

IASR/ASR



**Special Radius Cutting Edge
for Highest-Efficiency Milling**



**MODULAR
STYLE**



**FACE MILL
STYLE**



FEATURES

Extraordinary metal removal and feed rates

Dramatic reduction in cutting deflection and force

2-5 times better performance than conventional radius cutters

Reduced radial deflection even with long overhauls

INTRODUCTION

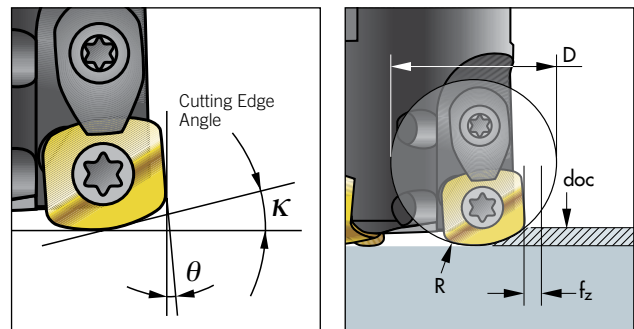
MOLDINO is pleased to present a cutter for the new millennium: the ASR. This addition to the MOLDINO Die/Mold Tooling Line is able to achieve extraordinary feeds and metal removal rates in roughing applications on both new and old machines.

The chart below demonstrates the performance difference between standard round insert style cutters and the new ASR. In most cases we are able to increase the feed (f_z) up to five times without the need to increase the cutting speed (V_c) thus stabilizing or even increasing tool life.

FEATURES

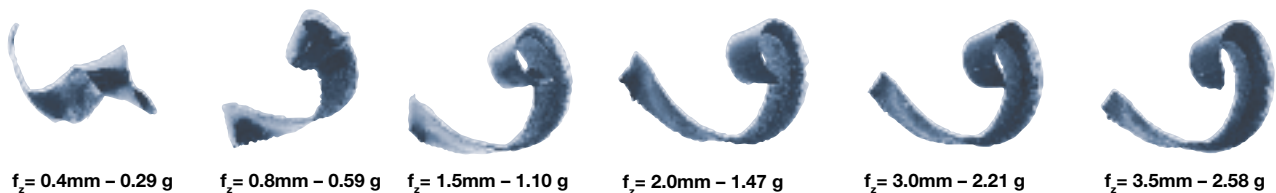
1. Specialized Radius Cutting Edge for Highest-Efficiency Machining

Thanks to the combination of the shortened cutting edge and special angle, deflection and force during the cutting process are dramatically reduced compared to round insert style cutters. This stabilizes the load and makes high-feed machining possible.



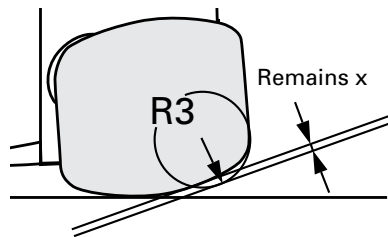
2. Extraordinary Feed Rates

The ASR's low cut structure enables increases in feed per tooth of up to five times. When cutting steel, a feed per tooth of 0.6 to 3.5mm (0.024" to 0.138") is achievable and already being successfully used. Feed per tooth in cast iron is 0.8 to 4.0mm (0.032" to 0.160"). The data below compares shape and weight of steel chips at different feeds per tooth.

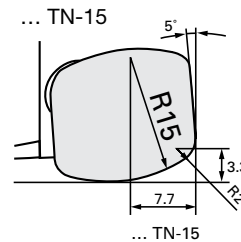


3. Programming Information

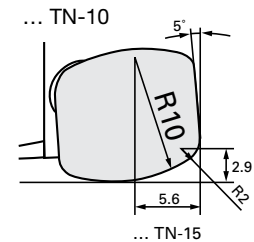
By programming R3 (theoretic) as the tool radius, the maximum difference between programming and the final shape is shown. These small remains will be left in some corners, and will be corrected later by semi-finishing or finishing operations.



Approximate Input Corner R : R3
(for all Inserts)



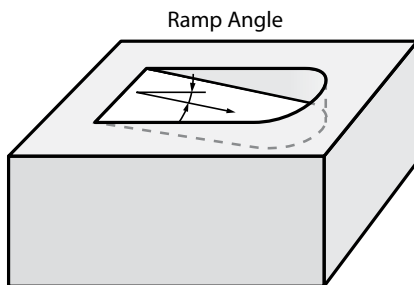
x = approx. 0.6 mm
(0.0236")



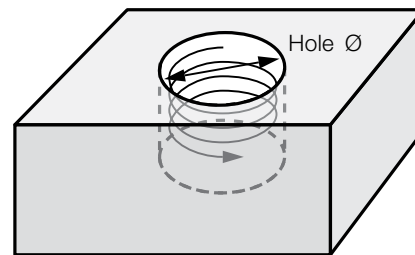
x = approx. 0.5 mm
(0.0197")

4. Direct Milling

Even though the ramp angle is limited due to the cutting edge design, both ramping and helical milling are possible. Please use the following recommendations:



