

MillLine

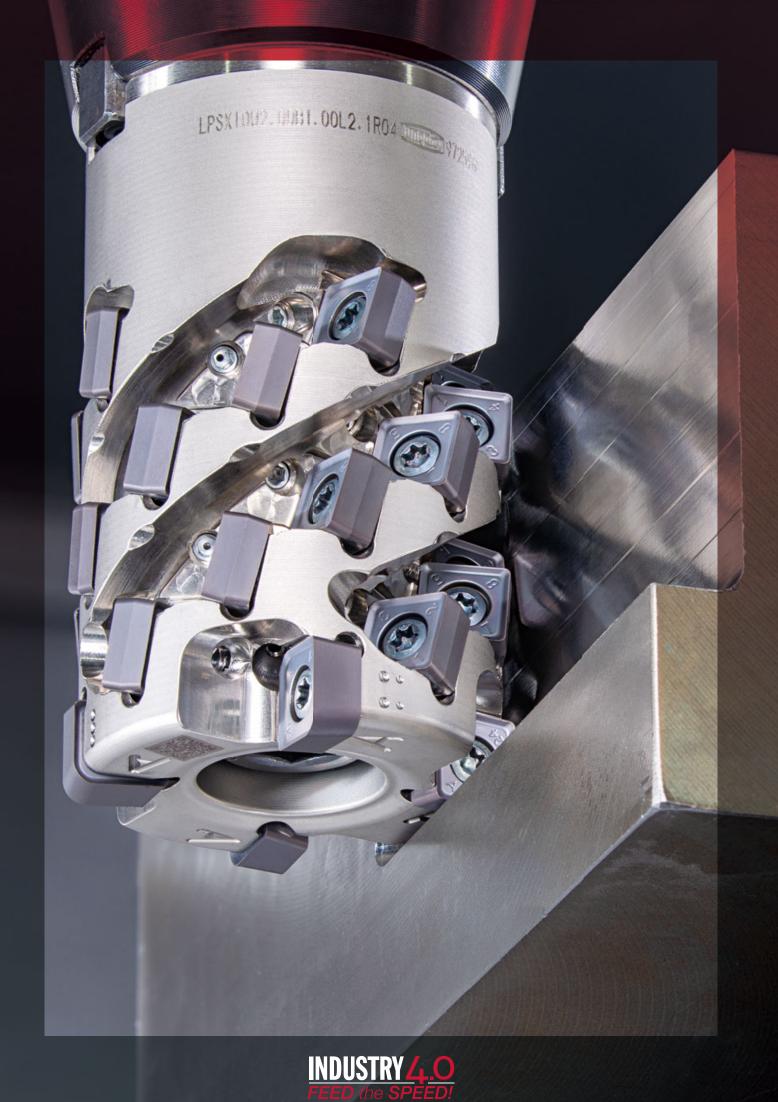
Square shoulder milling cutter for titanium alloys and cast iron

EXTENDED MILL

Tungaloy Report No. 560-US

Extended-flute rough milling cutter with double-sided inserts for maximum productivity and cost efficiency











Indexable extended-flute cutters for high-efficiency rough milling operations of titanium alloy and cast iron parts

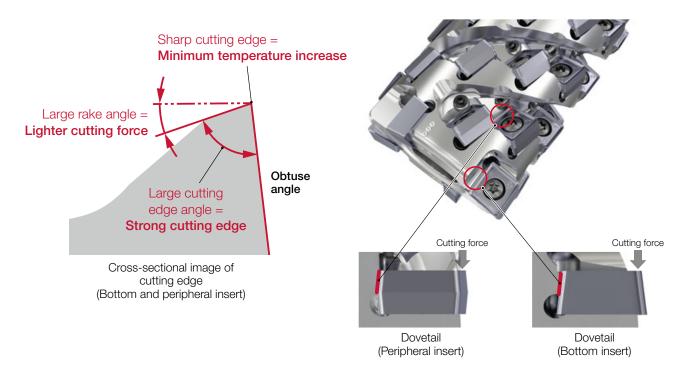
EXTENDED

Rough milling cutter with exceptional reliability for titanium alloys and cast iron parts

Rough milling cutter optimized for machining titanium alloy parts

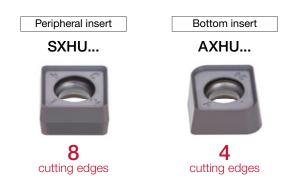
Titanium alloys generally exhibit excellent elastic deformation ability and low thermal conductivity. To meet these challenges, Tungaloy has developed the insert with unique and optimal features:

- A combination of sharp cutting edge and large rake angle generates lighter cutting action and reduced cutting forces.
- An obtuse-angled cutting edge design ensures the cutting edge's robustness and sharpness.
- The dovetail interlocking of the insert and pocket adds to tool reliability during aggressive machining.



