-040Z32R05MO09-IK	40	8	140	200	32	5	15000	1,2		5		
MT190Z-050Z32R06MO09-IK	50	8	140	200	32	6	14000	1,3		6		

*It is possibly to design mills with straght shank with drive flat (Weldon).

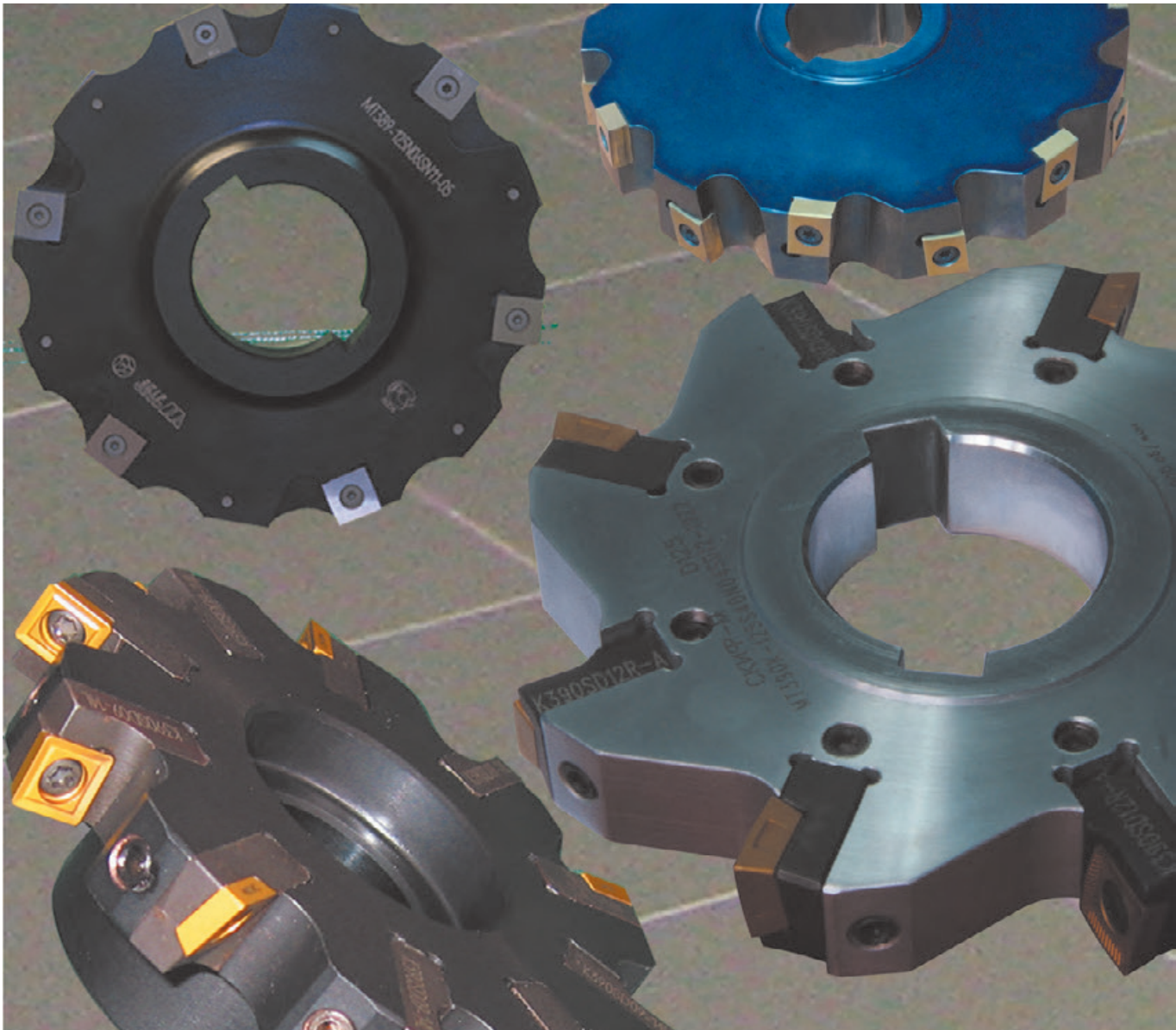


MT 190Z-G...MO..-IK

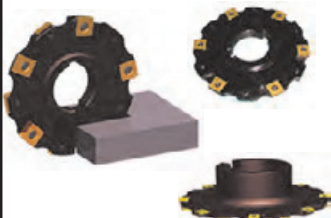
Screw fit shank ADD

Code key	Dimensions, mm							 kg		No.		
	D	a	H	L	d1	h	Z					
MT190Z-016G08R02MO06-IK	16	5	30	48	M08	10	2	0,1	MOET0602..	2	T220555-07	7008-T 0,8 Nm
MT190Z-020G10R03MO06-IK	20	5	35	54	M10	15	3	0,2		3		
MT190Z-025G12R02MO09-IK	25	8	40	62	M12	17	2	0,3	MOET09T304..	2	T300755-08	7008-T 2,0 Nm
MT190Z-032G16R04MO09-IK	32	8	43	66	M16	22	4	0,5		4		
MT190Z-040G20R05MO09-IK	40	8	45	77	M20	30	5	0,7		5		

*Types and mounting dimensions shank see "Tool Holder" page 265.



Choice of side and facemills

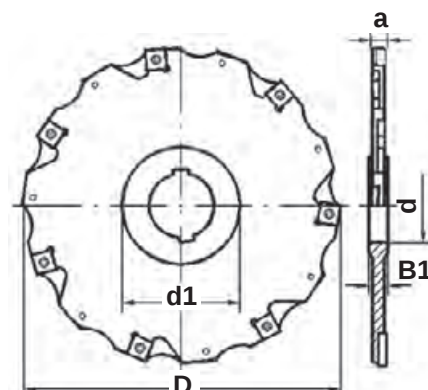
Types of mills	Insert type	Range Ø, mm	Depth of cut up to, mm	Workpiece material					Working areas		
				P	M	K	S	N	Roughing	Semi-finishing	Finishing
Slitting and slot milling 	MT389-S...N Page 228	Page 37	100-1010	4-12	••••	••	••	••	••••	••	•
	MT389-R...N Page 230	Page 37	100-160	5-12	••••	••	••	••	••••	••	•
Slot milling and square shoulder milling 	MT390-S...N Page 232-235	CN08...	80-315	12-14,5	••••	••	••	••	••••	••	•
		CN11...	100-315	14,5-20,5	••••	••	••	••	••••	••	•
		CN15...	125-315	20,5-28,5	••••	••	••	••	••••	••	•
Slot milling and square shoulder milling 	MT390K-S...N Page 236-239	SD09...	80-200	12-16	••••	•	••••	••	••••	••••	••••
		SD12...	100-315	16-22	••••	••••	••••	••	••••	••••	••••
		AD15M5...	100-315	22-27	••••	••••	••	••	••••	••••	••••
		TP22...	125-315	28-32	••••	•	••••	••	••••	••••	••••
	MT390K-R...N Page 240-241	SD09...	80-200	12-16	••••	•	••••	••	••••	••••	••••
		SD12...	100-315	16-22	••••	••••	••••	••	••••	••••	••••
		AD15M5...	100-315	22-27	••••	••••	••	••	••••	••••	••••
		TP22...	125-315	28-32	••••	•	••••	••	••••	••••	••••
Square shoulder milling 	MT390K-S...R Page 244-245	CC06...	80-200	4	••••	•	••••	••	••••	••••	••
		SD09...	80-200	7	••••	•	••••	••	••••	••••	••••
		SD12...	100-315	9	••••	••••	••••	••	••••	••••	••••
		AD15M5...	100-315	11	••••	••••	••	••	••••	••••	••••
		TP22...	125-315	16	••••	•	••••	••	••••	••••	••••
	MT390K-R...R Page 246-247	CC06...	80-200	4	••••	•	••••	••	••••	••••	••
		SD09...	80-200	7	••~••	•	••~••	••	••~••	••~••	••~••
		SD12...	100-315	9	••~••	••~••	••~••	••	••~••	••~••	••~••
		AD15M5...	100-315	11	••~••	••~••	••	••	••~••	••~••	••~••
		TP22...	125-315	16	••~••	•	••~••	••	••~••	••~••	••~••
Square shoulder milling 	MT390K-S...L Page 248-249	CC06...	80-200	4	••~••	•	••~••	••	••~••	••~••	••
		SD09...	80-200	7	••~••	•	••~••	••	••~••	••~••	••~••
		SD12...	100-315	9	••~••	••~••	••~••	••	••~••	••~••	••~••
		AD15M5...	100-315	11	••~••	••~••	••	••	••~••	••~••	••~••
		TP22...	125-315	16	••~••	•	••~••	••	••~••	••~••	••~••
	MT390K-R...L Page 250-251	CC06...	80-200	4	••~••	•	••~••	••	••~••	••~••	••
		SD09...	80-200	7	••~••	•	••~••	••	••~••	••~••	••~••
		SD12...	100-315	9	••~••	••~••	••~••	••	••~••	••~••	••~••
		AD15M5...	100-315	11	••~••	••~••	••	••	••~••	••~••	••~••
		TP22...	125-315	16	••~••	•	••~••	••	••~••	••~••	••~••

MT389-S...N

Slitting cutters



*For slitting and grooving.
 *Excellent productivity.
 *Tangentially arranged inserts, embedded in the basic cutter body.
 *Four cutting edges per insert.
 *Best productivity with insert SEXT12...-T in machining titanium alloys and heat resistant alloys.



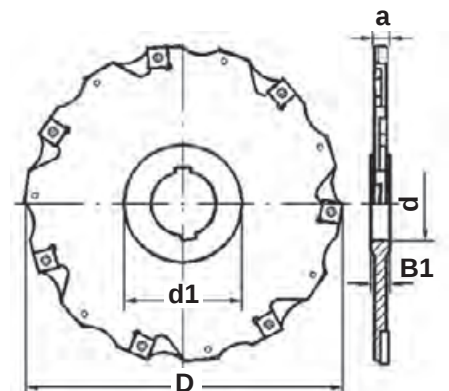
Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	d	d1	B1	Z						
MT389-100S32N05SN11-04	100	4	32	48	12	2x5	10000	0,3	SNEX11T1ZZ-M	10	T300390-07	7007-T
MT389-125S40N06SN11-04	125	4	40	58	12	2x6	9000	0,5		12		
MT389-160S40N07SN11-04	160	4	40	68	12	2x7	8000	0,8		14		
MT389-200S50N08SN11-04	200	4	50	72	12	2x8	6500	1,2		16		
MT389-250S50N11SN11-04	250	4	50	72	12	2x11	5500	1,7		22		
MT389-100S32N05SN11-05	100	5	32	48	12	2x5	10000	0,3	SNEX1102ZZ-M	10	T300490-07	7007-T
MT389-125S40N06SN11-05	125	5	40	58	12	2x6	9000	0,5		12		
MT389-160S40N07SN11-05	160	5	40	68	12	2x7	8000	0,8		14		
MT389-200S50N08SN11-05	200	5	50	72	12	2x8	6500	1,2		16		
MT389-250S50N11SN11-05	250	5	50	72	12	2x11	5500	1,7		22		
MT389-100S32N05SN12-06	100	6	32	48	12	2x5	9500	0,3	SNEX1203ZZ SNEX1203ZZ-T SNEX1203ZZ-M	10	T400590-15	7015-T
MT389-125S40N06SN12-06	125	6	40	58	12	2x6	8500	0,6		12		
MT389-160S40N07SN12-06	160	6	40	68	12	2x7	7500	0,8		14		
MT389-200S50N08SN12-06	200	6	50	72	12	2x8	6500	1,2		16		
MT389-250S50N11SN12-06	250	6	50	72	12	2x11	5500	1,7		22		
MT389-100S32N05SN12-07	100	7	32	48	12	2x5	9500	0,3	SNEX1204ZT SNEX1204ZZ-T SNEX1204ZZ-M	10	T400590-15	7015-T
MT389-125S40N06SN12-07	125	7	40	58	12	2x6	8500	0,6		12		
MT389-160S40N07SN12-07	160	7	40	68	12	2x7	7500	0,8		14		
MT389-200S50N08SN12-07	200	7	50	72	12	2x8	6500	1,2		16		
MT389-250S50N11SN12-07	250	7	50	72	12	2x11	5500	1,7		22		
MT389-100S32N05SN12-08	100	8	32	48	12	2x5	9500	0,4	SNEX1204ZT SNEX1204ZZ-T SNEX1204ZZ-M	10	T400690-15	7015-T
MT389-125S40N06SN12-08	125	8	40	58	12	2x6	8500	0,6		12		
MT389-160S40N07SN12-08	160	8	40	68	12	2x7	7500	0,8		14		
MT389-200S50N08SN12-08	200	8	50	72	12	2x8	6500	1,2		16		
MT389-250S50N11SN12-08	250	8	50	72	12	2x11	5500	1,7		22		
MT389-315S50N13SN12-08	315	8	50	72	12	2x13	4500	6,0		26		
MT389-400S50N17SN12-08	400	8	50	72	12	2x17	4500	8,0		34		
MT389-630S80N30SN12-08	630	8	80	240	12	2x30	2500	19,0		60		
MT389-630S80N21SN12-08	630	8	80	240	12	2x21	2500	19,0		42		
MT389-710S80N23SN12-08	710	8	80	240	16	2x23	2000	19,0		46		

MT389-S...N

Slitting cutters



*For slitting and grooving.
 *Excellent productivity.
 *Tangentially arranged inserts,
 embedded in the basic cutter body.
 *Four cutting edges per insert.
 *Best productivity with insert
 SEXT12...-T in machining titanium
 alloys and heat resistant alloys.



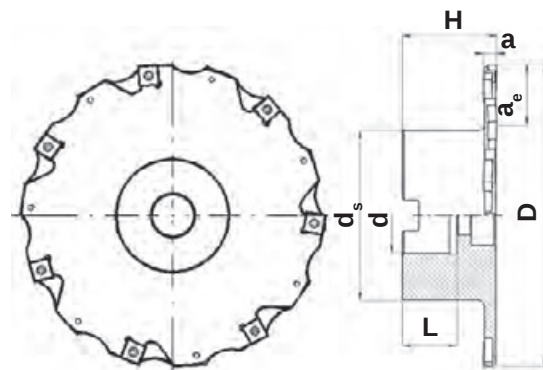
Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	d	d1	B1	Z						
MT389-100S32N05SN12-09	100	9	32	48	12	2x5	7500	0,4	SNEX1205ZT SNEX1205ZZ-T SNEX1205ZZ-M	10	T400890-15	7015-T
MT389-125S40N06SN12-09	125	9	40	58	12	2x6	6500	0,6		12		
MT389-160S40N07SN12-09	160	9	40	68	12	2x7	6000	0,9		14		
MT389-200S50N08SN12-09	200	9	50	72	12	2x8	5000	1,3		16		
MT389-250S50N11SN12-09	250	9	50	72	12	2x11	4500	1,9		22		
MT389-100S32N05SN12-10	100	10	32	48	12	2x5	7500	0,4	SNEX1205ZT SNEX1205ZZ-T SNEX1205ZZ-M	10	T400890-15	7015-T
MT389-125S40N06SN12-10	125	10	40	58	12	2x6	6500	0,6		12		
MT389-160S40N07SN12-10	160	10	40	68	12	2x7	6000	0,9		14		
MT389-200S50N08SN12-10	200	10	50	72	12	2x8	5000	1,3		16		
MT389-250S50N11SN12-10	250	10	50	72	12	2x11	4500	2,0		22		
MT389-315S50N13SN12-10	315	10	50	72	12	2x13	4500	6,0		26		
MT389-400S50N17SN12-10	400	10	50	72	12	2x17	4500	8,0		34		
MT389-510S80N24SN12-10	510	10	80	240	12	2x24	3000	12,4		48		
MT389-630S80N30SN12-10	630	10	80	240	12	2x30	2500	19,0		60		
MT389-800S80N27SN12-10	800	10	80	240	12	2x27	1600	19,0		54		
MT389-1010S120N34SN12-10	1010	10	120	240	12	2x34	625	19,0		68		
MT389-100S32N03SN12-11	100	11	32	48	14	3x3	7500	0,4	SNEX1205ZT SNEX1205ZZ-T SNEX1205ZZ-M	9	T400890-15	7015-T
MT389-125S40N04SN12-11	125	11	40	58	14	3x4	6500	0,6		12		
MT389-160S40N05SN12-11	160	11	40	68	14	3x5	6000	0,9		15		
MT389-200S50N05SN12-11	200	11	50	72	14	3x5	5000	1,4		15		
MT389-250S50N07SN12-11	250	11	50	72	14	3x7	4500	2,0		21		
MT389-100S32N03SN12-12	100	12	32	48	14	3x3	7500	0,4	SNEX1205ZT SNEX1205ZZ-T SNEX1205ZZ-M	9	T400890-15	7015-T
MT389-125S40N04SN12-12	125	12	40	58	14	3x4	6500	0,6		12		
MT389-160S40N05SN12-12	160	12	40	68	14	3x5	6000	0,9		15		
MT389-200S50N05SN12-12	200	12	50	72	14	3x5	5000	1,4		15		
MT389-250S50N07SN12-12	250	12	50	72	14	3x7	4500	2,1		21		

MT389-R...N

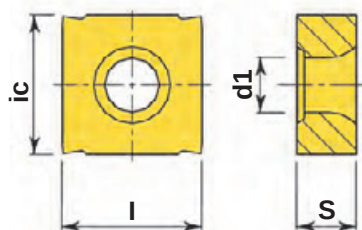
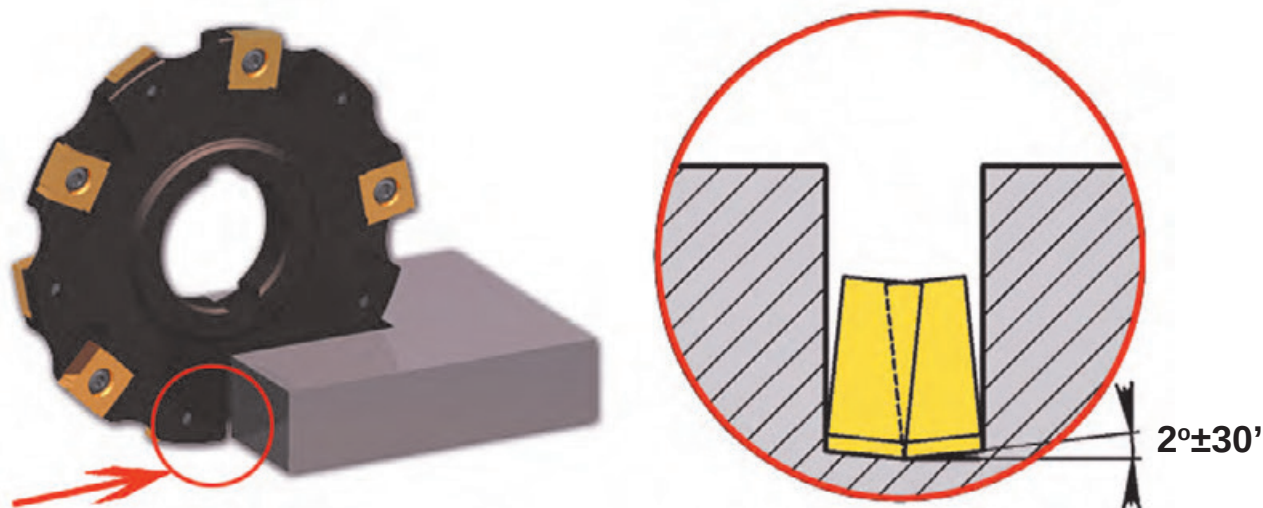
Slitting cutters



*For slitting and grooving.
 *Excellent productivity.
 *Tangentially arranged inserts, embedded in the basic cutter body.
 *Four cutting edges per insert.
 *Best productivity with insert SEXT12...-T in machining titanium alloys and heat resistant alloys.



Code key	Dimensions, mm							n _{max} RPM	kg		No.		
	D	a	d	H	a _e	d _s	Z						
MT389-100A27R05SN11-05N	100	5	27	40	23	48	2x5	10000	1,5	SNEX1102ZZ-M	10	T300490-07	7007-T
MT389-125A32R06SN11-05N	125	5	32	50	24,5	70	2x6	9000	3,0		12		
MT389-160A40R07SN11-05N	160	5	40	50	30	90	2x7	8000	4,4		14		
MT389-100A27R05SN12-06N	100	6	27	40	23	48	2x5	9500	1,5	SNEX1203ZZ SNEX1203ZZ-M	10	T400590-15	7015-T
MT389-125A32R06SN12-06N	125	6	32	50	24,5	70	2x6	8500	3,0		12		
MT389-160A40R07SN12-06N	160	6	40	50	30	90	2x7	7500	4,4		14		
MT389-100A27R05SN12-07N	100	7	27	40	23	48	2x5	9500	1,5	SNEX1204ZT SNEX1204ZZ-M	10	T400590-15	7015-T
MT389-125A32R06SN12-07N	125	7	32	50	24,5	70	2x6	8500	3,0		12		
MT389-160A40R07SN12-07N	160	7	40	50	30	90	2x7	7500	4,4		14		
MT389-100A27R05SN12-08N	100	8	27	40	23	48	2x5	9500	1,8	SNEX1204ZT SNEX1204ZZ-M	10	T400790-15	7015-T
MT389-125A32R06SN12-08N	125	8	32	50	24,5	70	2x6	8500	3,0		12		
MT389-160A40R07SN12-08N	160	8	40	50	30	90	2x7	7500	4,4		14		
MT389-100A27R05SN12-09N	100	9	27	40	23	48	2x5	7500	1,8	SNEX1205ZT SNEX1205ZZ-M	10	T400890-15	7015-T
MT389-125A32R06SN12-09N	125	9	32	50	24,5	70	2x6	6500	3,0		12		
MT389-160A40R07SN12-09N	160	9	40	50	30	90	2x7	6000	4,6		14		
MT389-100A27R05SN12-10N	100	10	27	40	23	48	2x5	7500	1,8	SNEX1205ZT SNEX1205ZZ-M	10	T400890-15	7015-T
MT389-125A32R06SN12-10N	125	10	32	50	24,5	70	2x6	6500	3,5		12		
MT389-160A40R07SN12-10N	160	10	40	50	30	90	2x7	6000	4,6		14		
MT389-100A27R03SN12-11N	100	11	27	40	23	48	3x3	7500	1,8	SNEX1205ZT SNEX1205ZZ-M	9	T400890-15	7015-T
MT389-125A32R04SN12-11N	125	11	32	50	24,5	70	3x4	6500	3,5		12		
MT389-160A40R05SN12-11N	160	11	40	50	30	90	3x5	6000	4,6		15		
MT389-100A27R03SN12-12N	100	12	27	40	23	48	3x3	7500	1,8	SNEX1205ZT SNEX1205ZZ-M	9	T400890-15	7015-T
MT389-125A32R04SN12-12N	125	12	32	50	24,5	70	3x4	6500	3,5		12		
MT389-160A40R05SN12-12N	160	12	40	50	30	90	3x5	6000	4,6		15		



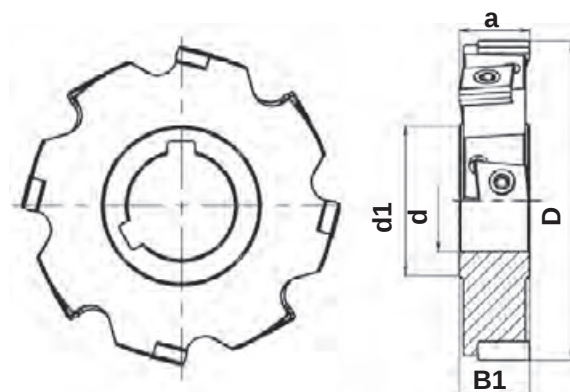
Code key	Carbide grade											Dimensions						
	P				M				K	N	S	is	l	S	d1	r	α	
	HCP35U	HWP40			HWP40	HWS30					HWS30							
																		mm
SNEX11T1ZZ-M	●	●			○							11,0	11,0	2,30	3,70	-	0	
SNEX1102ZZ-M	●	●			○							11,0	11,0	2,70	3,70	-	0	
SNEX1203ZZ	●	●			○							12,7	12,7	3,18	5,00	-	0	
SNEX1203ZZ-T						●					●	12,7	12,7	3,18	5,00	-	0	
SNEX1203ZZ-M	●	●			○							12,7	12,7	3,18	5,00	-	0	
SNEX1204ZZ	●	●			○							12,7	12,7	4,76	5,00	-	0	
SNEX1204ZZ-T						●					●	12,7	12,7	4,76	5,00	-	0	
SNEX1204ZZ-M	●	●			○							12,7	12,7	4,76	5,00	-	0	
SNEX1205ZZ	●	●			○							12,7	12,7	5,40	5,00	-	0	
SNEX1205ZZ-T						●					●	12,7	12,7	5,40	5,00	-	0	
SNEX1205ZZ-M	●	●			○							12,7	12,7	5,40	5,00	-	0	

MT390-...CN08

Fixed pocket side and facemills



- *The basic purpose - milling of slots.
- *Excellent productivity.
- *Tangentially arranged inserts with 4 cutting edges.



Width of cut from 12 to 14 mm

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	d	d1	B1	Z						
MT390-080S27N04CN08-12	80	12	27	38	15	2x4	9000	0,9	CNEX08T3AZTN	8	T300755-08	7008-T
MT390-100S32N05CN08-12	100	12	32	48	15	2x5	8000	1,3		10		
MT390-125S40N05CN08-12	125	12	40	58	15	2x5	7000	2,3		10		
MT390-160S40N06CN08-12	160	12	40	58	15	2x6	6000	3,8		12		
MT390-200S50N07CN08-12	200	12	50	72	15	2x7	5500	6,2		14		
MT390-250S60N08CN08-12	250	12	60	84	15	2x8	4500	10,7		16		
MT390-315S60N10CN08-12	315	12	60	84	15	2x10	8000	1,6		20		
MT390-080S27N04CN08-14	80	14	27	38	15	2x4	9000	0,9		8		
MT390-100S32N05CN08-14	100	14	32	48	15	2x5	8000	1,3		10		
MT390-125S40N05CN08-14	125	14	40	58	15	2x5	7000	2,3		10		
MT390-160S40N06CN08-14	160	14	40	58	15	2x6	6000	3,8		12		
MT390-200S50N07CN08-14	200	14	50	72	15	2x7	5500	6,2		14		
MT390-250S60N08CN08-14	250	14	60	84	15	2x8	4500	10,7		16		
MT390-315S60N10CN08-14	315	14	60	84	15	2x10	8000	1,6		20		

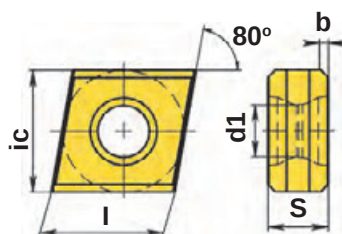
*The order of mills of non-standard width in a range of 12-14,5 mm is possible.

Example of a designation of the order of a mill of non-standard width a=13,5 mm in diameter of 100 mm:

MT390-100S60N08CN08 - 13,5

Length of the cutting edge of insert, mm

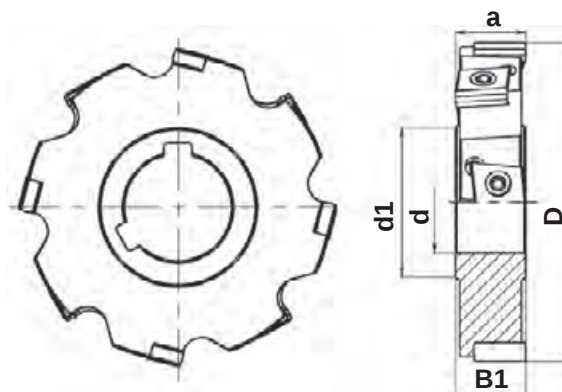
Cutter width, mm



Code key	Carbide grade										Dimensions				
	P		M		K		S		H		ic	I	S	d1	b
	HCP35U	HWP40	HWP40		HWK20										
CNEX08T3AZTN	●	●	○		●						8,0	8,1	3,97	3,4	0,5
CNEX1105AZTN	●	●	○		●						10	12,9	5,4	4,7	0,5
CNEX1506AZTN	●	●	○		●						12,7	16,2	6,35	5,5	0,5

MT390-...CN11**Fixed pocket side and facemills**

- *The basic purpose - milling of slots.
- *Excellent productivity.
- *Tangentially arranged inserts with 4 cutting edges.



Width of cut from 16 to 20 mm

Code key	Dimensions, mm						n _{max} RPM	 kg		No.		
	D	a	d	d1	B1	Z						
MT390-100S32N04CN11-16	100	16	32	48	21	2x4	7000	2,6		8		
MT390-125S40N05CN11-16	125	16	40	58	21	2x5	6500	4,3		10		
MT390-160S40N06CN11-16	160	16	40	58	21	2x6	5500	6,9		12		
MT390-200S50N07CN11-16	200	16	50	72	21	2x7	5000	12,0		14		
MT390-250S60N08CN11-16	250	16	60	84	21	2x8	8000	1,9		16		
MT390-315S60N10CN11-16	315	16	60	84	21	2x10	7000	3,0		20		
MT390-100S32N04CN11-18	100	18	32	48	21	2x4	7000	2,6		8		
MT390-125S40N05CN11-18	125	18	40	58	21	2x5	6500	4,3		10		
MT390-160S40N06CN11-18	160	18	40	58	21	2x6	5500	6,9		12		
MT390-200S50N07CN11-18	200	18	50	72	21	2x7	5000	12,0		14		
MT390-250S60N08CN11-18	250	18	60	84	21	2x8	8000	1,9		16		
MT390-315S60N10CN11-18	315	18	60	84	21	2x10	7000	3,0		20		
MT390-100S32N04CN11-20	125	20	32	48	21	2x4	7000	2,6		8		
MT390-125S40N05CN11-20	125	20	40	58	21	2x5	6500	4,3		10		
MT390-160S40N06CN11-20	160	20	40	58	21	2x6	5500	6,9		12		
MT390-200S50N07CN11-20	200	20	50	72	21	2x7	5000	12,0		14		
MT390-250S60N08CN11-20	250	20	60	84	21	2x8	8000	1,9		16		
MT390-315S60N10CN11-20	315	20	60	84	21	2x10	7000	3,0		20		

*The order of mills of non-standard width in a range of 14,5-20,5 mm is possible.

Example of a designation of the order of a mill of non-standard width a=17 mm in diameter of 100 mm:

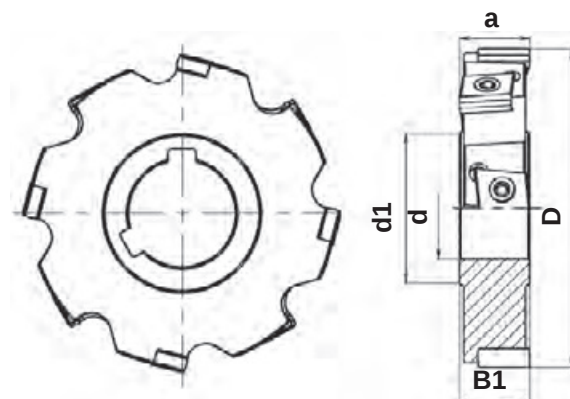
MT390-100S32N04CN11 - 17

Length of the cutting edge of insert, mm

Cutter width, mm

MT390-...CN15**Fixed pocket side and facemills**

- *The basic purpose - milling of slots.
- *Excellent productivity.
- *Tangentially arranged inserts with 4 cutting edges.



Width of cut from 22 to 28 mm

Code key	Dimensions, mm						n _{max} RPM	kg		No.		
	D	a	d	d1	B1	Z						
MT390-125S40N04CN15-22	125	22	40	58	29	2x4	6500	4,8	CNEX1506AZTN	8	T451455-20	7020-T
MT390-160S40N05CN15-22	160	22	40	58	29	2x5	5500	7,6		10		
MT390-200S50N06CN15-22	200	22	50	72	29	2x6	5000	13,3		12		
MT390-250S60N08CN15-22	250	22	60	84	29	2x8	8000	2,2		16		
MT390-315S60N10CN15-22	315	22	60	84	29	2x10	7000	3,4		20		
MT390-125S40N04CN15-24	125	24	40	58	29	2x4	6500	4,8		8		
MT390-160S40N05CN15-24	160	24	40	58	29	2x5	5500	7,6		10		
MT390-200S50N06CN15-24	200	24	50	72	29	2x6	5000	13,3		12		
MT390-250S60N08CN15-24	250	24	60	84	29	2x8	8000	2,2		16		
MT390-315S60N10CN15-24	315	24	60	84	29	2x10	7000	3,4		20		
MT390-125S40N04CN15-26	125	26	40	58	29	2x4	6500	4,8		8		
MT390-160S40N05CN15-26	160	26	40	58	29	2x5	5500	7,6		10		
MT390-200S50N06CN15-26	200	26	50	72	29	2x6	5000	13,3		12		
MT390-250S60N08CN15-26	250	26	60	84	29	2x8	8000	2,2		16		
MT390-315S60N10CN15-26	315	26	60	84	29	2x10	7000	3,4		20		
MT390-125S40N04CN15-28	125	28	40	58	29	2x4	6500	4,8		8		
MT390-160S40N05CN15-28	160	28	40	58	29	2x5	5500	7,6		10		
MT390-200S50N06CN15-28	200	28	50	72	29	2x6	5000	13,3		12		
MT390-250S60N08CN15-28	250	28	60	84	29	2x8	8000	2,2		16		
MT390-315S60N10CN15-28	315	28	60	84	29	2x10	7000	3,4		20		

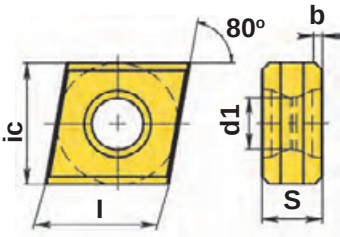
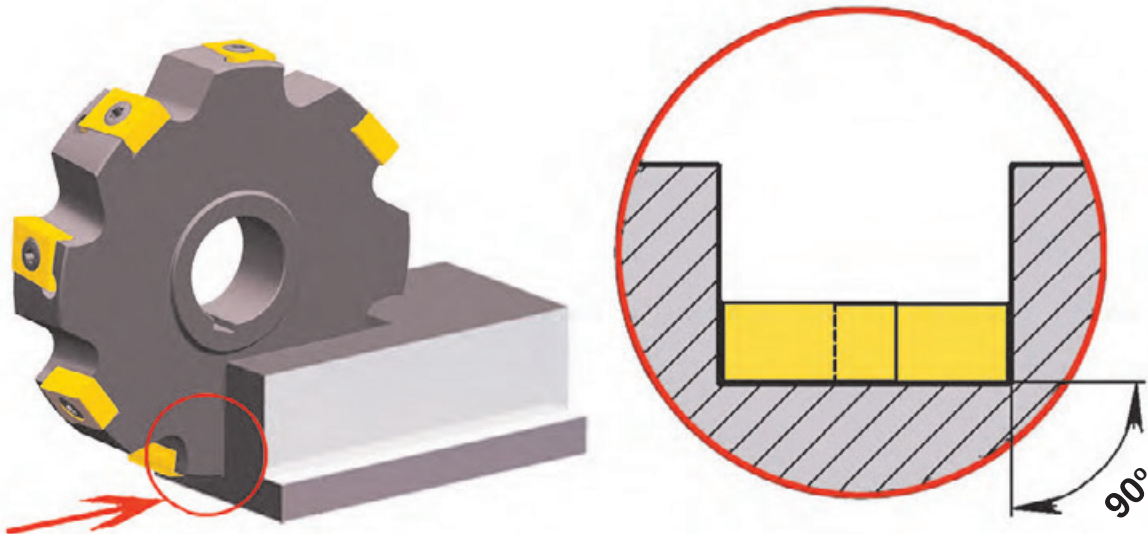
*The order of mills of non-standard width in a range of 20,5-28,5 mm is possible.

Example of a designation of the order of a mill of non-standard width a=23,5 mm in diameter of 250 mm:

MT390-250S60N08CN15 - 23,5

Length of the cutting edge of insert, mm

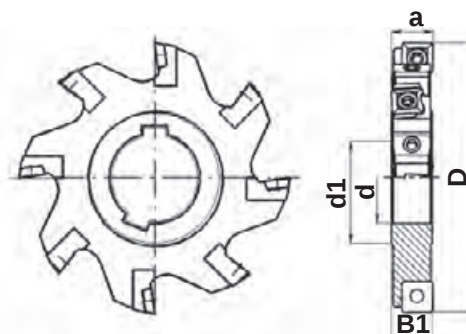
Cutter width, mm



Code key	Carbide grade															Dimensions					
	P					M				K			S			H	ic	l	S	d1	b
	HCP35U	HWP40				HWP40				HWK20											
																mm					
CNEX08T3AZTN	●	●				○				●						8,0	8,1	3,97	3,4	0,5	
CNEX1105AZTN	●	●				○				●						10	12,9	5,4	4,7	0,5	
CNEX1506AZTN	●	●				○				●						12,7	16,2	6,35	5,5	0,5	

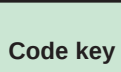
MT390K-S...N**Adjustable full side and facemills with cartridges**

- *The basic purpose - milling of slots.
- *Highly reliable cassette design.
- *Range of adjustment of the cutting width up to 3 mm.
- *Deep grooves in one run.
- *Fast reequipping of a full side and facemill in half side and facemill.
- *Machining of steel, stainless steel and aluminium alloy.