Slant Milling



Helical Milling

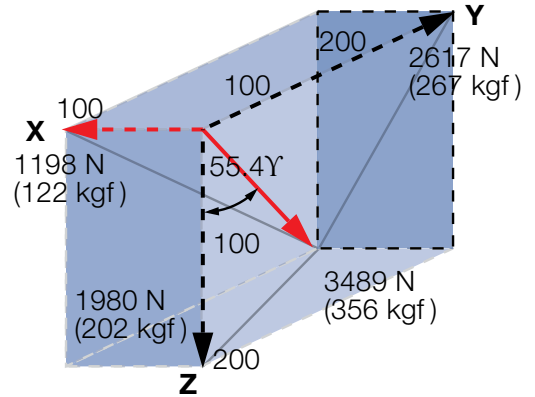
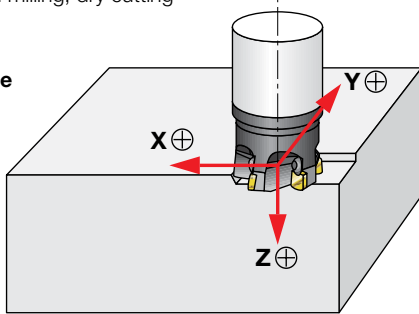
Tool Diameter	20mm or 0.75"	25mm or 1.00"	30mm	32mm or 1.25"	40mm or 1.50"	50mm or 2.00"	60mm	63mm or 2.50"	80mm or 3.00"	100mm or 4.00"
Ramp Angle	2°	2°	3°	2.5°	2°	1.5°	1°	1°	0.5°	0.5°
Helical Hole Diameter	27-38mm	37-48mm	38-58mm	42-62mm	58-78mm	78-98mm	98 - 118mm	101- 124mm	136- 158mm	176- 198mm
Helical Hole Diameter	1.06-1.50"	1.46-1.89"	1.50-2.28"	1.65-2.44"	2.28-3.07"	3.07-3.89"	3.89-4.65"	3.98-4.88"	5.35-6.22"	6.93-7.80"

5. Reduced Radial Deflection Even With Long Overhangs

When horizontal (x,y axis) machining with the ASR, radial forces are kept to an equal level to slant or helical milling, where the main force is in the z axis. This allows the ASR to achieve higher feed rates with less deflection and vibration. This table shows the directional forces.

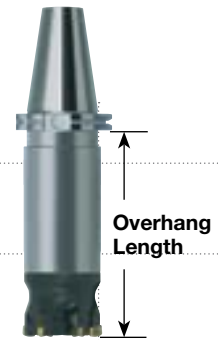
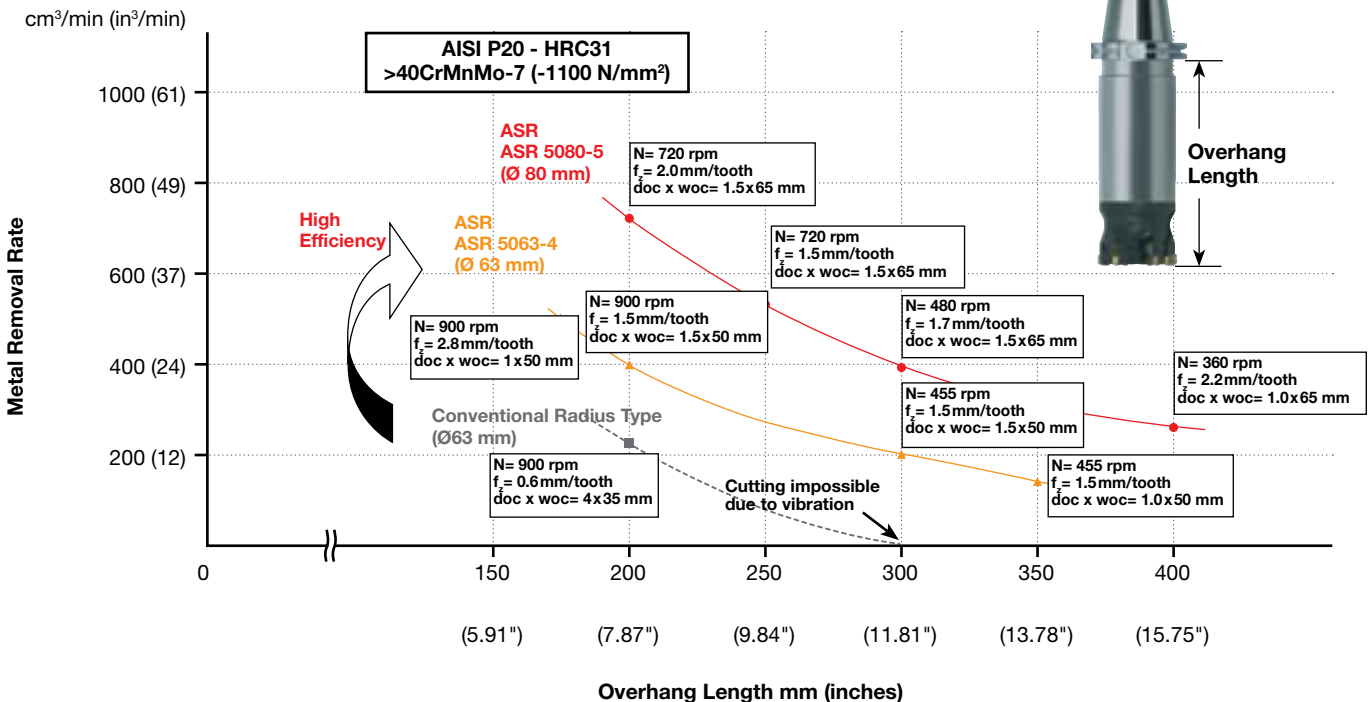
ASR5080-5 (dia 3.15")
 N = 720 rpm
 Vc = 180 m/min (591 sfm)
 Vf = 1500 mm/min (59.06 ipm)
 fz = 0.42 mm/tooth (0.0165 in/tooth)
 doc x woc = 1.5 x 60 mm (0.059" x 2.362")
 conventional milling, dry cutting

