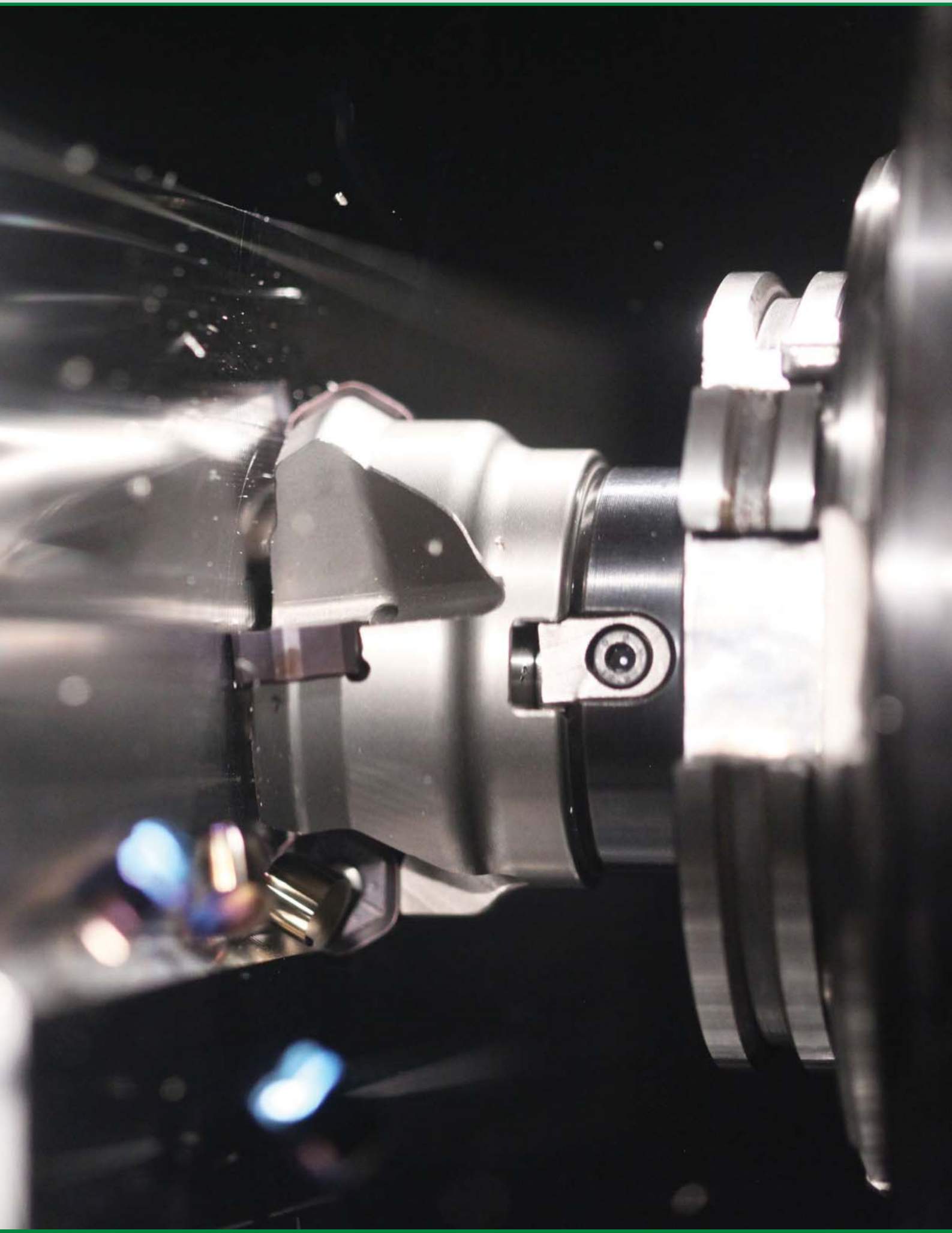


Indexable Milling

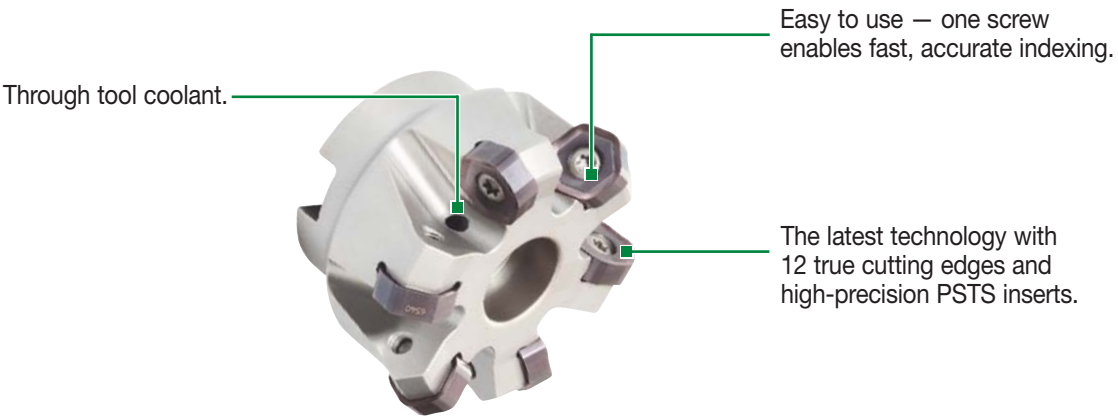
One Series Meets Every Face Milling Need •
WIDIA M1200 Mini

For consistent performance, look no further than the WIDIA M1200 Mini. This easy-to-use product ensures great tool life, reduced machining time, and maximum productivity.

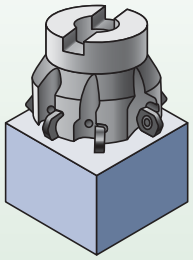
WIDIA VICTORY
Win with WIDIA™

M1200 Mini

- Low cost per edge and high productivity.
- 25% lower cutting forces due to soft cutting action.
- Up to 30% increased Metal Removal Rates (MRR).
- M1200 Mini 15°, 45°, and 60° lead.
- WIDIA premium milling grades.
- Up to 35% better tool life from light to heavy machining.
- Up to 40% shorter machining cycle time.



Face Mills

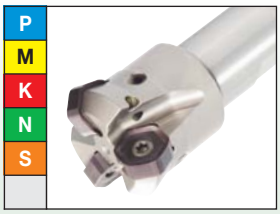


Victory™ M1200 Mini

Max depth of cut: .185"

Indexes per insert: 12
Diameter: 1–5"

Pages: B4–B21



Insert Geometry		Recommended Use
	LDJ	First choice for aluminum and non-ferrous machining. Periphery ground with polished rake face.
	LD	First choice for light machining and machining stainless steels.
	32LD	Optimization for light machining when greater corner protection required. Strong corner radius in place of wiper facet.

Insert Geometry		Recommended Use
	GD	First choice for general machining in steel and cast iron. Best option for general-purpose use.
	HD	First choice for heavy machining.
	32HD	Optimization for heavy machining when greater protection required. Strong corner radius in place of wiper facet.
	LDJ3W	Wiper insert for finishing aluminum and non-ferrous materials.
	LD3W	Wiper insert for finishing steel, stainless steel, and cast iron.

M1200 Mini High-Feed

12 True Cutting Edges

15° Lead

Insert HNGJ0704
HNPJ0704

Ap1 max = .068"

M1200 Mini HF can be loaded with all M1200 Mini standard inserts, except wiper inserts.

M1200 Mini 45°

12 True Cutting Edges

45° Lead

Insert HNGJ0704
HNPJ0704

Ap1 max = .138"

Best in class leader in face milling up to Ap1 max = .138". Excellent choice for near net shape strategies and driven tools.

M1200 Mini HD 60°

12 True Cutting Edges

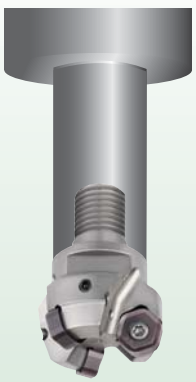
60° Lead

Insert HNGJ0704
HNPJ0704

Ap1 max = .185"

Achieve a higher axial depth-of-cut capabiltiy up to Ap1 = .185" with standard M1200 Mini inserts.

M1200 Mini HF High-Feed

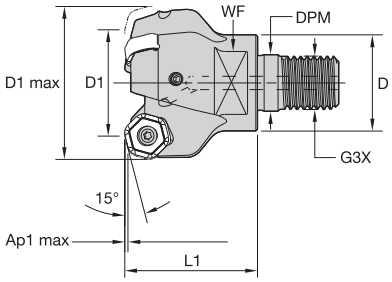


First choice for long reach face milling applications or light fixtures.

Chip thinning effect due to lead angle 14.5°. Tremendous enlargement of feed rate and MRR.

Up to 40% shorter machining cycle time.

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- High-Feed capability.



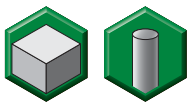
M1200 Mini HF High Feed • Screw-On

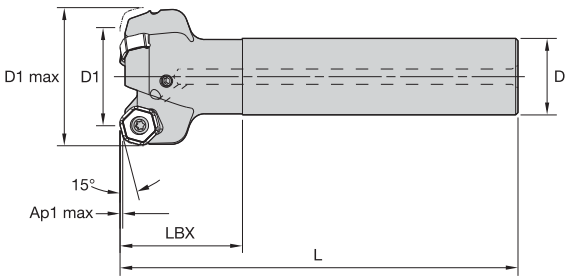
order number	catalog number	D1	D1 max	D	DPM	G3X	L1	WF	Ap1 max	Z	max RPM	coolant supply	lbs
4136437	**M1200HF100Z02M16HN07**	1.000	1.556	1.142	.669	M16	1.250	.866	.068	2	19800	Yes	.39
4136438	**M1200HF100Z03M16HN07**	1.000	1.556	1.142	.669	M16	1.250	.866	.068	3	19800	Yes	.36
4136439	**M1200HF125Z03M16HN07**	1.250	1.807	1.142	.669	M16	1.500	.866	.068	3	17600	Yes	.52
4136440	**M1200HF125Z04M16HN07**	1.250	1.807	1.142	.669	M16	1.500	.866	.068	4	17600	Yes	.53
4136441	**M1200HF150Z04M16HN07**	1.500	2.057	1.142	.669	M16	1.500	.866	.068	4	15800	Yes	.65
4136442	**M1200HF150Z05M16HN07**	1.500	2.057	1.142	.669	M16	1.500	.866	.068	5	15800	Yes	.66

Spare Parts

D1	insert screw	in.lbs.	Torx driver
1.000	**12146034500**	31	**12148082400**
1.250	**12146034500**	31	**12148082400**
1.500	**12146034500**	31	**12148082400**

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- High-Feed capability.





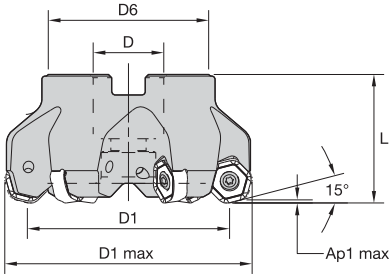
M1200 Mini HF High Feed • Cylindrical Shank

order number	catalog number	D1	D1 max	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
4136453	**M1200HF100Z02C075HN07L480**	1.000	1.556	.750	4.800	1.250	.068	2	19800	Yes	.73
4136454	**M1200HF100Z03C075HN07L480**	1.000	1.556	.750	4.800	1.250	.068	3	19800	Yes	.69
4136455	**M1200HF125Z03C100HN07L520**	1.250	1.807	1.000	5.200	1.500	.068	3	17700	Yes	1.28
4136456	**M1200HF125Z04C100HN07L520**	1.250	1.807	1.000	5.200	1.500	.068	4	17700	Yes	1.29

Spare Parts

D1	insert screw	in.lbs.	Torx driver
1.000	**12146034500**	31	**12148082400**
1.250	**12146034500**	31	**12148082400**

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- High-Feed capability.

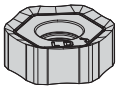


M1200 Mini HF High Feed • Shell Mills

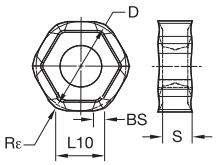
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136457	**M1200HF150Z05S050HN07**	1.500	2.057	.750	1.440	1.575	.068	5	15800	Yes	.57
4136458	**M1200HF200Z05S075HN07**	2.000	2.557	.750	1.750	1.575	.068	5	12500	Yes	1.12
4136459	**M1200HF250Z06S075HN07**	2.500	3.056	.750	1.750	1.575	.068	6	10000	Yes	1.48
4136460	**M1200HF300Z08S100HN07**	3.000	3.556	1.000	2.189	1.750	.068	8	8300	Yes	2.32

Spare Parts

D1	insert screw	in.lbs.	Torx driver
1.500	**12146034500**	31	**12148082400**
2.000	**12146034500**	31	**12148082400**
2.500	**12146034500**	31	**12148082400**
3.000	**12146034500**	31	**12148082400**



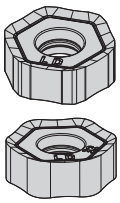
HNGJ-LDJ



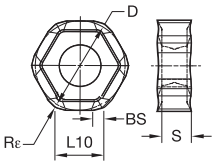
● first choice
○ alternate choice

P	M	K	N	S	H
			●		
			●		

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6501	THM-U
HNGJ0704ANFNLDJ	12	.500	.268	.176	.064	.047	.003	●	●



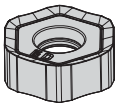
HNGJ-LD



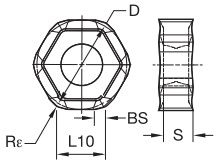
● first choice
○ alternate choice

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

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6505	TN6510	TN6520	TN6525	TN6540
HNGJ0704ANENLD	12	.500	.268	.174	.064	.047	.003	●	●	●	●	●	●
HNGJ070432ANENLD	12	.500	.268	.176	—	.126	.003			●		●	●



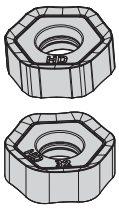
HNPJ-GD



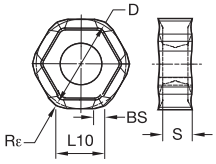
● first choice
○ alternate choice

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

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6510	TN6520	TN6540	TN7535
HNPJ0704ANSNGD	12	.500	.269	.175	.050	.047	.004	●	●	●	●	●



HNPJ-HD



● first choice
○ alternate choice

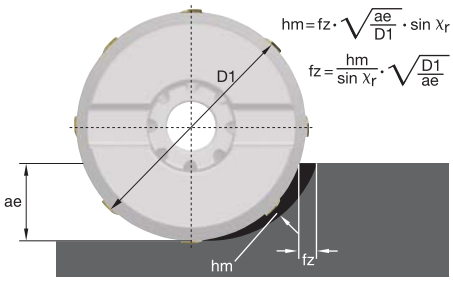
P	M	K	N	S	H
●		●			
●		●		○	
●		●		○	
●					

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6510	TN6520	TN6540	TN7535
HNPJ0704ANSNHD	12	.500	.269	.174	.049	.047	.006	●	●	●	●	●
HNPJ070432ANSNHD	12	.500	.269	.174	—	.126	.006		●	●	●	●