Regular pitch

Width of cut from 12 to 25 mm

Code key	Dimensions, mm						nmax			No.	Cartridge		
	D	a	d	d1	B1	Z	RPM	kg					
MT390K-080S27N03SD09-1214	80	12-14	27	40	12	2x3	14500	0,2	SD..T09T308..	6	K390SD09R + K390SD09L	T400655-15	7015-T
MT390K-100S32N04SD09-1214	100	12-14	32	48	12	2x4	12500	0,5		8			
MT390K-125S40N05SD09-1214	125	12-14	40	58	12	2x5	11000	0,7		10			
MT390K-160S40N06SD09-1214	160	12-14	40	58	12	2x6	10000	1,4		12			
MT390K-200S50N07SD09-1214	200	12-14	50	72	12	2x7	8500	2,1		14			
MT390K-100S32N04SD09-1416	100	14-16	32	48	14	2x4	12500	0,6		8	K390SD09-14R + K390SD09-14L		
MT390K-125S40N05SD09-1416	125	14-16	40	58	14	2x5	11000	0,8		10			
MT390K-160S40N06SD09-1416	160	14-16	40	58	14	2x6	10000	1,6		12			
MT390K-200S50N07SD09-1416	200	14-16	50	72	14	2x7	8500	2,5		14			
MT390K-100S32N03SD12M4-1619	100	16-19	32	48	16	2x3	9000	0,7		SD..T12M4...			
MT390K-125S40N04SD12M4-1619	125	16-19	40	58	16	2x4	8000	0,9	8				
MT390K-160S40N05SD12M4-1619	160	16-19	40	58	16	2x5	7000	1,8	10				
MT390K-200S50N06SD12M4-1619	200	16-19	50	72	16	2x6	6000	2,8	12				
MT390K-250S60N08SD12M4-1619	250	16-19	60	84	16	2x8	5500	4,8	16				
MT390K-315S60N10SD12M4-1619	315	16-19	60	84	16	2x10	4500	8,1	20				
MT390K-100S32N03SD12M4-1922	100	19-22	32	48	19	2x3	9000	0,8	6				
MT390K-100S32N03AD15M5-2225	100	22-25	32	48	22	2x3	9000	0,9	ADKT15M5..R+..L	3+3	K390AD15M5R+..L	T400955-15	7020-T

Accessories

D, mm	Cartridge	Cartridge	Dowel	Dowel screw	Adjusting screw	Cartridge screw	Cartridge screwdriver

For mills without adjustment mechanism on width

80	K390SD09R/L	-	-	-	-	H601400-30	7003H
100-315	K390SD09R/L	-	-	-	-	H601500-30	7003H
100-315	K390SD09-14R/L	-	-	-	-	H601500-30	7003H
100-315	K390SD12M4R/L	-	-	-	-	H601600-30	7003H
100-315	K390AD15M5R/L	-	-	-	-	H601600-30	7003H

For mills with adjustment mechanism on width

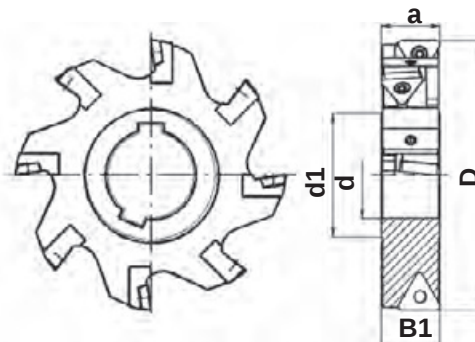
100-315	-	KA390SD12M4R/L	ЩС-987-4	T400955-20	H604000-30	H601600-30	7003H
100-315	-	KA390AD15M5R/L	ЩС-999-4	T451155-20	H606000-30	H601600-30	7003H
100-315	-	KA390TP22R/L	ЩС-999-4	T451155-20	H608000-30	H601700-30	7003H

MT390K-S...N

Adjustable full side and facemills with cartridges with adjustment mechanism on width



- *The basic purpose - milling of slots.
- *Highly reliable cassette design.
- *Range of adjustment of the cutting width up to 3 mm.
- *Deep grooves in one run.
- *Fast reequipping of a full side and facemill in half side and facemill.
- *Machining of steel, stainless steel and aluminium alloy.
- ***Modified cutter body with adjustment mechanism on width.**



Regular pitch

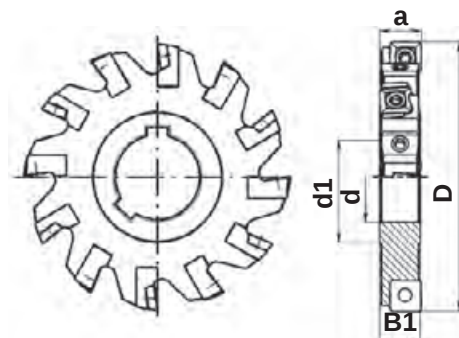


Width of cut from 19 to 35 mm

Code key	Dimensions, mm						n _{max} RPM	kg		No.	Cartridge		
	D	a	d	d1	B1	Z							
MT390K-125S40N04SD12M4-1922	125	19-22	40	58	19	2x4	8000	1,1	SD..T12M4...	8	KA390SD12M4R + KA390SD12M4L	T450955-20	7020-T
MT390K-160S40N05SD12M4-1922	160	19-22	40	58	19	2x5	7000	2,0		10			
MT390K-200S50N06SD12M4-1922	200	19-22	50	72	19	2x6	6000	3,3		12			
MT390K-250S60N08SD12M4-1922	250	19-22	60	84	19	2x8	5500	5,5		16			
MT390K-315S60N10SD12M4-1922	315	19-22	60	84	19	2x10	4500	9,4		20			
MT390K-125S40N04AD15M5-2225	125	22-25	40	58	22	2x4	8000	1,3	ADKT15M5...R(L)	4+4	KA390AD15M5R + KA390AD15M5L	T400955-15	7015-T
MT390K-160S40N05AD15M5-2225	160	22-25	40	58	22	2x5	7000	2,3		5+5			
MT390K-200S50N06AD15M5-2225	200	22-25	50	72	22	2x6	6000	3,8		6+6			
MT390K-250S60N08AD15M5-2225	250	22-25	60	84	22	2x8	5500	6,2		8+8			
MT390K-315S60N10AD15M5-2225	315	22-25	60	84	22	2x10	4500	10,7		10+10			
MT390K-125S40N04AD15M5-2527	125	25-27	40	58	25	2x4	8000	1,6		4+4			
MT390K-160S40N05AD15M5-2527	160	25-27	40	58	25	2x5	7000	2,6		5+5			
MT390K-200S50N06AD15M5-2527	200	25-27	50	72	25	2x6	6500	4,3		6+6			
MT390K-250S60N08AD15M5-2527	250	25-27	60	84	25	2x8	5500	6,9		8+8			
MT390K-315S60N10AD15M5-2527	315	25-27	60	84	25	2x10	5000	12,0		10+10			
MT390K-125S40N04TP22-2731	125	27-31	40	58	27	2x4	8000	1,9	TPCW2204PP	8	KA390TP22R + KA390TP22L	T450855-20	7020-T
MT390K-160S40N05TP22-2731	160	27-31	40	58	27	2x5	7000	3,0		10			
MT390K-200S50N06TP22-2731	200	27-31	50	72	27	2x6	6500	4,8		12			
MT390K-250S60N08TP22-2731	250	27-31	60	84	27	2x8	5500	7,6		16			
MT390K-315S60N10TP22-2731	315	27-31	60	84	27	2x10	5000	13,3		20			
MT390K-125S40N04TP22-3135	125	31-35	40	58	31	2x4	8000	2,2		8			
MT390K-160S40N05TP22-3135	160	31-35	40	58	31	2x5	7000	3,4		10			
MT390K-200S50N06TP22-3135	200	31-35	50	72	31	2x6	6500	5,3		12			
MT390K-250S60N08TP22-3135	250	31-35	60	84	31	2x8	5500	8,3		16			
MT390K-315S60N10TP22-3135	315	31-35	60	84	31	2x10	5000	14,6		20			

MT390K-S...N**Adjustable full side and facemills with cartridges**

- *The basic purpose - milling of slots.
- *Highly reliable cassette design.
- *Range of adjustment of the cutting width up to 3 mm.
- *Deep grooves in one run.
- *Fast reequipping of a full side and facemill in half side and facemill.
- *Machining of steel, stainless steel and aluminium alloy.



Close pitch

Width of cut from 12 to 19 mm

Code key	Dimensions, mm						nmax			No.	Cartridge		
	D	a	d	d1	B1	Z	RPM	kg					
MT390K-080S27N04SD09-1214	80	12-14	27	40	12	2x4	14500	0,2	SD..T09T308..	8	K390SD09R + K390SD09L	T400655-15	7015-T
MT390K-100S32N05SD09-1214	100	12-14	32	48	12	2x5	12500	0,5		10			
MT390K-125S40N07SD09-1214	125	12-14	40	58	12	2x7	11000	0,7		14			
MT390K-160S40N09SD09-1214	160	12-14	40	58	12	2x9	10000	1,4		18			
MT390K-200S50N11SD09-1214	200	12-14	50	72	12	2x11	8500	2,1		22			
MT390K-100S32N05SD09-1416	100	14-16	32	48	14	2x5	12500	0,6		10	K390SD09-14R + K390SD09-14L		
MT390K-125S40N07SD09-1416	125	14-16	40	58	14	2x7	11000	0,8		14			
MT390K-160S40N09SD09-1416	160	14-16	40	58	14	2x9	10000	1,6		18			
MT390K-200S50N11SD09-1416	200	14-16	50	72	14	2x11	8500	2,5		22			
MT390K-125S40N06SD12M4-1619	125	16-19	40	58	16	2x6	8000	0,9	SD..T12M4...	12	K390SD12M4R + K390SD12M4L	T450955-20	7020-T
MT390K-160S40N07SD12M4-1619	160	16-19	40	58	16	2x7	7000	1,8		14			
MT390K-200S50N10SD12M4-1619	200	16-19	50	72	16	2x10	6000	2,8		20			
MT390K-250S60N11SD12M4-1619	250	16-19	60	84	16	2x11	5500	4,8		22			
MT390K-315S60N12SD12M4-1619	315	16-19	60	84	16	2x12	4500	8,1		24			

Accessories

D, mm	Cartridge	Cartridge	Dowel	Dowel screw	Adjusting screw	Cartridge screw	Cartridge screwdriver

For mills without adjustment mechanism on width

80	K390SD09R/L	-	-	-	-	H601400-30	7003H
100-315	K390SD09R/L	-	-	-	-	H601500-30	7003H
100-315	K390SD09-14R/L	-	-	-	-	H601500-30	7003H
100-315	K390SD12M4R/L	-	-	-	-	H601600-30	7003H
100-315	K390AD15M5R/L	-	-	-	-	H601600-30	7003H

For mills with adjustment mechanism on width

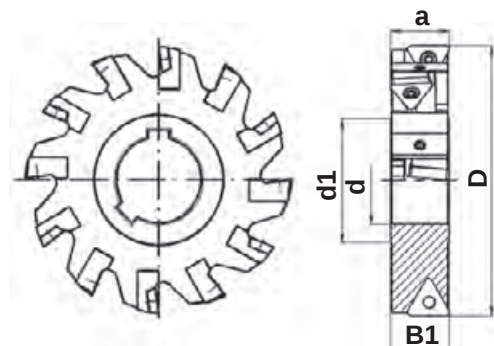
100-315	-	KA390SD12M4R/L	WC-987-4	T400955-20	H604000-30	H601600-30	7003H
100-315	-	KA390AD15M5R/L	WC-999-4	T451155-20	H606000-30	H601600-30	7003H
100-315	-	KA390TP22R/L	WC-999-4	T451155-20	H608000-30	H601700-30	7003H

MT390K-S...N

Adjustable full side and facemills with cartridges with adjustment mechanism on width



- *The basic purpose - milling of slots.
- *Highly reliable cassette design.
- *Range of adjustment of the cutting width up to 3 mm.
- *Deep grooves in one run.
- *Fast reequipping of a full side and facemill in half side and facemill.
- *Machining of steel, stainless steel and aluminium alloy.
- ***Modified cutter body with adjustment mechanism on width.**



Close pitch

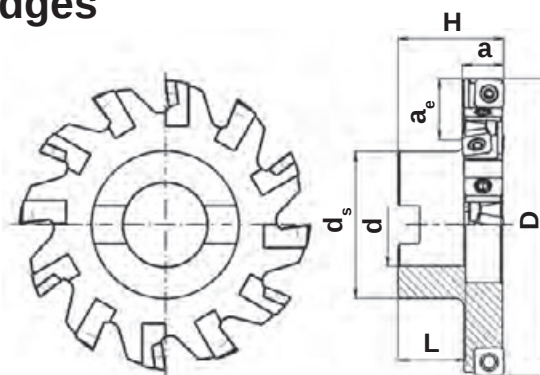


Width of cut from 19 to 35 mm

Code key	Dimensions, mm						n _{max} RPM	kg			No.	Cartridge		
	D	a	d	d1	B1	Z								
MT390K-125S40N06SD12M4-1922	125	19-22	40	58	19	2x6	8000	1,1	SD..T12M4...		12	KA390SD12M4R + K390ASD12M4L	T450955-20	7020-T
MT390K-160S40N07SD12M4-1922	160	19-22	40	58	19	2x7	7000	2,0			14			
MT390K-200S50N10SD12M4-1922	200	19-22	50	72	19	2x10	6000	3,3			20			
MT390K-250S60N11SD12M4-1922	250	19-22	60	84	19	2x11	5500	5,5			22			
MT390K-315S60N12SD12M4-1922	315	19-22	60	84	19	2x12	4500	9,4			24			
MT390K-160S40N07AD15M5-2225	160	22-25	40	58	22	2x7	7000	2,3	ADKT15M5...R(L)		7+7	KA390AD15M5R + KA390AD15M5L	T400955-15	7015-T
MT390K-200S50N10AD15M5-2225	200	22-25	50	72	22	2x10	6000	3,8			10+10			
MT390K-250S60N11AD15M5-2225	250	22-25	60	84	22	2x11	5500	6,2			11+11			
MT390K-315S60N12AD15M5-2225	315	22-25	60	84	22	2x12	4500	10,7			12+12			
MT390K-160S40N07AD15M5-2527	160	25-27	40	58	25	2x7	7000	2,6			7+7			
MT390K-200S50N10AD15M5-2527	200	25-27	50	72	25	2x10	6500	4,3			10+10			
MT390K-250S60N11AD15M5-2527	250	25-27	60	84	25	2x11	5500	6,9			11+11			
MT390K-315S60N12AD15M5-2527	315	25-27	60	84	25	2x12	5000	12,0			12+12			
MT390K-160S40N07TP22-2731	160	27-31	40	58	27	2x7	7000	3,0	TPCW2204PP		14	KA390TP22R + KA390TP22L	T450855-20	7020-T
MT390K-200S50N09TP22-2731	200	27-31	50	72	27	2x9	6500	4,8			18			
MT390K-250S60N10TP22-2731	250	27-31	60	84	27	2x10	5500	7,6			20			
MT390K-315S60N12TP22-2731	315	27-31	60	84	27	2x12	5000	13,3			24			
MT390K-160S40N07TP22-3135	160	31-35	40	58	31	2x7	7000	3,4			14			
MT390K-200S50N09TP22-3135	200	31-35	50	72	31	2x9	6500	5,3			18			
MT390K-250S60N10TP22-3135	250	31-35	60	84	31	2x10	5500	8,3			20			
MT390K-315S60N12TP22-3135	315	31-35	60	84	31	2x12	5000	14,6			24			

MT390K-...R...N**Adjustable full side and facemills with cartridges**

- *The basic purpose - milling of slots.
- *Highly reliable cassette design.
- *Range of adjustment of the cutting width up to 3 mm.
- *Deep grooves in one run.
- *Fast reequipping of a full side and facemill in half side and facemill.
- *Machining of steel, stainless steel and aluminium alloy.

**Regular pitch****Width of cut from 12 to 22 mm**

Code key	Dimensions, mm								n _{max}			No.	Cartridge		
	D	a	d	a _e	H	d _s	L	Z	RPM	kg					
MT390K-080A22R03SD09-1214N	80	12-14	22	15	40	38	20	2x3	14500	0,4	SD..T09T308..	6	K390SD09R + K390SD09L	T400655-15	7015-T
MT390K-100B27R04SD09-1214N	100	12-14	27	23	34	48	22	2x4	12500	0,7		8			
MT390K-125B32R05SD09-1214N	125	12-14	32	30	38	58	25	2x5	11000	1,0		10			
MT390K-160B40R06SD09-1214N	160	12-14	40	42	43	70	29	2x6	10000	1,8		12			
MT390K-200C40R07SD09-1214N	200	12-14	40	49	47	96	31	2x7	8500	2,6		14			
MT390K-100B27R04SD09-1416N	100	14-16	27	23	34	48	22	2x4	12500	0,8		8	K390SD09-14R + K390SD09-14L		
MT390K-125B32R05SD09-1416N	125	14-16	32	30	38	58	25	2x5	11000	1,1		10			
MT390K-160B40R06SD09-1416N	160	14-16	40	42	43	70	29	2x6	10000	2,0		12			
MT390K-200C40R07SD09-1416N	200	14-16	40	49	47	96	31	2x7	8500	3,0		14			
MT390K-100B27R03SD12M4-1619N	100	16-19	27	23	34	48	22	2x3	9000	0,9	SD..T12M4..	6	K390SD12M4R + K390SD12M4L	T450955-20	7020-T
MT390K-125B32R04SD12M4-1619N	125	16-19	32	30	38	58	25	2x4	8000	1,2		8			
MT390K-160B40R05SD12M4-1619N	160	16-19	40	42	43	70	29	2x5	7000	2,2		10			
MT390K-200C40R06SD12M4-1619N	200	16-19	40	49	47	96	31	2x6	6000	3,3		12			
MT390K-250D60R08SD12M4-1619N	250	16-19	60	54	50	130	32	2x8	5500	5,7		16			
MT390K-315D60R10SD12M4-1619N	315	16-19	60	86	50	130	32	2x10	4500	9,0		20			
MT390K-100B27R03SD12M4-1922N	100	19-22	27	23	34	48	22	2x3	9000	1,0		6			
MT390K-100B27R03AD15M5-2225N	100	22-25	27	23	34	48	22	2x3	9000	0,9	ADKT15M5..R(L)	3+3	K390AD15M5R+.L	T400955-15	7015-T

Accessories

D, mm	Cartridge	Cartridge	Dowel	Dowel screw	Adjusting screw	Cartridge screw	Cartridge screwdriver
							

For mills without adjustment mechanism on width

80	K390SD09R/L	-	-	-	-	H601400-30	7003H
100-315	K390SD09R/L	-	-	-	-	H601500-30	7003H
100-315	K390SD09-14R/L	-	-	-	-	H601500-30	7003H
100-315	K390SD12M4R/L	-	-	-	-	H601600-30	7003H
100-315	K390AD15M5R/L	-	-	-	-	H601600-30	7003H

For mills with adjustment mechanism on width

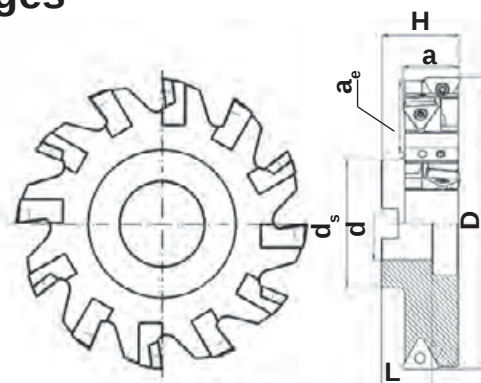
100-315	-	KA390SD12M4R/L	WC-987-4	T400955-20	H604000-30	H601600-30	7003H
100-315	-	KA390AD15M5R/L	WC-999-4	T451155-20	H606000-30	H601600-30	7003H
100-315	-	KA390TP22R/L	WC-999-4	T451155-20	H608000-30	H601700-30	7003H

MT390K-...R...N

Adjustable full side and facemills with cartridges with adjustment mechanism on width



- *The basic purpose - milling of slots.
- *Highly reliable cassette design.
- *Range of adjustment of the cutting width up to 3 mm.
- *Deep grooves in one run.
- *Fast reequipping of a full side and facemill in half side and facemill.
- *Machining of steel, stainless steel and aluminium alloy.
- ***Modified cutter body with adjustment mechanism on width.**



Regular pitch

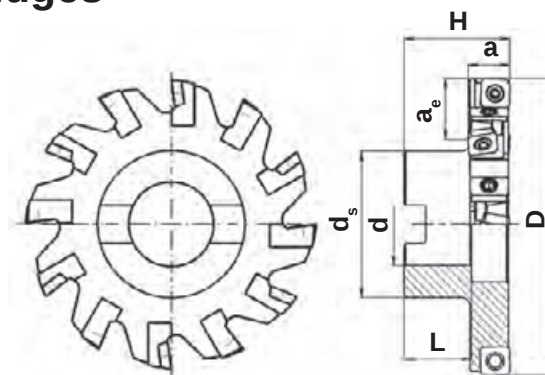


Width of cut from 19 to 35 mm

Code key	Dimensions, mm								n _{max}			No.	Cartridge		
	D	a	d	a _e	H	d _s	L	Z	RPM						
MT390K-125B32R04SD12M4-1922N	125	19-22	32	30	38	58	25	2x4	8000	1,4	SD..T12M4..	8	KA390SD12M4R + KA390SD12M4L	T450955-20	7020-T
MT390K-160B40R05SD12M4-1922N	160	19-22	40	42	43	70	29	2x5	7000	2,4		10			
MT390K-200C40R06SD12M4-1922N	200	19-22	40	49	47	96	31	2x6	6000	3,8		12			
MT390K-250D60R08SD12M4-1922N	250	19-22	60	54	50	130	32	2x8	5500	6,4		16			
MT390K-315D60R10SD12M4-1922N	315	19-22	60	86	50	130	32	2x10	4500	10,3		20			
MT390K-125B32R04AD15M5-2225N	125	22-25	32	30	38	58	25	2x4	8000	1,3	ADKT15M5..R(L)	4+4	KA390AD15M5R + K390AD15M5L	T400955-15	7015-T
MT390K-160B40R05AD15M5-2225N	160	22-25	40	42	43	70	29	2x5	7000	2,3		5+5			
MT390K-200C40R06AD15M5-2225N	200	22-25	40	49	47	96	31	2x6	6000	3,8		6+6			
MT390K-250D60R08AD15M5-2225N	250	22-25	60	54	50	130	32	2x8	5500	6,2		8+8			
MT390K-315D60R10AD15M5-2225N	315	22-25	60	86	50	130	32	2x10	4500	10,7		10+10			
MT390K-125B32R04AD15M5-2527N	125	25-27	32	30	38	58	25	2x4	8000	1,6		4+4			
MT390K-160B40R05AD15M5-2527N	160	25-27	40	42	43	70	29	2x5	7000	2,6		5+5			
MT390K-200C40R06AD15M5-2527N	200	25-27	40	49	47	96	31	2x6	6500	4,3		6+6			
MT390K-250D60R08AD15M5-2527N	250	25-27	60	54	50	130	32	2x8	5500	6,9		8+8			
MT390K-315D60R10AD15M5-2527N	315	25-27	60	86	50	130	32	2x10	5000	12,0		10+10			
MT390K-125B32R04TP22-2731N	125	27-31	32	30	38	58	25	2x4	8000	1,9	TPCW2204PP	8	KA390TP22R + KA390TP22L	T450855-20	7020-T
MT390K-160B40R05TP22-2731N	160	27-31	40	42	43	70	29	2x5	7000	3,0		10			
MT390K-200C40R06TP22-2731N	200	27-31	40	49	47	96	31	2x6	6500	4,8		12			
MT390K-250D60R08TP22-2731N	250	27-31	60	54	50	130	32	2x8	5500	7,6		16			
MT390K-315D60R10TP22-2731N	315	27-31	60	86	50	130	32	2x10	5000	13,3		20			
MT390K-125B32R04TP22-3135N	125	31-35	32	30	38	58	25	2x4	8000	2,2		8			
MT390K-160B40R05TP22-3135N	160	31-35	40	42	43	70	29	2x5	7000	3,4		10			
MT390K-200C40R06TP22-3135N	200	31-35	40	49	47	96	31	2x6	6500	5,3		12			
MT390K-250D60R08TP22-3135N	250	31-35	60	54	50	130	32	2x8	5500	8,3		16			
MT390K-315D60R10TP22-3135N	315	31-35	60	86	50	130	32	2x10	5000	14,6		20			

MT390K-R...N...**Adjustable full side and facemills with cartridges**

- *The basic purpose - milling of slots.
- *Highly reliable cassette design.
- *Range of adjustment of the cutting width up to 3 mm.
- *Deep grooves in one run.
- *Fast reequipping of a full side and facemill in half side and facemill.
- *Machining of steel, stainless steel and aluminium alloy.



Close pitch

Width of cut from 12 to 19 mm

Code key	Dimensions, mm								nmax				No.	Cartridge		
	D	a	d	a _e	H	d _s	L	Z	RPM	kg						
MT390K-080A22R04SD09-1214N	80	12-14	22	15	40	38	20	2x4	14500	0,4	SD..T09T308..	8	K390SD09R + K390SD09L	T400655-15	7015-T	
MT390K-100B27R05SD09-1214N	100	12-14	27	23	34	48	22	2x5	12500	0,7		10				
MT390K-125B32R07SD09-1214N	125	12-14	32	30	38	58	25	2x7	11000	1,2		14				
MT390K-160B40R09SD09-1214N	160	12-14	40	42	43	70	29	2x9	10000	1,8		18				
MT390K-200C40R11SD09-1214N	200	12-14	40	49	47	96	31	2x11	8500	2,6		22				
MT390K-100B27R05SD09-1416N	100	14-16	27	23	34	48	22	2x5	12500	0,8		10	K390SD09-14R + K390SD09-14L			
MT390K-125B32R07SD09-1416N	125	14-16	32	30	38	58	25	2x7	11000	1,3		14				
MT390K-160B40R09SD09-1416N	160	14-16	40	42	43	70	29	2x9	10000	2,0		18				
MT390K-200C40R11SD09-1416N	200	14-16	40	49	47	96	31	2x11	8500	3,0		22				
MT390K-125B32R06SD12M4-1619N	125	16-19	32	30	38	58	25	2x6	8000	1,5	SD..T12M4...	12	K390SD12M4R + K390SD12M4L	T450955-20	7020-T	
MT390K-160B40R07SD12M4-1619N	160	16-19	40	42	43	70	29	2x7	7000	2,3		14				
MT390K-200C40R10SD12M4-1619N	200	16-19	40	49	47	96	31	2x10	6000	3,3		20				
MT390K-250D60R11SD12M4-1619N	250	16-19	60	54	50	130	32	2x11	5500	5,7		22				
MT390K-315D60R12SD12M4-1619N	315	16-19	60	86	50	130	32	2x12	4500	9,0		24				

Accessories

D, mm							
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For mills without adjustment mechanism on width

80	K390SD09R/L	-	-	-	-	H601400-30	7003H
100-315	K390SD09R/L	-	-	-	-	H601500-30	7003H
100-315	K390SD09-14R/L	-	-	-	-	H601500-30	7003H
100-315	K390SD12M4R/L	-	-	-	-	H601600-30	7003H
100-315	K390AD15M5R/L	-	-	-	-	H601600-30	7003H

For mills with adjustment mechanism on width

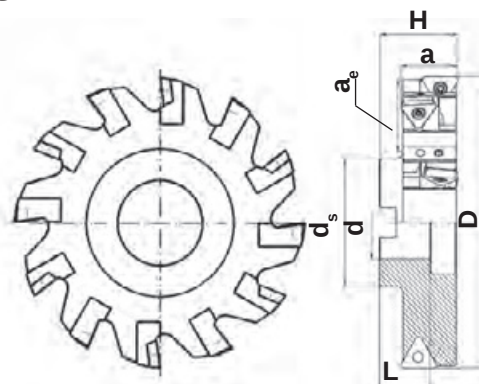
100-315	-	KA390SD12M4R/L	WC-987-4	T400955-20	H604000-30	H601600-30	7003H
100-315	-	KA390AD15M5R/L	WC-999-4	T451155-20	H606000-30	H601600-30	7003H
100-315	-	KA390TP22R/L	WC-999-4	T451155-20	H608000-30	H601700-30	7003H

MT390K-R...N...

Adjustable full side and facemills with cartridges with adjustment mechanism on width



- *The basic purpose - milling of slots.
- *Highly reliable cassette design.
- *Range of adjustment of the cutting width up to 3 mm.
- *Deep grooves in one run.
- *Fast reequipping of a full side and facemill in half side and facemill.
- *Machining of steel, stainless steel and aluminium alloy.
- ***Modified cutter body with adjustment mechanism on width.**



Close pitch



Width of cut from 19 to 35 mm

Code key	Dimensions, mm								n _{max} RPM	kg			No.	Cartridge		
	D	a	d	a _e	H	d _s	L	Z								
MT390K-125B32R06SD12M4-1922N	125	19-22	32	30	38	58	25	2x6	8000	1,6	SD..T12M4...		12	K390SD12M4R + K390SD12M4L	T450955-20	7020-T
MT390K-160B40R07SD12M4-1922N	160	19-22	40	42	43	70	29	2x7	7000	2,5			14			
MT390K-200C40R10SD12M4-1922N	200	19-22	40	49	47	96	31	2x10	6000	3,8			20			
MT390K-250D60R11SD12M4-1922N	250	19-22	60	54	50	130	32	2x11	5500	6,4			22			
MT390K-315D60R12SD12M4-1922N	315	19-22	60	86	50	130	32	2x12	4500	10,3			24			
MT390K-160B40R07AD15M5-2225N	160	22-25	40	42	43	70	29	2x7	7000	2,8	ADKT15M5..R(L)		7+7	K390AD15M5R + K390AD15M5L	T400955-15	7015-T
MT390K-200C40R10AD15M5-2225N	200	22-25	40	49	47	96	31	2x10	6000	4,3			10+10			
MT390K-250D60R11AD15M5-2225N	250	22-25	60	54	50	130	32	2x11	5500	7,1			11+11			
MT390K-315D60R12AD15M5-2225N	315	22-25	60	86	50	130	32	2x12	4500	11,7			12+12			
MT390K-160B40R07AD15M5-2527N	160	25-27	40	42	43	70	29	2x7	7000	3,0			7+7			
MT390K-200C40R10AD15M5-2527N	200	25-27	40	49	47	96	31	2x10	6500	4,8			10+10			
MT390K-250D60R11AD15M5-2527N	250	25-27	60	54	50	130	32	2x11	5500	7,8			11+11			
MT390K-315D60R12AD15M5-2527N	315	25-27	60	86	50	130	32	2x12	5000	12,9			12+12			
MT390K-160B40R07TP22-2731N	160	27-31	40	42	43	70	29	2x7	7000	3,4	TPCW2204PP		14	K390TP22R + K390TP22L	T450855-20	7020-T
MT390K-200C40R09TP22-2731N	200	27-31	40	49	47	96	31	2x9	6500	5,3			18			
MT390K-250D60R10TP22-2731N	250	27-31	60	54	50	130	32	2x10	5500	8,5			20			
MT390K-315D60R12TP22-2731N	315	27-31	60	86	50	130	32	2x12	5000	14,2			24			
MT390K-160B40R07TP22-3135N	160	31-35	40	42	43	70	29	2x7	7000	3,8			14			
MT390K-200C40R09TP22-3135N	200	31-35	40	49	47	96	31	2x9	6500	5,8			18			
MT390K-250D60R10TP22-3135N	250	31-35	60	54	50	130	32	2x10	5500	9,2			20			
MT390K-315D60R12TP22-3135N	315	31-35	60	86	50	130	32	2x12	5000	15,5			24			

MT390K-S...R...**Half side and facemills with cartridges right handed**

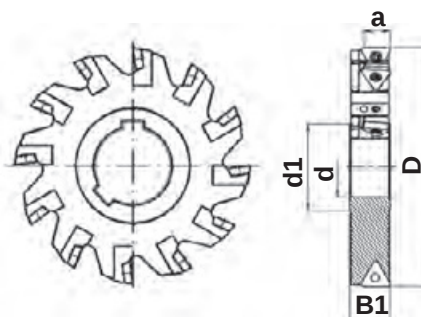
*Highly reliable cassette design.

*Fast reequipment of a half side and facemill in full side and facemill.

*Positive geometry.

Regular pitch: machining of steel, stainless steel and aluminium alloy.

Close pitch: effective milling of narrow details such as brackets, levers by sets of mills. Machining titanium alloys, heat resistant alloys, short chipping materials and steel.

**Regular pitch**

Code key	Dimensions, mm						Nmax RPM	 kg		No.	Cartridge			
	D	a	d	d1	B1	Z								
MT390K-080S27R06CC06	80	4	27	40	12	6	15500	0,2	CCMT060208	6	K390CC06R	H601400-30	T250555-08	7008-T + 7003H
MT390K-100S32R08CC06	100	4	32	48	12	8	14000	0,5		8				
MT390K-125S40R10CC06	125	4	40	58	12	10	12000	0,9		10				
MT390K-160S40R12CC06	160	4	40	58	12	12	10500	1,4		12				
MT390K-200S50R14CC06	200	4	50	72	12	14	9500	2,1		14				
MT390K-080S27R06SD09	80	7	27	40	12	6	14500	0,2	SD..T09T308..	6	K390SD09R	H601400-30	T400655-15	7015-T + 7003H
MT390K-100S32R08SD09	100	7	32	48	12	8	12500	0,5		8		H601500-30		
MT390K-125S40R10SD09	125	7	40	58	12	10	11000	0,9		10				
MT390K-160S40R12SD09	160	7	40	58	12	12	10000	1,4		12				
MT390K-200S50R14SD09	200	7	50	72	12	14	8500	2,1		14				
MT390K-100S32R06SD12M4	100	9	32	48	19	6	9000	0,7	SD..T12M4...	6	K390SD12M4R	H601600-30	T450955-20	7020-T + 7003H
MT390K-125S40R08SD12M4	125	9	40	58	19	8	8000	0,9		8				
MT390K-160S40R10SD12M4	160	9	40	58	19	10	7000	1,8		10				
MT390K-200S50R12SD12M4	200	9	50	72	19	12	6000	2,8		12				
MT390K-250S60R16SD12M4	250	9	60	84	19	16	5500	4,8		16				
MT390K-315S60R20SD12M4	315	9	60	84	19	20	4500	8,1		20				
MT390K-100S32R06AD15M5	100	11	32	48	20	6	9000	0,7	ADKT15M5..R(L)	6	K390AD15M5R	H601600-30	T400955-15	7015-T + 7003H
MT390K-125S40R08AD15M5	125	11	40	58	20	8	8000	0,9		8				
MT390K-160S40R10AD15M5	160	11	40	58	20	10	7000	1,8		10				
MT390K-200S50R12AD15M5	200	11	50	72	20	12	6000	2,8		12				
MT390K-250S60R16AD15M5	250	11	60	84	20	16	5500	4,8		16				
MT390K-315S60R20AD15M5	315	11	60	84	20	20	4500	8,1		20				
MT390K-125S40R08TP22	125	16	40	58	28	8	8000	1,6	TPCW2204PP	8	K390TP22R	H601700-30	T450855-15	7020-T + 7003H
MT390K-160S40R10TP22	160	16	40	58	28	10	7000	2,6		10				
MT390K-200S50R12TP22	200	16	50	72	28	12	6500	4,3		12				
MT390K-250S60R16TP22	250	16	60	84	28	16	5500	6,9		16				
MT390K-315S60R20TP22	315	16	60	84	28	20	5000	12,0		20				

MT390K-S...R...

Half side and facemills with cartridges right handed



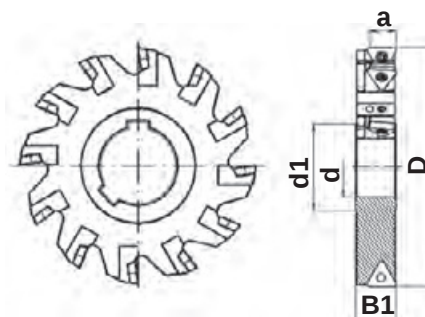
*Highly reliable cassette design.

*Fast reequipping of a half side and facemill in full side and facemill.

*Positive geometry.

Regular pitch: machining of steel, stainless steel and aluminium alloy.

Close pitch: effective milling of narrow details such as brackets, levers by sets of mills. Machining titanium alloys, heat resistant alloys, short chipping materials and steel.



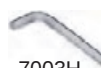
Close pitch

Code key	Dimensions, mm						nmax RPM	 kg		No.	Cartridge			
	D	a	d	d1	B1	Z								
MT390K-080S27R08CC06	80	4	27	40	12	8	15500	0,2	CCMT060208	8	K390CC06R	H601400-30	T250555-08	7008-T + 7003H
MT390K-100S32R10CC06	100	4	32	48	12	10	14000	0,5		10				
MT390K-125S40R14CC06	125	4	40	58	12	14	12000	0,9		14				
MT390K-160S40R18CC06	160	4	40	58	12	18	10500	1,4		18				
MT390K-200S50R22CC06	200	4	50	72	12	22	9500	2,1		22				
MT390K-080S27R08SD09	80	7	27	40	12	8	14500	0,2	SD..T09T308..	8	K390SD09R	H601400-30	T400655-15	7015-T + 7003H
MT390K-100S32R10SD09	100	7	32	48	12	10	12500	0,5		10		H601500-30		
MT390K-125S40R14SD09	125	7	40	58	12	14	11000	0,9		14				
MT390K-160S40R18SD09	160	7	40	58	12	18	10000	1,4		18				
MT390K-200S50R22SD09	200	7	50	72	12	22	8500	2,1		22				
MT390K-125S40R12SD12M4	125	9	40	58	19	12	8000	0,9	SD..T12M4...	12	K390SD12M4R	H601600-30	T450955-20	7020-T + 7003H
MT390K-160S40R14SD12M4	160	9	40	58	19	14	7000	1,8		14				
MT390K-200S50R20SD12M4	200	9	50	72	19	20	6000	2,8		20				
MT390K-250S60R22SD12M4	250	9	60	84	19	22	5500	4,8		22				
MT390K-315S60R24SD12M4	315	9	60	84	19	24	4500	8,1		24				
MT390K-125S40R12AD15M5	125	11	40	58	20	12	8000	0,9	ADKT15M5..R(L)	12	K390AD15M5R	H601600-30	T400955-15	7015-T + 7003H
MT390K-160S40R14AD15M5	160	11	40	58	20	14	7000	1,8		14				
MT390K-200S50R20AD15M5	200	11	50	72	20	20	6000	2,8		20				
MT390K-250S60R22AD15M5	250	11	60	84	20	22	5500	4,8		22				
MT390K-315S60R24AD15M5	315	11	60	84	20	24	4500	8,1		24				
MT390K-160S40R14TP22	160	16	40	58	28	14	7000	2,6	TPCW2204PP	14	K390TP22R	H601700-30	T450855-15	7020-T + 7003H
MT390K-200S50R18TP22	200	16	50	72	28	18	6500	4,3		18				
MT390K-250S60R20TP22	250	16	60	84	28	20	5500	6,9		20				
MT390K-315S60R24TP22	315	16	60	84	28	24	5000	12,0		24				

Cartridge screw



Cartridge screwdriver



7003H

MT390K-...R...R**Half side and facemills with cartridges right handed**

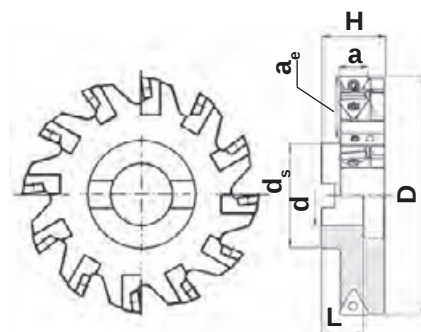
*Highly reliable cassette design.

*Fast reequipping of a half side and facemill in full side and facemill.

*Positive geometry.

Regular pitch: machining of steel, stainless steel and aluminium alloy.

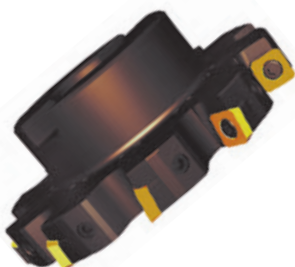
Close pitch: effective milling of narrow details such as brackets, levers by sets of mills. Machining titanium alloys, heat resistant alloys, short chipping materials and steel.

**Regular pitch**

Code key	Dimensions, mm								nmax RPM			No.	Cartridge			
	D	a	d	a _e	H	d _s	L	Z								
MT390K-080A22R06CC06R	80	4	22	15	40	38	20	6	15500	0,4	CCMT060208	6	K390CC06R	H601400-30	T250555-08	7008-T + 7003H
MT390K-100B27R08CC06R	100	4	27	23	34	48	22	8	14000	0,7		8				
MT390K-125B32R10CC06R	125	4	32	30	38	58	25	10	12000	1,2		10				
MT390K-160B40R12CC06R	160	4	40	42	43	70	29	12	10500	1,8		12				
MT390K-200C40R14CC06R	200	4	40	49	47	96	31	14	9500	2,6		14				
MT390K-080A22R06SD09R	80	7	22	15	40	38	20	6	14500	0,4	SD..T09T308..	6	K390SD09R	H601400-30	T400655-15	7015-T + 7003H
MT390K-100B27R08SD09R	100	7	27	23	34	48	22	8	12500	0,7		8		H601500-30		
MT390K-125B32R10SD09R	125	7	32	30	38	58	25	10	11000	1,2		10				
MT390K-160B40R12SD09R	160	7	40	42	43	70	29	12	10000	1,8		12				
MT390K-200C40R14SD09R	200	7	40	49	47	96	31	14	8500	2,6		14				
MT390K-100B27R06SD12M4R	100	9	27	23	34	48	22	6	9000	0,9	SD..T12M4...	6	K390SD12M4R	H601600-30	T450955-20	7020-T + 7003H
MT390K-125B32R08SD12M4R	125	9	32	30	38	58	25	8	8000	1,2		8				
MT390K-160B40R10SD12M4R	160	9	40	42	43	70	29	10	7000	2,2		10				
MT390K-200C40R12SD12M4R	200	9	40	49	47	96	31	12	6000	3,3		12				
MT390K-250D60R16SD12M4R	250	9	60	54	50	130	32	16	5500	5,7		16				
MT390K-315D60R20SD12M4R	315	9	60	86	50	130	32	20	4500	9,0		20				
MT390K-100B27R06AD15M5R	100	11	27	23	34	48	22	6	9000	0,9	ADKT15M5..R(L)	6	K390AD15M5R	H601600-30	T400955-15	7015-T + 7003H
MT390K-125B32R08AD15M5R	125	11	32	30	38	58	25	8	8000	1,2		8				
MT390K-160B40R10AD15M5R	160	11	40	42	43	70	29	10	7000	2,2		10				
MT390K-200C40R12AD15M5R	200	11	40	49	47	96	31	12	6000	3,3		12				
MT390K-250D60R16AD15M5R	250	11	60	54	50	130	32	16	5500	5,7		16				
MT390K-315D60R20AD15M5R	315	11	60	86	50	130	32	20	4500	9,0		20				
MT390K-125B32R08TP22R	125	16	32	30	38	58	25	8	8000	1,9	TPCW2204PP	8	K390TP22R	H601700-30	T450855-15	7020-T + 7003H
MT390K-160B40R10TP22R	160	16	40	42	43	70	29	10	7000	3,0		10				
MT390K-200C40R12TP22R	200	16	40	49	47	96	31	12	6500	4,8		12				
MT390K-250D60R16TP22R	250	16	60	54	50	130	32	16	5500	7,8		16				
MT390K-315D60R20TP22R	315	16	60	86	50	130	32	20	5000	12,9		20				

MT390K-...R...R

Half side and facemills with cartridges right handed



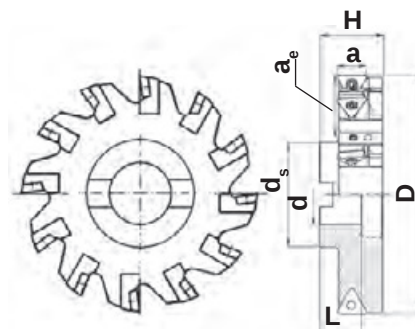
*Highly reliable cassette design.

