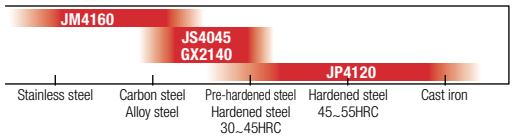
MOLDINO
The Edge To Innovation

TD4N

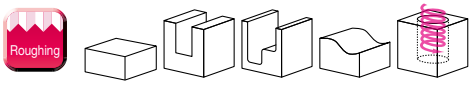
High Feed Radius Mill TD4N type

MOLDINO Tool Engineering, Ltd.

New Product News | No. H1801A-2 | 2020-4



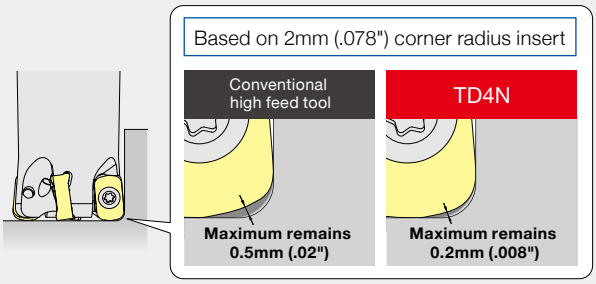
Applications



Features 01 Reduces uncut portion on work pieces

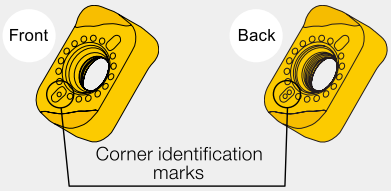
The cutting edge geometry of the TD4N is designed to minimize remaining stock in the uncut portion of the insert to reduce process variability and cycle time.

New insert design doubles usable corners from 2 to 4 without impacting edge security or performance.

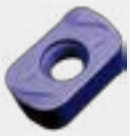


Features 02 Economical 4-corner inserts with chip breakers for various applications

The TD4N is engineered to utilize both sides of the insert doubling cutting edges from 2 to 4 while maintaining performance and edge security of a single sided insert. As an added plus, the chip breaker rake angle was increased to reduce cutting forces and improve chip discharge.



Features of insert breaker



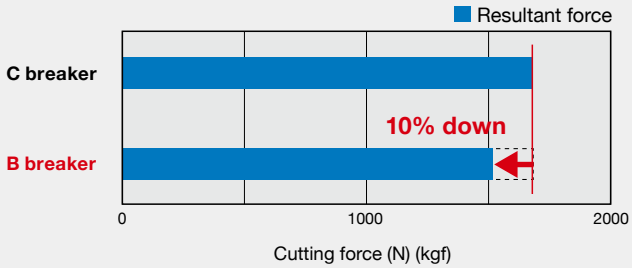
C breaker

First choice breaker for machine steel 30 to 50 HRC. Breaker is designed to be resistant to chip jamming, vibrations and crater wear.

B breaker

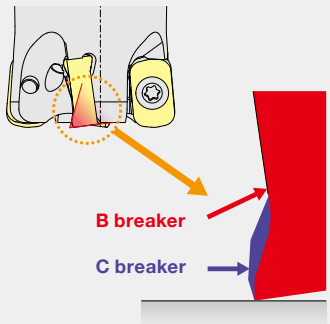
Designed for application that require low cutting resistance. The B breaker has a positive rake making it ideal for both stainless and low carbon steels.

Cutting force comparison



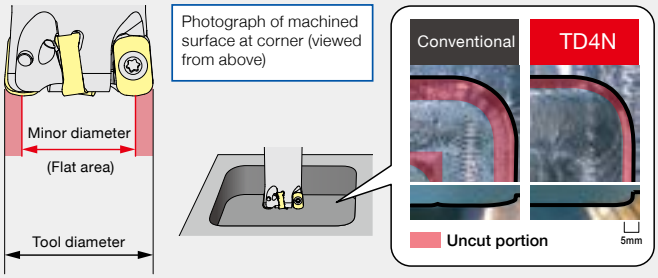
Magnified view of cutting edge cross section

Positive rake angle



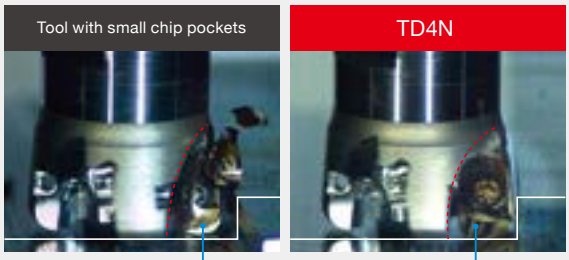
Features 03 Large minor cutting diameter minimized stock variation

Compared to conventional high feed tools, TD4N high feed cutters have a large minor diameter. The large minor diameter minimizes the uncut material in shoulders and enables an increased width of cut -ae- for improved cutter paths and floor blends without sacrificing performance.



