Member IMC Group Tungaloy INDUSTRY 4.0

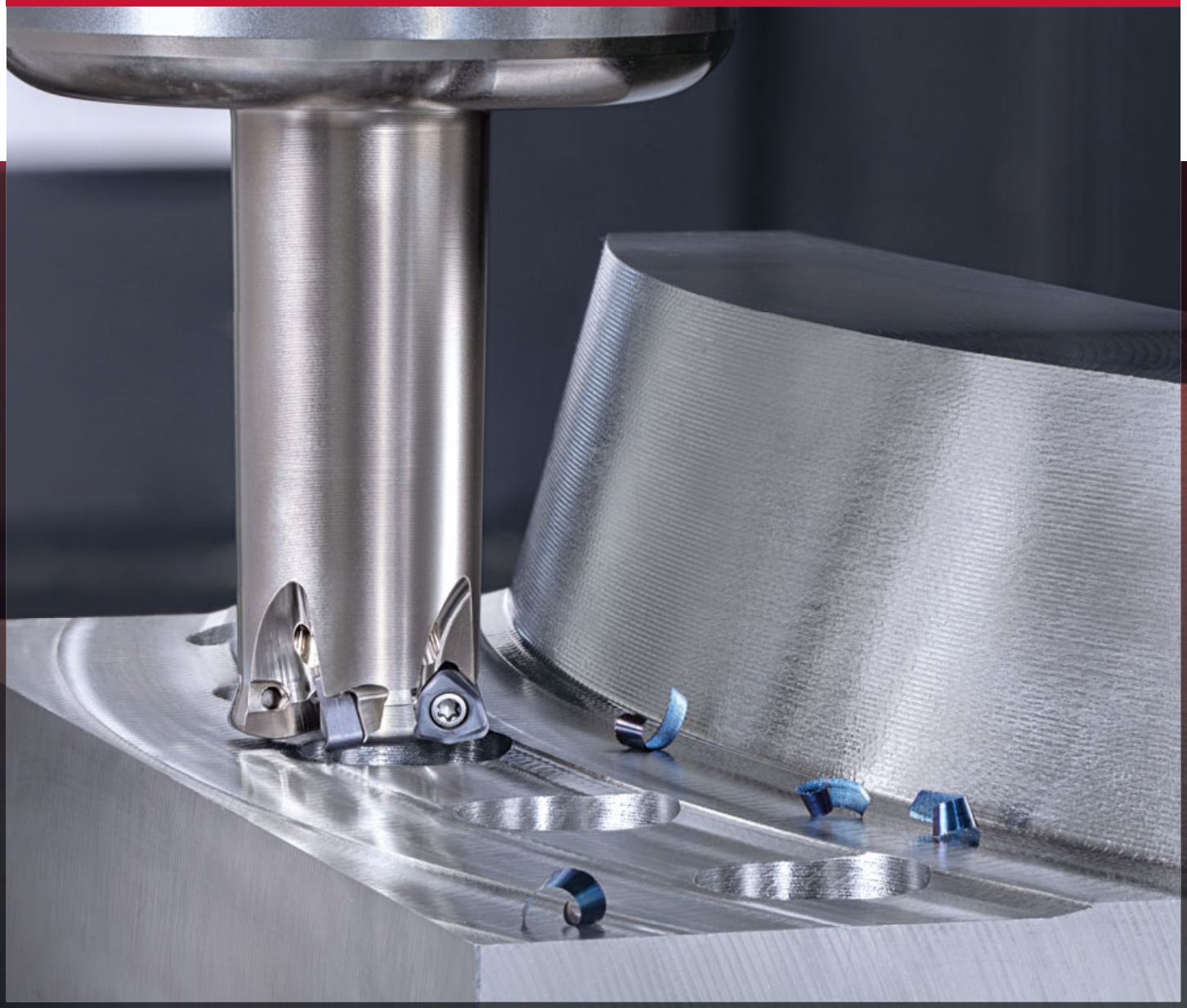
MillLine

High feed milling cutter

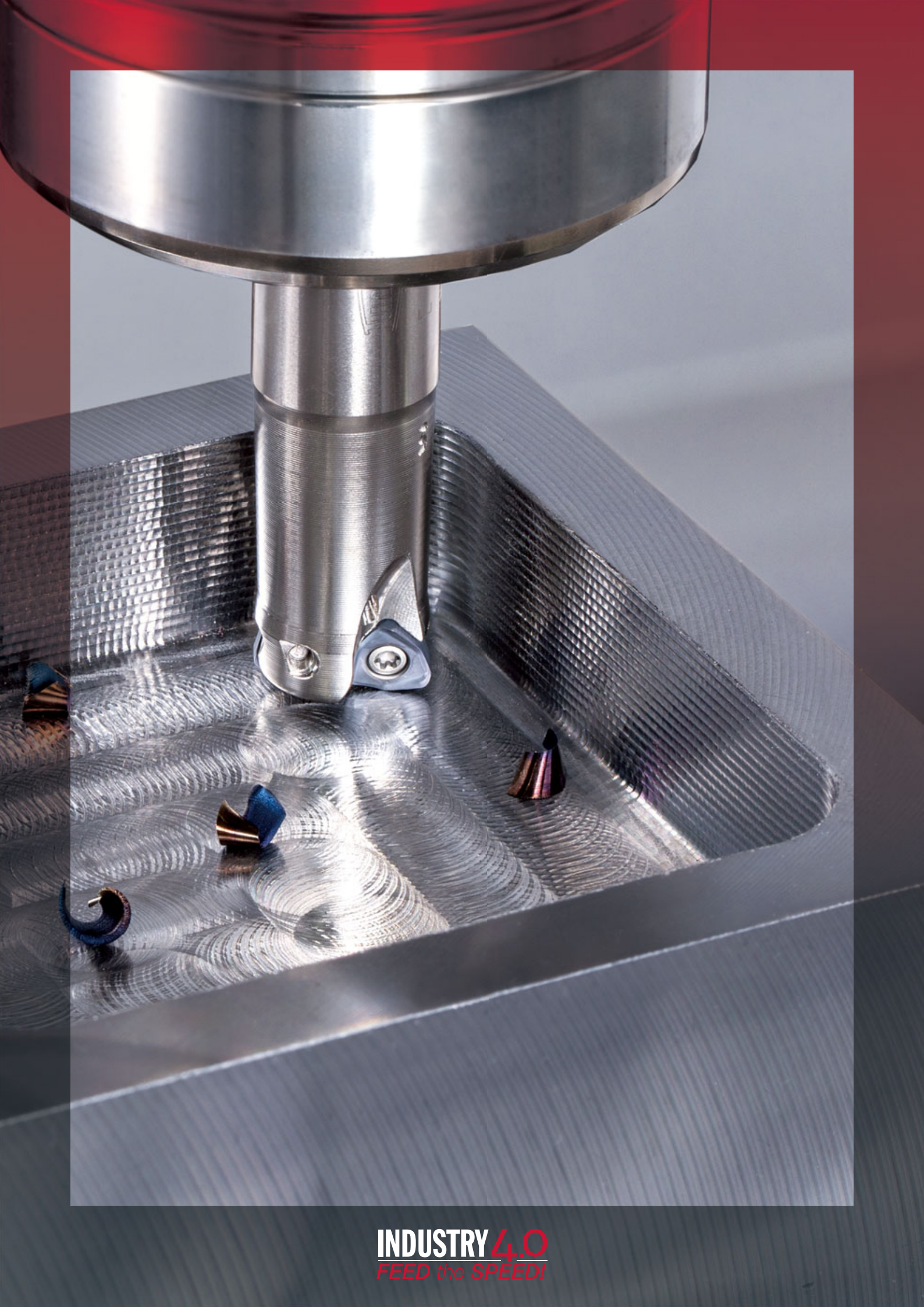
DOFEED TRI

Tungaloy Report No. 546-US

High feed milling cutters with six cutting edge inserts, featuring robust cutter design for high productivity



TUNGALOY ADDFORCE ACCELERATED LINES



INDUSTRY 4.0
FEED the SPEED!

TUNGALOY

ADDFORCE MILL

ACCELERATED MILLING

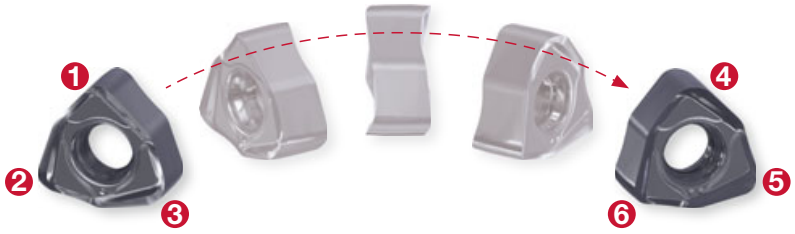
DOFEED TRI

High feed milling cutters featuring
strong double-sided inserts with six cutting edges

DOFEEDTRI

Economical double-sided inserts with six cutting edges