*Fast reequipping of a half side and facemill in full side and facemill.

*Positive geometry.

Regular pitch: machining of steel, stainless steel and aluminium alloy.

Close pitch: effective milling of narrow details such as brackets, levers by sets of mills. Machining titanium alloys, heat resistant alloys, short chipping materials and steel.



Close pitch

Code key	Dimensions, mm							Z	nmax RPM			No.	Cartridge			
	D	a	d	a _e	H	d _s	L									
MT390K-080A22R08CC06R	80	4	22	15	40	38	20	8	15500	0,4	CCMT060208	8	K390CC06R	H601400-30	T250555-08	7008-T + 7003H
MT390K-100B27R10CC06R	100	4	27	23	34	48	22	10	14000	0,7		10				
MT390K-125B32R14CC06R	125	4	32	30	38	58	25	14	12000	1,2		14				
MT390K-160B40R18CC06R	160	4	40	42	43	70	29	18	10500	1,8		18				
MT390K-200C40R22CC06R	200	4	40	49	47	96	31	22	9500	2,6		22				
MT390K-080A22R08SD09R	80	7	22	15	40	38	20	8	14500	0,4	SD..T09T308..	8	K390SD09R	H601400-30	T400655-15	7015-T + 7003H
MT390K-100B27R10SD09R	100	7	27	23	34	48	22	10	12500	0,7		10		H601500-30		
MT390K-125B32R14SD09R	125	7	32	30	38	58	25	14	11000	1,2		14				
MT390K-160B40R18SD09R	160	7	40	42	43	70	29	18	10000	1,8		18				
MT390K-200C40R22SD09R	200	7	40	49	47	96	31	22	8500	2,6		22				
MT390K-125B32R12SD12M4R	125	9	32	30	38	58	25	12	8000	1,2	SD..T12M4...	12	K390SD12M4R	H601600-30	T450955-20	7020-T + 7003H
MT390K-160B40R14SD12M4R	160	9	40	42	43	70	29	14	7000	2,2		14				
MT390K-200C40R20SD12M4R	200	9	40	49	47	96	31	20	6000	3,3		20				
MT390K-250D60R22SD12M4R	250	9	60	54	50	130	32	22	5500	5,7		22				
MT390K-315D60R24SD12M4R	315	9	60	86	50	130	32	24	4500	9,0		24				
MT390K-125B32R12AD15M5R	125	11	32	30	38	58	25	12	8000	1,2	ADKT15M5..R(L)	12	K390AD15M5R	H601600-30	T400955-15	7015-T + 7003H
MT390K-160B40R14AD15M5R	160	11	40	42	43	70	29	14	7000	2,2		14				
MT390K-200C40R20AD15M5R	200	11	40	49	47	96	31	20	6000	3,3		20				
MT390K-250D60R22AD15M5R	250	11	60	54	50	130	32	22	5500	5,7		22				
MT390K-315D60R24AD15M5R	315	11	60	86	50	130	32	24	4500	9,0		24				
MT390K-160B40R14TP22R	160	16	40	42	43	70	29	14	7000	3,0	TPCW2204PP	14	K390TP22R	H601700-30	T450855-15	7020-T + 7003H
MT390K-200C40R18TP22R	200	16	40	49	47	96	31	18	6500	4,3		18				
MT390K-250D60R20TP22R	250	16	60	54	50	130	32	20	5500	7,8		20				
MT390K-315D60R24TP22R	315	16	60	86	50	130	32	24	5000	12,6		24				

Cartridge screw



Cartridge screwdriver



7003H

MT390K-S...L...**Half side and facemills with cartridges left handed**

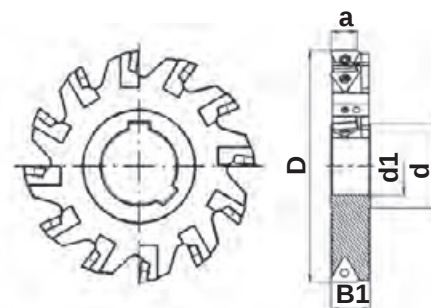
*Highly reliable cassette design.

*Fast reequipping of a half side and facemill in full side and facemill.

*Positive geometry.

Regular pitch: machining of steel, stainless steel and aluminium alloy.

Close pitch: effective milling of narrow details such as brackets, levers by sets of mills. Machining titanium alloys, heat resistant alloys, short chipping materials and steel.

**Regular pitch**

Code key	Dimensions, mm						nmax RPM	 kg		No.	Cartridge			
	D	a	d	d1	B1	Z								
MT390K-080S27L06CC06	80	4	27	40	12	6	15500	0,2	CCMT060208	6	K390CC06L	H601400-30	T250555-08	7008-T + 7003H
MT390K-100S32L08CC06	100	4	32	48	12	8	14000	0,5		8				
MT390K-125S40L10CC06	125	4	40	58	12	10	12000	0,9		10				
MT390K-160S40L12CC06	160	4	40	58	12	12	10500	1,4		12				
MT390K-200S50L14CC06	200	4	50	72	12	14	9500	2,1		14				
MT390K-080S27L06SD09	80	7	27	40	12	6	14500	0,2	SD..T09T308..	6	K390SD09L	H601400-30	T400655-15	7015-T + 7003H
MT390K-100S32L08SD09	100	7	32	48	12	8	12500	0,5		8		H601500-30		
MT390K-125S40L10SD09	125	7	40	58	12	10	11000	0,9		10				
MT390K-160S40L12SD09	160	7	40	58	12	12	10000	1,4		12				
MT390K-200S50L14SD09	200	7	50	72	12	14	8500	2,1		14				
MT390K-100S32L06SD12M4	100	9	32	48	19	6	9000	0,7	SD..T12M4...	6	K390SD12M4L	H601600-30	T450955-20	7020-T + 7003H
MT390K-125S40L08SD12M4	125	9	40	58	19	8	8000	0,9		8				
MT390K-160S40L10SD12M4	160	9	40	58	19	10	7000	1,8		10				
MT390K-200S50L12SD12M4	200	9	50	72	19	12	6000	2,8		12				
MT390K-250S60L16SD12M4	250	9	60	84	19	16	5500	4,8		16				
MT390K-315S60L20SD12M4	315	9	60	84	19	20	4500	8,1		20				
MT390K-100S32L06AD15M5	100	11	32	48	20	6	9000	0,7	ADKT15M5..R(L)	6	K390AD15M5L	H601600-30	T400955-15	7015-T + 7003H
MT390K-125S40L08AD15M5	125	11	40	58	20	8	8000	0,9		8				
MT390K-160S40L10AD15M5	160	11	40	58	20	10	7000	1,8		10				
MT390K-200S50L12AD15M5	200	11	50	72	20	12	6000	2,8		12				
MT390K-250S60L16AD15M5	250	11	60	84	20	16	5500	4,8		16				
MT390K-315S60L20AD15M5	315	11	60	84	20	20	4500	8,1		20				
MT390K-125S40L08TP22	125	16	40	58	28	8	8000	1,6	TPCW2204PP	8	K390TP22L	H601700-30	T450855-15	7020-T + 7003H
MT390K-160S40L10TP22	160	16	40	58	28	10	7000	2,6		10				
MT390K-200S50L12TP22	200	16	50	72	28	12	6500	4,3		12				
MT390K-250S60L16TP22	250	16	60	84	28	16	5500	6,9		16				
MT390K-315S60L20TP22	315	16	60	84	28	20	5000	12,0		20				

MT390K-S...L...**Half side and facemills with cartridges left handed**

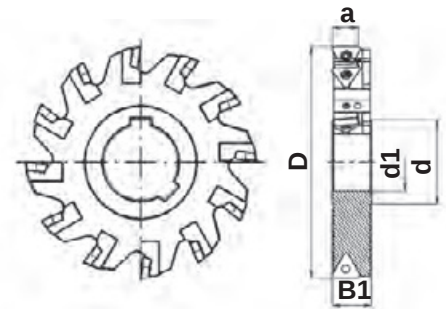
*Highly reliable cassette design.

*Fast reequipping of a half side and facemill in full side and facemill.

*Positive geometry.

Regular pitch: machining of steel, stainless steel and aluminium alloy.

Close pitch: effective milling of narrow details such as brackets, levers by sets of mills. Machining titanium alloys, heat resistant alloys, short chipping materials and steel.

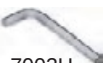
**Close pitch**

Code key	Dimensions, mm						nmax RPM	 kg		No.	Cartridge			
	D	a	d	d1	B1	Z								
MT390K-080S27L08CC06	80	4	27	40	12	8	15500	0,2	CCMT060208	8	K390CC06L	H601400-30	T250555-08	7008-T + 7003H
MT390K-100S32L10CC06	100	4	32	48	12	10	14000	0,5		10				
MT390K-125S40L14CC06	125	4	40	58	12	14	12000	0,9		14				
MT390K-160S40L18CC06	160	4	40	58	12	18	10500	1,4		18				
MT390K-200S50L22CC06	200	4	50	72	12	22	9500	2,1		22				
MT390K-080S27L08SD09	80	7	27	40	12	8	14500	0,2	SD..T09T308..	8	K390SD09L	H601400-30	T400655-15	7015-T + 7003H
MT390K-100S32L10SD09	100	7	32	48	12	10	12500	0,5		10		H601500-30		
MT390K-125S40L14SD09	125	7	40	58	12	14	11000	0,9		14				
MT390K-160S40L18SD09	160	7	40	58	12	18	10000	1,4		18				
MT390K-200S50L22SD09	200	7	50	72	12	22	8500	2,1		22				
MT390K-125S40L12SD12M4	125	9	40	58	19	12	8000	0,9	SD..T12M4...	12	K390SD12M4L	H601600-30	T450955-20	7020-T + 7003H
MT390K-160S40L14SD12M4	160	9	40	58	19	14	7000	1,8		14				
MT390K-200S50L20SD12M4	200	9	50	72	19	20	6000	2,8		20				
MT390K-250S60L22SD12M4	250	9	60	84	19	22	5500	4,8		22				
MT390K-315S60L24SD12M4	315	9	60	84	19	24	4500	8,1		24				
MT390K-125S40L12AD15M5	125	11	40	58	20	12	8000	0,9	ADKT15M5..R(L)	12	K390AD15M5L	H601600-30	T400955-15	7015-T + 7003H
MT390K-160S40L14AD15M5	160	11	40	58	20	14	7000	1,8		14				
MT390K-200S50L20AD15M5	200	11	50	72	20	20	6000	2,8		20				
MT390K-250S60L22AD15M5	250	11	60	84	20	22	5500	4,8		22				
MT390K-315S60L24AD15M5	315	11	60	84	20	24	4500	8,1		24				
MT390K-160S40L14TP22	160	16	40	58	28	14	7000	2,6	TPCW2204PP	14	K390TP22L	H601700-30	T450855-15	7020-T + 7003H
MT390K-200S50L18TP22	200	16	50	72	28	18	6500	4,3		18				
MT390K-250S60L20TP22	250	16	60	84	28	20	5500	6,9		20				
MT390K-315S60L24TP22	315	16	60	84	28	24	5000	12,0		24				

Cartridge screw



Cartridge screwdriver



7003H

MT390K-...R...L**Half side and facemills with cartridges left handed**

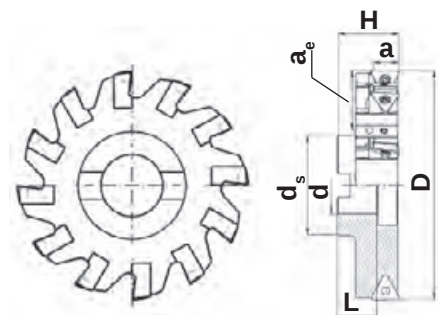
*Highly reliable cassette design.

*Fast reequipping of a half side and facemill in full side and facemill.

*Positive geometry.

Regular pitch: machining of steel, stainless steel and aluminium alloy.

Close pitch: effective milling of narrow details such as brackets, levers by sets of mills. Machining titanium alloys, heat resistant alloys, short chipping materials and steel.

**Regular pitch**

Code key	Dimensions, mm								nmax RPM			No.	Cartridge			
	D	a	d	a _e	H	d _s	L	Z								
MT390K-080A22R06CC06L	80	4	22	15	40	38	20	6	15500	0,4	CCMT060208	6	K390CC06R	H601400-30	T250555-08	7008-T + 7003H
MT390K-100B27R08CC06L	100	4	27	23	34	48	22	8	14000	0,7		8				
MT390K-125B32R10CC06L	125	4	32	30	38	58	25	10	12000	1,2		10				
MT390K-160B40R12CC06L	160	4	40	42	43	70	29	12	10500	1,8		12				
MT390K-200C40R14CC06L	200	4	40	49	47	96	31	14	9500	2,6		14				
MT390K-080A22R06SD09L	80	7	22	15	40	38	20	6	14500	0,4	SD..T09T308..	6	K390SD09L	H601400-30	T400655-15	7015-T + 7003H
MT390K-100B27R08SD09L	100	7	27	23	34	48	22	8	12500	0,7		8		H601500-30		
MT390K-125B32R10SD09L	125	7	32	30	38	58	25	10	11000	1,2		10				
MT390K-160B40R12SD09L	160	7	40	42	43	70	29	12	10000	1,8		12				
MT390K-200C40R14SD09L	200	7	40	49	47	96	31	14	8500	2,6		14				
MT390K-100B27R06SD12M4L	100	9	27	23	34	48	22	6	9000	0,9	SD..T12M4...	6	K390SD12M4L	H601600-30	T450955-20	7020-T + 7003H
MT390K-125B32R08SD12M4L	125	9	32	30	38	58	25	8	8000	1,2		8				
MT390K-160B40R10SD12M4L	160	9	40	42	43	70	29	10	7000	2,2		10				
MT390K-200C40R12SD12M4L	200	9	40	49	47	96	31	12	6000	3,3		12				
MT390K-250D60R16SD12M4L	250	9	60	54	50	130	32	16	5500	5,7		16				
MT390K-315D60R20SD12M4L	315	9	60	86	50	130	32	20	4500	9,0		20				
MT390K-100B27R06AD15M5L	100	11	27	23	34	48	22	6	9000	0,9	ADKT15M5..R(L)	6	K390AD15M5L	H601600-30	T400955-15	7015-T + 7003H
MT390K-125B32R08AD15M5L	125	11	32	30	38	58	25	8	8000	1,2		8				
MT390K-160B40R10AD15M5L	160	11	40	42	43	70	29	10	7000	2,2		10				
MT390K-200C40R12AD15M5L	200	11	40	49	47	96	31	12	6000	3,3		12				
MT390K-250D60R16AD15M5L	250	11	60	54	50	130	32	16	5500	5,7		16				
MT390K-315D60R20AD15M5L	315	11	60	86	50	130	32	20	4500	9,0		20				
MT390K-125B32R08TP22L	125	16	32	30	38	58	25	8	8000	1,9	TPCW2204PP	8	K390TP22L	H601700-30	T450855-15	7020-T + 7003H
MT390K-160B40R10TP22L	160	16	40	42	43	70	29	10	7000	3,0		10				
MT390K-200C40R12TP22L	200	16	40	49	47	96	31	12	6500	4,8		12				
MT390K-250D60R16TP22L	250	16	60	54	50	130	32	16	5500	7,8		16				
MT390K-315D60R20TP22L	315	16	60	86	50	130	32	20	5000	12,9		20				

MT390K-...R...L**Half side and facemills with cartridges left handed**

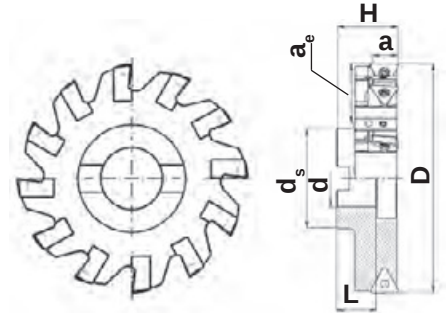
*Highly reliable cassette design.

*Fast reequipping of a half side and facemill in full side and facemill.

*Positive geometry.

Regular pitch: machining of steel, stainless steel and aluminium alloy.

Close pitch: effective milling of narrow details such as brackets, levers by sets of mills. Machining titanium alloys, heat resistant alloys, short chipping materials and steel.

**Close pitch**

Code key	Dimensions, mm								nmax RPM	 kg		No.	Cartridge			
	D	a	d	a _e	H	d _s	L	Z								
MT390K-080A22R08CC06L	80	4	22	15	40	38	20	8	15500	0,4	CCMT060208	8	K390CC06L	H601400-30	T250555-08	7008-T + 7003H
MT390K-100B27R10CC06L	100	4	27	23	34	48	22	10	14000	0,7		10				
MT390K-125B32R14CC06L	125	4	32	30	38	58	25	14	12000	1,2		14				
MT390K-160B40R18CC06L	160	4	40	42	43	70	29	18	10500	1,8		18				
MT390K-200C40R22CC06L	200	4	40	49	47	96	31	22	9500	2,6		22				
MT390K-080A22R08SD09L	80	7	22	15	40	38	20	8	14500	0,4	SD..T09T308..	8	K390SD09L	H601400-30	T400655-15	7015-T + 7003H
MT390K-100B27R10SD09L	100	7	27	23	34	48	22	10	12500	0,7		10		H601500-30		
MT390K-125B32R14SD09L	125	7	32	30	38	58	25	14	11000	1,2		14				
MT390K-160B40R18SD09L	160	7	40	42	43	70	29	18	10000	1,8		18				
MT390K-200C40R22SD09L	200	7	40	49	47	96	31	22	8500	2,6		22				
MT390K-125B32R12SD12M4L	125	9	32	30	38	58	25	12	8000	1,2	SD..T12M4...	12	K390SD12M4L	H601600-30	T450955-20	7020-T + 7003H
MT390K-160B40R14SD12M4L	160	9	40	42	43	70	29	14	7000	2,2		14				
MT390K-200C40R20SD12M4L	200	9	40	49	47	96	31	20	6000	3,3		20				
MT390K-250D60R22SD12M4L	250	9	60	54	50	130	32	22	5500	5,7		22				
MT390K-315D60R24SD12M4L	315	9	60	86	50	130	32	24	4500	9,0		24				
MT390K-125B32R12AD15M4L	125	11	32	30	38	58	25	12	8000	1,2	ADKT15M5..R(L)	12	K390AD15M5L	H601600-30	T400955-15	7015-T + 7003H
MT390K-160B40R14AD15M5L	160	11	40	42	43	70	29	14	7000	2,2		14				
MT390K-200C40R20AD15M5L	200	11	40	49	47	96	31	20	6000	3,3		20				
MT390K-250D60R22AD15M5L	250	11	60	54	50	130	32	22	5500	5,7		22				
MT390K-315D60R24AD15M5L	315	11	60	86	50	130	32	24	4500	9,0		24				
MT390K-160B40R14TP22L	160	16	40	42	43	70	29	14	7000	3,0	TPCW2204PP	14	K390TP22L	H601700-30	T450855-15	7020-T + 7003H
MT390K-200C40R18TP22L	200	16	40	49	47	96	31	18	6500	4,3		18				
MT390K-250D60R20TP22L	250	16	60	54	50	130	32	20	5500	7,8		20				
MT390K-315D60R24TP22L	315	16	60	86	50	130	32	24	5000	12,6		24				

Cartridge screw



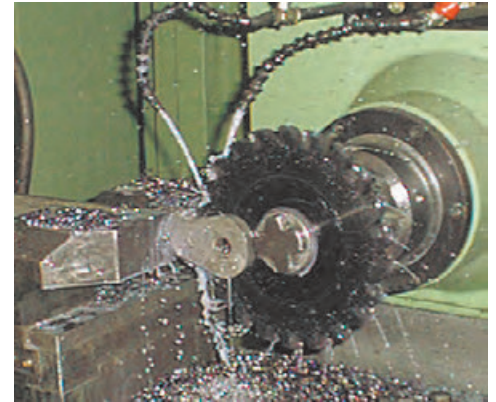
Cartridge screwdriver



7003H

ADD adjustable full side and facemills with cartridges for steel, stainless steel, cast iron and aluminium alloys

- *highly reliable cartridges design
- *range of adjustment of the cutting width up to 3 mm.
- * high effective milling of narrow details such as brackets, levers by sets of mills.
- * deep grooves in one run.
- * fast reequipment of a full side and facemill in half side and facemill.
- * regular and close pitch.



Adjustment procedures of adjustable full side and facemills

Ideally, insert adjustment can be carried out on a shadowgraph. Alternately, the side and facemill can be mounted on a set-up turntable or other device having a flat-button indicator point. If no other means is available, an indicator may be used in conjunction with the machine spindle.

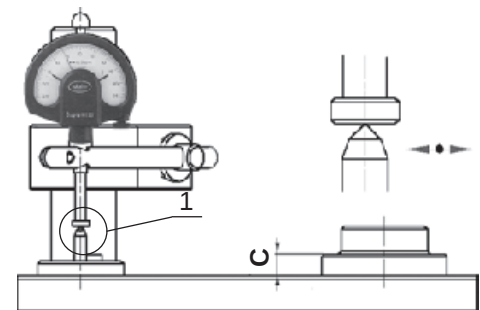
Install the indicator on adjusted size, which depends on adjusted widths of cut and value thickness hubs of the facemill. Calculation value adjusted size on formula:

$$L = C + \left(B1 - \frac{B1 - a}{2} \right) \text{ ,where}$$

- B1** – thickness hubs of the mill;
a – adjusted widths;
C – height of the mounting disk.

Example MT390K-S200N11SD09-1214: C=10 mm, B1=12 mm, a=13,5 mm, then

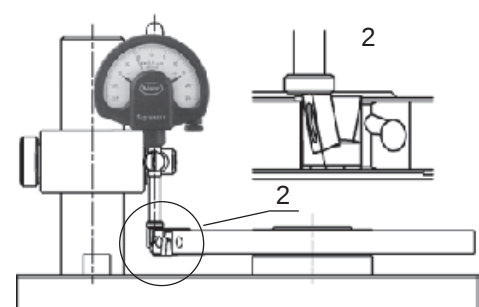
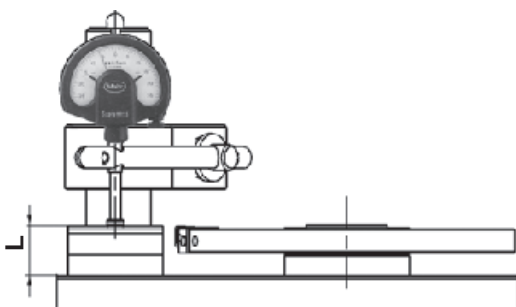
$$L = 10 + \left(12 - \frac{12 - 13,5}{2} \right) = 22,75 \text{ mm.}$$



Before installing the side and facemill on mounting disk necessary to check the condition of the base surfaces facemill on absence mechanical damages.

1. Loosen the cartridge screw 1/4 turn.
2. The Moving cartridge is on base surface facemill to obtain zero of the indicator on adjusted size.
3. Fasten the screw and tightening torque to 9 Nm.
4. Remove the reference insert and do the same for the following cartridge. By adjustment pay attention to the similar position of marked peak in pockets of all cartridges.

After adjusting first sides to go to adjustment second sides, repeating actions described above.





New design of side and facemills MT390K.. with the adjustment mechanism on width

Adjustment of side and facemills on width:

For adjustment it is necessary:

- To loosen a cartridge screws (8) to 2 Nm.
- To unscrew the adjustment screw (5.1) on the distance providing cartridge movement. The maximum distance of adjustment is 2 mm.
- To adjust necessary width of mill screwing the screw (5.2).
- To tighten cartridges screws (8) with tightening torque of 9 Nm.
- To fix screws (5.1) and (5.2) against the dowel (6), for protection from cartridge displacement during the milling.
- To check up motion variation if it exceeds 0,01 mm, it is necessary to carry out the readjustment. Adjustment is made for the left cartridges in the opposite side. Necessary adjustment is carried out for all cartridges in cutter body.

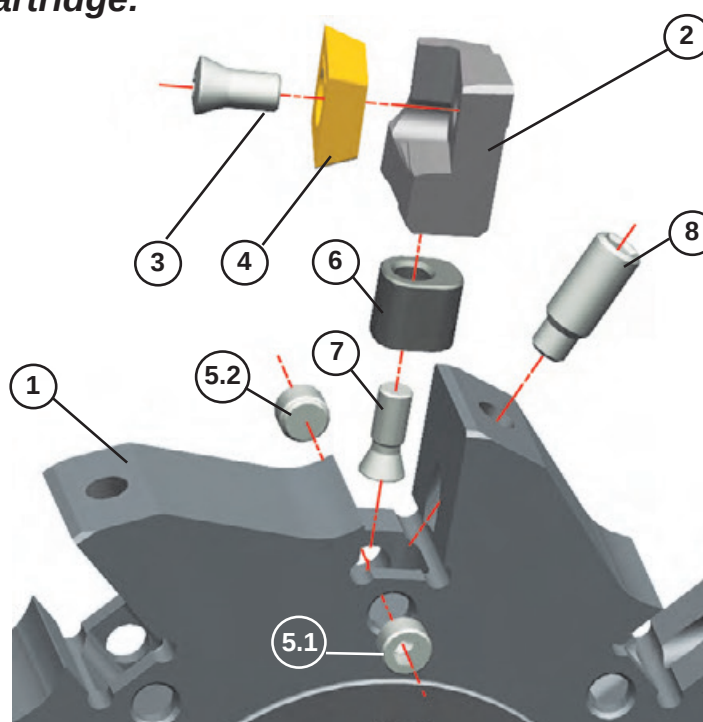
Calculation of value of movement of cartridge:

$$X = \frac{B - B_1}{2}, \text{ where}$$

B_1 - initial width of cut.

B - necessary width of cut.

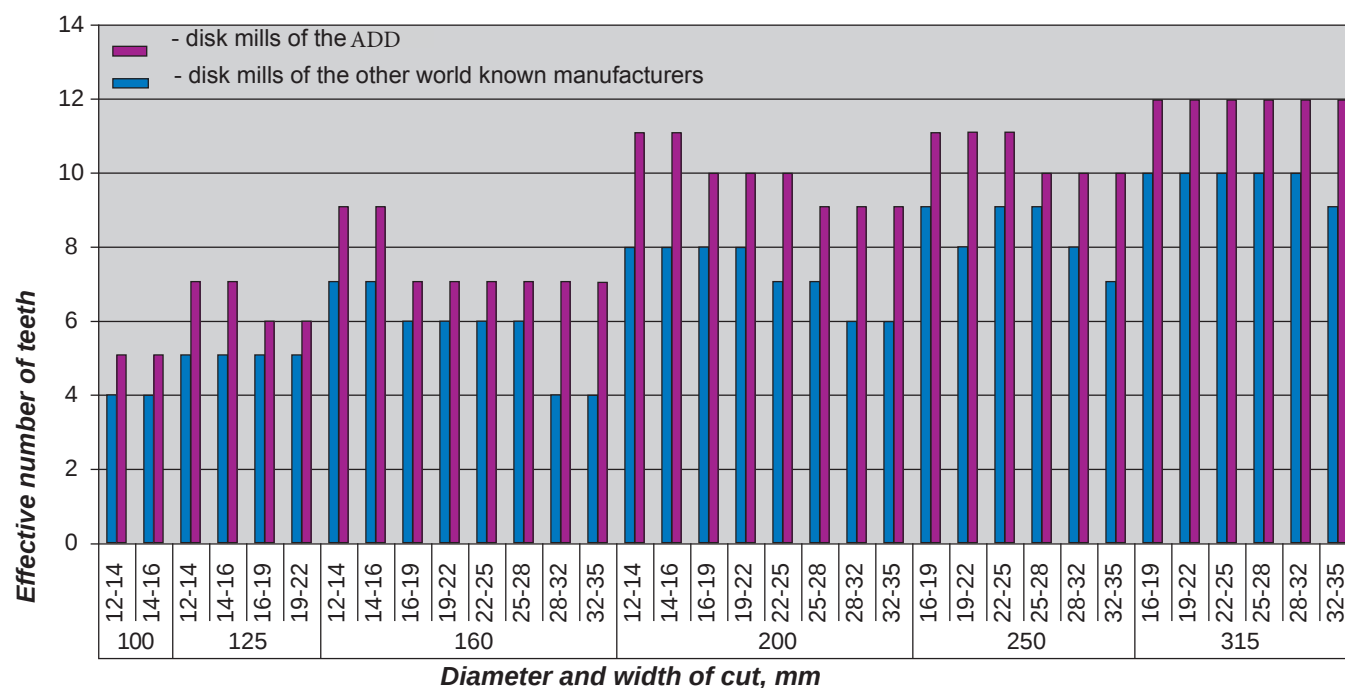
X - value of movement.

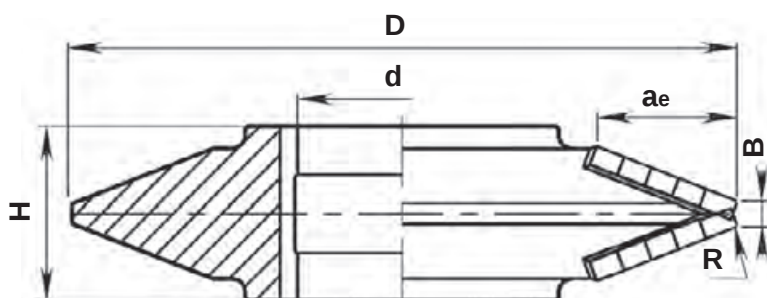


1. Cutter body.
2. Cartridge.
3. Insert screw
4. Insert.
- 5.1, 5.2 Adjusting screw.
6. Dowel.
7. Dowel screw.
8. Cartridge screw.

Disk mills close pitch

ADD disk mills with cartridges close pitch present the biggest number of teeth in the world, that guarantees fantastic productivity together with the high reliability of the machining process.



MT370L**Gear roughing cutters**

m Module	Code key	D	Z	d	ae	B	H	R		No.		
		mm		mm	mm	mm	mm	mm				
8	MT370L-160S40N02SN12-m8	160	2	40	18,4	4,2	27	1,5	SNGQ1205 R1.5	12	T400890-15	7015-T
	MT370L-200S50N03SN12-m8	200	3	50						18		
	MT370L-250S60N04SN12-m8	250	4	60						24		
	MT370L-315S80N05SN12-m8	315	5	80						30		
10	MT370L-160S40N02SN12-m10	160	2	40	25	5,8	35	2	+ SNGQ1206 R2 SNGQ1206 DNT	8+8	T451155-20	7020-T
	MT370L-200S50N03SN12-m10	200	3	50						12+12		
	MT370L-250S60N04SN12-m10	250	4	60						16+16		
	MT370L-315S80N05SN12-m10	315	5	80						20+20		
12	MT370L-200S50N03SN12-m12	200	3	50	35	7,2	50	3	+ SNGQ1207 R3 SNGQ1207 DNT	12+18	T451155-20	7020-T
	MT370L-250S60N04SN12-m12	250	4	60						16+24		
	MT370L-315S80N05SN12-m12	315	5	80						20+30		
14	MT370L-200S50N03SN12-m14	200	3	50	35	8,4	50	5	+ SNGQ1207 R5 SNGQ1207 DNT	12+18	T451155-20	7020-T
	MT370L-250S60N04SN12-m14	250	4	60						16+24		
	MT370L-315S80N05SN12-m14	315	5	80						20+30		
16	MT370L-250S60N04SN12-m16	250	4	60	50	10	54	7,5	+ SNGQ1207 R6 SNGQ1207 DNT	16+24	T451455-20	7020-T
	MT370L-315S80N05SN12-m16	315	5	80						20+30		
20	MT370L-250S60N04SN12-m20	250	4	60	52	12	65	4	+ SNGQ1207 R4 SNGQ1207 DNT	16+32	T451455-20	7020-T
	MT370L-315S80N05SN12-m20	315	5	80						20+40		
	MT370L-360S80N06SN12-m20	360	6	80						24+48		
22	MT370L-250S60N04SN12-m22	250	4	60	52	13,2	65	4	+ SNGQ1207 R4 SNGQ1207 DNT	16+32	T451455-20	7020-T
	MT370L-315S80N05SN12-m22	315	5	80						20+40		
	MT370L-360S80N06SN12-m22	360	6	80						24+48		
24	MT370L-315S60N04SN12-m24	315	4	60	72	14,6	84	10	+ SNGQ1207 R10 SNGQ1207 DNT	52+12	T451455-20	7020-T
	MT370L-360S80N04SN12-m24	360	4	80						52+12		
26	MT370L-315S80N04SN12-m26	315	4	80	72	15,9	84	10	+ SNGQ1207 R10 SNGQ1207 DNT	52+12	T451455-20	7020-T
	MT370L-360S80N04SN12-m26	360	4	80						52+12		
	MT370L-400S80N05SN12-m26	400	5	80						20+60		
30	MT370L-315S80N04SN12-m30	315	4	80	72	18,4	84	12	+ SNGQ1207 R12 SNGQ1207 DNT	52+12	T451455-20	7020-T
	MT370L-360S80N04SN12-m30	360	4	80						52+12		
	MT370L-400S80N05SN12-m30	400	5	80						20+60		
34	MT370L-360S80N05SN12-m34	360	5	80	85	21	100	13	+ SNGQ1207 R13 SNGQ1207 DNT	20+90	T451455-20	7020-T
	MT370L-400S80N06SN12-m34	400	6	80						24+108		
36	MT370L-360S80N05SN12-m36	360	5	80	85	22,3	100	13	+ SNGQ1207 R13 SNGQ1207 DNT	20+90	T451455-20	7020-T
	MT370L-400S80N06SN12-m36	400	6	80						24+108		

General information

The large-sized mills for milling of engine crankshafts, generator slots, turbine rotors and seaborne machinery have a special place among ADD special design mills. Gear-cutting hob with the module up **m7** to **m24** on accuracy class "B" are produced.

The style with protuberance is also available.

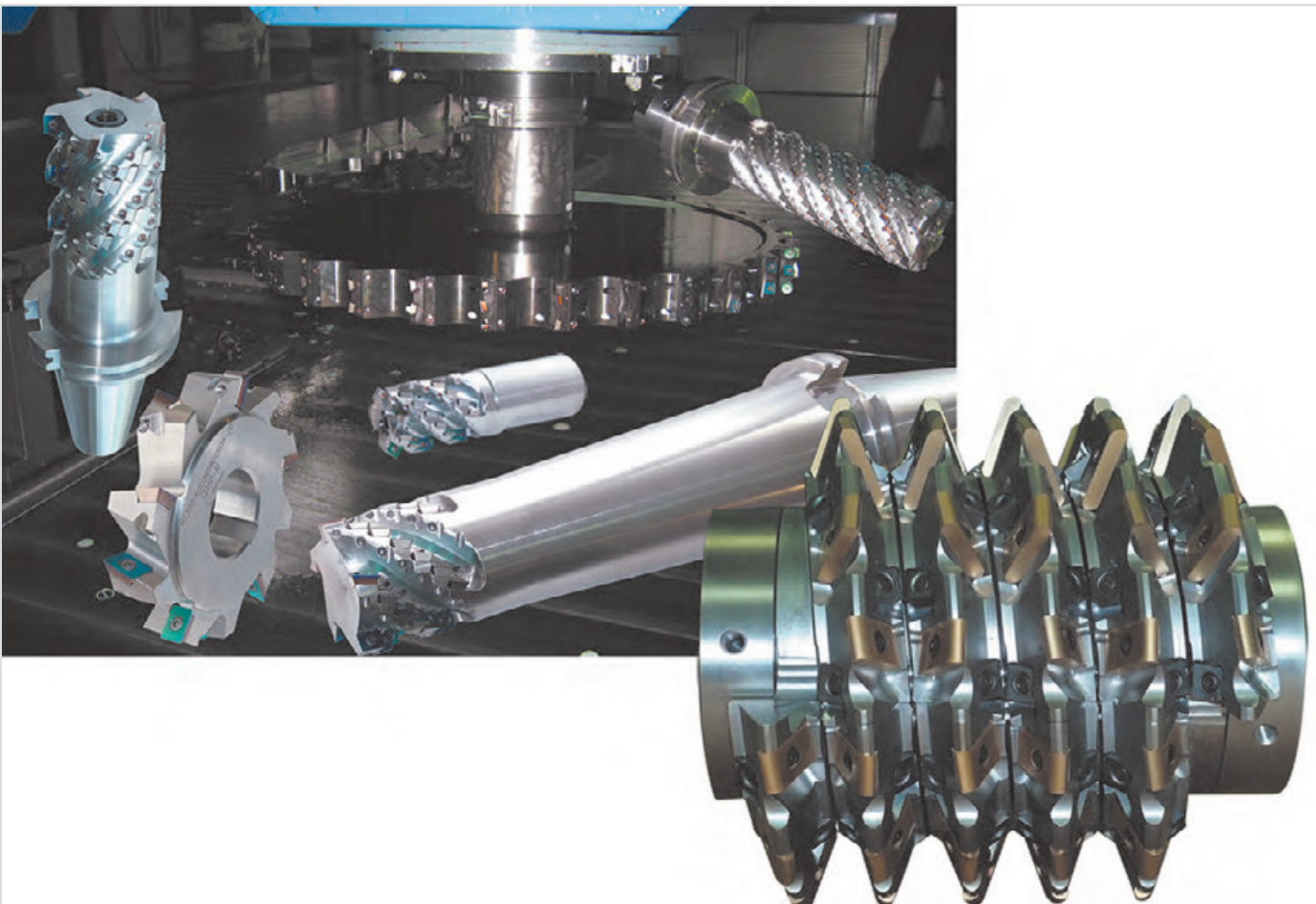
The unique production technique of these mills is based on know-how.