Features 04 Excellent chip discharge characteristics

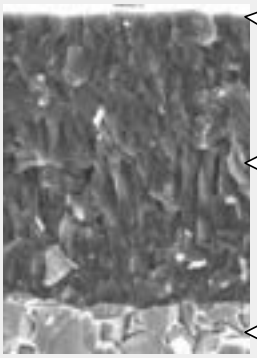
The next generation TD4N high feed cutter excels in chip control without sacrificing performance.



The TD4N insert is designed to curl the chip up and into the new chip pocket design before discharge. The breakthrough concept in high feed milling chip control minimizes the possibility of chip jamming especially when machining shoulders.

AJ Coating Series

New AJ coating is now applied to all 4100 series inserts. AJ coating features High AlTiN PVD coating technology that delivers both improved heat resistance and coating adhesion. To further increase performance, 4100 series inserts have a special surface treatment that reduces friction and minimizes welding.



Coating structure

PVD Technology Grade for machining pre-hardened or hardened materials **JP4120**

Highly versatile with excellent cutting performance on pre-hardened steel or hardened steel. (30-50 HRC).

PVD Technology Grade for machining stainless-steel materials **JM4160**

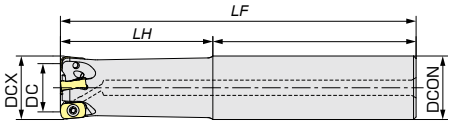
JM4160 features a tough substrate to handle demanding stainless materials topped with AJ coating engineered specially for stainless materials.

PVD Technology General purpose for steel **JS4045**

JS4045 is an existing PVD coated steel grade selected for the TD4N cutter due to its exceptional toughness in interrupted or unstable applications. JS4045 should be used when JP4120 encounters chipping.

Shank type ITD4N20○○□-○ Inch

Fig.1
(Standard type)



Style		Order Number	# of Flutes	Dimensions (Inch)					Type	Insert
				DCX	DC	LF	LH	DCON		
Shank Style	Regular	ITD4N2010S-2	2	0.625	0.389	4.000	1.250	0.625	Fig.1	ENMU0603ER-B/C
		ITD4N2012S-3	3	0.750	0.514	5.000	2.000	0.750		
		ITD4N2016S-4	4	1.000	0.764	5.500	2.500	1.000		
		ITD4N2020S-5	5	1.250	1.014	6.000	2.750	1.250		
		ITD4N2024S-6	6	1.500	1.264	6.000	1.750	1.500		
	Long	ITD4N2010L-2	2	0.625	0.389	6.000	2.000	0.625		
		ITD4N2012L-3	3	0.750	0.514	6.250	3.250	0.750		
		ITD4N2016L-4	4	1.000	0.764	7.000	4.000	1.000		
		ITD4N2020L-5	5	1.250	1.014	8.000	5.000	1.250		
		ITD4N2024L-6	6	1.500	1.264	9.000	1.750	1.500		

Shank type TD4N20○○□(32)-○ Metric

Fig.1
(Standard type)

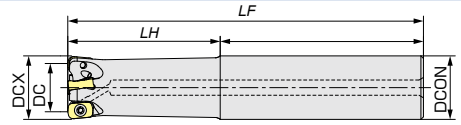
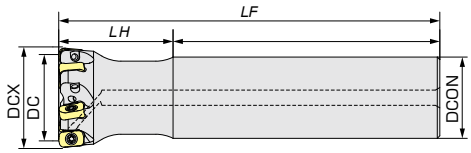
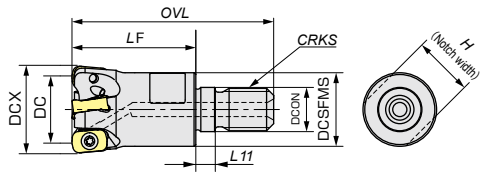


Fig.2
(Undercut type)



Style		Order Number	# of Flutes	Dimensions (mm)					Type	Insert
				DCX	DC	LF	LH	DCON		
Shank Style	Regular	TD4N2016S-2	2	16	10	100	30	16	Fig.1	ENMU0603ER-B/C
		TD4N2020S-3	3	20	14	130	50	20		
		TD4N2025S-4	4	25	19	140	60	25		
		TD4N2032S-5	5	32	26	150	70	32		
		TD4N2040S32-6	6	40	34	150	45	32	Fig.2	
	Long	TD4N2016L-2	2	16	10	150	50	16	Fig.1	
		TD4N2018L-2	2	18	12	150	25	16	Fig.2	
		TD4N2020L-3	3	20	14	160	80	20	Fig.1	
		TD4N2022L-3	3	22	16	160	30	20	Fig.2	
		TD4N2025L-4	4	25	19	180	100	25	Fig.1	
		TD4N2028L-4	4	28	22	180	35	25	Fig.2	
		TD4N2032L-5	5	32	26	200	120	32	Fig.1	
		TD4N2035L-5	5	35	29	200	40	32	Fig.2	
		TD4N2040L32-6	6	40	34	220	45	32	Fig.2	