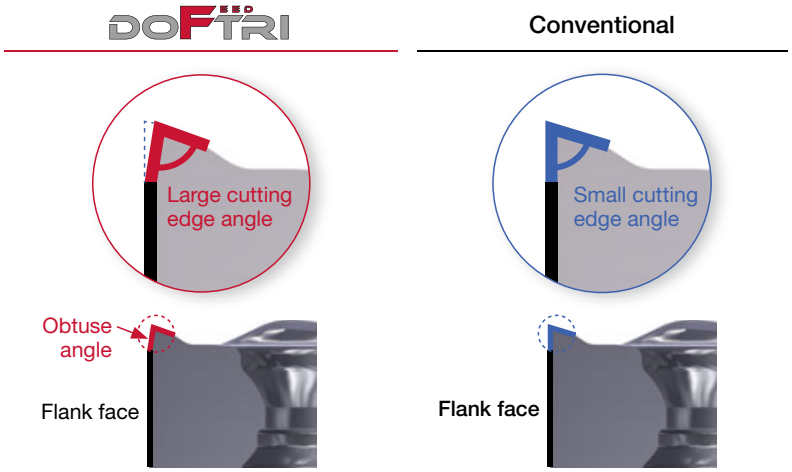
- 1.5 to 3 times greater number of cutting edges per insert compared with conventional high feed milling inserts.
- Reduced cost per insert when machining stainless steels and difficult materials, where inserts demonstrate rapid wear.

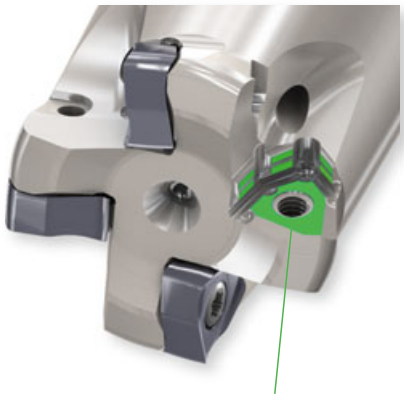


Tool dia: ø0.625" - ø2.00"

Designed for tool reliability and stability

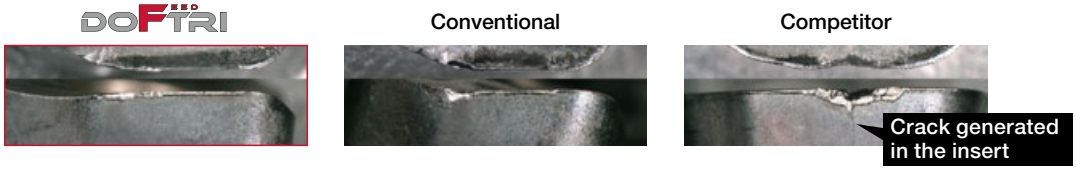
- Robust cutting edge design forms an obtuse angle, eliminating insert fracture during machining.
- A large contact face on the insert seat provides secure insert retention.