		TN5515			TN6501			TN6505			TN6510			TN6520		
Edge Geometry		feed per tooth fz (inch)														
	..LDJ				.0051	**.0115**	.0256									
	..LD	.0090	**.0166**	.0269				.0102	**.0179**	.0297	.0102	**.0179**	.0297	.0102	**.0192**	.0317
	..GD	.0138	**.0234**	.0322							.0152	**.0262**	.0349	.0165	**.0275**	.0358
	..HD	.0179	**.0331**	.0469							.0193	**.0358**	.0515	.0207	**.0372**	.0525
Material Group		vc (ft/min)														
P	1							1510	**1150**	980						
	2							1020	**750**	690						
	3							850	**660**	560						
	4							890	**690**	560						
	5							720	**560**	460						
	6							980	**720**	590						
	7							720	**560**	520						
	8							660	**520**	430						
	9							560	**430**	330						
	10							720	**590**	560						
	11							520	**390**	300						
	12							950	**720**	590						
	13.1							820	**590**	520						
	13.2							430	**300**	260						
M	14.1															
	14.2															
	14.3															
	14.4															
K	15	1740	**1280**	920				—	—	—	1570	**1150**	820	1250	**920**	660
	16	1350	**1020**	750				—	—	—	1210	**920**	690	980	**720**	560
	17	1510	**1020**	750				1020	**750**	690	1380	**920**	690	1120	**720**	560
	18	980	**720**	560				850	**660**	560	890	**660**	490	720	**520**	390
	19	1210	**950**	720				—	—	—	1120	**850**	660	890	**690**	520
	20	1020	**750**	590				—	—	—	920	**690**	520	720	**560**	430
N	21				6560	**3440**	2130									
	22				3220	**1800**	1480									
	23				5910	**3120**	1970									
	24				3440	**2130**	1640									
	25				2460	**1640**	1150									
	26				—	—	—									
	27				—	—	—									
	28				—	—	—									
	29				—	—	—									
	30				—	—	—									
S	31															
	32															
	33															
	34															
	35															
	36															
	37															
H	38.1															
	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:

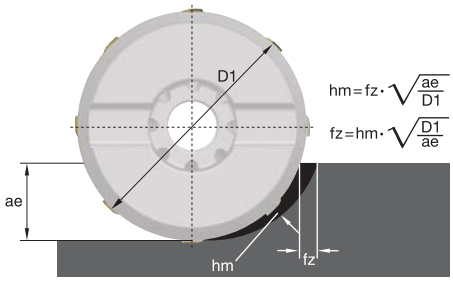
ae/D1 =	0.1	0.2	0.3	0.4
fz-Factor	2.0	1.5	1.3	1.0
vc-Factor	1.4	1.3	1.2	1.1



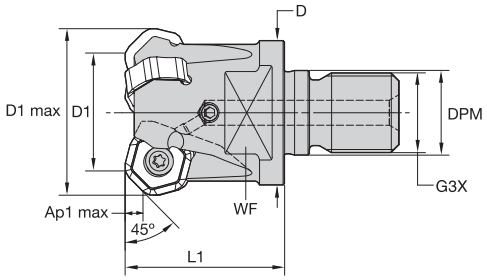
		TN6525			TN6540			TN7535			THM-U		
Edge Geometry		feed per tooth fz (inch)											
	..LDJ										.0051	**.0115**	.0256
	..LD	.0077	**.0141**	.0230	.0102	**.0192**	.0297	.0090	**.0166**	.0269			
	..GD	.0110	**.0207**	.0269	.0152	**.0276**	.0358	.0138	**.0234**	.0322			
	..HD	.0152	**.0276**	.0375	.0193	**.0358**	.0525	.0179	**.0331**	.0469			
Material Group		vc (ft/min)											
P	1	1150	**890**	750	950	**720**	620	1180	**920**	790			
	2	790	**590**	520	660	**490**	430	820	**620**	540			
	3	660	**490**	430	560	**430**	360	690	**520**	460			
	4	690	**520**	430	560	**430**	360	710	**540**	460			
	5	560	**430**	360	460	**330**	300	590	**430**	360			
	6	750	**560**	460	620	**460**	390	790	**590**	490			
	7	560	**430**	390	460	**360**	330	590	**460**	390			
	8	490	**390**	330	430	**330**	260	520	**390**	330			
	9	430	**330**	260	360	**260**	200	460	**330**	260			
	10	560	**460**	430	460	**390**	330	590	**480**	430			
	11	390	**300**	230	330	**230**	200	390	**300**	230			
	12	720	**560**	460	590	**460**	390	750	**570**	490			
	13.1	620	**460**	390	520	**390**	330	660	**480**	390			
	13.2	310	**230**	200	260	**200**	160	330	**250**	200			
M	14.1	620	**390**	300	520	**330**	230	660	**390**	300			
	14.2	490	**300**	230	430	**260**	200	520	**310**	230			
	14.3	390	**230**	160	330	**200**	130	390	**230**	180			
	14.4	330	**200**	130	260	**160**	130	330	**200**	150			
K	15	—	—	—	—	—	—	—	—	—			
	16	—	—	—	—	—	—	—	—	—			
	17	790	**590**	520	660	**490**	430	820	**620**	540			
	18	660	**490**	430	560	**430**	360	690	**520**	460			
	19	—	—	—	—	—	—	—	—	—			
	20	—	—	—	—	—	—	—	—	—			
N	21										5910	**3120**	1940
	22										2890	**1640**	1330
	23										5250	**2820**	1770
	24										3120	**1940**	1480
	25										2230	**1480**	1030
	26										2200	**1640**	1020
	27										2300	**2000**	1640
	28										2460	**2170**	1770
	29										2460	**2130**	1740
	30										2300	**2150**	1640
S	31				200	**160**	150						
	32				160	**130**	110						
	33				110	**80**	70						
	34				100	**70**	50						
	35				100	**70**	50						
	36				260	**160**	130						
	37				230	**150**	110						
H	38.1												
	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 =	0.1	0.2	0.3	0.4
fz-Factor	2.0	1.5	1.3	1.0
vc-Factor	1.4	1.3	1.2	1.1



- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- Maximum number of teeth per diameter.



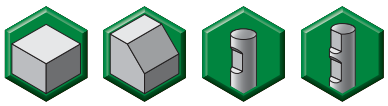
Victory M1200 Mini

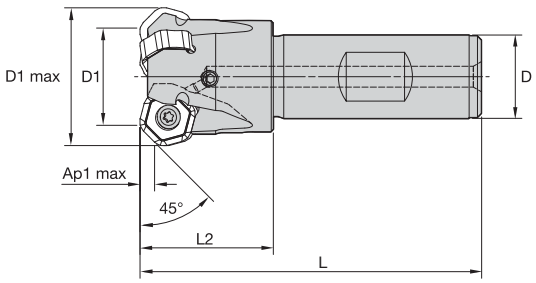
order number	catalog number	D1	D1 max	D	DPM	G3X	L1	WF	Ap1 max	Z	max RPM	coolant supply	lbs
3953681	**M1200D100Z02M16HN07**	1.000	1.343	1.142	.669	M16	1.250	.864	.138	2	19800	Yes	.30
3953682	**M1200D100Z03M16HN07**	1.000	1.343	1.142	.669	M16	1.250	.864	.138	3	19800	Yes	.28
3953903	**M1200D125Z03M16HN07**	1.250	1.593	1.142	.669	M16	1.500	.864	.138	3	17600	Yes	.44
3953904	**M1200D125Z04M16HN07**	1.250	1.593	1.142	.669	M16	1.500	.864	.138	4	17600	Yes	.41
3953905	**M1200D150Z04M16HN07**	1.500	1.843	1.142	.669	M16	1.500	.864	.138	4	15800	Yes	.49
3953906	**M1200D150Z05M16HN07**	1.500	1.843	1.142	.669	M16	1.500	.864	.138	5	15800	Yes	.48

Spare Parts

D1	insert screw	in.lbs.	Torx driver
1.000	**12146034500**	31	**12148082400**
1.250	**12146034500**	31	**12148082400**
1.500	**12146034500**	31	**12148082400**

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- Maximum number of teeth per diameter.





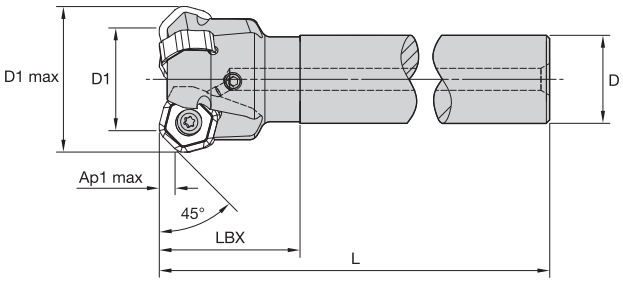
Victory M1200 Mini

order number	catalog number	D1	D1 max	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
3953893	**M1200D100Z02W075HN07**	1.000	1.343	.750	3.280	1.250	.138	2	19800	Yes	.46
3953894	**M1200D100Z03W075HN07**	1.000	1.343	.750	3.280	1.250	.138	3	19800	Yes	.44
3953895	**M1200D125Z03W100HN07**	1.250	1.593	1.000	3.783	1.500	.138	3	17700	Yes	.91
3953896	**M1200D125Z04W100HN07**	1.250	1.593	1.000	3.783	1.500	.138	4	17700	Yes	.88

Spare Parts

D1	insert screw	in.lbs.	Torx driver
1.000	**12146034500**	31	**12148082400**
1.250	**12146034500**	31	**12148082400**

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- Maximum number of teeth per diameter.



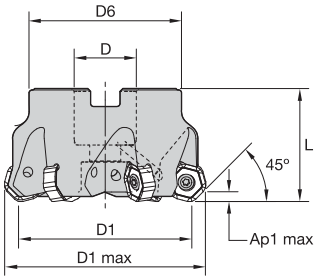
Victory M1200 Mini

order number	catalog number	D1	D1 max	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
3953897	**M1200D100Z02C075HN07L480**	1.000	1.343	.750	4.800	1.250	.138	2	19800	Yes	.64
3953898	**M1200D100Z03C075HN07L480**	1.000	1.343	.750	4.800	1.250	.138	3	19800	Yes	.62
3953901	**M1200D100Z02C100HN07L800**	1.000	1.343	1.000	8.000	1.250	.138	2	19800	Yes	1.66
3953902	**M1200D100Z03C100HN07L800**	1.000	1.343	1.000	8.000	1.250	.138	3	19800	Yes	1.64
3953899	**M1200D125Z03C100HN07L520**	1.250	1.593	1.000	5.200	1.500	.138	3	17700	Yes	1.22
3953900	**M1200D125Z04C100HN07L520**	1.250	1.593	1.000	5.200	1.500	.138	4	17700	Yes	1.19

Spare Parts

D1	insert screw	in.lbs.	Torx driver
1.000	**12146034500**	31	**12148082400**
1.250	**12146034500**	31	**12148082400**

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- Maximum number of teeth per diameter.



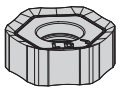
Victory M1200 Mini

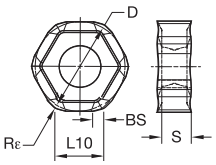
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136461	**M1200D150Z04S050HN07**	1.500	1.813	.500	1.440	1.575	.136	4	15800	Yes	.55
4136462	**M1200D150Z05S050HN07**	1.500	1.813	.500	1.440	1.575	.136	5	15800	Yes	.55
3954485	**M1200D200Z04S075HN07**	2.000	2.343	.750	1.750	1.575	.138	4	12500	Yes	1.00
3954486	**M1200D200Z05S075HN07**	2.000	2.343	.750	1.750	1.575	.138	5	12500	Yes	1.02
3954487	**M1200D200Z06S075HN07**	2.000	2.343	.750	1.750	1.575	.138	6	12500	Yes	1.00
3954488	**M1200D250Z04S075HN07**	2.500	2.843	.750	1.750	1.575	.138	4	10000	Yes	1.27
3954489	**M1200D250Z06S075HN07**	2.500	2.843	.750	1.750	1.575	.138	6	10000	Yes	1.40
3954490	**M1200D250Z08S075HN07**	2.500	2.843	.750	1.750	1.575	.138	8	10000	Yes	1.36
3954491	**M1200D300Z05S100HN07**	3.000	3.343	1.000	2.189	1.750	.138	5	8300	Yes	2.00
3954492	**M1200D300Z08S100HN07**	3.000	3.343	1.000	2.189	1.750	.138	8	8300	Yes	2.25
3954503	**M1200D300Z10S100HN07**	3.000	3.343	1.000	2.189	1.750	.138	10	8300	Yes	2.12
3954504	**M1200D400Z06S150HN07**	4.000	4.342	1.500	3.661	1.750	.138	6	6300	Yes	3.74
3954505	**M1200D400Z09S150HN07**	4.000	4.342	1.500	3.661	1.750	.138	9	6300	Yes	3.68
3954506	**M1200D400Z12S150HN07**	4.000	4.342	1.500	3.661	1.750	.138	12	6300	Yes	3.65
4130534	**M1200D500Z08S150HN07**	5.000	5.343	1.500	3.652	2.380	.138	8	5000	Yes	6.31
4130535	**M1200D500Z12S150HN07**	5.000	5.343	1.500	3.652	2.380	.138	12	5000	Yes	6.52
4130536	**M1200D500Z16S150HN07**	5.000	5.343	1.500	3.652	2.380	.138	16	5000	Yes	6.63

Spare Parts



D1	insert screw	in. lbs.	Torx driver	coolant lock screw assembly
1.500	**12146034500**	31	**12148082400**	
2.000	**12146034500**	31	**12148082400**	
2.500	**12146034500**	31	**12148082400**	
3.000	**12146034500**	31	**12148082400**	
4.000	**12146034500**	31	**12148082400**	**12146109600**
5.000	**12146034500**	31	**12148082400**	**12146109600**



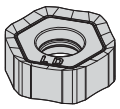


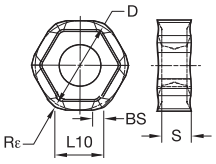
● first choice
○ alternate choice

P									
M									
K									
N								●	●
S									
H									

■ HNGJ-LDJ

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6501	THM-U
HNGJ0704ANFNLDJ	12	.500	.268	.176	.064	.047	.003	●	●



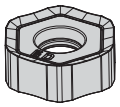


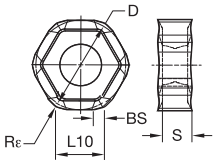
● first choice
○ alternate choice

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

■ HNGJ-LD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6505	TN6510	TN6520	TN6525	TN6540
HNGJ0704ANENLD	12	.500	.268	.174	.064	.047	.003	●	●	●	●	●	●
HNGJ070432ANENLD	12	.500	.268	.176	—	.126	.003			●		●	●



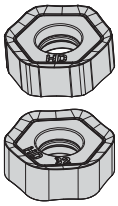


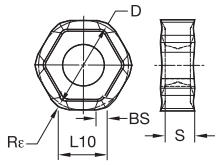
● first choice
○ alternate choice

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

■ HNPJ-GD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6510	TN6520	TN6540	TN7535
HNPJ0704ANSNGD	12	.500	.269	.175	.050	.047	.004	●	●	●	●	●



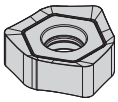


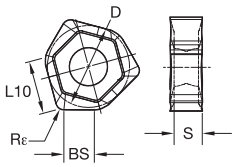
● first choice
○ alternate choice

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

■ HNPJ-HD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6510	TN6520	TN6540	TN7535
HNPJ0704ANSNHD	12	.500	.269	.174	.049	.047	.006	●	●	●	●	●
HNPJ070432ANSNHD	12	.500	.269	.174	—	.126	.006		●	●	●	●





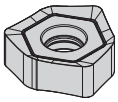
● first choice
○ alternate choice

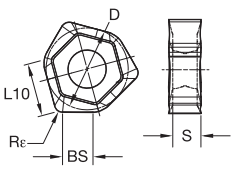
P								
M								
K								
N							●	●
S								
H								

■ XNGJ-LDJ3 Wiper

catalog number	cutting edges *	D	L10	S	BS	Rε	TN6501	THM-U
XNGJ0704ANFNLDJ3W	3	.500	.267	.176	.267	.051	●	●