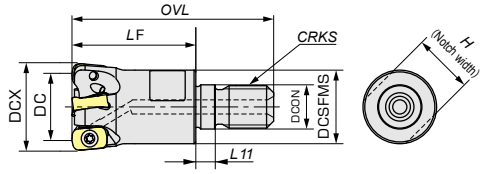
Modular type ITD4N20○○M-○ Inch



Order Number	# of Flutes	Dimensions (Inch)									Insert
		DCX	DC	LF	OVL	L11	DCON	DCSFMS	CRKS	H	
ITD4N2010M-2	2	0.625	0.389	0.984	1.653	0.217	0.335	0.504	M8	0.394	ENMU0603ER-B/C
ITD4N2012M-3	3	0.750	0.514	1.181	1.929	0.217	0.413	0.701	M10	0.591	
ITD4N2016M-4	4	1.000	0.764	1.378	2.244	0.217	0.492	0.819	M12	0.669	
ITD4N2020M-5	5	1.250	1.014	1.575	2.481	0.236	0.669	1.134	M16	0.866	
ITD4N2024M-6	6	1.500	1.264	1.575	2.481	0.236	0.669	1.134	M16	0.866	

Note Do not apply lubricants such as grease, etc. to the contact faces and modular screws of the modular mill, special shanks and special arbor.

Modular type TD4N20○○M-○ Metric



Order Number	# of Flutes	Dimensions (mm)									Insert
		DCX	DC	LF	OVL	L11	DCON	DCSFMS	CRKS	H	
TD4N2016M-2	2	16	10	25	42	5.5	8.5	12.8	M8	10	ENMU0603ER-B/C
TD4N2018M-2	2	18	12	25	42	5.5	8.5	12.8	M8	10	
TD4N2020M-3	3	20	14	30	49	5.5	10.5	17.8	M10	15	
TD4N2022M-3	3	22	16	30	49	5.5	10.5	17.8	M10	15	
TD4N2025M-4	4	25	19	35	57	5.5	12.5	20.8	M12	17	
TD4N2028M-4	4	28	22	35	57	5.5	12.5	20.8	M12	17	
TD4N2032M-5	5	32	26	40	63	6	17	28.8	M16	22	
TD4N2035M-5	5	35	29	40	63	6	17	28.8	M16	22	
TD4N2040M-6	6	40	34	40	63	6	17	28.8	M16	22	
TD4N2042M-6	6	42	36	40	63	6	17	28.8	M16	22	

Note Do not apply lubricants such as grease, etc. to the contact faces and modular screws of the modular mill, special shanks and special arbor.

Insert Super Radius Mill TD4N type

Fig.1
Tougher edge
C breaker
ENMU0603ER-C

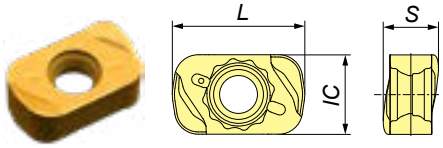
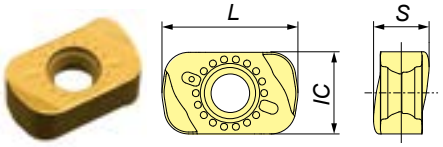


Fig.2
Reduce cutting force
B breaker
ENMU0603ER-B



P	Carbon Steel		■		■	■
M	Stainless Steel			■		
K	Cast Iron		■		⊔	⊔
H	Hardened Steel		■			

■ : General cutting, First recommendation
⊔ : General cutting, Second recommendation

Order Number	Tolerance Class	AJ-Coated		JS-Coated	GX-Coated	Size (mm)			Shape
		JP4120	JM4160	JS4045	GX2140	L	IC	S	
ENMU0603ER-C	M	●	●	●	●	10	6	4.2	Fig.1
ENMU0603ER-B		●	●	●	●				Fig.2

● Inventory maintained in US Note the GX2140 can not be used with conductive touch sensors.

