

MillLine

DOFEED

www.tungaloy.com

Tungaloy Report No. 403-G



Super high feed cutter **now expanded** **with the newest grade AH3225**



INDUSTRY 4.0
FEED the SPEED!



ACCELERATED MACHINING



High-feed cutters reduce machining time **in a wide range of applications.**

Innovative high-feed cutters!

DoFeed offers outstanding productivity thanks to its close-pitch insert orientation and light cutting geometry. The rich lineup is suitable for a wide variety of applications.

Outstanding productivity

Excellent chip evacuation prevents chip packing



Optimized coolant jet delivery effectively removes chip and prevent it from re-cutting

Large inclination forms ideal chips and controls the chips flow



DOFEED
Good
Curl consistently at ideal length

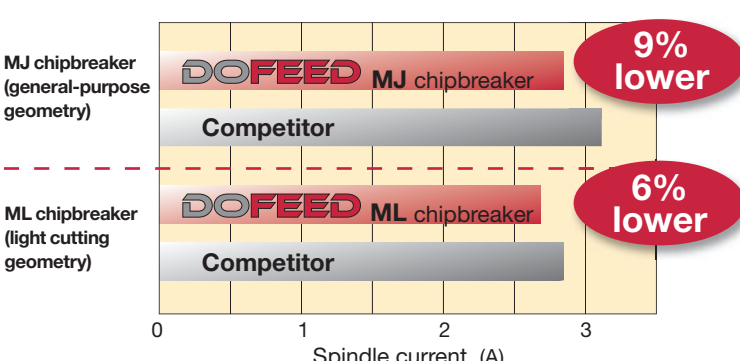


Competitor
Poor
Crushed or unstable

P Steel	Cutter : TXN06R050M22.0E05 Insert : LNMMU06X5ZER-MJ Grade : AH725 Workpiece material : Carbon steels (S55C / C55) Cutting speed : $V_c = 180$ m/min Feed per tooth : $f_z = 1.8$ mm/t Depth of cut : $a_p = 1.0$ mm Coolant : Dry Machine : Vertical M/C, BT50
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Innovative geometry allows for an extremely light cutting for negative inserts

■ Comparison of spindle load



P Steel	Cutter : EXN03R025M25.0-05 ($\phi 25, z = 5$) Insert : LNMMU0303ZER-MJ / ML Grade : AH725 Workpiece material : Carbon steels (S55C / C55) Cutting speed : $V_c = 250$ (m/min) Feed per tooth : $f_z = 0.5$ mm/t (1 insert) Depth of cut : $a_p = 0.5$ mm Width of cut : $a_e = 25$ mm (Slot milling) Coolant : Dry Machine : Vertical M/C, BT40
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Close pitch cutters for high productivity!

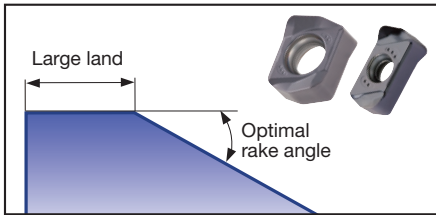
Tool dia. DCX (mm)	No. of inserts (z)		Competitor	Productivity improvement compared to competitor
	Coarse pitch	Close pitch		
$\phi 20$	3	4	3	1.3 times
$\phi 25$	4	5	4	1.3 times
$\phi 50$	4	5	4	1.3 times
$\phi 63$	4	6	4	1.5 times

· $\phi 20$ and $\phi 25$ are based on EXN03 and HXN03 type
 · $\phi 50$ and $\phi 63$ are based on TXN06 type

Extensive application coverage with a large variety of items

Five chipbreakers for all machining needs

MJ General machining

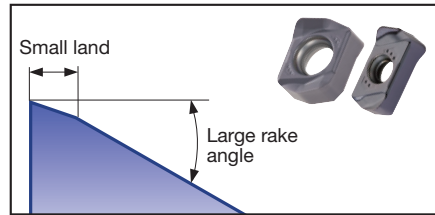


P M K S H

4 cutting edges

- Excellent combination of sharpness and strength
- Ideal for machining steel, cast iron, and hardened steel

ML Low cutting force

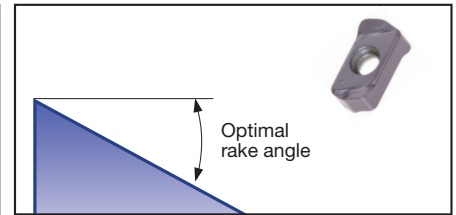


P M S

4 cutting edges

- Exceptional sharpness
- Suitable for cutting stainless steel, titanium alloys, and other exotic materials
- Reduces chattering when cutting with low rigid set-ups

MS For stainless steel

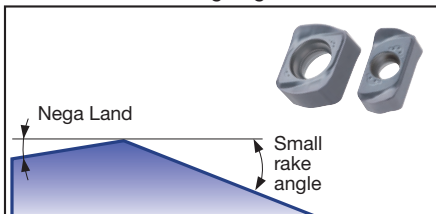


M

4 cutting edges

- Sharp cutting edge
- Most suited for stainless steel milling

MH Robust cutting edges



H

4 cutting edges

- Robust cutting edges
- Suitable for hardened steel

W Wiper insert



P M K S H

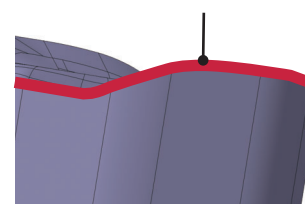
2 cutting edges

- Excellent surface finish while maintaining high productivity

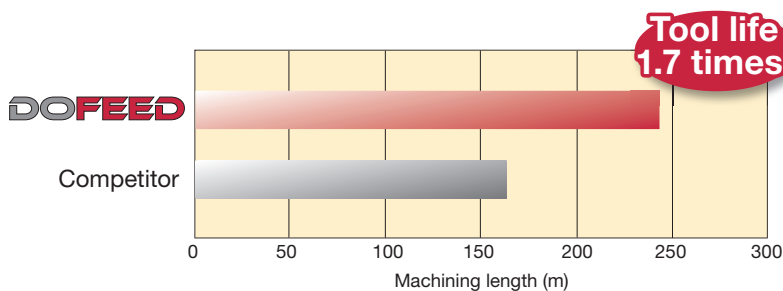
MS chipbreaker - features

- Sharp cutting edge ensures light cutting, while preventing built-up edge to ensure long tool life during stainless steel machining
- Large inclination on the cutting edge reduces impact at the entry of the cut, eliminating chatter or chipping

Large inclination on cutting edge



■ Tool life comparison in stainless steel milling



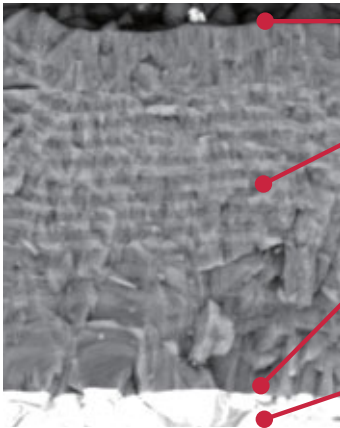
M
Stainless

Cutter	: EXN03R020M20.0-04-C ($\phi 20$, $z = 4$)
Insert	: LNMU0303ZER-MS
Grade	: AH130
Workpiece material	: SUS304
Cutting speed	: $V_c = 150$ m/min
Feed per tooth	: $f_z = 0.6$ mm/t
Depth of cut	: $a_p = 0.6$ mm
Width of cut	: $a_e = 10$ mm
Coolant	: Dry
Machine	: Vertical M/C, BT40

Grades with long tool life for a wide range of materials

New **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



Technology 1 - Resistance to built-up edge

The coating surface prevents built-up edge

Technology 2 - Resistance to wear, oxidation, and fracture

Multi-layered coating is designed to resist wear and oxidation, while preventing micro-cracks from propagating in the coating layer for improved resistance to edge chipping

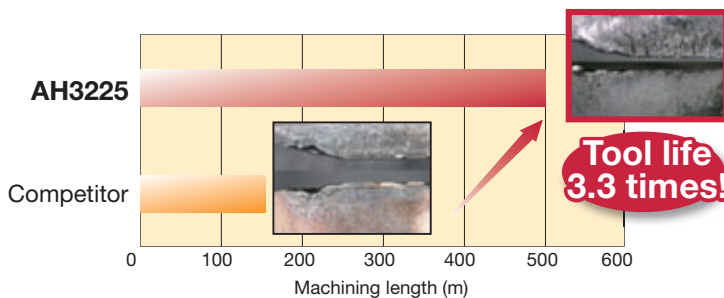
Technology 3 - Strong coating/substrate adhesion

Coating is optimized for strong adhesion property with substrate to maintain strong cutting edge integrity

Carbide substrate

High resistance to fracture

Tool life comparison of AH3225



P	Cutter	: EXN03R025M25.0-05-C
	Insert	: LNMU0303ZER-MJ
	Grade	: AH3225
	Workpiece material	: S55C / C55
	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	: $a_e = 15$ mm
	Coolant	: Dry
	Machine	: Vertical M/C, BT50

AH3035



- Wear and fracture resistant for high-feed application
- Most suitable for steel and stainless steel machining

AH725



- Superior resistance to wear and fracture in cast iron milling

AH130



- High chipping resistance
- Ideal for titanium alloy machining

AH120



- Exceptionally wear resistant in cast iron machining

AH8015



- High wear and chipping resistance and minimized built up edge due to nano multi-layered AlTiN coating with high Al content
- Well-suited for difficult materials of 45-55 HRc

AH8005



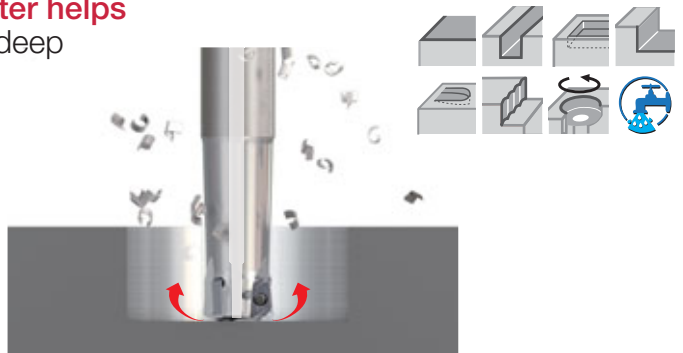
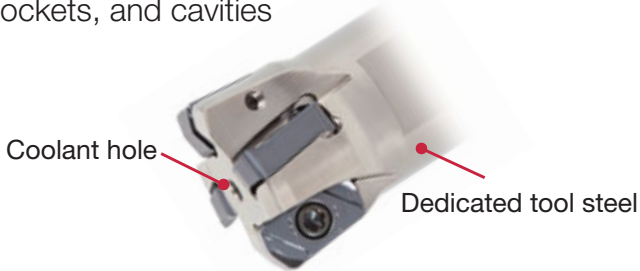
- High wear and chipping resistance and minimized built-up edge due to nano multi-layered AlTiN coating with high Al content
- Ideal for hardened steel of 55HRc and above

Available in 3 body types (EXN03/HXN03)

Premium Body

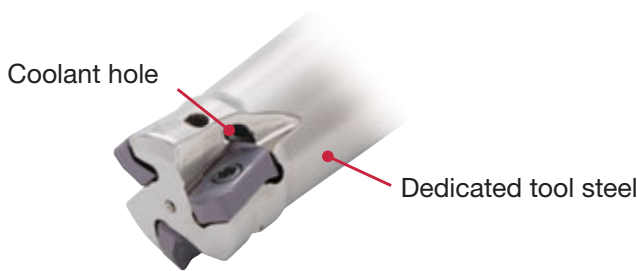
- Robust tool body design in special tool steel
- Two types of internal coolant channel designs are available:

1. Coolant supplied through the tool axial center helps evacuate chip effectively in milling blind holes, deep pockets, and cavities

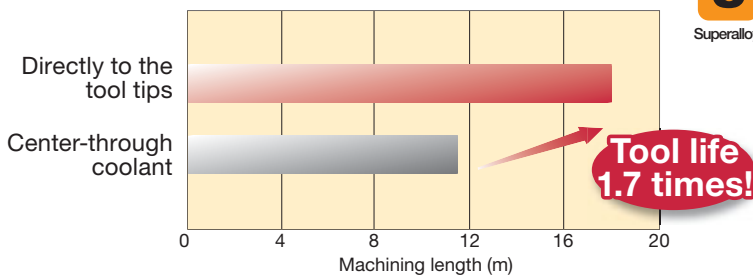


2. Coolant supplied directly to each cutting edge is ideal for ISO S materials

For shouldering with a small radial immersion where the optimal coolant supply to the tip of the cutting edge is vital for reducing cutting heat and build-up edge, while improving tool life stability in millin difficult materials.