**3 RH and 3 LH cutting edges.*





● first choice
○ alternate choice

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

■ XNGJ-LD3 Wiper

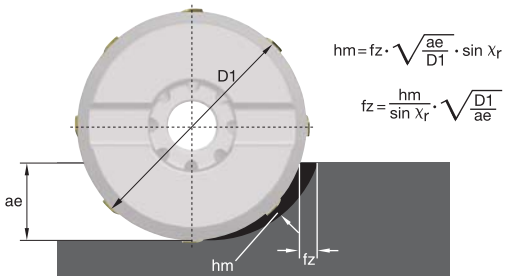
catalog number	cutting edges *	D	L10	S	BS	Rε	TN5515	TN6510	TN6520	TN6525	TN6540
XNGJ0704ANENLD3W	3	.500	.267	.176	.267	.051	●	●	●	●	●

**3 RH and 3 LH cutting edges.*

		TN5515			TN6501			TN6505			TN6510			TN6520		
Edge Geometry		feed per tooth fz (inch)														
	..LDJ				.0024	**.0039**	.0118									
	..LD	.0031	**.0059**	.0098				.0031	**.0039**	.0098	.0035	**.0065**	.0108	.0036	**.0068**	.0114
	..GD	.0047	**.0079**	.0138							.0052	**.0087**	.0152	.0055	**.0091**	.0159
	..HD	.0071	**.0098**	.0217							.0078	**.0108**	.0238	.0082	**.0114**	.0250
Material Group		vc (ft/min)														
P	1							1510	**1150**	980						
	2							1020	**750**	690						
	3							850	**660**	560						
	4							890	**690**	560						
	5							720	**560**	460						
	6							980	**720**	590						
	7							720	**560**	520						
	8							660	**520**	430						
	9							560	**430**	330						
	10							720	**590**	560						
	11							520	**390**	300						
	12							950	**720**	590						
	13.1							820	**590**	520						
	13.2							430	**300**	260						
M	14.1															
	14.2															
	14.3															
	14.4															
K	15	1740	**1280**	920				—	—	—	1570	**1150**	820	1250	**920**	660
	16	1350	**1020**	750				—	—	—	1210	**920**	690	980	**720**	560
	17	1510	**1020**	750				1020	**750**	690	1380	**920**	690	1120	**720**	560
	18	980	**720**	560				850	**660**	560	890	**660**	490	720	**520**	390
	19	1210	**950**	720				—	—	—	1120	**850**	660	890	**690**	520
	20	1020	**750**	590				—	—	—	920	**690**	520	720	**560**	430
N	21				6560	**3440**	2130									
	22				3220	**1800**	1480									
	23				5910	**3120**	1970									
	24				3440	**2130**	1640									
	25				2460	**1640**	1150									
	26				—	—	—									
	27				—	—	—									
	28				—	—	—									
	29				—	—	—									
	30				—	—	—									
S	31															
	32															
	33															
	34															
	35															
	36															
	37															
H	38.1															
	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:

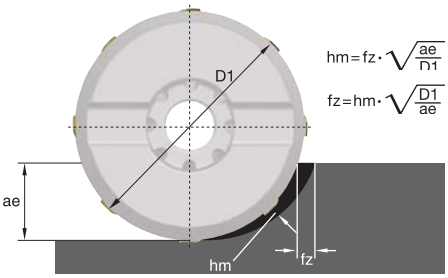
ae/D1 =	0.1	0.2	0.3	0.4
fz-Factor	2.0	1.5	1.3	1.0
vc-Factor	1.4	1.3	1.2	1.1



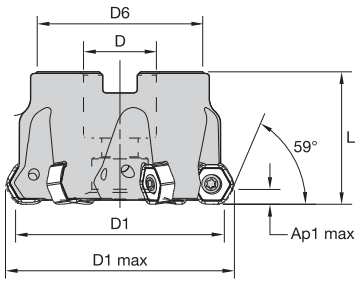
		TN6525			TN6540			TN7535			THM-U		
Edge Geometry		feed per tooth fz (inch)											
..LDJ											.0024	**.0039**	.0118
..LD		.0032	**.0049**	.0097	.0043	**.0065**	.0130	.0039	**.0059**	.0118			
..GD		.0039	**.0065**	.0114	.0052	**.0087**	.0152	.0047	**.0079**	.0138			
..HD		.0058	**.0081**	.0195	.0078	**.0108**	.0260	.0071	**.0098**	.0236			
Material Group		vc (ft/min)											
P	1	1150	**890**	750	950	**720**	620	1180	**920**	790			
	2	790	**590**	520	660	**490**	430	820	**620**	540			
	3	660	**490**	430	560	**430**	360	690	**520**	460			
	4	690	**520**	430	560	**430**	360	710	**540**	460			
	5	560	**430**	360	460	**330**	300	590	**430**	360			
	6	750	**560**	460	620	**460**	390	790	**590**	490			
	7	560	**430**	390	460	**360**	330	590	**460**	390			
	8	490	**390**	330	430	**330**	260	520	**390**	330			
	9	430	**330**	260	360	**260**	200	460	**330**	260			
	10	560	**460**	430	460	**390**	330	590	**480**	430			
	11	390	**300**	230	330	**230**	200	390	**300**	230			
	12	720	**560**	460	590	**460**	390	750	**570**	490			
	13.1	620	**460**	390	520	**390**	330	660	**480**	390			
	13.2	310	**230**	200	260	**200**	160	330	**250**	200			
M	14.1	620	**390**	300	520	**330**	230	660	**390**	300			
	14.2	490	**300**	230	430	**260**	200	520	**310**	230			
	14.3	390	**230**	160	330	**200**	130	390	**230**	180			
	14.4	330	**200**	130	260	**160**	130	330	**200**	150			
K	15	—	—	—	—	—	—	—	—	—			
	16	—	—	—	—	—	—	—	—	—			
	17	790	**590**	520	660	**490**	430	820	**620**	540			
	18	660	**490**	430	560	**430**	360	690	**520**	460			
	19	—	—	—	—	—	—	—	—	—			
	20	—	—	—	—	—	—	—	—	—			
N	21										5910	**3120**	1940
	22										2890	**1640**	1330
	23										5250	**2820**	1770
	24										3120	**1940**	1480
	25										2230	**1480**	1030
	26										2200	**1640**	1020
	27										2300	**2000**	1640
	28										2460	**2170**	1770
	29										2460	**2130**	1740
	30										2300	**2150**	1640
S	31				200	**160**	150						
	32				160	**130**	110						
	33				110	**80**	70						
	34				100	**70**	50						
	35				100	**70**	50						
	36				260	**160**	130						
	37				230	**150**	110						
H	38.1												
	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 =	0.1	0.2	0.3	0.4
fz-Factor	2.0	1.5	1.3	1.0
vc-Factor	1.4	1.3	1.2	1.1



- Twelve cutting edges.
- Higher Ap1 max with standard insert.

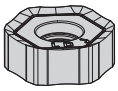


M1200 Mini HD • 60° • Shell Mills

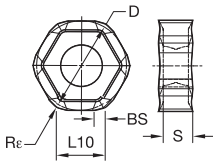
order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136415	**M1200HD150Z04S050HN07**	1.500	1.759	.500	1.440	1.575	.186	4	15800	Yes	.49
4136416	**M1200HD150Z05S050HN07**	1.500	1.759	.500	1.440	1.575	.186	5	15800	Yes	.50
4136417	**M1200HD200Z04S075HN07**	2.000	2.258	.750	1.750	1.575	.186	4	12500	Yes	.89
4136418	**M1200HD200Z05S075HN07**	2.000	2.257	.750	1.750	1.575	.186	5	12500	Yes	.90
4136419	**M1200HD250Z04S075HN07**	2.500	2.758	.750	1.750	1.575	.186	4	10000	Yes	1.19
4136420	**M1200HD250Z06S075HN07**	2.500	2.758	.750	1.750	1.575	.186	6	10000	Yes	1.23
4136421	**M1200HD300Z05S100HN07**	3.000	3.259	1.000	2.188	1.750	.186	5	8300	Yes	1.92
4136422	**M1200HD300Z08S100HN07**	3.000	3.259	1.000	2.188	1.750	.186	8	8300	Yes	2.01
4136433	**M1200HD400Z06S150HN07**	4.000	4.257	1.500	3.661	1.750	.185	6	6300	Yes	3.30
4136434	**M1200HD400Z09S150HN07**	4.000	4.257	1.500	3.661	1.750	.185	9	6300	Yes	3.44
4136435	**M1200HD500Z08S150HN07**	5.000	5.258	1.500	3.661	2.380	.185	8	5000	Yes	6.24
4136436	**M1200HD500Z12S150HN07**	5.000	5.258	1.500	3.661	2.380	.185	12	5000	Yes	6.45

Spare Parts

D1	insert screw	in. lbs.	Torx driver	coolant lock screw assembly
1.500	**12146034500**	31	**12148082400**	**–**
2.000	**12146034500**	31	**12148082400**	**–**
2.500	**12146034500**	31	**12148082400**	**–**
3.000	**12146034500**	31	**12148082400**	**–**
4.000	**12146034500**	31	**12148082400**	**12146109600**
5.000	**12146034500**	31	**12148082400**	**12146109600**



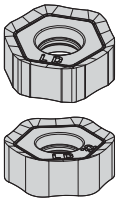
HNGJ-LDJ



● first choice
○ alternate choice

P	M	K	N	S	H
			●		
			●		

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6501	THM-U
HNGJ0704ANFNLDJ	12	.500	.268	.176	.064	.047	.003	●	●



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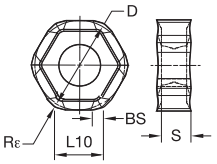
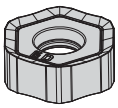


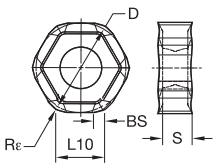
● first choice
○ alternate choice

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

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6505	TN6510	TN6520	TN6525	TN6540
HNGJ0704ANENLD	12	.500	.268	.174	.064	.047	.003	●	●	●	●	●	●
HNGJ070432ANENLD	12	.500	.268	.176	—	.126	.003			●		●	●



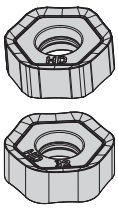
HNPJ-GD



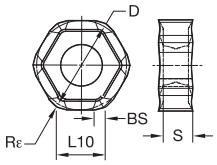
● first choice
○ alternate choice

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

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6510	TN6520	TN6540	TN7535
HNPJ0704ANSNGD	12	.500	.269	.175	.050	.047	.004	●	●	●	●	●



HNPJ-HD



● first choice
○ alternate choice

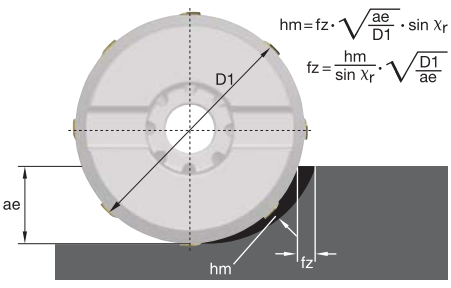
P	M	K	N	S	H
●		●			
●		●			
○	○	○			
●	○	○		●	

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6510	TN6520	TN6540	TN7535
HNPJ0704ANSNHD	12	.500	.269	.174	.049	.047	.006	●	●	●	●	●
HNPJ070432ANSNHD	12	.500	.269	.174	—	.126	.006		●	●	●	●

		TN5515			TN6501			TN6505			TN6510			TN6520		
Edge Geometry		feed per tooth fz (inch)														
	..LDJ				.0024	**.0039**	.0118									
	..LD	.0031	**.0059**	.0098				.0031	**.0039**	.0098	.0035	**.0065**	.0108	.0036	**.0068**	.0114
	..GD	.0047	**.0079**	.0138							.0052	**.0087**	.0152	.0055	**.0091**	.0159
	..HD	.0071	**.0098**	.0217							.0078	**.0108**	.0238	.0082	**.0114**	.0250
Material Group		vc (ft/min)														
P	1							1510	**1150**	980						
	2							1020	**750**	690						
	3							850	**660**	560						
	4							890	**690**	560						
	5							720	**560**	460						
	6							980	**720**	590						
	7							720	**560**	520						
	8							660	**520**	430						
	9							560	**430**	330						
	10							720	**590**	560						
	11							520	**390**	300						
	12							950	**720**	590						
	13.1							820	**590**	520						
	13.2							430	**300**	260						
M	14.1															
	14.2															
	14.3															
	14.4															
K	15	1740	**1280**	920				—	—	—	1570	**1150**	820	1250	**920**	660
	16	1350	**1020**	750				—	—	—	1210	**920**	690	980	**720**	560
	17	1510	**1020**	750				1020	**750**	690	1380	**920**	690	1120	**720**	560
	18	980	**720**	560				850	**660**	560	890	**660**	490	720	**520**	390
	19	1210	**950**	720				—	—	—	1120	**850**	660	890	**690**	520
	20	1020	**750**	590				—	—	—	920	**690**	520	720	**560**	430
N	21				6560	**3440**	2130									
	22				3220	**1800**	1480									
	23				5910	**3120**	1970									
	24				3440	**2130**	1640									
	25				2460	**1640**	1150									
	26				—	—	—									
	27				—	—	—									
	28				—	—	—									
	29				—	—	—									
	30				—	—	—									
S	31															
	32															
	33															
	34															
	35															
	36															
	37															
H	38.1															
	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:

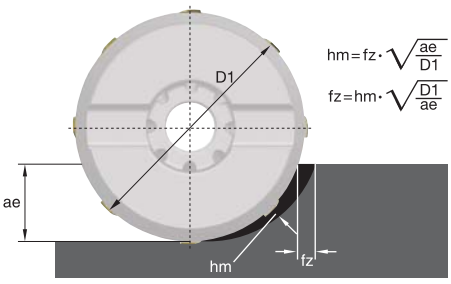
ae/D1 =	0.1	0.2	0.3	0.4
fz-Factor	2.0	1.5	1.3	1.0
vc-Factor	1.4	1.3	1.2	1.1



		TN6525			TN6540			TN7535			THM-U		
Edge Geometry		feed per tooth fz (inch)											
..LDJ											.0024	**.0039**	.0118
..LD		.0032	**.0049**	.0097	.0043	**.0065**	.0130	.0039	**.0059**	.0118			
..GD		.0039	**.0065**	.0114	.0052	**.0087**	.0152	.0047	**.0079**	.0138			
..HD		.0058	**.0081**	.0195	.0078	**.0108**	.0260	.0071	**.0098**	.0236			
Material Group		vc (ft/min)											
P	1	1150	**890**	750	950	**720**	620	1180	**920**	790			
	2	790	**590**	520	660	**490**	430	820	**620**	540			
	3	660	**490**	430	560	**430**	360	690	**520**	460			
	4	690	**520**	430	560	**430**	360	710	**540**	460			
	5	560	**430**	360	460	**330**	300	590	**430**	360			
	6	750	**560**	460	620	**460**	390	790	**590**	490			
	7	560	**430**	390	460	**360**	330	590	**460**	390			
	8	490	**390**	330	430	**330**	260	520	**390**	330			
	9	430	**330**	260	360	**260**	200	460	**330**	260			
	10	560	**460**	430	460	**390**	330	590	**480**	430			
	11	390	**300**	230	330	**230**	200	390	**300**	230			
	12	720	**560**	460	590	**460**	390	750	**570**	490			
	13.1	620	**460**	390	520	**390**	330	660	**480**	390			
	13.2	310	**230**	200	260	**200**	160	330	**250**	200			
M	14.1	620	**390**	300	520	**330**	230	660	**390**	300			
	14.2	490	**300**	230	430	**260**	200	520	**310**	230			
	14.3	390	**230**	160	330	**200**	130	390	**230**	180			
	14.4	330	**200**	130	260	**160**	130	330	**200**	150			
K	15	—	—	—	—	—	—	—	—	—			
	16	—	—	—	—	—	—	—	—	—			
	17	790	**590**	520	660	**490**	430	820	**620**	540			
	18	660	**490**	430	560	**430**	360	690	**520**	460			
	19	—	—	—	—	—	—	—	—	—			
	20	—	—	—	—	—	—	—	—	—			
N	21										5910	**3120**	1940
	22										2890	**1640**	1330
	23										5250	**2820**	1770
	24										3120	**1940**	1480
	25										2230	**1480**	1030
	26										2200	**1640**	1020
	27										2300	**2000**	1640
	28										2460	**2170**	1770
	29										2460	**2130**	1740
	30										2300	**2150**	1640
S	31				200	**160**	150						
	32				160	**130**	110						
	33				110	**80**	70						
	34				100	**70**	50						
	35				100	**70**	50						
	36				260	**160**	130						
	37				230	**150**	110						
H	38.1												
	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 =	0.1	0.2	0.3	0.4
fz-Factor	2.0	1.5	1.3	1.0
vc-Factor	1.4	1.3	1.2	1.1