Radial force



6. Two to Five Times Greater Efficiency Compared to Conventional Radius Cutters

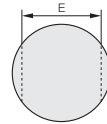
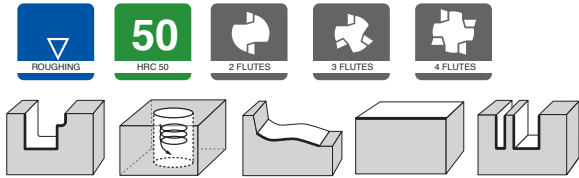
The ASR is capable of achieving 4 to 5 times greater efficiency in deep milling with an overhang of 3D or more, and 2 to 3 times for shallow milling of 3D or less. This enables faster production resulting in quicker turnaround of components. The chart below compares metal removal rates and overhang lengths for ASR and conventional radius cutters.



IASR/ASR



Modular Style



D 0/-0.2

ASRM - METRIC

Part No.	Flutes	ØD	H	Ød ₁	M	Ød ₂	A	B	C	E	Insert
ASRM0020-2	2	20	30	10.5	M10	17.8	5.5	19	10	15	EPNW08
ASRM0025-2	2	25	35	12.5	M12	20.8	5.5	22	10	17	EDNW10
ASRM0032-3	3	32	40	17.0	M16	28.8	6.0	23	12	22	EDNW10
ASRM0040-4	4	40	40	17.0	M16	28.8	6.0	23	12	22	EDNW10

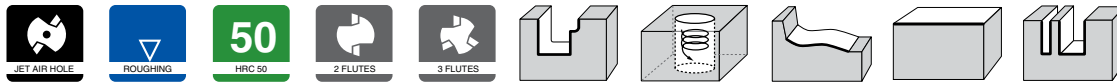
Modular Shanks on p. 163

Inserts p. 113

Part No.	Clamp Screw	Clamp Assembly	Wrench
ASRM0020-2	242-141		104-T15
ASRM0025-2	412-141	CM3.5-141	104-T15
ASRM0032-3	412-141	CM3.5-141	104-T15
ASRM0040-4	412-141	CM3.5-141	104-T15

IASR/ASR

Shank Style
Regular Length



D 0/-0.2

IASRS - INCH

Part No.	Flutes	ØD	L	Ød	lb	Is	Insert
IASRS0012R	2	0.750	5.118	0.750	1.969	3.150	EPNW08
IASRS0016R	2	1.000	5.512	1.000	2.362	3.150	EDNW10
IASRS4020R	2	1.250	5.906	1.250	2.756	3.150	EDNW13
IASRS4024R	3	1.500	5.906	1.500	1.969	3.937	EDNW13

ASRS - METRIC

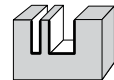
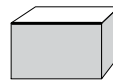
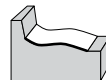
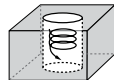
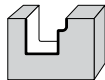
Part No.	Flutes	ØD	L	Ød	lb	Is	Insert
ASRS0020	2	20	130	20	50	80	EPNW08
ASRS0025	2	25	140	25	60	80	EDNW10
ASRS4032	2	32	150	32	70	80	EDNW13
ASRS4040	3	40	150	42	50	100	EDNW13

Inserts p. 113

Part No.	Clamp Screw	Clamp Assembly	Wrench
IASRS0012R	242-141		104-T15
IASRS0016R	412-141	CM3.5-141	104-T15
IASRS4020R	555-141	CM5-147	105-T20
IASRS4024R	555-141	CM5-147	105-T20
ASRS0020	242-141		104-T15
ASRS0025	412-141	CM3.5-141	104-T15
ASRS4032	555-141	CM5-147	105-T20
ASRS4040	555-141	CM5-147	105-T20

IASR/ASR

Shank Style
Long Length



D 0/-0.2

IASRL - INCH

Part No.	Flutes	ØD	L	Ød	lb	Is	Insert
IASRL0012R	2	0.75	7.087	0.75	3.937	3.150	EPNW08
IASRL0016R	2	1.00	7.874	1.00	4.724	3.150	EDNW10
IASRL4020R	2	1.25	7.874	1.25	4.724	3.150	EDNW13
IASRL4024R	3	1.50	9.843	1.50	1.969	7.874	EDNW13

ASRL - METRIC

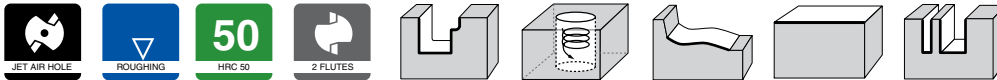
Part No.	Flutes	ØD	L	Ød	lb	Is	Insert
ASRL0020	2	20	180	20	100	80	EPNW08
ASRL0025	2	25	200	25	120	80	EDNW10
ASRL4032	2	32	200	32	120	80	EDNW13
ASRL4040	3	40	250	42	50	200	EDNW13

