

High feed milling cutter

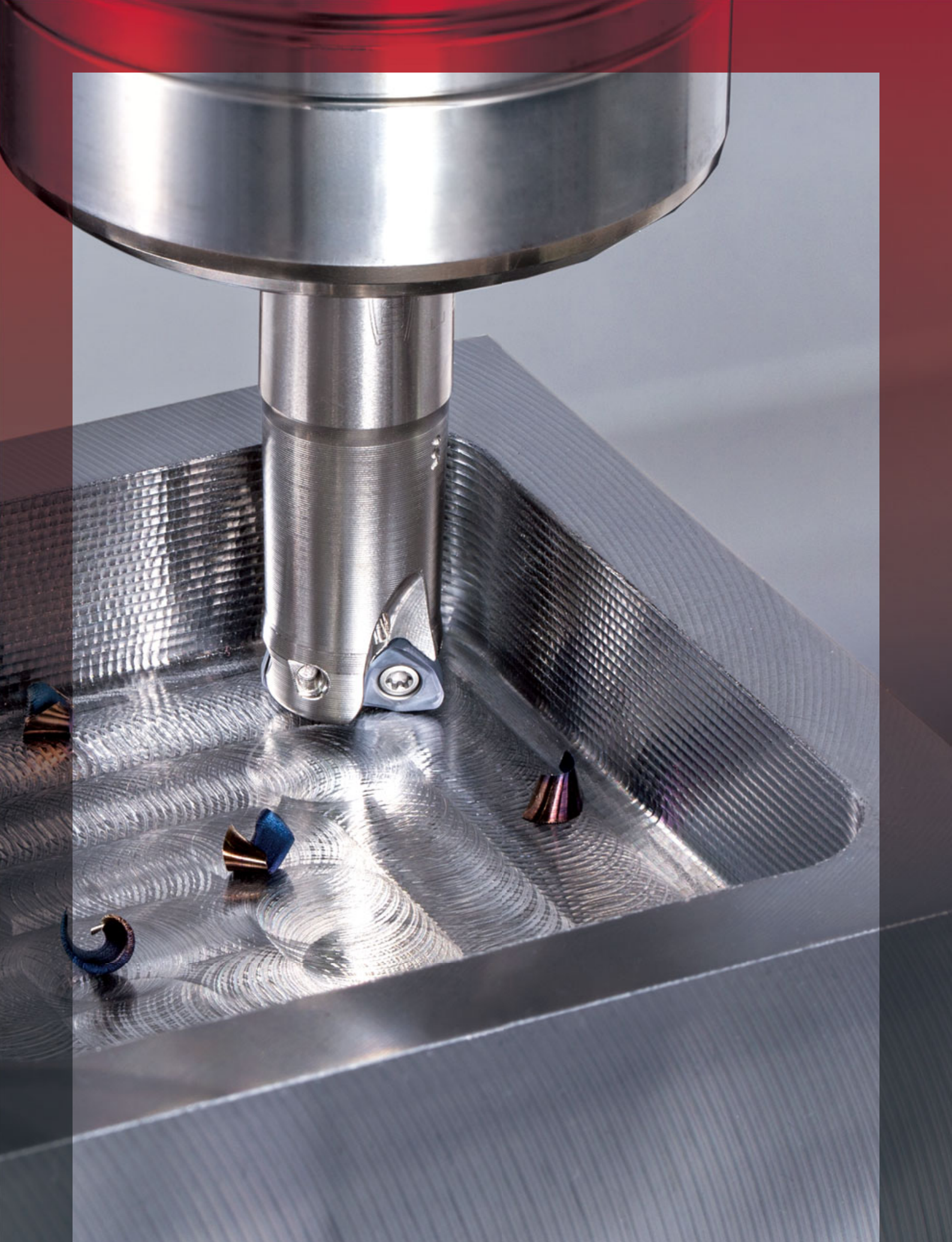
**DOF<sup>EEED</sup>TRI**

Tungaloy Report No. 546-G

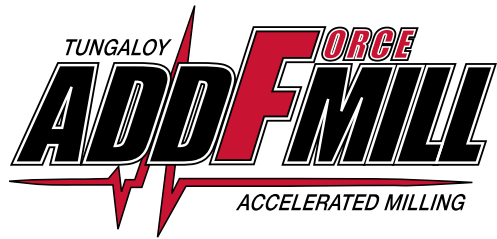
**High feed milling cutters with six cutting edge inserts**, featuring robust cutter design for high productivity