Material Name ISO Classification	Coating Name Coating Type	Application	Features
JP4120 **P10-M10-K10**	AJ Coating PVD	For pre-hardened steel (35-50HRC) and alloy steel.	Uses fine grain substrate and AJ coating. Suitable for cutting of common steels through pre-hardened steels.
JM4160 **M40**	AJ Coating PVD	General purpose for stainless steel.	Uses high toughness substrate and AJ coating. Suitable for cutting of stainless steels.
JS4045 **P30-K30**	JS Coating PVD	General purpose for steel.	Uses tough substrate and JS coating. Suitable for general steel cutting.
GX2140 **P40-K40**	GX Coating CVD	Dry high speed cutting for steel 35HRC or less.	Uses tough substrate and GX coating. Suitable for dry high speed mild steel cutting.

Parts

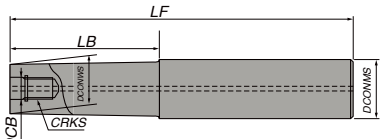
In consideration of the environment, the screwdriver and screw anti-seizure agent are now sold separately.

Parts	Clamp Screw		Not included with product (sold separately)	
			Screw Driver	Screw Anti-Seizure Agent
Shape		Fastening torque (N·m)		
Order No.	250-141	1.1	104-T8	P-37

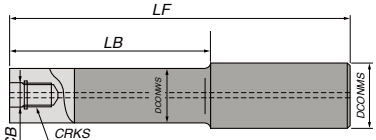
The clamp screw is a consumable part. Clamp screw replacement is dependent on use, we recommend replacing screw at signs of wear on screw seat chamfer.

Modular Mill Shanks

Carbide shank



A type



B type

Inch

Order Number	Stock	DCB	CRKS	LF	LB	DCONWS	DCONMS	Type	Cutter Body	Coolant Thru
IASC0.625-M8-4-2	●	8.5mm	M8	4	2	0.571	0.625	A	ø5/8 (ø16mm/18mm)	○
IASC0.625-M8-6-3	●	8.5mm	M8	6	3	0.571	0.625			○
IASC0.75-M10-5-2.5Z	●	10.5mm	M10	5	3	0.689	0.750		ø3/4 (ø20mm/22mm)	○
IASC0.75-M10-8-4Z	●	10.5mm	M10	8	4	0.689	0.750			○
IASC1-M12-6-3Z	●	12.5mm	M12	6	3	0.906	1.00		ø1 (ø25mm/28mm)	○
IASC1-M12-8-4Z	●	12.5mm	M12	8	4	0.906	1.00			○

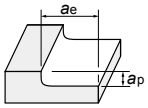
Metric

Order Number	Stock	DCB	CRKS	LF	LB	DCONWS	DCONMS	Type	Cutter Body	Coolant Thru
ASC16-8.5-95-30Z	●	8.5	M8	95	30	14.5	16	A	ø16 ø18 (ø5/8")	○
ASC16-8.5-120-55Z	●			120	55					
ASC16-8.5-140-75Z	●			140	75					
ASC16-8.5-160-95Z	★			160	95					
ASC16-8.5-160-30Z	★			160	30					
ASC18-M10-125-0Z	●	10.5	M10	125	-	18	18	A	ø20 ø22 (ø3/4")	○
ASC20-10.5-120-50Z	★			120	50	18.5	20			
ASC20-10.5-170-90Z	●			170	90					
ASC20-10.5-220-120Z	●			220	120					
ASC20-10.5-270-150Z	★			270	150					
ASC20-10.5-220-50Z	★			220	50					
ASC20-10.5-270-50Z	★			270						
ASC25-12.5-145-65	★	12.5	M12	145	65	23	25	B	ø25 ø28 (ø1")	○
ASC25-M12-150-0Z	●			150	-	25				
ASC25-12.5-215-115	●			215	115	23				
ASC25-12.5-265-145	●			265	145					
ASC25-12.5-315-195	★			315	195					
ASC25-12.5-265-65	★			265	65					
ASC25-12.5-315-65	★			315						
ASC32-17-160-80	★	17	M16	160	80	28	32	B	ø32 ø35 ø40 ø42	○
ASC32-17-210-110	●			210	110					
ASC32-17-260-140	●			260	140					
ASC32-17-310-190	★			310	190					
ASC32-17-360-240	★			360	240					
ASC32-17-260-80	★	17	M16	260	80	28	32	B		○
ASC32-17-310-80	★			310						
ASC32-17-360-80	★			360						

● = Inventory Maintained in US ★ = Inventory Maintained in Japan ○ = Tool With Air Hole

Recommended Cutting Conditions

INCH

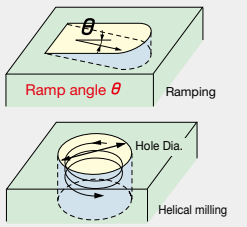


Red indicates primary recommended insert grade.