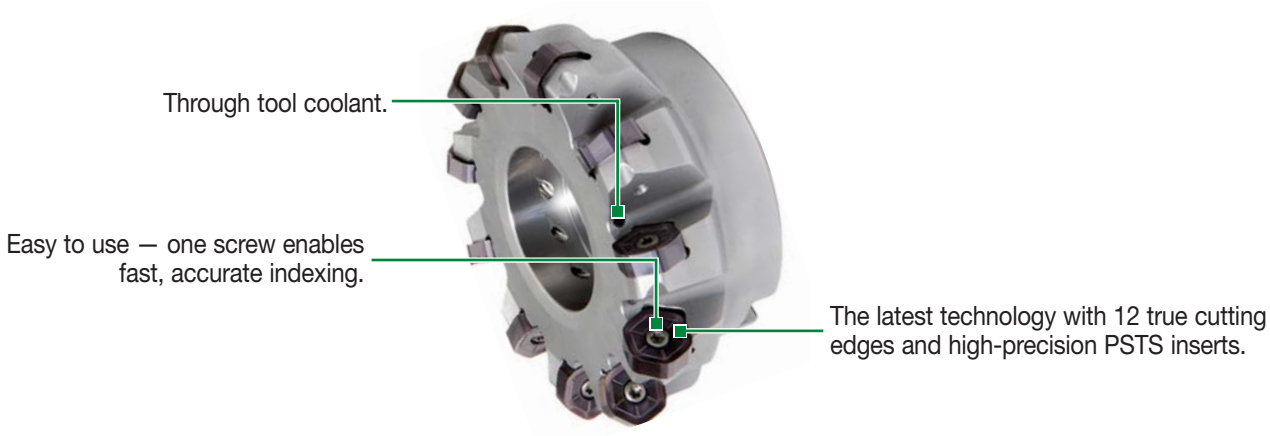
One Series Meets Every Face Milling Need •
WIDIA™ M1200 HD 60°

Increased Ap1 max capability with standard M1200 inserts.

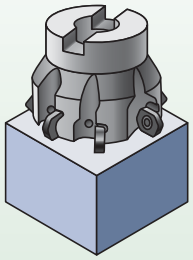
WIDIA VICTORY
Win with WIDIA™

M1200 HD

- Low cost per edge and high productivity.
- 60° lead angle.
- Increased Ap1 max capability with standard M1200 inserts.
- One series meets every face milling needs.
- WIDIA premium milling grades.
- Up to 35% better tool life from light to heavy machining.



Face Mills

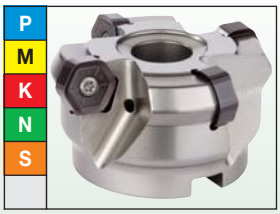


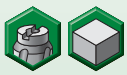
M1200 HD 60° Heavy Duty

Max depth of cut: 6mm

Lead angle: 60°
Indexes per insert: 12
Diameter: 2–6"

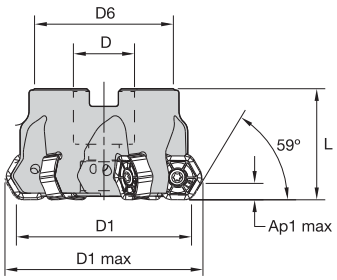
Pages: B24–B27





Insert Geometry		Recommended Use
	LDJ	First choice for non-ferrous materials. Periphery ground with polished rake face.
	GD	First choice for high-feed face milling in stainless steel and super alloys.
	HD	Alternate choice for high-feed face milling in steel and cast iron.
	43HD	First choice for high-feed face milling in steel and cast iron. Strong corner radius. Best option for general-purpose use.

- Twelve cutting edges.
- Higher Ap1 max with standard insert.
- Low cutting forces for maximum productivity.



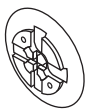
M1200 HD • 60° • Shell Mills

order number	catalog number	D1	D1 max	D	D4	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4147876	**M1200HD200Z04S075HN09**	2.000	2.328	.750	—	1.593	1.575	.240	4	12500	Yes	.75
4147877	**M1200HD200Z05S075HN09**	2.000	2.328	.750	—	1.593	1.575	.240	5	12500	Yes	.73
4147878	**M1200HD250Z04S075HN09**	2.500	2.827	.750	—	1.986	1.575	.240	4	10000	Yes	1.28
4147879	**M1200HD250Z06S075HN09**	2.500	2.827	.750	—	1.986	1.575	.240	6	10000	Yes	1.28
4147880	**M1200HD300Z05S100HN09**	3.000	3.327	1.000	—	2.189	1.750	.240	5	8300	Yes	1.86
4147881	**M1200HD300Z08S100HN09**	3.000	3.327	1.000	—	2.189	1.750	.240	8	8300	Yes	1.86
4147882	**M1200HD400Z06S150HN09**	4.000	4.326	1.500	—	3.661	1.750	.240	6	6300	Yes	3.19
4147883	**M1200HD400Z08S150HN09**	4.000	4.326	1.500	—	3.661	1.750	.240	8	6300	Yes	3.21
4147884	**M1200HD500Z08S150HN09**	5.000	5.326	1.500	—	3.652	2.380	.240	8	5000	Yes	6.28
4147885	**M1200HD500Z10S150HN09**	5.000	5.326	1.500	—	3.652	2.380	.240	10	5000	Yes	6.26
4147886	**M1200HD600Z09S200HN09**	6.000	6.326	2.000	—	4.722	2.380	.240	9	4100	Yes	9.26
4147887	**M1200HD600Z12S200HN09**	6.000	6.326	2.000	—	4.722	2.380	.240	12	4100	Yes	9.23

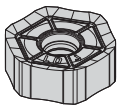
Spare Parts



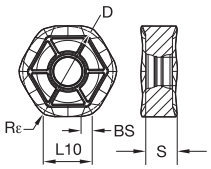




D1	D	insert screw	in. lbs.	Torx driver	coolant screw assembly	coolant lock screw	coolant shower plate
2.000	.750	**12146034500**	31	**12148082400**	**—**	**—**	**—**
2.500	.750	**12146034500**	31	**12148082400**	**—**	**—**	**—**
3.000	1.000	**12146034500**	31	**12148082400**	**—**	**—**	**—**
4.000	1.500	**12146034500**	31	**12148082400**	**12146109600**	**—**	**—**
5.000	1.500	**12146034500**	31	**12148082400**	**12146109600**	**—**	**—**
6.000	2.000	**12146034500**	31	**12148082400**	**—**	**12146110600**	**12146111900**



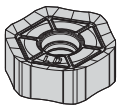
HNGJ-LDJ



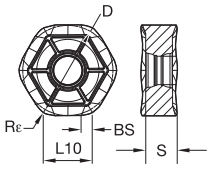
● first choice
○ alternate choice

P	M	K	N	S	H
			●		

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6501	THM-U
HNGJ0905ANFNLDJ	12	.625	.338	.219	.071	.047	.003	●	●



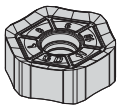
HNGJ-LD



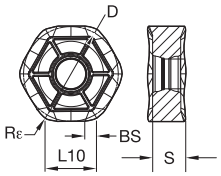
● first choice
○ alternate choice

P	M	K	N	S	H
●	○	●		●	

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6520	TN6525	TN6540	TN7535
HNGJ0905ANENLD	12	.625	.338	.219	.071	.047	.004	●	●	●	●	●



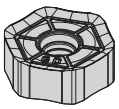
HNPJ-GD



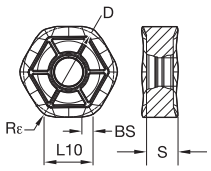
● first choice
○ alternate choice

P	M	K	N	S	H
●	●	●		●	

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6520	TN6540	TN7535
HNPJ0905ANSNGD	12	.625	.338	.219	.071	.047	.006	●	●	●	●



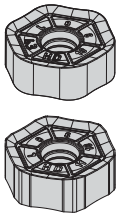
HNGJ-GD

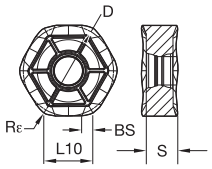


● first choice
○ alternate choice

P	M	K	N	S	H
●	○	●		●	

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6520	TN6525	TN6540	TN7535
HNGJ0905ANSNGD	12	.625	.338	.219	.071	.047	.006	●	●	●	●	●



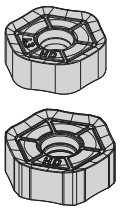


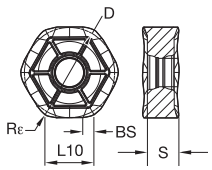
● first choice
○ alternate choice

P			●
M			●
K	●	●	○
N			
S			●
H			

HNPJ-HD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6520	TN6540
HNPJ0905ANSNHD	12	.625	.338	.215	.065	.047	.008	●	●	●
HNPJ090543ANSNHD	12	.625	.334	.214	—	.171	.008		●	●





● first choice
○ alternate choice

P		●	●
M		○	●
K	●	○	○
N			
S			●
H			

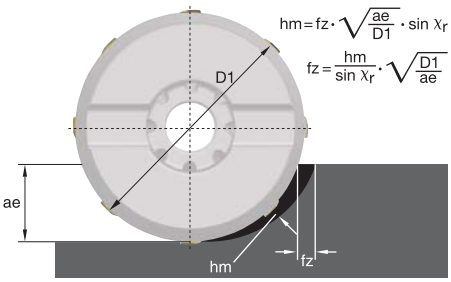
HNGJ-HD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6520	TN6525	TN6540
HNGJ0905ANSNHD	12	.625	.338	.215	.065	.047	.008	●	●	●	●
HNGJ090543ANSNHD	12	.625	.334	.214	—	.171	.008		●	●	●

		TN5515	TN6501	TN6510	TN6520	TN6525	TN6540	TN7535	THM-U
Edge Geometry		feed per tooth fz (Inch)							
	..LDJ		.0031 **.0047** .0118						.0031 **.0047** .0118
	..LD	.0047 **.0079** .0157		.0052 **.0087** .0173	.0055 **.0091** .0182	.0039 **.0065** .0130	.0052 **.0087** .0173	.0047 **.0079** .0157	
	..GD	.0059 **.0098** .0197		.0065 **.0108** .0217	.0068 **.0114** .0227	.0049 **.0081** .0162	.0065 **.0108** .0217	.0059 **.0098** .0197	
	..HD	.0079 **.0118** .0236		.0087 **.0130** .0260	.0091 **.0136** .0273	.0065 **.0097** .0195	.0087 **.0130** .0260	.0079 **.0118** .0236	
Material Group		vc (ft/min)							
P	1					1150 **890** 750	950 **720** 620	1180 **920** 790	
	2					790 **590** 520	660 **490** 430	820 **620** 540	
	3					660 **490** 430	560 **430** 360	690 **520** 460	
	4					690 **520** 430	560 **430** 360	710 **540** 460	
	5					560 **430** 360	460 **330** 300	590 **430** 360	
	6					750 **560** 460	620 **460** 390	790 **590** 490	
	7					560 **430** 390	460 **360** 330	590 **460** 390	
	8					490 **390** 330	430 **330** 260	520 **390** 330	
	9					430 **330** 260	360 **260** 200	460 **330** 260	
	10					560 **460** 430	460 **390** 330	590 **480** 430	
	11					390 **300** 230	330 **230** 200	390 **300** 230	
	12					720 **560** 460	590 **460** 390	750 **570** 490	
	13.1					620 **460** 390	520 **390** 330	660 **480** 390	
	13.2					310 **230** 200	260 **200** 160	330 **250** 200	
M	14.1					620 **390** 300	520 **330** 230	660 **390** 300	
	14.2					490 **300** 230	430 **260** 200	520 **310** 230	
	14.3					390 **230** 160	330 **200** 130	390 **230** 180	
	14.4					330 **200** 130	260 **160** 130	330 **200** 150	
K	15	1740 **1280** 920		1570 **1150** 820	1250 **920** 660	— — —	— — —	— — —	
	16	1350 **1020** 750		1210 **920** 690	980 **720** 560	— — —	— — —	— — —	
	17	1510 **1020** 750		1380 **920** 690	1120 **720** 560	790 **590** 520	660 **490** 430	820 **620** 540	
	18	980 **720** 560		890 **660** 490	720 **520** 390	660 **490** 430	560 **430** 360	690 **520** 460	
	19	1210 **950** 720		1120 **850** 660	890 **690** 520	— — —	— — —	— — —	
	20	1020 **750** 590		920 **690** 520	720 **560** 430	— — —	— — —	— — —	
N	21		6560 **3440** 2130						5910 **3120** 1940
	22		3220 **1800** 1480						2890 **1640** 1330
	23		5910 **3120** 1970						5250 **2820** 1770
	24		3440 **2130** 1640						3120 **1940** 1480
	25		2460 **1640** 1150						2230 **1480** 1030
	26		— — —						2200 **1640** 1020
	27		— — —						2300 **2000** 1640
	28		— — —						2460 **2170** 1770
	29		— — —						2460 **2130** 1740
	30		— — —						2300 **2150** 1640
S	31						200 **160** 150		
	32						160 **130** 110		
	33						110 **80** 70		
	34						100 **70** 50		
	35						100 **70** 50		
	36						260 **160** 130		
	37						230 **150** 110		
H	38.1								
	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 =	0.1	0.2	0.3	0.4
fz-Factor	2.0	1.5	1.3	1.0
vc-Factor	1.4	1.3	1.2	1.1

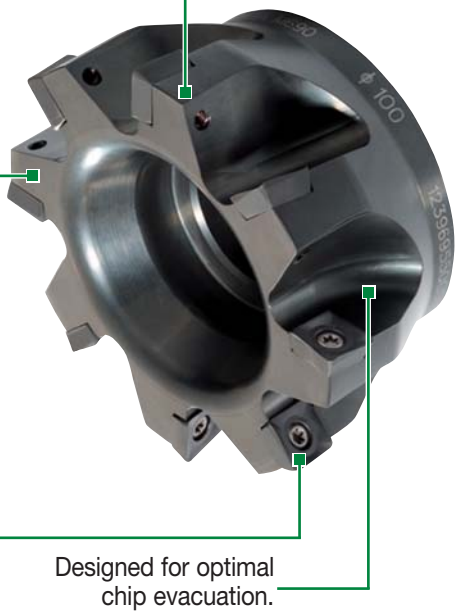


First Choice for Economical Shoulder Milling •
M690 Series 90° Shoulder Mills

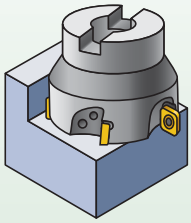
Designed to streamline even your most challenging milling operations, the M690 Series provides optimal chip evacuation, excellent shoulder finish, free cutting action, and solid tool design for optimal insert support.

M690

- New SDMX inserts — helical cutting edges for smooth cutting.
- Strong insert and tool design for maximum productivity.
- Four cutting edges enable excellent machining economy.



90° Shoulder Mills

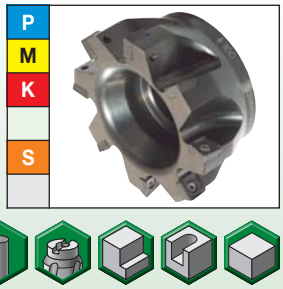


M690 SD1204..