Improved tool life thank to optimal coolant supply



Improved tool life by 170% due to controlling the cutting heat



Cutter	: EXN03R020M20.0-04 (Center-through coolant, $\phi 20$, $z = 4$)
	: EXN03R020M20.0-04-C (Directly to the tool tips, $\phi 20$, $z = 4$)
Insert	: LNMU0303ZER-ML
Grade	: AH725
Workpiece material	: Inconel718 (46HRC)
Cutting speed	: $V_c = 40$ m/min
Feed per tooth	: $f_z = 0.3$ mm/t
Depth of cut	: $a_p = 0.5$ mm
Width of cut	: $a_e = 5$ mm
Coolant	: Wet
Process	: Shoulder milling
Machine	: Vertical M/C, BT50








3. ECO body

- Steel body with no internal coolant channels
- Economical solution for machining faces, shoulders, and shallow pockets where chip evacuation is relatively easy with external coolant supply

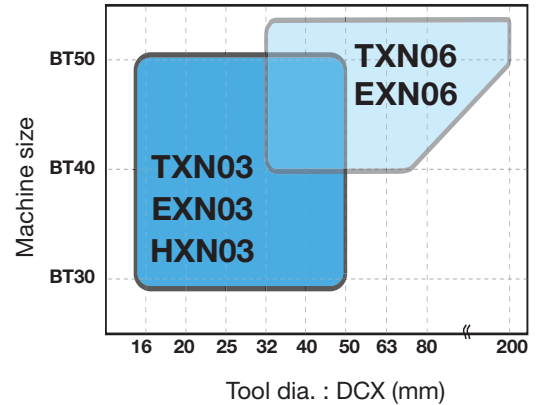
* To avoid chip re-cutting, ECO body is NOT recommended for slotting or pocketing with depths of cut (a_p) exceeding 10 mm.



Rich lineup of cutter bodies from $\varnothing 16$ to $\varnothing 200$ mm

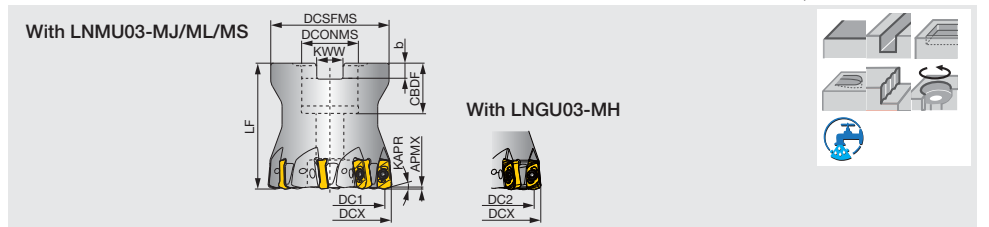
Insert	Bore type	Shank type	Modular type
LN*U03  Max. ap = 1.0 mm	TXN03 (DCX = 40 - 50 mm) 	EXN03 (DCX = 16 - 40 mm) 	HXN03 (DCX = 16 - 40 mm) 
LN*U06  Max. ap = 1.5 mm	TXN06 (DCX = 50 - 200 mm) 	EXN06 (DCX = 32 - 40 mm) 	

Applicable area



TXN03

Super high feed milling cutters with double sided inserts with 4 edges



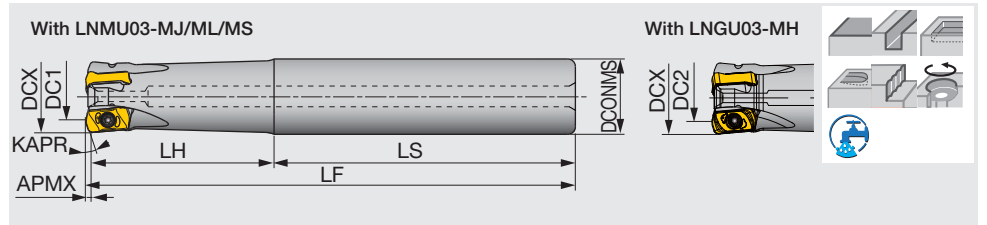
Designation	APMX	DCX	CICT	DC1	DC2	DCSFMS	DCONMS	CBDF	LF	b	KWW	KAPR	WT (kg)	Air hole	Insert
TXN03R040M16.0E05	1	40	5	33.6	33.6	35	16	18	40	5.6	8.4	17	0.2	with	LN*U03...
TXN03R040M16.0E06	1	40	6	33.6	33.6	35	16	18	40	5.6	8.4	17	0.2	with	LN*U03...
TXN03R050M22.0E05	1	50	5	43.6	43.6	47	22	20	50	6.3	10.4	17	0.5	with	LN*U03...
TXN03R050M22.0E08	1	50	8	43.6	43.6	47	22	20	50	6.3	10.4	17	0.5	with	LN*U03...
TXN03R050M22.2-08	1	50	8	43.6	43.6	47	22.225	20	50	5	8	17	0.5	with	LN*U03...

SPARE PARTS

Designation	Clamping screw	Lubricant	Shell locking bolt	Wrench
TXN03R04...	CSPB-2.5	M-1000	CM8X30H	IP-8D
TXN03R05...	CSPB-2.5	M-1000	CM10X30H	IP-8D

EXN03

Super high feed milling endmills with double sided inserts with 4 edges (Through-center coolant supply)



Designation	APMX	DCX	CICT	DC1	DC2	DCONMS	LF	LH	LS	KAPR	WT (kg)	Air hole	Insert
EXN03R016M16.0-02	1	16	2	9.6	9.8	16	100	30	70	15	0.2	with	LN*U03...
EXN03R016M16.0-02L	1	16	2	9.6	9.8	16	150	50	100	15	0.2	with	LN*U03...
EXN03R018M16.0-02	1	18	2	11.5	11.7	16	100	30	70	17	0.2	with	LN*U03...
EXN03R018M16.0-02L	1	18	2	11.5	11.7	16	150	25	125	17	0.2	with	LN*U03...
EXN03R020M20.0-03	1	20	3	13.5	13.6	20	130	50	80	17	0.3	with	LN*U03...
EXN03R020M20.0-03L	1	20	3	13.5	13.6	20	160	80	80	17	0.3	with	LN*U03...
EXN03R020M20.0-04	1	20	4	13.5	13.6	20	130	50	80	17	0.3	with	LN*U03...
EXN03R022M20.0-03	1	22	3	15.5	15.6	20	130	50	80	17	0.3	with	LN*U03...
EXN03R022M20.0-03L	1	22	3	15.5	15.6	20	160	30	130	17	0.4	with	LN*U03...
EXN03R022M20.0-04	1	22	4	15.5	15.6	20	130	50	80	17	0.3	with	LN*U03...
EXN03R025M25.0-04	1	25	4	18.5	18.6	25	140	60	80	17	0.5	with	LN*U03...
EXN03R025M25.0-04L	1	25	4	18.5	18.6	25	180	100	80	17	0.6	with	LN*U03...
EXN03R025M25.0-05	1	25	5	18.5	18.6	25	140	60	80	17	0.5	with	LN*U03...
EXN03R028M25.0-04	1	28	4	21.5	21.6	25	140	60	80	17	0.5	with	LN*U03...
EXN03R028M25.0-04L	1	28	4	21.5	21.6	25	180	35	145	17	0.7	with	LN*U03...
EXN03R028M25.0-05	1	28	5	21.5	21.6	25	140	60	80	17	0.5	with	LN*U03...
EXN03R030M32.0-04	1	30	4	23.5	23.6	32	150	70	80	17	0.8	with	LN*U03...
EXN03R030M32.0-04L	1	30	4	23.5	23.6	32	200	120	80	17	0.9	with	LN*U03...
EXN03R030M32.0-05	1	30	5	23.5	23.6	32	150	70	80	17	0.8	with	LN*U03...
EXN03R032M32.0-05	1	32	5	25.5	25.6	32	150	70	80	17	0.8	with	LN*U03...
EXN03R032M32.0-05L	1	32	5	25.5	25.6	32	200	120	80	17	1.1	with	LN*U03...
EXN03R032M32.0-06	1	32	6	25.5	25.6	32	150	70	80	17	0.9	with	LN*U03...
EXN03R035M32.0-05	1	35	5	28.5	28.6	32	150	35	115	17	0.9	with	LN*U03...
EXN03R035M32.0-05L	1	35	5	28.5	28.6	32	200	35	165	17	1.2	with	LN*U03...
EXN03R035M32.0-06	1	35	6	28.5	28.6	32	150	35	115	17	0.9	with	LN*U03...

SPARE PARTS

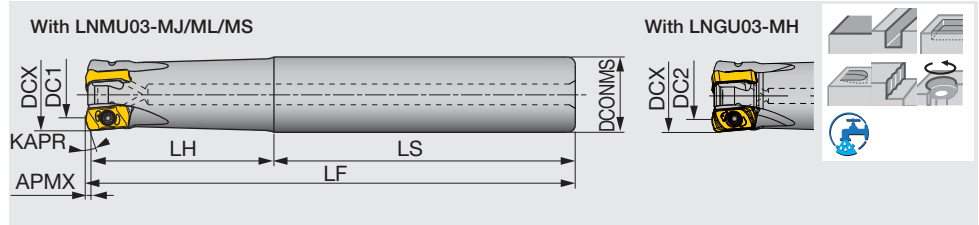


Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

EXN03-C

Super high feed milling endmills with double sided inserts with 4 edges (Directly to the tool tips)

GAMP = +6°, GAMF = +5° ~ +11°



Designation	APMX	DCX	CICT	DC1	DC2	DCONMS	LF	LH	LS	KAPR	WT (kg)	Air hole	Insert
EXN03R016M16.0-02-C	1	16	2	9.6	9.8	16	100	30	70	15	0.2	with	LN*U03...
EXN03R016M16.0-02L-C	1	16	2	9.6	9.8	16	150	50	100	15	0.2	with	LN*U03...
EXN03R020M20.0-03-C	1	20	3	13.5	13.6	20	130	50	80	17	0.3	with	LN*U03...
EXN03R020M20.0-03L-C	1	20	3	13.5	13.6	20	160	80	80	17	0.3	with	LN*U03...
EXN03R020M20.0-04-C	1	20	4	13.5	13.6	20	130	50	80	17	0.3	with	LN*U03...
EXN03R025M25.0-04-C	1	25	4	18.5	18.6	25	140	60	80	17	0.5	with	LN*U03...
EXN03R025M25.0-04L-C	1	25	4	18.5	18.6	25	180	100	80	17	0.6	with	LN*U03...
EXN03R025M25.0-05-C	1	25	5	18.5	18.6	25	140	60	80	17	0.5	with	LN*U03...
EXN03R032M32.0-05-C	1	32	5	25.5	25.6	32	150	70	80	17	0.8	with	LN*U03...
EXN03R032M32.0-05L-C	1	32	5	25.5	25.6	32	200	120	80	17	1.1	with	LN*U03...
EXN03R032M32.0-06-C	1	32	6	25.5	25.6	32	150	70	80	17	0.8	with	LN*U03...
EXN03R040M32.0-06-C	1	40	6	33.6	33.7	32	150	45	105	17	1	with	LN*U03...
EXN03R040M32.0-06L-C	1	40	6	33.6	33.7	32	220	45	175	17	1.4	with	LN*U03...

SPARE PARTS

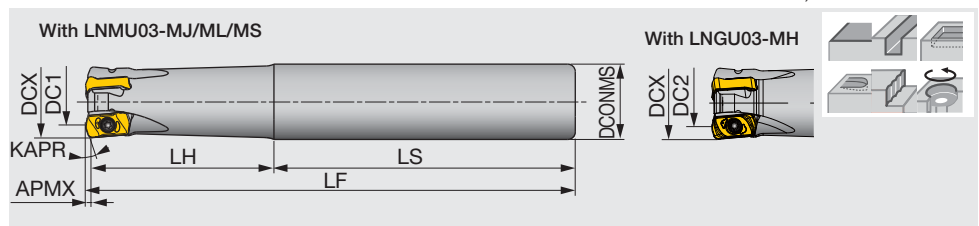


Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

EXN03-N

Super high feed milling endmills with double sided inserts (Eco)

GAMP = +6°, GAMF = +5° ~ +11°



Designation	APMX	DCX	CICT	DC1	DC2	DCONMS	LF	LH	LS	KAPR	WT (kg)	Air hole	Insert
EXN03R016M16.0-02N	1	16	2	9.6	9.8	16	100	30	70	15	0.2	without	LN*U03...
EXN03R020M20.0-03N	1	20	3	13.5	13.6	20	130	50	80	17	0.3	without	LN*U03...
EXN03R025M25.0-04N	1	25	4	18.5	18.6	25	140	60	80	17	0.5	with	LN*U03...
EXN03R032M32.0-05N	1	32	5	25.5	25.6	32	150	70	80	17	0.8	without	LN*U03...