Large contact face

Tool life comparisons after pocket milling for 240 min



Pocketing

Cutter	: EXWX03U0.75C0.75R03 (ø0.750", z = 3)
Insert	: WXMU0303ZER-MM AH3225
Workpiece material	: 4140 / 8620
Cutting speed	: *Vc* = 492 sfm
Feed per tooth	: *fz* = 0.032 ipt
Depth of cut	: *ap* = 0.019"
Width of cut	: *ae* = 0.413"
Number of teeth	: 3
Coolant	: Internal air
Machine	: Vertical M/C, Cat50

Excellent ramping capability

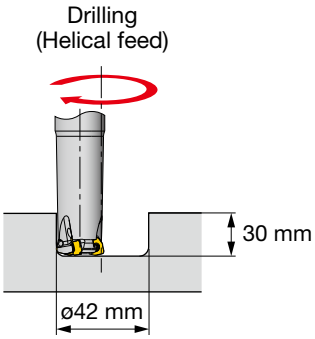
- Longer inner cutting edge allows higher ramp-down capabilities to promote higher productivity.
- Increased max ramping angles allow productivity boosts in linear and helical ramping operations.

Inner cutting edge
(Cutting edge for ramp down operation)

Main cutting edge

Long inner cutting edge design

Machining time comparison with helical interpolation



	DOFTRI	Competitor
Feed speed: *Vf* (ipm)	125.0	125.0
Pitch for helical interpolation (inch)	**0.039"**	**0.019"**
Machining time (seconds)	**25**	**50**
Chip control	 Consistent chip form	 Inconsistent chip form

Tool dia. : ø1.00" , z = 4
Workpiece material : S55C / C55
Cutting speed : *Vc* = 492sfm
Feed per tooth : *fz* = 0.019 ipt
Number of teeth : 4

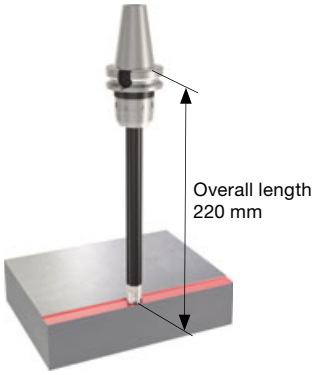
Excellent chatter-free design

- With 12° entry angle, the cutter directs the cutting force in the axial direction, eliminating chatter.
- Boosts productivity and tool stability for long overhang setups.

DOFTRI

Common high feed cutter

The comparison of anti chattering performance with long overhang setup



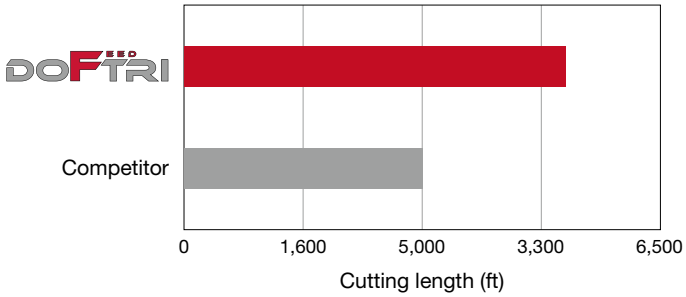
	fz (mm/t)		
	1	1.2	1.5
DOFTRI	✓	✓	✓
Competitor A	✓	×	×
Competitor B	✓	×	×

✓ OK
× Chatter

Cutter : HXWX03M020M10R03 (ø20 mm, z = 3)
Insert : WXMU0303ZER-MM AH3225
Workpiece material : S55C / C55
Cutting speed : *Vc* = 150 m/min
Depth of cut : *ap* = 0.5 mm
Width of cut : *ae* = 10 mm
Number of teeth : 3
Coolant : Dry
Machine : Vertical M/C, BT50
Overhang length : L/D = 11

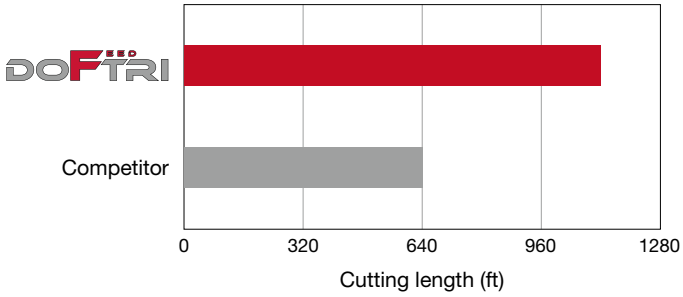
CUTTING PERFORMANCE

P S55C / C55 (200HB)



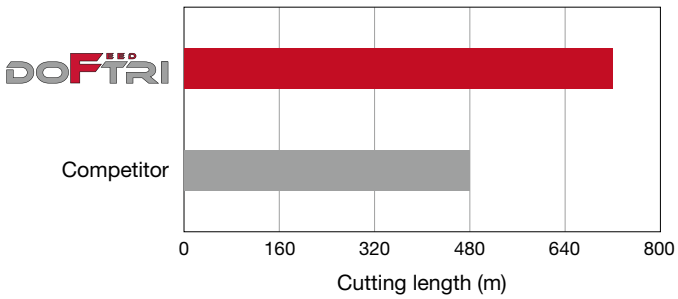
Cutter : EXWX03U0.75C0.75R03 (ø0.750", z = 3)
Insert : WXMU0303ZER-MM AH3225
Cutting speed : *Vc* = 656 sfm
Feed per tooth : *fz* = 0.039 ipt
Depth of cut : *ap* = 0.024"
Width of cut : *ae* = 0.472"
Coolant : Dry
Machine : Vertical M/C, CAT40

P NAK80 (40HRC)



Cutter : EXWX03U0.75C0.75R03 (ø0.750", z = 3)
Insert : WXMU0303ZER-MM AH3225
Cutting speed : *Vc* = 393 sfm
Feed per tooth : *fz* = 0.027 ipt
Depth of cut : *ap* = 0.024"
Width of cut : *ae* = 0.472"
Coolant : Dry
Machine : Vertical M/C, CAT40

M SUS304 / X5CrNi18-9 (170HB)