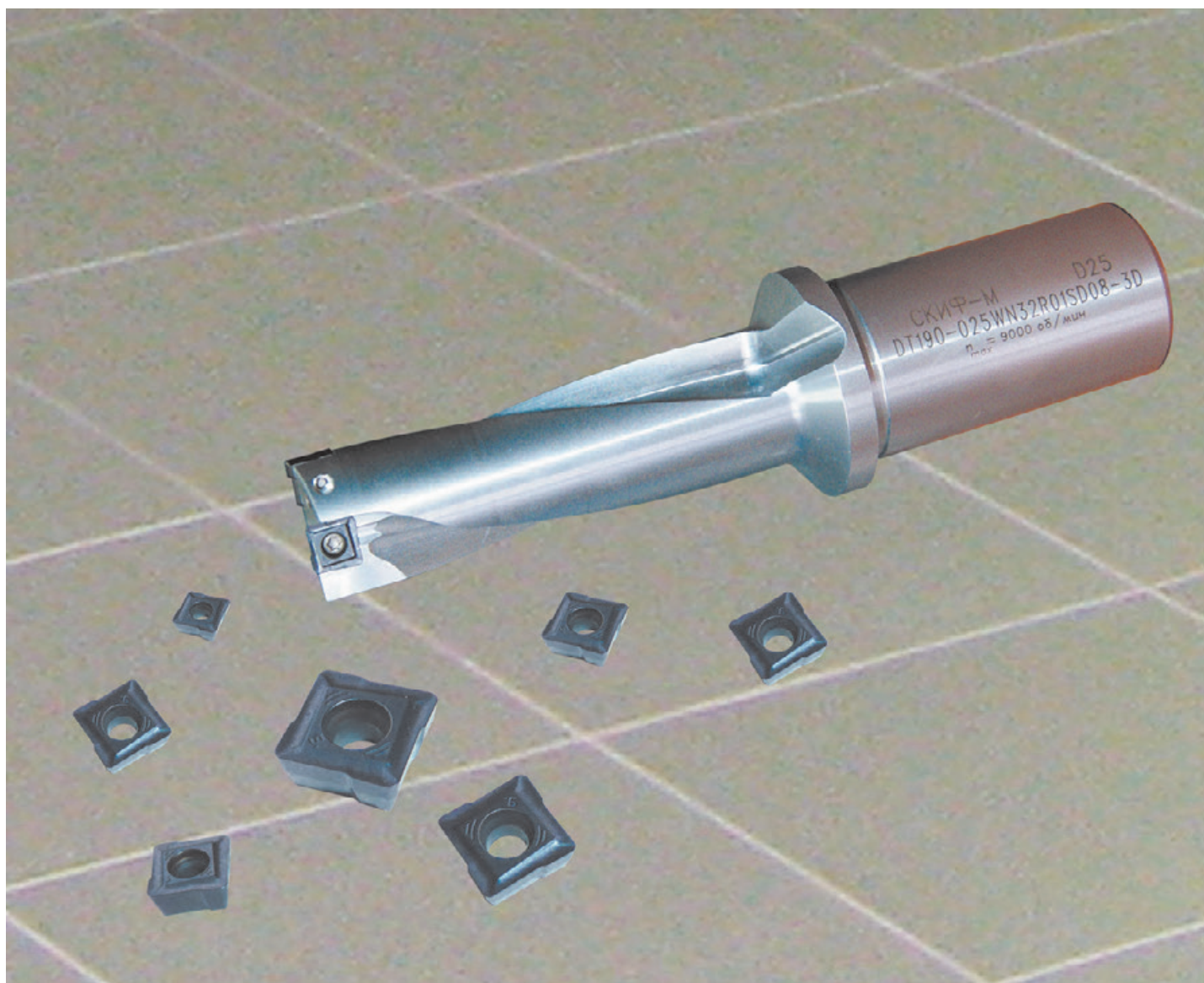
Special large-sized mills for crankshaft have two base styles:

1. Cartridge style.
2. Wedge style.

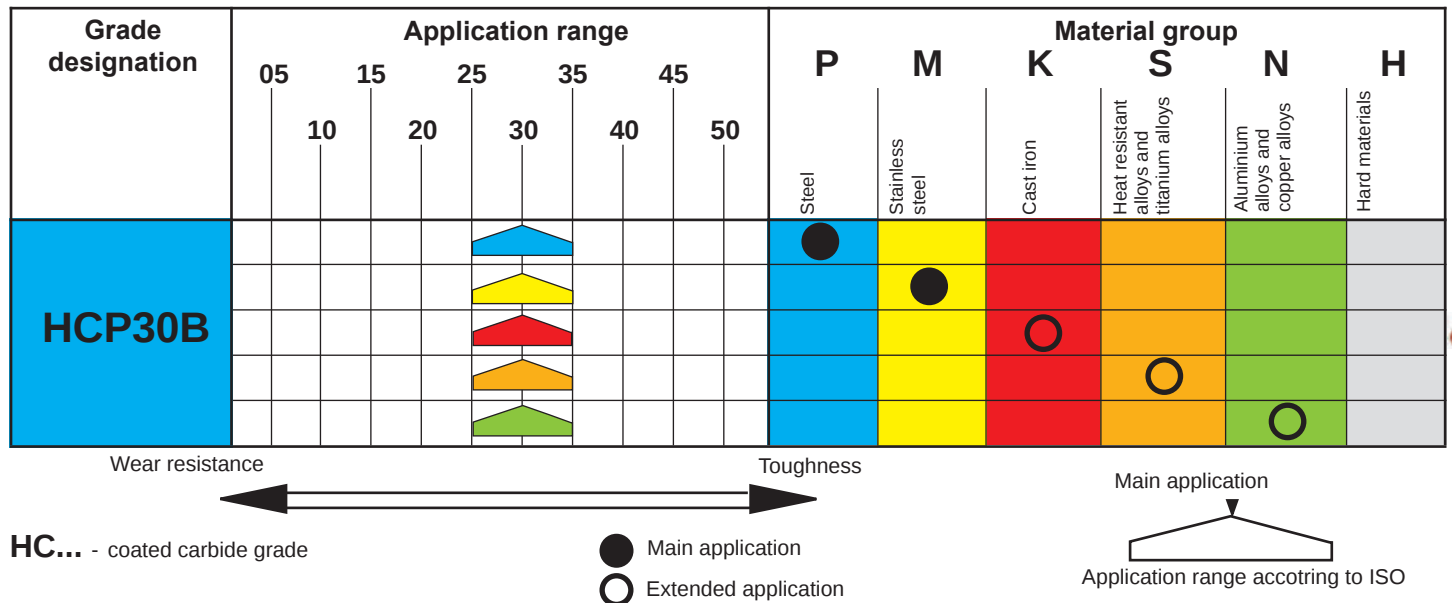
ADD produce both styles of mills with an internal or outside arrangement of cutting teeth.

Besides ADD produces special mills for an airspace, automobile and railway industry. The mill designs are based on using standard elements of mills ADD from the general catalogue. It is about 50% of total production volume.





Application fields carbide grade for drilling



Type description coated carbide grade for drilling

HCP30B	Universal high-production coated grade for all kinds of steel including stainless steel. Very tough and resistant against edge chipping. Good balance of toughness and wear resistance, combined with high edge strength, makes for cost - effective drilling on the high feed. Extended application for heat resisting alloys and nonferrous metals.
P25-P35	
M25-M35	
K25-K35	
S25-S35	
N25-N35	

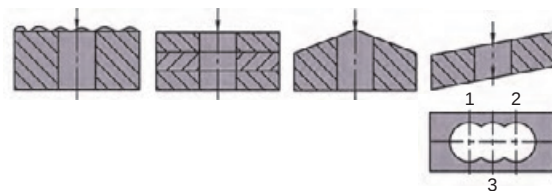
Choice cutting speed and definition of feed rates for drilling

ISO	Work materials	Cutting speed v _c (m/min)	L/D	Diameter (mm)				
		HCP30B		19-20	21-23	24-27	28-32	33-36
				Feed/tooth (mm/tooth)				
P	Non-alloy steel	160-300	3D-4D	0,05-0,18	0,05-0,20	0,06-0,22	0,06-0,24	0,06-0,24
			5D	0,04-0,12	0,04-0,15	0,06-0,17	0,06-0,19	0,06-0,19
	Low-alloy steel	100-280	3D-4D	0,05-0,20	0,06-0,22	0,07-0,23	0,07-0,25	0,07-0,25
			5D	0,05-0,15	0,05-0,17	0,07-0,18	0,08-0,20	0,08-0,20
	High-alloy steel and cast steel	100-200	3D-4D	0,05-0,18	0,06-0,20	0,07-0,23	0,07-0,25	0,07-0,25
			5D	0,05-0,13	0,05-0,15	0,07-0,17	0,08-0,19	0,08-0,19
	Stainless steel and cast steel	80-150	3D-4D	0,05-0,15	0,06-0,15	0,06-0,17	0,06-0,19	0,06-0,19
			5D	0,04-0,08	0,04-0,10	0,06-0,12	0,07-0,15	0,07-0,15
M	Stainless steel and cast steel	80-120	3D-4D	0,05-0,15	0,05-0,16	0,05-0,18	0,06-0,18	0,06-0,18
			5D	0,04-0,13	0,05-0,15	0,05-0,16	0,05-0,16	0,05-0,16
K	Grey cast iron	100-200	3D-4D	0,08-0,24	0,10-0,25	0,10-0,28	0,10-0,28	0,10-0,30
			5D	0,08-0,22	0,10-0,23	0,10-0,25	0,10-0,25	0,10-0,25
	Nodular cast iron	100-200	3D-4D	0,08-0,22	0,10-0,25	0,10-0,28	0,10-0,28	0,10-0,28
			5D	0,08-0,18	0,10-0,23	0,10-0,25	0,10-0,25	0,10-0,22
	Malleable cast iron	70-160	3D-4D	0,08-0,21	0,10-0,25	0,10-0,28	0,10-0,28	0,10-0,30
			5D	0,08-0,16	0,10-0,20	0,10-0,22	0,10-0,22	0,10-0,22
N	Aluminium wrought alloys	150-500	3D-4D	0,08-0,15	0,10-0,15	0,10-0,15	0,10-0,17	0,10-0,17
	5D	0,08-0,14						
	Aluminium cast alloys	150-350	3D-4D	0,08-0,15				
5D								
S	Heat resistant alloys	20-80	3D-4D	0,04-0,08	0,05-0,08	0,05-0,10	0,05-0,10	0,05-0,12
			5D	0,04-0,06	0,04-0,06	0,04-0,07	0,05-0,08	0,05-0,08
	Titanium alloys	40-100	3D-4D	0,07-0,10	0,05-0,12	0,06-0,12	0,07-0,15	0,07-0,15
5D			0,04-0,08	0,05-0,11	0,05-0,11	0,06-0,12	0,07-0,12	

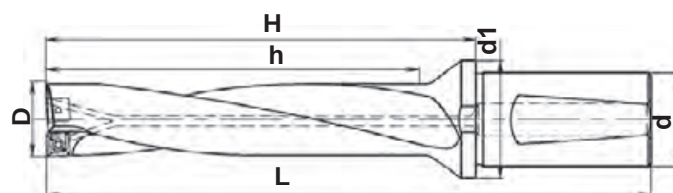
DT190...-3D



Drilling tools with internal coolant supply



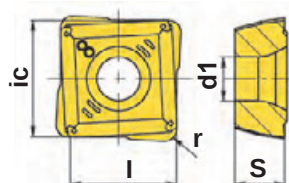
- *Optimized for high feed rates.
- *Long tool life thanks to cutter body coating.
- *4 cutting edges per insert.
- *For general drilling of steels, stainless steel, cast irons and non ferrous metals.



Hole depth 3D

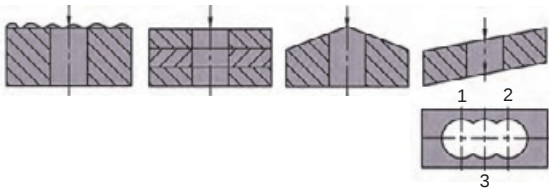
Straight shank with sloping clamping surface DIN 1835 E

Code key	Dimensions, mm							No.		
	D	H	h	L	d	d1				
DT190-019WN25R01SO05-3D-IK	19	75	57	131	25	32	SOMT050206ER	2	T220555-07	7007-T 1,0 Nm
DT190-019,5WN25R01SO05-3D-IK	19,5	77	59	133	25	32		2		
DT190-020WN25R01SO05-3D-IK	20	78	60	134	25	32		2		
DT190-020,5WN25R01SO05-3D-IK	20,5	80	62	136	25	32		2		
DT190-021WN25R01SO06-3D-IK	21	82	63	138	25	32	SOMT06M307ER	2	T220555-07	7007-T 1,0 Nm
DT190-021,5WN25R01SO06-3D-IK	21,5	84	65	140	25	32		2		
DT190-022WN25R01SO06-3D-IK	22	85	66	141	25	32		2		
DT190-022,5WN25R01SO06-3D-IK	22,5	87	68	143	25	32		2		
DT190-023WN25R01SO06-3D-IK	23	88	69	144	25	32		2		
DT190-023,5WN25R01SO06-3D-IK	23,5	90	71	146	25	32		2		
DT190-024WN32R01SO07-3D-IK	24	95	72	155	32	40	SOMT070308ER	2	T250655-08AP	7008-T 1,2 Nm
DT190-024,5WN32R01SO07-3D-IK	24,5	97	74	157	32	40		2		
DT190-025WN32R01SO07-3D-IK	25	98	75	158	32	40		2		
DT190-025,5WN32R01SO07-3D-IK	25,5	100	77	160	32	40		2		
DT190-026WN32R01SO07-3D-IK	26	101	78	161	32	40		2		
DT190-026,5WN32R01SO07-3D-IK	26,5	103	80	163	32	40		2		
DT190-027WN32R01SO07-3D-IK	27	104	81	164	32	40		2		
DT190-027,5WN32R01SO07-3D-IK	27,5	106	83	166	32	40		2		

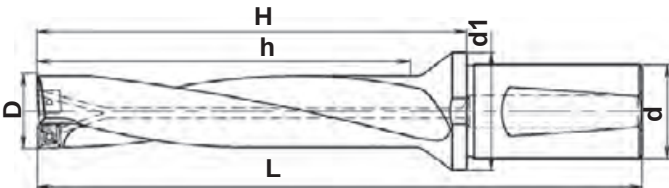


Code key	Carbide grade										Dimensions				
	P		M		K		S		N		ic	l	S	d1	r
	HCP30B		HCP30B		HCP30B		HCP30B		HCP30B						
SOMT050206ER	●		●		○		○		○		5,9	5,5	2,5	2,5	0,6
SOMT06M307ER	●		●		○		○		○		6,5	6,1	3,0	2,5	0,7
SOMT070308ER	●		●		○		○		○		7,7	7,3	3,3	2,9	0,8
SOMT08T308ER	●		●		○		○		○		8,9	8,5	3,8	3,5	0,8
SOMT100408ER	●		●		○		○		○		10,1	9,6	4,4	4,1	0,8

DT190...-3D
Drilling tools with internal coolant supply



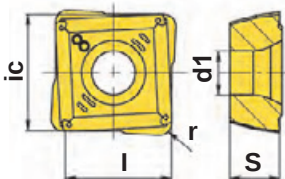
- *Optimized for high feed rates.
- *Long tool life thanks to cutter body coating.
- *4 cutting edges per insert.
- *For general drilling of steels, stainless steel, cast irons and non ferrous metals.



Hole depth 3D

Straight shank with sloping clamping surface DIN 1835 E

Code key	Dimensions, mm							No.		
	D	h	H	L	d	d1				
DT190-028WN32R01SO08-3D-IK	28	84	107	167	32	40	SOMT08T308ER	2	T300755-08	7008-T 2,2 Nm
DT190-028,5WN32R01SO08-3D-IK	28,5	86	109	169	32	40		2		
DT190-029WN32R01SO08-3D-IK	29	87	110	170	32	40		2		
DT190-029,5WN32R01SO08-3D-IK	29,5	89	112	172	32	40		2		
DT190-030WN32R01SO08-3D-IK	30	90	113	173	32	40		2		
DT190-030,2WN32R01SO08-3D-IK	30,5	92	115	175	32	40		2		
DT190-031WN32R01SO08-3D-IK	31	93	116	176	32	40		2		
DT190-031,5WN32R01SO08-3D-IK	31,5	95	118	178	32	40		2		
DT190-032WN32R01SO08-3D-IK	32	96	119	179	32	40	SOMT100408ER	2	T400955-15	7015-T 4,5 Nm
DT190-032,5WN40R01SO10-3D-IK	32,5	98	124	192	40	50		2		
DT190-033WN40R01SO10-3D-IK	33	99	125	193	40	50		2		
DT190-033,5WN40R01SO10-3D-IK	33,5	101	127	195	40	50		2		
DT190-034WN40R01SO10-3D-IK	34	102	128	196	40	50		2		
DT190-034,5WN40R01SO10-3D-IK	34,5	104	130	198	40	50		2		
DT190-035WN40R01SO10-3D-IK	35	105	131	199	40	50		2		
DT190-035,5WN40R01SO10-3D-IK	35,5	107	133	201	40	50		2		
DT190-036WN40R01SO10-3D-IK	36	108	134	202	40	50	SOMT100408ER	2		
DT190-036,5WN40R01SO10-3D-IK	36,5	110	136	204	40	50		2		

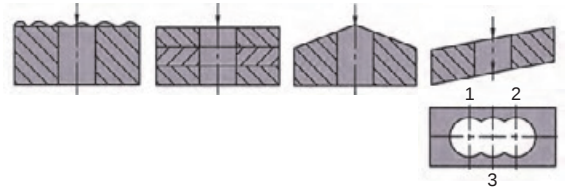


Code key	Carbide grade										Dimensions				
	P		M		K		S		N		ic	I	S	d1	r
	HCP30B		HCP30B		HCP30B		HCP30B		HCP30B						
SOMT050206ER	●		●		○		○		○		5,9	5,5	2,5	2,5	0,6
SOMT06M307ER	●		●		○		○		○		6,5	6,1	3,0	2,5	0,7
SOMT070308ER	●		●		○		○		○		7,7	7,3	3,3	2,9	0,8
SOMT08T308ER	●		●		○		○		○		8,9	8,5	3,8	3,5	0,8
SOMT100408ER	●		●		○		○		○		10,1	9,6	4,4	4,1	0,8

DT190...-4D



Drilling tools with internal coolant supply

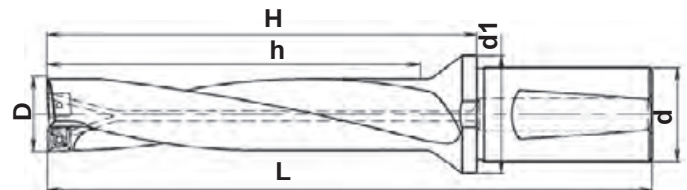


*Optimized for high feed rates.

*Long tool life thanks to cutter body coating.

*4 cutting edges per insert.

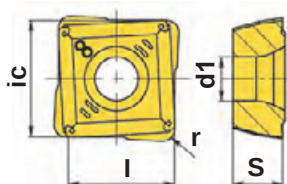
*For general drilling of steels, stainless steel, cast irons and non ferrous metals.



Hole depth 4D

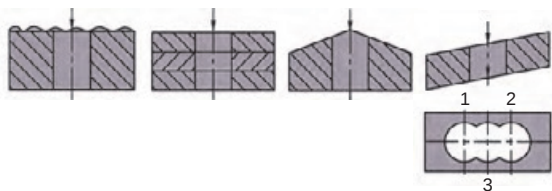
Straight shank with sloping clamping surface DIN 1835 E

Code key	Dimensions, mm							No.		
	D	h	H	L	d	d1				
DT190-019WN25R01SO05-4D-IK	19	76	94	150	25	32	SOMT050206ER	2	T220555-07	7007-T 1,0 Nm
DT190-020WN25R01SO05-4D-IK	20	80	98	154	25	32		2		
DT190-021WN25R01SO06-4D-IK	21	84	103	159	25	32	SOMT06M307ER	2	T220555-07	7007-T 1,0 Nm
DT190-022WN25R01SO06-4D-IK	22	88	107	163	25	32		2		
DT190-023WN25R01SO06-4D-IK	23	92	111	167	25	32		2		
DT190-024WN32R01SO07-4D-IK	24	96	119	179	32	40	SOMT070308ER	2	T250655-08AP	7008-T 1,2 Nm
DT190-025WN32R01SO07-4D-IK	25	100	123	183	32	40		2		
DT190-026WN32R01SO07-4D-IK	26	104	127	187	32	40		2		
DT190-027WN32R01SO07-4D-IK	27	108	131	191	32	40		2		
DT190-028WN32R01SO08-4D-IK	28	112	135	195	32	40	SOMT08T308ER	2	T300755-08	7008-T 2,2 Nm
DT190-029WN32R01SO08-4D-IK	29	116	139	199	32	40		2		
DT190-030WN32R01SO08-4D-IK	30	120	143	203	32	40		2		
DT190-031WN32R01SO08-4D-IK	31	124	147	207	32	40		2		
DT190-032WN32R01SO08-4D-IK	32	128	151	211	32	40		2		
DT190-033WN40R01SO10-4D-IK	33	132	159	226	40	50	SOMT100408ER	2	T400955-15	7015-T 4,5 Nm
DT190-034WN40R01SO10-4D-IK	34	136	162	230	40	50		2		
DT190-035WN40R01SO10-4D-IK	35	140	166	234	40	50		2		
DT190-036WN40R01SO10-4D-IK	36	144	170	238	40	50		2		

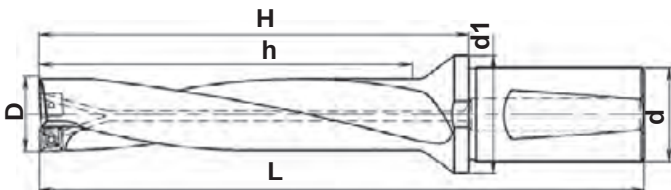


Code key	Carbide grade											Dimensions							
	P				M		K		S		N								
	HCP30B				HCP30B			HCP30B			HCP30B			HCP30B	ic	l	S	d1	r
SOMT050206ER	●				●			○			○			○	5,9	5,5	2,5	2,5	0,6
SOMT06M307ER	●				●			○			○			○	6,5	6,1	3,0	2,5	0,7
SOMT070308ER	●				●			○			○			○	7,7	7,3	3,3	2,9	0,8
SOMT08T308ER	●				●			○			○			○	8,9	8,5	3,8	3,5	0,8
SOMT100408ER	●				●			○			○			○	10,1	9,6	4,4	4,1	0,8

DT190...-5D
Drilling tools with internal coolant supply



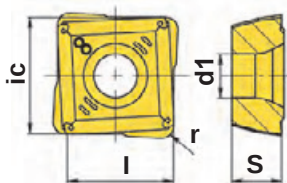
*Optimized for high feed rates.
*Long tool life thanks to cutter body coating.
*4 cutting edges per insert.
*For general drilling of steels, stainless steel, cast irons and non ferrous metals.



Hole depth 5D

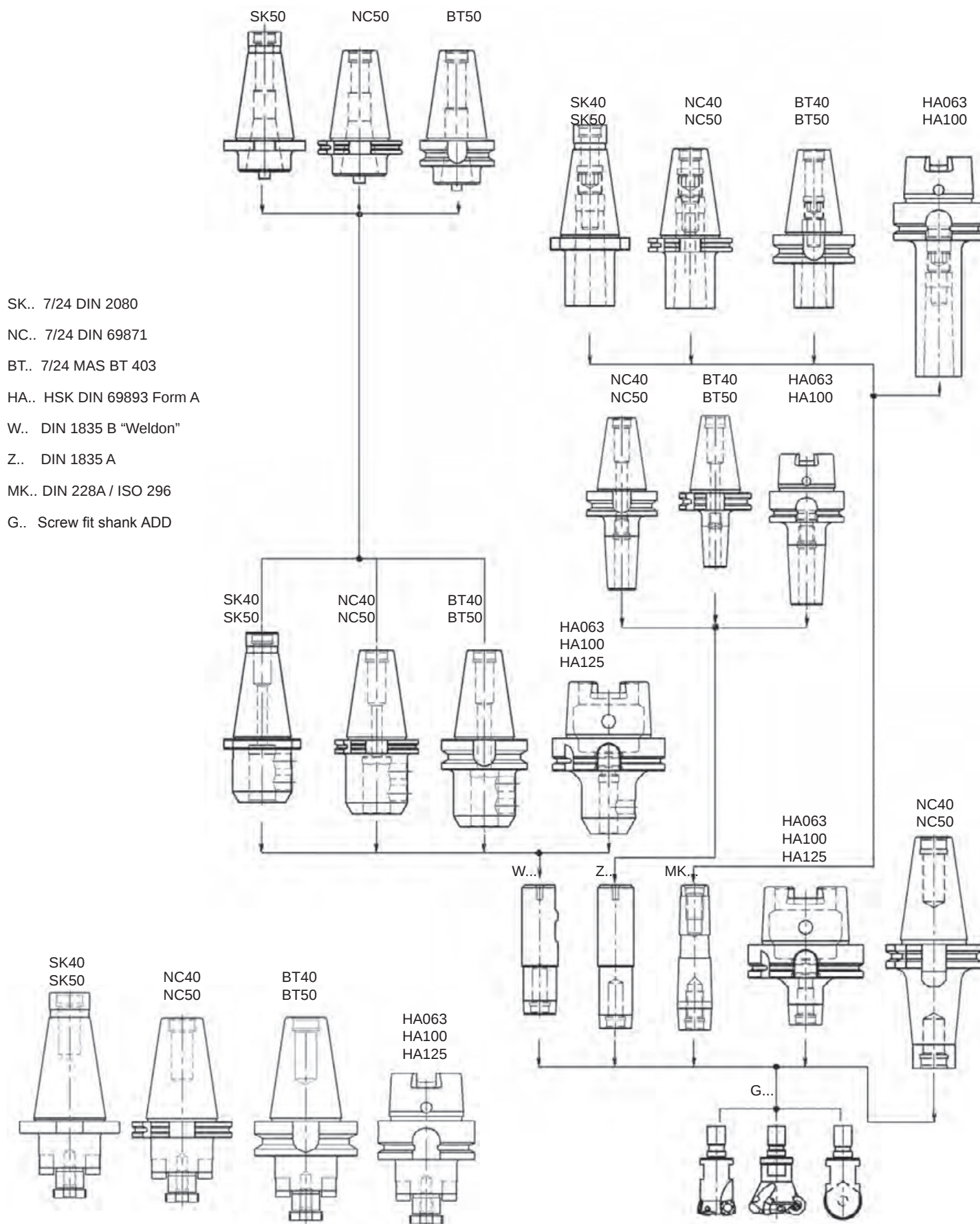
Straight shank with sloping clamping surface DIN 1835 E

Code key	Dimensions, mm							No.		
	D	h	H	L	d	d1				
DT190-019WN25R01SO05-5D-IK	19	95	113	169	25	32	SOMT050206ER	2	T220555-07	7007-T 1,0 Nm
DT190-020WN25R01SO05-5D-IK	20	100	118	174	25	32		2		
DT190-021WN25R01SO06-5D-IK	21	105	124	180	25	32	SOMT06M307ER	2	T220555-07	7007-T 1,0 Nm
DT190-022WN25R01SO06-5D-IK	22	110	128	184	25	32		2		
DT190-023WN25R01SO06-5D-IK	23	115	133	189	25	32		2		
DT190-024WN32R01SO07-5D-IK	24	120	143	203	32	40	SOMT070308ER	2	T250655-08AP	7008-T 1,2 Nm
DT190-025WN32R01SO07-5D-IK	25	125	148	208	32	40		2		
DT190-026WN32R01SO07-5D-IK	26	130	152	212	32	40		2		
DT190-027WN32R01SO07-5D-IK	27	135	157	217	32	40		2		
DT190-028WN32R01SO08-5D-IK	28	140	161	221	32	40	SOMT08T308ER	2	T300755-08	7008-T 2,2 Nm
DT190-029WN32R01SO08-5D-IK	29	145	166	226	32	40		2		
DT190-030WN32R01SO08-5D-IK	30	150	170	230	32	40		2		
DT190-031WN32R01SO08-5D-IK	31	155	175	235	32	40		2		
DT190-032WN32R01SO08-5D-IK	32	160	179	239	32	40		2		
DT190-033WN40R01SO10-5D-IK	33	165	191	259	40	50	SOMT100408ER	2	T400955-15	7015-T 4,5 Nm
DT190-034WN40R01SO10-5D-IK	34	170	196	264	40	50		2		
DT190-035WN40R01SO10-5D-IK	35	175	201	269	40	50		2		
DT190-036WN40R01SO10-5D-IK	36	180	206	274	40	50		2		

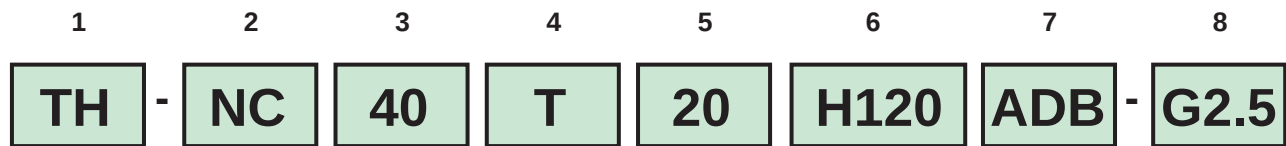


Code key	Carbide grade										Dimensions				
	P		M		K		S		N		ic	l	S	d1	r
	HCP30B		HCP30B		HCP30B		HCP30B		HCP30B						
SOMT050206ER	●		●		○		○		○		5,9	5,5	2,5	2,5	0,6
SOMT06M307ER	●		●		○		○		○		6,5	6,1	3,0	2,5	0,7
SOMT070308ER	●		●		○		○		○		7,7	7,3	3,3	2,9	0,8
SOMT08T308ER	●		●		○		○		○		8,9	8,5	3,8	3,5	0,8
SOMT100408ER	●		●		○		○		○		10,1	9,6	4,4	4,1	0,8





Tool Holders Nomenclature

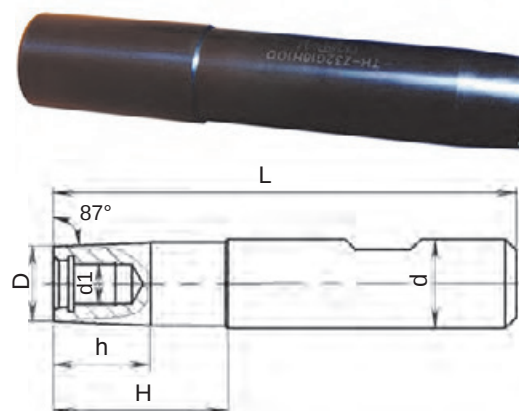


- 1 **Name of the tool:**
TH - Tool Holder;
- 2 **Shank type of the tool Holder:**
SK - 7/24 taper shank to ISO 297 / DIN 2080;
NC - 7/24 taper shank to DIN 69871 A;
BT - 7/24 taper shank to Japan-Norm (MAS BT 403);
CV - 7/24 taper shank to USA-Norm (CAT-V flange);
HA - Taper Hollow Shank HSK DIN 69893 Form A;
W - Straight shank with drive flat (Weldon);
Z - Straight shank cylindrical;
MK - Конус Морзе DIN 228 A;
N - Morse taper shank with draw-bar thread DIN 228 A;
WN - Complex sraight shank with drive flat (Weldon) and with sloping clamping surface Whistle Notch DIN 1835E;
- 3 **Shank size of the tool Holder**
- 4 **Shank type of the cutting tools:**
W - Adaptors system with straight shank with drive flat (Weldon);
Z - Collet chucks system OZ;
ML - Adaptors for drills with Morse taper shank and flat tang;
MG - Adaptors for mills with Morse taper shank and drawbar thread;;
N - Adaptors system Whistle Notch for mills and drills with straight shank and drive flat to DIN 1835E;
WN - Adaptors system Weldon-Whistle Notch for mills and drills with combining straight shank DIN 1835E & DIN 1835B;
G - Adaptors for endmills with screw fit shank;
T - Shrink fit holder;
D - Short drill chuck;
A - Facemill Tool Holder form A;
B - Facemill Tool Holder form B;
C - Facemill Tool Holder form C;
S - Complex Tool Holder for long edge milling cutters;
SK - Reduction sleeves for tapered tools to 7/24 DIN 2080;
NC - Reduction sleeves for tapered tools to 7/24 DIN 69871;
BT - Reduction sleeves for tapered tools to 7/24 MAS BT 403;
- 5 **Diameter bore, mm or retaining cone cutting mills, range thread, tap borer cutting for tap adapter**
- 6 **Length from gauge line to adaptor nose (H), mm;**
- 7 **Adapter spindle 7/24 with internal coolant supply:**
AD - central coolant supply;
ADB - central and over shoulder coolant supply;
- 8 **Designation of disbalance class for Balanceable Tool Holder;**

Extensions and Adaptors for endmills with screw fit shank

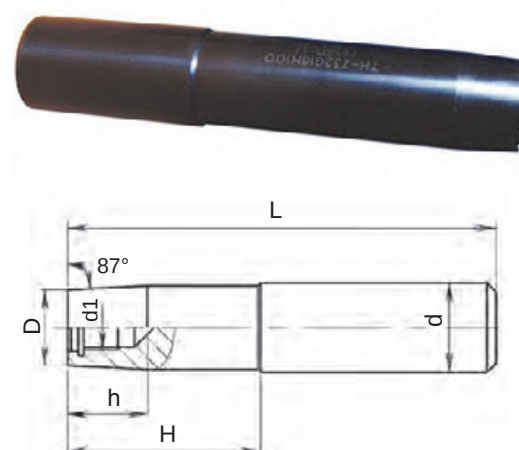
Weldon Extensions with straight shank with drive flat DIN 1835 B

Code key	Dimensions, mm					
	d	d1	D	h	H	L
TH-W16G08H032	16	M08	14,5	14,31	32	80
TH-W16G08H102	16	M08	14,5	14,31	102	150
TH-W20G10H030	20	M10	18,5	14,31	30	80
TH-W20G10H102	20	M10	18,5	14,31	102	152
TH-W25G12H034	25	M12	22	17	34	90
TH-W25G12H104	25	M12	22	17	104	160
TH-W32G16H045	32	M16	28	22	45	105
TH-W32G16H072	32	M16	28	22	72	132
TH-W32G16H132	32	M16	28	22	132	192



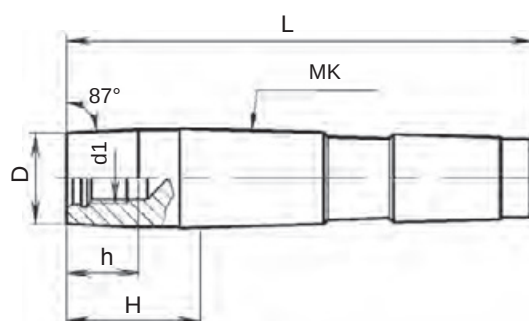
Straight shank DIN 1835 A Extensions

Code key	Dimensions, mm					
	d	d1	D	h	H	L
TH-Z16G08H052	16	M08	14,5	14,31	52	100
TH-Z16G08H112	16	M08	14,5	14,31	112	160
TH-Z20G10H050	20	M10	18,5	14,31	50	100
TH-Z20G10H110	20	M10	18,5	14,31	110	160
TH-Z25G12H044	25	M12	22	17	44	100
TH-Z25G12H104	25	M12	22	17	104	160
TH-Z25G12H144	25	M12	22	17	144	200
TH-Z32G16H040	32	M16	28	22	40	100
TH-Z32G16H100	32	M16	28	22	100	160
TH-Z32G16H140	32	M16	28	22	140	200
TH-Z32G16H180	32	M16	28	22	180	240

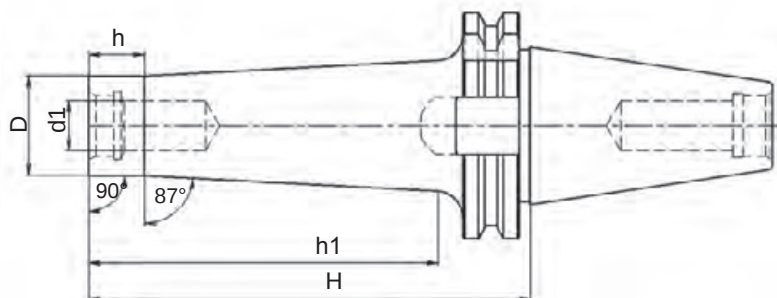


Morse taper shank Extensions with draw-bar thread DIN 228 A

Code key	MK	Dimensions, mm				
		d1	D	h	H	L
TH-MK2G08H029	MK2	M08	14,5	-	29.5	93.5
TH-MK2G08H059	MK2	M08	14,5	24.5	59.5	123.5
TH-MK2G10H029	MK2	M10	18,5	-	29.5	93.5
TH-MK2G10H059	MK2	M10	18,5	24.5	59.5	123.5
TH-MK3G12H020	MK3	M12	22	22	20	101
TH-MK3G12H069	MK3	M12	22	22	69	150
TH-MK4G16H059	MK4	M16	28	34.73	59.5	162
TH-MK4G16H099	MK4	M16	28	34.73	99.5	202
TH-MK5G16H128	MK5	M16	28	122	128.5	258

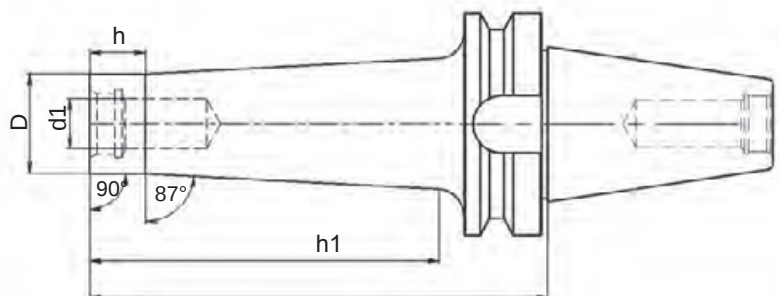


Adaptors with taper shank to 7/24 DIN 69871 A



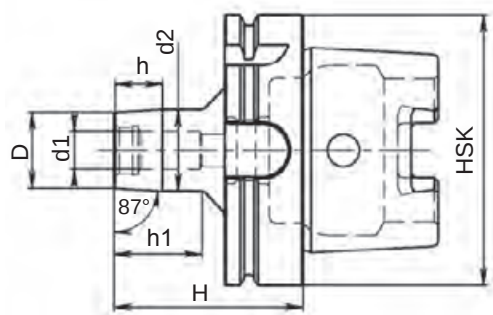
Code key	Dimensions, mm					
	NC	d1	D	h	H	h1
TH-NC40G08H045	40	M08	14,5	10	45	17
TH-NC40G08H070	40	M08	14,5	10	70	45
TH-NC40G08H095	40	M08	14,5	10	95	67
TH-NC40G08H120	40	M08	14,5	10	120	95
TH-NC40G10H050	40	M10	18,5	10	50	22
TH-NC40G10H075	40	M10	18,5	10	75	50
TH-NC40G10H100	40	M10	18,5	10	100	72
TH-NC40G10H125	40	M10	18,5	10	125	100
TH-NC40G10H150	40	M10	18,5	10	150	125
TH-NC40G12H060	40	M12	22	10	60	32
TH-NC40G12H085	40	M12	22	10	85	60
TH-NC40G12H110	40	M12	22	10	110	82
TH-NC40G12H135	40	M12	22	10	135	110
TH-NC40G12H160	40	M12	22	10	160	135
TH-NC40G16H040	40	M16	28	10	40	17
TH-NC40G16H065	40	M16	28	10	65	37
TH-NC40G16H090	40	M16	28	10	90	65
TH-NC40G16H115	40	M16	28	10	115	90
TH-NC40G16H140	40	M16	28	10	140	115
TH-NC40G16H165	40	M16	28	10	165	140
TH-NC50G12H050	50	M12	22	10	50	25
TH-NC50G12H100	50	M12	22	10	100	75
TH-NC50G12H150	50	M12	22	10	150	128
TH-NC50G12H200	50	M12	22	10	200	175
TH-NC50G16H050	50	M16	28	10	50	25
TH-NC50G16H100	50	M16	28	10	100	75
TH-NC50G16H150	50	M16	28	10	150	125
TH-NC50G16H200	50	M16	28	10	200	175
TH-NC50G16H250	50	M16	28	10	250	228
TH-NC50G20H075	50	M20	36,2	10	75	50
TH-NC50G20H100	50	M20	36,2	10	100	75
TH-NC50G20H150	50	M20	36,2	10	150	125
TH-NC50G20H200	50	M20	36,2	10	200	175
TH-NC50G24H095ADB	50	M24	45	20	95	72
TH-NC50G24H228ADB	50	M24	45	54	228,75	193,7