**INDUSTRY 4.0**  
*FEED the SPEED!*



DOF<sup>FEED</sup>TRI

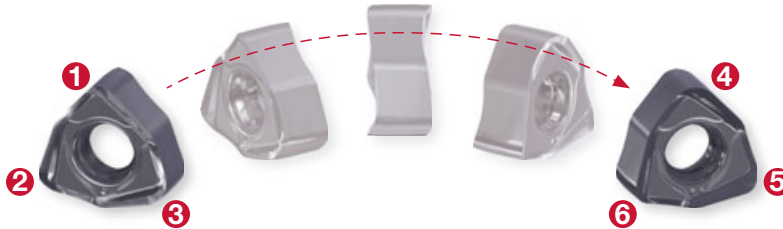
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High feed milling cutters featuring strong double-sided inserts with six cutting edges

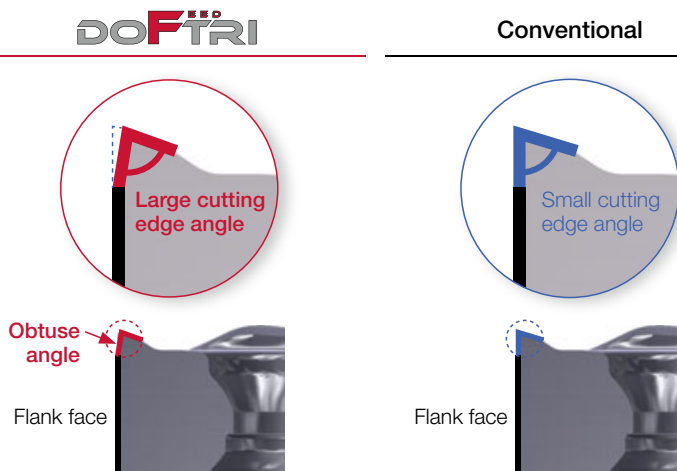
## Economical double-sided inserts with six cutting edges

- 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.



## 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.



## Tool life comparisons after pocket milling for 240 min



 Pocketing	Cutter	: EXWX03M020C20.0R03 (ø20 mm, z = 3)
	Insert	: WXMU0303ZER-MM AH3225
	Workpiece material	: SCM440 / 42CrMo4 (280HB)
	Cutting speed	: Vc = 150 m/min
	Feed per tooth	: fz = 0.8 mm/t
	Depth of cut	: ap = 0.5 mm
	Width of cut	: ae = 10.5 mm
	Number of teeth	: 3
	Coolant	: Internal air
	Machine	: Vertical M/C, BT50

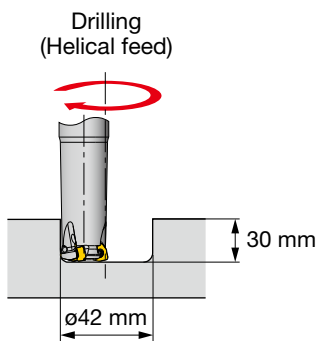




## ■ Excellent ramping capability

- 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.



## ■ Machining time comparison with helical interpolation

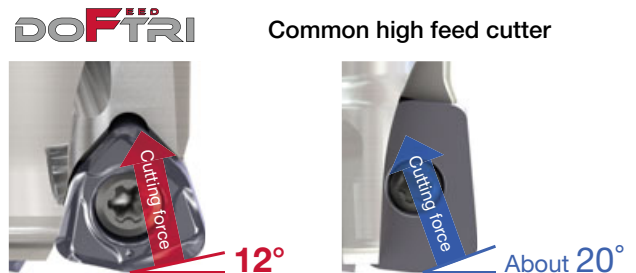


	<b>DOFTRI</b>	Competitor
Feed speed: Vf (mm/min)	3820	3820
<b>Pitch for helical interpolation (mm)</b>	<b>1</b>	<b>0.5</b>
<b>Machining time (seconds)</b>	<b>25</b>	<b>50</b>
Chip control	 <b>Consistent chip form</b>	 <b>Inconsistent chip form</b>

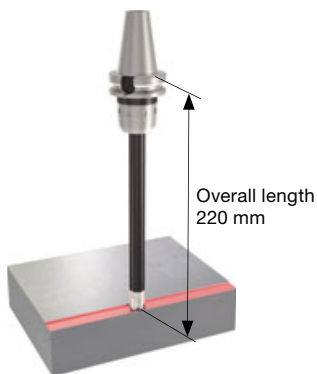
Tool dia. :  $\phi 25$  mm, z = 4      Feed per tooth : fz = 0.5 mm/t  
 Workpiece material : S55C / C55      Number of teeth : 4  
 Cutting speed : Vc = 150 m/min