Cutter : EXWX03U0.75C0.75R03 (ø0.750", z = 3)
Insert : WXMU0303ZER-MM AH3225
Cutting speed : *Vc* = 393 sfm
Feed per tooth : *fz* = 0.027 ipt
Depth of cut : *ap* = 0.024"
Width of cut : *ae* = 0.472"
Coolant : Wet
Machine : Vertical M/C, CAT40

HIGH FEED CUTTER SELECTION GUIDE

Series	DOFTRI	DOFEED 03	ADDOFEED	MILLQFEED 09
Tool image				
Tool diameter (inch)	ø0.625 - ø2.00	ø0.6250 - ø2.00	ø0.375 - ø1.00	ø1.00 - ø1.25
Max. depth of cut (inch)	0.039	0.039	0.019	0.039, 0.059
No. of edges per insert	6	4	4	4
Approach angle	12°	17°	17°	ZER type: 12° UER type: 7°
Efficiency (density)	○	◎	◎	○
Tool life	◎	○	○	◎
Light cutting	○	◎	◎	○
Cutting edge strength	◎	○	○	○
Chip evacuation	○	◎	◎	○
Ramping	◎	○	○	◎
Corner radius deviation	◎	◎	◎	○
Long overhang applications	◎	○	○	◎

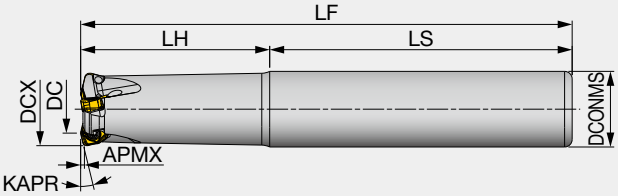
◎: First choice
○: Supplementary

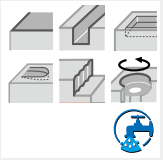
DOFEEDTRI

EXWX03

High feed endmill, shank type, with screw clamp system, for 6-corner double sided inserts

GAMP = +23°, GAMF = -7.9° ~ -6.2°





Inch	APMX	DCX	CICT	DC	DCONMS	LS	LH	LF	KAPR	WT(lb)	Air hole	Insert
EXWX03U0.62C0.62R02	0.039	0.625	2	0.3448	0.625	2.750	1.250	4.000	12°	0.31	With	WXMU03...
EXWX03U0.62C0.62R02L	0.039	0.625	2	0.3448	0.625	4.000	2.000	6.000	12°	0.46	With	WXMU03...
EXWX03U0.75C0.75R03	0.039	0.750	3	0.4645	0.750	3.000	2.000	5.000	12°	0.50	With	WXMU03...
EXWX03U0.75C0.75R03L	0.039	0.750	3	0.4645	0.750	3.000	3.500	6.500	12°	0.63	With	WXMU03...
EXWX03U1.00C1.00R04	0.039	1.000	4	0.7125	1.000	3.000	2.500	5.500	12°	1.05	With	WXMU03...
EXWX03U1.00C1.00R04L	0.039	1.000	4	0.7125	1.000	3.000	4.000	7.000	12°	1.31	With	WXMU03...
EXWX03U1.25C1.25R05	0.039	1.250	5	0.9606	1.250	3.000	3.000	6.000	12°	1.85	With	WXMU03...
EXWX03U1.25C1.25R05L	0.039	1.250	5	0.9606	1.250	3.000	5.000	8.000	12°	2.44	With	WXMU03...

SPARE PARTS

Designation	Clamping screw	Wrench
EXWX03...	CSPB-2.5SH	IP-7D

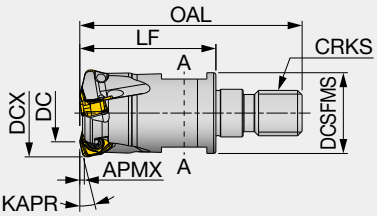
*Recommended clamping torque (lbs·ft): CSPB-2.5SH = 0.81

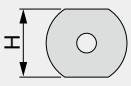
TUNGFLEX

HXWX03-M

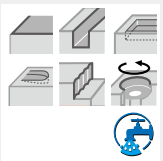
High feed endmill, modular type (TungFlex)

GAMP = +23°, GAMF = -7.9° ~ -6.2°





A-A cross section



Metric	APMX	DCX	CICT	DC	OAL	LF	H	DCSFMS	KAPR	CRKS	WT(kg)	Air hole	Insert
HXWX03M016M08R02	1	16	2	8.9	42	25	10	12.8	12°	M8	0.03	With	WXMU03...
HXWX03M020M10R03	1	20	3	12.8	49	30	15	17.8	12°	M10	0.06	With	WXMU03...
HXWX03M025M12R04	1	25	4	17.8	57	35	17	20.8	12°	M12	0.1	With	WXMU03...
HXWX03M032M16R05	1	32	5	24.7	63	40	22	28.8	12°	M16	0.21	With	WXMU03...

SPARE PARTS

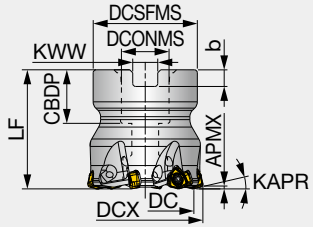
Designation	Clamping screw	Wrench
HXWX03...	CSPB-2.5SH	IP-7D

*Recommended clamping torque (lbs·ft): CSPB-2.5SH = 0.81

TXWX03

High feed mill, with screw clamp system, for 6-corner double sided inserts

GAMP = +23°, GAMF = -6.2° ~ -6.1°



Inch	APMX	DCX	CICT	DC	DCSFMS	DCONMS	CBDP	LF	b	KWW	KAPR	WT(lb)	Air hole	Insert
TXWX03U1.50B0.50R05	0.039	1.500	6	1.217	1.457	0.500	0.630	1.575	0.157	0.258	12°	0.53	With	WXMU03...
TXWX03U2.00B0.75R08	0.039	2.000	8	1.713	1.693	0.750	0.750	1.969	0.197	0.315	12°	0.96	With	WXMU03...