Inserts p. 113

Part No.	Clamp Screw	Clamp Assembly	Wrench
IASRL0012R	242-141		104-T15
IASRL0016R	412-141	CM3.5-141	104-T15
IASRL4020R	555-141	CM5-147	105-T20
IASRL4024R	555-141	CM5-147	105-T20
ASRL0020	242-141		104-T15
ASRL0025	412-141	CM3.5-141	104-T15
ASRL4032	555-141	CM5-147	105-T20
ASRL4040	555-141	CM5-147	105-T20

IASR/ASR

Shank Style
Extra Long Length



D 0/-0.2

IASRE - INCH

Part No.	Flutes	ØD	L	Ød	lb	ls	Insert
IASRE0012R	2	0.750	9.843	0.750	5.118	4.724	EPNW08
IASRE0016R	2	1.000	11.811	1.000	7.087	4.724	EDNW10
IASRE4020R	2	1.250	11.811	1.250	7.087	4.724	EDNW13
IASRE4024R	2	1.500	11.811	1.500	1.969	9.843	EDNW13

ASRE - METRIC

Part No.	Flutes	ØD	L	Ød	lb	ls	Insert
ASRE0020	2	20	250	20	130	120	EPNW08
ASRE0025	2	25	300	25	180	120	EDNW10
ASRE4032	2	32	300	32	180	120	EDNW13
ASRE4040	2	40	300	42	50	250	EDNW13

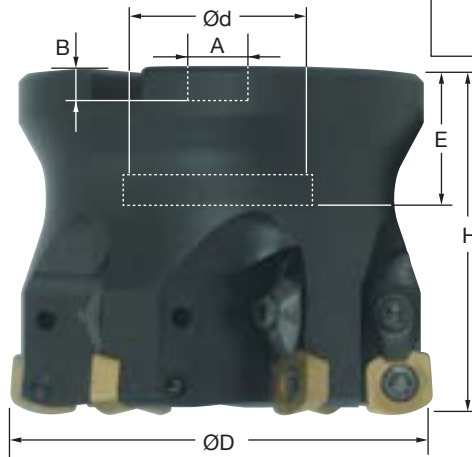
Inserts p. 113

Part No.	Clamp Screw	Clamp Assembly	Wrench
IASRE0012R	242-141		104-T15
IASRE0016R	412-141	CM3.5-141	104-T15
IASRE4020R	555-141	CM5-147	105-T20
IASRE4024R	555-141	CM5-147	105-T20
ASRE0020	242-141		104-T15
ASRE0025	412-141	CM3.5-141	104-T15
ASRE4032	555-141	CM5-147	105-T20
ASRE4040	555-141	CM5-147	105-T20

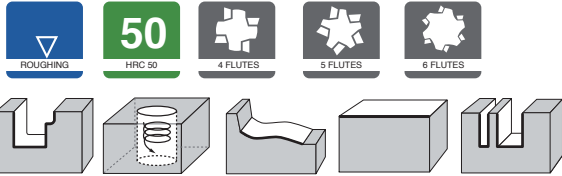
IASR/ASR



Face Mill Style



D 0/-0.2



IASR-B - INCH

Part No.	Flutes	ØD	H	R	Ød	E	A	B	Insert
IASR4032-4	4	2.0	1.969	0.591	0.75	0.748	0.32	0.197	EDNW13
IASR5040-4	4	2.5	1.969	0.591	0.75	1.024	0.32	0.197	EDNW15
IASR5048-5	5	3.0	1.969	0.591	1.00	1.378	0.38	0.236	EDNW15
IASR5064-6	6	4.0	1.969	0.591	1.50	1.378	0.63	0.394	EDNW15

ASR-B - METRIC

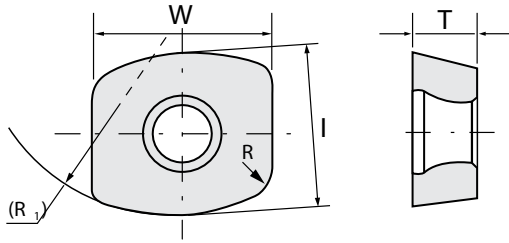
Part No.	Flutes	ØD	H	R	Ød	E	A	B	Insert
ASR4050M-4	4	50	50	15	22	20.0	10.4	6.3	EDNW13
ASR5063M-4	4	63	50	15	22	20.0	10.4	6.3	EDNW15
ASR5080M-5	5	80	70	15	27	22.0	12.4	7.0	EDNW15
ASR5100M-6	6	100	70	15	32	25.5	14.4	8.0	EDNW15

Inserts p. 113

Part No.	Clamp Screw	Clamp Assembly	Wrench
IASR4032-4	555-141	CM5-147	105-T20
IASR5040-4	555-141	CM5-147	105-T20
IASR5048-5	555-141	CM5-147	105-T20
IASR5064-6	555-141	CM5-147	105-T20
ASR4050M-4	555-141	CM5-147	105-T20
ASR5063M-4	555-141	CM5-147	105-T20
ASR5080M-5	555-141	CM5-147	105-T20
ASR5100M-6	555-141	CM5-147	105-T20

IASR/ASR

Inserts



Part No.	JS4045	CY250	R	R ₁ (mm)	I (mm)	T (mm)	W (mm)
EPNW0803TN-10	•	•	3	10.0	8.1	3.2	7.94
EDNW10T3TN-10	•	•	3	10.0	10.0	4.0	10.00
EDNW13T4TN-10	•	•	3	10.0	13.5	5.6	12.70
EDNW13T4TN-15	•	•	3	15.0	13.5	5.6	12.70
EDNW15T4TN-10	•	•	3	10.0	15.0	5.6	14.00
EDNW15T4TN-15	•	•	3	15.0	15.0	5.6	14.00