## ■ 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.



## ■ The comparison of anti chattering performance with long overhang setup



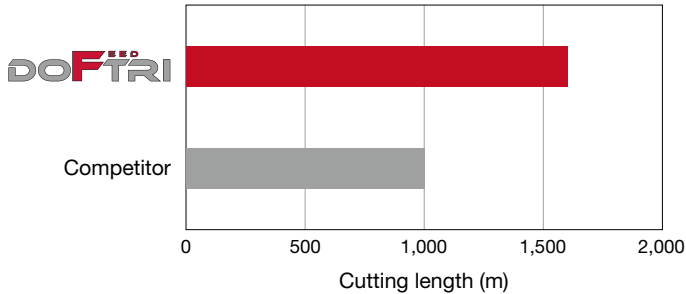
	fz (mm/t)		
	1	1.2	1.5
<b>DOFTRI</b>	✓	✓	✓
Competitor A	✓	×	×
Competitor B	✓	×	×

✓ OK  
 × Chatter

Cutter : HXWX03M020M10R03 ( $\phi 20$  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

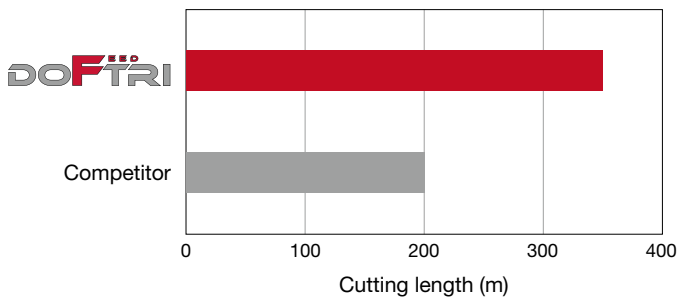
## CUTTING PERFORMANCE

### P S55C / C55 (200HB)



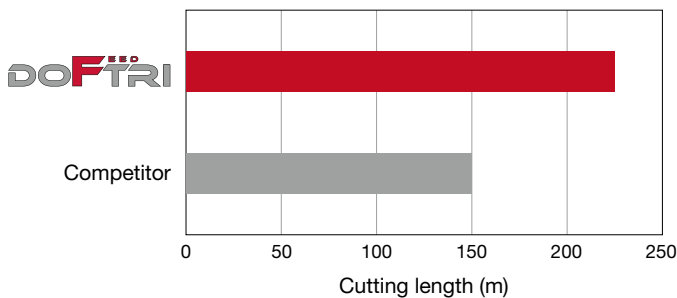
Cutter : EXWX03M020C20.0R03 ( $\phi$ 20 mm, z = 3)  
 Insert : WXMU0303ZER-MM AH3225  
 Cutting speed :  $V_c = 200$  m/min  
 Feed per tooth :  $f_z = 1$  mm/t  
 Depth of cut :  $a_p = 0.6$  mm  
 Width of cut :  $a_e = 12$  mm  
 Coolant : Dry  
 Machine : Vertical M/C, BT40

### P NAK80 (40HRC)







Cutter : EXWX03M020C20.0R03 ( $\phi$ 20 mm, z = 3)  
 Insert : WXMU0303ZER-MM AH3225  
 Cutting speed :  $V_c = 120$  m/min  
 Feed per tooth :  $f_z = 0.7$  mm/t  
 Depth of cut :  $a_p = 0.6$  mm  
 Width of cut :  $a_e = 12$  mm  
 Coolant : Dry  
 Machine : Vertical M/C, BT40

### M SUS304 / X5CrNi18-9 (170HB)



Cutter : EXWX03M020C20.0R03 ( $\phi$ 20 mm, z = 3)  
 Insert : WXMU0303ZER-MM AH3225  
 Cutting speed :  $V_c = 120$  m/min  
 Feed per tooth :  $f_z = 0.7$  mm/t  
 Depth of cut :  $a_p = 0.6$  mm  
 Width of cut :  $a_e = 12$  mm  
 Coolant : Wet  
 Machine : Vertical M/C, BT40