Work Material	Recommended Insert Grade	Tool Diameter	Ø5/8" (2 flutes)		Ø3/4" (3 flutes)		Ø1" (4 flutes)		Ø1.25" (5 flutes)		Ø1.5" (6 flutes)	
		Overhang ratio	~ 3Dc	4Dc ~ 7Dc	~ 3Dc	4Dc ~ 7Dc	~ 3Dc	4Dc ~ 7Dc	~ 3Dc	4Dc ~ 7Dc	~ 3Dc	4Dc ~ 7Dc
Carbon Steel Alloy Steel <30HRC	GX2140 JS4045	n (min-1)	3380	2990	2710	2390	2170	1910	1690	1490	1350	1190
		Vc (sfm)	558	492	558	492	558	492	558	492	558	492
		Vf (inch/min)	319	282	384	339	410	361	399	352	383	337
		fz (inch/t)	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
		ap (inch)	0.031	0.024	0.031	0.024	0.031	0.024	0.031	0.024	0.031	0.024
		ae (inch)	0.394	0.394	0.551	0.551	0.748	0.748	0.866	0.866	1.102	1.102
		Q (In3/min)	3.9	2.7	6.6	4.5	9.5	6.5	10.7	7.3	13.1	8.9
Alloy Steel Tool Steel 30 ~ 40HRC	JP4120 JS4045	n (min-1)	2990	2590	2390	2070	1910	1660	1490	1290	1190	1040
		Vc (sfm)	492	426	492	426	492	426	492	426	492	426
		Vf (inch/min)	235	204	282	244	301	261	293	254	281	246
		fz (inch/t)	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039
		ap (inch)	0.031	0.024	0.031	0.024	0.031	0.024	0.031	0.024	0.031	0.024
		ae (inch)	0.394	0.394	0.551	0.551	0.748	0.748	0.866	0.866	1.102	1.102
		Q (In3/min)	2.9	1.9	4.8	3.2	7	4.7	7.9	5.3	9.6	6.5
Pre-Hardened Steel Alloy Steel 40 ~ 50HRC	JP4120 JS4045	n (min-1)	1990	1790	1590	1430	1270	1150	1000	900	800	720
		Vc (sfm)	328	295	328	295	328	295	328	295	328	295
		Vf (inch/min)	157	113	188	135	200	145	197	142	189	136
		fz (inch/t)	0.039	0.031	0.039	0.031	0.039	0.031	0.039	0.031	0.039	0.031
		ap (inch)	0.024	0.02	0.024	0.02	0.024	0.02	0.024	0.02	0.024	0.02
		ae (inch)	0.394	0.394	0.551	0.551	0.748	0.748	0.866	0.866	1.102	1.102
		Q (In3/min)	1.5	0.9	2.5	1.5	3.6	2.2	4.1	2.5	5	3
Stainless Steel	JM4160	n (min-1)	1990	1790	1590	1430	1270	1150	1000	900	800	720
		Vc (sfm)	328	295	328	295	328	295	328	295	328	295
		Vf (inch/min)	157	113	188	135	200	145	197	142	189	136
		fz (inch/t)	0.039	0.031	0.039	0.031	0.039	0.031	0.039	0.031	0.039	0.031
		ap (inch)	0.024	0.02	0.024	0.02	0.024	0.02	0.024	0.02	0.024	0.02
		ae (inch)	0.394	0.394	0.551	0.551	0.748	0.748	0.866	0.866	1.102	1.102
		Q (In3/min)	1.5	0.9	2.5	1.5	3.6	2.2	4.1	2.5	5	3
Cast Iron	JP4120 GX2140	n (min-1)	3980	3580	3180	2870	2550	2290	1990	1790	1590	1430
		Vc (sfm)	656	590	656	590	656	590	656	590	656	590
		Vf (inch/min)	470	338	563	407	602	433	587	423	563	405
		fz (inch/t)	0.059	0.047	0.059	0.047	0.059	0.047	0.059	0.047	0.059	0.047
		ap (inch)	0.031	0.024	0.031	0.024	0.031	0.024	0.031	0.024	0.031	0.024
		ae (inch)	0.394	0.394	0.551	0.551	0.748	0.748	0.866	0.866	1.102	1.102
		Q (In3/min)	5.7	3.2	9.6	5.4	14	7.8	15.8	8.8	19.2	10.7
Maximum ap (Inch)			ap ≤ 0.04									

1. Use the appropriate coolant for the work material and machining shape.
2. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
3. Grade GX2140 can not be used with conductive touch sensors.
4. To prevent tool damage due to chip clogging, always use a chip removal method such as an air blower, etc.
5. Ensure to exchange the insert at the correct time to ensure safety of the tool-body.
6. The following equation can be used to determine the metal removal rate per unit time Q:
   Q (in 3/min) = ap (in) × ae (in) × Vf (in/min)
   Do not set values higher than the maximum value.

