WIN WITH WIDIA™

WIDIA M370™ Series

The M370 Series combines the latest in insert technology with outstanding performance and reliability, providing you with security and optimal metal removal rates at an efficient cost per edge.

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WIDIA™

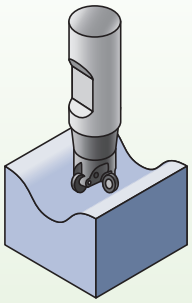
For High-Feed Applications • **M370 Series**

Designed for high-feed-rate productivity, M370 Series provides the latest insert technology with an outstanding performance and reliability. Its double-sided concept and six cutting edges provide you with security and optimal metal removal with an efficient cost per edge.

- Double-sided design offers six cutting edge per insert.
- Extremely high metal removal rates.
- First choice for high-feed roughing applications.

M370

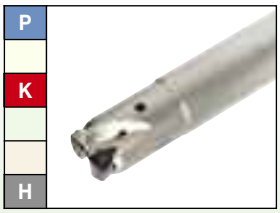
Copy Mills

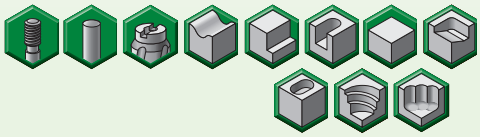


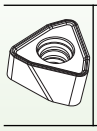
M370

Max. depth of cut: 1,25mm

Diameter: 25mm–66mm





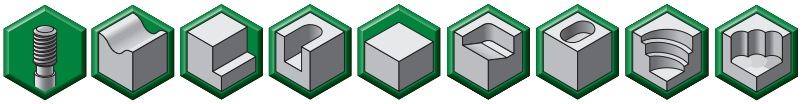
Insert Geometry		Recommended Use
	MH	First choice for high-feed roughing in steel and cast iron materials

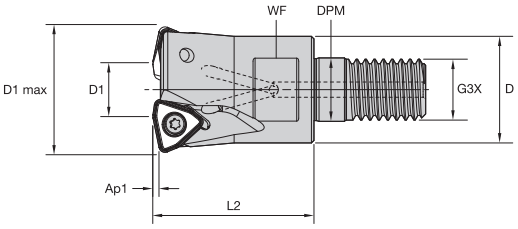
M370 Application Example:

- Application: pocketing and face milling
- Material: 1.2311
- Component: injection mould
- Holder: 80mm
- Workpiece dimensions: 400mm x 300mm x 400mm

Tool:	Diameter 32; M370D032Z04M16WO08
Insert:	W0EJ080412SRMH TN6525
vc:	200 m/min
fz:	1,5mm per tooth
Ap:	0,5mm
Ae:	80–100%
vf:	12.000 mm/min
Coolant:	MQL
Comment:	25% higher tool life versus 3-edged, single sided competitor, plus M370 offered 2X the number of edges with our unique double sided design!

- Double sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





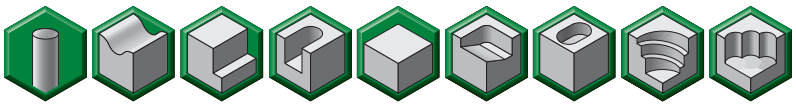
M370

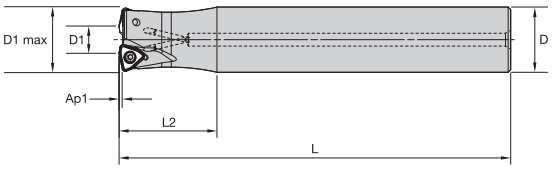
order number	catalogue number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	kg
4056186	**M370D025Z02M12WO08**	25	11	21	12,5	M12	35	17	1,2	2	46000	Yes	0,09
4056187	**M370D032Z04M16WO08**	32	18	29	17,0	M16	43	24	1,2	4	38700	Yes	0,21
4056188	**M370D042Z05M16WO08**	42	28	29	17,0	M16	43	24	1,2	5	32500	Yes	0,26

M370 • Spare Parts

D1 max	insert screw	Nm	Torx driver
25	**MS1966**	1,1	**12148086600**
32	**MS1966**	1,1	**12148086600**
42	**MS1966**	1,1	**12148086600**

- Double sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.