SPARE PARTS

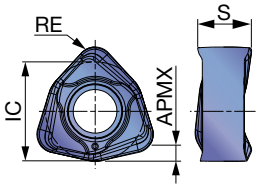


Designation	Clamping screw	Shell locking bolt (optional parts)	Wrench
TXWX03U1.50B0.50R05	CSPB-2.5SH	(SR UNF 1/4X3/4 B18.3)	IP-7D
TXWX03U2.00B0.75R08	CSPB-2.5SH	(C0.375X1.125H)	IP-7D

*Recommended clamping torque (lbs·ft): CSPB-2.5SH = 0.81

INSERT

WXMU0303-MM



P	Steel	★	☆	
M	Stainless	★		
K	Cast iron	☆	★	
N	Non-ferrous			
S	Superalloy	☆	★	
H	Hard materials		★	

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH3225	Coated AH8015	IC	S
WXMU0303ZER-MM	0.047	0.039	●	●	0.039	0.143

● : Line up

GRADES

AH3225 P M

- Nano multi-layer coating technology with three major properties for optimal cutting edge integrity
- Increased resistance to wear, fracture, oxidation, built-up edge, and delamination

AH8015 H K S

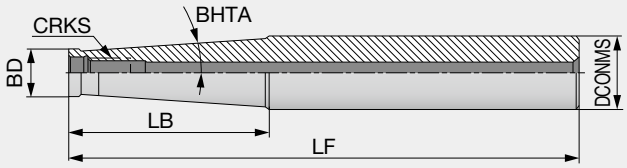
- Incorporates a hard coating layer and carbide substrate
- Strong resistance to wear, heat, and built-up edge, ideal for machining hard or difficult materials

DOFEEDTRI

TUNGFLEX

SM

TungFlex - Modular shank

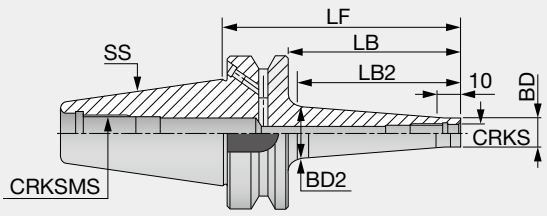


Designation	DCONMS	BD	LF	LB	BHTA	CRKS
SM08-L73C16	16	13	73	25	0°	M8
SM08-L128-C16	16	13	128	80	0.9°	M8
SM08-L170-C20	20	13	170	66.8	3.3°	M8
SM10-L80-C20	20	18	80	30	0°	M10
SM10-L130-C20	20	18	130	80	0.6°	M10
SM10-L200-C25	25	19	200	57.2	3.3°	M10
SM12-L86-C25	25	21	86	30	5.1°	M12
SM12-L200-C32	32	21	200	78	4.4°	M12
SM16-L95-C32	32	29	95	35	1.7°	M16
SM16-L230-C32	32	29	230	50	1.8°	M16

TUNGFLEX

BT-ODP (Screw clamping head holder)

TungFlex modular tooling system with BT shank



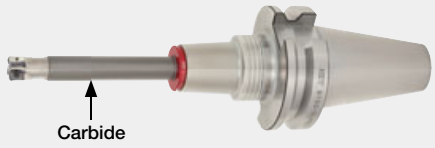
Designation	SS	CRKS	BD	BD2	LF	LB	LB2	CRKSMS
BT40ODP8X66	40	M8	13	15	66	39	30	M16
BT40ODP8X106	40	M8	13	23	106	79	70	M16
BT40ODP10X66	40	M10	18	20	66	39	30	M16
BT40ODP10X106	40	M10	18	28	106	79	70	M16
BT40ODP12X66	40	M12	21	24	66	39	30	M16
BT40ODP12X106	40	M12	21	31	106	79	70	M16
BT40ODP16X66	40	M16	29	28.6	66	39	-	M16
BT40ODP16X106	40	M16	29	34	106	79	70	M16

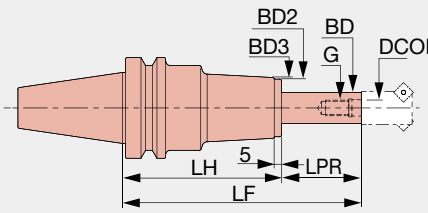
Applicable for 10 MPa pressure coolant
(1) Balanced to G6.3 at 12,000 min^{-1}

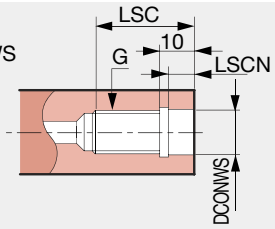
TUNGFLEX

BT-RSG (Screw clamping head holder)