Regarding ramping and helical milling diameter

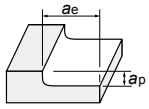


Tool Diameter	0.625" or 16mm	18mm	0.75" or 20mm	22mm	1" or 25mm	28mm	1.25" or 32mm	35mm	1.5" or 40mm
Max ramp angle Ø	0.8°	0.8°	0.8°	0.8°	0.8°	0.6°	0.5°	0.5°	0.3°
Hole Dia. (inch)	0.945"~ 1.181"	1.102"~ 1.339"	1.260"~ 1.496"	1.417"~ 1.654"	1.654"~ 1.890"	1.890"~ 2.126"	2.205"~ 2.441"	2.441"~ 2.677"	2.835"~ 3.071"
Hole Dia. (mm)	24~30mm	28~34mm	32~38mm	36~42mm	42~48mm	48~54mm	56~62mm	62~68mm	72~78mm

Cutting depth per rotation should be set to ap = 0.04" (1mm) or less
It is recommended that the tool be used while performing sufficient chip removal and checking that there are no abnormal vibrations.

METRIC

Red indicates primary recommended insert grade.



Work Material	Recommended Insert Grade	Tool Diameter	Ø16 (2 flutes)		Ø20 (3 flutes)		Ø25 (4 flutes)		Ø32 (5 flutes)		Ø40 (6 flutes)	
		Overhang ratio	~ 3Dc	4Dc ~ 7Dc	~ 3Dc	4Dc ~ 7Dc	~ 3Dc	4Dc ~ 7Dc	~ 3Dc	4Dc ~ 7Dc	~ 3Dc	4Dc ~ 7Dc
Carbon Steel Alloy Steel <30HRC	GX2140 JS4045	n (min-1)	3380	2990	2710	2390	2170	1910	1690	1490	1350	1190
		Vc (m/min)	170	150	170	150	170	150	170	150	170	150
		Vf (mm/min)	8110	7170	9750	8600	10410	9160	10140	8940	9720	8560
		fz (mm/t)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		ap (mm)	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6
		ae (mm)	10	10	14	14	19	19	22	22	28	28
		Q (cm3/min)	65	43	109	72	158	104	178	118	218	144
Alloy Steel Tool Steel 30 ~ 40HRC	JP4120 JS4045	n (min-1)	2990	2590	2390	2070	1910	1660	1490	1290	1190	1040
		Vc (m/min)	150	130	150	130	150	130	150	130	150	130
		Vf (mm/min)	5980	5180	7170	6210	7640	6640	7450	6450	7140	6240
		fz (mm/t)	1	1	1	1	1	1	1	1	1	1
		ap (mm)	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6
		ae (mm)	10	10	14	14	19	19	22	22	28	28
		Q (cm3/min)	48	31	80	52	116	76	131	85	160	105
Pre-Hardened Steel Alloy Steel 40 ~ 50HRC	JP4120 JS4045	n (min-1)	1990	1790	1590	1430	1270	1150	1000	900	800	720
		Vc (m/min)	100	90	100	90	100	90	100	90	100	90
		Vf (mm/min)	3980	2860	4770	3430	5080	3680	5000	3600	4800	3450
		fz (mm/t)	1	0.8	1	0.8	1	0.8	1	0.8	1	0.8
		ap (mm)	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5
		ae (mm)	10	10	14	14	19	19	22	22	28	28
		Q (cm3/min)	24	14	40	24	58	35	66	40	81	48
Stainless Steel	JM4160	n (min-1)	1990	1790	1590	1430	1270	1150	1000	900	800	720
		Vc (m/min)	100	90	100	90	100	90	100	90	100	90
		Vf (mm/min)	3980	2860	4770	3430	5080	3680	5000	3600	4800	3450
		fz (mm/t)	1	0.8	1	0.8	1	0.8	1	0.8	1	0.8
		ap (mm)	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5
		ae (mm)	10	10	14	14	19	19	22	22	28	28
		Q (cm3/min)	24	14	40	24	58	35	66	40	81	48
Cast Iron	JP4120 GX2140	n (min-1)	3980	3580	3180	2870	2550	2290	1990	1790	1590	1430
		Vc (m/min)	200	180	200	180	200	180	200	180	200	180
		Vf (mm/min)	11940	8590	14310	10330	15300	10990	14920	10740	14310	10290
		fz (mm/t)	1.5	1.2	1.5	1.2	1.5	1.2	1.5	1.2	1.5	1.2
		ap (mm)	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6
		ae (mm)	10	10	14	14	19	19	22	22	28	28
		Q (cm3/min)	96	52	160	87	233	125	263	142	321	173
Maximum a_p (mm)			$a_p \leq 1.0$									