Adaptors with taper shank to 7/24 MAS BT



Code key	Dimensions, mm					
	BT	d1	D	h	H	h1
TH-BT40G08H050	40	M08	14,5	10	50	17
TH-BT40G08H075	40	M08	14,5	10	75	42
TH-BT40G08H100	40	M08	14,5	10	100	67
TH-BT40G08H120	40	M08	14,5	10	120	87
TH-BT40G10H055	40	M10	18,5	10	55	22
TH-BT40G10H080	40	M10	18,5	10	80	47
TH-BT40G10H105	40	M10	18,5	10	105	72
TH-BT40G10H130	40	M10	18,5	10	130	97
TH-BT40G10H150	40	M10	18,5	10	150	117
TH-BT40G12H060	40	M12	22	10	60	27
TH-BT40G12H085	40	M12	22	10	85	52
TH-BT40G12H110	40	M12	22	10	110	77
TH-BT40G12H135	40	M12	22	10	135	102
TH-BT40G12H160	40	M12	22	10	160	127
TH-BT40G16H070	40	M16	28	10	70	37
TH-BT40G16H095	40	M16	28	10	95	62
TH-BT40G16H120	40	M16	28	10	120	84
TH-BT40G16H145	40	M16	28	10	145	112
TH-BT40G16H170	40	M16	28	10	170	137
TH-BT50G12H070	50	M12	22	10	70	26
TH-BT50G12H120	50	M12	22	10	120	76
TH-BT50G12H170	50	M12	22	10	170	126
TH-BT50G12H220	50	M12	22	10	220	176
TH-BT50G16H070	50	M16	28	10	70	26
TH-BT50G16H120	50	M16	28	10	120	76
TH-BT50G16H170	50	M16	28	10	170	126
TH-BT50G16H220	50	M16	28	10	220	176
TH-BT50G16H270	50	M16	28	10	270	226
TH-BT50G20H070	50	M20	36,2	10	70	26
TH-BT50G20H120	50	M20	36,2	10	120	76
TH-BT50G20H170	50	M20	36,2	10	170	126
TH-BT50G20H220	50	M20	36,2	10	220	176

Adaptors HSK DIN 69893 Form A



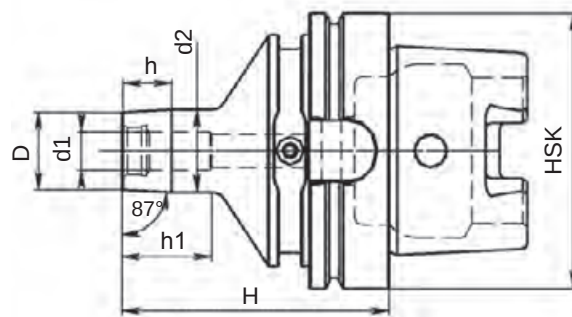
$n_{max} = 8\,000\,min^{-1}$

Code key	Dimensions, mm						
	HSK	d1	d2	D	h	H	h1
TH-HA63G08H045	63	M08	15,5	14,5	10	45	14
TH-HA63G08H070	63	M08	15,5	14,5	10	70	39
TH-HA63G08H095	63	M08	15,5	14,5	10	95	64
TH-HA63G08H120	63	M08	15,5	14,5	10	120	85
TH-HA63G10H050	63	M10	19,5	18,5	10	50	16
TH-HA63G10H075	63	M10	19,5	18,5	10	75	41
TH-HA63G10H100	63	M10	19,5	18,5	10	100	66
TH-HA63G10H125	63	M10	19,5	18,5	10	125	91
TH-HA63G10H150	63	M10	19,5	18,5	10	150	116
TH-HA63G12H060	63	M12	23	22	10	60	26
TH-HA63G12H085	63	M12	23	22	10	85	51
TH-HA63G12H110	63	M12	23	22	10	110	76
TH-HA63G12H135	63	M12	23	22	10	135	101
TH-HA63G12H160	63	M12	23	22	10	160	126
TH-HA63G16H065	63	M16	30	28	19	65	31
TH-HA63G16H090	63	M16	30	28	19	90	59
TH-HA63G16H115	63	M16	30	28	19	115	81
TH-HA63G16H140	63	M16	30	28	19	140	109
TH-HA63G16H165	63	M16	30	28	19	165	134

$n_{max} = 8\,000\,min^{-1}$

Code key	Dimensions, mm						
	HSK	d1	d2	D	h	H	h1
TH-HA100G12H055	100	M12	23	22	10	55	21
TH-HA100G12H100	100	M12	23	22	10	100	60
TH-HA100G12H150	100	M12	23	22	10	150	110
TH-HA100G12H200	100	M12	23	22	10	200	156
TH-HA100G16H060	100	M16	30	28	19	60	21
TH-HA100G16H100	100	M16	30	28	19	100	60
TH-HA100G16H150	100	M16	30	28	19	150	110
TH-HA100G16H200	100	M16	30	28	19	200	156
TH-HA100G16H250	100	M16	30	28	19	250	206

Balanced adaptors HSK DIN 69893 Form A



$n_{max} = 25\,000\,min^{-1}$

Code key	Dimensions, mm						
	HSK	d1	d2	D	h	H	h1
TH-HA63G08H060G2.5	63	M08	15,5	14,5	10	60	14
TH-HA63G08H085G2.5	63	M08	15,5	14,5	10	85	39
TH-HA63G08H0110G2.5	63	M08	15,5	14,5	10	110	64
TH-HA63G08H135G2.5	63	M08	15,5	14,5	10	135	85
TH-HA63G10H065G2.5	63	M10	19,5	18,5	10	65	16
TH-HA63G10H090G2.5	63	M10	19,5	18,5	10	90	41
TH-HA63G10H115G2.5	63	M10	19,5	18,5	10	115	66
TH-HA63G10H140G2.5	63	M10	19,5	18,5	10	140	91
TH-HA63G10H165G2.5	63	M10	19,5	18,5	10	165	116
TH-HA63G12H075G2.5	63	M12	23	22	10	75	26
TH-HA63G12H100G2.5	63	M12	23	22	10	100	51
TH-HA63G12H125G2.5	63	M12	23	22	10	125	76
TH-HA63G12H150G2.5	63	M12	23	22	10	150	101
TH-HA63G12H175G2.5	63	M12	23	22	10	175	126
TH-HA63G16H080G2.5	63	M16	30	28	19	80	31
TH-HA63G16H105G2.5	63	M16	30	28	19	105	59
TH-HA63G16H130G2.5	63	M16	30	28	19	130	81
TH-HA63G16H155G2.5	63	M16	30	28	19	155	109
TH-HA63G16H180G2.5	63	M16	30	28	19	180	134

$n_{max} = 16\,000\,min^{-1}\,G2.5$

Code key	Dimensions, mm						
	HSK	d1	d2	D	h	H	h1
TH-HA100G12H070G2.5	100	M12	23	22	10	70	21
TH-HA100G12H115G2.5	100	M12	23	22	10	115	60
TH-HA100G12H165G2.5	100	M12	23	22	10	165	110
TH-HA100G16H075G2.5	100	M16	30	28	19	75	21
TH-HA100G16H115G2.5	100	M16	30	28	19	115	60
TH-HA100G16H165G2.5	100	M16	30	28	19	165	110
TH-HA100G16H215G2.5	100	M16	30	28	19	215	156

Balancing equipment



HSK63 B510805

HSK100 B840805

Balancing screw



H600500-30

Balancing screwdriver

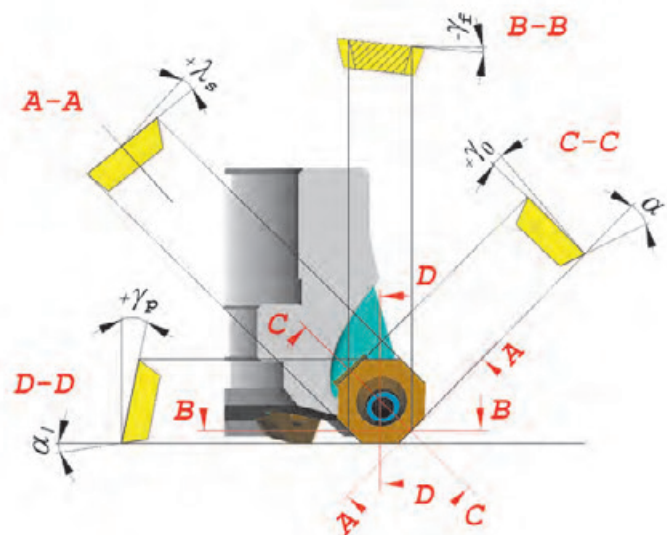
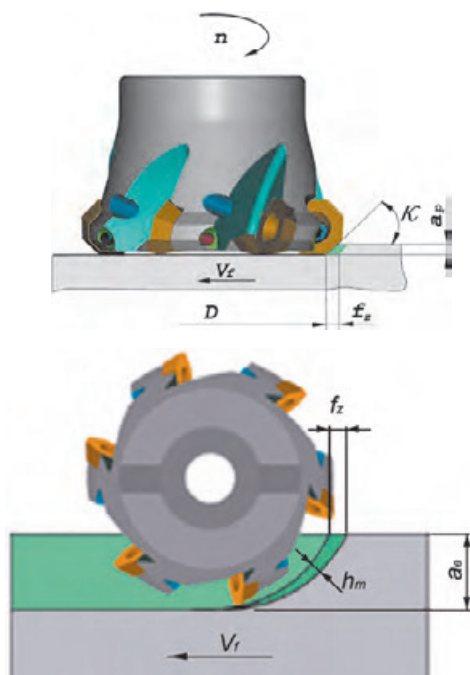


7003H



Symbols, Terms and Dimensions

Symbols	Terms	Dimensions
a_e	Width of cut	mm
a_p	Depth of cut	mm
D	Cutter diameter	mm
f_z	Feed per tooth	mm/z
h_m	Mean undeformed chip thickness	mm
k_c	Specific cutting force	N/mm ²
$k_{c1.1}$	Specific cutting force (for an undeformed chip cross section $b \times h = 1 \times 1$ mm ²)	N/mm ²
m_c	Exponent for mean undeformed chip thickness	
n	Spindle speed	1/min
P	Power requirement of motor	kW
Q	Metal removal rate	cm ³ /min
V_c	Cutting speed	m/min
V_f	Feed rate	mm/min
Z	Number of teeth	
iC	Inscribed circle	mm
η	Efficiency	
γ_o	Tool orthogonal	degrees
γ_f	Tool back rake (radial rake)	degrees
γ_p	Tool side rake (axial rake)	degrees
γ_ω	Insert orthogonal rake	degrees
κ	Tool cutting edge angle	degrees
λ_s	Tool cutting edge inclination	degrees
α	Tool orthogonal clearance	degrees
α_1	Tool side clearance	degrees



Formulas

Cutting speed (m/min)

$$V_c = \frac{\pi D n}{1000}$$

Spindle speed, RPM

$$n = \frac{1000 V_c}{\pi D}$$

Feed rate (mm/min)

$$V_f = f_z n z$$

Feed per tooth (mm/z)

$$f_z = \frac{V_f}{n z}$$

Metal removal rate (cm³ /min)

$$Q = \frac{a_p a_e V_f}{1000}$$

Tool orthogonal rake (°)

$$\gamma_o = \arctg(\cos \kappa \operatorname{tg} \gamma_p \sin \kappa \operatorname{tg} \gamma_f)$$

Specific cutting force (N/mm²)

$$k_c = k_{c1.1} \frac{1 - 0,015 (\gamma_o + \gamma_\omega)}{(h_m)^{m_c}}$$

Power requirement of motor, HP (kW)

$$P = \frac{a_p a_e V_f k_c}{60 \times 10^6 \eta}$$



Average chip thickness, inch (mm)

for $a_e/D \leq 0,1$

$$h_m = f_z \sqrt{\frac{a_e}{D}}$$

for $a_e/D > 0,1$

$$h_m = \frac{180 a_e f_z \sin \kappa}{\pi D \arcsin\left(\frac{a_e}{D}\right)}$$

for MT100, MT200

$$h_m = f_z \sqrt{\frac{a_p}{iC}}$$

Calculation of cutting data for some mills

Calculation of cutting data for milling with round inserts

For endmills with round inserts a_e depending on machining data.

For facemills with round inserts $a_p < 0,5 iC$, mm $a_e = 0,75-0,8 D_1$, mm

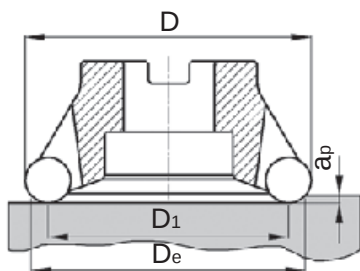
$$n = \frac{1000V_c}{\pi D_e} \quad (\text{RPM})$$

The cutting speed recommendations see pages 320-321.

$$V_c = V_c^{\text{table}} k_v \quad (\text{m/min}), \text{ where } k_v - \text{correction factors.}$$

Use recommendations for value D_e see on table 1 for endmills or on table 2 for facemills or define by the following formula. Particularly when using round insert cutters at small depths of cut, it is always important to calculate the true cutting speed V_c based on the effective - or true diameter in cut D_e .

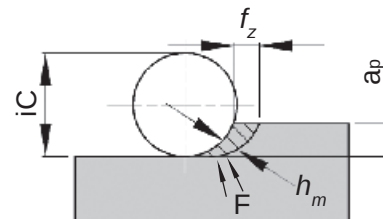
$$D_e = D_1 + \sqrt{iC^2 - (iC - 2a_p)^2}$$



D_e - effective diameter, mm;

iC - inscribed circle, mm;

D_1 - inside cutter diameter, mm;



Calculated effective diameter (D_e) for endmills with round inserts

Table 1

a _p , mm	D- cutter diameter, mm																										
	08	10	12	16	20	12	16	20	25	20	25	32	20	25	32	40	50	25	32	40	50	25	40	50			
	RD05					RD08					RP10				RP12					RP16					RP20		
	D _e , mm																										
0,2	5,0	7,0	9,0	13,0	17,0	6,5	10,5	14,5	19,5	12,8	17,8	24,8	11,1	15,1	23,1	31,1	41,1	12,6	19,6	27,6	37,6	24,0	24,0	34,0			
0,4	5,7	7,7	9,7	13,7	17,7	7,5	11,5	15,5	20,5	13,9	18,9	25,9	12,3	16,3	24,3	32,3	42,3	14,0	21,0	29,0	39,0	25,6	25,6	35,6			
0,6	6,2	8,2	10,2	14,2	18,2	8,2	12,2	16,2	21,2	14,7	19,7	26,7	13,2	17,2	25,2	33,2	43,2	15,1	22,1	30,1	40,1	26,8	26,8	36,8			
0,8	6,7	8,7	10,7	14,7	18,7	8,8	12,8	16,8	21,8	15,4	20,4	27,4	14,0	18,0	26,0	34,0	44,0	16,0	23,0	31,0	41,0	27,8	27,8	37,8			
1,2	7,3	9,3	11,3	15,3	19,3	9,7	13,7	17,7	22,7	16,5	21,5	28,5	15,2	19,2	27,2	35,2	45,2	17,4	24,4	32,4	42,4	29,5	29,5	39,5			
1,6	7,7	9,7	11,7	15,7	19,7	10,4	14,4	18,4	23,4	17,3	22,3	29,3	16,0	20,2	28,2	36,2	46,2	18,6	25,6	33,6	43,6	30,9	30,9	40,9			
2,5	8,0	10,0	12,0	16,0	20,0	11,4	15,4	19,4	24,4	18,7	23,7	30,7	17,7	21,7	29,7	37,7	47,7	20,6	27,6	35,6	45,6	33,2	33,2	43,2			
3,2						11,8	15,8	19,8	24,8	19,3	24,3	31,3	18,6	22,6	30,6	38,6	48,6	21,8	28,8	36,8	46,8	34,7	34,7	44,7			
4,0						12,0	16,0	20,0	25,0	19,8	24,8	31,8	19,3	23,3	31,3	39,3	49,3	22,9	29,9	37,9	47,9	36,0	36,0	46,0			
4,5										19,9	24,9	31,9	19,6	23,6	31,6	39,6	49,6	23,4	30,4	38,4	48,4	36,7	36,7	46,7			
5,0										20,0	25,0	32,0	19,8	23,8	31,8	39,8	49,8	23,8	30,8	38,8	48,8	37,3	37,3	47,3			
6,0													20,0	24,0	32,0	40,0	50,0	24,5	31,5	39,5	49,5	38,3	38,3	48,3			
8,0																		25,0	32,0	40,0	50,0	39,6	39,6	49,6			
9,0																						39,9	39,9	49,9			
10,0																						40,0	40,0	50,0			

Calculated effective diameter (D_e) for facemills with round inserts

Table 2

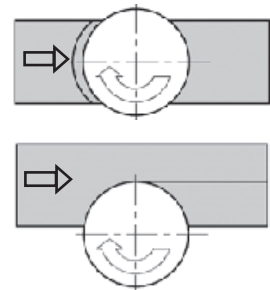
a _p , mm	D- cutter diameter, mm														
	50		63		80		100		125		160				
	Inserts														
	RP12	RP16	RP12	RP16	RP12	RP16	RP20	RP12	RP16	RP20	RP12	RP16	RP20	RP16	RP20
D _e , mm															
0,2	41,1	37,6	54,1	50,6	71,1	67,6	64,0	91,1	87,6	84,0	116,1	112,6	109,0	147,6	144,0
0,4	42,3	39,0	55,3	52,0	72,3	69,0	65,6	92,3	89,0	85,6	117,3	114,0	110,6	149,0	145,6
0,6	43,2	40,1	56,2	53,1	73,2	70,1	66,8	93,2	90,1	86,8	118,2	115,1	111,8	150,1	146,8
0,8	44,0	41,0	57,0	54,0	74,0	71,0	67,8	94,0	91,0	87,8	119,0	116,0	112,8	151,0	147,8
1,2	45,2	42,4	58,2	55,4	75,2	72,4	69,5	95,2	92,4	89,5	120,2	117,4	114,5	152,4	149,5
1,6	46,2	43,6	59,2	56,6	76,2	73,6	70,9	96,2	93,6	90,9	121,2	118,6	115,9	153,6	150,9
2,5	47,7	45,6	60,7	58,6	77,7	75,6	73,2	97,7	95,6	93,2	122,7	120,6	118,2	155,6	153,2
3,2	48,6	46,8	61,6	59,8	78,6	76,8	74,7	98,6	96,8	94,7	123,6	121,8	119,7	156,8	154,7
4,0	49,3	47,9	62,3	60,9	79,3	77,9	76,0	99,3	97,9	96,0	124,3	122,9	121,0	157,9	156,0
4,5	49,6	48,4	62,6	61,4	79,6	78,4	76,7	99,6	98,4	96,7	124,6	123,4	121,7	158,4	156,7
5,0	49,8	48,8	62,8	61,8	79,8	78,8	77,3	99,8	98,8	97,3	124,8	123,8	122,3	158,8	157,3
6,0	50,0	49,5	63,0	62,5	80,0	79,5	78,3	100,0	99,5	98,3	125,0	124,5	123,3	159,5	158,3
6,5		49,7		62,7		79,7	78,7		99,7	98,7		124,7	123,7	159,7	158,7
7,0		49,9		62,9		79,9	79,1		99,9	99,1		124,9	124,1	159,9	159,1
8,0		50,0		63,0		80,0	79,6		100,0	99,6		125,0	124,6	160,0	159,6
9,0							79,9			99,9			124,9		159,9
10,0							80,0			100,0			125,0		160,0

Feed per tooth (mm/tooth) by centered position of the cutter

$$f_z = \frac{ic h_m}{D_e - D_1}$$

Feed per tooth (mm/tooth) by side milling

$$f_z = \frac{D_e ic h_m}{(D_e - D_1) \sqrt{D_e^2 - (D_e a_p)^2}}$$



Thickness insert, mm	h_m mm
<3,18	0,1 - 0,15
3,18 - 3,97	0,2
4,76 - 5,56	0,3
>6,35	0,4 - 0,7

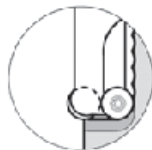
h_m - Mean undeformed chip thickness (mm), page 327 .

The mills work best at small axial depths where the round insert shape can be used to increase the feed per tooth in 4-5 times, due to the thin chip. A small axial and radial depth of cut gives a short cutting edge engagement. Low cutting forces (F) and very little heat is generated allowing the cutting speed to be increased 50-100%. Together with the high feed per tooth this will allow the table feed to be increased in 5-10 times compared with general milling.

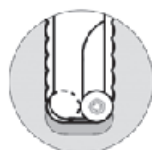
Working areas



Facemilling



Shoulder milling



Full slot milling



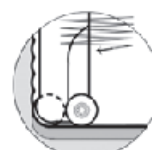
Rest milling



Profiling



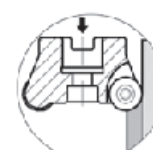
Helical interpolation



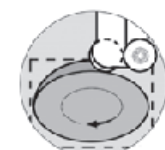
Ramping



Contouring



Plunge milling

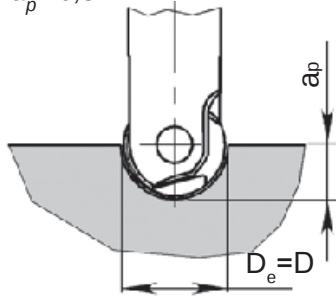


Turn-milling

Machining data:

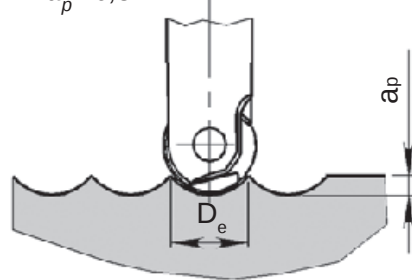
Slot milling

$$a_p = 0,5D$$

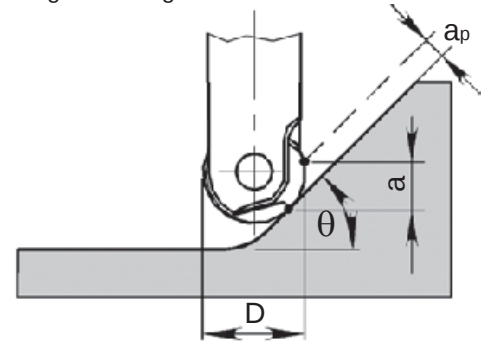


Copy milling

$$a_p < 0,5D$$



Angular milling



For determination of spindle speed it is necessary to know the effective diameter (D_e), which depends from depth of cut (a_p).

$$n = \frac{1000V_c}{\pi D_e} \quad , \quad \text{RPM}$$

The cutting speed recommendations see pages 320-321.

$$V_c = V_c^{ma6n} k_v \quad , \quad \text{m/min}$$

k_v - correction factors.

Value D_e see on table 1 under given depth of cut (a_p) or define by the following formula.

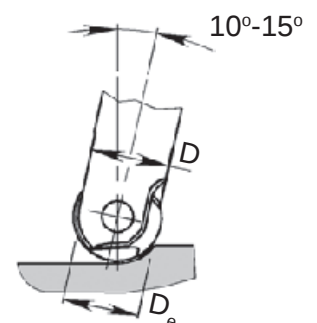
$$D_e = \sqrt{D^2 - (D - 2a_p)^2} \quad , \quad \text{mm}$$

To avoid the zero cutting speed appearing at the tool centre, it is recommended to move the cutting zone away from this area by tilting spindle or work piece.

$$V_e = \frac{\pi n D_e}{1000} \quad , \quad \text{m/min}$$

The feed rate is specified by the following formula:

$$V_f = z f_z n \quad , \quad \text{mm/min}$$



Dependence of the effective diameter of the milling cutter (D_e) from depth of cut (a_p)

Table 1

a_p , mm	D- cutter diameter, mm								
	6	8	10	12	14	16	20	25	32
	D_e , mm								
0,2	2,2	2,5	2,8	3,1	3,3	3,6	4,0	4,5	5,0
0,4	3,0	3,5	3,9	4,3	4,7	5,0	5,6	6,3	7,1
0,6	3,6	4,2	4,7	5,2	5,7	6,1	6,8	7,7	8,7
0,8	4,1	4,8	5,4	6,0	6,5	7,0	7,8	8,8	10,0
1,2	4,8	5,7	6,5	7,2	7,8	8,4	9,5	10,7	12,2
1,6	5,3	6,4	7,3	8,2	8,9	9,6	10,9	12,2	13,9
3,2	6,0	7,8	9,3	10,6	11,8	12,8	14,7	16,7	19,2
6,0			9,8	12,0	13,9	15,5	18,3	21,4	25,0
8,0						16,0	19,6	23,3	27,7
10,0							20,0	24,5	29,7
12,0								25,0	31,0
14,0									31,7
16,0									32,0

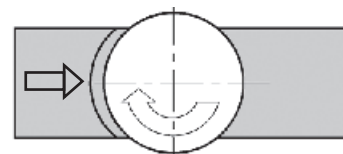
Depth of cut by angular milling

Table 2

θ	D- cutter diameter, mm															
	6	8	10	12	16	20	25	32	6	8	10	12	16	20	25	32
	a_p , mm								a , mm							
15°	2,1	3,0	3,7	4,5	6,0	7,4	9,3	12,0	3,0	3,9	4,8	5,8	7,7	9,6	12,1	15,34
30°	1,5	2,0	2,5	3,0	4,0	5,0	6,3	8,2	2,6	3,5	4,4	5,2	6,9	8,6	10,8	14,1
45°	1,0	1,2	1,5	1,8	2,4	3,0	3,7	5,0	2,3	2,8	3,6	4,2	5,6	7,1	8,8	11,5
60°	0,5	0,5	0,7	0,8	1,1	1,3	1,7	2,5	1,7	2,0	2,6	3,0	4,0	5,0	6,25	8,2
75°	0,14	0,14	0,2	0,2	0,3	0,4	0,4	0,6	1,0	1,1	1,4	1,4	2,0	2,9	3,2	5,0
85°	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,4	0,5	0,6	0,7	0,9	1,1	3,3

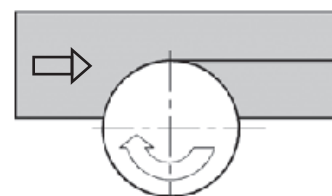
Feed per tooth (mm/tooth) by centered position of the cutter

$$f_z = \frac{D h_m}{D_e} \quad , \quad \text{mm/z}$$



Feed per tooth (mm/tooth) by side milling

$$f_z = \frac{D h_m}{\sqrt{D_e^2 - (D_e - 2 a_e)^2}} \quad , \quad \text{mm/z}$$



h_m - Mean undeformed chip thickness page 328, mm .

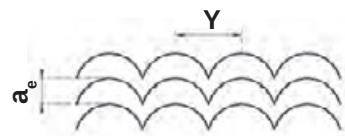
Definition of cutting data

The cutting speeds and feed rates for milling with high feed

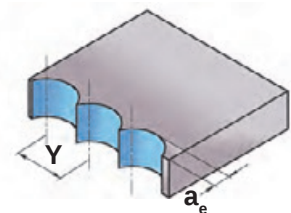
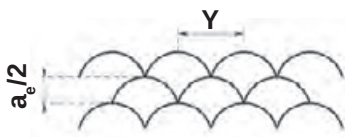
ISO		Carbide grades						Z012		Z009		Z006	
Material groups		HCP25C	HCP30	HCM40	HCK15	HCS30	HCS35	Feed/tooth (mm/tooth)					
		Cutting speed v_c (m/min)						fz rec. min - max		fz rec. min - max		fz rec. min - max	
P	1	350-210	220-70	260-140		180-90		2,00	0,10-3,00	1,50	0,10-2,50	0,80	0,10-1,50
	2	320-170	220-70	220-110		180-90		2,00	0,10-3,00	1,50	0,10-2,50	0,80	0,10-1,50
	3	280-150	220-70	160-70		180-90		1,50	0,10-2,50	1,00	0,10-2,00	0,80	0,10-1,50
	6	250-150	220-70	220-110		160-70		2,00	0,10-3,00	1,50	0,10-2,50	0,80	0,10-1,50
	7-8	210-140	220-70	190-80		160-70		2,00	0,10-3,00	1,50	0,10-2,50	0,80	0,10-1,50
	9	180-100	220-70	160-70		160-70		2,00	0,10-3,00	1,50	0,10-2,50	0,80	0,10-1,50
	10	210-140	180-60	200-100		140-70		2,00	0,10-3,00	1,50	0,10-2,50	0,80	0,10-1,50
	11	170-100	180-60	140-70		140-70		1,50	0,10-2,50	1,00	0,10-2,00	0,80	0,10-1,50
	12	190-140	180-60	220-90		140-60		2,00	0,10-3,00	1,50	0,10-2,50	0,80	0,10-1,50
13	170-100	180-60	180-80		180-60		1,50	0,10-2,50	1,00	0,10-2,00	0,80	0,10-1,50	
M	14		200-40	250-50		350-60		2,00	0,10-3,00	1,20	0,10-2,50	0,80	0,10-1,50
K	15-20	220-80			350-100			2,00	0,10-3,00	1,50	0,10-2,50	0,80	0,10-1,50
S	33			40-25		60-20	60-25	1,00	0,10-1,50	0,80	0,10-1,20	0,60	0,10-1,00
	34			35-15		50-10	50-10	1,00	0,10-1,50	0,80	0,10-1,20	0,60	0,10-1,00
	37			50-30		70-25	80-30	1,00	0,10-1,50	0,80	0,10-1,20	0,60	0,10-1,00
H	39	130-70						1,00	0,10-1,50	0,80	0,10-1,20	0,60	0,10-1,00

Definition feed for plunge milling

Tool offset with optimum overlap

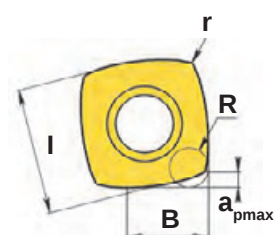


Tool offset for unstable conditions



I	a_e max	fz rec.	fz min	fz max	Y max
mm					
6.35	5.3	0.1	0.08	0.15	<0.7xD
9	7.5	0.10	0.08	0.15	<0.7xD
12	10	0.15	0.10	0.20	<0.7xD

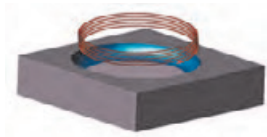
to lower feed on 50% for milling at walls



I	B	r	a_{pmax}	R
mm				
6.35	4.3	0.5	0.8	1.2
9	5.9	0.8	1.0	2.0
12	8.3	1.0	2.0	3.0

$$fz \geq 0.5 / Z_{eff}$$

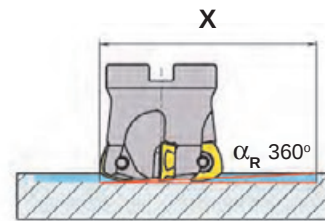
Application data for pocket milling



$X_{c\max}$ - Maximum hole diameter

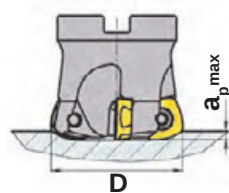
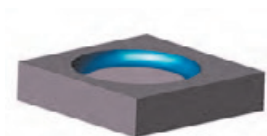
$X_{c\min}$ - Minimum hole diameter

D - Cutter diameter



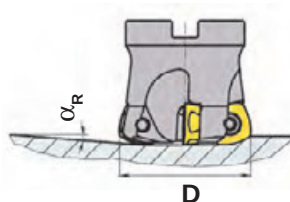
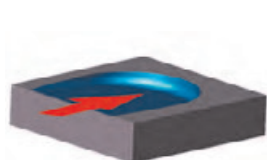
D	ZO06			ZO09			ZO12		
	$X_{c\max}$	$X_{c\min}$	$\alpha_R 360^\circ$	$X_{c\max}$	$X_{c\min}$	$\alpha_R 360^\circ$	$X_{c\max}$	$X_{c\min}$	$\alpha_R 360^\circ$
	mm		°	mm		°	mm		°
16	31	22	4.5	-	-	-	-	-	-
20	39	30	2.3	-	-	-	-	-	-
25	49	40	1.3	48	35	3.1	-	-	-
32	62	54	0.9	62	49	1.7	62	44	6.1
35				68	55	1.4	68	50	3.7
40				78	65	1.0	78	60	2.5
42				82	69	0.9	82	64	2.3
50				98	85	0.8	98	80	1.3
52				102	89	0.7	102	84	1.3
63				124	111	0.7	124	106	0.9
66				130	117	0.6	130	112	0.9
80							158	140	1.1
100							198	180	0.6
125							248	230	0.5

Axial plunging



	ZO06		ZO09		ZO12
D	$a_{p\max}$	D	$a_{p\max}$	D	$a_{p\max}$
MM					
16-32	0.50	25-66	0.75	32-125	1.15

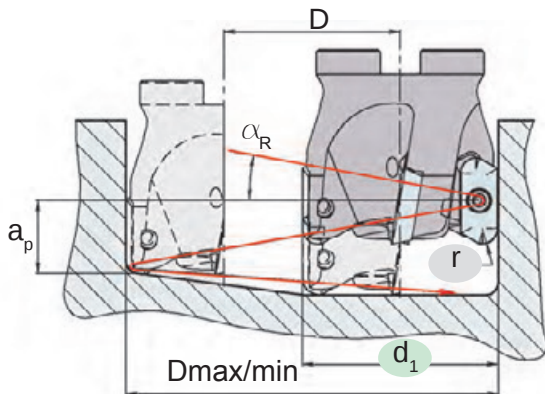
Angled ramping



ZO06		ZO09		ZO12	
D	α_R	D	α_R	D	α_R
mm	°	mm	°	mm	°
16	5.9	25	3.6	32	-
20	3.2	32	2.0	35	6.1
25	2.0	35	1.6	40	3.7
32	1.3	40	1.2	42	2.5
		42	1.1	50	2.3
		50	0.9	52	1.3
		52	0.8	63	1.3
		63	0.8	66	0.9
		66	0.7	80	0.9
				100	1.1

Application data for pocket milling with insert AD10, XD19, BO12

Helical milling for insert AD10, XD19



r = Insert radius

$\alpha_R [^\circ]$ = Maximum ramp angle (in relation to tool centre)

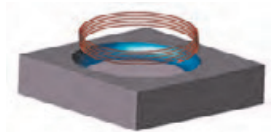
$a_p [mm]$ = $D \times \pi \times \tan(\alpha_R)$

$D [mm]$ = $\frac{D_{max} - d_1}{D_{min} - d_1}$ or

For flat bottom ground

$D_{max} [mm]$ = Maximum hole diameter

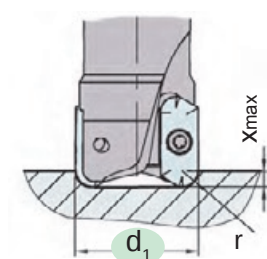
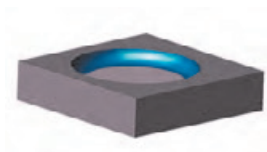
$D_{min} [mm]$ = Minimum hole diameter



DN_{max} = Maximum hole diameter for non flat bottom

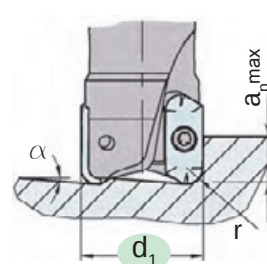
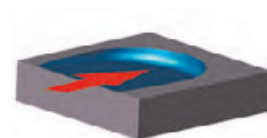
d_1 (DN_{max})	r, mm	AD.T-10										XDH.19									
		0,2	0,4	0,8	1,2	1,6	2,0	2,5	3,2	4,0	5,0	0,2	0,4	0,8	1,2	1,6	2,0	2,5	3,2	4,0	5,0
16 (31)	$\alpha_R [^\circ]$	9°43'	9°58'	9°52'	9°23'	8°55'	8°26'	7°51'	7°00'	6°03'	Upon request										
	D_{max}	30	30	29	28	27	27	26	24	23											
	D_{min}	18	18	18	18	18	18	18	18	18											
18 (35)	$\alpha_R [^\circ]$	9°21'	9°08'	8°43'	8°18'	7°53'	7°28'	6°56'	6°11'	5°20'											
	D_{max}	34	34	33	32	31	31	30	28	27											
	D_{min}	22	22	22	22	22	22	22	22	22											
19 (37)	$\alpha_R [^\circ]$	8°50'	8°38'	8°15'	7°51'	7°27'	7°30'	6°33'	5°51'	5°03'											
	D_{max}	36	36	35	34	33	33	32	30	29											
	D_{min}	24	24	24	24	24	24	24	24	24											
20 (39)	$\alpha_R [^\circ]$	8°23'	8°11'	7°49'	7°26'	7°40'	6°41'	6°12'	5°32'	4°47'											
	D_{max}	38	38	37	36	35	35	34	32	31											
	D_{min}	26	26	26	26	26	26	26	26	26											
22 (43)	$\alpha_R [^\circ]$	7°35'	7°25'	7°50'	6°44'	6°23'	6°30'	5°37'	5°10'	4°20'		2°10'	2°12'	2°16'	2°21'	2°26'	2°31'	2°38'	2°48'	3°01'	1°24'
	D_{max}	42	42	41	40	39	39	38	36	35		42	42	41	40	39	39	38	36	35	33
	D_{min}	30	30	30	30	30	30	30	30	30		32	32	32	32	32	32	32	32	32	31
25 (49)	$\alpha_R [^\circ]$	6°39'	6°30'	6°12'	5°54'	5°36'	5°18'	4°55'	4°23'	3°47'		7°02'	7°08'	7°21'	7°35'	7°49'	8°40'	8°24'	8°54'	9°32'	6°49'
	D_{max}	48	48	47	46	45	45	44	42	41		48	48	47	46	45	45	44	42	41	39
	D_{min}	36	36	36	36	36	36	36	36	36		32	32	32	32	32	32	32	32	32	32
32 (63)	$\alpha_R [^\circ]$	4°39'	4°42'	4°48'	4°34'	4°20'	4°06'	3°49'	3°24'	2°56'		4°34'	4°37'	4°44'	4°50'	4°57'	5°04'	5°13'	5°26'	5°42'	3°59'
	D_{max}	62	62	61	60	59	59	58	56	55		62	62	61	60	59	59	58	56	55	53
	D_{min}	50	50	50	50	50	50	50	50	50		46	46	46	46	46	46	46	46	46	46
40 (79)	$\alpha_R [^\circ]$	3°16'	3°18'	3°22'	3°26'	3°27'	3°16'	3°02'	2°42'	2°20'		3°47'	3°49'	3°53'	3°57'	4°02'	4°06'	4°12'	4°20'	4°30'	3°20'
	D_{max}	78	78	77	76	75	75	74	72	71		78	78	77	76	75	75	74	72	71	69
	D_{min}	66	66	66	66	66	66	66	66	66		62	62	62	62	62	62	62	62	62	62
50 (99)	$\alpha_R [^\circ]$	2°26'	2°27'	2°30'	2°32'	2°34'	2°36'	2°25'	2°09'	1°51'		3°01'	3°02'	3°05'	3°08'	3°11'	3°13'	3°17'	3°22'	3°28'	2°13'
	D_{max}	98	98	97	96	95	95	94	92	91		98	98	97	96	95	95	94	92	91	89
	D_{min}	86	86	86	86	86	86	86	86	86		81	81	81	81	81	81	81	81	81	81
63 (125)	$\alpha_R [^\circ]$	1°42'	1°43'	1°44'	1°45'	1°47'	1°48'	1°50'	1°42'	1°28'		2°17'	2°18'	2°20'	2°21'	2°23'	2°25'	2°27'	2°30'	2°33'	1°52'
	D_{max}	124	124	123	122	121	121	120	118	117		124	124	123	122	121	121	120	118	117	115
	D_{min}	112	112	112	112	112	112	112	112	112		107	107	107	107	107	107	107	107	107	107
80 (159)	$\alpha_R [^\circ]$	1°04'	1°04'	1°05'	1°05'	1°06'	1°07'	1°08'	1°09'	1°09'		158	158	157	156	155	155	154	152	151	149
	D_{max}	158	158	157	156	155	155	154	152	151		141	141	141	141	141	141	141	141	141	141
	D_{min}	146	146	146	146	146	146	146	146	146											
100 (199)	$\alpha_R [^\circ]$	0°50'	0°50'	0°51'	0°51'	0°52'	0°52'	0°53'	0°54'	0°55'		198	198	197	196	195	195	194	192	191	189
	D_{max}	198	198	197	196	195	195	194	192	191		181	181	181	181	181	181	181	181	181	181
	D_{min}	186	186	186	186	186	186	186	186	186											

Axial plunging



D (mm)	AD10...	XD19...	XD19...	BO12...
	$X_{\max}$ (mm) r 0,2-4,0	$X_{\max}$ (mm) r 0,2-4,0	$X_{\max}$ (mm) r 5,0	$X_{\max}$ (mm) r 0,8
16	1,70	-	-	
18	2,11	-	-	
19	2,24	-	-	
20	2,39	-	-	
22	2,70	0,70	0,28	
25	2,55	2,23	1,45	1,9
32	2,40	2,12	1,39	1,9
40	2,28	2,38	1,53	1,9
50	2,26	2,54	1,57	1,9
63	2,10	2,61	1,86	1,9
80	1,75			1,9
100	1,79			1,9

Angled ramping



D (mm)	AD10...	XD19...	XD19...	BO12...
	α r 0,2-4,0	α r 0,2-4,0	α r 5,0	α r 0,8
16	18° 45'	-	-	
18	16° 15'	-	-	
19	15° 15'	-	-	
20	14° 45'	-	-	
22	13° 45'	3° 30'	1° 45'	
25	10° 15'	11° 00'	7° 30'	7° 28'
32	6° 45'	6° 45'	4° 30'	5° 03'
40	4° 45'	5° 15'	3° 30'	3° 42'
50	3° 30'	4° 00'	2° 45'	2° 45'
63	2° 30'	3° 00'	2° 15'	2° 04'
80	1° 45'	2° 30'	2° 00'	1° 33'
100	1° 15'	2° 50'	1° 30'	1° 12'

Choice cutting speed

ISO	Material & Condition	Brinell HB	Material groups	Carbide grades									
				HCP20	HCP25	HCP25C	HCP25U	HCP30	HCP35	HCP35D	HCP35U	HCP40	
				Cutting speed v_c (m/min)									
P	Non-alloy steel	annealed	125	1	351 - 251	350 - 235	350 - 210	350 - 210	220 - 100	280 - 200	180 - 140	290 - 160	200 - 100
		annealed	190	2	351 - 251	310 - 210	320 - 170	320 - 170	220 - 100	250 - 170	150 - 125	260 - 135	200 - 100
		heat treated	250	3	-	290 - 125	280 - 150	280 - 150	220 - 100	220 - 150	100 - 80	220 - 115	200 - 100
	Low-alloy steel	annealed	180	6	316 - 228	240 - 165	250 - 150	200 - 150	220 - 80	200 - 140	160 - 120	235 - 145	200 - 100
		heat treated	275	7	316 - 228	170 - 115	210 - 140	200 - 150	220 - 80	180 - 130	140 - 90	195 - 130	200 - 100
		heat treated	300	8	-	160 - 100	210 - 140	200 - 120	220 - 80	170 - 115	120 - 80	170 - 110	200 - 100
		heat treated	350	9	-	135 - 90	180 - 100	180 - 100	220 - 80	160 - 100	100 - 70	150 - 95	200 - 100
	High-alloy steel and cast steel	annealed	200	10	147 - 109	180 - 120	210 - 140	160 - 120	180 - 80	160 - 100	80 - 60	180 - 100	180 - 100
		heat treated	325	11	147 - 109	80 - 50	170 - 100	160 - 120	180 - 80	140 - 90	70 - 55	145 - 70	145 - 70
	High-alloy steel and cast steel	ferritic	200	12	213 - 176	190 - 125	190 - 140		180 - 70	180 - 130	220 - 130	180 - 140	180 - 80
		martensitic	240	13	200 - 160	140 - 90	170 - 100		180 - 70	150 - 90	200 - 80	155 - 100	180 - 80
M	High-alloy steel and cast steel	austenitic	180	14,1	195 - 165	140 - 60		120 - 90	200 - 60	140 - 70	130 - 100	175 - 120	160 - 80
		austenitic / ferritic	260	14,2	139 - 119	120 - 50		120 - 90	200 - 60	130 - 70		120 - 80	160 - 60
		ferritic / martensitic	200	14,3	130 - 110	120 - 60		120 - 90	200 - 60	110 - 60		185 - 125	160 - 100
		martensitic / austenitic	330	14,4		100 - 50		120 - 90	200 - 60	130 - 70		100 - 65	-
					HCP20	HCH15	HCP25C	HCP25U	HCK10	HCK15	HCP35D	HCH10	HCP40
K	Grey cast iron	ferritic/perlitic	180	15	255 - 220	350 - 180	220 - 160	360 - 200	350 - 180	350 - 180	140 - 70	160 - 90	230 - 90
		perlitic	260	16	235 - 195	280 - 140	170 - 100	360 - 200	280 - 140	280 - 140	120 - 60	130 - 80	230 - 90
	Nodular cast iron	ferritic	160	17	210 - 155	250 - 130	200 - 100	200 - 100	250 - 130	250 - 130	240 - 130	160 - 100	170 - 70
		perlitic	250	18	210 - 155	200 - 100	180 - 90	300 - 150	200 - 100	200 - 100	200 - 110	150 - 90	170 - 70
	Malleable cast iron	ferritic	130	19	180 - 120	320 - 150	180 - 90		320 - 150	320 - 150	330 - 180	160 - 100	220 - 90
		perlitic	230	20	180 - 120	250 - 120	160 - 80		250 - 120	250 - 120	290 - 160	150 - 70	220 - 90
N	Aluminium wrought alloys	non hadrened	60	21								5800 - 300	
		hadrened	100	22								2000 - 200	
	Aluminium cast alloys	non hadrened(Si<12%)	75	23								2000 - 400	
		hadrened (Si<12%)	90	24								2000 - 400	
		(Si>12%)	130	25								1000 - 200	
	Copper and copper alloys	brass, copper	90	27								1000 - 250	
		bronze, electrolyte-Cu	100	28								800 - 150	
S	Heat resistant alloys	annealed	250	33	60 - 50			40 - 35			35 - 25		
		aged	350	34	60 - 50			35 - 15			35 - 25		
	Titanium alloys		300	37	50 - 40			70 - 25			80 - 30		
H	Tempered steel	hardened and tempered	55 HRC	38	45 - 40	60 - 40		90 - 70					
		hardened and tempered	60 HRC	39	40 - 35	50 - 30							
	Chilled castings	hardened and tempered	400	40	35 - 30	100 - 80	130 - 70						
	Tempered cast iron	hardened and tempered	55 HRC	40	40 - 35	60 - 30							

The cutting speeds given on the following pages are valid for a specific material hardness. If the material being machined differs in hardness from those values, the recommended cutting speed must be multiplied by a factor obtained from the table K_v below.