SPARE PARTS



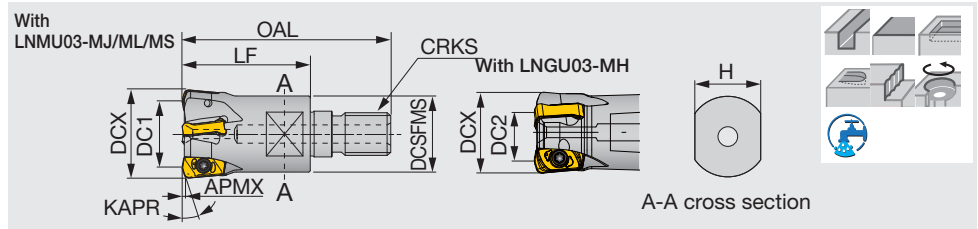
Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

TUNGFLEX

HXN03

Super high feed milling endmills (Dofeed) with TungFlex (Through-center coolant supply)

GAMP = +6°, GAMF = +5° ~ +11°



Designation	APMX	DCX	CICT	DC1	DC2	OAL	LF	H	DCSFMS	KAPR	CRKS	WT (kg)	Air hole	Insert
HXN03R016MM08-02	1	16	2	9.6	9.8	42	25	10	12.8	15	M8	0.03	with	LN*U03...
HXN03R018MM08-02	1	18	2	11.5	11.7	42	25	10	14.5	17	M8	0.04	with	LN*U03...
HXN03R020MM10-03	1	20	3	13.5	13.6	49	30	15	17.8	17	M10	0.06	with	LN*U03...
HXN03R020MM10-04	1	20	4	13.5	13.6	49	30	15	17.8	17	M10	0.06	with	LN*U03...
HXN03R022MM10-03	1	22	3	15.5	15.6	49	30	15	17.8	17	M10	0.06	with	LN*U03...
HXN03R022MM10-04	1	22	4	15.5	15.6	49	30	15	17.8	17	M10	0.07	with	LN*U03...
HXN03R025MM12-04	1	25	4	18.5	18.6	57	35	17	20.8	17	M12	0.1	with	LN*U03...
HXN03R025MM12-05	1	25	5	18.5	18.6	57	35	17	20.8	17	M12	0.11	with	LN*U03...
HXN03R028MM12-04	1	28	4	21.5	21.6	57	35	17	23	17	M12	0.12	with	LN*U03...
HXN03R028MM12-05	1	28	5	21.5	21.6	57	35	17	23	17	M12	0.12	with	LN*U03...
HXN03R030MM16-04	1	30	4	23.5	23.6	63	40	22	28.8	17	M16	0.19	with	LN*U03...
HXN03R030MM16-05	1	30	5	23.5	23.6	63	40	22	28.8	17	M16	0.2	with	LN*U03...
HXN03R032MM16-05	1	32	5	25.5	25.6	63	40	22	28.8	17	M16	0.2	with	LN*U03...
HXN03R032MM16-06	1	32	6	25.5	25.6	63	40	22	28.8	17	M16	0.21	with	LN*U03...

SPARE PARTS

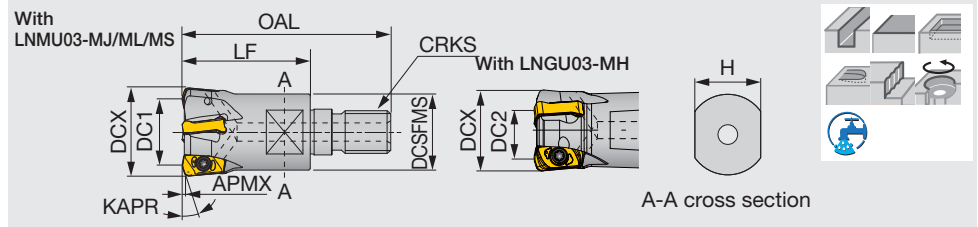
Designation	Clamping screw	Lubricant	Wrench
HXN03...	CSPB-2.5	M-1000	IP-8D

TUNGFLEX

HXN03-C

Super high feed milling endmills (Dofeed) with TungFlex (Directly to the tool tips)

GAMP = +6°, GAMF = +5° ~ +11°



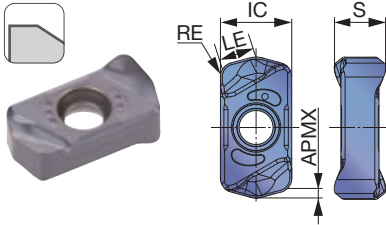
Designation	APMX	DCX	CICT	DC1	DC2	OAL	LF	H	DCSFMS	KAPR	CRKS	WT (kg)	Air hole	Insert
HXN03R016MM08-02-C	1	16	2	9.6	9.8	42	25	10	12.8	15	M8	0.03	with	LN*U03...
HXN03R020MM10-03-C	1	20	3	13.5	13.6	49	30	15	17.8	17	M10	0.06	with	LN*U03...
HXN03R020MM10-04-C	1	20	4	13.5	13.6	49	30	15	17.8	17	M10	0.06	with	LN*U03...
HXN03R025MM12-04-C	1	25	4	18.5	18.6	57	35	17	20.8	17	M12	0.1	with	LN*U03...
HXN03R025MM12-05-C	1	25	5	18.5	18.6	57	35	17	20.8	17	M12	0.1	with	LN*U03...
HXN03R032MM16-05-C	1	32	5	25.5	25.6	63	40	22	28.8	17	M16	0.2	with	LN*U03...
HXN03R032MM16-06-C	1	32	6	25.5	25.6	63	40	22	28.8	17	M16	0.2	with	LN*U03...
HXN03R040MM16-06-C	1	40	6	33.6	33.7	63	40	22	28.8	17	M16	0.27	with	LN*U03...

SPARE PARTS

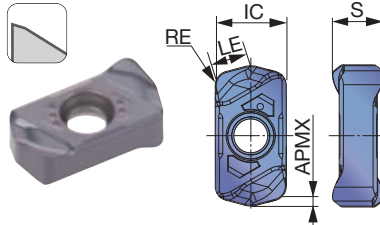
Designation	Clamping screw	Lubricant	Wrench
HXN03...	CSPB-2.5	M-1000	IP-8D

INSERTS

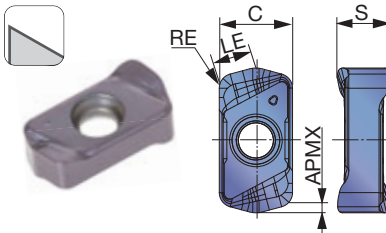
LNMU03-MJ (for general purpose)



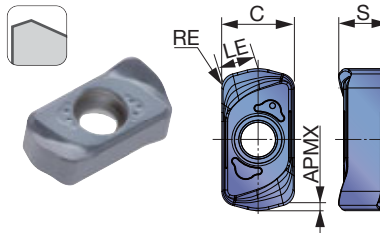
LNMU03-ML (for low cutting force)



LNMU03-MS (for stainless steel)



LNGU03-MH (Robust cutting edges)



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

★ : First choice
☆ : Second choice

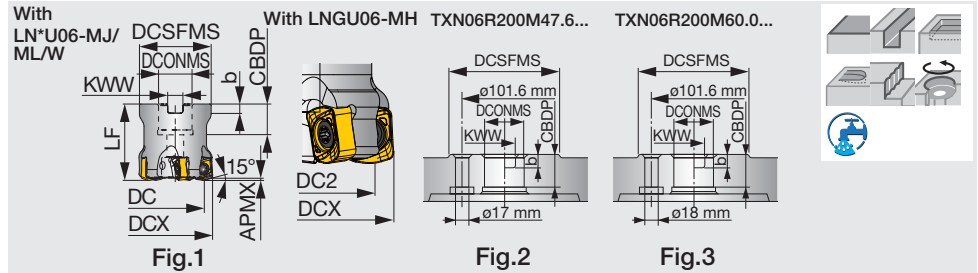
Designation	RE	APMX	Coated						LE	IC	S
			AH130	AH3225	AH3035	AH725	AH8015	AH8005			
LNMU0303ZER-MJ	1.2	1	●	●	●	●	●		3.2	6	4.3
LNMU0303ZER-ML	1.2	1	●	●	●	●	●		3.2	6	4.3
LNMU0303ZER-MS	1.2	1	●	●					3.2	6	4.3
LNGU0303ZER-MH	1.2	1					●	●	3.2	6	4.3

● : New
● : Line up

TXN06

Super high feed milling cutters with double sided inserts with 4 edges

GAMP = +10°, GAMF = +2° ~ +6°



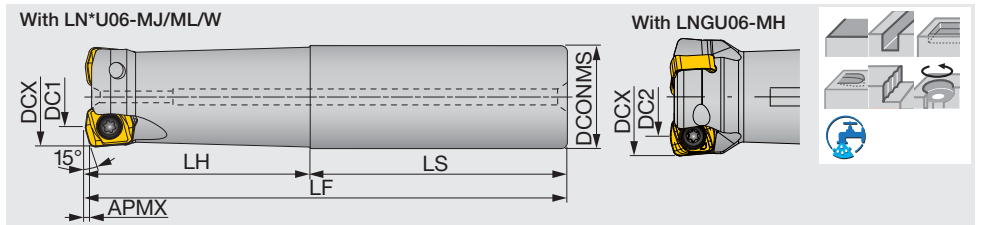
Designation	APMX	DCX	CICT	DC1	DC2	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT (kg)	Air hole	Insert	Fig.
TXN06R050M22.0E04	1.5	50	4	37.6	36.9	47	50	22	20	10.4	6.3	0.4	with	LN*U06...	1
TXN06R050M22.0E05	1.5	50	5	37.6	36.9	47	50	22	20	10.4	6.3	0.4	with	LN*U06...	1
TXN06R050M22.2-04	1.5	50	4	37.6	36.9	47	50	22.225	20	8	5	0.4	with	LN*U06...	1
TXN06R050M22.2-05	1.5	50	5	37.6	36.9	47	50	22.225	20	8	5	0.4	with	LN*U06...	1
TXN06R052M22.0E04	1.5	52	4	39.6	38.9	49	50	22	20	10.4	6.3	0.5	with	LN*U06...	1
TXN06R052M22.0E05	1.5	52	5	39.6	38.9	49	50	22	20	10.4	6.3	0.5	with	LN*U06...	1
TXN06R063M22.0E04	1.5	63	4	50.6	49.8	59	50	22	20	10.4	6.3	0.8	with	LN*U06...	1
TXN06R063M22.0E06	1.5	63	6	50.6	49.8	59	50	22	20	10.4	6.3	0.8	with	LN*U06...	1
TXN06R063M22.2-04	1.5	63	4	50.6	49.8	59	50	22.225	20	8	5	0.8	with	LN*U06...	1
TXN06R063M22.2-06	1.5	63	6	50.6	49.8	59	50	22.225	20	8	5	0.8	with	LN*U06...	1
TXN06R066M27.0E04	1.5	66	4	53.6	52.8	63	50	27	22	12.4	7	0.8	with	LN*U06...	1
TXN06R066M27.0E06	1.5	66	6	53.6	52.8	63	50	27	22	12.4	7	0.8	with	LN*U06...	1
TXN06R080M27.0E05	1.5	80	5	67.6	66.8	76	63	27	22	12.4	7	1.6	with	LN*U06...	1
TXN06R080M27.0EE05	1.5	80	5	67.6	66.8	60	63	27	22	12.4	7	1.2	with	LN*U06...	1
TXN06R080M27.0E08	1.5	80	8	67.6	66.8	76	63	27	22	12.4	7	1.6	with	LN*U06...	1
TXN06R080M27.0EE08	1.5	80	8	67.6	66.8	60	63	27	22	12.4	7	1.2	with	LN*U06...	1
TXN06R080M31.7-05	1.5	80	5	67.6	66.8	76	63	31.75	32	12.7	8	1.6	with	LN*U06...	1
TXN06R080M31.7-08	1.5	80	8	67.6	66.8	76	63	31.75	32	12.7	8	1.6	with	LN*U06...	1
TXN06R100M31.7-06	1.5	100	6	87.6	86.8	96	63	31.75	32	12.7	8	2.2	with	LN*U06...	1
TXN06R100M32.0E06	1.5	100	6	87.6	86.8	96	63	32	25	14.4	8	2.2	with	LN*U06...	1
TXN06R125M38.1-08	1.5	125	8	112.6	111.8	100	63	38.1	43	15.9	10	3	with	LN*U06...	1
TXN06R125M40.0E08	1.5	125	8	112.6	111.8	100	63	40	37	16.4	9	3	with	LN*U06...	1
TXN06R160M40.0E10	1.5	160	10	147.6	146.8	100	63	40	37	16.4	9	5	with	LN*U06...	1
TXN06R160M50.8-10	1.5	160	10	147.6	146.8	100	63	50.8	46	19	11	4.6	with	LN*U06...	1
TXN06R200M47.6-12	1.5	200	12	187.6	186.8	130	63	47.625	38	25.4	14	7.7	without	LN*U06...	2
TXN06R200M60.0E12	1.5	200	12	187.6	186.8	130	63	60	38	25.7	14	7.2	without	LN*U06...	3