Max depth of cut: .400"

Lead angle: 90°
Indexes per insert: 4
Diameter: 1.50–6.00"

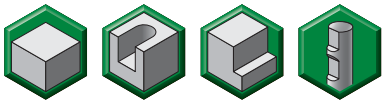
Pages: B30–B32

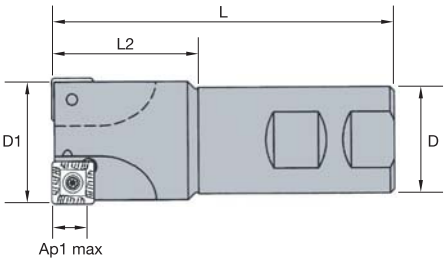


Insert Geometry		Recommended Use
	MM	New geometry designed to provide protection and soft cutting. First choice for general machining in all materials.
	MH	New geometry designed to provide the highest protection with soft cutting action. First choice for heavy machining in steel and cast iron.

For more information on M690 and SDMX15 for larger depth of cut, please visit www.widia.com or see catalog A-09-02081.

- Four cutting edges.
- 90° shoulders.
- Excellent for slot and profile milling.





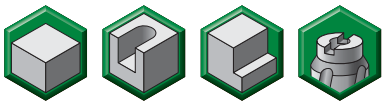
M690

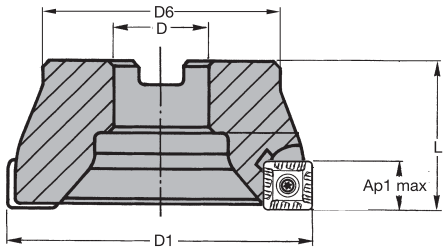
order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
2646782	**M690D150Z03W125SD12**	1.500	1.250	4.000	1.720	.400	3	22400	Yes	1.40
2646784	**M690D200Z04W125SD12**	2.000	1.250	4.000	1.720	.400	4	22400	Yes	1.80

M690 • Spare Parts

D1	insert screw	in. lbs.	Torx driver
1.500	**12148037700**	32	**12148000600**
2.000	**12148037700**	32	**12148000600**

- Four cutting edges.
- 90° shoulders.
- Excellent for slot and profile milling.





M690

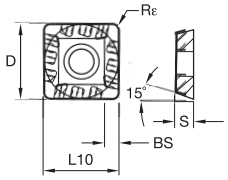
order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646783	**M690D200Z04S075SD12**	2.000	.750	1.700	1.500	.400	4	22400	Yes	.50
2646785	**M690D200Z05S075SD12**	2.000	.750	1.700	1.500	.400	5	22400	Yes	.50
2646787	**M690D250Z05S100SD12**	2.500	1.000	2.200	1.750	.400	5	20000	Yes	1.00
2646788	**M690D250Z06S100SD12**	2.500	1.000	2.200	1.750	.400	6	20000	Yes	1.35
2646790	**M690D300Z06S100SD12**	3.000	1.000	2.300	2.000	.400	6	17200	No	2.00
2646792	**M690D400Z08S150SD12**	4.000	1.500	3.100	2.000	.400	8	15800	No	2.70
2646794	**M690D500Z10S150SD12**	5.000	1.500	3.500	2.000	.400	9	14200	No	5.25
2646796	**M690D600Z10S200SD12**	6.000	2.000	4.000	2.500	.400	10	12500	No	8.15

Spare Parts

D1	insert screw	in. lbs.	Torx driver
2.000	**12148037700**	32	**12148000600**
2.500	**12148037700**	32	**12148000600**
3.000	**12148037700**	32	**12148000600**
4.000	**12148037700**	32	**12148000600**
5.000	**12148037700**	32	**12148000600**
6.000	**12148037700**	32	**12148000600**

NOTE: Standard milling cutters will accept insert nose radius up to 2mm without modification. For larger radii, clearance must be added.

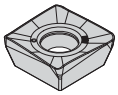
SDMX-MM



● first choice
○ alternate choice

								TN5515	TN6520	TN6525	TN6540	TN7525	TN7535
P										●	●	●	●
M										○	●	○	○
K								●	●	○	○		○
N													
S											●		
H													

	catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6520	TN6525	TN6540	TN7525	TN7535
	SDMX120408RMM	4	.500	.500	.188	.076	.031	.004			●	●	●	●
	SDMX120412RMM	4	.500	.500	.188	.061	.047	.004	●		●	●	●	●
NEW!	SDMX120416RMM	4	.500	.500	.188	.059	.063	.004	●	●	●	●		●
NEW!	SDMX120424RMM	4	.500	.500	.188	.024	.095	.004				●		●
	SDMX120432RMM	4	.500	.500	.188	—	.126	.004				●		●



SDMX-MH

● first choice
○ alternate choice

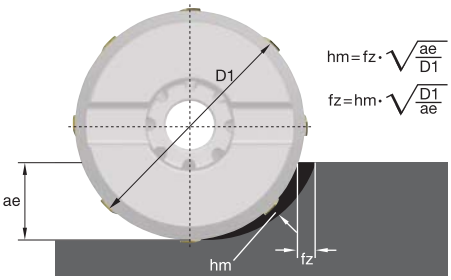
								TN5515	TN6520	TN6525	TN6540	TN7525	TN7535
P										●	●	●	●
M										○	●	○	○
K								●	●	○	○		○
N													
S											●		
H													

	catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN5515	TN6520	TN6525	TN6540	TN7525	TN7535
	SDMX120408RMH	4	.500	.500	.188	.076	.031	.006	●			●	●	●
	SDMX120412RMH	4	.500	.500	.188	.061	.047	.006	●	●	●	●	●	●
	SDMX120416RMH	4	.500	.500	.188	.059	.063	.006	●			●		●

		TN5515			TN6520			TN6525			TN6540			TN7525			TN7535		
Edge Geometry		feed per tooth fz (inch)																	
	..MM	.0039	**.0067**	.0098				.0032	**.0055**	.0081	.0043	**.0074**	.0108	.0031	**.0054**	.0079	.0039	**.0067**	.0098
	..MH	.0055	**.0094**	.0134	.0064	**.0109**	.0155	.0045	**.0078**	.0110	.0061	**.0104**	.0147	.0044	**.0076**	.0107	.0055	**.0094**	.0134
Material Group		vc (ft/min)																	
P	1							980	**750**	620	820	**660**	560	1080	**820**	690	920	**720**	620
	2							750	**590**	490	560	**460**	390	820	**660**	560	620	**490**	430
	3							620	**460**	430	460	**360**	330	690	**520**	490	520	**390**	360
	4							660	**490**	460	490	**390**	330	720	**560**	490	540	**430**	360
	5							560	**390**	360	430	**300**	260	620	**430**	390	460	**330**	280
	6							720	**560**	460	560	**430**	330	790	**620**	490	610	**460**	380
	7							560	**460**	360	430	**330**	260	620	**490**	390	460	**360**	300
	8							460	**360**	330	360	**260**	230	520	**390**	360	390	**300**	260
	9							460	**330**	260	330	**230**	200	490	**360**	300	360	**260**	230
	10							560	**460**	390	430	**330**	300	620	**490**	430	460	**360**	330
	11							360	**300**	200	260	**200**	160	390	**310**	230	300	**230**	200
	12							720	**520**	460	520	**390**	330	790	**590**	490	590	**440**	380
	13.1							620	**460**	360	460	**330**	260	690	**490**	390	510	**360**	300
	13.2							330	**230**	160	230	**160**	130	360	**250**	200	260	**180**	150
M	14.1							620	**390**	260	460	**300**	200	690	**430**	300	520	**330**	230
	14.2							490	**330**	200	390	**230**	160	560	**360**	230	430	**260**	200
	14.3							390	**260**	160	300	**160**	150	430	**280**	200	330	**200**	160
	14.4							330	**200**	150	260	**150**	110	360	**210**	160	300	**160**	130
K	15	1080	**790**	660	950	**690**	560	—	—	—	—	—	—	—	—	—	—	—	—
	16	840	**620**	540	720	**520**	460	—	—	—	—	—	—	—	—	—	—	—	—-
	17	900	**690**	540	790	**590**	490	750	**590**	490	560	**460**	390	—	—	—	620	**490**	430
	18	690	**390**	300	590	**360**	260	620	**460**	430	460	**360**	330	—	—	—	520	**390**	360
	19	900	**540**	480	790	**460**	390	—	—	—	—	—	—	—	—	—	—	—	—-
	20	720	**460**	330	620	**390**	300	—	—	—	—	—	—	—	—	—	—	—	—-
N	21																		
	22																		
	23																		
	24																		
	25																		
	26																		
	27																		
	28																		
	29																		
	30																		
S	31										160	**130**	110						
	32										130	**100**	80						
	33										80	**50**	30						
	34										70	**50**	20						
	35										110	**80**	50						
	36										230	**130**	100						
	37										200	**100**	80						
H	38.1																		
	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 =	0.02	0.05	0.1	0.2	0.4
fz-Factor	3.5	3	2	1.5	1
vc-Factor	1.6	1.5	1.4	1.3	1.1



WIN WITH WIDIA™

WIDIA M690 90° Shoulder Mill Series

M690 SD1204.. | **M690 SD1506..**

Strong and specially designed to streamline most milling operations, M690 Series 90º shoulder mills enable excellent shoulder finishes, enhanced chip evacuation, and optimal insert support.

- Sturdy tool design for maximum safety and productivity.
- Four cutting edges for economical and reliable machining.
- Superior shoulder finishes and smooth cutting action.

To learn more about our innovations, contact your local Authorized Distributor or visit **www.widia.com**.

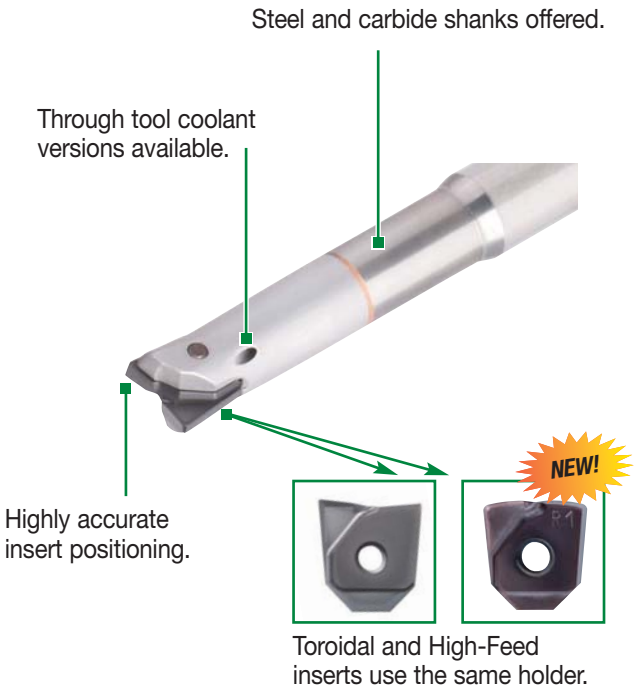
WIDIA™

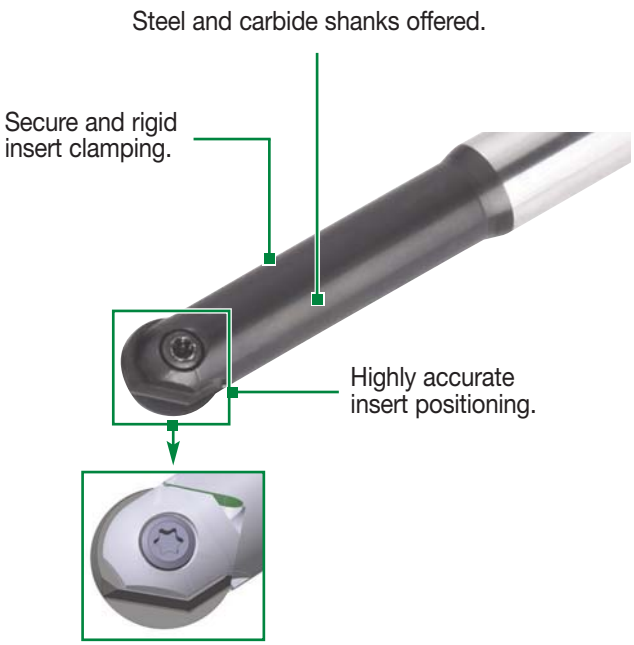
For Secure and Rigid Insert Clamping • **M270 Series**

With precision engineered ball nose, toroidal, and new high-feed inserts, the M270 Series provides the highest accuracy and insert stability for exceptional reliability and performance.

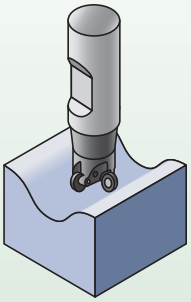
- New performance-boosting High-Feed (HF) inserts offered standard and are now available in grade TN6525™ for steel optimization.
- Ball nose and toroidal tools for semi-finishing through finishing are also available.
- V-shaped contact faces enable maximum rigidity and accuracy.

M270





Copy Mills



M270 High-Feed

Max depth of cut:
.024–.043"

Diameter: .375–.750"

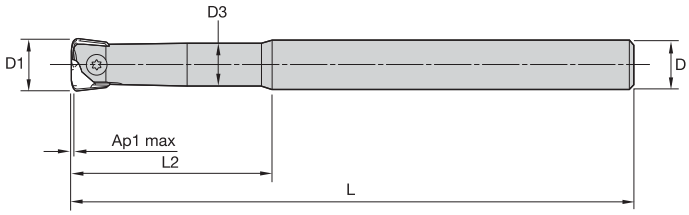
Pages: B36–B39

P
M
K
S
H

Insert Geometry		Recommended Use
	HF	High-Feed geometry for roughing and semi-finishing applications at maximum feed rates. Exceptional stability, even when long overhang is required.

For M270 ball nose and toroidal offerings, please visit www.widia.com or see catalog A-09-02080.

- High metal removal rates.
- Excellent in long reach applications.
- Rough and semi-finish applications.



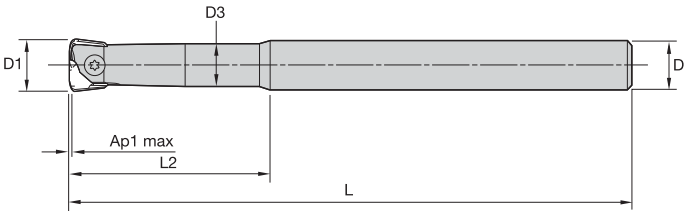
M270 High-Feed

order number	catalog number	D1	D	D3	L	L2	Ap1 max	Z	Z U	insert	max RPM	coolant supply	lbs
4145101	**M270TD037C037L525**	.375	.375	—	5.250	.750	.024	1	2	M270HF0375	57000	Yes	.14
3904063	**M270TD037C037L555**	.375	.375	.345	5.550	1.800	.024	1	2	M270HF0375	57000	Yes	.14
4145102	**M270TD050C050L550**	.500	.500	.417	5.500	1.000	.024	1	2	M270HF0500	55000	Yes	.24
3904064	**M270TD050C050L575**	.500	.500	.417	5.750	2.000	.024	1	2	M270HF0500	55000	Yes	.24
4145103	**M270TD062C062L575**	.625	.625	.509	5.750	1.250	.035	1	2	M270HF0625	53000	Yes	.39
3904065	**M270TD062C062L600**	.625	.625	.559	6.000	2.300	.035	1	2	M270HF0625	53000	Yes	.40
4145104	**M270TD075C075L675**	.750	.750	—	6.750	1.500	.043	1	2	M270HF0750	52000	Yes	.69
3904066	**M270TD075C075L700**	.750	.750	.707	7.000	2.800	.043	1	2	M270HF0750	52000	Yes	.70

Spare Parts

D1	insert screw	in. lbs.	Torx driver
.375	**12748610500**	18	**12148788900**
.500	**12748610600**	18	**12148788900**
.625	**12748610700**	44	**12148099300**
.750	**12748610800**	44	**12148099300**

- High metal removal rates.
- Excellent in long reach applications.
- Carbide shank.