All Inserts have two effective cutting edges

COATING MATERIALS FOR INSERTS

Material name ISO Classification	Coating Name Coating Type	Application	Features
JS4045 P30-K30	JS Coating PVD	General purpose for steel	Uses rough grain substrate and JS coating. Suitable for general steel cutting
CY250 P30-M30-K30	PCA Coating PVD	General purpose for steel	Uses TiAlN Coating; has wide cutting region range

IASR/ASR



**Cutting Conditions
Modular +
Shank Styles
Inch**



Ø No. of Flutes		3/4" or 20mm 2					1" or 25mm 2				
		3D					3D				
		General	Highspeed	3D-5D	5D-7D	7D	General	Highspeed	3D-5D	5D-7D	7D
Carbon Steel Alloy Steel 30HRC	N(rpm)	2380	2860	2070	2070	1430	1910	2290	1650	1650	1140
	Vc(sfm)	492	591	427	427	295	492	591	427	427	295
	Vf(in/min)	150	225	130	98	45	120	180	104	78	36
	fz(in/t)	0.031	0.039	0.031	0.024	0.016	0.031	0.039	0.031	0.024	0.016
	doc(in)	0.031	0.024	0.024	0.020	0.012	0.031	0.024	0.024	0.020	0.016
	woc(in)	0.591	0.591	0.591	0.591	0.591	0.787	0.787	0.787	0.787	0.787
Tool Steel Alloy Steel 30-40HRC	N(rpm)	2070	2860	2070	2070	1430	1650	2290	1650	1650	1140
	Vc(sfm)	427	591	427	427	295	427	591	427	427	295
	Vf(in/min)	130	225	130	98	45	104	180	104	78	36
	fz(in/t)	0.031	0.039	0.031	0.024	0.016	0.031	0.039	0.031	0.024	0.016
	doc(in)	0.024	0.016	0.020	0.016	0.012	0.024	0.016	0.020	0.016	0.012
	woc(in)	0.591	0.591	0.591	0.591	0.591	0.787	0.787	0.787	0.787	0.787
Tool Steel Pre-hardened 40-50HRC	N(rpm)	1430	2070	1430	1430	1430	1140	1650	1140	1140	1140
	Vc(sfm)	295	427	295	295	295	295	427	295	295	295
	Vf(in/min)	67	130	67	67	45	54	104	54	54	36
	fz(in/t)	0.024	0.031	0.024	0.024	0.016	0.024	0.031	0.024	0.024	0.016
	doc(in)	0.020	0.014	0.016	0.012	0.008	0.020	0.014	0.016	0.012	0.008
	woc(in)	0.591	0.591	0.591	0.591	0.591	0.787	0.787	0.787	0.787	0.787
Cast Iron	N(rpm)	2380	2860	2070	2070	1430	1910	2290	1650	1650	1140
	Vc(sfm)	492	591	427	427	295	492	591	427	427	295
	Vf(in/min)	150	225	130	98	45	120	180	104	78	36
	fz(in/t)	0.031	0.039	0.031	0.024	0.016	0.031	0.039	0.031	0.024	0.016
	doc(in)	0.039	0.031	0.031	0.024	0.020	0.039	0.031	0.031	0.024	0.020
	woc(in)	0.591	0.591	0.591	0.591	0.591	0.787	0.787	0.787	0.787	0.787

IASR/ASR



**Cutting Conditions
Modular +
Shank Styles
Inch**



Ø No. of Flutes		1.25" or 32mm 2					1.50" or 40mm 3				
		3D		3D-5D	5D-7D	7D	3D		3D-5D	5D-7D	7D
		General	Highspeed				General	Highspeed			
Carbon Steel Alloy Steel 30HRC	N(rpm)	1490	1790	1290	1290	890	1190	1430	1030	1030	710
	Vc(sfm)	492	591	427	427	295	492	591	427	427	295
	Vf(in/min)	176	282	122	81	28	211	338	146	97	33
	fz(in/t)	0.059	0.079	0.047	0.031	0.016	0.059	0.079	0.047	0.031	0.016
	doc(in)	0.047	0.031	0.039	0.024	0.016	0.047	0.031	0.039	0.024	0.016
	woc(in)	0.866	0.866	0.866	0.866	0.866	1.102	1.102	1.102	1.102	1.102
JS4045											
CY250											
Tool Steel Alloy Steel 30-40HRC	N(rpm)	1290	1790	1290	1290	890	1030	1430	1030	1030	710
	Vc(sfm)	427	591	427	427	295	427	591	427	427	295
	Vf(in/min)	122	211	102	61	28	146	253	122	73	33
	fz(in/t)	0.047	0.059	0.039	0.024	0.016	0.047	0.059	0.039	0.024	0.016
	doc(in)	0.039	0.024	0.031	0.024	0.016	0.039	0.024	0.031	0.024	0.016
	woc(in)	0.866	0.866	0.866	0.866	0.866	1.102	1.102	1.102	1.102	1.102
JS4045											
CY250											
Tool Steel Pre-hardened 40-50HRC	N(rpm)	890	1290	890	890	890	710	1030	710	710	710
	Vc(sfm)	295	427	295	295	295	295	427	295	295	295
	Vf(in/min)	56	102	42	42	28	67	122	50	50	33
	fz(in/t)	0.031	0.039	0.024	0.024	0.016	0.031	0.039	0.024	0.024	0.016
	doc(in)	0.031	0.024	0.024	0.020	0.012	0.031	0.024	0.024	0.020	0.012
	woc(in)	0.866	0.866	0.866	0.866	0.866	1.102	1.102	1.102	1.102	1.102
JS4045											
CY250											
Cast Iron	N(rpm)	1490	1790	1290	1290	890	1190	1430	1030	1030	710
	Vc(sfm)	492	591	427	427	295	492	591	427	427	295
	Vf(in/min)	176	282	122	81	28	211	338	146	97	33
	fz(in/t)	0.059	0.079	0.047	0.031	0.016	0.059	0.079	0.047	0.031	0.016
	doc(in)	0.059	0.047	0.039	0.024	0.016	0.059	0.047	0.039	0.024	0.016
	woc(in)	0.866	0.866	0.866	0.866	0.866	1.102	1.102	1.102	1.102	1.102
JS4045											
CY250											