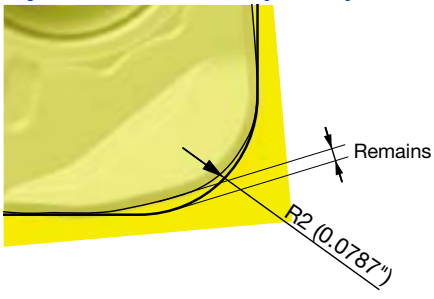
1. Use the appropriate coolant for the work material and machining shape.
2. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
3. Grade GX2140 can not be used with conductive touch sensors.
4. To prevent tool damage due to chip clogging, always use a chip removal method such as an air blower, etc.
5. Ensure to exchange the insert at the correct time to ensure safety of the tool-body.
6. The following equation can be used to determine the metal removal rate per unit time Q:
   Q (cm3/min) = ap (mm) × ae (mm) × Vf (mm/min) / 1000
   Do not set values higher than the maximum value.

Points requiring care when creating the machining program

- In CAM, define the tool shape as an R2.0 (0.0787") radius shape.
- Use with axial-direction cutting depths ap of 1.0mm (0.04") or less.

	Corner R Definition in CAM	Remains (inch/mm)	Over Cut (inch/mm)
	0.0591" / R1.5mm	0.0118" / 0.3mm	0
Recommended	0.0787" / R2.0mm	0.0079" / 0.2mm	0
	0.1181" / R3.0mm	0	0.0157" / 0.4mm

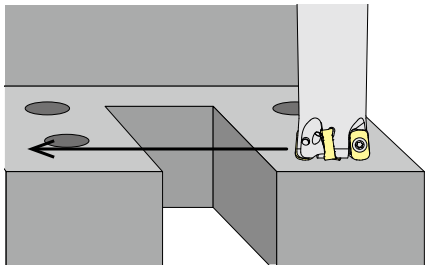
apmax = 1.0mm (0.04")



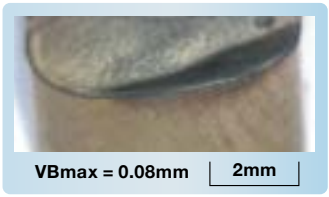
Field Data

01 Shortened machining time

Interrupted machining



Cutting edge condition after 30 minutes of cutting



[Work material] Pre-hardened steel (40HRC)

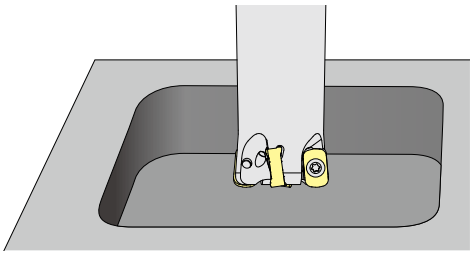
[Tool] TD4N2032S-5 (Ø1.5"-5 flutes)
ENMU0603EN-B (JP4120)

[Cutting conditions]
Vc = 100 m/min (328 sfm)
Vf = 9000 mm/min (354 ipm)
fz = 1.8 mm/t (0.071 in/tooth)
ap × ae = 0.6 × 20 mm (0.024" x 0.79")
Air-blow

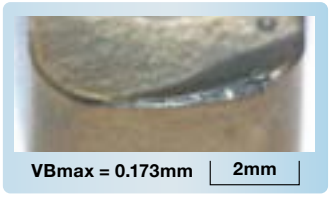
- 90-minute machining time shortened to approximately 30 minutes.

02 Improved tool life

Pocketing



Cutting edge condition after 100 minutes of cutting



[Work material] Carbon steel

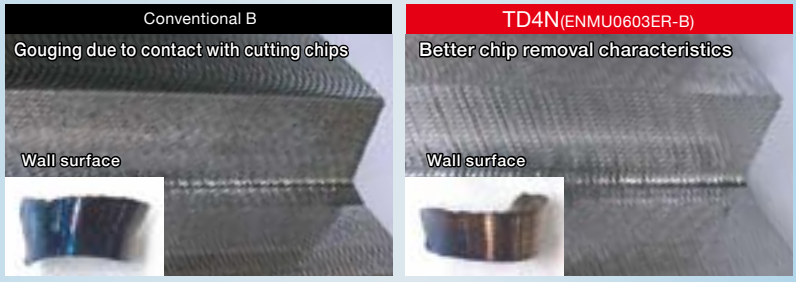
[Tool] TD4N2020S-3 (Ø 0.75"-3 flutes)
ENMU0603EN-B (JP4120)

[Cutting conditions]
Vc = 140 m/min (459 sfm)
Vf = 5000 mm/min (197 ipm)
fz = 0.75 mm/t (0.03 in/tooth)
ap × ae = 0.8 × 10 mm (0.031" x 0.394")
Emulsion oil

- There is no major chipping and damage is reduced.