TungFlex modular tooling system with BT shank







Designation	DCONWS	LSC	LSCN	BD	LF	LPR	LH	BD2	BD3	WT (kg)	G
BT40-RSG 8-105-M 25	8.5	18	6.5	15	105	25	80	30	32	1.4	M8
BT40-RSG 8-135-M 25	8.5	18	6.5	15	135	25	110	30	32	1.8	M8
BT40-RSG 8-130-M 50	8.5	18	6.5	15	130	50	80	30	32	1.4	M8
BT40-RSG 8-160-M 50	8.5	18	6.5	15	160	50	110	30	32	1.8	M8
BT40-RSG 8-155-M 75	8.5	18	6.5	15	155	75	80	30	32	1.5	M8
BT40-RSG 8-185-M 75	8.5	18	6.5	15	185	75	110	30	32	1.9	M8
BT40-RSG 10-125-M 25	10.5	22	6.5	19	125	25	100	36	38	1.8	M10
BT40-RSG 10-155-M 25	10.5	22	6.5	19	155	25	130	36	38	2.2	M10
BT40-RSG 10-150-M 50	10.5	22	6.5	19	150	50	100	36	38	1.9	M10
BT40-RSG 10-180-M 50	10.5	22	6.5	19	180	50	130	36	38	2.3	M10
BT40-RSG 10-175-M 75	10.5	22	6.5	19	175	75	100	36	38	2	M10
BT40-RSG 10-205-M 75	10.5	22	6.5	19	205	75	130	36	38	2.4	M10
BT40-RSG 10-200-M100	10.5	22	6.5	19	200	100	100	36	38	2	M10
BT40-RSG 10-230-M100	10.5	22	6.5	19	230	100	130	36	38	2.4	M10
BT40-RSG 12-125-M 25	12.5	22	6	24	125	25	100	43	45	2	M12
BT40-RSG 12-155-M 25	12.5	22	6	24	155	25	130	43	45	2.4	M12
BT40-RSG 12-150-M 50	12.5	22	6	24	150	50	100	43	45	2.1	M12
BT40-RSG 12-180-M 50	12.5	22	6	24	180	50	130	43	45	2.5	M12
BT40-RSG 12-175-M 75	12.5	22	6	24	175	75	100	43	45	2.3	M12
BT40-RSG 12-205-M 75	12.5	22	6	24	205	75	130	43	45	2.7	M12
BT40-RSG 12-200-M100	12.5	22	6	24	200	100	100	43	45	2.4	M12
BT40-RSG 12-230-M100	12.5	22	6	24	230	100	130	43	45	2.8	M12
BT50-RSG 8-120-M 25	8.5	18	6.5	15	120	25	95	30	32	4	M8
BT50-RSG 8-150-M 25	8.5	18	6.5	15	150	25	125	30	32	4.3	M8
BT50-RSG 8-145-M 50	8.5	18	6.5	15	145	50	95	30	32	4	M8
BT50-RSG 8-175-M 50	8.5	18	6.5	15	175	50	125	30	32	4.3	M8
BT50-RSG 8-170-M 75	8.5	18	6.5	15	170	75	95	30	32	4.1	M8
BT50-RSG 8-200-M 75	8.5	18	6.5	15	200	75	125	30	32	4.4	M8
BT50-RSG 10-140-M 25	10.5	22	6.5	19	140	25	115	36	38	4.3	M10
BT50-RSG 10-170-M 25	10.5	22	6.5	19	170	25	145	36	38	4.6	M10
BT50-RSG 10-165-M 50	10.5	22	6.5	19	165	50	115	36	38	4.4	M10
BT50-RSG 10-195-M 50	10.5	22	6.5	19	195	50	145	36	38	4.7	M10
BT50-RSG 10-190-M 75	10.5	22	6.5	19	190	75	115	36	38	4.5	M10
BT50-RSG 10-220-M 75	10.5	22	6.5	19	220	75	145	36	38	4.8	M10
BT50-RSG 10-215-M100	10.5	22	6.5	19	215	100	115	36	38	4.5	M10
BT50-RSG 10-245-M100	10.5	22	6.5	19	245	100	145	36	38	4.8	M10
BT50-RSG 12-140-M 25	12.5	22	6	24	140	25	115	43	45	4.6	M12
BT50-RSG 12-170-M 25	12.5	22	6	24	170	25	145	43	45	5	M12
BT50-RSG 12-165-M 50	12.5	22	6	24	165	50	115	43	45	4.7	M12
BT50-RSG 12-195-M 50	12.5	22	6	24	195	50	145	43	45	5.1	M12
BT50-RSG 12-190-M 75	12.5	22	6	24	190	75	115	43	45	4.9	M12
BT50-RSG 12-220-M 75	12.5	22	6	24	220	75	145	43	45	5.3	M12
BT50-RSG 12-215-M100	12.5	22	6	24	215	100	115	43	45	5	M12
BT50-RSG 12-245-M100	12.5	22	6	24	245	100	145	43	45	5.4	M12
BT50-RSG 12-240-M125	12.5	22	6	24	240	125	115	43	45	5.2	M12
BT50-RSG 16-140-M 25	17	25	6	29	140	25	115	52	54	5.4	M16
BT50-RSG 16-165-M 50	17	25	6	29	165	50	115	52	54	5.6	M16
BT50-RSG 16-190-M 75	17	25	6	29	190	75	115	52	54	5.8	M16
BT50-RSG 16-215-M100	17	25	6	29	215	100	115	52	54	6	M16
BT50-RSG 16-240-M125	17	25	6	29	240	125	115	52	54	6.2	M16