Choice cutting speed

ISO	Material & Condition		Brinell HB	Material groups	Carbide grades									
					HCM35	HCM40	HCS30	HWP20	HWP25	HWP30	HWP35	HWP40		
					Cutting speed v_c (m/min)									
P	Non-alloy steel	annealed	125	1	260 - 150	260 - 160		220 - 160	260 - 140	310 - 180	180 - 120	135 - 85		
		annealed	190	2	260 - 150	220 - 130		140 - 100	180 - 110	205 - 120	130 - 90	125 - 80		
		heat treated	250	3	260 - 150	160 - 90		180 - 120	150 - 90	170 - 95	110 - 70	80 - 55		
	Low-alloy steel	annealed	180	6	220 - 80	220 - 150		180 - 120	180 - 90	200 - 120	130 - 90	90 - 65		
		heat treated	275	7	220 - 80	190 - 110		170 - 110	140 - 70	200 - 120	100 - 70	90 - 65		
		heat treated	300	8	220 - 80	180 - 100		170 - 110	120 - 60	125 - 70	80 - 55	90 - 65		
		heat treated	350	9	220 - 80	160 - 90		160 - 100	110 - 60	125 - 70	70 - 40	90 - 65		
	High-alloy steel and cast steel	annealed	200	10	180 - 90	200 - 120		160 - 100	140 - 90	180 - 110	120 - 80	80 - 55		
		heat treated	325	11	180 - 90	140 - 90		150 - 90	85 - 45	120 - 65	70 - 40	40 - 30		
	High-alloy steel and cast steel	ferritic	200	12	180 - 70	220 - 110	140 - 60		170 - 90	210 - 120	130 - 80	70 - 45		
		martensitic	240	13	180 - 70	180 - 90	140 - 60		140 - 40	210 - 120	110 - 70	60 - 37		
M	High-alloy steel and cast steel	austenitic	180	14,1	200 - 60	250 - 90	350 - 220		140 - 60	60 - 50	100 - 65	130 - 80		
		austenitic / ferritic	260	14,2	200 - 60	160 - 100	240 - 150		120 - 50	60 - 50	90 - 60	70 - 45		
		ferritic / martensitic	200	14,3	200 - 60	100 - 50	140 - 60		90 - 45	60 - 50	40 - 75	120 - 75		
		martensitic / austenitic	330	14,4	200 - 60	180 - 60	180 - 60		80 - 35	60 - 50	50 - 30	60 - 37		
					HCM35	HCM40	HCS30	HCS35	HCK20	HWP30	HWS30	HWK15	HWK20	HWN15
K	Grey cast iron	ferritic/perlitic	180	15					270 - 175	155 - 85	110 - 65	155 - 85	110 - 65	160 - 90
		perlitic	260	16					205 - 135	115 - 70	80 - 45	115 - 70	80 - 45	130 - 80
	Nodular cast iron	ferritic	160	17					155 - 110	115 - 70	70 - 45	230 - 150	70 - 45	160 - 100
		perlitic	250	18					145 - 100	100 - 65	60 - 40	190 - 130	60 - 40	150 - 90
	Malleable cast iron	ferritic	130	19					240 - 160	150 - 100	85 - 60	150 - 100	85 - 60	160 - 100
		perlitic	230	20					190 - 125	135 - 90	70 - 45	135 - 90	70 - 45	150 - 70
N	Aluminium wrought alloys	non hadrened	60	21										5800 - 200
		hadrened	100	22										2000 - 200
	Aluminium cast alloys	non hadrened (Si<12%)	75	23										2000 - 200
		hadrened (Si<12%)	90	24										1800 - 200
		(Si>12%)	130	25										1000 - 200
	Copper and copper alloys	brass, copper	90	27										1000 - 250
		bronze, electrolyte-Cu	100	28										400 - 150
S	Heat resistant alloys	annealed	250	33	60 - 20	40 - 25	60 - 20	60 - 20			35 - 30	24 - 16		
		aged	350	34	30 - 30	35 - 15	50 - 10	50 - 10			12 - 10	20 - 13		
	Titanium alloys		300	37	40 - 20	50 - 30	70 - 25	80 - 30			45 - 20	50 - 20		

Table k_v

← Reduced hardness Increased hardness →

Workpiece material	Material groups										
		- 80	- 60	- 40	- 20	0	+ 20	+ 40	+ 60	+ 80	
		Correction factors k_v									
Non-alloy steel	1 - 3	-	-	-	1,07	1,0	0,95	0,90	-	-	
Low-alloy steel	6 - 9	1,26	1,18	1,2	1,05	1,0	0,94	0,91	0,86	0,83	
High-alloy steel	10 - 11	-	-	1,21	1,10	1,0	0,91	0,84	0,79	-	
Stainless steel	12 - 14	-	-	1,21	1,10	1,0	0,91	0,85	0,79	0,75	
Cast steel		-	-	1,31	1,13	1,0	0,87	0,80	0,73	-	
Malleable cast iron	19 - 20	-	1,14	1,08	1,03	1,0	0,96	0,92	-	-	
Grey cast iron	15 - 16	-	-	1,25	1,10	1,0	0,92	0,86	0,80	-	
Nodular cast iron	17 - 18	-	-	1,07	1,03	1,0	0,97	0,95	0,93	0,91	
Heat resistant alloys	33 - 34	1,26	-	1,11	-	1,0	-	0,90	-	0,82	

Definition of feed rates facemills, square shoulder facemills and endmills

MT245..SD12X4, MT245K..SD12X4, MT245..SD09, MT290..SD09, MT290..LN14, MT245..SN12
MT290..SD12M4, MT290K..SD12M4, MT260..PN10, MT260K..PN10, MT290K..AD15M5, MT260K..LN24

ISO	Material & Condition		Brinell HB	Material groups	MT245, MT290 ...SD09	MT245..SD12X4 MT245K..SD12X4 MT260..PN10	MT290..LN14 MT290..SD12M4 MT290K..SD12M4	MT290K..AD15M5 MT245..SN12	MT260K...LN24
					Feed / tooth (mm/tooth)				
P	Non-alloy steel	annealed	125	1	0,08-0,20	0,08-0,40	0,08-0,30	0,10-0,30	0,2-0,90
		annealed	190	2	0,08-0,20	0,08-0,40	0,08-0,30	0,10-0,34	0,2-0,90
		heat treated	250	3	0,08-0,17	0,08-0,33	0,08-0,25	0,10-0,28	0,2-0,90
	Low-alloy steel	annealed	180	6	0,07-0,18	0,08-0,35	0,08-0,25	0,10-0,30	0,2-0,90
		heat treated	275	7	0,07-0,18	0,08-0,35	0,08-0,25	0,10-0,28	0,2-0,90
		heat treated	300	8	0,07-0,15	0,08-0,30	0,08-0,22	0,10-0,28	0,2-0,90
		heat treated	350	9	0,07-0,15	0,08-0,30	0,07-0,22	0,08-0,20	0,2-0,90
	High-alloy steel and cast steel	annealed	200	10	0,06-0,15	0,08-0,35	0,07-0,22	0,08-0,28	0,2-0,90
		heat treated	325	11	0,06-0,12	0,08-0,26	0,07-0,20	0,08-0,22	0,2-0,90
	High-alloy steel and cast steel	ferritic	200	12	0,05-0,15	0,08-0,30	0,07-0,22	0,08-0,25	0,2-0,90
		martensitic	240	13	0,05-0,15	0,08-0,30	0,07-0,22	0,08-0,25	0,2-0,90
M	High-alloy steel and cast steel	austenitic	180	14	0,06-0,15	0,08-0,30	0,06-0,22	0,07-0,25	0,15-0,50
K	Grey cast iron	ferritic/perlitic	180	15	0,08-0,20	0,08-0,40	0,10-0,30	0,09-0,34	0,2-0,85
		perlitic	260	16	0,08-0,20	0,08-0,40	0,10-0,30	0,09-0,34	0,2-0,85
	Nodular cast iron	ferritic	160	17	0,08-0,20	0,12-0,35	0,10-0,30	0,09-0,34	0,2-0,85
		perlitic	250	18	0,06-0,15	0,08-0,23	0,08-0,20	0,09-0,34	0,2-0,85
	Malleable cast iron	ferritic	130	19	0,08-0,20	0,12-0,35	0,10-0,30	0,09-0,34	0,2-0,85
		perlitic	230	20	0,06-0,15	0,08-0,23	0,08-0,20	0,09-0,34	0,2-0,85
N	Aluminium wrought alloys	non hadrened	60	21	0,05-0,20	0,08-0,30*	0,08-0,25*	0,08-0,25*	
		hadrened	100	22					
	Aluminium cast alloys	non hadrened (Si<12%)	75	23	0,05-0,20	0,08-0,30*	0,08-0,25*	0,08-0,25*	
		hadrened (Si<12%)	90	24					
		(Si>12%)	130	25					
	Copper and copper alloys	brass, copper	90	27	0,05-0,14	0,07-0,23*	0,07-0,23*	0,08-0,20*	
bronze, electrolyte-Cu		100	28						
S	Heat resistant alloys	annealed	250	33	0,05-0,10	0,05-0,12	0,05-0,12*	0,05-0,14	
		aged	350	34	0,04-0,10	0,04-0,12	0,04-0,12*	0,05-0,14	
	Titanium alloys		300	37	0,05-0,12	0,05-0,15	0,05-0,15*	0,04-0,14	

* Without facemills MT245..SN12, MT260..PN10 MT290..LN14.

MT190..XN04, MT190..WN06, MT190..WN06, MT190..WN08, MT290..WN08,
MT260...SN25, MT290...XN12, MT260...SN12, MT260K...SN12

ISO	Material & Condition		Brinell HB	Material groups	MT190..XN04	MT190..WN06 MT290..WN06	MT190..WN08 MT290..WN08	MT260..SN25	MT290K..XN12	MT260..SN12 MT260K..SN12
					Feed / tooth (mm/tooth)					
P	Non-alloy steel	annealed	125	1	0,03-0,08	0,05-0,10	0,05-0,15	0,20-1,00	0,20-0,50	0,20-0,80
		annealed	190	2	0,03-0,08	0,05-0,10	0,05-0,15	0,20-1,00	0,20-0,50	0,20-0,80
		heat treated	250	3	0,03-0,08	0,05-0,10	0,05-0,15	0,20-0,80	0,20-0,40	0,20-0,60
	Low-alloy steel	annealed	180	6	0,03-0,08	0,05-0,10	0,05-0,15	0,20-0,80	0,20-0,35	0,20-0,65
		heat treated	275	7	0,03-0,08	0,05-0,10	0,05-0,15	0,20-0,80	0,20-0,35	0,20-0,65
		heat treated	300	8	0,03-0,08	0,05-0,10	0,05-0,15	0,20-0,65	0,20-0,30	0,20-0,50
		heat treated	350	9	0,03-0,08	0,05-0,10	0,05-0,15	0,15-0,65	0,15-0,30	0,15-0,50
	High-alloy steel and cast steel	annealed	200	10	0,03-0,08	0,05-0,10	0,05-0,15	0,15-0,65	0,15-0,30	0,15-0,45
		heat treated	325	11	0,03-0,08	0,05-0,10	0,05-0,15	0,15-0,50	0,15-0,28	0,15-0,45
	High-alloy steel and cast steel	ferritic	200	12	0,03-0,08	0,05-0,10	0,05-0,15	0,10-0,50	0,10-0,30	0,10-0,45
		martensitic	240	13	0,03-0,08	0,05-0,10	0,05-0,15	0,10-0,50	0,10-0,30	0,10-0,45
M	High-alloy steel and cast steel	austenitic	180	14	0,03-0,08	0,05-0,10	0,05-0,15	0,10-0,50	0,10-0,30	0,10-0,45
K	Grey cast iron	ferritic/perlitic	180	15	0,03-0,08	0,05-0,10	0,05-0,15	0,30-1,00	0,20-0,50	0,20-0,80
		perlitic	260	16	0,03-0,08	0,05-0,10	0,05-0,15	0,30-1,00	0,20-0,50	0,20-0,80
	Nodular cast iron	ferritic	160	17	0,03-0,08	0,05-0,10	0,05-0,15	0,30-1,00	0,20-0,50	0,20-0,80
		perlitic	250	18	0,03-0,08	0,05-0,10	0,05-0,15	0,20-0,75	0,15-0,40	0,15-0,60
	Malleable cast iron	ferritic	130	19	0,03-0,08	0,05-0,10	0,05-0,15	0,30-1,00	0,20-0,50	0,20-0,80
		perlitic	230	20	0,03-0,08	0,05-0,10	0,05-0,15	0,20-0,75	0,15-0,40	0,15-0,60
N	Aluminium wrought alloys	non hadrened	60	21						
		hadrened	100	22						
	Aluminium cast alloys	non hadrened (Si<12%)	75	23						
		hadrened (Si<12%)	90	24						
		(Si>12%)	130	25						
	Copper and copper alloys	brass, copper	90	27						
		bronze, electrolyte-Cu	100	28						
S	Heat resistant alloys	annealed	250	33	0,03-0,05	0,05-0,10	0,05-0,15			
		aged	350	34						
	Titanium alloys		300	37	0,03-0,05	0,05-0,10	0,05-0,15			

Definition of feed rates facemills, square shoulder facemills and endmills

MT190...AD08, MT190...AD10, MT190B..AD10, MT190...SD09, MT190..AD16
MT290...AD08, MT290...AD10, MT190B..AD16, MT290..AD16, MT290..AD19

ISO	Material & Condition		Brinell HB	Material groups	MT190..AD08, MT290..AD10, MT190..SD09			MT290..AD08 MT290..AD10	MT190..AD16 MT190B..AD16 M290..AD16	MT290..AD19
					Diameter (mm)					
					10-14	16-20	25-50			
Feed / tooth (mm/tooth)										
P	Non-alloy steel	annealed	125	1	0,03-0,06	0,05-0,11	0,07-0,18	0,06-0,15	0,08-0,35	0,12-0,4
		annealed	190	2	0,03-0,06	0,05-0,10	0,07-0,20	0,06-0,17	0,08-0,35	0,12-0,4
		heat treated	250	3	0,03-0,05	0,04-0,08	0,05-0,16	0,05-0,14	0,08-0,35	0,12-0,4
	Low-alloy steel	annealed	180	6	0,03-0,06	0,05-0,10	0,06-0,18	0,06-0,12	0,08-0,35	0,12-0,4
		heat treated	275	7	0,03-0,05	0,05-0,08	0,06-0,16	0,06-0,10	0,08-0,35	0,12-0,4
		heat treated	300	8	0,03-0,05	0,05-0,08	0,06-0,16	0,06-0,10	0,08-0,35	0,12-0,4
		heat treated	350	9	0,025-0,04	0,04-0,08	0,05-0,12	0,06-0,09	0,08-0,35	0,12-0,4
	High-alloy steel and cast steel	annealed	200	10	0,04-0,08	0,04-0,08	0,06-0,16	0,05-0,12	0,08-0,35	0,12-0,4
		heat treated	325	11	0,04-0,06	0,04-0,06	0,06-0,12	0,05-0,10	0,08-0,35	0,12-0,4
	High-alloy steel and cast steel	ferritic	200	12	0,04-0,07	0,04-0,08	0,06-0,14	0,05-0,12	0,08-0,35	0,12-0,4
		martensitic	240	13	0,04-0,07	0,04-0,08	0,06-0,14	0,05-0,12	0,08-0,35	0,12-0,4
M	High-alloy steel and cast steel	austenitic	180	14	0,04-0,07	0,04-0,08	0,06-0,14	0,05-0,12	0,08-0,35	0,12-0,35
K	Grey cast iron	ferritic/perlitic	180	15	0,03-0,06	0,05-0,12	0,08-0,20	0,12-0,35	0,08-0,35	-
		perlitic	260	16	0,03-0,06	0,05-0,12	0,08-0,20	0,12-0,35	0,08-0,35	-
	Nodular cast iron	ferritic	160	17	0,03-0,06	0,05-0,12	0,08-0,20	0,12-0,35	0,08-0,35	-
		perlitic	250	18	0,03-0,06	0,05-0,12	0,08-0,20	0,08-0,23	0,08-0,35	-
	Malleable cast iron	ferritic	130	19	0,03-0,06	0,05-0,12	0,08-0,20	0,12-0,35	0,08-0,35	-
		perlitic	230	20	0,03-0,06	0,05-0,12	0,08-0,20	0,08-0,23	0,08-0,35	-
N	Aluminium wrought alloys	non hadrened	60	21	0,03-0,05	0,04-0,10	0,06-0,15	0,08-0,15	0,12-0,40	-
		hadrened	100	22						
	Aluminium cast alloys	non hadrened (Si<12%)	75	23	0,03-0,05	0,04-0,10	0,06-0,15	0,08-0,15	0,12-0,40	-
		hadrened (Si<12%)	90	24						
		(Si>12%)	130	25						
	Copper and copper alloys	brass, copper	90	27	0,03-0,05	0,04-0,08	0,06-0,12	0,07-0,12	0,12-0,40	-
bronze, electrolyte-Cu		100	28							
S	Heat resistant alloys	annealed	250	33		0,03-0,06	0,05-0,08	0,04-0,06	0,08-0,20	0,12-0,3
		aged	350	34						
	Titanium alloys		300	37		0,03-0,06	0,05-0,09	0,04-0,07	0,08-0,20	0,12-0,3

MT145..OO06, MT245..OO06, MT245K..OO06, MT245..SO16, MT245K..SO16, MT145F...SD09, MT190T..SD12M4, MT190T..CC06, MT190T..SD09, MT145...OF03

ISO	Material & Condition		Brinell HB	Material groups	MT145..OO06 MT245..OO06 MT245K..OO06	MT288.. LN11	MT245..SO16 MT245K..SO16	MT145F.. SD09	MT190T.. SD12M4	MT190T.. CC06	MT190T..SD09 MT145..OF03
					Feed / tooth (mm/tooth)						
P	Non-alloy steel	annealed	125	1	0,05-0,6		0,1-0,5	0,07-0,18	0,08-0,24	0,03-0,06	0,05-0,11
		annealed	190	2	0,05-0,6		0,1-0,5	0,07-0,20	0,08-0,24	0,03-0,06	0,05-0,10
		heat treated	250	3	0,05-0,6		0,1-0,5	0,05-0,16	0,07-0,20	0,03-0,05	0,04-0,08
	Low-alloy steel	annealed	180	6	0,05-0,6		0,1-0,5	0,06-0,18	0,10-0,30	0,03-0,06	0,05-0,10
		heat treated	275	7	0,05-0,6		0,1-0,5	0,06-0,16	0,10-0,28	0,03-0,05	0,05-0,08
		heat treated	300	8	0,05-0,6		0,1-0,5	0,06-0,16	0,10-0,28	0,03-0,05	0,05-0,08
		heat treated	350	9	0,05-0,6		0,1-0,5	0,05-0,12	0,08-0,20	0,025-0,04	0,04-0,08
	High-alloy steel and cast steel	annealed	200	10	0,05-0,6		0,1-0,5	0,06-0,16	0,08-0,28	0,03-0,05	0,04-0,08
		heat treated	325	11	0,05-0,6		0,1-0,5	0,06-0,12	0,08-0,22	0,025-0,04	0,04-0,06
	High-alloy steel and cast steel	ferritic	200	12	0,05-0,6		0,1-0,5	0,06-0,14	0,08-0,25	0,03-0,05	0,04-0,08
martensitic		240	13	0,05-0,6		0,1-0,5	0,06-0,14	0,08-0,25	0,03-0,05	0,04-0,08	
M	High-alloy steel and cast steel	austenitic	180	14	0,05-0,4		0,1-0,5	0,06-0,14	0,07-0,20	0,03-0,05	0,04-0,08
K	Grey cast iron	ferritic/perlitic	180	15	0,05-0,4	0,05-0,3	0,1-0,5	0,08-0,20	0,08-0,24	0,03-0,06	0,05-0,12
		perlitic	260	16	0,05-0,4	0,05-0,3	0,1-0,5	0,08-0,20	0,08-0,24	0,03-0,06	0,05-0,12
	Nodular cast iron	ferritic	160	17	0,05-0,4	0,05-0,3	0,1-0,5	0,08-0,20	0,08-0,24	0,03-0,06	0,05-0,12
		perlitic	250	18	0,05-0,4	0,05-0,3	0,1-0,5	0,08-0,20	0,08-0,24	0,03-0,06	0,05-0,12
	Malleable cast iron	ferritic	130	19	0,05-0,4	0,05-0,3	0,1-0,5	0,08-0,20	0,08-0,24	0,03-0,06	0,05-0,12
		perlitic	230	20	0,05-0,4	0,05-0,3	0,1-0,5	0,08-0,20	0,08-0,24	0,03-0,06	0,05-0,12
N	Aluminium wrought alloys	non hadrened	60	21				0,06-0,15	0,08-0,20		0,04-0,10
		hadrened	100	22							
	Aluminium cast alloys	non hadrened (Si<12%)	75	23							
		hadrened (Si<12%)	90	24				0,06-0,15	0,08-0,20		0,04-0,10
		(Si>12%)	130	25							
Copper and copper alloys	brass, copper	90	27				0,06-0,12	0,07-0,20		0,04-0,08	
	bronze, electrolyte-Cu	100	28								
S	Heat resistant alloys	annealed	250	33	0,05-0,15			0,05-0,08	0,05-0,12		0,03-0,06
		aged	350	34	0,05-0,15			0,05-0,08	0,04-0,12		0,03-0,06
	Titanium alloys		300	37	0,05-0,15			0,05-0,09	0,04-0,12		0,03-0,06

Definition of feed rates long edge spiral flute endmills

MT190L, MT290L

ISO	Material & Condition		Brinell HB	Material groups	Diameter (mm) MT190L, MT290L			MT190L..SD09 MT190LB..SP06	MT290L..SD09 MT190LB..SD09	MT290L..SX12
					16-25 AD08	25-63 AD10	50-125 SX12			
					Feed / tooth (mm/tooth)					
P	Non-alloy steel	annealed	125	1	0,03-0,10	0,07-0,12	0,09-0,18	0,05-0,10	0,07-0,12	0,09-0,18
		annealed	190	2	0,03-0,10	0,07-0,12	0,09-0,18	0,05-0,10	0,07-0,12	0,09-0,18
		heat treated	250	3	0,03-0,10	0,05-0,10	0,07-0,16	0,04-0,08	0,05-0,10	0,07-0,16
	Low-alloy steel	annealed	180	6	0,03-0,10	0,05-0,12	0,08-0,16	0,04-0,10	0,05-0,12	0,08-0,16
		heat treated	275	7	0,03-0,10	0,05-0,10	0,08-0,14	0,04-0,08	0,05-0,10	0,08-0,14
		heat treated	300	8	0,03-0,10	0,05-0,10	0,08-0,14	0,04-0,08	0,05-0,10	0,08-0,14
		heat treated	350	9	0,03-0,10	0,04-0,08	0,08-0,12	0,04-0,06	0,04-0,08	0,08-0,12
	High-alloy steel and cast steel	annealed	200	10	0,03-0,10	0,05-0,10	0,07-0,16	0,04-0,08	0,05-0,10	0,07-0,16
		heat treated	325	11	0,03-0,10	0,05-0,08	0,07-0,12	0,04-0,06	0,05-0,08	0,07-0,12
	High-alloy steel and cast steel	ferritic	200	12	0,03-0,10	0,05-0,09	0,07-0,15	0,04-0,07	0,05-0,09	0,07-0,15
		martensitic	240	13	0,03-0,10	0,05-0,09	0,07-0,15	0,04-0,07	0,05-0,09	0,07-0,15
M	High-alloy steel and cast steel	austenitic	180	14	0,03-0,10	0,05-0,09	0,07-0,15	0,04-0,07	0,05-0,09	0,07-0,15
K	Grey cast iron	ferritic/perlitic	180	15	0,03-0,10	0,07-0,14	0,09-0,20	0,05-0,12	0,07-0,14	0,09-0,20
		perlitic	260	16	0,03-0,10	0,07-0,14	0,09-0,20	0,05-0,12	0,07-0,14	0,09-0,20
	Nodular cast iron	ferritic	160	17	0,03-0,10	0,07-0,14	0,09-0,20	0,05-0,12	0,07-0,14	0,09-0,20
		perlitic	250	18	0,03-0,10	0,07-0,14	0,09-0,20	0,05-0,12	0,07-0,14	0,09-0,20
	Malleable cast iron	ferritic	130	19	0,05-0,10	0,07-0,14	0,09-0,20	0,05-0,12	0,07-0,14	0,09-0,20
		perlitic	230	20	0,05-0,10	0,07-0,14	0,09-0,20	0,05-0,12	0,07-0,14	0,09-0,20
N	Aluminium wrought alloys	non hadrened	60	21		0,05-0,15	0,07-0,20	0,04-0,10	0,05-0,15	0,07-0,20
		hadrened	100	22						
	Aluminium cast alloys	non hadrened (Si<12%)	75	23						
		hadrened (Si<12%)	90	24		0,05-0,15	0,07-0,20	0,04-0,10	0,05-0,15	0,07-0,20
		(Si>12%)	130	25						
	Copper and copper alloys	brass, copper	90	27		0,05-0,14	0,07-0,18	0,04-0,08	0,05-0,14	0,07-0,18
		bronze, electrolyte-Cu	100	28						
S	Heat resistant alloys	annealed	250	33	0,03-0,08	0,05-0,09		0,04-0,07	0,05-0,09	
		aged	350	34	0,03-0,08	0,05-0,09		0,04-0,07	0,05-0,09	
	Titanium alloys		300	37	0,03-0,08	0,05-0,09		0,04-0,07	0,05-0,09	

When edging (side milling) multiply the fz for full slot milling (see table above) by the correction factor f depending on the radial depth of cut ratio, achieve (D/ae) to the correct feed.

D/ a _e	50	40	20	10	5	2,5	1
f	4,5	4	3	2	1,5	1	0,7

Definition of feed rates facemills and endmills with round inserts

MT100, MT200, MT200K

ISO	Material & Condition		Brinell HB	Material groups	MT100, MT200		Diameter (mm)			
							MT100, MT200			MT200, MT200K
					25-32 RN10	32-50 RN12	10-12 RD05	16-20 RD08, RP10	25-32 RP12, RP16	50-500 RP12, RP16
					Mean undeformed chip thickness h _m , mm					
P	Non-alloy steel	annealed	125	1	0,07-0,50	0,08-0,55	0,06-0,10	0,08-0,12	0,10-0,15	0,10-0,30
		annealed	190	2	0,07-0,50	0,08-0,55	0,06-0,10	0,08-0,12	0,10-0,15	0,10-0,30
		heat treated	250	3	0,07-0,50	0,08-0,55	0,05-0,08	0,06-0,10	0,08-0,12	0,10-0,30
	Low-alloy steel	annealed	180	6	0,07-0,50	0,08-0,55	0,05-0,09	0,06-0,11	0,08-0,14	0,10-0,30
		heat treated	275	7	0,07-0,50	0,08-0,55	0,05-0,08	0,06-0,10	0,08-0,12	0,10-0,30
		heat treated	300	8	0,07-0,50	0,08-0,55	0,05-0,08	0,06-0,10	0,08-0,12	0,10-0,28
		heat treated	350	9	0,07-0,50	0,08-0,55	0,05-0,07	0,06-0,08	0,08-0,10	0,10-0,28
	High-alloy steel and cast steel	annealed	200	10	0,07-0,50	0,08-0,55	0,05-0,08	0,06-0,10	0,08-0,12	0,08-0,30
		heat treated	325	11	0,07-0,50	0,08-0,55	0,05-0,07	0,06-0,08	0,08-0,10	0,08-0,25
	High-alloy steel and cast steel	ferritic	200	12	0,07-0,50	0,08-0,55	0,05-0,07	0,06-0,08	0,08-0,10	0,08-0,25
martensitic		240	13	0,07-0,50	0,08-0,55	0,05-0,07	0,06-0,08	0,08-0,10	0,08-0,25	
M	High-alloy steel and cast steel	austenitic	180	14	0,07-0,50	0,08-0,55	0,05-0,07	0,06-0,08	0,08-0,10	0,07-0,25
K	Grey cast iron	ferritic/perlitic	180	15			0,06-0,10	0,08-0,12	0,10-0,15	0,10-0,45
		perlitic	260	16			0,06-0,10	0,08-0,12	0,10-0,15	0,10-0,45
	Nodular cast iron	ferritic	160	17			0,06-0,10	0,08-0,12	0,08-0,12	0,10-0,45
		perlitic	250	18			0,06-0,16	0,08-0,12	0,08-0,12	0,08-0,30
	Malleable cast iron	ferritic	130	19			0,06-0,16	0,08-0,12	0,10-0,15	0,10-0,45
		perlitic	230	20			0,06-0,16	0,08-0,12	0,10-0,15	0,10-0,30
N	Aluminium wrought alloys	non hadrened	60	21			0,04-0,10	0,04-0,10	0,04-0,12	0,04-0,14
		hadrened	100	22						
	Aluminium cast alloys	non hadrened (Si<12%)	75	23						
		hadrened (Si<12%)	90	24						
		(Si>12%)	130	25						
	Copper and copper alloys	brass, copper	90	27						
		bronze, electrolyte-Cu	100	28						
S	Heat resistant alloys	annealed	250	33	0,07-0,35	0,08-0,4	0,04-0,12	0,04-0,12	0,04-0,14	0,04-0,25
		aged	350	34			0,04-0,10	0,04-0,10	0,04-0,12	0,04-0,20
	Titanium alloys		300	37	0,08-0,35	0,08-0,4	0,04-0,10	0,04-0,12	0,04-0,12	0,04-0,14

Definition of feed rates ball nose endmills

MT100L MT100LX

ISO	Material & Condition		Brinell HB	Material groups	Diameter (mm)						
					12	16	20	25	32	40	50
					Mean undeformed chip thickness h _m , mm						
P	Non-alloy steel	annealed	125	1	0,06-0,10	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12	0,10-0,15	0,10-0,15
		annealed	190	2	0,06-0,10	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12	0,10-0,15	0,10-0,15
		heat treated	250	3	0,05-0,08	0,05-0,08	0,05-0,08	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12
	Low-alloy steel	annealed	180	6	0,05-0,09	0,05-0,09	0,05-0,09	0,06-0,11	0,06-0,11	0,08-0,14	0,08-0,14
		heat treated	275	7	0,05-0,08	0,05-0,08	0,05-0,08	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12
		heat treated	300	8	0,05-0,08	0,05-0,08	0,05-0,08	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12
		heat treated	350	9	0,05-0,07	0,05-0,07	0,05-0,07	0,06-0,08	0,06-0,08	0,08-0,10	0,08-0,10
	High-alloy steel and cast steel	annealed	200	10	0,05-0,08	0,05-0,08	0,05-0,08	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12
		heat treated	325	11	0,05-0,07	0,05-0,07	0,05-0,07	0,06-0,08	0,06-0,08	0,08-0,10	0,08-0,10
	High-alloy steel and cast steel	ferritic	200	12	0,05-0,07	0,05-0,07	0,05-0,07	0,06-0,08	0,06-0,08	0,08-0,10	0,08-0,10
martensitic		240	13	0,05-0,07	0,05-0,07	0,05-0,07	0,06-0,08	0,06-0,08	0,08-0,10	0,08-0,10	
M	High-alloy steel and cast steel	austenitic	180	14	0,05-0,07	0,05-0,07	0,05-0,07	0,06-0,08	0,06-0,08	0,08-0,10	0,08-0,10
K	Grey cast iron	ferritic/perlitic	180	15	0,06-0,10	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12	0,10-0,15	0,10-0,15
		perlitic	260	16	0,06-0,10	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12	0,10-0,15	0,10-0,15
	Nodular cast iron	ferritic	160	17	0,06-0,10	0,06-0,10	0,06-0,10	0,08-0,12	0,08-0,12	0,08-0,12	0,08-0,12
		perlitic	250	18	0,06-0,16	0,06-0,16	0,06-0,16	0,08-0,12	0,08-0,12	0,08-0,12	0,08-0,12
	Malleable cast iron	ferritic	130	19	0,06-0,16	0,06-0,16	0,06-0,16	0,08-0,12	0,08-0,12	0,10-0,15	0,10-0,15
		perlitic	230	20	0,06-0,16	0,06-0,16	0,06-0,16	0,08-0,12	0,08-0,12	0,10-0,15	0,10-0,15
N	Aluminium wrought alloys	non hadrened	60	21	0,03-0,10	0,03-0,10	0,03-0,10	0,03-0,10	0,05-0,12	0,15-0,50	0,15-0,50
		hadrened	100	22	0,03-0,08	0,03-0,08	0,03-0,08	0,03-0,08	0,05-0,12	0,15-0,50	0,15-0,50
	Aluminium cast alloys	non hadrened (Si<12%)	75	23	0,03-0,10	0,03-0,10	0,03-0,10	0,03-0,10	0,05-0,12	0,15-0,50	0,15-0,50
		hadrened (Si<12%)	90	24	0,03-0,08	0,03-0,08	0,03-0,08	0,03-0,08	0,05-0,12	0,15-0,50	0,15-0,50
		(Si>12%)	130	25	0,03-0,08	0,03-0,08	0,03-0,08	0,03-0,08	0,05-0,12	0,15-0,50	0,15-0,50
	Copper and copper alloys	brass, copper	90	27	0,03-0,10	0,03-0,10	0,03-0,10	0,03-0,10	0,05-0,12	0,15-0,50	0,15-0,50
		bronze, electrolyte-Cu	100	28	0,03-0,08	0,03-0,08	0,03-0,08	0,03-0,08	0,05-0,12	0,15-0,50	0,15-0,50
S	Heat resistant alloys	annealed	250	33	0,03-0,08	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,12	0,04-0,12	0,04-0,12
		aged	350	34	0,03-0,08	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,12	0,04-0,12	0,04-0,12
	Titanium alloys		300	37	0,02-0,08	0,02-0,08	0,02-0,08	0,02-0,08	0,04-0,08	0,04-0,1	0,04-0,1

Definition of feed rates ball nose finishing endmills

MT100LS

ISO	Material & Condition		Brinell HB	Material groups	Diameter (mm)							
					6	8	10	12	16	20	25	32
	Mean undeformed chip thickness h _m , mm											
P	Non-alloy steel	annealed	125	1	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,15	0,04-0,15	0,04-0,15	0,04-0,20	0,04-0,20
		annealed	190	2	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,15	0,04-0,15	0,04-0,15	0,04-0,18	0,04-0,18
		heat treated	250	3	0,03-0,06	0,03-0,06	0,03-0,06	0,04-0,12	0,04-0,12	0,04-0,12	0,04-0,15	0,04-0,15
	Low-alloy steel	annealed	180	6	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,15	0,04-0,15	0,04-0,15	0,04-0,20	0,04-0,20
		heat treated	275	7	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,15	0,04-0,15	0,04-0,15	0,04-0,18	0,04-0,18
		heat treated	300	8	0,03-0,06	0,03-0,06	0,03-0,06	0,04-0,12	0,04-0,12	0,04-0,12	0,04-0,18	0,04-0,18
		heat treated	350	9	0,03-0,06	0,03-0,06	0,03-0,06	0,04-0,10	0,04-0,10	0,04-0,10	0,04-0,15	0,04-0,15
	High-alloy steel and cast steel	annealed	200	10	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,12	0,04-0,12	0,04-0,12	0,04-0,20	0,04-0,20
		heat treated	325	11	0,03-0,06	0,03-0,06	0,03-0,06	0,04-0,10	0,04-0,10	0,04-0,10	0,04-0,15	0,04-0,15
	High-alloy steel and cast steel	ferritic	200	12	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,12	0,04-0,12	0,04-0,12	0,04-0,15	0,04-0,15
		martensitic	240	13	0,03-0,06	0,03-0,06	0,03-0,06	0,04-0,10	0,04-0,10	0,04-0,10	0,04-0,12	0,04-0,12
M	High-alloy steel and cast steel	austenitic	180	14	0,03-0,06	0,03-0,06	0,03-0,06	0,04-0,08	0,04-0,08	0,04-0,08	0,04-0,1	0,043-0,1
K	Grey cast iron	ferritic/perlitic	180	15	0,03-0,1	0,03-0,1	0,03-0,1	0,04-0,14	0,04-0,14	0,04-0,14	0,08-0,3	0,08-0,3
		perlitic	260	16	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,14	0,04-0,14	0,04-0,14	0,08-0,25	0,08-0,25
	Nodular cast iron	ferritic	160	17	0,03-0,1	0,03-0,1	0,03-0,1	0,04-0,14	0,04-0,14	0,04-0,14	0,08-0,3	0,08-0,3
		perlitic	250	18	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,14	0,04-0,14	0,04-0,14	0,08-0,25	0,08-0,25
	Malleable cast iron	ferritic	130	19	0,03-0,1	0,03-0,1	0,03-0,1	0,04-0,14	0,04-0,14	0,04-0,14	0,08-0,3	0,08-0,3
		perlitic	230	20	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,14	0,04-0,14	0,04-0,14	0,08-0,25	0,08-0,25
N	Aluminium wrought alloys	non hadrened	60	21	0,03-0,1	0,03-0,1	0,03-0,1	0,05-0,12	0,05-0,12	0,05-0,12	0,15-0,5	0,15-0,5
		hadrened	100	22	0,03-0,08	0,03-0,08	0,03-0,08	0,05-0,12	0,05-0,12	0,05-0,12	0,15-0,5	0,15-0,5
	Aluminium cast alloys	non hadrened (Si<12%)	75	23	0,03-0,1	0,03-0,1	0,03-0,1	0,05-0,12	0,05-0,12	0,05-0,12	0,15-0,5	0,15-0,5
		hadrened (Si<12%)	90	24	0,03-0,08	0,03-0,08	0,03-0,08	0,05-0,12	0,05-0,12	0,05-0,12	0,15-0,5	0,15-0,5
		(Si>12%)	130	25	0,03-0,08	0,03-0,08	0,03-0,08	0,05-0,12	0,05-0,12	0,05-0,12	0,15-0,5	0,15-0,5
	Copper and copper alloys	brass, copper	90	27	0,03-0,1	0,03-0,1	0,03-0,1	0,05-0,12	0,05-0,12	0,05-0,12	0,15-0,5	0,15-0,5
		bronze, electrolyte-Cu	100	28	0,03-0,08	0,03-0,08	0,03-0,08	0,05-0,12	0,05-0,12	0,05-0,12	0,15-0,5	0,15-0,5
S	Heat resistant alloys	annealed	250	33	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,12	0,04-0,12	0,04-0,12	0,04-0,12	0,04-0,12
		aged	350	34	0,03-0,08	0,03-0,08	0,03-0,08	0,04-0,12	0,04-0,12	0,04-0,12	0,04-0,12	0,04-0,12
	Titanium alloys		300	37	0,02-0,08	0,02-0,08	0,02-0,08	0,04-0,08	0,04-0,1	0,04-0,1	0,04-0,1	0,04-0,1

Nominal cutting data for milling tools for machining aluminium alloys

ISO	Insert type	Finishing		Semi-finishing		Roughing	
		Cutting speed v_c (m/min)	Feed/tooth (mm/tooth)	Cutting speed v_c (m/min)	Feed/tooth (mm/tooth)	Cutting speed v_c (m/min)	Feed/tooth (mm/tooth)
N	AD.T10T3...-AL	3500-300	0,05-0,1	3000-300	0,075-0,2	1500-200	0,1-0,25
	XDHT1904...-AL	2000-300	0,05-0,1	2000-300	0,075-0,2	2000-300	0,1-0,25
	XDHX1904...-AL	5000-300	0,05-0,1	5000-300	0,1-0,3	5000-300	0,1-0,4

If in designs at once used together different inserts, so that cutting data are fixed on inserts with the slightest of the cutting data and feed.