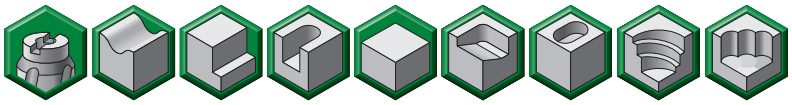
M370

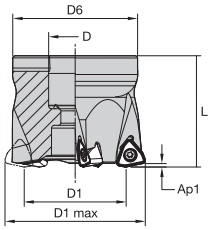
order number	catalogue number	D1 max	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	kg
4008281	**M370D025Z02A25WO08L200**	25	11	25	200	50	1,2	2	46000	Yes	1,37
4056189	**M370D025Z03A25WO08L150**	25	11	25	150	40	1,2	3	46000	Yes	0,50
4056190	**M370D028Z03A25WO08L200**	28	14	25	200	40	1,2	3	42400	Yes	1,42
4056191	**M370D032Z04A32WO08L150**	32	18	32	150	40	1,2	4	38700	Yes	0,84
4056192	**M370D032Z04A32WO08L200**	32	18	32	200	50	1,2	4	38700	Yes	1,14

M370 • Spare Parts

D1 max	insert screw	Nm	Torx driver
25	**MS1966**	1,1	**12148086600**
28	**MS1966**	1,1	**12148086600**
32	**MS1966**	1,1	**12148086600**

- Double sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.



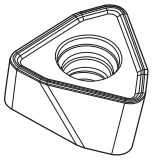


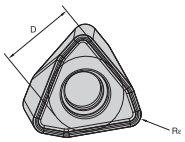
M370

order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	kg
4056193	**M370D040Z04WO08**	40	26	16	37	40	1,2	4	33500	Yes	0,19
4008276	**M370D050Z05WO08**	50	36	22	44	40	1,2	5	29200	Yes	0,65
4056194	**M370D052Z05WO08**	52	38	22	44	40	1,2	5	28600	Yes	0,32
4056195	**M370D063Z06WO08**	63	49	27	60	50	1,2	6	25500	Yes	0,70
4008277	**M370D066Z06WO08**	66	52	27	60	50	1,2	6	24900	Yes	0,77

M370 • Spare Parts

D1 max	insert screw	Nm	Torx driver	socket-head cap screw	socket-head-cap screw with cool groove	mounting screw
40	**MS1966**	1,1	**12148086600**	**–**	**MS1294CG**	**125.825**
50	**MS1966**	1,1	**12148086600**	**12146120500**	**12146101000**	**–**
52	**MS1966**	1,1	**12148086600**	**12146120500**	**12146101000**	**–**
63	**MS1966**	1,1	**12148086600**	**MS2038**	**MS2038CG**	**–**
66	**MS1966**	1,1	**12148086600**	**MS2038**	**MS2038CG**	**–**





WOEJ-MH

● first choice
○ alternate choice

P			●	●		
M						
K		●	○	○		
N						
S						
H			○			

catalogue number	cutting edges	D	S	Rε	TN5515	TN6525	TN6540
WOEJ080412SRMH	6	7,79	4,75	1,22	●	●	●

M370 Application Example:

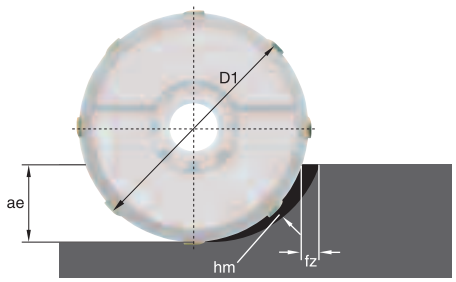
- Application: pocketing
- Material: 1.2311
- Component: injection mould
- Holder: 200mm

Tool:	Diameter 66; M370D066Z06M16WO08
Insert:	W0EJ080412SRMH TN6540
vc:	180 m/min
fz:	1,66mm/Fz
Ap:	0,5mm
Ae:	Variable
vf:	8.700 mm/min
Coolant:	Air
Comment:	35% higher MRR versus previous conventional high-feed tooling. With lower cost per edge due to the double side concept.