## ■ HIGH FEED CUTTER SELECTION GUIDE

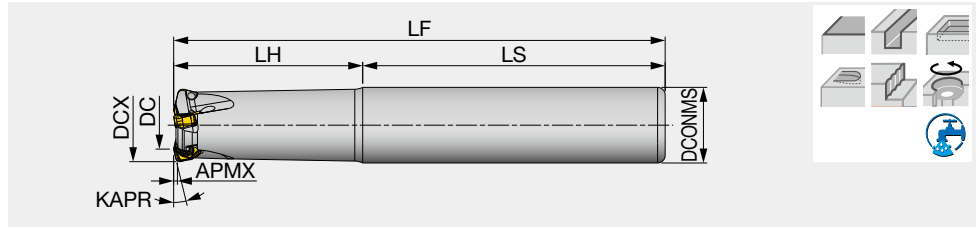
Series	<b>DOFTRI</b>	<b>DOFEED 03</b>	<b>ADD<sup>o</sup>FEED</b>	<b>MILLQ<sup>o</sup>FEED 09</b>
Tool image				
Tool diameter (mm)	ø16 - ø50	ø16 - ø50	ø8 - ø25	ø25 - ø63
Max. depth of cut (mm)	1	1	0.5	1, 1.5
No. of edges per insert	<b>6</b>	4	4	4
Approach angle	<b>12°</b>	17°	17°	ZER type: 12° UER type: 7°
Efficiency (density)	○	⊙	⊙	○
Tool life	⊙	○	○	⊙
Light cutting	○	⊙	⊙	○
Cutting edge strength	⊙	○	○	○
Chip evacuation	○	⊙	⊙	○
Ramping	⊙	○	○	⊙
Corner radius deviation	⊙	⊙	⊙	○
Long overhang applications	⊙	○	○	⊙

⊙: First choice  
○: Supplementary

## EXWX03

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

GAMP = +23°, GAMF = -7.9° ~ -6.2°



Designation	APMX	DCX	CICT	DC	DCONMS	LS	LH	LF	KAPR	WT(kg)	Air hole	Insert
EXWX03M016C16.0R02	1	16	2	8.9	16	70	30	100	12°	0.14	With	WXMU03...
EXWX03M016C16.0R02L	1	16	2	8.9	16	100	50	150	12°	0.21	With	WXMU03...
EXWX03M020C20.0R03	1	20	3	12.8	20	80	50	130	12°	0.26	With	WXMU03...
EXWX03M020C20.0R03L	1	20	3	12.8	20	80	80	160	12°	0.31	With	WXMU03...
EXWX03M025C25.0R04	1	25	4	17.8	25	80	60	140	12°	0.46	With	WXMU03...
EXWX03M025C25.0R04L	1	25	4	17.8	25	80	100	180	12°	0.58	With	WXMU03...
EXWX03M032C32.0R05	1	32	5	24.7	32	80	70	150	12°	0.84	With	WXMU03...
EXWX03M032C32.0R05L	1	32	5	24.7	32	80	120	200	12°	1.11	With	WXMU03...

### SPARE PARTS



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

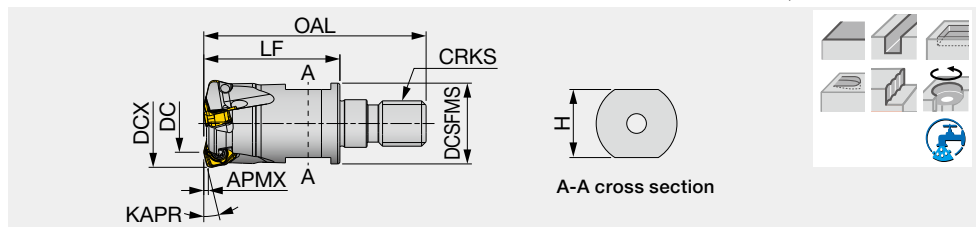
\*Recommended clamping torque (N·m): CSPB-2.5SH = 1.1

## TUNGFLEX

### HXWX03-M

High feed endmill, modular type (TungFlex)

GAMP = +23°, GAMF = -7.9° ~ -6.2°



Designation	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

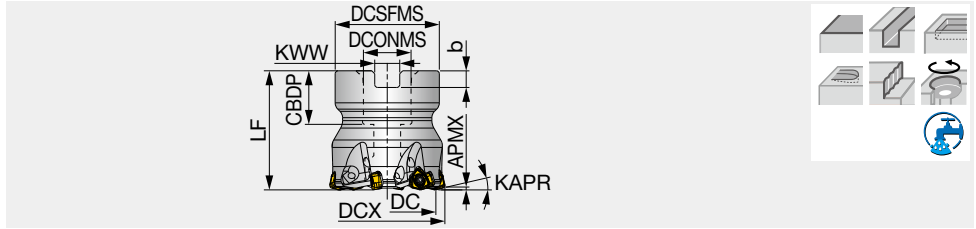
\*Recommended clamping torque (N·m): CSPB-2.5SH = 1.1



# TXWX03

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

GAMP = +23°, GAMF = -6.2° ~ -6.1°



Designation	APMX	DCX	CICT	DC	DCSFMS	DCONMS	CBDP	LF	b	KWW	KAPR	WT(kg)	Air hole	Insert
TXWX03M040B16.0R06	1	40	6	32.7	35	16	18	40	5.6	8.4	12°	0.22	With	WXMU03...
TXWX03M050B22.0R08	1	50	8	42.7	47	22	20	50	6.3	10.4	12°	0.46	With	WXMU03...