IASR/ASR



Cutting Conditions
Face Mill Style
Inch



Ø No. of Flutes		2" or 50mm 4					2.5" or 63mm 4				
		3D		3D-5D	5D-7D	7D	3D		3D-5D	5D-7D	7D
General	Highspeed	General	Highspeed								
Carbon Steel Alloy Steel 30HRC	N(rpm)	950	1140	820	820	570	750	900	650	650	450
	Vc(sfm)	492	591	427	427	295	492	591	427	427	295
	Vf(in/min)	224	359	155	103	36	177	283	123	82	28
	fz(in/t)	0.059	0.079	0.047	0.031	0.016	0.059	0.079	0.047	0.031	0.016
	doc(in)	0.059	0.047	0.039	0.024	0.016	0.059	0.047	0.039	0.024	0.016
	woc(in)	1.378	1.378	1.378	1.378	1.378	1.772	1.772	1.772	1.772	1.772
Tool Steel Alloy Steel 30-40HRC	N(rpm)	820	1140	820	820	570	650	900	650	650	450
	Vc(sfm)	427	591	427	427	295	427	591	427	427	295
	Vf(in/min)	129	215	129	77	36	102	170	102	61	28
	fz(in/t)	0.039	0.047	0.039	0.024	0.016	0.039	0.047	0.039	0.024	0.016
	doc(in)	0.059	0.047	0.031	0.024	0.016	0.059	0.047	0.031	0.024	0.016
	woc(in)	1.378	1.378	1.378	1.378	1.378	1.772	1.772	1.772	1.772	1.772
Tool Steel Pre-hardened 40-50HRC	N(rpm)	570	820	570	570	570	450	650	450	450	450
	Vc(sfm)	295	427	295	295	295	295	427	295	295	295
	Vf(in/min)	72	129	54	54	36	57	102	43	43	28
	fz(in/t)	0.031	0.039	0.024	0.024	0.016	0.031	0.039	0.024	0.024	0.016
	doc(in)	0.031	0.024	0.024	0.020	0.012	0.031	0.024	0.024	0.020	0.012
	woc(in)	1.378	1.378	1.378	1.378	1.378	1.772	1.772	1.772	1.772	1.772
Cast Iron	N(rpm)	950	1140	820	820	570	750	900	650	650	450
	Vc(sfm)	492	591	427	427	295	492	591	427	427	295
	Vf(in/min)	224	359	155	103	36	177	283	123	82	28
	fz(in/t)	0.059	0.079	0.047	0.031	0.016	0.059	0.079	0.047	0.031	0.016
	doc(in)	0.079	0.079	0.039	0.024	0.016	0.079	0.079	0.039	0.024	0.016
	woc(in)	1.378	1.378	1.378	1.378	1.378	1.772	1.772	1.772	1.772	1.772

IASR/ASR



Cutting Conditions
Face Mill Style
Inch



Ø No. of Flutes		3" or 80mm			4" or 100mm		
		5			6		
		3D			3D		
		General	Highspeed	3D-5D	General	Highspeed	3D-5D
Carbon Steel Alloy Steel 30HRC	N(rpm)	590	710	510	470	570	410
	Vc(sfm)	492	591	427	492	591	427
	Vf(in/min)	174	280	120	167	269	116
	fz(in/t)	0.059	0.079	0.047	0.059	0.079	0.047
	doc(in)	0.059	0.047	0.039	0.059	0.047	0.039
JS4045 CY250	woc(in)	2.205	2.205	2.205	2.756	2.756	2.756
Tool Steel Alloy Steel 30-40HRC	N(rpm)	510	710	510	410	570	410
	Vc(sfm)	427	591	427	427	591	427
	Vf(in/min)	100	168	100	97	161	97
	fz(in/t)	0.039	0.047	0.039	0.039	0.047	0.039
	doc(in)	0.059	0.047	0.031	0.059	0.047	0.031
JS4045 CY250	woc(in)	2.205	2.205	2.205	2.756	2.756	2.756
Tool Steel Pre-hardened 40-50HRC	N(rpm)	350	510	350	280	410	280
	Vc(sfm)	295	427	295	295	427	295
	Vf(in/min)	55	100	41	53	97	39
	fz(in/t)	0.031	0.039	0.024	0.031	0.039	0.024
	doc(in)	0.031	0.024	0.024	0.031	0.024	0.024
JS4045 CY250	woc(in)	2.205	2.205	2.205	2.756	2.756	2.756
Cast Iron	N(rpm)	590	710	510	470	570	410
	Vc(sfm)	492	591	427	492	591	427
	Vf(in/min)	174	280	120	167	269	116
	fz(in/t)	0.059	0.079	0.047	0.059	0.079	0.047
	doc(in)	0.079	0.079	0.039	0.079	0.079	0.039
JS4045 CY250	woc(in)	2.205	2.205	2.205	2.756	2.756	2.756