		TN5515			TN6525			TN6540		
Edge Geometry		feed per tooth fz (mm)								
...-MH		0,35	**1,10**	2,00	0,35	**1,00**	2,00	0,35	**1,10**	2,00
Material Group		vc (m/min)								
P	1				350	**270**	230	290	**220**	190
	2				240	**180**	160	200	**150**	130
	3				200	**150**	130	170	**130**	110
	4				210	**160**	130	170	**130**	110
	5				170	**130**	110	140	**100**	90
	6				230	**170**	140	190	**140**	120
	7				170	**130**	120	140	**110**	100
	8				150	**120**	100	130	**100**	80
	9				130	**100**	80	110	**80**	60
	10				170	**140**	130	140	**120**	100
	11				120	**90**	70	100	**70**	60
	12				220	**170**	140	180	**140**	120
	13.1				190	**140**	120	160	**120**	100
	13.2				100	**70**	60	80	**60**	50
M	14.1									
	14.2									
	14.3									
	14.4									
K	15	530	**390**	280	—	**—**	—	—	**—**	—
	16	410	**310**	230	—	**—**	—	—	**—**	—
	17	460	**310**	230	240	**180**	160	200	**150**	130
	18	300	**220**	170	200	**150**	130	170	**130**	110
	19	370	**290**	220	—	**—**	—	—	**—**	—
	20	310	**230**	180	—	**—**	—	—	**—**	—
N	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									
S	31									
	32									
	33									
	34									
	35									
	36									
	37									
H	38.1				120	**90**	70			
	38.2									
	39.1									
	39.2									

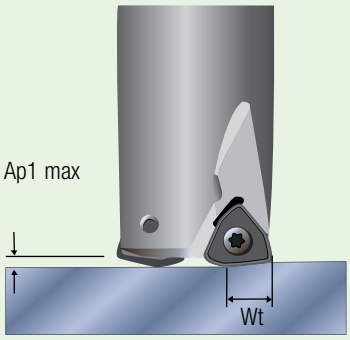
*First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0,4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0,2	0,3	0,4
fz-Factor	1,5	1,3	1,0
vc-Factor	1,3	1,2	1,1

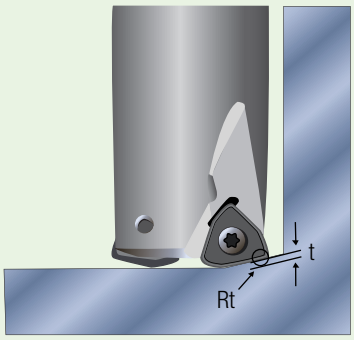


Applying High-Feed Tools

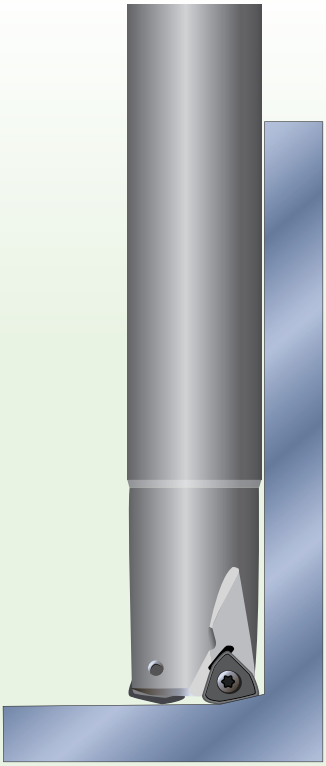
The high-feed concept bases its strategy in small depth of cut and higher fz values, which result in a higher MRR and productivity with low radial forces.