## SPARE PARTS

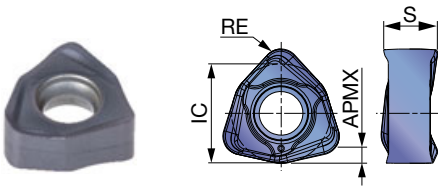


Designation	Clamping screw	Shell locking bolt	Wrench
TXWX03M040B16.0R06	CSPB-2.5SH	CM8X30H	IP-7D
TXWX03M050B22.0R08	CSPB-2.5SH	CM10X30H	IP-7D

\*Recommended clamping torque (N·m): CSPB-2.5SH = 1.1

## INSERT

### WXMU0303-MM



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

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated		IC	S
			AH3225	AH8015		
WXMU0303ZER-MM	1.2	1	●	●	6.35	3.63

● : Line up

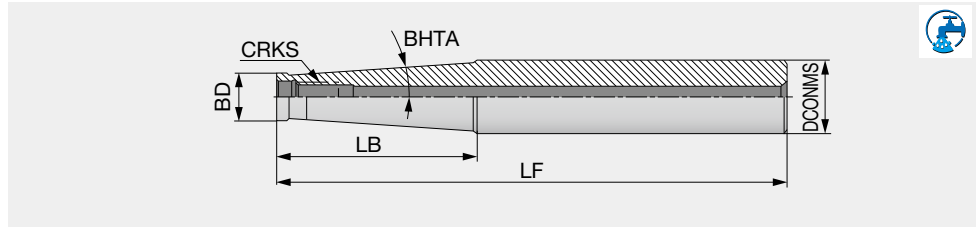
## GRADES

### AH3225 **P M**

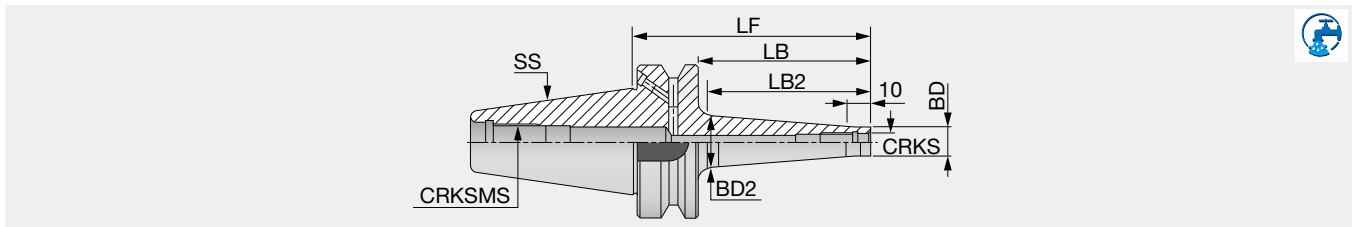
- Nano multi-layer coating technology with three major properties for optimal cutting edge integrity
- Increased resistance to wear, fracture, oxidation, built-up edge, and delamination

### 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



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



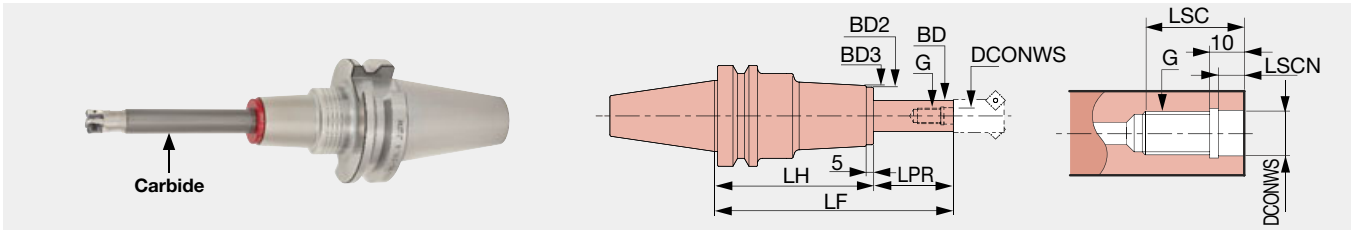
Designation	SS	CRKS	BD	BD2	LF	LB	LB2	CRKSMS
BT40ODP8X66	40	M8	13	15	66	39	30	M16
BT40ODP8X106	40	M8	13	23	106	79	70	M16
BT40ODP10X66	40	M10	18	20	66	39	30	M16
BT40ODP10X106	40	M10	18	28	106	79	70	M16
BT40ODP12X66	40	M12	21	24	66	39	30	M16
BT40ODP12X106	40	M12	21	31	106	79	70	M16
BT40ODP16X66	40	M16	29	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<sup>-1</sup>