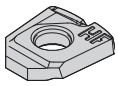


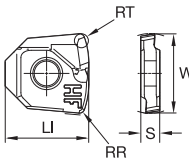
M270 High-Feed

order number	catalog number	D1	D	D3	L	L2	Ap1 max	Z	Z U	insert	max RPM	coolant supply	lbs
2639258	**M270TD037C050L555C**	.375	.500	.345	5.550	1.800	.024	1	2	M270HF0375	57000	Yes	.44
2639259	**M270TD050C050L575C**	.500	.500	.417	5.750	2.000	.024	1	2	M270HF0500	55000	Yes	.55
2639260	**M270TD062C062L600C**	.625	.625	.559	6.000	2.300	.035	1	2	M270HF0625	53000	Yes	.88
2639261	**M270TD075C075L700C**	.750	.750	.707	7.000	2.800	.043	1	2	M270HF0750	52000	Yes	1.32

Spare Parts

D1	insert screw	in. lbs.	Torx driver
.375	**12748610500**	18	**12148788900**
.500	**12748610600**	18	**12148788900**
.625	**12748610700**	44	**12148099300**
.750	**12748610800**	44	**12148099300**





● first choice
○ alternate choice

		TN2505	TN6525	TN6540
P		○	●	●
M			○	●
K		●	○	○
N				
S				●
H		●	○	

■ M270 High-Feed

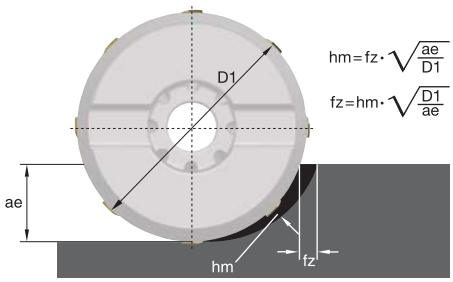
catalog number	W	LI	S	RR	RT	TN2505	TN6525	TN6540
M270HF0375	.375	.414	.094	.023	.044	●	●	●
M270HF0500	.500	.488	.125	.031	.057	●	●	●
M270HF0625	.625	.654	.187	.039	.070	●	●	●
M270HF0750	.750	.792	.187	.047	.090	●	●	●

NOTE: RT = Programming Radius.

		TN2505			TN6525			TN6540		
Edge Geometry		feed per tooth fz (inch)								
.375		.0059	**.0098**	.0110	.0059	**.0098**	.0110	.0059	**.0118**	.0197
.500		.0059	**.0118**	.0138	.0059	**.0118**	.0138	.0059	**.0157**	.0197
.625		.0059	**.0157**	.0177	.0059	**.0157**	.0177	.0059	**.0197**	.0236
.750		.0059	**.0197**	.0217	.0059	**.0197**	.0217	.0059	**.0236**	.0276
Material Group		vc (ft/min)								
P	1	—	—	—	1150	**890**	750	950	**740**	620
	2	—	—	—	790	**590**	520	660	**490**	430
	3	—	—	—	660	**490**	430	560	**430**	360
	4	—	—	—	690	**520**	430	560	**430**	360
	5	—	—	—	560	**430**	360	480	**340**	300
	6	—	—	—	750	**560**	460	620	**480**	390
	7	—	—	—	560	**430**	390	480	**360**	310
	8	—	—	—	490	**390**	330	430	**310**	260
	9	—	—	—	430	**330**	260	360	**260**	210
	10	560	**460**	430	560	**460**	430	480	**380**	340
	11	360	**260**	230	390	**300**	230	310	**230**	180
	12	720	**560**	460	720	**560**	460	610	**460**	390
	13.1	620	**460**	360	620	**460**	390	520	**380**	310
	13.2	330	**230**	200	310	**230**	200	260	**200**	160
M	14.1				620	**390**	300	520	**310**	230
	14.2				490	**300**	230	430	**250**	180
	14.3				390	**230**	160	310	**180**	150
	14.4				330	**200**	130	260	**160**	110
K	15	—	—	—	—	—	—	—	—	—
	16	—	—	—	—	—	—	—	—	—
	17	790	**590**	520	790	**590**	520	660	**490**	430
	18	660	**520**	430	660	**490**	430	560	**430**	360
	19	—	—	—	—	—	—	—	—	—
	20	—	—	—	—	—	—	—	—	—
N	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									
S	31							200	**160**	150
	32							160	**130**	110
	33							110	**80**	70
	34							100	**70**	50
	35							100	**70**	50
	36							260	**160**	130
	37							230	**150**	110
H	38.1	520	**390**	260	390	**300**	230			
	38.2	520	**390**	260	—	—	—			
	39.1	390	**330**	200	—	—	—			
	39.2	390	**330**	200	—	—	—			

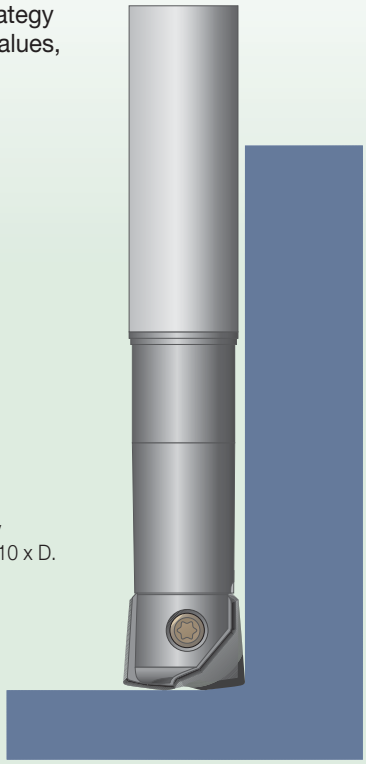
*First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	≤0.2	0.3	0.4
fz-Factor	1.5	1.3	1
vc-Factor	1.3	1.2	1.1

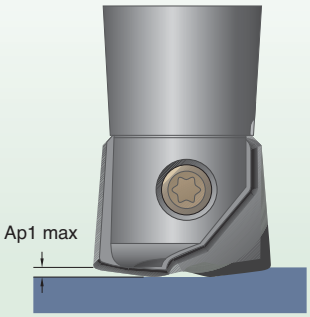


Applying High-Feed Tools

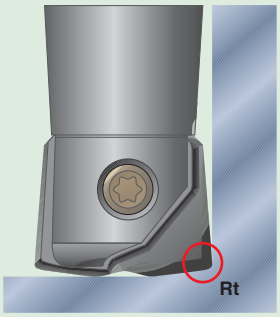
The High-Feed concept bases its strategy on small depth of cut and higher fz values, which result in a higher MRR and productivity with low radial forces.



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



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.

L/D ratio	% of Ap1 max to reduce	% of vc to reduce
<4	0%	0%
4<L/D<7	55–65%	10–15%
>8	65–75%	20–30%

General Programming Information for Applying M270 High-Feed

tool diameter	.375"	.500"	.625"	.750"
recommended starting Ap1 (inch)	.016	.016	.023	.030
Rt CAM programming	.044	.057	.070	.090
fz recommended for general purpose	.020	.022	.024	.030
fz recommended for 45 HRC (approximately)	.015	.018	.022	.026
fz recommended for 55 HRC (approximately)	.012	.014	.018	.020

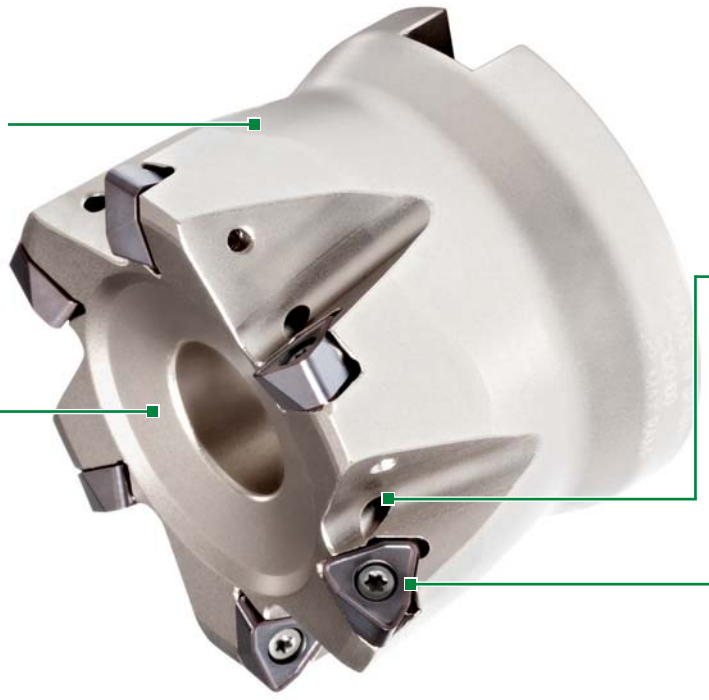
Use two effective teeth for feed calculations.
For materials above 45 HRC, we recommend adjusting the ae max to 55% of cutting diameter and using no more than 50% of Ap1 max.
While center cutting is possible, we recommend using a ramp angle of 0.5˚–1.0˚ to ensure smooth operation.

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

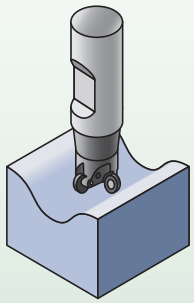
Designed for high feed rate productivity, M370 Series provides the latest insert technology with outstanding performance and reliability. Its double-sided concept and six cutting edges provide security and optimal metal removal with an efficient cost per edge.

M370™

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



Copy Mills

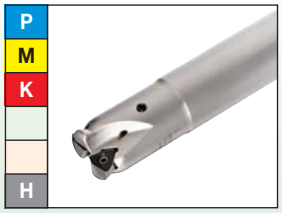


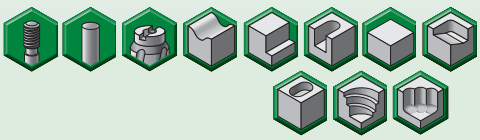
M370™

Max depth of cut: .049"

Diameter: 1–3"

Pages: B42–B47





Insert Geometry		Recommended Use
	MH	First choice for high-feed roughing in steel and cast iron materials.
	MM	First choice for soft steel and stainless steel. Lower cutting forces.

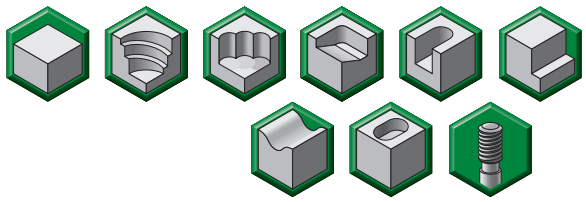
M370 Application Example:

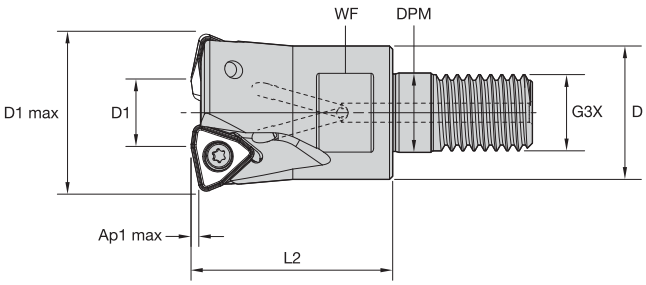
M370 MH geometry versus conventional High-Feed cutter

- Application: pocketing and face milling
- Material: P6 steel
- Component: injection mold
- Holder length: 3.15"
- Workpiece dimensions: 15.75" x 12" x 15.75"

Tool:	Diameter 32; M370D032Z04M16WO08
Insert:	W0EJ080412SRMH TN6525
vc:	656 SFM
fz:	0.060" per tooth
Ap:	0.020"
ae:	80–100%
vf:	472 IPM
Coolant:	MQL
Comment:	25% higher tool life versus 3-edged, single-sided competitor, plus M370 offers 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.





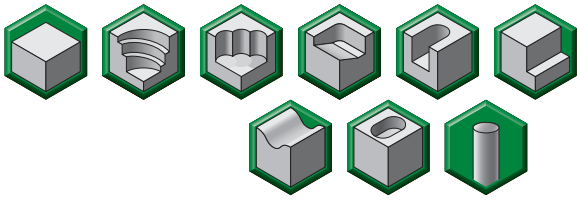
M370

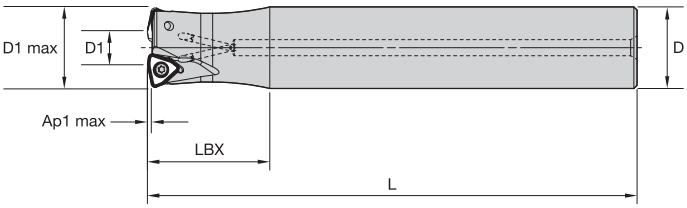
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
4047591	**M370D100Z02M12WO08**	1.000	.460	.827	.492	M12	1.250	.669	.048	2	45500	Yes	.19
4171164	**M370D100Z03M12WO08**	1.000	.460	.827	.492	M12	1.377	.667	.048	3	46000	Yes	.19
4171165	**M370D125Z02M16WO08**	1.250	.700	1.132	.669	M16	1.500	.940	.048	2	38900	Yes	.41
4047592	**M370D125Z03M16WO08**	1.250	.700	1.132	.669	M16	1.500	.945	.048	3	38900	Yes	.41
4047653	**M370D150Z03M16WO08**	1.500	.950	1.142	.669	M16	1.500	.866	.048	3	34500	Yes	.49
4171166	**M370D150Z04M16WO08**	1.500	.950	1.142	.669	M16	1.500	.945	.049	4	34500	Yes	.48

Spare Parts

D1 max	 insert screw	in.lbs.	 wrench
1.000	**MS1966**	16	**170.028**
1.250	**MS1966**	16	**170.028**
1.500	**MS1966**	16	**170.028**

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





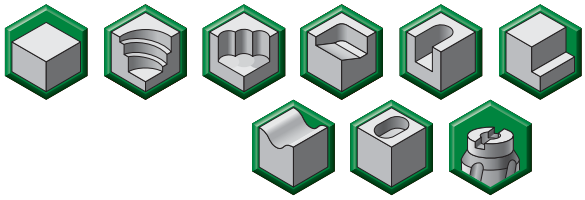
M370

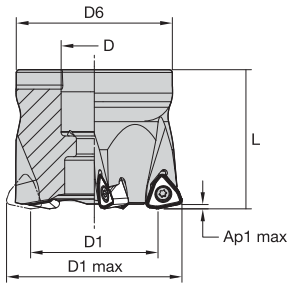
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
4047654	**M370D100Z02C100WO08L600**	1.000	.460	1.000	6.000	1.500	.048	2	45500	Yes	1.17
4047655	**M370D100Z02C100WO08L800**	1.000	.460	1.000	8.000	1.500	.048	2	45500	Yes	1.60
4047656	**M370D100Z03C100WO08L600**	1.000	.460	1.000	6.000	1.500	.048	3	45500	Yes	1.16
4047657	**M370D125Z03C125WO08L600**	1.250	.700	1.250	6.000	1.500	.048	3	38900	Yes	1.87
4047658	**M370D125Z03C125WO08L800**	1.250	.700	1.250	8.000	1.500	.048	3	38900	Yes	2.55
4047659	**M370D150Z03C125WO08L600**	1.500	.950	1.250	6.000	1.500	.049	3	34500	Yes	1.97
4171167	**M370D150Z03C125WO08L800**	1.500	.950	1.250	7.686	1.500	.049	3	34500	Yes	5.11
4171168	**M370D150Z04C150WO08L600**	1.500	.950	1.500	6.000	1.500	.049	4	34500	Yes	2.70