Small Ap1 values and higher feed rates generate lower cutting forces versus traditional milling strategies.



For CAM programming, the tools can be programmed as a toroidal tool type by using the Rt value as the insert radius.



Recommended when long overhang is necessary due to lower radial forces. Maximum L/D ratio of 10 x D.

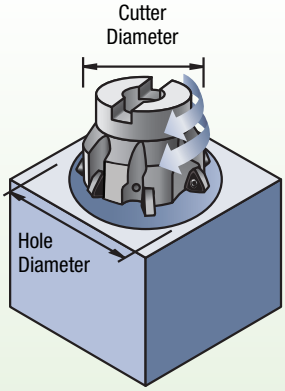
General Programming Information for Applying M370

L/D ratio	starting Ap1	starting fz range
<3	0,9mm	1mm–1,3mm
>3 to <5	0,6mm	1mm–1,3mm
>5 to <7	0,4mm	0,6mm–1mm

Rt	t	Wt
2,5mm	1mm	7,5mm

Maximum Linear Ramping and Helical Interpolation from Solid

cutter diameter	max. linear ramp angle (straight line)	min. hole diameter	max. hole diameter	Ap1 max. per revolution
25	3,1°	30,2	49,5	1,25
28	2,6°	36,1	55,5	1,25
32	2,9°	44,1	63,5	1,25
40	1,6°	60,0	79,5	1,25
42	1,5°	64,0	83,5	1,25
50	1,3°	80,0	99,5	1,25
52	1,2°	84,0	103,5	1,25
63	1,0°	106,0	125,5	1,25
66	0,9°	112,0	131,5	1,25