## BT-RSG (Screw clamping head holder)

TungFlex modular tooling system with BT shank



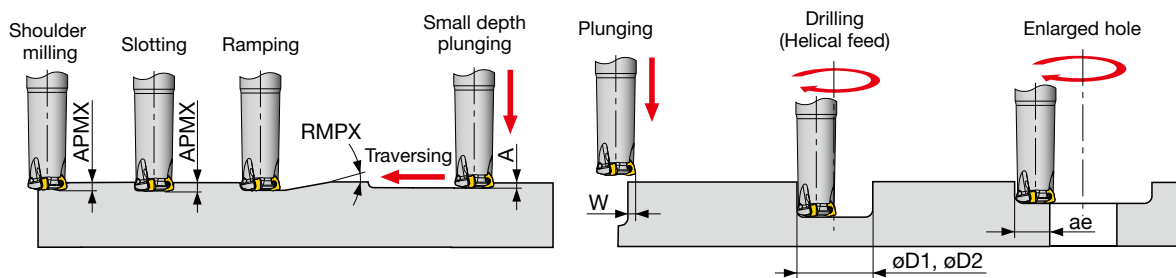
Designation	DCONWS	LSC	LSCN	BD	LF	LPR	LH	BD2	BD3	WT (kg)	G
BT40-RSG 8-105-M 25	8.5	18	6.5	15	105	25	80	30	32	1.4	M8
BT40-RSG 8-135-M 25	8.5	18	6.5	15	135	25	110	30	32	1.8	M8
BT40-RSG 8-130-M 50	8.5	18	6.5	15	130	50	80	30	32	1.4	M8
BT40-RSG 8-160-M 50	8.5	18	6.5	15	160	50	110	30	32	1.8	M8
BT40-RSG 8-155-M 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

## STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grades	Chipbreaker	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steel S15C, SS400, etc. C15E4, E275A, etc.	- 300HB	First choice	AH3225	MM	100 - 300	0.5 - 1.5
			For wear resistance	AH8015			
	Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc.	- 300HB	First choice	AH3225	MM	100 - 250	0.5 - 1.5
			For wear resistance	AH8015			
Prehardened steel NAK80, PX5, etc.	30 - 40HRC	First choice	AH3225	MM	100 - 200	0.5 - 1.2	
		For wear resistance	AH8015				
M	Austenitic Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200HB	First choice	AH3225	MM	80 - 150	0.5 - 1
	Martensitic Stainless steel SUS410, SUS420J1, etc. X12Cr13, X20Cr13, etc.	- 200HB	First choice	AH3225	MM	50 - 120	0.3 - 1
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.	150 - 250HB	First choice	AH8015	MM	100 - 300	0.5 - 1.5
			For impact resistance	AH3225			
K	Ductile cast iron FCD400, etc. 400-15, 600-3, etc.	150 - 250HB	First choice	AH8015	MM	80 - 200	0.5 - 1.5
			For impact resistance	AH3225			
S	Titanium alloy Ti-6Al-4V, etc.	- 40HRC	First choice	AH3225	MM	30 - 60	0.3 - 0.7
	Superalloys Inconel718, etc.	- 40HRC	First choice	AH8015	MM	20 - 50	0.1 - 0.3
H	Hardened steel SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	AH8015	MM	80 - 150	0.1 - 0.5
			For impact resistance	AH3225			
H	SKD11, etc. X153CrMoV12, etc.	50 - 60HRC	First choice	AH8015	MM	50 - 70	0.03 - 0.1

## APPLICATION RANGE



Designation	DCX	Max. depth of cut	Max. ramping angle	Max. plunging depth	Max. cutting width in plunging	Min. machinable hole dia.	Max. machinable hole dia.	Max. cutting width in enlarged hole
		APMX	RMPX	A	W	øD1	øD2	ae
E/HXWX03M016...	16	1	3	0.3	4	25	30	12
E/HXWX03M020...	20	1	2	0.3	4	31	38	16
E/HXWX03M025...	25	1	1.4	0.3	4	41	48	21
E/HXWX03M032...	32	1	1	0.3	4	54	62	28
TXWX03M040...	40	1	0.7	0.3	4	71	78	36
TXWX03M050...	50	1	0.6	0.3	4	87	98	46