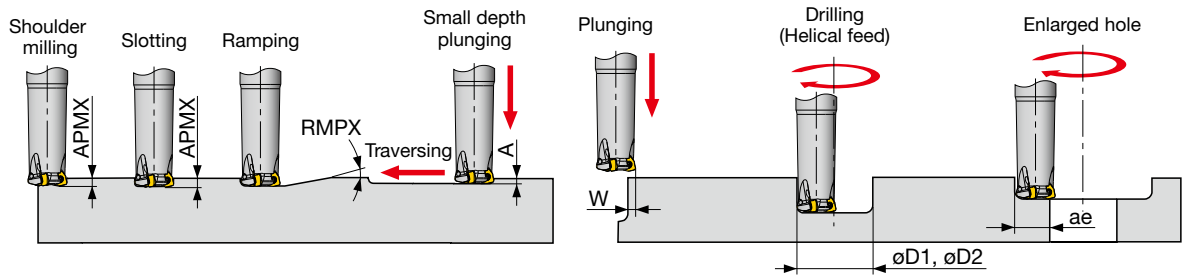
Manufactured by: MST corporation

DOFEEDTRI

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials		Hardness	Priority	Grades	Chipbreaker	Cutting speed *Vc* (sfm)	Feed per tooth *fz* (ipt)
P	Low carbon steel 1018, 1020, etc.		- 300HB	First choice	AH3225	MM	328 - 984	0.020 - 0.059
				For wear resistance	AH8015			
	Carbon steel, Alloy steel 1045, 1055, etc.		- 300HB	First choice	AH3225	MM	328 - 820	0.020 - 0.059
				For wear resistance	AH8015			
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	AH3225	MM	328 - 656	0.020 - 0.047
				For wear resistance	AH8015			
M	Austenitic Stainless steel 304SS, 316SS, etc.		- 200HB	First choice	AH3225	MM	262 - 492	0.020 - 0.039
	Martensitic Stainless steel S41000, 420SS, etc.		- 200HB	First choice	AH3225	MM	164 - 394	0.012 - 0.039
K	Gray cast iron Class 25, Class 30, etc.		150 - 250HB	First choice	AH8015	MM	328 - 984	0.020 - 0.059
				For impact resistance	AH3225			
	Ductile cast iron 60-40-18, etc.		150 - 250HB	First choice	AH8015	MM	262 - 656	0.020 - 0.059
				For impact resistance	AH3225			
S	Titanium alloy Ti-6Al-4V, etc.		- 40HRC	First choice	AH3225	MM	98 - 197	0.012 - 0.028
	Superalloys Inconel718, etc.		- 40HRC	First choice	AH8015	MM	66 - 164	0.004 - 0.012
H	Hardened steel	H-13, etc.	40 - 50HRC	First choice	AH8015	MM	262 - 492	0.004 - 0.020
				For impact resistance	AH3225			
		D2, etc.	50 - 60HRC	First choice	AH8015	MM	164 - 230	0.001 - 0.004

APPLICATION RANGE

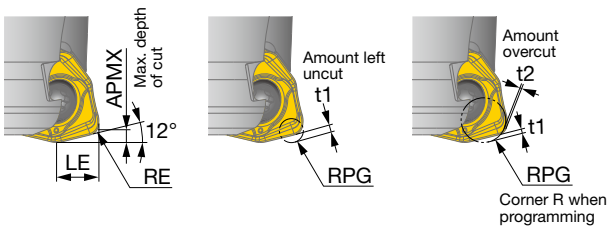


Designation	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging depth A	Max. cutting width in plunging W	Min. machinable hole dia. øD1	Max. machinable hole dia. øD2	Max. cutting width in enlarged hole ae
EXWX03U0.62C0.62R02	0.625	0.039	3.600	0.012	0.157	0.979	1.176	0.468
EXWX03U0.62C0.62R02L	0.625	0.039	3.600	0.012	0.157	0.979	1.176	0.468
EXWX03U0.75C0.75R03	0.750	0.039	2.300	0.012	0.157	1.196	1.511	0.593
EXWX03U0.75C0.75R03L	0.750	0.039	2.300	0.012	0.157	1.196	1.511	0.593
EXWX03U1.00C1.00R04	1.000	0.039	1.400	0.012	0.157	1.630	1.898	0.843
EXWX03U1.00C1.00R04L	1.000	0.039	1.400	0.012	0.157	1.630	1.898	0.843
EXWX03U1.25C1.25R05	1.250	0.039	1.000	0.012	0.157	2.116	2.392	1.093
EXWX03U1.25C1.25R05L	1.250	0.039	1.000	0.012	0.157	2.116	2.392	1.093
TXWS03U150W0.75R06	1.500	0.039	0.700	0.012	0.157	2.666	2.902	1.343
TXWS03U2.00W0.75R08	2.000	0.039	0.500	0.012	0.157	3.457	3.850	1.843

Tool dia: DCX (in), Number of revolution: *n* (min^{-1}), Feed speed: *Vf* (ipm), Max. depth of cut: APMX = 0.039", Number of teeth: CICT											
ø0.625", CICT = 2		ø0.750", CICT = 3		ø1.000", CICT = 4		ø1.250", CICT = 5		ø1.500", CICT = 6		ø2.000", CICT = 8	
n	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***
4034	315	3361	393	2521	393	2017	393	1681	393	1261	393
					Vc = 660 sfm, *fz* = 0.039 ipt						
4034	315	3361	393	2521	393	2017	393	1681	393	1261	393
					Vc = 660 sfm, *fz* = 0.039 ipt						
2995	168	2496	210	1872	210	1497	210	1248	210	936	210
					Vc = 490 sfm, *fz* = 0.028 ipt						
2384	95	1986	119	1490	119	1192	119	993	119	745	119
					Vc = 390 sfm, *fz* = 0.020 ipt						
2017	48	1681	61	1261	61	1008	60	840	60	630	60
					Vc = 330 sfm, *fz* = 0.012 ipt						
4034	315	3361	393	2521	393	2017	393	1681	393	1261	393
					Vc = 660 sfm, *fz* = 0.039 ipt						
2995	234	2496	292	1872	292	1497	292	1248	292	936	292
					Vc = 490 sfm, *fz* = 0.039 ipt						
801	26	667	32	500	32	400	32	334	32	250	32
					Vc = 131 sfm, *fz* = 0.016 ipt						
599	10	499	12	374	12	299	12	250	12	187	12
					Vc = 98 sfm, *fz* = 0.008 ipt						
2384	57	1986	71	1490	72	1192	72	993	71	745	72
					Vc = 390 sfm, *fz* = 0.012 ipt						
1204	10	1003	12	752	12	602	12	502	12	376	12
					Vc = 197 sfm, *fz* = 0.004 ipt						

TOOL GEOMETRY ON PROGRAMMING

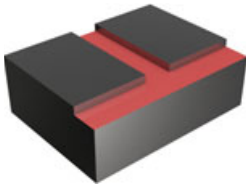
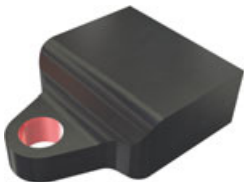
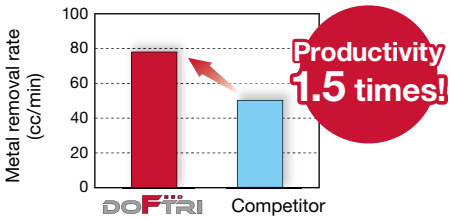
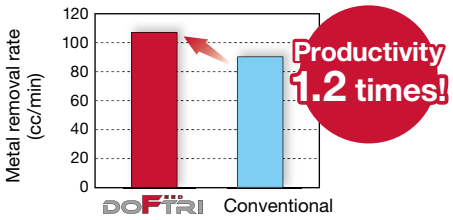
When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as R = 0.059".
If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t1) and overcut (t2).