IASR/ASR



**Cutting Conditions
Modular +
Shank Styles
Metric**



Ø No. of Flutes		3/4" or 20mm					1" or 25mm				
		2					2				
		3D					3D				
		General	Highspeed	3D-5D	5D-7D	7D	General	Highspeed	3D-5D	5D-7D	7D
Carbon Steel Alloy Steel 30HRC	N(rpm)	2380	2860	2070	2070	1430	1910	2290	1650	1650	1140
	Vc(m/min)	150	180	130	130	90	150	180	130	130	90
	Vf(mm/min)	3800	5720	3310	2480	1140	3050	4580	2640	1980	910
	fz(mm/t)	0.80	1.00	0.80	0.60	0.40	0.80	1.00	0.80	0.60	0.40
	doc(mm)	0.8	0.6	0.6	0.5	0.3	0.8	0.6	0.6	0.5	0.4
JS4045 CY250	woc(mm)	15	15	15	15	15	20	20	20	20	20
Tool Steel Alloy Steel 30-40HRC	N(rpm)	2070	2860	2070	2070	1430	1650	2290	1650	1650	1140
	Vc(m/min)	130	180	130	130	90	130	180	130	130	90
	Vf(mm/min)	3310	5720	3310	2480	1140	2640	4580	2640	1980	910
	fz(mm/t)	0.80	1.00	0.80	0.60	0.40	0.80	1.00	0.80	0.60	0.40
	doc(mm)	0.6	0.4	0.5	0.4	0.3	0.6	0.4	0.5	0.4	0.3
JS4045 CY250	woc(mm)	15	15	15	15	15	20	20	20	20	20
Tool Steel Pre- hardened 40-50HRC	N(rpm)	1430	2070	1430	1430	1430	1140	1650	1140	1140	1140
	Vc(m/min)	90	130	90	90	90	90	130	90	90	90
	Vf(mm/min)	1710	3310	1710	1710	1140	1360	2640	1360	1360	910
	fz(mm/t)	0.60	0.80	0.60	0.60	0.40	0.60	0.80	0.60	0.60	0.40
	doc(mm)	0.5	0.35	0.4	0.3	0.2	0.5	0.35	0.4	0.3	0.2
JS4045 CY250	woc(mm)	15	15	15	15	15	20	20	20	20	20
Cast Iron	N(rpm)	2380	2860	2070	2070	1430	1910	2290	1650	1650	1140
	Vc(m/min)	150	180	130	130	90	150	180	130	130	90
	Vf(mm/min)	3800	5720	3310	2480	1140	3050	4580	2640	1980	910
	fz(mm/t)	0.80	1.00	0.80	0.60	0.40	0.80	1.00	0.80	0.60	0.40
	doc(mm)	1	0.8	0.8	0.6	0.5	1	0.8	0.8	0.6	0.5
JS4045 CY250	woc(mm)	15	15	15	15	15	20	20	20	20	20

IASR/ASR



**Cutting Conditions
Modular +
Shank Styles
Metric**



Ø No. of Flutes		1.25" or 32mm					1.50" or 40mm				
		2					3				
		3D		3D-5D	5D-7D	7D	3D		3D-5D	5D-7D	7D
General	Highspeed	General	Highspeed								
Carbon Steel Alloy Steel 30HRC	N(rpm)	1490	1790	1290	1290	890	1190	1430	1030	1030	710
	Vc(m/min)	150	180	130	130	90	150	180	130	130	90
	Vf(mm/min)	4470	7160	3090	2060	710	5350	8580	3700	2470	850
	fz(mm/t)	1.50	2.00	1.20	0.80	0.40	1.50	2.00	1.20	0.80	0.40
	doc(mm)	1.2	0.8	1	0.6	0.4	1.2	0.8	1	0.6	0.4
	woc(mm)	22	22	22	22	22	28	28	28	28	28
Tool Steel Alloy Steel 30-40HRC	N(rpm)	1290	1790	1290	1290	890	1030	1430	1030	1030	710
	Vc(m/min)	130	180	130	130	90	130	180	130	130	90
	Vf(mm/min)	3090	5370	2580	1540	710	3700	6430	3090	1850	850
	fz(mm/t)	1.20	1.50	1.00	0.60	0.40	1.20	1.50	1.00	0.60	0.40
	doc(mm)	1	0.6	0.8	0.6	0.4	1	0.6	0.8	0.6	0.4
	woc(mm)	22	22	22	22	22	28	28	28	28	28
Tool Steel Pre- hardened 40-50HRC	N(rpm)	890	1290	890	890	890	710	1030	710	710	710
	Vc(m/min)	90	130	90	90	90	90	130	90	90	90
	Vf(mm/min)	1420	2580	1060	1060	710	1700	3090	1270	1270	850
	fz(mm/t)	0.80	1.00	0.60	0.60	0.40	0.80	1.00	0.60	0.60	0.40
	doc(mm)	0.8	0.6	0.6	0.5	0.3	0.8	0.6	0.6	0.5	0.3
	woc(mm)	22	22	22	22	22	28	28	28	28	28
Cast Iron	N(rpm)	1490	1790	1290	1290	890	1190	1430	1030	1030	710
	Vc(m/min)	150	180	130	130	90	150	180	130	130	90
	Vf(mm/min)	4470	7160	3090	2060	710	5350	8580	3700	2470	850
	fz(mm/t)	1.50	2.00	1.20	0.80	0.40	1.50	2.00	1.20	0.80	0.40
	doc(mm)	1.5	1.2	1	0.6	0.4	1.5	1.2	1	0.6	0.4
	woc(mm)	22	22	22	22	22	28	28	28	28	28