Spare Parts

D1 max	 insert screw	in.lbs.	 wrench
1.000	**MS1966**	16	**170.028**
1.250	**MS1966**	16	**170.028**
1.500	**MS1966**	16	**170.028**

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



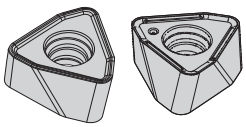


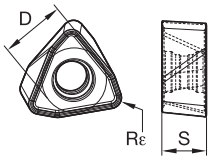
M370

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4047660	**M370D150Z04S050W008**	1.500	.950	.500	1.417	1.575	.049	4	34500	Yes	.41
4047661	**M370D200Z05S075W008**	2.000	1.450	.750	1.732	1.575	.049	5	29000	Yes	.82
4047662	**M370D200Z07S075W008**	2.000	1.450	.750	1.732	1.575	.049	7	29000	Yes	.83
4171169	**M370D250Z07S075W008**	2.500	1.950	.750	1.732	1.575	.048	7	29000	Yes	1.42
4171170	**M370D300Z08S100W008**	3.000	2.270	1.000	2.362	1.968	.049	8	22900	Yes	4.82

M370 • Spare Parts

D1 max	insert screw	in.lbs.	wrench	socket-head cap screw	socket-head cap screw with coolant groove
1.500	**MS1966**	16	**170.028**	**S424**	**–**
2.000	**MS1966**	16	**170.028**	**–**	**12146102400**
2.500	**MS1966**	16	**170.028**	**–**	**12146102400**
3.000	**MS1966**	16	**170.028**	**MS2038**	**MS2038CG**





● first choice
○ alternate choice

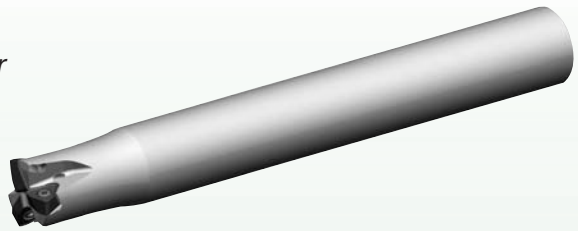
P		○	●	●	
M			○	●	
K	●	●	○	○	
N					
S					
H			○		

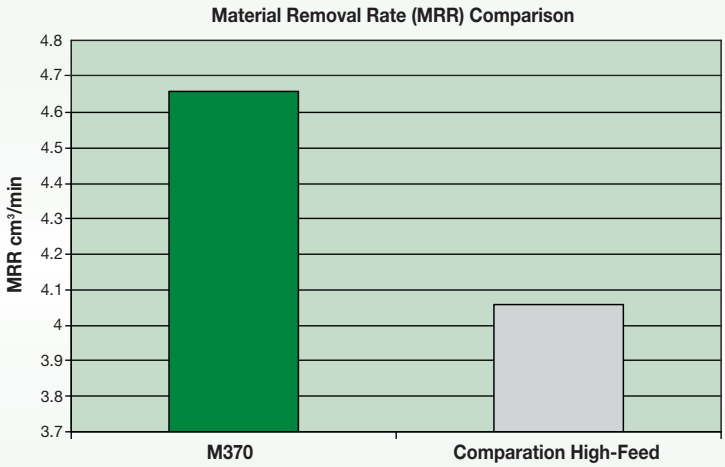
■ WOEJ-MH and -MM

catalog number	cutting edges	D	S	Rε	TN5515	TN6520	TN6525	TN6540
WOEJ080412SRMH	6	.307	.187	.048	●	●	●	●
WOEJ080412SRMM	6	.307	.185	.048		●	●	●

M370 Application Example:

M370 MM geometry versus conventional High-Feed cutter
- Application: pocketing — roughing
- Material: P5 high-alloy steel, 300HB
- Component: forging die
- Machine: BT40 vertical milling center





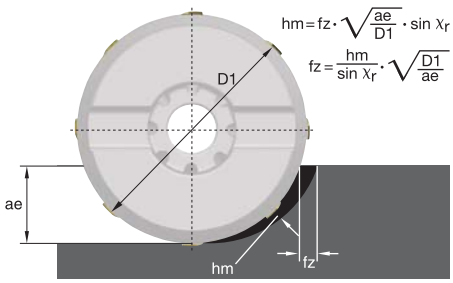
M370 improves tool life and productivity in comparison to conventional single-sided High-Feed platforms.

Tool:	M370D100Z03C100WO08L600 (Dia. 1.00 in)
Insert:	WOEJ080412SRMM TN6540
vc:	528 SFM
fz:	0.035 ipt
Ap:	0.02 in
ae:	Variable
vf:	242 IPM
Coolant:	Dry
Comment:	Considering the weakness from the machine, M370 achieves 32% longer tool life operating with higher cutting condition, improving productivity by 20%.

		TN5515			TN6525			TN6540			TN6540		
Edge Geometry		feed per tooth fz (inch)											
..-MM		.014	**.031**	.059	.014	**.031**	.059	.014	**.031**	.059	.014	**.035**	.063
..-MH		.014	**.045**	.070	.014	**.040**	.065	.014	**.040**	.065	.014	**.045**	.070
Material Group		vc (ft/min)											
P	1				—	—	—	1150	**890**	750	950	**720**	620
	2				—	—	—	790	**590**	520	660	**490**	430
	3				—	—	—	660	**490**	430	560	**430**	360
	4				—	—	—	690	**520**	430	560	**430**	360
	5				—	—	—	560	**430**	360	460	**330**	300
	6				750	**560**	460	750	**560**	460	620	**460**	390
	7				560	**430**	390	560	**430**	390	460	**360**	330
	8				490	**390**	330	490	**390**	330	430	**330**	260
	9				430	**330**	260	430	**330**	260	360	**260**	200
	10				560	**460**	430	560	**460**	430	460	**390**	330
	11				390	**300**	230	390	**300**	230	330	**230**	200
	12				—	—	—	720	**560**	460	590	**460**	390
	13.1				—	—	—	620	**460**	390	520	**390**	330
	13.2				—	—	—	310	**230**	200	260	**200**	160
M	14.1							620	**390**	300	520	**330**	230
	14.2							490	**300**	230	430	**260**	200
	14.3							390	**230**	160	330	**200**	130
	14.4							330	**200**	130	260	**160**	130
K	15	1740	**1280**	920	1250	**920**	660	—	—	—	—	—	—
	16	1350	**1020**	750	980	**720**	560	—	—	—	—	—	—
	17	1510	**1020**	750	1120	**720**	560	790	**590**	520	660	**490**	430
	18	980	**720**	560	720	**520**	390	660	**490**	430	560	**430**	360
	19	1210	**950**	720	890	**690**	520	—	—	—	—	—	—
	20	1020	**750**	590	720	**560**	430	—	—	—	—	—	—
N	21												
	22												
	23												
	24												
	25												
	26												
	27												
	28												
	29												
	30												
S	31												
	32												
	33												
	34												
	35												
	36												
	37												
H	38.1							390	**300**	230			
	38.2							—	—	—			
	39.1							—	—	—			
	39.2							—	—	—			

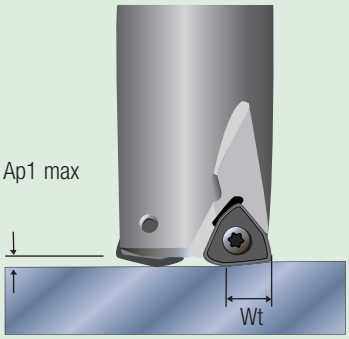
*First choice starting feed (fz) is in **bold** type.*
Use corresponding speed (vc).
fz and vc are valid for ae ≥0.4 D1.
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1

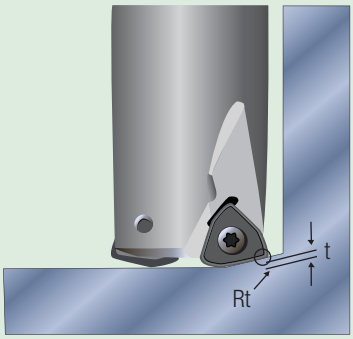


Applying High-Feed Tools

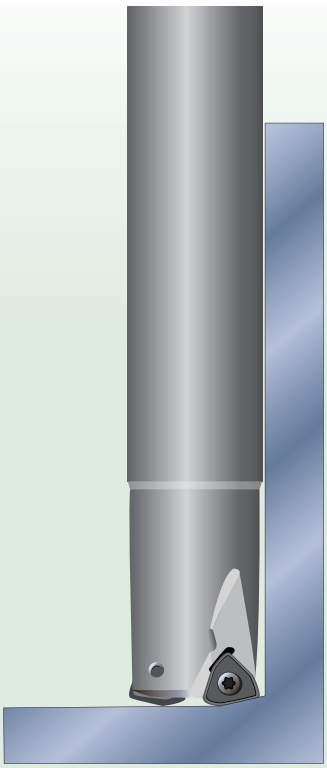
The High-Feed concept bases its strategy on small depth of cut and higher fz values, which result in a higher MRR and productivity with low radial forces.



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.

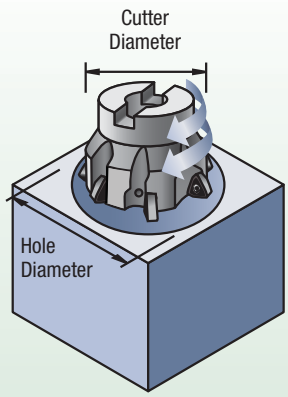
General Programming Information for Applying M370

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

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

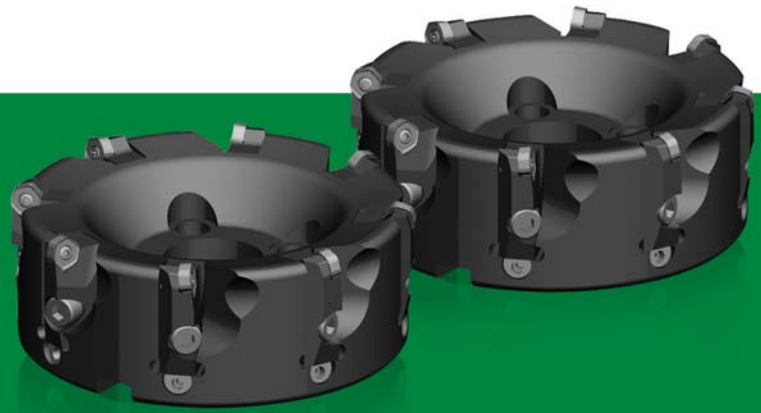
Maximum Linear Ramping and Helical Interpolation from Solid

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	1,0°	112,0	131,5	1,25
80	0,8°	140.0	155.5	1.25
1.00"	3.1°	1.41"	1.98"	0.049"
1.25"	2.2°	1.91"	2.48"	0.049"
1.50"	1.8°	2.41"	2.98"	0.049"
2.00"	1.3°	3.40"	3.98"	0.049"
2.50"	1,0°	4.66"	4.98"	0.049"
3.00"	0,8°	5.22"	5.98"	0.049"



Roughing and Finishing in One Tool • **WIDIA M4000**

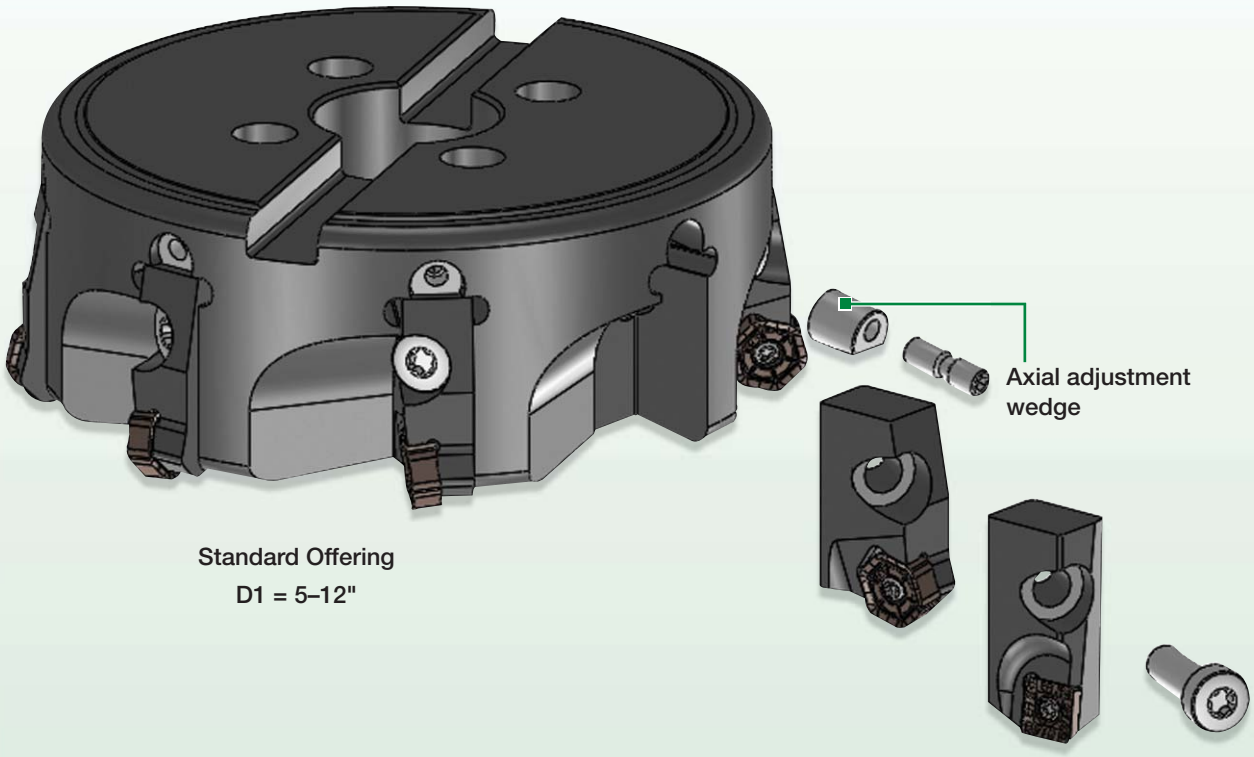
Cartridges with different insert styles and lead angles can be changed easily.



M4000

- Roughing and finishing solution with a single tool.
- Adjustable pockets and cartridge stop feature.
- Easily change cartridges with different insert styles and lead angles.
- Best-in-class flexibility for less money.
- Easy runout adjustment.
- Perfect floor surface for finishing operations.

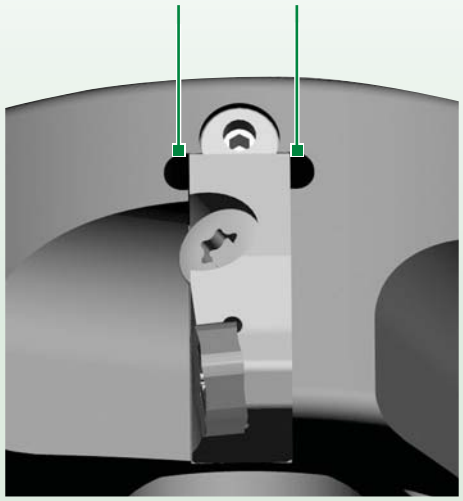
Roughing and Finishing with a Single Tool



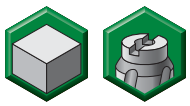
Standard Offering
D1 = 5–12"

Quick Cartridge Stop

Ready to go in a minute with
no adjustment for roughing.



- Roughing and finishing with one single tool.
- Quick cartridge stop feature.
- Easy runout adjustment.
- Easy change of cartridges with different insert styles and lead angles.