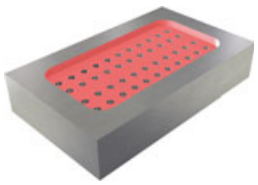
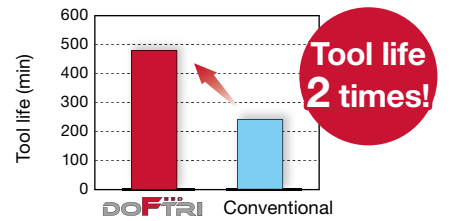
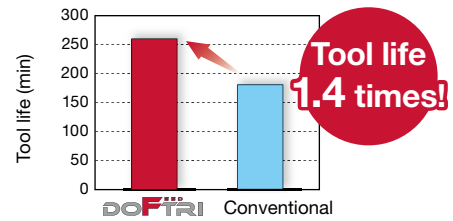


Max. depth of cut APMX (in)	Corner radius RE (in)	LE (in)	Corner R when programming RPG	Amount left uncut t1 (in)	Amount overcut t2 (in)
0.039	0.047	0.138	0.039	0.022	-
0.039	**0.047**	**0.138**	**0.059**	**0.018**	**-**
0.039	0.047	0.138	0.079	0.014	0.006
0.039	0.047	0.138	0.098	0.008	0.020

*Recommended

PRACTICAL EXAMPLES

Workpiece type		**Machine structural part**	**Heavy equipment part**
Cutter		EXWX03U0.75C0.75R03 (ø0.750", z = 3)	EXWX03U1.00C1.00R04 (ø1.00", z = 4)
Insert		WXMU0303ZER-MM	WXMU0303ZER-MM
Grade		AH3225	AH3225
Workpiece material		A283	SM400
		 P	 P
Cutting conditions	**Cutting speed: *Vc* (sfm)**	590	836
	Feed per tooth: *fz* (ipt)	0.035	0.011
	Depth of cut : *ap* (inch)	0.019	0.039
	Width of cut : *ae* (inch)	0.750	1.000
	Machining	Slotting, Shoulder milling	Hole enlarging
	Coolant	Dry	Wet
	Machine	Vertical M/C, CAT40	Vertical M/C, CAT40
Results		 Generating low cutting forces, **DoFeedTri** eliminated chatter, providing machining stability and 1.5 times productivity.	 With its steep ramp-down capability, **DoFeedTri** boosted 1.2 times productivity during helical interpolation process.

Workpiece type		**Machine part**	**Die and mold**
Cutter		EXWX03U1.00C1.00R04 (ø1.000", z = 4)	EXWX03U1.25C1.25R05 (ø1.25", z = 5)
Insert		WXMU0303ZER-MM	WXMU0303ZER-MM
Grade		AH3225	AH3225
Workpiece material		1045	H13 Tool Steel
		 P	 H
Cutting conditions	**Cutting speed: *Vc* (sfm)**	656	393
	Feed per tooth: *fz* (ipt)	0.012	0.026
	Depth of cut : *ap* (inch)	0.019	0.027
	Width of cut : *ae* (inch)	1.000	1.250
	Machining	Slotting, Shoulder milling	Pocketing
	Coolant	Dry	Wet
	Machine	Vertical M/C, CAT40	Vertical M/C, CAT50
Results		 Due to its small entering angle, **DoFeedTri** created thin chips, doubling tool life.	 With its strong cutting edge design, **DoFeedTri** provided 1.4 times tool life while machining parts with heavy interruptions

FIXEDTORQUEWRENCH

Achieve high cutting edge precision thanks to uniform force in clamping

Easy setting

Handle

Multi-component handle optimally designed for the hand enables ideal power transmission.

Mechanism

Driver clicks to alert the operator when the preset torque is attained.
IDs printed on the handle end allow easy identification of the driver specs.
Driver has unlimited loosening torque.
Driver mechanism is industrial-lubricant-resistant.

High repeatability & robustness

Robustness / Fitting

Wiha ChromTop® finish on tip for a perfect fit every time.
Durability thanks to high quality chrome-vanadium-molybdenum steel, through hardened, chrome-plated.

Versatility

Extra slim blade geometry is particularly suitable for applications with confined narrow access.

Handle

Ex) TW - D - 0.6NM

① Torque Wrench | ② Driver type | ③ Torque

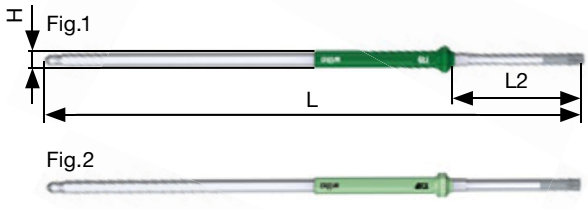
Designation	Stock	Torque (N·m)	Accuracy (%)	øD	L
TW-D-0.6NM	●	0.6	10	34	130
TW-D-0.9NM	●	0.9	10	34	130
TW-D-1.1NM	●	1.1	10	34	130
TW-D-1.4NM	●	1.4	10	34	130
TW-D-2.5NM	●	2.5	10	34	130
TW-D-3.0NM	●	3.0	10	34	130
TW-D-3.5NM	●	3.5	10	34	130

1 piece per package

Blade

Ex) TW - B - T6

① Torque Wrench | ② Blade | ③ TORX geom.



Designation	Stock	TORX geom.	H	L	L2	Fig.
TW-B-T6	●	T6	4	175	42	1
TW-B-T7	●	T7	4	175	42	1
TW-B-T8	●	T8	4	175	42	1
TW-B-T9	●	T9	4	175	42	1
TW-B-T10	●	T10	4	175	42	1
TW-B-T15	●	T15	4	175	42	1
TW-B-6IP	●	6IP	4	175	42	2
TW-B-7IP	●	7IP	4	175	42	2
TW-B-8IP	●	8IP	4	175	42	2
TW-B-10IP	●	10IP	4	175	42	2
TW-B-15IP	●	15IP	4	175	42	2

1 piece per package

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