Application data for Titanium milling with ADD milling tools

ISO	MT190..AD10-T MT290..AD10-T MT190L..AD10-T	MT190..BO12-T MT190L..SO09-T MT290L..SO09-T	MT245..SO09	MT245..SO19	MT190Z..MO09 MT290Z..MO09
	Feed / tooth (mm/tooth)				
S	0,08-0,12	0,08-0,14	0,10-0,16	0,10-0,20	0,05-0,15
N					0,05-0,15

Titanium alloys	Hardness	Rm	Kc	Cutting speed
	HRC	N/mm	N/mm	m/min
Ti6Al4V (Ti 6.4) (BT6)	36	1130	2400	48-100 (70)
BT20			2800	35-70 (45)
BT22	38	1200	3400	24-50 (30)
BT23			3330	30-60 (37)
Ti10V2Fe3Al (Ti 10.2.3)	35	1100	3000	22-46(35)
Ti6Al2Sn4Zr2Mo	28	900	1500	50-108
Ti13V11Cr3Al	40	1270	3400	24-50
Ti3Al8V6Cr4Mo4Zr	32	1000	2200	27-58
Ti5Al5V5Mo3Cr (Ti 5.5.5.3)	40	1270	3400	24-50 (30)
Ti 17	38	1200	2500	44-93
Ti4Al4Mo2Sn0,5Si	35	1100	2400	40-85

*For sidemilling with long edge endmills $a_e < 0,33D$.

*Mainly down milling.

*At milling slots cutting speed is necessary for reducing on 10-15%.

*For facemilling $a_e < 0,6D$.

Especially important plentiful cooling. The greatest effect is brought with internal cooling through a spindle under pressure 70-110bar.

*In brackets optimum speed is resulted at roughing side milling by ADD long edge endmills.

Definition of feed rates slitting cutters and disk mills

ISO	Material & Condition		Brinell HB	Material groups	MT390K...			MT390			MT389	
					CC06...	SD09...	TP22, SD12, AD15	CN08..	CN11..	CN15..	SN11...	SN12...
					Feed / tooth (mm/tooth)							
P	Non-alloy steel	annealed	125	1	0,03-0,10	0,08-0,18	0,08-0,30	0,1-0,4	0,1-0,5	0,1-0,6	0,08-0,20	0,08-0,30
		annealed	190	2	0,03-0,11	0,08-0,20	0,08-0,25	0,1-0,4	0,1-0,5	0,1-0,6	0,08-0,20	0,08-0,30
		heat treated	250	3	0,03-0,09	0,06-0,16	0,06-0,20	0,1-0,4	0,1-0,5	0,1-0,6	0,08-0,17	0,08-0,25
	Low-alloy steel	annealed	180	6	0,03-0,09	0,07-0,16	0,07-0,20	0,1-0,4	0,1-0,5	0,1-0,6	0,07-0,18	0,08-0,25
		heat treated	275	7	0,03-0,08	0,07-0,14	0,07-0,18	0,1-0,4	0,1-0,5	0,1-0,6	0,07-0,18	0,08-0,25
		heat treated	300	8		0,07-0,14	0,07-0,18	0,1-0,4	0,1-0,5	0,1-0,6	0,07-0,15	0,08-0,22
		heat treated	350	9		0,07-0,12	0,07-0,15	0,1-0,4	0,1-0,5	0,1-0,6	0,05-0,15	0,07-0,22
	High-alloy steel and cast steel	annealed	200	10		0,06-0,15	0,06-0,15	0,1-0,4	0,1-0,5	0,1-0,6	0,06-0,15	0,08-0,22
		heat treated	325	11		0,06-0,12	0,06-0,12	0,1-0,4	0,1-0,5	0,1-0,6	0,06-0,12	0,08-0,20
	High-alloy steel and cast steel	ferritic	200	12		0,06-0,12	0,06-0,15	0,1-0,4	0,1-0,5	0,1-0,6	0,05-0,15	0,08-0,22
		martensitic	240	13		0,06-0,10	0,06-0,12	0,1-0,4	0,1-0,5	0,1-0,6	0,05-0,15	0,08-0,20
M	High-alloy steel and cast steel	austenitic	180	14		0,06-0,10	0,06-0,15	0,1-0,4	0,1-0,5	0,1-0,6	0,06-0,15	0,08-0,22
K	Grey cast iron	ferritic/perlitic	180	15		0,08-0,20	0,12-0,35	0,1-0,4	0,1-0,5	0,1-0,6	0,08-0,20	0,10-0,30
		perlitic	260	16		0,08-0,20	0,12-0,35	0,1-0,4	0,1-0,5	0,1-0,6	0,08-0,20	0,10-0,30
	Nodular cast iron	ferritic	160	17		0,08-0,20	0,12-0,35	0,1-0,4	0,1-0,5	0,1-0,6	0,08-0,20	0,10-0,30
		perlitic	250	18		0,08-0,15	0,08-0,23	0,1-0,4	0,1-0,5	0,1-0,6	0,06-0,15	0,08-0,20
	Malleable cast iron	ferritic	130	19		0,08-0,20	0,12-0,35	0,1-0,4	0,1-0,5	0,1-0,6	0,08-0,20	0,10-0,30
		perlitic	230	20		0,06-0,15	0,08-0,23	0,1-0,4	0,1-0,5	0,1-0,6	0,06-0,15	0,08-0,20
N	Aluminium wrought alloys	non hadrened	60	21	0,04-0,15	0,05-0,15	0,07-0,20				0,05-0,20	0,08-0,25
		hadrened	100	22								
	Aluminium cast alloys	non hadrened (Si<12%)	75	23	0,04-0,15	0,05-0,15	0,07-0,20				0,05-0,20	0,08-0,25
		hadrened (Si<12%)	90	24								
		(Si>12%)	130	25								
S	Copper and copper alloys	brass, copper	90	27	0,03-0,11	0,05-0,14	0,07-0,18				0,05-0,14	0,07-0,23
		bronze, electrolyte-Cu	100	28	0,03-0,10	0,05-0,14	0,07-0,18				0,05-0,14	0,07-0,23
	Heat resistant alloys	annealed	250	33		0,05-0,10	0,05-0,12				0,05-0,10	0,05-0,12
		aged	350	34		0,04-0,10	0,05-0,12				0,04-0,10	0,04-0,12
	Titanium alloys		300	37		0,04-0,10	0,05-0,14				0,04-0,10	0,05-0,15

Definition of feed rates finishing facemills MT200S

ISO	Insert type	MT200S...LN19
		Feed / tooth (mm/tooth)
P	LNGQ1906...	2,0-6,0
K	LNGQ1906...	2,0-6,0

Material cross reference list

ISO 513	Country							k _{c1.1}	m _c	Gruppen VDI 3323
	Russian	Great Britain	USA	Germany		France	Spain			
	Standart									
ГОСТ P	BS	AISI/SAE	W.-Nr.	DIN	AFNOR	UNF				
P	Non-alloy steel									
	15	080M15	1015	1.0401/ 1.1141	C15/ Ck15	11SMnPb28	F.111/ C15K	1350	0.21	1
	20	050A20	1020	1.0402	C22	CC20	F.112	1350	0.21	1
		230M07	1213	1.0715	9SMn28	S250	11SMn28	1350	0.21	1
			12L13	1.0718	9SMnPb28	S250Pb	11SMnPb28	1350	0.21	1
	A12			1.0722	10SPb20	10PbF2	10SPb20	1350	0.21	1
		240M07	1215	1.0736	9SMn36	S300	12SMn35	1350	0.21	1
			12L14	1.0737	9SMnPb36	S300Pb	12SMnP35	1350	0.21	1
	25		1025	1.1158	Ck25			1350	0.21	1
	35Г2	150M28	1330	1.1170	28Mn6	20M5		1500	0.22	2
	A30	212M36	1140	1.0726	35S20	35MF4	F210G	1525	0.22	2/3
	35	060A35	1035	1.0501	C35	CC35	F.113	1525	0.22	2/3
	45	080M46	1045	1.0503	C45	CC45	F.114	1525	0.22	2/3
	40Г	150M36	1039	1.1157	40Mn4	35M5		1525	0.22	2/3
	35ГЛ		1335	1.1167	36Mn5	40M5	36Mn5	1525	0.22	2/3
		060A35	1035	1.1183	Cf35	XC38TS		1525	0.22	2/3
	45	080M46	1045	1.1191	Ck45	XC42	C45K	1525	0.22	2/3
	50	060A52	1050	1.1213	Cf53	XC48TS		1525	0.22	2/3
	55	070M55	1055	1.0535/ 1.1203	C55/ Ck55	XC55	C55K	1675	0.24	3
	60	080A62	1060	1.0601	C60	CC55		1675	0.24	3
	60Г	080A62	1060	1.1221	Ck60	XC60		1675	0.24	3
	Low-alloy steel									
	ШХ15	534A99	52100	1.3505	100Cr6	100C6	F.131	1675	0.24	6/7
	15HM	1501-240	ASTM A204Gr.A	1.5415	15Mo3	15000	16Mo3	1675	0.24	6/7
		1503-245-420	4520	1.5423	16Mo5		16Mo5	1675	0.24	6/7
	15ГНЛ		ASTM A350LF5	1.5622	14Ni6	16N6	15Ni6	1675	0.24	6/7
	12XH3A		3415	1.5732	14NiCr10	14NC11	15NiCr11	1675	0.24	6/7
	20XH4ΦA	655M13;	3415:3310	1.5752	14NiCr14	12NC15		1675	0.24	6/7
	18X2H4BA	820A16		1.6587	17CrNiMo6	18NCD6	14NiCrMo13	1675	0.24	6/7
	18XГ	(527M20)	5115	1.7131	16MnCr5	16MC5	16MnCr5	1675	0.24	6/7
	15XM			1.7262	15CrMo5	12CD4	12CrMo4	1675	0.24	6/7
	12XM	1501-620Gr27	ASTM A182	1.7335	13CrMo4 4	15CD3.5	14CrMo45	1675	0.24	6/7
	12X2MΦA	1501-622	ASTM A182	1.7380	10CrMo910	12CD9,10	TU.H	1675	0.24	6/7
	12X1MΦ	1503-660-440		1.7715	14MoV6 3		13MoCrV6	1675	0.24	6/7
	20XГНМ	805M20	8620	1.6523	21NiCrMo22	20NCD2	20NiCrMo2	1725	0.24	6/8
	15X	523M15	5015	1.7015	15Cr3	12C3		1725	0.24	6/8
	35X	530A32	5132	1.7033	34Cr4	32C4	35Cr4	1725	0.24	6/8
	20XM	1717CDS110	4130	1.7218	25CrMo4	25CD4	55Cr3	1725	0.24	6/8
	35XH2МЛ	640A35	3135	1.5710	36NiCr6	35NC6		1800	0.24	3/9
	55C2	250A53	9255	1.0904	55Si7	55S7	56Si7	1775	0.24	6/9
	60C2		9262	1.0961	60SiCr7	60SC7	60SiCr8	1775	0.24	6/9
	40XH2MA	816M40	9840	1.6511	36CrNiMo4	40NCD3	35NiCrMo4	1775	0.24	6/9
		311-Type 7	8740	1.6546	40NiCrMo22		40NiCrMo2	1775	0.24	6/9
	38X2H2MA	817M40	4340	1.6582	35CrNiMo6	35NCD6		1775	0.24	6/9
	40X	530M40	5140	1.7035	41Cr4	42C4	42Cr4	1775	0.24	6/9
	50XГA	527A60	5155	1.7176	55Cr3	55C3		1775	0.24	6/9
	35XM	708A37	4137:4135	1.7220	34CrMo4	35CD4	34CrMo4	1775	0.24	6/9
	38XMA	708M40	4140,4142	1.7223	41CrMo4	42CD4TS	42CrMo4	1775	0.24	6/9
	40XH2MA	708M40	4140	1.7225	42CrMo4	42CD4	42CrMo4	1775	0.24	6/9
	30X3BA	722M24		1.7361	32CrMo12	30CD12	F.124.A	1775	0.24	6/9
	50XΦA	735A50	6150	1.8159	50CrV4	50CV4	51CrV4	1775	0.24	6/9
	38XMЮA	905M39		1.8509	41CrAlMo7	40CAD6,12	41CrAlMo7	1775	0.24	6/9
	40X5MΦ	897M39		1.8523	39CrMoV13 9			1775	0.24	6/9
	9X2	BL3	L3	1.2067	100Cr6	Y100C6	100Cr6	1775	0.24	6/9
	XBГ			1.2419	105WCr6	105WC13	105WCr5	1775	0.24	6/9
	5XHM		L6	1.2713	55NiCrMoV6	55NCDV7	F.520.S	1775	0.24	6/9
	5XB2C	BS1	SI	1.2542	45WCrV7		45WCrSi8	1775	0.24	6/9

ISO 513	Country							k _{c1.1}	m _c	Grupper VDI 3323
	Russian	Great Britain	USA	Germany		France	Spain			
	Standart									
	ГОСТ P	BS	AISI/SAE	W.-Nr.	DIN	AFNOR	UNF			
P	High-alloy steel									
	4X5MΦ1C	BH13	H13	1.2344	X40CrMoV51	Z40CDV5	X40CrMoV5	2450	0.23	10/11
		1501-509;510	ASTM A353	1.5662	X8Ni9		XBNI09	2450	0.23	10/11
	15ГН4М		2515	1.5680	12Ni19	Z18N5		2450	0.23	10/11
	18X2H4MA	832M13		1.6657	14NiCrMo134		14NiCrMo131	1675	0.24	10/11
	X12	BD3	D3	1.2080	X210Cr12	Z200C12	X210Cr12	2450	0.23	10/11
	X6BΦ	BA2	A2	1.2363	X100CrMoV51	Z100CDV5	X100CfMoV5	2450	0.23	10/11
	3X2B8Φ	BH21	H21	1.2581	X30WCrV9 3	Z30WCV9	X30WCrV9	2450	0.23	10/11
	40X9S2	401 S45	HW3	1.4818	X45GrSi93	Z45CS9	F322	2450	0.23	10/11
	P6M5K5			1.3243	S 6-5-2-5	Z85WDKCV	HS6-5-2-5	2450	0.23	10/11
	P18K5Φ2			1.3255	S 18-1-2-5	Z80WKCV	HS18-1-1-5	2450	0.23	10/11
	P6M5			1.3343	S 6-5-2	Z85WDCV	HS6-5-2	2450	0.23	10/11
				1.3348	S 2-9-2	Z100WCWV	HS2-9-2	2450	0.23	10/11
	P18			1.3355	S 18-0-1		HS18-0-1	2450	0.23	10/11
	X12MΦ			1.2601	X165CrMoV 12		X160CrMoV12	2450	0.23	10/11
	X12BM			1.2436	X210CrW12		X210CrW12	2450	0.23	10/11
	110Г13Л	Z1201VU2		1.3401	G-X120Mn12	Z120M12	X120Mn12	3300	0.24	11
	Stainless ferritic and martensitic steel									
	08X13	403S17	403	1.4000	X7Cr13	Z6C13	F.3110	1875	0.21	12/13
				1.4001	X7Cr14		F.8401	1875	0.21	12/13
	12X13	410S21	410	1.4006	X10G13	Z10C14	F.3401	1875	0.21	12/13
	12X17	430S17	430	1.4016	X8Cr17	Z8C17	F.3113	1875	0.21	12/13
	40X13	420S45		1.4034	X46Cr13	Z40CM	F.3405	1875	0.21	12/13
		405S17	405	1.4002	X6CrAl13	Z8CA12		1875	0.21	12/13
	20X13	420S37	420	1.4021		Z20C13		1875	0.21	12/13
	20X17H12	431 S29	431	1.4057	X22CrNi17	Z15CNI6.02	F.3427	1875	0.21	12/13
	08X18T		430F	1.4104	X12CrMoS17	Z10CF17	F.3117	1875	0.21	12/13
		434S17	434	1.4113	X6CrMo17	Z8CD17.01		1875	0.21	12/13
		425C11		1.4313	X5CrNi13 4	Z4CND13.4M		1875	0.21	12/13
	10X13CЮ	403S17	405	1.4724	X10CrAl13	Z10C13	F.311	1875	0.21	12/13
	15X18CЮ	430S15	430	1.4742	X10CrAl18	Z10CAS18	F.3113	1875	0.21	12/13
	95X18	443S65	HNv6	1.4747	X80CrNiSi20	Z80CSN20.02	F.320B	1875	0.21	12/13
			446	1.4762	X10CrAl24	Z10CAS24		1875	0.21	12/13
55X20Г9AH4	349S54	EV8	1.4871	X53CrMnNiN219	Z52CMN21.09		1875	0.21	12/13	
M	Stainless ferritic/martensitic and austenitic steel									
	X18H10T	321S12	321	1.4541	X10CrNiTi189	Z6CNT18.10	F.3553	2150	0.2	14.1
	02X18H25M4C3	904S13, 904S14, 904S92	N08904	1.4539	X1 NiCrMoCu25 20 5	Z2 CNDU 25.20		2150	0.2	14.1
						URANUS B6				
	02X25H22AM2		310MoLN, N08310, S31050	1.4465	X1CrNiMoN 25 22 2	Z2 CND25.22 Az		2150	0.2	14.1
						CLI UREA 25.22.2				
	03X17H14M3	316S13	316L	1.4404, 1.4435	X2CrNiMo1812, X2CrNiMo18 14 3	Z2CND17.12		2150	0.2	14.1
	03X18H11	304S11	304L	1.4306	X2CrNi1911	Z2CN18-10		2150	0.2	14.1
	06XH28MДТ		N08028	1.4563	X1 NiCrMoCuN31 27 4	Z1NCDU31-27-03		2150	0.2	14.1
	08X18H10	304S15	304	1.4301	X6CrNi189	Z6CN18.09	F.3551	2150	0.2	14.1
	08X18H12B	347S17	347	1.4550	X10CrNiNb189	Z6CNCNb18.10	F.3552	2150	0.2	14.1
	09X17H7Ю1	316S111	17-7PH	1.4568	X7 CrNiAl 17 7	Z8CNA17-07		2150	0.2	14.1
	10X17H13M2T	320S17	316Ti, 318	1.4571, 1.4583	X10CrNiMoTi1810, X10CrNiMoNb1812	Z6NDT17.12, Z6CNDNb1713B	F.3535	2150	0.2	14.1
	10X23H18	310S24	310S	1.4845	X12CrNi25 21	Z12CN25 20	F.331	2150	0.2	14.1
	12X18H9	303S21	301, 303	1.4305, 1.4310	X12CrNiS188, X12CrNi177	Z10CNF 18.09, Z12CN17.07	F.3508, F.3517	2150	0.2	14.1
	15X23H18Л			1.4840	G-X15 CrNi 25 20			2150	0.2	14.1
	15X25T		S44600	1.4746				2150	0.2	14.1
	15X28		S44600	1.4749		X18 CrN28		2150	0.2	14.1
	20X23H13	309S24				Z10CNS25.20		2150	0.2	14.1

ISO 513	Country							k _{c1.1}	m _c	Gruppen VDI 3323
	Russian	Great Britain	USA	Germany		France	Spain			
	Standart									
	ГОСТ P	BS	AISI/SAE	W.-Nr.	DIN	AFNOR	UNF			
M	20X23H18, (20X25H20C2)	310, 310S24, 314S25	S31000, S31400, J24202	1.4841	X15CrNiSi2520	Z15CNS25-20		2150	0.2	14.1
						314, SIRIUS 310, 4841, SIRIUS 314		2150	0.2	14.1
	40X24H1CЛ	309C30	J93503, J94003, J94013	1.4837	G-X40 CrNiSi 25 12			2150	0.2	14.1
								2150	0.2	14.1
	-	304S11	316	1.4436	X5CrNiMo17 13 3	Z6CND18-12-03		2150	0.2	14.1
	-	317S12	317L	1.4438	X2CrNiMo18 16	Z2CND18.15		2150	0.2	14.1
	12X25H5TMФЛ		S31200, S32900	1.4460	X3 GrNiMo 27 5	Z3CND25-07		2150	0.2	14.2
	-	3RE60	S31500	1.4417	X2 GrNiMoSi 19 5	GX2CrNiMoN25-7-3		2150	0.2	14.2
	-			1.4462	X2 GrNiMoN 22 5 3	Z2CND22-05-03		2150	0.2	14.2
	-			1.4821	X20 GrNiSi 25 4	Z20CNS25.04		2150	0.2	14.2
	-			1.4823	G-X40CrNiSi27 4			2150	0.2	14.2
K	Grey cast iron									
	C410		No 20 B	0.6010	GG10	Ft10D		1150	0.2	15
	C415	Grade 150	No 25 B	0.6015	GG15	Ft15D		1150	0.2	15
	C420	Grade 220	No 30 B	0.6020	GG20	Ft20D		1150	0.2	15
	C425	Grade 260	No 35 B	0.6025	GG25	Ft25D		1250	0.24	15/16
	C430	Grade 300	No 45 B	0.6030	GG30	FT30D		1350	0.28	16
	C435	Grade 350	No 50 B	0.6035	GG35	Ft35D		1350	0.28	16
	C440	Grade 400	No 55 B	0.6040	GG40	Ft40D		1350	0.28	16
	Nodular cast iron									
	B42-12	SNG 420/12	60-40-18	0.7040	GGG40	FCS 400-12		1225	0.25	17
				0.7033	GGG 35.3			1225	0.25	17
		SNG 370/17		0.7043	GGG 40.3	FGS 370-17		1225	0.25	17
	B450-2	SNG 500/7	80-55-06	0.7050	GGG 50	FGS 500-7		1350	0.28	18
	B460-2	SNG 600/3		0.7060	GGG 60	FGS 600-3		1350	0.28	18
	B470-2	SNG 700/2	100-70-03	0.7070	GGG 70	FGS 700-2		1350	0.28	18
	Malleable cast iron									
	K435-10	B 340/12	32510	0.8135	GTS-35	MN 35-10		1225	0.25	19
K445-6	P 440/7	40010	0.8145	GTS-45			1420	0.3	20	
K455-4	P 510/4	50005	0.8155	GTS-55	MP 50-5		1420	0.3	20	
K460-3	P 570/3	70003	0.8165	GTS-65	MP 60-3		1420	0.3	20	
N	Aluminium wrought alloys									
	1350	6082	1350, A96351, AA6003, AA6007, AA6351		AlMgSi1	A-SGM0.7	6351	700	0.25	21
	1400 (1401, 3000)	3103	3003, A93003, AA3003, AA3009, AA3011, AA3103, AA3107, AA3303, AA3307		3003, AlMn1, AlMnCu	A-M1	3003, Al-1Mn	700	0.25	21
	1420							700	0.25	22
	1530	5154A	5154A, A95154, A95754, AA5154, AA5254, AA5654, AA5754, AlMg3.5		5754, AlMg3, S-AlMg3, SG-AlMg3	5154, A-G3M, AlMg3, AlMg3.5	5154A, Al-3Mg	700	0.25	21
	1933		AA7076					700	0.25	22
	AB	6061	6061, 6151, A96010, A96070, A96151, AA6009, AA6011, AA6013, AA6061, AA6070, AA6151, AA6351		AlMg1SiCu	A-GSUS	6351	700	0.25	22
	AD0		1050, 1055, 1060, 1065, 1250, 1350	3.0205	Al99.5 Al99.98R			700	0.25	21

ISO 513	Country							k _{c1.1}	m _c	Gruppen VDI 3323	
	Russian	Great Britain	USA	Germany		France	Spain				
	Standart										
ГОСТ P	BS	AISI/SAE	W.-Nr.	DIN	AFNOR	UNF					
N	АД1		A91030, A91230		Al99.3			700	0.25	21	
			AA1230								
	АД31 (1310, 1320)	6060, 6063, 6443, 91E,	6060, 6101, A96005, A96060,	3.2316	6060, AlMgSi0.5 AlMgSi0.8	6063, A-GS	6063, A-GS	700	0.25	22	
		HE9, HF9,	A96063, A96101,								
		HG9, HT9	A96201, A96463,								
			AA6005, AA6017,								
			AA6060, AA6063,								
			AA6101, AA6105,								
			AA6162, AA6201,								
			AA6301, AA6463,								
	АД33 (1330, 1340)	6061, HB20, HE20, HG20,	A96061, A96205, A96262	3.3315	AlMg1SiCu 6061	6061, A-GSUC A-SGM0.3		700	0.25	22	
		L117									
	AK4-1		A92618, AA2018,					700	0.25	22	
			AA2218, AA2618								
	AK6							700	0.25	22	
	AK7		A03570, A444.0					700	0.25	22	
	AK8 (1380)	2014A	358.0, A92014,		2014, AlCu4SiMg		2014	700	0.25	22	
			AA2014, AA2214		AlCuSiMn						
	AMr2 (1520)	2L55, 5251	A95052, AA5051,		5052, 5251,	5051, 5052,	5052, Al-2Mg	700	0.25	21	
			AA5151, AA5251,		AlMg2, AlMg2.5,	505203, A-G2.5C,					
			AA5252, AA5351,		AlMg2Mn0.3	A-G2M					
			AA5352, AA5454,								
			AA5552, AA5652								
	AMr4 (1540, 1541)		A95086, AA5082,		5086, AlMg4.5Mn	5086, A-G4MC	5086, Al-4Mg	700	0.25	21	
			AA5083, AA5086		AlMg4, AlMg4Mn						
	AMr5 (1550, 1556)	5056, 5056A,	A95056, AA5019,		5019, AlMg5			700	0.25	21	
		A56S, NB6,	AA5056, AA5356,								
		NG6, NR6	AA5456, AA5556								
	AMr6 (1560)	NG61	A95456, A95556		AlMg6	AlMg5Mn	Al-6Mg	700	0.25	21	
	B93							700	0.25	22	
	B95 (1950)	C77S, M75S	AA7075, AA7175,		AlZnMgCu1.5	A-Z5GU		700	0.25	22	
			AA7475								
	B96ц пч		AA7049					700	0.25	22	
	ВД19							700	0.25	22	
	Д1 (1110)		A91110, A92017,		AlCu4MgSi	1110, 131050,	Al-4CuSiMg	700	0.25	22	
			AA1110, AA2014,		AlCuMg1,	A-U4SG					
			AA2017		AlCuSiMn						
	Д16 (1160)	2024	A92024, A92124,	3.1325	2024, AlCuMg2	A-U 4G1	2024	700	0.25	22	
			AA2024, AA2124								
	Д19							700	0.25	23	
	Aluminium cast alloys										
	AK5M4	LM21		3.2551	G-AlSi6Cu4			700	0.25	24	
	АЛ2	AlSi12	A04132, A94047,	3.2581	GK-AlSi12, AlSi12,	A-S12, A-S13,	Al-12SiFe	700	0.25	25	
		AlSi12Fe	A413.0, B413.0,		G-AlSi12	AlSi12					
		LM20, LM6	B413.1								
	АЛ4		360.0, A03600,	3.2381	G-AlSi10Mg	A-S9GU		700	0.25	24	
			A360.0								
	АЛ5	LM16	305.0		G-AlSi5Mg		Al-5SiCuMg	700	0.25	24	
				GK-AlSi5MgWa							
АЛ5-1		A305.0					700	0.25	24		
АЛ9		356, A03560					700	0.25	24		
АЛ9-1	LM25	356, A03560	3.2371	G-AlSi7Mg		AlSi7Mg	700	0.25	24		
АЛ19				AlCu4Ti			700	0.25	23		

ISO 513	Country							k _{c1.1}	m _c	Gruppen VDI 3323
	Russian	Great Britain	USA	Germany		France	Spain			
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	ГОСТ P	BS	AISI/SAE	W.-Nr.	DIN	AFNOR	UNF			
N	АЛ22							700	0.25	23
	АЛ24		A07070				707	700	0.25	23
	АЛ27	LM10	520, A05200		G-ALMg10			700	0.25	24
	АЛ30	LN13	A03360		AlSi12CuNiMg	A-Si12UGN		700	0.25	23
	АЛ32		A03280					700	0.25	24
	АЛ34		358.0					700	0.25	24
	АМг4К1,5М			3.3261	G-ALMg5Si			700	0.25	24
	ВАЛ8		A380.0, A380.1	3.2163	G-ALSi9Cu3			700	0.25	24
	Copper alloys									
	ЛС60-2	CZ124	C35330, C36000	2.0375	CuZn36Pb3	CuZn36Pb3		700	0.27	26
	ЛС63-3	CZ119	C35300, C35600					700	0.27	26
	ЛО62-1	CZ112	C46200, C46400		CuZn38Sn1			700	0.27	27
	ЛМц58-2		C67410		CuZn40Mn2			700	0.27	27
	Л63	CZ108	C27200	2.0321	CuZn37	CuZn36, CuZn37		700	0.27	27
	Л70	CZ106	C26000	2.0265	CuZn30	CuZn30		700	0.27	27
	Л85	CZ102	C23000	2.0240	CuZn15	CuZn15		700	0.27	27
	БрАЖН10-4-4	Ca104	C63000	2.0966	CuAl10Ni5Fe4	U-A10N		700	0.27	28
	БрОФ6,5-0,15	C11, PB103	C51900, C51980		CuSn6	CuSn6P		700	0.27	28
	БрОФ7-0,2		C52100		CuSn8	CuSn8, CuSn8P		700	0.27	28
БрОЦС 4-4-4		C54400			CuSn4Zn4Pb5		700	0.27	28	
S	Heat resistant alloys									
	XH32T	NA15, NA15H	INCOLOY 800,	1.4876,	X10 NiCrAlTi 32 20	SIRIUS 800,		2600	0.24	31
			N08332, N08800,	1.4958,		Z10 NC32-21,				
			N08810, RA330TX	1.4959		Z8 NC 33-21				
	-	37/18, NA17	INCOLOY DS,	1.4864	X12 NiCrSi 36 16	Z20 NCS 33-16,		2600	0.24	31
			N08830			Z12 NCS 35-16				
	-	330C11, 331C40	N08002, N08004	1.4865	G-X40NiCrSi			2600	0.24	31
			N08030, N08005							
	ЭК77		08028	1.4563	X1 NiCrMoCuN 31 27 4	Z2 NCDU 31-27,		2600	0.24	31
						URANUS B28				
	-		5390A, N06002,	2.4603	NiCr21Fe18Mo	NC22FeD		3300	0.24	33
			HASTELLOYS G-30							
	-		INCONEL 625, 5666,	2.4856	NiCr22Mo9Nb	NC22FeDNb		3300	0.24	33
			N06625, N26625							
	XH38BT	NA14, NA16	INCONEL 825,	2.4858	NiCr21Mo			3300	0.24	33
			N08825							
	XH77TЮP	2R201, NA20	NIMONIC80, HEV5,	2.4631	NiCr20TiAl	NC20TA		3300	0.24	33
			N07080							
	XH78T	NA14	INCONEL 600		Nicrofer 7216			3300	0.24	33
	-		NIMONIC 901	2.4662	NiFe35Cr14MoTi	ZSNCDT42		3300	0.24	33
	-		INCONEL X-750,	2.4669	NiCr15Fe7TiAl	NC15 TNb A,		3300	0.24	35
			688, N07750			NC15 Fe7TA				
	-		IN-713, N07713	2.4670	S-NiCr13A16MoNb	NC12AD		3300	0.24	34
	-		INCONEL 718,	2.4668	NiCr19Fe19NbMo	NC19 Fe Nb,		3300	0.24	34
			XEV-1, N07718			NC20K14				
	-	3072-76, NA18	4676A, N05500,	2.4375	NiCu30Al	NC19eNB,		3300	0.24	34
			MONEL K-500			NU30 AT				
	-		AMS 5399	2.4973	NiCr19Co11MoTi	NC19KDT		3300	0.24	34
	-			2.4674	NiCo15Cr10MoAlTi			3300	0.24	34
	XH73МБТЮ-ВД		INCONEL 751	2.4694	NiCr16Fe7TiAl			3300	0.24	35
-	ANC15	HASTELLOYS C(B)	2.4810	G-NiMo3	Ni-Mo28		3300	0.24	33	
-	HR240	Stellite No. 25	2.4964	CoCr20W15Ni	KC20WN		3300	0.24	35	

ISO 513	Country							k _{c1.1}	m _c	Gruppen VDI 3323
	Russian	Great Britain	USA	Germany		France	Spain			
	Standart									
	ГОСТ P	BS	AISI/SAE	W.-Nr.	DIN	AFNOR	UNF			
S	Titanium alloys									
	BT1-00	2TA.1, 2TA.4	R50250, R52400	3.7025	Ti1, Ti1Pd	T-35	L7021	2110	0.22	36
	BT3-1							2110	0.22	37
	BT5-1	BS TA.14,	R54520	3.7115	TiAl5Sn2.5	T-A5E	L7101	2110	0.22	37
		BS TA.15,	5Al-2.5Sn							
		BS TA.16,								
		BS TA.17,								
	BT6	BS 2TA.11,	AMS R56400,	3.7165	TiAl6V4	T-A6V		2110	0.22	37
		BS 2TA.12,	AMS R56407,		Ti-6Al-4V					
		BS 2TA.13,	6Al-4V, ERTi-5,							
		BS TA.56,	F467, F468							
		BS TA.59,								
	BT18y							2110	0.22	37
	BT20							2800	0.22	37
	BT22							3400	0.24	37
	BT23							3300	0.23	37
	BT25							2440	0.24	37
						Ti10V2Fe3Al		3000	0.24	37
						Ti6Al2Sn4Zr2Mo		1500	0.24	37
						Ti13V11Cr3Al		3400	0.24	37
						Ti3Al8V6Cr4Mo4Zr		2200	0.24	37
						Ti5Al5V5Mo3Cr		3400	0.24	37
						Ti17		2500	0.24	37
						Ti4Al4Mo2Sn0.5Si		2400	0.24	37

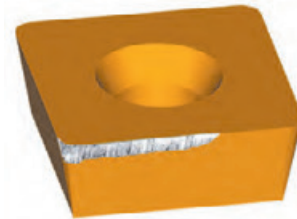
Appearance of wear during milling

Flank wear

General criterion for end of tool life characterized by an admissible amount of flank wear. Figures usually relate to a tool life of $T=15$ min.

Remedy:

- *select more wear-resistant grade;
- *increase feed if possible;
- *reduce cutting speed.



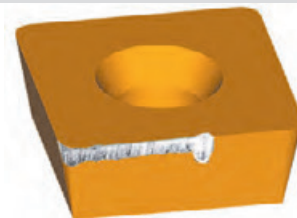
Notch wear

Occurs locally in the area of the primary cutting edge where it contacts the workpiece surface. Caused by hard surface layers and work-hardened burrs, especially on stainless austenitic steels.

Danger of breakage!

Remedy:

- *strengthen cutting edge;
- *select smaller cutting edge angle (45°);
- *reduce feed.



Edge chipping

Minor chipping along the cutting edge, usually accompanied by flank wear and therefore not always identifiable.

Danger of breakage!

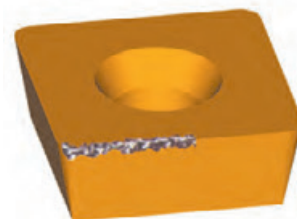
Edge chipping outside the cutting area is the result of chip impact due to unfavourable chip removal.

Remedy:

- *select tougher grade;
- *use insert with stronger cutting edge geometry;
- *reduce feed when starting the cut.