M4000 Cartridge Milling System

order number	catalog number	D1	D	D4	D6	L	number of cartridges	coolant supply	lbs
4136310	**M4000D500Z06ADJ**	5.000	1.500	—	4.252	2.480	6	No	7.81
4136311	**M4000D500Z08ADJ**	5.000	1.500	—	4.252	2.480	8	No	7.41
4136312	**M4000D600Z08ADJ**	6.000	2.000	—	5.394	2.480	8	No	12.18
4136353	**M4000D600Z12ADJ**	6.000	2.000	—	5.394	2.480	12	No	10.56
4136354	**M4000D800Z10ADJ**	8.000	2.500	4.000	5.394	2.480	10	No	10.56
4136355	**M4000D800Z14ADJ**	8.000	2.500	4.000	5.394	2.480	14	No	10.56
4136356	**M4000D1000Z12ADJ**	10.000	2.500	4.000	5.394	2.480	12	No	10.56
4136357	**M4000D1000Z18ADJ**	10.000	2.500	4.000	5.394	2.480	18	No	10.56
4136358	**M4000D1200Z16ADJ**	12.400	2.500	4.000	11.535	3.150	16	No	66.31
4136359	**M4000D1200Z22ADJ**	12.400	2.500	4.000	11.535	3.150	22	No	66.31

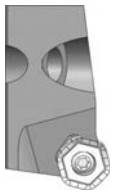
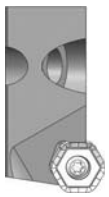
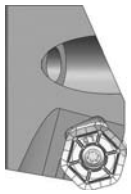
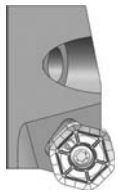
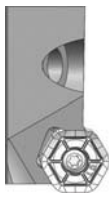
Spare Parts • For diameter 5.000"–12.000"

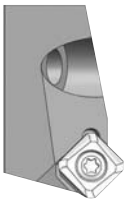
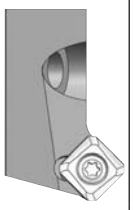
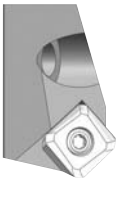
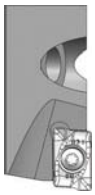
cartridge screw	in. lbs.	wedge	adjusting screw
MS1294	**177**	12748308500	**12748600900**

Cartridges

order number	catalog number	insert style	master platform *	Ap max
4159022	**M4000CA-AD1505**	AD.T1505	—	.55
4159020	**M4000CA-AP1003**	AP.T1003	—	.31
4159021	**M4000CA-AP1604**	AP.T1604	—	.59
3968124	**M4000CA-HN07**	HN.J0704/XNGJ0704	M1200 Mini	.14
4159018	**M4000CA-HN07HD**	HN.J0704	M1200 Mini	.18
4159017	**M4000CA-HN07HF**	HN.J0704	M1200 Mini	.06
3126691	**M4000CA-HN09**	HN.J0905/XNGJ0905	M1200	.17
4159019	**M4000CA-HN09HD**	HN.J0905	M1200	.24
3954792	**M4000CA-HN09HF**	HN.J0905	M1200	.08
2511344	**M4000CA-HP06**	HP.T06T3	M640	.18
2006361	**M4000CA-MDHX10**	MDHX1004	—	.03
2006346	**M4000CA-RC1606**	RC.T1606	M100	.31
2067492	**M4000CA-SD1204**	SDM.1204	M690	.39
2006359	**M4000CA-SD1506**	SDM.1506	M690	.47
2006374	**M4000CA-SE1203**	SE.N1203/SE.R1203	M68	.23
2033495	**M4000CA-SE1204**	SE.N1204/SE.R1204	M68	.23
2006377	**M4000CA-SE1504**	SE.N1504/SE.R1504	M68	.31
2006348	**M4000CA-SN12**	SN.T1205/XNKT1205	M660	.25
2006357	**M4000CA-SN12RC**	SN.T1205	M660	.25
2006360	**M4000CA-SN15**	SN.T1505	M660	.31
2006362	**M4000CA-SP12**	121358680	M40Wiper	.02
2006373	**M4000CA-SP1203**	SP.N1203/SP.R1203	M40	.35
2006376	**M4000CA-SP1504**	SP.N1504	M40	.47
2033496	**M4000CA-TP1603**	TP.N1603/TP.R1603	M40	.47
2006379	**M4000CA-TP2204**	TP.N2204/TP.R2204	M40	.7
2006347	**M4000CA-XP16**	XP.T1604	M680	.55

**For all details regarding insert offering and cutting conditions, please refer to the master platforms.*

	 M4000CA-MDHX10CA	 M4000CA-HN07HF	 M4000CA-HN07	 M4000CA-HN07HD	 M4000CA-HN09HF	 M4000CA-HN09	 M4000CA-HN09HD	 M4000CA-HP06
	order number 2006361	order number 4159017	order number 3968124	order number 4159018	order number 3954792	order number 3126691	order number 4159019	order number 2511344
D1	D1max	D1max	D1max	D1max	D1max	D1max	D1max	D1max
5.000	5.000	5,472	5.276	5.197	5.630	5.354	5.236	5.173
6.000	6.000	6.850	6.654	6.575	7.008	6.732	6.614	6.551
8.000	8.000	8.425	8.228	8.150	8.583	8.307	8.189	8.126
10.000	10.000	10.393	10.197	10.118	10.551	10.276	10.157	10.094
12.000	12.000	12.953	12.756	12.678	13.110	12.835	12.717	12.654

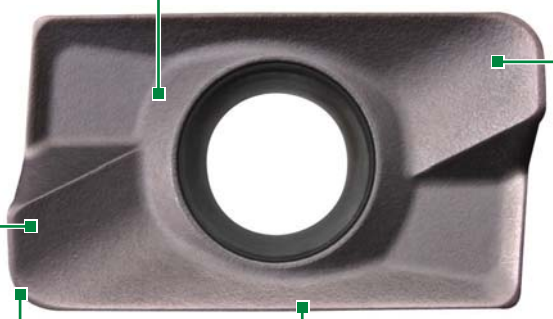
	 M4000CA-SN12	 M4000CA-SN12RC	 M4000CA-SN15	 M4000CA-XP16	 M4000CA-AP1003	 M4000CA-AD1505	 M4000CA-AP1604	 M4000CA-SD1204	 M4000CA-SD1506
	order number 2006348	order number 2006357	order number 2006360	order number 2006347	order number 4159020	order number 4159022	order number 4159021	order number 2067492	order number 2006359
D1	D1max	D1max	D1max	D1max	D1max	D1max	D1max	D1max	D1max
5.000	5.484	5.484	5.630	5.000	5.000	5.000	5.000	5.000	5.000
6.000	6.862	6.862	7.008	6.000	6.000	6.000	6.000	6.000	6.000
8.000	8.437	8.437	8.583	8.000	8.000	8.000	8.000	8.000	8.000
10.000	10.406	10.406	10.551	10.000	10.000	10.000	10.000	10.000	10.000
12.000	12.965	12.965	13.110	12.000	12.000	12.000	12.000	12.000	12.000

	 M4000CA-RC1606	 M4000CA-SE1203	 M4000CA-SE1204	 M4000CA-SE1504	 M4000CA-SP1203	 M4000CA-SP12 Wiper	 M4000CA-SP1504	 M4000CA-TP1603	 M4000CA-TP2204
	order number 2006346	order number 2006374	order number 2033495	order number 2006377	order number 2006373	order number 2006362	order number 2006376	order number 2033496	order number 2006379
D1	D1max	D1max	D1max	D1max	D1max	D1max	D1max	D1max	D1max
5.000	5.000	5,472	5,472	5.630	5.142	5.205	5.205	5.000	5.000
6.000	6.000	6.850	6.850	7.008	6.520	6.583	6.583	6.000	6.000
8.000	8.000	8.425	8.425	8.583	8.094	8.157	8.157	8.000	8.000
10.000	10.000	10.393	10.393	10.551	10.063	10.126	10.126	10.000	10.000
12.000	12.000	12.953	12.953	13.110	12.622	12.685	12.685	12.000	12.000

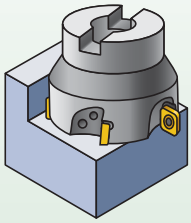
Industry Standard Inserts Available in Premium WIDIA™ Grades • **WIDIA ISO Insert Additions**

Now offering a simple choice for direct replacement inserts in tools commonly used in the market place. We created universal geometries providing performance, long tool life, low cutting forces, and high reliability to provide a winning WIDIA option.

ISO



90° Shoulder Mills



APPT1604..

Max depth of cut: .590"

Lead angle: 90°
Indexes per insert: 2

Pages: B54–B56

P
M
K
S

Insert Geometry		Recommended Use
	ERMM	First choice for general machining in stainless steel and low carbon steels.
	SRMM	First choice for general machining in steel and cast iron materials. Best option for general-purpose use.

ADPT1505..

Max depth of cut: .550"

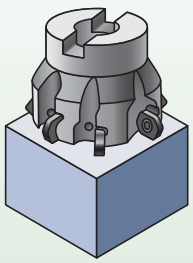
Lead angle: 90°
Indexes per insert: 2

Pages: B54–B56

P
M
K
S

Insert Geometry		Recommended Use
	ERMM	First choice for general machining. Best option for general-purpose use.

Face Mills



SEPT13T3..

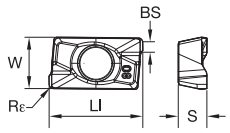
Max depth of cut: .236"

Lead angle: 45°
Indexes per insert: 4

Pages: B54–B56

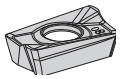
P
M
K
S

Insert Geometry		Recommended Use
	MM	First choice for general machining. Best option for general-purpose use.



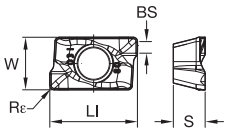
● first choice
○ alternate choice

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



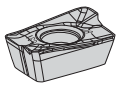
■ APPT

catalog number	cutting edges	W	LI	S	BS	Rε	TN6520	TN6525	TN6540
APPT160408PDERMM	2	.371	.679	.207	.058	.031		●	●
APPT160408PDSRMM	2	.371	.678	.207	.056	.031	●	●	●
APPT160416PDERMM	2	.371	.678	.207	.056	.062		●	●
APPT160416PDSRMM	2	.371	.678	.207	.056	.062	●	●	●
APPT160424PDERMM	2	.371	.673	.207	.046	.094			●
APPT160432PDERMM	2	.371	.664	.207	—	.125		●	●



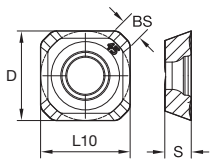
● first choice
○ alternate choice

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



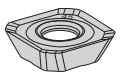
■ ADPT

catalog number	cutting edges	W	LI	S	BS	Rε	TN6520	TN6525	TN6540
ADPT150508ERMM	2	.380	.635	.230	.084	.031	●	●	●
ADPT150516ERMM	2	.380	.635	.230	.053	.062	●	●	●
ADPT150524ERMM	2	.380	.612	.230	.034	.094			●
ADPT150532ERMM	2	.380	.607	.230	—	.125			●



● first choice
○ alternate choice

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



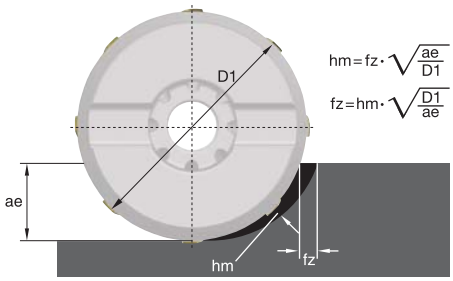
■ SEPT

catalog number	cutting edges	D	L10	S	BS	TN6520	TN6525	TN6540
SEPT13T3AGENMM	4	.528	.528	.156	.098	●	●	●

		TN6520			TN6525			TN6540		
Edge Geometry		feed per tooth fz (inch)								
..ERMM		.0040	**.0080**	.0120	.0030	**.0055**	.0080	.0035	**.0070**	.0100
..SRMM		.0050	**.0100**	.0140	.0040	**.0080**	.0100	.0045	**.0100**	.0140
Material Group		vc (ft/min)								
P	1				980	**750**	620	820	**660**	560
	2				750	**590**	490	560	**460**	390
	3				620	**460**	430	460	**360**	330
	4				660	**490**	460	490	**390**	330
	5				560	**390**	360	430	**300**	260
	6				720	**560**	460	560	**430**	330
	7				560	**460**	360	430	**330**	260
	8				460	**360**	330	360	**260**	230
	9				460	**330**	260	330	**230**	200
	10				560	**460**	390	430	**330**	300
	11				360	**300**	200	260	**200**	160
	12				720	**520**	460	520	**390**	330
	13.1				620	**460**	360	460	**330**	260
	13.2				330	**230**	160	230	**160**	130
M	14.1				620	**390**	260	460	**300**	200
	14.2				490	**330**	200	390	**230**	160
	14.3				390	**260**	160	300	**160**	150
	14.4				330	**200**	150	260	**150**	110
K	15	950	**690**	560	—	—	—	—	—	—
	16	720	**520**	460	—	—	—	—	—	—
	17	790	**590**	490	750	**590**	490	560	**460**	390
	18	590	**360**	260	620	**460**	430	460	**360**	330
	19	790	**460**	390	—	—	—	—	—	—
	20	620	**390**	300	—	—	—	—	—	—
N	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									
S	31							160	**130**	110
	32							130	**100**	80
	33							80	**50**	30
	34							70	**50**	20
	35							110	**80**	50
	36							230	**130**	100
	37							200	**100**	80
H	38.1									
	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:

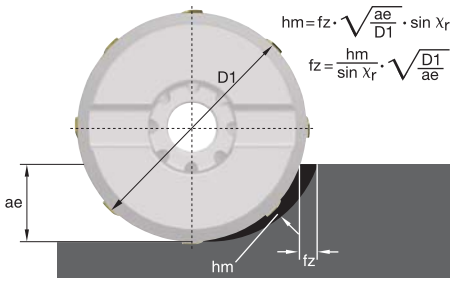
ae/D1 =	0.02	0.05	0.1	0.2	0.4
fz-Factor	3.5	3	2	1.5	1
vc-Factor	1.6	1.5	1.4	1.3	1.1



		TN6520			TN6525			TN6540		
Edge Geometry		feed per tooth fz (inch)								
..ENMM		.0060	**.0110**	.0180	.0040	**.0080**	.0120	.0060	**.0100**	.0140
Material Group		vc (ft/min)								
P	1				1150	**890**	750	950	**720**	620
	2				790	**590**	520	660	**490**	430
	3				660	**490**	430	560	**430**	360
	4				690	**520**	430	560	**430**	360
	5				560	**430**	360	460	**330**	300
	6				750	**560**	460	620	**460**	390
	7				560	**430**	390	460	**360**	330
	8				490	**390**	330	430	**330**	260
	9				430	**330**	260	360	**260**	200
	10				560	**460**	430	460	**390**	330
	11				390	**300**	230	330	**230**	200
	12				720	**560**	460	590	**460**	390
	13.1				620	**460**	390	520	**390**	330
	13.2				310	**230**	200	260	**200**	160
M	14.1				620	**390**	300	520	**330**	230
	14.2				490	**300**	230	430	**260**	200
	14.3				390	**230**	160	330	**200**	130
	14.4				330	**200**	130	260	**160**	130
K	15	1250	**920**	660	—	—	—	—	—	—
	16	980	**720**	560	—	—	—	—	—	—
	17	1120	**720**	560	790	**590**	520	660	**490**	430
	18	720	**520**	390	660	**490**	430	560	**430**	360
	19	890	**690**	520	—	—	—	—	—	—
	20	720	**560**	430	—	—	—	—	—	—
N	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									
S	31							200	**160**	150
	32							160	**130**	110
	33							110	**80**	70
	34							100	**70**	50
	35							100	**70**	50
	36							260	**160**	130
	37							230	**150**	110
H	38.1									
	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 =	0.1	0.2	0.3	0.4
fz-Factor	2.0	1.5	1.3	1.0
vc-Factor	1.4	1.3	1.2	1.1



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