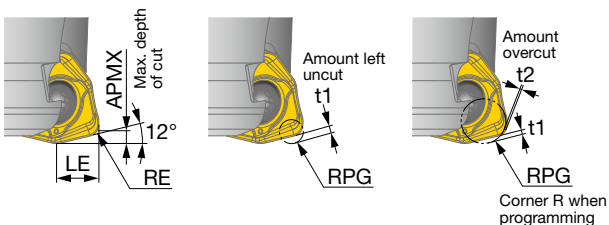


Tool dia: DCX (mm), Number of revolution:  $n$  ( $\text{min}^{-1}$ ), Feed speed:  $V_f$  (mm/min), Max. depth of cut:  $APMX = 1$  mm, Number of teeth: CICT

$\phi 16$ , CICT = 2		$\phi 20$ , CICT = 3		$\phi 25$ , CICT = 4		$\phi 32$ , CICT = 5		$\phi 40$ , CICT = 6		$\phi 50$ , CICT = 8	
$n$	$V_f$	$n$	$V_f$	$n$	$V_f$	$n$	$V_f$	$n$	$V_f$	$n$	$V_f$
3,981	7,962	3,185	9,554	2,548	10,191	1,990	9,952	1,592	9,554	1,274	10,191
$V_c = 200$ m/min, $f_z = 1$ mm/t											
3,981	7,962	3,185	9,554	2,548	10,191	1,990	9,952	1,592	9,554	1,274	10,191
$V_c = 200$ m/min, $f_z = 1$ mm/t											
2,986	4,180	2,389	5,016	1,911	5,350	1,493	5,225	1,194	5,016	955	5,350
$V_c = 150$ m/min, $f_z = 0.7$ mm/t											
2,389	2,389	1,911	2,866	1,529	3,057	1,194	2,986	955	2,866	764	3,057
$V_c = 120$ m/min, $f_z = 0.5$ mm/t											
1,990	1,194	1,592	1,433	1,274	1,529	995	1,493	796	1,433	637	1,529
$V_c = 100$ m/min, $f_z = 0.3$ mm/t											
3,981	7,962	3,185	9,554	2,548	10,191	1,990	9,952	1,592	9,554	1,274	10,191
$V_c = 200$ m/min, $f_z = 1$ mm/t											
2,986	5,971	2,389	7,166	1,911	7,643	1,493	7,464	1,194	7,166	955	7,643
$V_c = 150$ m/min, $f_z = 1$ mm/t											
796	637	637	764	510	815	398	796	318	764	255	815
$V_c = 40$ m/min, $f_z = 0.4$ mm/t											
597	239	478	287	382	306	299	299	239	287	191	306
$V_c = 30$ m/min, $f_z = 0.2$ mm/t											
2,389	1,433	1,911	1,720	1,529	1,834	1,194	1,791	955	1,720	764	1,834
$V_c = 120$ m/min, $f_z = 0.3$ mm/t											
1,194	239	955	287	764	306	597	299	478	287	382	306
$V_c = 60$ m/min, $f_z = 0.1$ mm/t											

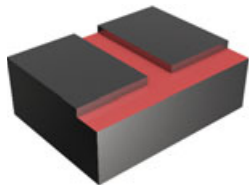
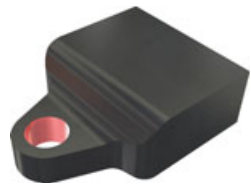
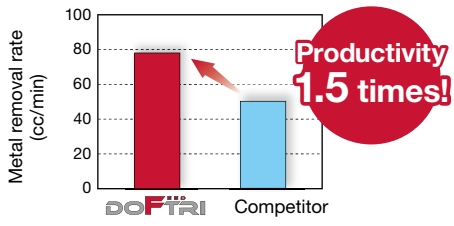
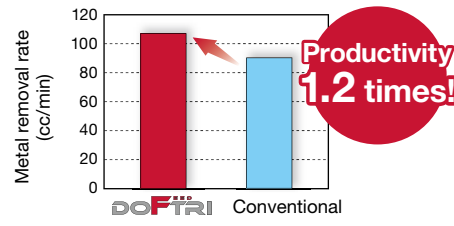