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TXN06R050M22.0...	CSPB-5	H-TB2W	M-1000	-	FSHM10-40H	BLDIP20/S7
TXN06R050M22.2-04	CSPB-5	H-TB2W	M-1000	-	CM10-30H	BLDIP20/S7
TXN06R050M22.2-05, TXN06R052M22.0...	CSPB-5	H-TB2W	M-1000	-	FSHM10-40H	BLDIP20/S7
TXN06R063M...	CSPB-5	H-TB2W	M-1000	-	CM10X30H	BLDIP20/S7
TXN06R066,080M27.0...	CSPB-5	H-TB2W	M-1000	-	CM12X30H	BLDIP20/S7
TXN06R080,100M31.7...	CSPB-5	H-TB2W	M-1000	-	CM16X40H	BLDIP20/S7
TXN06R125M...	CSPB-5	H-TB2W	M-1000	TMBA-M20H	-	BLDIP20/S7
TXN06R160M40.0...	CSPB-5	H-TB2W	M-1000	TMBA-M20H	-	BLDIP20/M7
TXN06R160M50.8...	CSPB-5	H-TB2W	M-1000	TMBA-M24H	-	BLDIP20/M7
TXN06R200M...	CSPB-5	H-TB2W	M-1000	-	-	BLDIP20/M7

EXN06

Super high feed milling endmills with double sided inserts with 4 edges



GAMP = +10°, GAMF = -2° ~ +6°

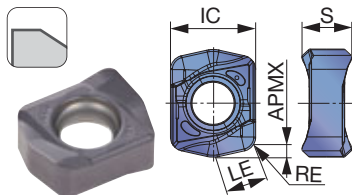
Designation	APMX	DCX	CICT	DC1	DC2	DCONMS	LF	LH	LS	WT (kg)	Air hole	Insert
EXN06R032M32.0-02	1.5	32	2	19.7	19.1	32	150	70	80	0.8	with	LN*U06...
EXN06R032M32.0-02L	1.5	32	2	19.7	19.1	32	200	120	80	1.1	with	LN*U06...
EXN06R035M32.0-02	1.5	35	2	22.7	22	32	150	45	105	0.9	with	LN*U06...
EXN06R035M32.0-02L	1.5	35	2	22.7	22	32	200	45	155	1.2	with	LN*U06...
EXN06R040M32.0-03	1.5	40	3	27.7	27	32	150	45	105	0.9	with	LN*U06...
EXN06R040M32.0-03L	1.5	40	3	27.7	27	32	220	45	175	1.3	with	LN*U06...

SPARE PARTS

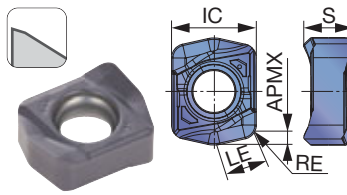
Designation	Clamping screw	Lubricant	Wrench
EXN06	CSPB-5	M-1000	IP-20D

INSERTS

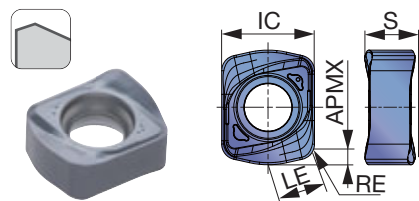
LNMU06-MJ



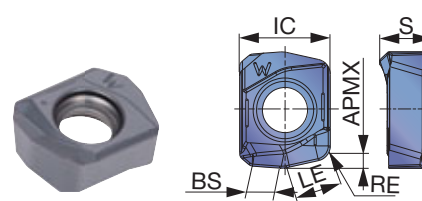
LNMU06-ML



LNGU06-MH



LNGU06-W (2 cutting edges)



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated							LE	IC	S	BS
			AH130	AH3225	AH3035	AH725	AH120	AH8015	AH8005				
LNMU06X5ZER-MJ	2	1.5	●	●	●	●	●	●		6	12	7	-
LNMU06X5ZER-ML	2	1.5	●	●	●	●	●	●		6	12	7	-
LNGU06X5ZER-MH	2	1.5						●	●	6	12	7	-
LNGU06X5ZER-W	2	1.5				●				6	12	7	3.6

● : New
● : Line up

STANDARD CUTTING CONDITIONS TXN03 / EXN03 / HXN03

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth: fz (mm/t)			ø16, CICT = 2		ø18, CICT = 2		ø20		
							Tool dia.: DCX (mm)			Plunging	n	Vf	n	Vf	n	Vf
							ø16 ~ ø22	ø25 ~ ø50								
P	Carbon steels (S45C / C45, S55C / C55, etc.)	- 300HB	First choice	AH3225	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
	Alloy steels (SCM440 / 42CrMo4, etc.)	- 300HB	First choice	AH3225	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
	Prehardened steels (NAK80, PX5, etc.)	30 - 40HRC	First choice	AH3225	MJ	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
		30 - 40HRC for wear resistance		AH8015	MJ	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
M	Austenitic stainless steels (SUS304 / X5CrNi18-9, etc.)	- 200HB	First choice	AH130	MS	80 - 150	0.3 - 0.8	0.3 - 0.8	0.1	2,390	2,390	2,120	2,120	1,910	2,860	3,820
	Precipitation hardening stainless steels (SUS630 / X5CrNiCuNb16-4)	28HRC - (H1150)	First choice	AH130	MS	80 - 150	0.2 - 0.5	0.2 - 0.5	0.1	2,390	1,430	2,120	1,270	1,910	1,720	2,290
		40HRC - (H900)	First choice	AH3035	ML	80 - 120	0.1 - 0.3	0.1 - 0.3	0.1	1,990	800	1,770	710	1,590	950	1,270
		40HRC for impact resistance		AH3035	MJ					1,990	800	1,770	710	1,590	950	1,270
K	Gray cast irons (FC250 / GG25 / 250, etc.)	150 - 250HB	First choice	AH725	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
	Ductile cast irons (FCD400, etc.)	150 - 250HB	First choice	AH725	MJ	80 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	4,770	2,650	4,240	2,390	5,740	7,650
S	Titanium alloy (Ti-6Al-4V, etc.)	- 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.3 - 0.7	0.08	800	640	710	570	640	770	1,020
	Heat-resistance alloy (Inconel, Hasteloy, etc.)	- 40HRC	First choice	AH8015	ML	20 - 50	0.1 - 0.3	0.1 - 0.3	0.05	600	240	530	210	480	290	380
H	Hot mold steel (SKD61 / X40CrMoV5-1, etc.)	40 - 55HRC	First choice	AH8015	MH	80 - 150	0.1 - 0.5	0.1 - 0.5	0.05	2,390	1,430	2,120	1,270	1,910	1,720	2,290
	Hot mold steel of D.T.C materials (DAC**, DH**, DIEVER, etc.)	40 - 55HRC	First choice	AH8015	MJ		1,590	640		1,420	570	1,270	760	1,020		
	Cold mold steels (SKD11 / X153CrMoV12, etc.)	55 - 60HRC	First choice	AH8005	MH	50 - 70	0.05 - 0.2	0.03 - 0.1	0.03	1,190	290	1,060	250	950	340	450
		55 - 60HRC for impact resistance		AH8015	MH	50 - 70	0.03 - 0.1	0.05 - 0.2	0.03	1,190	150	1,060	130	950	170	230

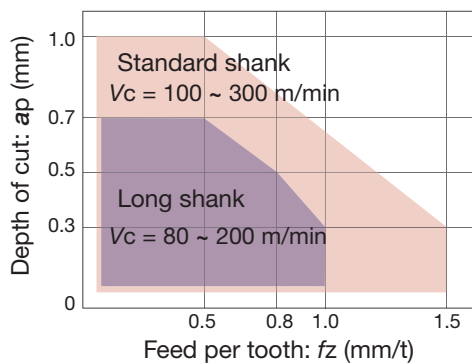
- When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area.

- Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.

Cautionary points in use

■ The use of a standard or long shank

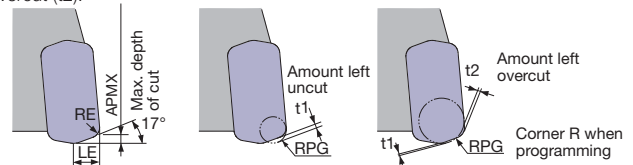
When using a long shank, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.



Tool dia.: DCX = ø16 ~ 35 mm
 Workpiece: S55C / C55 (200HB)
L/D ratio of overhang
 Standard shank: L/D ≤ 3
 Long shank: L/D = 4

■ 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 (t1) and overcut (t2).



LNNU03-MJ/ML

Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0	1.2	3.0	1.0	0.6	-
1.0	1.2	3.0	1.5	0.5	-
1.0	1.2	3.0	2.0	0.25	0.08
1.0	1.2	3.0	2.5	0.14	0.26

LNGU03-MH

Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0	1.2	3.0	1.0	0.45	-
1.0	1.2	3.0	1.5	0.35	-
1.0	1.2	3.0	2.0	0.2	0.1
1.0	1.2	3.0	2.5	0.08	0.29

Each value in table is calculated theoretically at the maximum condition.

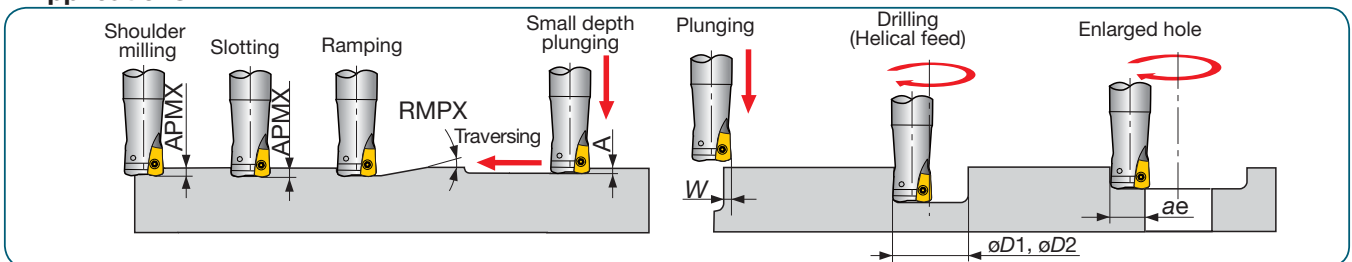
Tool dia.: DCX (mm), Number of revolutions: n (min^{-1}), Feed speed: V_f (mm/min), Max. depth of cut: $a_p = 1.0$ mm

ø22		ø25			ø28			ø30			ø32			ø35			ø40			ø50			
n	V_f	n	V_f	n	V_f	n	V_f	n	V_f	n	V_f	n	V_f	n	V_f	n	V_f	n	V_f	n	V_f		
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, fz = 1.0 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, fz = 1.0 mm/t																							
2,170	4,560	6,080	1,910	5,350	6,690	1,710	4,790	5,990	1,590	4,450	5,570	1,490	5,220	6,260	1,360	4,760	5,710	1,190	4,170	5,000	950	3,330	5,320
Vc = 150 m/min, fz = 0.7 mm/t																							
2,170	4,560	6,080	1,910	5,350	6,690	1,710	4,790	5,990	1,590	4,450	5,570	1,490	5,220	6,260	1,360	4,760	5,710	1,190	4,170	5,000	950	3,330	5,320
Vc = 150 m/min, fz = 0.7 mm/t																							
3,180	4,770	6,360	1,530	3,060	3,820	1,360	2,720	3,400	1,270	2,540	3,180	1,190	2,980	3,570	1,090	2,720	3,270	960	2,400	2,880	760	1,900	2,280
Vc = 120 m/min, fz = 0.5 mm/t																							
1,740	1,570	2,090	1,530	1,840	2,300	1,370	1,640	2,060	1,270	1,520	1,910	1,190	1,790	2,140	1,090	1,640	1,960	960	1,440	1,730	760	1,140	1,820
Vc = 120 m/min, fz = 0.3 mm/t																							
1,450	870	1,160	1,270	1,020	1,270	1,140	910	1,140	1,060	850	1,060	1,000	1,000	1,200	910	910	1,090	800	800	960	640	640	1,020
Vc = 100 m/min, fz = 0.2 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, fz = 1.0 mm/t																							
2,170	5,210	6,940	1,910	6,110	7,640	1,710	5,460	6,820	1,590	6,360	7,950	1,490	7,450	8,940	1,360	6,800	8,160	1,190	5,950	7,140	950	4,750	5,700
Vc = 150 m/min, fz = 1.0 mm/t																							
580	700	930	510	820	1,020	450	730	910	420	840	1,050	400	1,000	1,200	360	900	1,080	320	800	960	250	630	1,000
Vc = 40 m/min, fz = 0.5 mm/t																							
430	260	340	380	230	290	340	200	260	320	260	320	300	300	360	270	270	320	240	240	290	190	190	300
Vc = 30 m/min, fz = 0.2 mm/t																							
1,740	1,570	2,090	1,530	1,840	2,300	1,360	1,630	2,040	1,270	1,520	1,910	1,190	1,790	2,140	1,090	1,640	1,960	950	1,430	1,710	760	1,140	1,820
Vc = 120 m/min, fz = 0.3 mm/t																							
1,160	700	930	1,020	820	1,020	910	730	910	850	680	850	800	800	960	730	730	880	640	640	770	510	510	820
Vc = 80 m/min, fz = 0.2 mm/t																							
870	310	420	760	300	380	680	270	340	640	260	320	600	300	360	550	230	340	480	240	280	380	200	300
Vc = 60 m/min, fz = 0.1 mm/t																							
870	160	210	760	150	190	680	140	170	640	130	160	600	150	180	550	120	170	480	120	140	380	100	150
Vc = 60 m/min, fz = 0.06 mm/t																							

- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

- Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

Applications



Designation	Tool dia. 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
			MJ/ML/MS	MH		MJ/ML/MS	MH	MJ/ML/MS	MH			
E/HXN03R016M...	ø16	1	2.1	1.7	0.3	3.5	3	22	23	30	12.5	
E/HXN03R018M...	ø18	1	1.7	1.6	0.3	3.5	3	26	27	34	14.5	
E/HXN03R020M...	ø20	1	1.4	1.3	0.3	3.5	3	30	31	38	16.5	
E/HXN03R022M...	ø22	1	1.2	1.1	0.3	3.5	3	34	35	42	18.5	
E/HXN03R025M...	ø25	1	1.0	0.9	0.3	3.5	3	40	41	48	21.5	
E/HXN03R028M...	ø28	1	0.8	0.8	0.3	3.5	3	46	46	54	24.5	
E/HXN03R030M...	ø30	1	0.7	0.7	0.3	3.5	3	50	50	58	26.5	
E/HXN03R032M...	ø32	1	0.7	0.7	0.3	3.5	3	54	54	62	28.5	
EXN03R035M...	ø35	1	0.6	0.6	0.3	3.5	3	60	60	68	31.5	
E/H/TXN03R040M...	ø40	1	0.5	0.5	0.3	3.5	3	70	70	78	36.5	
TXN03R050M...	ø50	1	0.4	0.4	0.3	3.5	3	90	90	98	46.5	

• For øDc above ø33 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut

STANDARD CUTTING CONDITIONS TXN06 / EXN06

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth: fz (mm/t)		ø32, CICT = 2		ø35, CICT = 2		ø40, CICT = 3	
							Tool dia.: DCX (mm)	Plunging	n	Vf	n	Vf	n	Vf
P	Carbon steels (S45C / C45, S55C / C55, etc.)	- 300HB	First choice	AH3225	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
	Alloy steels (SCM440 / 42CrMo4, etc.)	- 300HB	First choice	AH3225	MJ	100 - 200	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
	Prehardened steels (NAK80, PX5, etc.)	30	for wear resistance	AH3225	MJ	100 - 200	0.5 - 1.2	0.15	1,490	2,380	1,360	2,180	1,190	2,860
		30		AH8015	MJ	100 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
M	Stainless steels (SUS304 / X5CrNi18-9, etc.)	- 200HB	First choice	AH130	ML	80 - 150	0.3 - 0.8	0.1	1,190	1,430	1,090	1,310	950	1,710
	Precipitation hardening stainless steels (SUS630 / X5CrNiCuNb16-4)	28HRC	for wear resistance	AH130	MS	80 - 150	0.2 - 0.5	0.1	1,190	710	1,090	650	960	860
		40HRC - (H900)		AH3035	ML	80 - 120	0.1 - 0.3	0.1	1,000	400	910	360	800	480
				AH3035	MJ									
K	Gray cast irons (FC250 / GG25 / 250, etc.)	150	First choice	AH120	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
		250HB		AH120	MJ	80 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
S	Titanium alloy (Ti-6Al-4V, etc.)	- 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.08	400	400	360	360	320	480
	Heat-resistance alloy (Inconel, Hasteroy, etc.)	- 40HRC	for impact resistance	AH130	MJ									
H	Hot mold steel (SKD61 / X40CrMoV5-1, etc.)	40 - 55HRC	First choice	AH8015	MH	80 - 150	0.1 - 0.5	0.05	1,190	710	1,090	650	950	850
			Low resistance	AH8015	MJ									
	Hot mold steel of D.T.C materials (DAC**, DH**, DIEVER, etc)	40 - 55HRC	First choice	AH8015	MJ	50-100	0.1 - 0.3	0.05	800	320	730	290	640	380
			for impact resistance	AH8015	MH									
Cold mold steels (SKD11 / X153CrMoV12, etc.)	55 - 60HRC	First choice	AH8005	MH	50 - 70	0.05 - 0.3	0.03	600	120	550	110	480	140	
		for impact resistance	AH8015	MH	50 - 70	0.05 - 0.3	0.03	600	60	550	55	480	70	

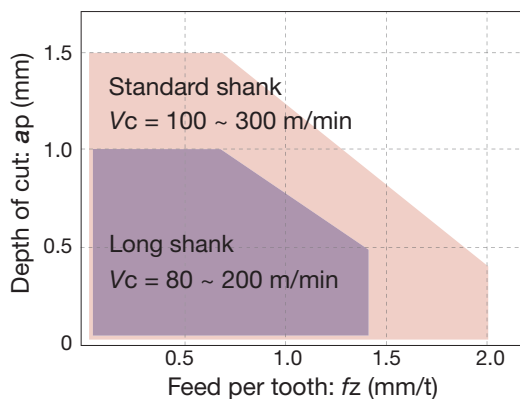
The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

Cautionary points in use

The use of a standard or long shank

When using a long shank, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.

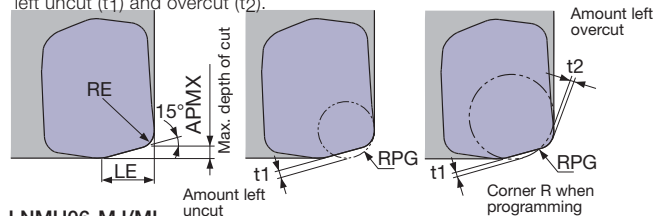


Tool dia.: $\phi D_c = \phi 32 \sim 40$ mm
Workpiece: S55C / C55 (200HB)

L/D ratio of overhang
Standard shank: L/D \leq 3
Long shank: L/D = 4

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 = 3.0 mm. 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 (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.5	2.0	6.0	2.0	1.0	-
			3.0	0.77	-
			4.0	0.54	0.26

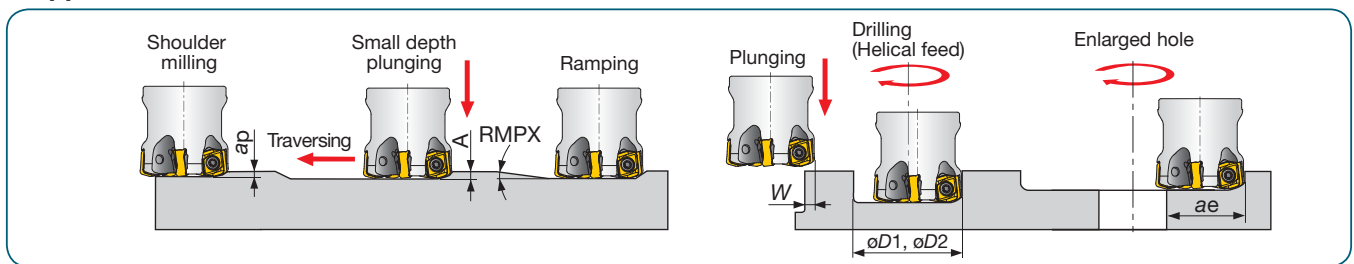
Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.5	2.0	6.0	2.0	0.9	-
			3.0	0.66	-
			4.0	0.41	0.26

Each value in table is calculated theoretically at the maximum condition.

Tool dia.: DCX (mm), Number of revolutions: n (min^{-1}), Feed speed: Vf (mm/min), Max. depth of cut: ap = 1.5 mm, Number of teeth: CICT

ø50			ø63			ø80			ø100, CICT = 6		ø125, CICT = 8		ø160, CICT = 10		ø200, CICT = 12	
n	Vf		n	Vf		n	Vf		n	Vf	n	Vf	n	Vf	n	Vf
	CICT = 4	CICT = 5		CICT = 4	CICT = 6		CICT = 5	CICT = 8								
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
Vc = 200 m/min, fz = 1.0 mm/t																
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
Vc = 200 m/min, fz = 1.0 mm/t																
950	3,040	3,800	760	2,430	3,650	600	2,400	3,840	480	2,290	380	2,450	300	2,390	240	2,290
Vc = 150 m/min, fz = 0.8 mm/t																
950	3,800	4,750	760	3,040	4,560	600	3,000	4,800	480	2,880	380	3,040	300	3,000	240	2,880
Vc = 150 m/min, fz = 1.0 mm/t																
760	1,820	2,280	610	1,470	2,200	480	1,440	2,300	380	1,380	310	1,470	240	1,430	190	1,380
Vc = 120 m/min, fz = 0.6 mm/t																
760	910	1,140	610	730	1,100	480	720	1,150	380	680	310	740	240	720	190	680
Vc = 120 m/min, fz = 0.3 mm/t																
640	510	640	510	410	610	400	400	640	320	380	260	420	200	400	160	380
Vc = 100 m/min, fz = 0.2 mm/t																
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
Vc = 200 m/min, fz = 1.0 mm/t																
950	3,800	4,750	760	3,040	4,560	600	3,000	4,800	480	2,870	380	3,060	300	2,990	240	2,870
Vc = 150 m/min, fz = 1.0 mm/t																
250	500	630	200	400	600	160	400	640	130	380	100	410	80	400	60	380
Vc = 40 m/min, fz = 0.5 mm/t																
190	150	190	150	120	180	120	120	190	100	120	80	120	60	120	50	120
Vc = 30 m/min, fz = 0.2 mm/t																
760	910	1,140	610	730	1,100	480	720	1,150	380	680	310	740	240	720	190	680
Vc = 120 m/min, fz = 0.3 mm/t																
510	410	510	400	320	480	320	320	510	250	300	200	320	160	320	130	310
Vc = 80 m/min, fz = 0.2 mm/t																
380	150	190	300	120	180	240	120	190	190	110	150	120	120	120	100	120
Vc = 60 m/min, fz = 0.1 mm/t																
380	75	95	300	60	90	240	60	95	190	55	150	60	120	60	100	60
Vc = 60 m/min, fz = 0.05 mm/t																

Applications

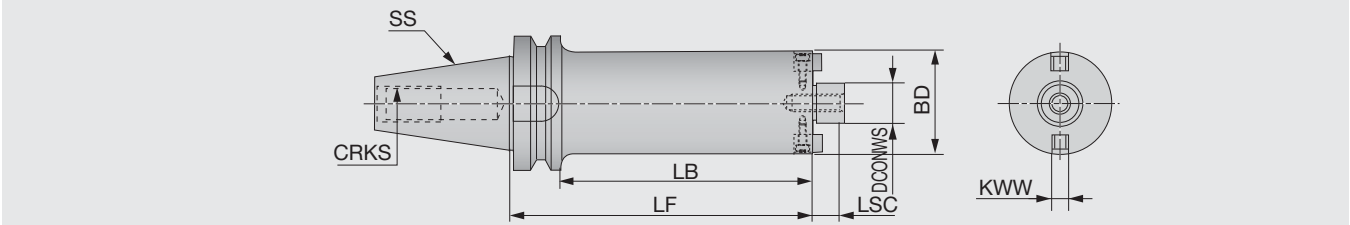


Designation	Tool dia. DCX	Max. depth of cut APMX	Max. ramping angle RMPX			Max. plunging depth A		Max. cutting width in plunging W	Min. machinable hole dia. øD1	Max. machinable hole dia. øD2	Max. cutting width in enlarged hole ae
			MJ/ML	MH	MJ/ML	MH					
EXN06R032M...	ø32	1.5	2	1.4	0.5	0.4	6	47	59	25	
EXN06R035M...	ø35	1.5	1.7	1.1	0.5	0.4	6	53	65	28	
EXN06R040M...	ø40	1.5	1.3	0.8	0.5	0.4	6	63	75	33	
TXN06R050M...	ø50	1.5	0.9	0.7	0.5	0.4	6	83	95	43	
TXN06R052M...	ø52	1.5	0.8	0.6	0.5	0.4	6	87	99	45	
TXN06R063M...	ø63	1.5	0.6	0.5	0.5	0.4	6	109	121	56	
TXN06R066M...	ø66	1.5	0.5	0.5	0.5	0.4	6	115	127	59	
TXN06R080M...	ø80	1.5	0.5	0.3	0.5	0.4	6	143	155	73	
TXN06R100M...	ø100	1.5	0.34	0.25	0.5	0.4	6	183	195	93	
TXN06R125M...	ø120	1.5	0.26	0.2	0.5	0.4	6	233	245	118	
TXN06R160M...	ø160	1.5	0.2	0.15	0.5	0.4	6	303	315	153	
TXN06R200M...	ø200	1.5	0.15	0.11	0.5	0.4	6	383	395	193	

· For øDc above 100 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut.