IASR/ASR



Cutting Conditions
Face Mill Style
Metric



Ø No. of Flutes		2" or 50mm 4					2.5" or 63mm 4				
		3D					3D				
		General	Highspeed	3D-5D	5D-7D	7D	General	Highspeed	3D-5D	5D-7D	7D
Carbon Steel Alloy Steel 30HRC	N(rpm)	950	1140	820	820	570	750	900	650	650	450
	Vc(m/min)	150	180	130	130	90	150	180	130	130	90
	Vf(mm/min)	5700	9120	3930	2620	910	4500	7200	3120	2080	720
	fz(mm/t)	1.50	2.00	1.20	0.80	0.40	1.50	2.00	1.20	0.80	0.40
	doc(mm)	1.5	1.2	1	0.6	0.4	1.5	1.2	1	0.6	0.4
JS4045											
CY250	woc(mm)	35	35	35	35	35	45	45	45	45	45
Tool Steel Alloy Steel 30-40HRC	N(rpm)	820	1140	820	820	570	650	900	650	650	450
	Vc(m/min)	130	180	130	130	90	130	180	130	130	90
	Vf(mm/min)	3280	5470	3280	1960	910	2600	4320	2600	1560	720
	fz(mm/t)	1.00	1.20	1.00	0.60	0.40	1.00	1.20	1.00	0.60	0.40
	doc(mm)	1.5	1.2	0.8	0.6	0.4	1.5	1.2	0.8	0.6	0.4
JS4045											
CY250	woc(mm)	35	35	35	35	35	45	45	45	45	45
Tool Steel Pre-hardened 40-50HRC	N(rpm)	570	820	570	570	570	450	650	450	450	450
	Vc(m/min)	90	130	90	90	90	90	130	90	90	90
	Vf(mm/min)	1820	3280	1360	1360	910	1440	2600	1080	1080	720
	fz(mm/t)	0.80	1.00	0.60	0.60	0.40	0.80	1.00	0.60	0.60	0.40
	doc(mm)	0.8	0.6	0.6	0.5	0.3	0.8	0.6	0.6	0.5	0.3
JS4045											
CY250	woc(mm)	35	35	35	35	35	45	45	45	45	45
Cast Iron	N(rpm)	950	1140	820	820	570	750	900	650	650	450
	Vc(m/min)	150	180	130	130	90	150	180	130	130	90
	Vf(mm/min)	5700	9120	3930	2620	910	4500	7200	3120	2080	720
	fz(mm/t)	1.50	2.00	1.20	0.80	0.40	1.50	2.00	1.20	0.80	0.40
	doc(mm)	2	2	1	0.6	0.4	2	2	1	0.6	0.4
JS4045											
CY250	woc(mm)	35	35	35	35	35	45	45	45	45	45

IASR/ASR



Cutting Conditions Face Mill Style Metric



	Ø No. of Flutes	3" or 80mm			4" or 100mm		
		5			6		
		3D			3D		
		General	Highspeed	3D-5D	General	Highspeed	3D-5D
Carbon Steel Alloy Steel 30HRC	N(rpm)	590	710	510	470	570	410
	Vc(m/min)	150	180	130	150	180	130
	Vf(mm/min)	4420	7100	3060	4230	6840	2950
	fz(mm/t)	1.50	2.00	1.20	1.50	2.00	1.20
JS4045	doc(mm)	1.5	1.2	1	1.5	1.2	1
CY250	woc(mm)	56	56	56	70	70	70
Tool Steel Alloy Steel 30-40HRC	N(rpm)	510	710	510	410	570	410
	Vc(m/min)	130	180	130	130	180	130
	Vf(mm/min)	2550	4260	2550	2460	4100	2460
	fz(mm/t)	1.00	1.20	1.00	1.00	1.20	1.00
JS4045	doc(mm)	1.5	1.2	0.8	1.5	1.2	0.8
CY250	woc(mm)	56	56	56	70	70	70
Tool Steel Pre-hardened 40-50HRC	N(rpm)	350	510	350	280	410	280
	Vc(m/min)	90	130	90	90	130	90
	Vf(mm/min)	1400	2550	1050	1340	2460	1000
	fz(mm/t)	0.80	1.00	0.60	0.80	1.00	0.60
JS4045	doc(mm)	0.8	0.6	0.6	0.8	0.6	0.6
CY250	woc(mm)	56	56	56	70	70	70
Cast Iron	N(rpm)	590	710	510	470	570	410
	Vc(m/min)	150	180	130	150	180	130
	Vf(mm/min)	4420	7100	3060	4230	6840	2950
	fz(mm/t)	1.50	2.00	1.20	1.50	2.00	1.20
JS4045	doc(mm)	2	2	1	2	2	1
CY250	woc(mm)	56	56	56	70	70	70