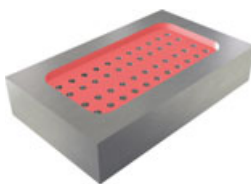
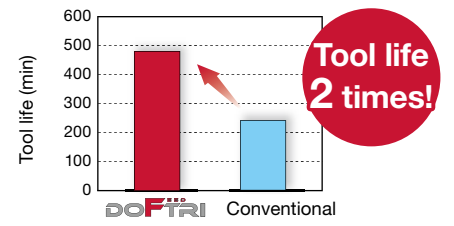
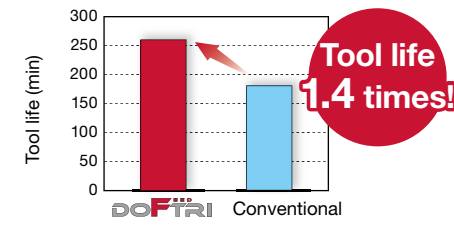
## TOOL GEOMETRY ON PROGRAMMING

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as  $R = 1.5$  mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut ( $t_1$ ) and overcut ( $t_2$ ).



Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming RPG	Amount left uncut $t_1$ (mm)	Amount overcut $t_2$ (mm)
1	1.2	3.5	1	0.56	-
1	1.2	3.5	1.5	0.46	-
1	1.2	3.5	2	0.35	0.16
1	1.2	3.5	2.5	0.2	0.5

## PRACTICAL EXAMPLES

Workpiece type		Machine structural part	Heavy equipment part
Cutter		EXWX03M020C20.0R03 (ø20 mm, z = 3)	EXWX03U1.00C1.00R04 (ø25.4 mm, z = 4)
Insert		WXMU0303ZER-MM	WXMU0303ZER-MM
Grade		AH3225	AH3225
Workpiece material		SS400 / E275A	SM400 / E235A
		 <b>P</b>	 <b>P</b>
Cutting conditions	Cutting speed: $V_c$ (m/min)	180	255
	Feed per tooth: $f_z$ (mm/t)	0.9	0.28
	Depth of cut : $a_p$ (mm)	0.5	1
	Width of cut : $a_e$ (mm)	20	25.4
	Machining	Slotting, Shoulder milling	Hole enlarging
	Coolant	Dry	Wet
Machine		Vertical M/C, BT40	Vertical M/C, CAT40
Results		 <p>Generating low cutting forces, <b>DoFeedTri</b> eliminated chatter, providing machining stability and 1.5 times productivity.</p>	 <p>With its steep ramp-down capability, <b>DoFeedTri</b> boosted 1.2 times productivity during helical interpolation process.</p>
		<p><b>DOFEEDTRI</b> Competitor</p> <p><b>DOFEEDTRI</b> Conventional</p>	
Workpiece type		Machine part	Die and mold
Cutter		EXWX03M025C25.0R04 (ø25 mm, z = 4)	EXWX03M032C32.0R05 (ø32 mm, z = 5)
Insert		WXMU0303ZER-MM	WXMU0303ZER-MM
Grade		AH3225	AH3225
Workpiece material		S45C / C45	SKD61 / X40CrMoV5-1
		 <b>P</b>	 <b>H</b>
Cutting conditions	Cutting speed: $V_c$ (m/min)	200	120
	Feed per tooth: $f_z$ (mm/t)	0.3	0.67
	Depth of cut : $a_p$ (mm)	0.5	0.7
	Width of cut : $a_e$ (mm)	25	- 32
	Machining	Slotting, Shoulder milling	Pocketing
	Coolant	Dry	Wet
Machine		Vertical M/C, BT40	Vertical M/C, BT50
Results		 <p>Due to its small entering angle, <b>DoFeedTri</b> created thin chips, doubling tool life.</p>	 <p>With its strong cutting edge design, <b>DoFeedTri</b> provided 1.4 times tool life while machining parts with heavy interruptions</p>
		<p><b>DOFEEDTRI</b> Conventional</p> <p><b>DOFEEDTRI</b> Conventional</p>	

# FIXED TORQUE WRENCH

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



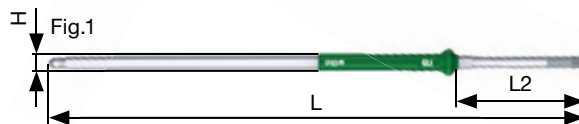
Designation	Stock	Torque (N-m)	Accuracy (%)	øD	L
TW-D-0.6NM	●	0.6	10	34	130
TW-D-0.9NM	●	0.9	10	34	130
TW-D-1.1NM	●	1.1	10	34	130
TW-D-1.4NM	●	1.4	10	34	130
TW-D-2.5NM	●	2.5	10	34	130
TW-D-3.0NM	●	3.0	10	34	130
TW-D-3.5NM	●	3.5	10	34	130

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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