BT50-FM (Shell mill holder for long overhang)

Face mill holder with BT shank

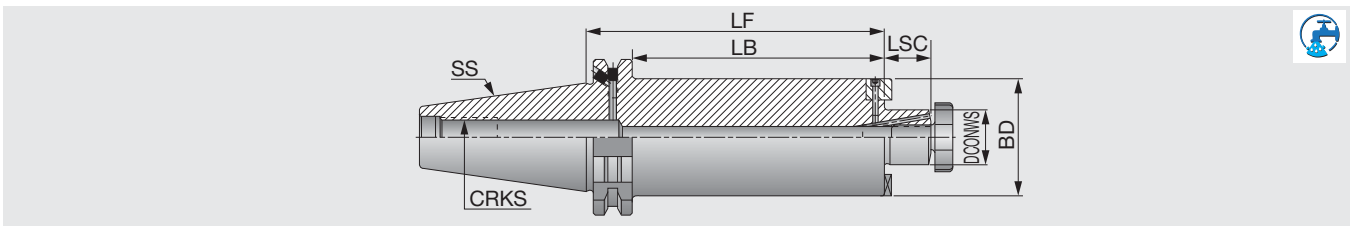


Designation	SS	DCONWS	BD	LSC	LF	LB	CRKS	KWW	WT (kg)
BT50-FMC22-138-47	50	22	47	18	138	100	M24	10	5.2
BT50-FMC22-188-47	50	22	47	18	188	150	M24	10	5.9
BT50-FMC22-243-47	50	22	47	18	243	205	M24	10	6.5
BT50-FMC22-293-47	50	22	47	18	293	255	M24	10	7.2
BT50-FMC22-178-59	50	22	59	18	178	140	M24	10	6.8
BT50-FMC22-238-59	50	22	59	18	238	200	M24	10	8
BT50-FMC22-308-59	50	22	59	18	308	270	M24	10	9.5
BT50-FMC22-373-59	50	22	59	18	373	335	M24	10	10.9
BT50-FMA31.75-215-76	50	31.75	76	30	215	177	M24	12.7	10
BT50-FMA31.75-295-76	50	31.75	76	30	295	257	M24	12.7	12.9
BT50-FMA31.75-375-76	50	31.75	76	30	375	337	M24	12.7	15.8
BT50-FMA31.75-275-96	50	31.75	96	30	275	237	M24	12.7	16.8
BT50-FMA31.75-375-96	50	31.75	96	30	375	337	M24	12.7	23

(Option:Wrench for lock screw)

DIN69871-SEM (Shell mill holder for long overhang)

Extra long type shell mill holder with coolant hole with DIN69871 shank



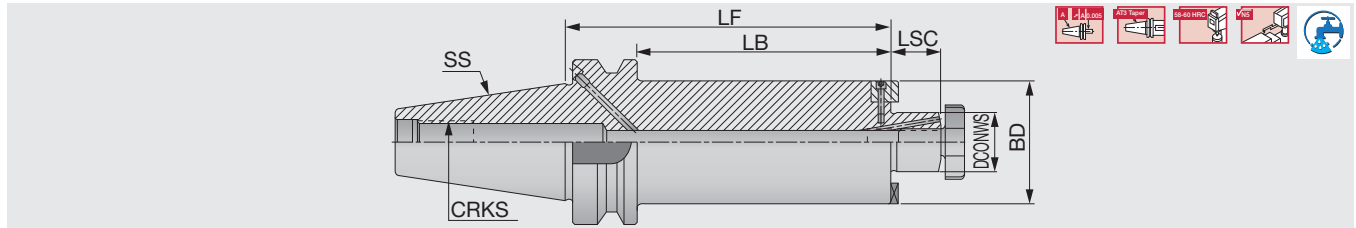
Designation	SS	DCONWS	LSC	BD	LF	LB	CRKS
DIN6987150SEM22X48X200C	50	22	19	48	200	181	M24
DIN6987150SEM22X61X300C	50	22	19	61	300	281	M24
DIN6987150SEM27X61X300C	50	27	21	61	300	281	M24

- Applicable for 10 MPa pressure coolant
- If the "B type" option is required, the plug screw must be removed from the flange cooling hole. (use a 2 mm hex key.)

(Option:Wrench for lock screw)

BT-SEM-C (Shell mill holder)

Shell mill holder with coolant hole with BT shank (for long overhang)



Designation	SS	DCONWS	BD	LF	LB	LSC	CRKS
BT50SEM22X48X220C	50	22	48	220	182	19	M24
BT50SEM22X61X320C	50	22	61	320	282	19	M24
BT50SEM27X61X320C	50	27	61	320	282	21	M24

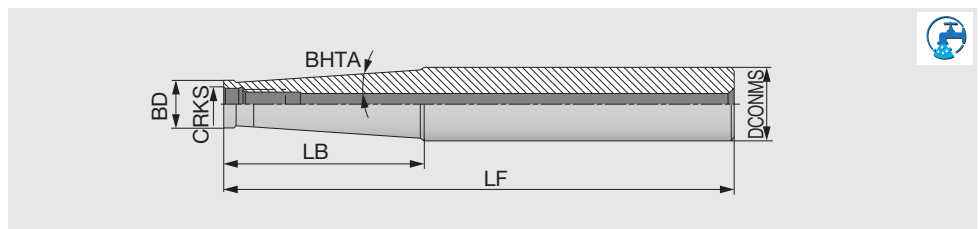
• Applicable for 10 MPa pressure coolant

• If the "B type" option is required, the plug screw must be removed from the flange cooling hole (use a 2 mm hex key).

(Option: Wrench for lock screw)

TUNGFLEX SM

TungFlex - Modular shank

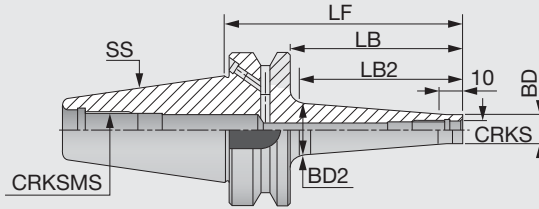


Designation	DCONMS	BD	LF	LB	BHTA	CRKS
SM06-L60C10	10	9.7	60	20	0°	M6
SM06-L105-C12	12	9.7	105	60	1.2°	M6
SM06-L125-C16	16	9.7	125	60	3.3°	M6
SM08-L73C16	16	13	73	25	0°	M8
SM08-L128-C16	16	13	128	80	0.9°	M8
SM08-L170-C20	20	13	170	66.8	3.3°	M8
SM10-L80-C20	20	18	80	30	0°	M10
SM10-L130-C20	20	18	130	80	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
BT40ODP6X66	40	M6	9.8	13	66	39	30	M16
BT40ODP6X106	40	M6	9.8	23	106	79	70	M16
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
BT50ODP12X94	50	M12	23	30	94	56	50	M24
BT50ODP12X144 ⁽¹⁾	50	M12	23	40	144	106	100	M24
BT50ODP12X194 ⁽¹⁾	50	M12	23	40	194	156	150	M24
BT50ODP12X244 ⁽¹⁾	50	M12	23	46	244	206	200	M24
BT50ODP16X94 ⁽¹⁾	50	M16	29	34	94	56	50	M24
BT50ODP16X144 ⁽¹⁾	50	M16	29	40	144	106	100	M24
BT50ODP16X194 ⁽¹⁾	50	M16	29	55	194	156	150	M24
BT50ODP16X244 ⁽¹⁾	50	M16	29	60	244	206	200	M24

• Applicable for 10 MPa pressure coolant (1) Balanced to G6.3 at 12,000 min⁻¹

RED screw arbor

(Manufactured by MST Corporation)

- Arbor integrated with carbide shank
- Carbide shank provides high rigidity
- Eliminates shank slip-off when rotated at high torque thanks to integrated shank-arbor design
- Chatter-free machining is possible even with long overhang

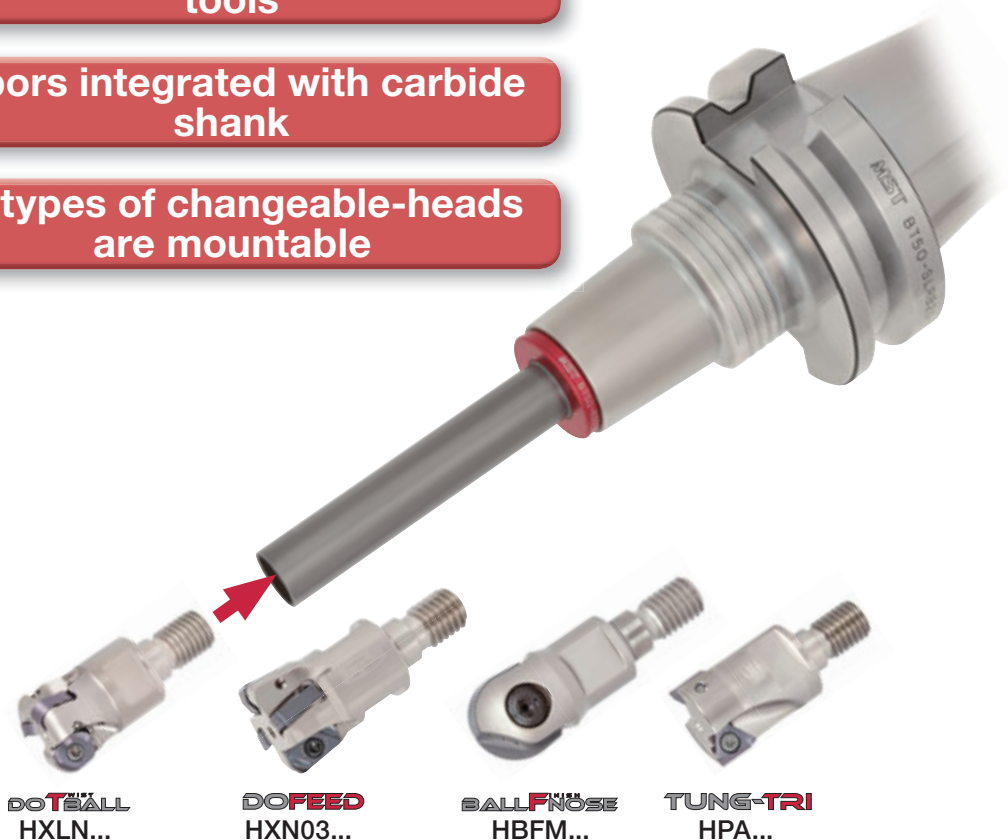


Ensures the highest performance with changeable-head tools

Optimized for changeable-head tools

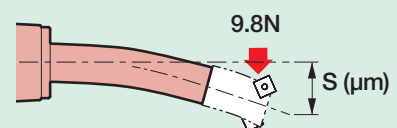
Arbors integrated with carbide shank

All types of changeable-heads are mountable



Tool rigidity index

Values in "S" column in the table on page 19 indicates the amount of deflection at the tool tip when working load of 9.8N is applied. The smaller the value is, the more rigid the tool is.

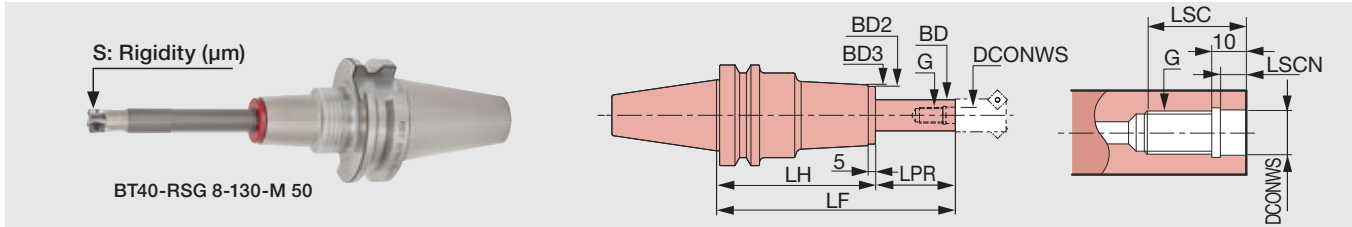


Manufactured by: **MST** corporation

TUNGFLEX

BT-RSG (Screw clamping head holder)