03 Machining condition comparison for walls

Condition of machined wall and cutting chips



[Work material] Carbon steel

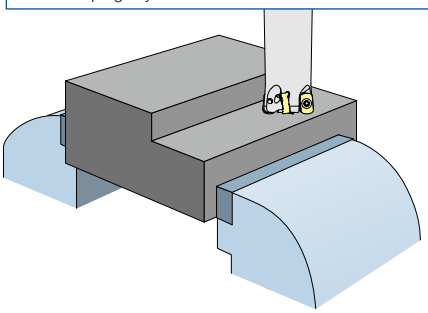
[Tool] TD4N2025S-4 (Ø 1"-4 flutes)
ENMU0603EN-B (JM4160)

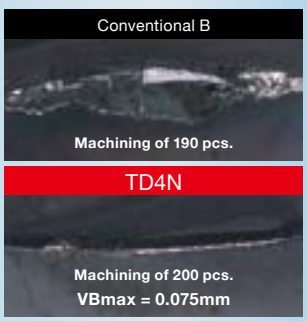
[Cutting conditions]
Vc = 180 m/min (590 sfm)
Vf = 7300 mm/min (287 ipm)
fz = 0.8 mm/t (0.031 in/tooth)
ap × ae = 0.5 × 18 mm (0.02" x 0.71")
Air-blow

- New free cutting design curls chip up and into the pocket minimizing chip discharge contact with walls.

04 High-performance machining when clamp rigidity is weak

Low clamp rigidity





[Work material] Mild steel

[Tool] TD4N2032S-5 (Ø 1.5"-5 flutes)
ENMU0603EN-C (JS4045)

[Cutting conditions]
Vc = 200 m/min (656 sfm)
Vf = 8000 mm/min (315 ipm)
fz = 0.8 mm/t (0.031 in/tooth)
ap × ae = 0.5 × 20 mm (0.02" x 0.79")
Emulsion oil

- Even after machining 200 pieces, wear is minimal.

High Feed Tools Lineup

Handle many kind of roughing machining needs with a plentiful lineup.

Type	Feature				Holder	Insert			Programing R	Max cutting depth
	Economical (no. of corners)	High accuracy (Less uncut remnants)	Supports for high-hardened steel	Efficiency (no. of Flutes)	Tool dia.	No. of corners	Shape	Inscribed circle code		
TD4N 	◎	◎	~50HRC	◎ High efficiency multiflutes	0.625" ~ 1.5" 16mm~42mm	4		06	0.0787" or 2.0mm	0.04" or 1.0mm
ASR MULTI 		○	○ ~62HRC	◎ High efficiency multiflutes	0.625" ~ 2.5" 16mm ~ 66mm	2		06 12	0.0787" or 2.0mm	0.06" or 1.5mm
ASRF-mini 	◎		○ ~62HRC	○ General	0.75"~2.5" 20mm ~ 63mm	4		07	0.0787" or 2.0mm	0.047" or 1.2mm
ASR 		○	○ ~60HRC	○ General	0.75" ~ 4" 20mm ~100mm	2		08 ~ 15	0.118" or 3.0mm	0.078" or 2.0mm
IASRT 	○	○	○ ~62HRC	○ General	2" ~ 5"	3		09 ~ 15	0.118" or 3.0mm	0.078" or 2.0mm
IASRF 	◎		○ ~60HRC	○ General	1.25" ~ 4"	4		12	0.177" or 4.5mm	0.078" or 2.0mm

※ For details of tool specifications, please check on catalog or website (www.moldino.com/en-US/)

The diagrams and table data are examples of test results, and are not guaranteed values.
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Safety Considerations

1. Handling

(1) When removing tool from packaging, be careful not to drop the tool on your foot or fingers.
(2) When actually setting the inserts, be careful not to touch the cutting flute directly with your bare hands.

2. Mounting

(1) When preparing to use, be sure that the insert is firmly screwed in the pocket and cutter is properly mounted on the tool holder.
(2) If abnormal chattering occurs during use, stop the machine immediately, identify the cause of the chatter and take corrective action.

3. Usage

(1) Before use confirm all dimensions, verify work material and programmed tool rotation.
(2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
(3) Inserts are made of hard material and may break and be expelled from cutter at high speeds. Since there is a danger of injury to workers from chip evacuation, insert breakage or fire safety precautions must be observed at all times. Including, but not limited to: safety glasses, machine enclosures or other means to create a safe environment for work. If you have questions on safety, contact your supervisor.
- Do not use where there is a risk of fire or explosion.
- Do not use non-water-soluble cutting oils. Such oils may result in fire.

(4) Do not use the tool for any purpose other than that for which it is intended, and do not modify it.

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