DIN ISO 513	VDI 3323	Material		Condition	Rm N/mm²	Hardness HB 30	Examples
P	1	Unalloyed steel/cast steel	C < 0,25%	G	420	125	9 SMn 28, St 37.3, C 10, Ck 22, GS-16 Mn 5
	2		0,25 ≤ C < 0,55%	G	650	190	35 S 20, GS-45, GS-52, St 52.3, C 25, C 45, Ck 45, Cf 53
	3	Free cutting steel		V	850	250	35 S 20, GS-45, GS-52, St 52.3, C 25, C 45, Ck 45, Cf 53
	4		0,55% ≤ C	G	750	220	GS-60, 60 S 20, C 60, Ck 67, C 60 W, Ck 75, C 105 W 1, C 110 W
	5			V	1000	300	GS-60, 60 S 20, C 60, Ck 67, C 60 W, Ck 75, C 105 W 1, C 110 W
	6	Low-alloyed steel/cast steel		G	600	180	15 Cr 3, 16 MnCr 5, 17 CrNiMo 6, 25 CrMo 4, 29 CrMoV 9, 30 CrNiMo8
	7			V	930	275	31 CrV 3, 42 CrMo 4, 51 CrV 4, 62 SiMnCr 4, 100 Cr 6, G-105 W 1,
	8			V	1000	300	105 WCr 6
	9			V	1200	350	105 WCr 6
	10	High-alloyed steel/cast steel		G	680	200	X 210 Cr 12, X 40 CrMoV 5 1, X 30 WCrV 9 3, X 85 CrMoV 18 2,
	11	Tool steel		V	1100	325	X 38 CrMoV 5 3, X 23 CrNi 17, X 155 CrVMo 12 1, S 6-5-2-5
	12	Stainless steel/cast steel		FE/MA	680	200	1.4000, 1.4005, 1.4021, 1.4109, 1.4119, 1.4120, 1.4313, 1.4510, 1.4512, 1.4523
	13.1			MA	820	240	1.4000, 1.4002, 1.4005, 1.4006, 1.4024, 1.4119, 1.4120, 1.4313, 1.4510, 1.4512, 1.4523
	13.2			MA-PH	1060	330	1.4542, 1.4548, 1.4923
M	14.1	Stainless steel/cast steel		AU	600	180	1.4301, 1.4401, 1.4436, 1.4541, 1.4550, 1.4568, 1.4571, 1.4573, 1.4580
	14.2			DU	740	230	1.4362, 1.4417, 1.4410, 1.4460, 1.4462, 1.4575, 1.4582
	14.3			S-AU	680	200	1.4465, 1.4505, 1.4506, 1.4529 (254SMO), 1.4539, 1.4563, 1.4577, 1.4586, 654SMO
	14.4			AU-PH	1060	330	1.4504, 1.4568
K	15	Grey iron GG		FE/PE		180	GG-10, GG-15, GG-170 HB
	16			PE		260	GG20, GG-25, GG-30, GG-25Cr
	17	Nodular iron GGG		FE		160	GGG-35.3, GGG-40, GGG-50, GGV-30
	18			PE		250	≥GGG-60, GGV-40
	19	Malleable iron GTS/GTW		FE		130	GTS-35-10, GTS-45-06, GTW-S-38-12
	20			PE		230	GTW-35-04, GTS-55-04, GTS-65-02
N	21	Wrought aluminium alloys		NAG		60	Al 99,5, AlMg 1
	22			AG		100	AlCuMg 1, AlMgSiPb, AlMgSi 1
	23	Cast aluminium alloys	Si < 12%	NAG		75	G-AlSi 10 Mg, G-AlSi12
	24			AG		90	G-AlCu 5 Si 3
	25		Si > 12%			130	G-AlSi 17, G-AlSi 23
	26	Copper/copper alloys	Pb > 1%			110	Free cutting brass, CuNi 18 Zn 19 Pb
	27					90	Brass, red brass, CuZn33, CuZn-/CuSnZn-alloys
	28					100	Bronze, electrolytic copper, CuNi 3 Si, CuSn-alloys
	29	Non-metals					Thermosetting plastics, FVK, Fibre reinforced plastics, Bakelit
	30						Hard rubber
S	31	High-temperature alloys	Fe-based	G		200	1.4864, 1.4865, 1.4876
	32			AG		280	1.4864, 1.4865, 1.4876
	33		Ni-/Co-based	G		250	INCONEL® 718, Nimonic 80 A, Hasteloy, Udimet
	34			AG		350	INCONEL 718, Nimonic 80 A, Hasteloy, Udimet
	35			GO		320	INCONEL 718, Nimonic 80 A, Hasteloy, Udimet
	36	Titanium/titanium alloys, Alpha-/Beta-alloys			400		Titanium
	37			AG	1050		TiAl 6 V 4
H	38.1	Steel		H		45 HRC	90 MnV 8, Hardox 400
	38.2			H		55 HRC	Hardox 500
	39.1			H		60 HRC	HSS, 90 MnV 8
	39.2			H		> 62 HRC	HSS, 90 MnV 8
	40.1	Chilled cast iron		GO		400	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42
	40.2			GO		> 440	G-X 260 Cr 27, G-X 260 NiCr 42, G-X 300 CrNiSi 9 5 2, G-X 330 NiCr 42
	41.1	Cast iron		H		55 HRC	G-X 300 NiMo 3 Mg
	41.2			H		> 57 HRC	G-X 300 NiMo 3 Mg

Material Groups and Condition

Many materials — mostly steels — can be available in various microstructures that differ in their machinability significantly. Those materials are part of several material groups depending on their actual conditions.

AG — Aged
AU — Austenitic
BF — Heat treated to specified strength
BG — Heat treated to specified microstructure
BY — Heat treated to improved machinability
DU — Stainless steel duplex (austenitic-ferritic)
FE — Ferritic
G — Annealed
GG — Grey cast iron
GGG — Nodular cast iron
GO — Cast
H — Hardened
MA — Martensitic
N — Normalised
NAG — Non-aged (non-aging)
PH — Precipitation hardened
S-AU — Superaustenitic
U — Untreated
V — Heat treated
var1 — Variable

M370 SERIES

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