TungFlex modular tooling system with BT shank

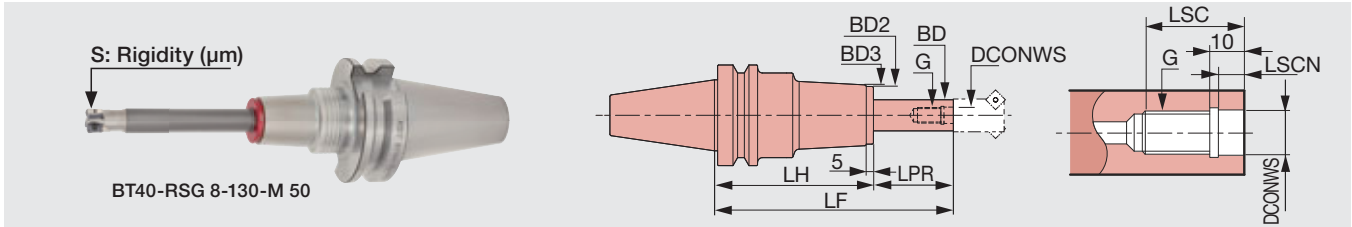


Designation	DCONWS	LSC	LSCN	BD	LF	LPR	LH	BD2	BD3	S	WT (kg)	G
BT40-RSG 8-105-M 25	8.5	18	6.5	15	105	25	80	30	32	0.6	1.4	M8
BT40-RSG 8-135-M 25	8.5	18	6.5	15	135	25	110	30	32	0.7	1.8	M8
BT40-RSG 8-130-M 50	8.5	18	6.5	15	130	50	80	30	32	1.5	1.4	M8
BT40-RSG 8-160-M 50	8.5	18	6.5	15	160	50	110	30	32	1.7	1.8	M8
BT40-RSG 8-155-M 75	8.5	18	6.5	15	155	75	80	30	32	3.1	1.5	M8
BT40-RSG 8-185-M 75	8.5	18	6.5	15	185	75	110	30	32	3.4	1.9	M8
BT40-RSG 8-165-M 85	8.5	18	6.5	15	165	85	80	30	32	4	1.5	M8
BT40-RSG 10-125-M 25	10.5	22	6.5	19	125	25	100	36	38	0.4	1.8	M10
BT40-RSG 10-155-M 25	10.5	22	6.5	19	155	25	130	36	38	0.5	2.2	M10
BT40-RSG 10-150-M 50	10.5	22	6.5	19	150	50	100	36	38	0.9	1.9	M10
BT40-RSG 10-180-M 50	10.5	22	6.5	19	180	50	130	36	38	1	2.3	M10
BT40-RSG 10-175-M 75	10.5	22	6.5	19	175	75	100	36	38	1.6	2	M10
BT40-RSG 10-205-M 75	10.5	22	6.5	19	205	75	130	36	38	1.8	2.4	M10
BT40-RSG 10-200-M100	10.5	22	6.5	19	200	100	100	36	38	2.8	2	M10
BT40-RSG 10-230-M100	10.5	22	6.5	19	230	100	130	36	38	3	2.4	M10
BT40-RSG 12-125-M 25	12.5	22	6	24	125	25	100	43	45	0.3	2	M12
BT40-RSG 12-155-M 25	12.5	22	6	24	155	25	130	43	45	0.4	2.4	M12
BT40-RSG 12-150-M 50	12.5	22	6	24	150	50	100	43	45	0.5	2.1	M12
BT40-RSG 12-180-M 50	12.5	22	6	24	180	50	130	43	45	0.7	2.5	M12
BT40-RSG 12-175-M 75	12.5	22	6	24	175	75	100	43	45	0.9	2.3	M12
BT40-RSG 12-205-M 75	12.5	22	6	24	205	75	130	43	45	1.1	2.7	M12
BT40-RSG 12-200-M100	12.5	22	6	24	200	100	100	43	45	1.4	2.4	M12
BT40-RSG 12-230-M100	12.5	22	6	24	230	100	130	43	45	1.6	2.8	M12
BT50-RSG 8-120-M 25	8.5	18	6.5	15	120	25	95	30	32	0.6	4	M8
BT50-RSG 8-150-M 25	8.5	18	6.5	15	150	25	125	30	32	0.7	4.3	M8
BT50-RSG 8-145-M 50	8.5	18	6.5	15	145	50	95	30	32	1.5	4	M8
BT50-RSG 8-175-M 50	8.5	18	6.5	15	175	50	125	30	32	1.7	4.3	M8
BT50-RSG 8-170-M 75	8.5	18	6.5	15	170	75	95	30	32	3	4.1	M8
BT50-RSG 8-200-M 75	8.5	18	6.5	15	200	75	125	30	32	3.3	4.4	M8
BT50-RSG 8-180-M 85	8.5	18	6.5	15	180	85	95	30	32	3.9	4.1	M8
BT50-RSG 10-140-M 25	10.5	22	6.5	19	140	25	115	36	38	0.4	4.3	M10
BT50-RSG 10-170-M 25	10.5	22	6.5	19	170	25	145	36	38	0.5	4.6	M10
BT50-RSG 10-165-M 50	10.5	22	6.5	19	165	50	115	36	38	0.8	4.4	M10
BT50-RSG 10-195-M 50	10.5	22	6.5	19	195	50	145	36	38	0.9	4.7	M10
BT50-RSG 10-190-M 75	10.5	22	6.5	19	190	75	115	36	38	1.6	4.5	M10
BT50-RSG 10-220-M 75	10.5	22	6.5	19	220	75	145	36	38	1.7	4.8	M10
BT50-RSG 10-215-M100	10.5	22	6.5	19	215	100	115	36	38	2.7	4.5	M10
BT50-RSG 10-245-M100	10.5	22	6.5	19	245	100	145	36	38	2.9	4.8	M10
BT50-RSG 12-140-M 25	12.5	22	6	24	140	25	115	43	45	0.2	4.6	M12
BT50-RSG 12-170-M 25	12.5	22	6	24	170	25	145	43	45	0.3	5	M12
BT50-RSG 12-165-M 50	12.5	22	6	24	165	50	115	43	45	0.5	4.7	M12
BT50-RSG 12-195-M 50	12.5	22	6	24	195	50	145	43	45	0.6	5.1	M12
BT50-RSG 12-190-M 75	12.5	22	6	24	190	75	115	43	45	0.8	4.9	M12
BT50-RSG 12-220-M 75	12.5	22	6	24	220	75	145	43	45	1	5.3	M12

TUNGFLEX

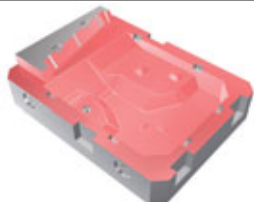

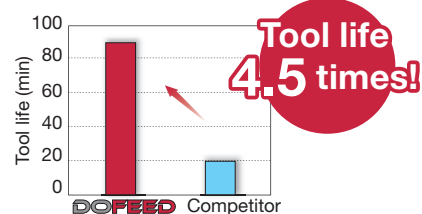
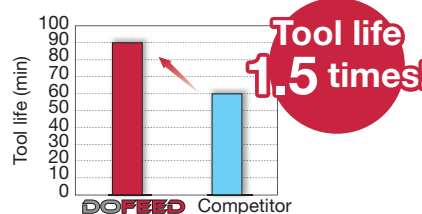


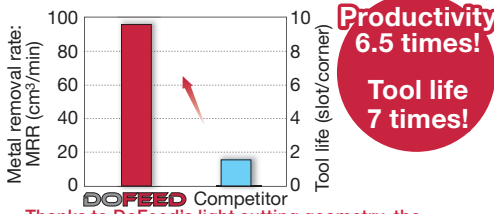
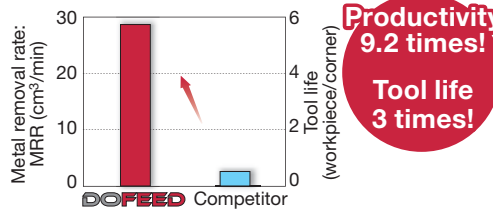
BT-RSG (Screw clamping head holder)

TungFlex modular tooling system with BT shank

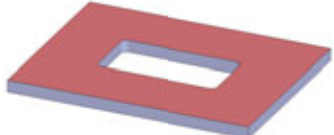
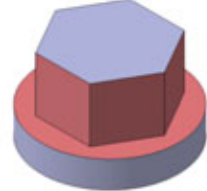
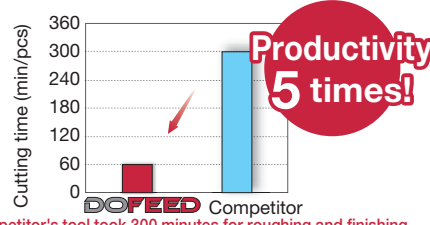
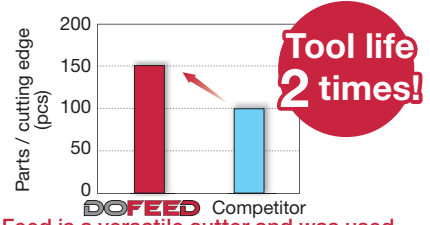
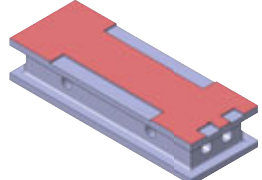
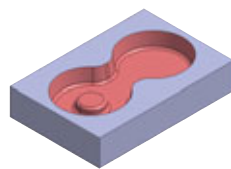
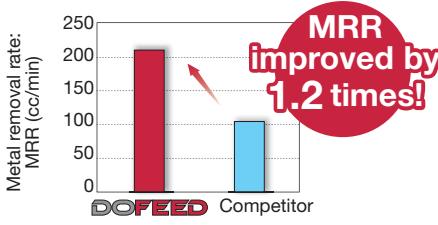
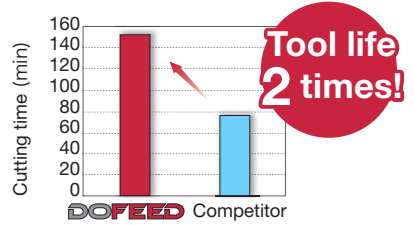


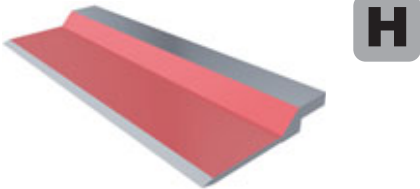

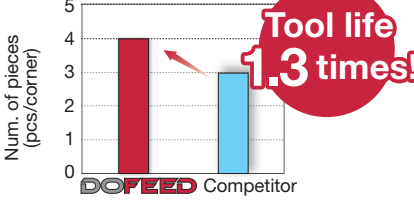
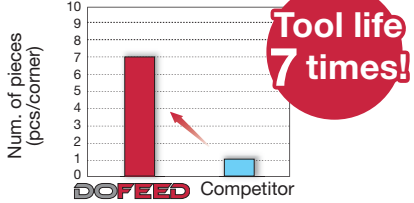

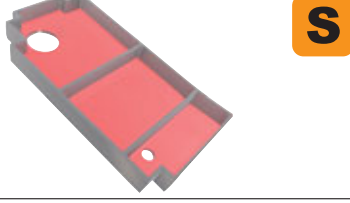
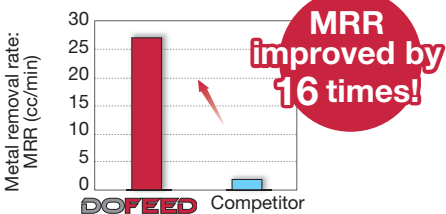
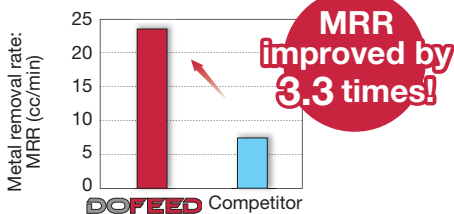
Designation	DCONWS	LSC	LSCN	BD	LF	LPR	LH	BD2	BD3	S	WT (kg)	G
BT50-RSG 12-215-M100	12.5	22	6	24	215	100	115	43	45	1.3	5	M12
BT50-RSG 12-245-M100	12.5	22	6	24	245	100	145	43	45	1.5	5.4	M12
BT50-RSG 12-240-M125	12.5	22	6	24	240	125	115	43	45	2	5.2	M12
BT50-RSG 16-140-M 25	17	25	6	29	140	25	115	52	54	0.2	5.4	M16
BT50-RSG 16-165-M 50	17	25	6	29	165	50	115	52	54	0.3	5.6	M16
BT50-RSG 16-190-M 75	17	25	6	29	190	75	115	52	54	0.5	5.8	M16
BT50-RSG 16-215-M100	17	25	6	29	215	100	115	52	54	0.7	6	M16
BT50-RSG 16-240-M125	17	25	6	29	240	125	115	52	54	1.1	6.2	M16