In the case of damage due to chip impact:

- *vary feed;
- *change chipbreaker geometry;
- *change cutting edge angle.

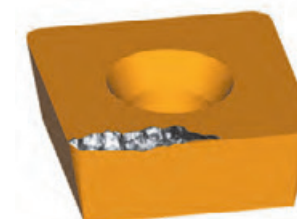


Built-up edges

Edge build-up occurs on the rake face as a result of work material welding together with the cutting material, especially when cutting difficult-to-machine materials. From time to time the built-up edge will break off and may cause damage to the cutting edge. Built-up edges result in poor surface finishing.

Remedy:

- *increase cutting speed;
- *use coated hardmetals or cermets;
- *select positive cutting edge geometry;
- *use cutting fluid.



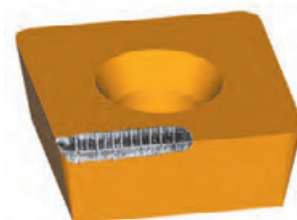
Thermal cracks

Small cracks running across the cutting edge, caused by thermal shock loads in interrupted cutting operations, particularly in milling.

Danger of breakage!

Remedy:

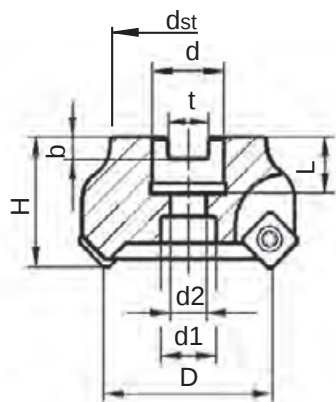
- *use grade with greater resistance to thermal shock;
- *check use of cutting fluid; cutting fluid should not generally be used for milling, except aluminium and titanium alloys and high temperature materials;
- *use compressed air to remove chips in slot milling.



Mounting dimensions and tool shanks for milling tools

Mounting dimensions based for facemills and square shoulder facemills, mm

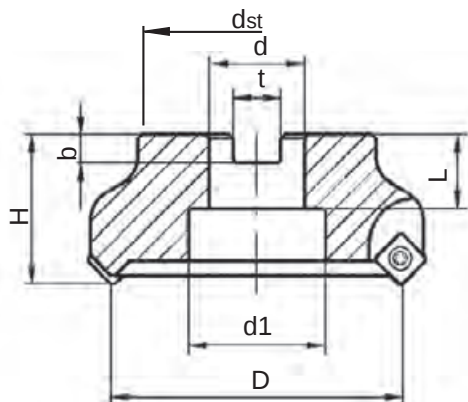
Form A



D	d	H	t _{H11}	b _{H12}	L	d1	d2	dst
32 40	16	40	8,4	5,6	19	13,5	8,4	32
50 63	22	40	10,4	6,3	20	18	11	48
80*	27	50	12,4	7	22	20	13	60
100*	32	50	14,4	8	25	27	17	78
125*	40	63	16,4	9	29	32	21	89

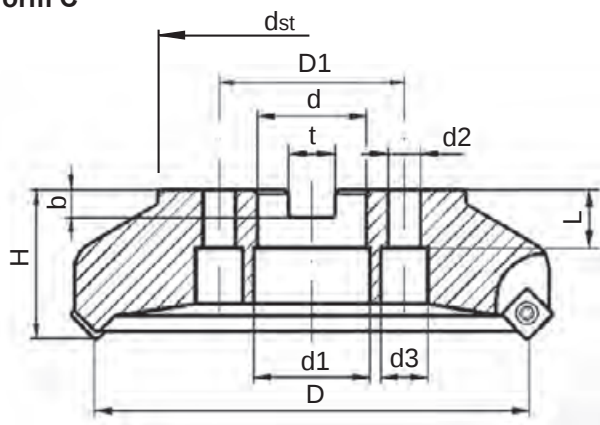
* For mills with internal coolant supply

Form B



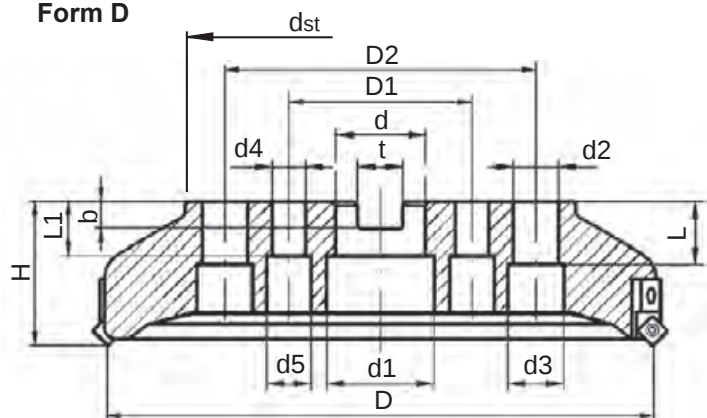
D	d	H	t _{H11}	b _{H12}	L	d1	dst
80	27	50	12,4	7	22	38	60
100	32	50	14,4	8	25	45	78
125	40	63	16,4	9	29	56	89

Form C



D	D1	d	H	t _{H11}	b _{H12}	L	d1	d2	d3	dst
160	66,7	40	63	16,4	9 ^{+0,15}	31	56	14	20	90
200	101,6	60	63	25,7	14 ^{+0,18}	32	70	18	26	140
250										170

Form D

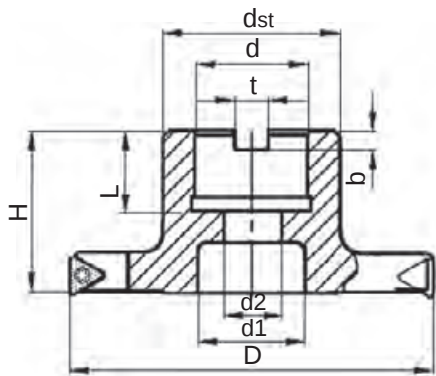


D	D1	d	H	t _{H11}	b _{H12}	L	d1	d2	d3	dst
315										220
400	101,6	60	80	25,7	14 ^{+0,18}	32	70	22	32	240
500										

D2=177,8 d4=18 d5=26 L1=32

Mounting dimensions based for slitting cutters, side and facemills, mm

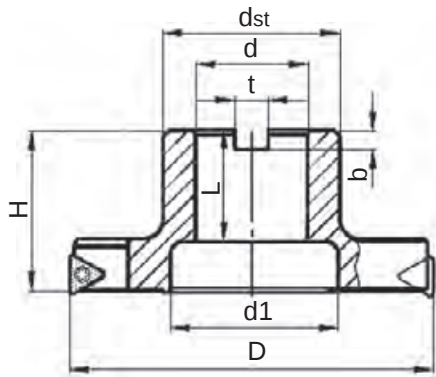
Form A



D	d	H	t _{H11}	b _{H12}	L _{min}	d1 _{min}	d2 _{min}	dst
80	22	40	10,4	6,3	20	18	11	40
100*	27	40	12,4	7	22	20	13	48
125*	32	50	14,4	8	25	27	17	58
160*	40	50	16,4	9	29	32	21	70

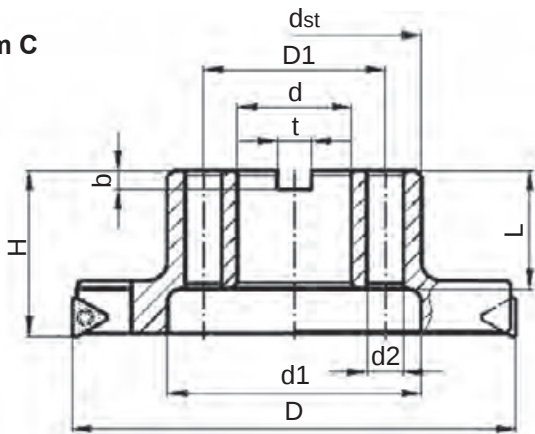
* For mills with internal coolant supply

Form B



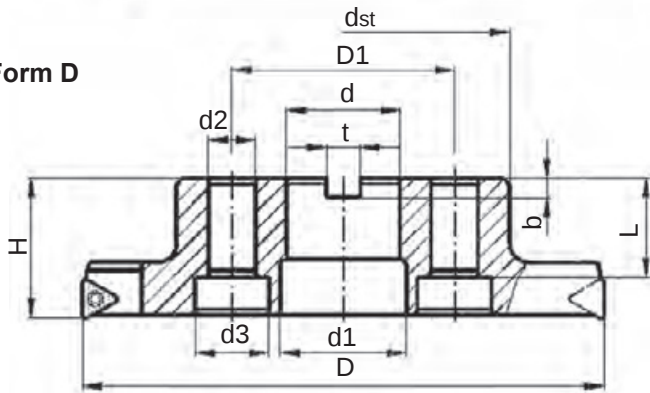
D	d	H	t _{H11}	b _{H12}	L _{min}	d1 _{min}	dst
100	27	34	12,4	7	22	38	48
125	32	38	14,4	8	25	45	58
160	40	43	16,4	9	29	56	70

Form C



D	D1	d	H	t _{H11}	b _{H12}	L	d1 _{min}	d2 _{min}	dst
200	66,7	40	47	16,4	9	31	88	14	96

Form D

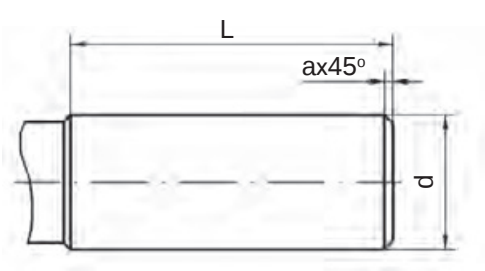


D	D1	d	H	t _{H11}	b _{H12}	L	d1	d2	d3	dst
250 315	101,6	60	50	25,7	14	32	70	18	26	130

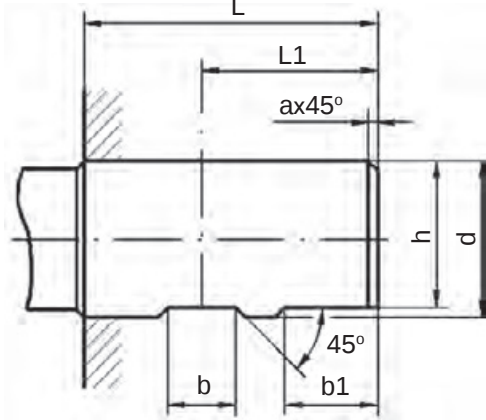
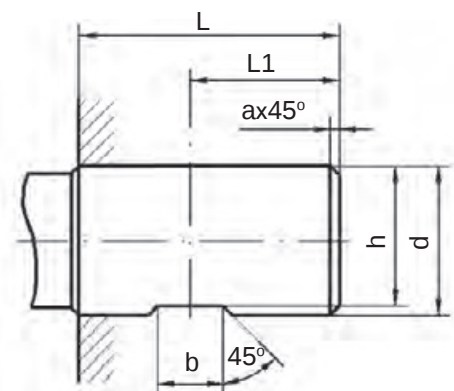
Tool shanks for endmills and long edge endmills, mm

Z - Straight shank DIN 1835 A

d	L	a
^{h6}	⁺² ₀	
8	36	0,8
10	40	1,0
12	45	1,2
16	48	1,6
20	50	2,0
25	56	2,0
32	60	2,0
40	70	2,0
50	80	2,0
63	90	2,0

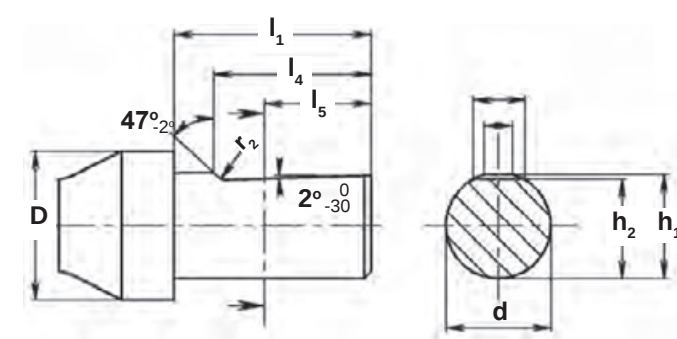


W - Straight shank with drive flat DIN 1835 B



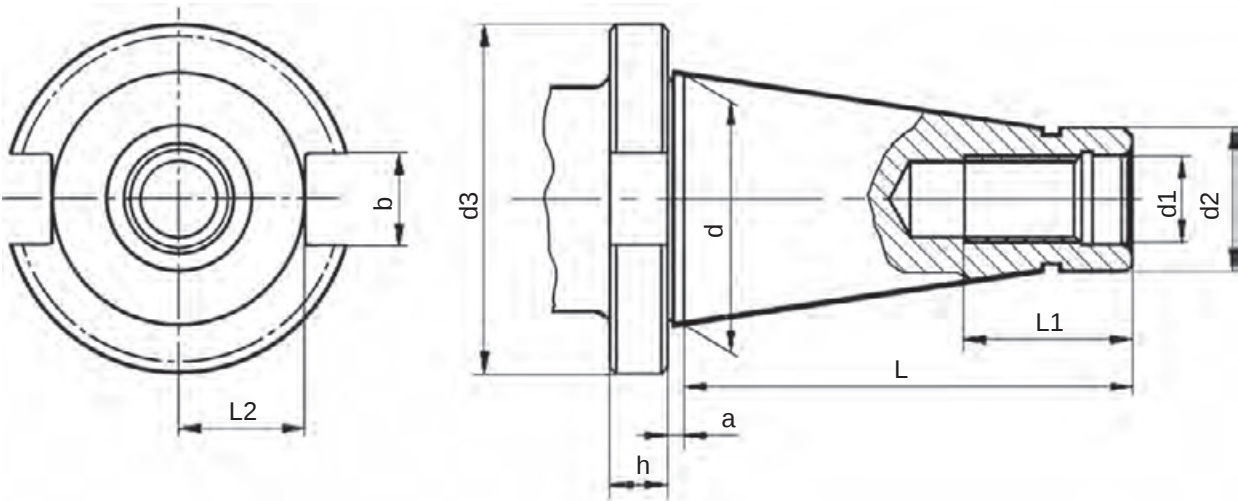
d	h	b	b1	L	L1	a
^{h6}	^{h11}	^{+0,05} ₀	⁺¹ ₀	⁺² ₀	⁰ ₋₁	
8	6,6	5,5		36	18	0,8
10	8,4	7		40	20	1,0
12	10,4	8		45	22,5	1,2
16	14,2	10		48	24	1,6
20	18,2	11		50	25	2,0
25	23,0	12	17,0	56	32	2,0
32	30,0	14	19,0	60	36	2,0
40	38,0	14	19,0	70	40	2,0
50	47,8	18	23,0	80	45	2,0
63	60,8	18	23,0	90	50	2,0

N - Straight shank with sloping clamping surface (Whistle Notch DIN 1835E)



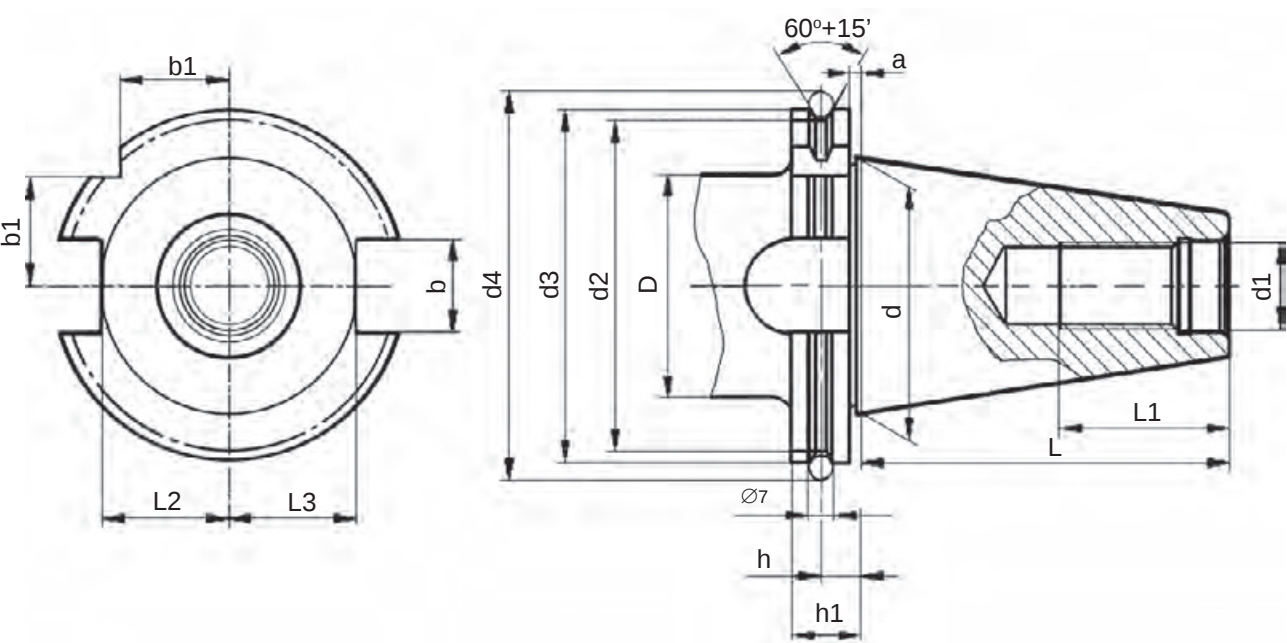
d	h ₂	l ₁ ⁺² ₀	l ₄ ⁰ ₋₁	l ₅	r ₂ min	b ₁	b ₂	h ₁
h6	h13							
6	4,8	36	25	18	1,2	3,5	4,8	5,4
8	6,6	36	25	18	1,2	4,7	6,1	7,2
10	8,4	40	28	20	1,2	5,7	7,3	9,1
12	10,4	45	33	22,5	1,2	6	8,2	11,2
16	14,2	48	36	24	1,6	7,6	10,1	15
20	18,2	50	38	25	1,6	8,4	11,5	19,1
25	23	56	44	32	1,6	9,3	13,6	24,1
32	30	60	48	35	1,6	9,9	15,5	31,2
40	38	70	58	46	1,6	10,5	17,8	39,2

SK - 7/24 taper shank DIN 2080



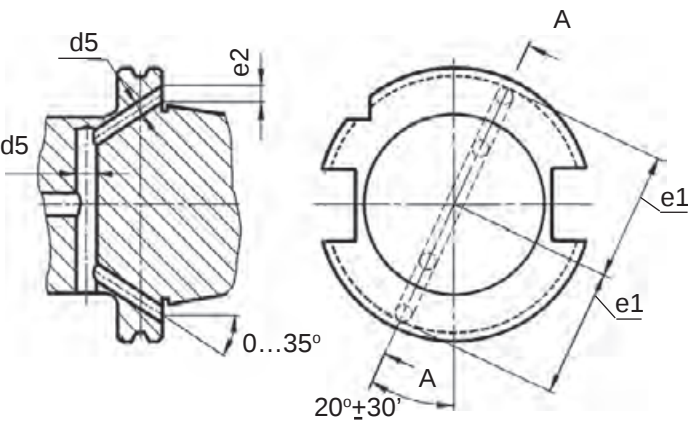
SK	a ^{+0,2} _{-0,2}	b H12	d	d1	d2	d3 ⁰ _{-0,4}	L	L1	L2 max	h ^{+0,15} _{-0,15}
30	1,6	16,1	31,75	M12	17,4	50	68,4	24	16,2	8
40	1,6	16,1	44,45	M16	25,3	63	93,4	32	22,5	10
45	3,2	19,3	57,15	M20	32,4	80	106,8	40	29	12
50	3,2	25,7	69,85	M24	39,6	97,5	126,8	47	35,3	12
60	3,2	25,7	107,95	M30	60,2	156	206,8	59	60	16

NC - 7/24 taper shank DIN 69871 A



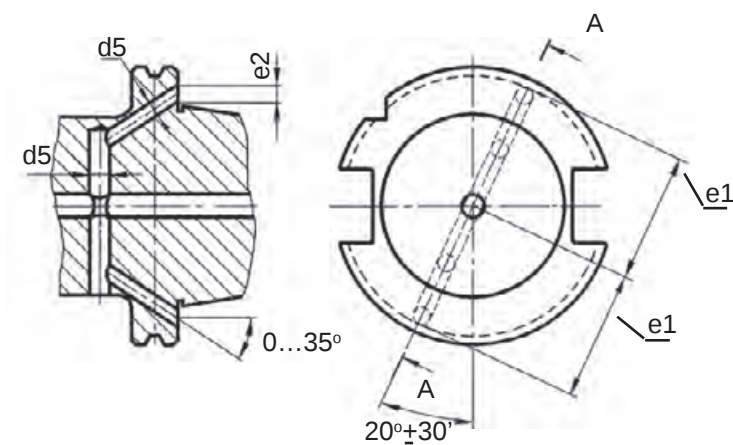
NC	a	b	b1	d	d1	d2	d3	d4	D	h	h1	L	L1	L2	L3
	+0,1 -0,1	H12	0 -0,3			0 -0,5	0 -0,1	+0,05 -0,05	max	+0,1 -0,1	0 -0,1	0 -0,3	min.	0 -0,4	0 -0,4
30	3,2	16,1	15	31,75	M12	44,3	50	59,3	45	11,1	19,1	47,8	24	19	16,4
40	3,2	16,1	18,5	44,45	M16	56,25	63,55	72,3	50	11,1	19,1	68,4	32	25	22,8
45	3,2	19,3	24	57,15	M20	75,25	82,55	91,35	63	11,1	19,1	82,7	40	31,3	29,1
50	3,2	25,7	30	69,85	M24	91,25	97,5	107,25	80	11,1	19,1	101,75	47	37,7	35,5

NC...B - 7/24 taper shank with coolant supply over shoulder DIN 69871 B



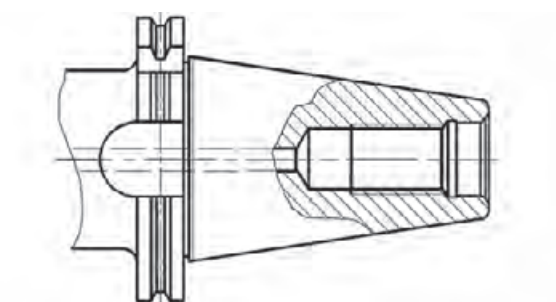
NC	e1	e2	d5
	+0,1 -0,1	max	
30	21	5	4
40	27	5	4
45	35	6	5
50	42	7	6

NC...ADB - 7/24 taper shank with central and over shoulder coolant supply DIN 69871 ADB

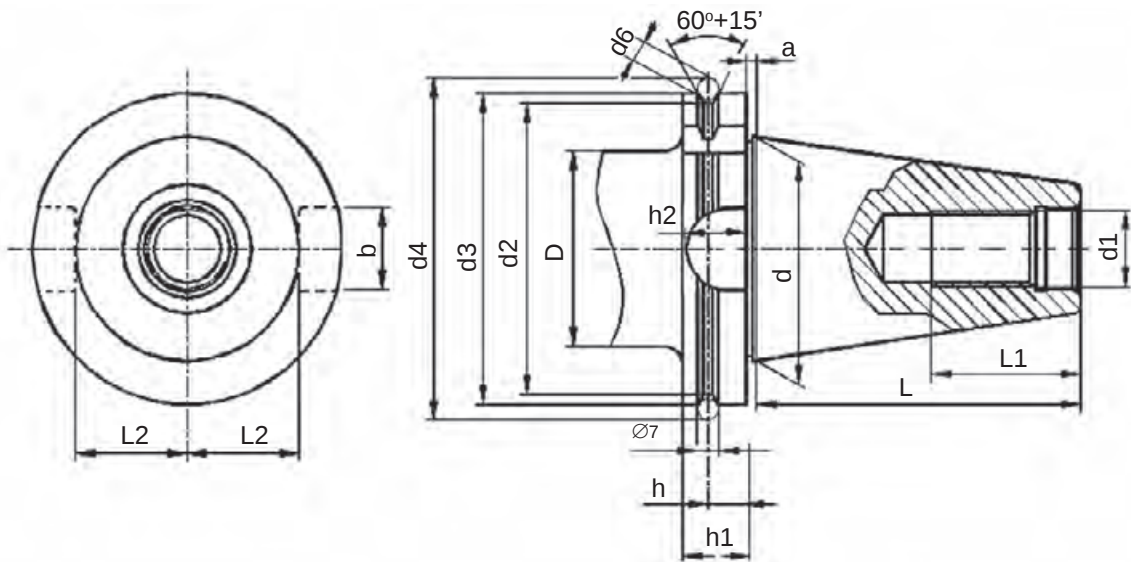


NC	e1 +0,1 -0,1	e2 max	d5
30	21	5	4
40	27	5	4
45	35	6	5
50	42	7	6

NC...AD - 7/24 taper shank with central coolant supply DIN 69871 AD

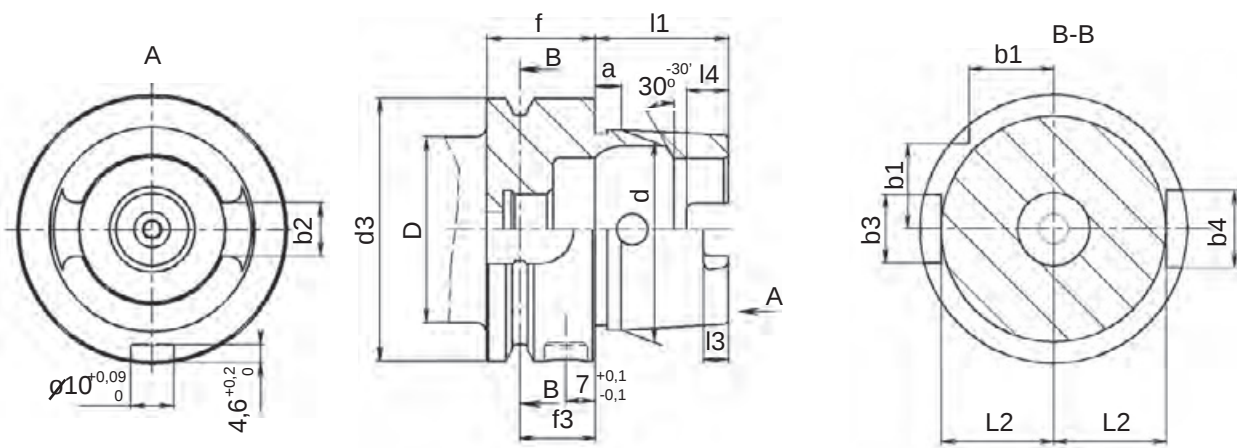


BT - 7/24 taper shank to Japan-Norm (MAS BT 403)



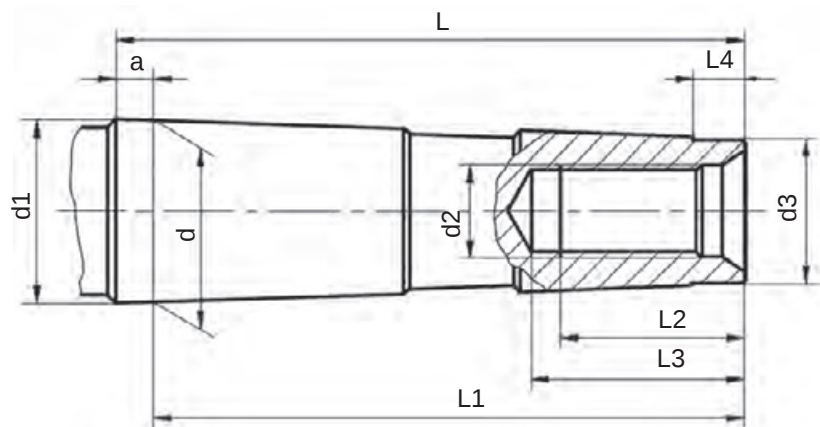
BT	a ^{+0,4 -0,4}	b _{H12}	h2	d	d1	d2 ^{0 -0,5}	d3 ^{0 -0,1}	d4 ^{0 -0,05}	D _{max}	h ^{+0,1 -0,1}	h1 ^{0 -0,1}	L ^{0 -0,3}	L1 _{min}	L2 ^{0 -0,4}	d6
40	2	16,1	21	44,45	M16	53	63	75,68	50	16,6	27	65,4	30	22,6	10
45	3	19,3	26	57,15	M20	73	85	100,22	63	21,2	33	82,8	38	29,1	21
50	3	25,7	31	69,85	M24	85	100	119,02	80	23,2	38	101,8	45	35,4	15

H...A - Taper Hollow Shank HSK DIN 69893 Form A



H...A	a	b1 ^{0 -0,3}	b2 ^{+0,4 -0,4}	b3 _{H10}	b4 _{H10}	d	d3 _{h10}	D _{max}	f ^{0 -0,1}	f3 ^{+0,1 -0,1}	l1 ^{0 -0,2}	L2 ^{0 -0,2}	l3 ^{+0,2 0}	l4 ^{+0,2 0}
63	6,3	20	12,54	16	18	48	63	53	26	18	32	26,5	6	10
80	8	25	16,04	18	20	60	80	67	26	18	40	34	8	12
100	10	31,5	20,02	20	22	75	100	85	29	20	50	44	10	15
125	12,5	39,5	25,02	25	28	95	125	105	29	20	63	55,5	12	19
160	16	50	30,02	32	36	120	160	130	31	22	80	72	16	23

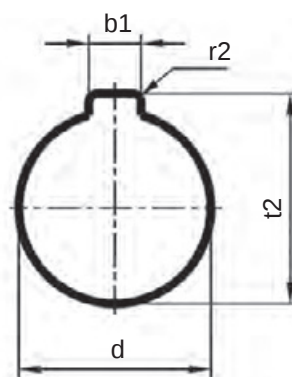
MK - Morse taper shank with draw-bar thread DIN 228 A



MK	d	d1	d2	d3	a	L	L1	L2	L3	L4
						max	max	min	min	
0	09,045	9,2	-	6,4	$3,0^{+1,2}$	53	50	-	-	4
1	12,065	12,2	M6	9,4	$3,5^{+1,4}$	57	53,5	16	22	5
2	17,780	18	M10	14,6	$5,0^{+1,4}$	69	64	24	31,5	5
3	23,825	24,1	M12	19,8	$5,0^{+1,7}$	86	81	24	33,5	7
4	31,267	31,6	M16	25,9	$6,5^{+1,9}$	109	102,5	32	42,5	9
5	44,399	44,7	M20	35,7	$6,5^{+1,9}$	136	129,5	40	52,5	10
6	63,348	63,8	M24	53,9	$8,0^{+2,3}$	190	182	47	61,5	16

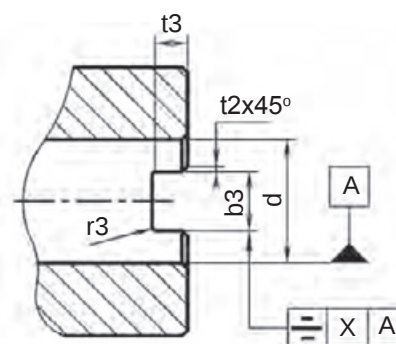
Disk mills with standard keyway to (type "S") DIN 138

d	b1 C11	t2	r2
13	3	$14,6 +0,1$	$0,6 -0,2$
16	4	$17,7 +0,1$	$0,6 -0,2$
22	6	$24,1 +0,2$	$1,0 -0,3$
27	7	$29,8 +0,2$	$1,0 -0,3$
32	8	$34,8 +0,2$	$1,2 -0,3$
40	10	$43,5 +0,2$	$1,2 -0,3$
50	12	$53,6 +0,2$	$1,6 -0,3$
60	14	$64,2 +0,2$	$1,6 -0,3$

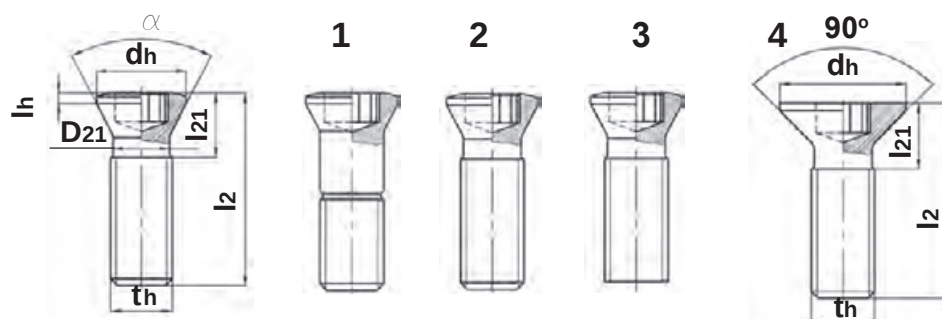


Disk mills with drive slot to (type "F") DIN 138

d	b3 H11	t3 H12	r3	t2	X
13	8,4	5	$1,0 -0,2$	$0,5 +0,2$	0,2
16	8,4	5,6	$1,0 -0,3$	$0,6 +0,2$	0,2
22	10,4	6,3	$1,2 -0,3$	$0,6 +0,2$	0,2
27	12,4	7	$1,2 -0,3$	$0,8 +0,2$	0,2
32	14,4	8	$1,6 -0,4$	$0,8 +0,2$	0,2
40	16,4	9	$2,0 -0,5$	$1,0 +0,3$	0,2
50	18,4	10	$2,0 -0,5$	$1,0 +0,3$	0,2
60	20,5	11,2	$2,0 -0,5$	$1,0 +0,3$	0,2



Insert screw dimensions and torque values



N	Code key screw	Type Screw	Size screw, mm							Torx
			th	lh	l21	dh	D21	l2	α°	
1	T200355-06	2	M2,0-5h	0,3	1,9	2,7	-	3,3	55	T6
2	T200460-06	2	M2,0-5h	0,3	1,9	2,7	-	3,3	60	T6
3	T220455-07	2	M2,2-5h	0,3	1,8	2,8	-	4,2	55	T7P
4	T250555-08	2	M2,5-5h	0,3	2,5	3,5	-	5,5	55	T8
5	T250555-08AP	2	M2,5-5h	0,3	2,5	3,5	-	5,5	55	T8P
6	T250540-7S	1	M2,5-5h	0,5	3,5	3,0	-	5,2	40	T7
7	T250640-7S	1	M2,5-5h	0,5	4,0	3,0	-	6,2	40	T7
8	T250655-08AP	2	M2,5-5h	0,3	2,5	3,5	-	6,0	55	T8P
9	T300490-07	4	M3-5h	0,3	2,0	5,0	-	4,3	90	T7
10	T300755-08	2	M3-5h	0,3	2,9	4,2	-	7,3	55	T8
11	T350760-10	2	M3,5-5h	0,7	4,7	5,0	3,0	9,2	60	T10P
12	T400860-15S	1	M4-5h	0,7	5,0	5,2	-	8,5	60	T15
13	T400590-15	4	M4-5h	0,3	2,5	6,3	-	5,2	90	T15
14	T400655-15	2	M4-5h	0,7	4,0	5,8	-	6,5	55	T15
15	T400790-15	4	M4-5h	0,3	2,5	6,3	-	7,4	90	T15
16	T400890-15	4	M4-5h	0,3	2,5	6,3	-	8,4	90	T15
17	T400755-15	2	M4-5h	0,7	3,4	5,8	3,5	7,5	55	T15
18	T400855-15	2	M4-5h	0,3	2,5	6,3	-	8,0	55	T15
19	T400955-15	2	M4-5h	0,7	4,2	5,8	3,5	9,0	55	T15
20	T450955-20	2	M4,5-5h	1,0	4,0	6,6	-	8,0	55	T20
21	T451155-20	2	M4,5-5h	0,8	4,7	6,6	4,0	11,5	55	T20
22	T451455-20	2	M4,5-5h	0,8	4,7	6,6	4,0	14,0	55	T20
23	T501060-20S	1	M5-5h	1	6,0	6,7	-	10,0	60	T20
24	T501160-20S	1	M5-5h	1	7,0	6,7	-	11,5	60	T20
25	T501360-20S	1	M5-5h	1	7,0	6,7	-	13,0	60	T20
26	T501455-20Im	1	M5-5h	1	7,0	6,7	-	14,0	60	T20
27	T501560-20S	1	M5-5h	1	10,1	7,9	-	15,4	60	T20
28	T501490-20	1	M5-5h	1	7,0	6,7	-	14,0	60	T20
29	T501855-15	1	M5-5h	1	7,0	6,7	-	18,0	55	T15
30	T602060-20S	1	M6-6h	2,0	14,5	9,5	-	20,3	60	T20
31	H601890-40	4	M6-6h	0,5	7,0	12,7	6,5	18,0	90	H40
32	H602000-50	*	M6-6h	-	-	10,0	-	20,0	0	H50
33	H601400-30	***	M6-6h	-	-	M6	-	***	0	H30
34	H601500-30	***	M6-6h	-	-	M6	-	***	0	H30
35	H601600-30	***	M6-6h	-	-	M6	-	***	0	H30
36	H601700-30	***	M6-6h	-	-	M6	-	***	0	H30
37	T802560-30S	1	M8-6h	2,5	18,3	11,9	-	24,7	60	T30
38	H801160-30S	****	M8-6h	-	-	M8	-	****	0	H30
39	H801360-30S	****	M8-6h	-	-	M8	-	****	0	H30
40	H801560-30S	****	M8-6h	-	-	M8	-	****	0	H30

* -Cartridge screw for facemills with cartridges.

**** -Adjusting screw

*** -Cartridge screw for half side and facemills with cartridges.

Recommended screw tightening torque

Screw for insert and cartridge	ADD Milling tools	Tightening torque, Nm
T200355-06	...RD05	0,7
T220455-07	...AD08, ...WN06, ...SOMT05	1,0
T250555-08	...AP10, ...RD08, ...CC06, ...SP06, ...ZO06, ...ZP05, ...ZP06, ...XO10, ...XO14, MT100L...XO D12, D=16	1,2
T250555-08AP	...AD10	1,6
T250555-08AP	...AD10-AL	1,8
T250655-08AP	...SOMT07	1,2
T250755-08	...OF03	1,6
T250540-07S	MT100LS...RB06	1,0
T250640-07S	MT100LS...RB08	1,0
T300390-07	MT389 B=4	2,0
T300490-07	MT389 B=5	2,0
T300755-08	...RP10, ...SD0903..., ...XD09, ...RN10, ...MO, ...WN08, SOMT08	1,2
T350760-10	...BO12, ...SO09, MT100L...XO17 D=20	3,0
T400590-15	MT389 B=6, B=7	3,2
T400690-15	MT389 B=8	3,2
T400890-15	MT389 B=9-12	3,2
T400655-15	MT390...SD09	3,2
T400755-15	MT390...AD15, ...SD09T3, ...ZO09	3,2
T400955-15	...AD15, ...AD16, ...RN12, ...RP12, ...SOMT10 MT100L D=32-40, MT100L...XO22 D=25	4,5
T400955-15A	...XDXH19... ...XDHT19...	5,0 6,0
T401155-15	...LN11, ...LN14, ...SNCU12T5, ...PN10	3,2
T400860-15S	MT100LS...RB10	3,2
T450855-20	MT390...SD12, ...TP22	5,0
T451155-20	...RP16 ...SD12M4, ...SD12X4 MT215...ZO, MT215K...ZO12, MT115...ZO12 MT100L...ZP12 D=50	5,0
T451455-20	...SNGQ1207	5,0
T501155-20	...RP20, MT100L...XO D=30-32	5,0
T501155-20Im	...AD19	5,0
T501455-20	... OO06, ...XOHT0606, MT200S...LN19, ...SO16	5,0
T501855-15	... LN24	5,0
T501060-20S	MT100LS...RB12	6,0
T501160-20S	MT100LS...RB14	6,2
T501360-20S	MT100LS...RB16	6,2
T501560-20S	MT100LS...RB20	6,2
T601260-20S	MT100LS...RB25	6,5
T802560-30S	MT100LS...RB32	7,0
H601890-4	MT260...SN25	6,0
H602000-50	Cartridge screw	16,0
H601400-30D	MT245KC...MT290KC (Clamp screw)	9,0
H601400-30	MT390...SD09 (Cartridge screw)	9,0
H601500-30	MT390...SD09...CC06 (Cartridge screw)	9,0
H601600-30	MT390...SD12, ...AD15 (Cartridge screw)	9,0
H601700-30	MT390...TP22 (Cartridge screw)	9,0