PRACTICAL EXAMPLES

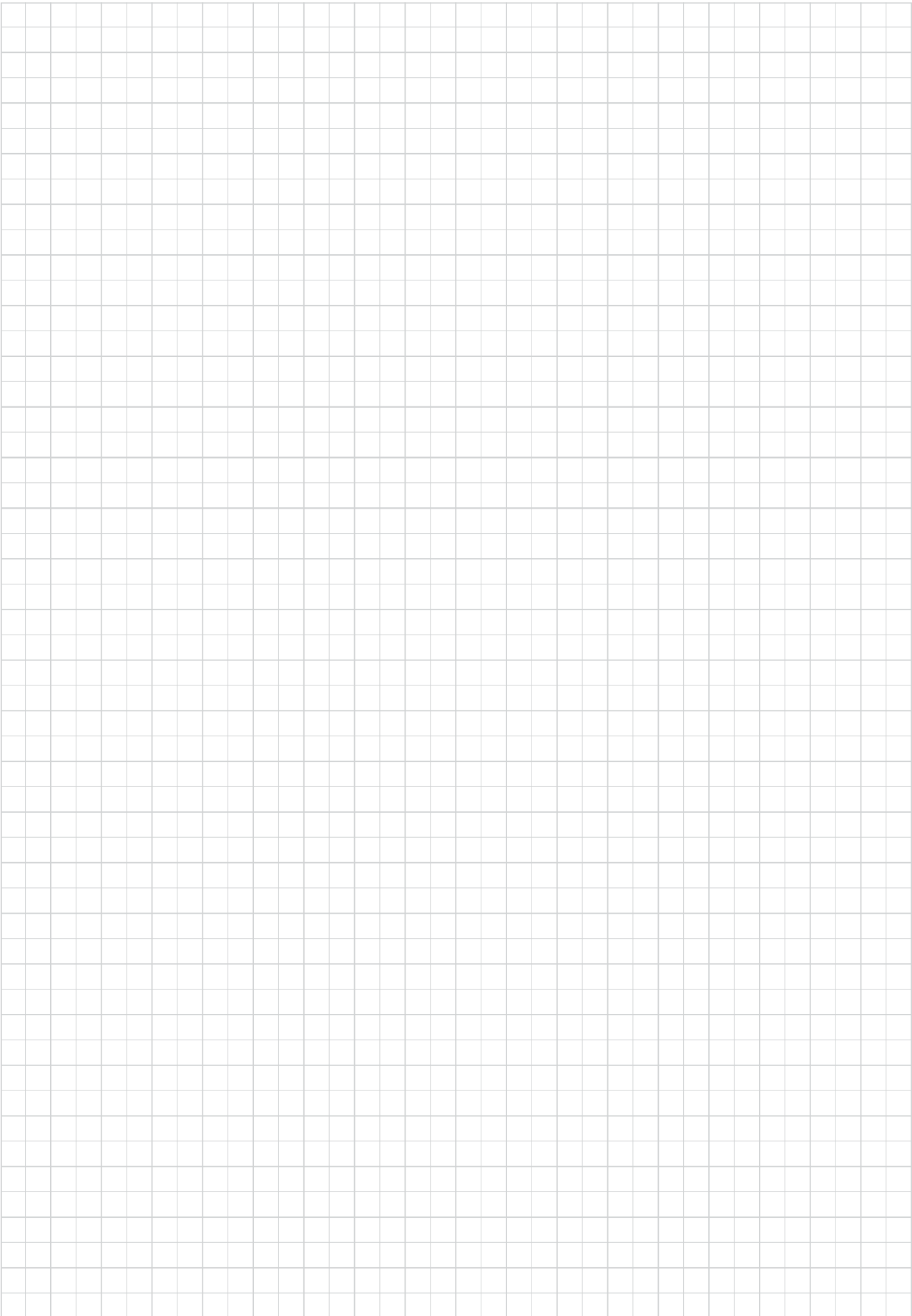
Workpiece type		Die & Mould	Die & Mould / Back block	
Cutter		TXN06R063M22.0E04 ($\phi 63$, $z = 4$)	TXN06R063M22.2-06 ($\phi 63$, $z = 6$)	
Insert		LNMU06X5ZER-MJ	LNMU06X5ZER-MJ	
Grade		AH3225	AH3035	
Workpiece material		S45C / C45 (20 - 35 HRC)	Prehardened steel HPM7 (HRC30)	
		New  P	 P	
Cutting conditions	Cutting speed: V_c (m/min)	197	115	
	Feed per tooth: f_z (mm/t)	1.5	0.7	
	Depth of cut: a_p (mm)	0.75	1.1	
	Width of cut: a_e (mm)	45	42	
	Process	Contouring	Contour milling	
	Coolant	Dry	Air blow	
Machine	Vertical M/C, BT50	Vertical M/C, BT50		
Results	 <p>Tool life 4.5 times!</p> <p>AH3225 reduced the damage of the bottom cutting edge, extending tool life by 4.5 times.</p>		 <p>Tool life 1.5 times!</p> <p>AH3035 grade showed better chipping resistance than competitor improving tool life by 50%.</p>	
Workpiece type		Mould base	Flange	
Cutter		EXN03R025M25.0-05 ($\phi 25$, $z = 5$)	EXN03R025M25.0-04 ($\phi 25$, $z = 4$)	
Insert		LNMU0303ZER-MJ	LNMU0303ZER-MJ	
Grade		AH725	AH725	
Workpiece material		SC360	SUS347 (Heat resistant stainless steel)	
		 P	 M	
Cutting conditions	Cutting speed: V_c (m/min)	140	220	
	Feed per tooth: f_z (mm/t)	0.48	0.2	
	Depth of cut: a_p (mm)	0.9	0.5	
	Width of cut: a_e (mm)	25	25	
	Process	Slot milling	Helical interpolation	
	Coolant	Dry	Wet	
Machine	Horizontal M/C, BT50	Vertical M/C		
Results	 <p>Productivity 6.5 times!</p> <p>Tool life 7 times!</p> <p>Thanks to DoFeed's light cutting geometry, the MRR has improved by 650%, while maintaining the same level of, or even reduced, spindle load as the competitor's tool. Chip re-cutting has significantly reduced, while increasing the tool life by 7-fold.</p>		 <p>Productivity 9.2 times!</p> <p>Tool life 3 times!</p> <p>Thanks to its low cutting geometry, DoFeed has improved the MRR even in the weak fixture setting. Insert life has tripled even in a high speed milling, while significantly reducing insert fractures induced by thermal cracking.</p>	

PRACTICAL EXAMPLES

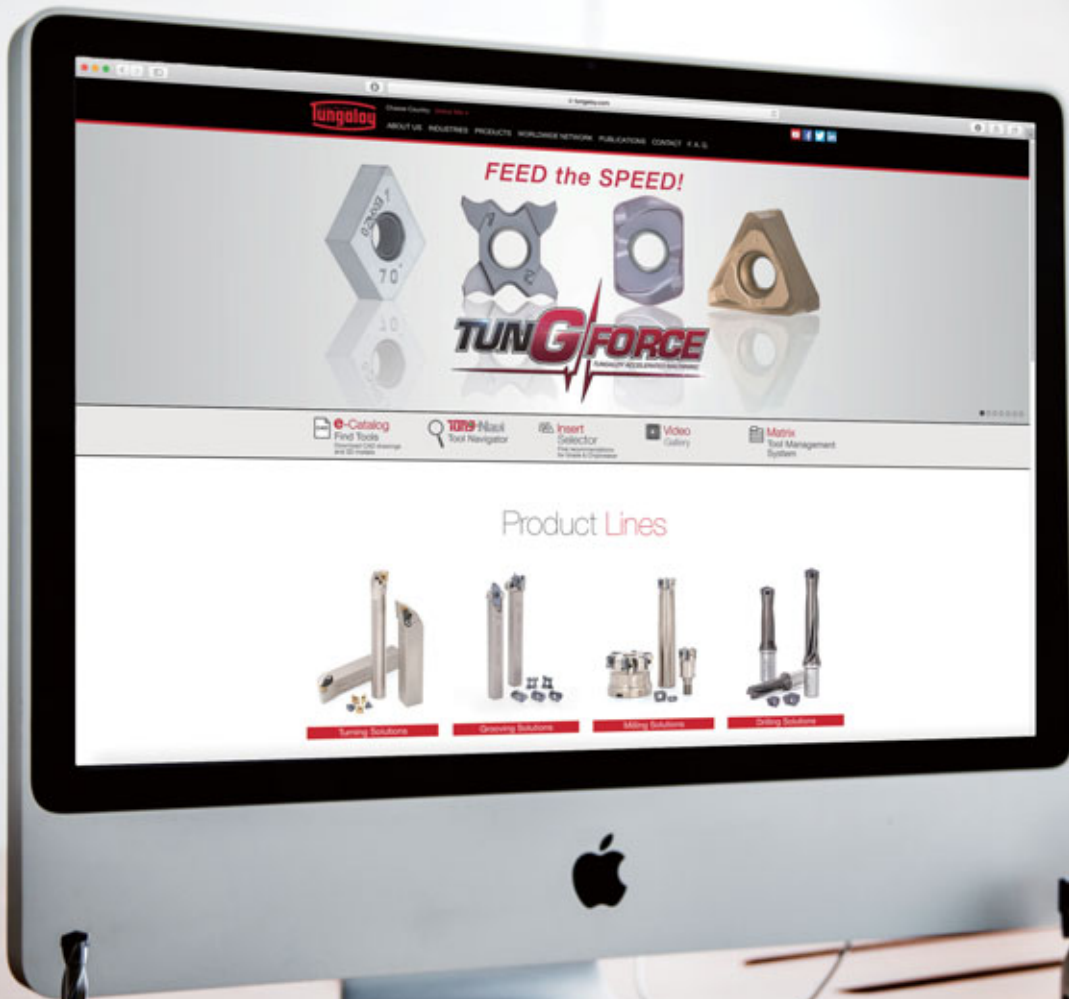
Workpiece type		Machine frame	Automotive / Rod end
Cutter		TXN06R080M31.7-08 (ø80, z = 8)	EXN03R032M32.0-06-C (ø32, z = 6)
Insert		LNMU06X5ZER-ML x 7 / LNGU06X5ZER-W x 1	LNMU0303ZER-MS
Grade		AH130 / AH725 SUS304 / X5CrNi18-9	AH130 SUS630 / X5CrNiCuNb16-4
Workpiece material		 M	 M
Cutting conditions	Cutting speed: V_c (m/min)	100	120
	Feed per tooth: f_z (mm/t)	0.4	0.5
	Feed speed: V_f (mm/min)	1273	3600
	Depth of cut: a_p (mm)	0.5	0.7
	Width of cut: a_e (mm)	60	~20
	Process	Face milling	Face milling
	Coolant	Wet	Internal supply
Machine	Vertical M/C, BT50	Turning center / 7.5 kW	
Results		 <p>Productivity 5 times!</p> <p>Competitor's tool took 300 minutes for roughing and finishing. DoFeed with wiper insert reduces time for finishing and improves total productivity by 5 times that of the competitor.</p>	 <p>Tool life 2 times!</p> <p>DoFeed is a versatile cutter and was used against a shoulder milling cutter, achieving double tool life.</p>
Workpiece type		Large machine parts	Die & mould
Cutter		TXN06R200M47.6-12 (ø200, z = 12)	HXN03R020MM10-04 (ø20, z = 4)
Insert		LNMU06X5ZER-MJ	LNMU0303ZER-MJ
Grade		AH120 FCD600 / 600-3	AH725 FCD600 / 600-3
Workpiece material		 K	 K
Cutting conditions	Cutting speed: V_c (m/min)	150	190
	Feed per tooth: f_z (mm/t)	1.0	0.4
	Depth of cut: a_p (mm)	0.5	0.3
	Width of cut: a_e (mm)	150	9
	Process	Face milling	Pocket milling
	Coolant	Dry	Dry (air)
	Machine	Horizontal M/C, BT50	Vertical M/C, BT40
Results		 <p>MRR improved by 1.2 times!</p> <p>DoFeed, with high density insert, can effectively increase productivity. Lower cutting forces reduce chattering, achieving 1.5 times tool life.</p>	 <p>Tool life 2 times!</p> <p>Due to the lower cutting forces, DoFeed can increase the productivity 4 times higher. AH725 grade can effectively reduce sudden fracture, achieving double tool life.</p>

Workpiece type		Press-cutter blade	Machine part
Cutter		TXN06R063M22.0E06 (ø63, z = 6)	EXN03R035M32.0-06 (ø35, z = 6)
Insert		LNGU06X5ZER-MH	LNMU0303ZER-MJ
Grade		AH8015	AH8015
Workpiece material		SCM440/42CrMo4(44HRC)	SCM440/42CrMo4(44HRC)
			
Cutting conditions	Cutting speed: V_c (m/min)	118	170
	Feed per tooth: f_z (mm/t)	0.8	0.8
	Depth of cut: a_p (mm)	0.8	0.92
	Width of cut: a_e (mm)	38	26
	Process	Face milling	Pocketing
	Machine	Dry (air)	Air blast
Results		 <p>A combination of the MH chipbreaker and AH8015 reduced chipping and wear. Tool life has increased to 130%.</p>	 <p>AH8015 exhibited superior wear resistance, improving the tool life by sevenfold over the competitor.</p>
Workpiece type		Turbine blade	Aerospace component
Cutter		EXN03R030M32.0-05 (ø30, z = 5)	EXN03R025M25.0-05 (ø25, z = 5)
Insert		LNMU0303ZER-ML	LNMU0303ZER-ML
Grade		AH725	AH725
Workpiece material		Heat resistant cast steel	Ti-6Al-4V (36HRC)
			
Cutting conditions	Cutting speed: V_c (m/min)	70	50
	Feed per tooth: f_z (mm/t)	0.5	0.7
	Depth of cut: a_p (mm)	0.5	0.5
	Width of cut: a_e (mm)	30	25
	Process	Shoulder milling	Pocket milling
	Machine	Wet	Wet
Results		 <p>Tripled cutting speed and super high feed milling offer 16 times higher productivity.</p>	 <p>7.3 times higher feed machining that drastically improves productivity.</p>

MEMO



Check our site and our App to get more info!



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