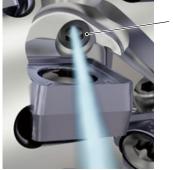
Multiple edge double-sided inserts for maximum cost efficiency

8 total cutting edges for the peripheral insert and 4 for the bottom insert for maximum cost efficiency.



Precision coolant

Coolant jet is directed precisely to the cutting point through the fixed coolant nozzle, exerting maximum cooling effect for the cutting edge and workpiece.



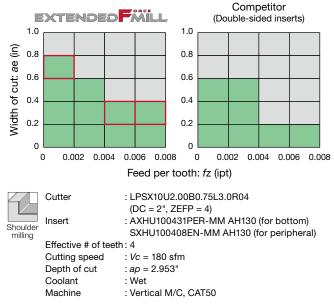
- Coolant nozzle

CUTTING PERFORMANCE

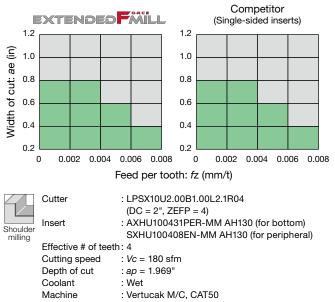
Application range comparisons

Ti-6AI-4V (34HRC)

ExtendedForceMill vs competitor's double-sided inserts



ExtendedForceMill generated lower cutting loads vs the competitor and allowed machining over a broader application range.



ExtendedForceMill vs competitor's single-sided inserts

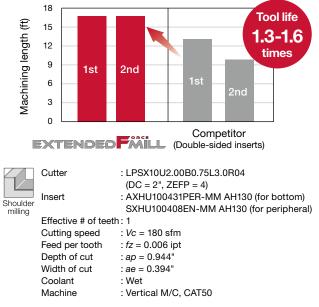
ExtendedForceMill double-sided inserts were as efficient as competitor's single-sided positive inserts with no compromise on cutting parameters.

Light cutting geometry of **ExtendedForceMill** negative inserts allows the use of productive cutting parameters as used with the positive inserts.

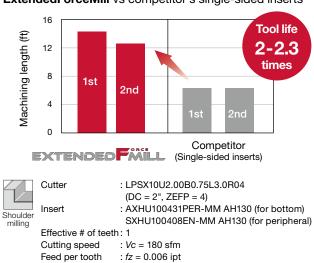
■ Tool life comparisons

S Ti-6AI-4V (34HRC)

ExtendedForceMill vs competitor's double-sided inserts



ExtendedForceMill provided longer tool life vs the competitor's double-sided inserts thanks to its sharp cutting edge.



ExtendedForceMill vs competitor's single-sided inserts

Machine : Vertical M/C, CAT50 ExtendedForceMill provided longer tool life vs the competitor's single-sided inserts.

: ap = 0.669'

: ae =0.591"

: Wet

Up-sharp cutting edge helps prevent the cutting point temperatures from increasing during machining, while its thick, strong design eliminates edge chipping. **ExtendedForceMill** provides long, predictable tool life.

Depth of cut

Width of cut

Coolant



LPSX10

Square shoulder mill for roughing, with screw clamp system

GAMP: Bottom insert +0.3°, Peripheral insert +15.5° GAMF: Bottom insert -18°, Peripheral insert -22°



Inch	APMX	DC	ZEFP	CICT	DCSMFS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Air hole	Insert
LPSX10U2.00B0.75L3.0R04	3.011	2.000	4	40	1.771	0.750	0.750	3.500	0.196	0.314	2.01	With	AXHU10, SXHU10
LPSX10U2.00B1.00L2.1R04	2.125	2.000	4	28	1.862	1.000	1.023	3.250	0.236	0.374	1.71	With	AXHU10, SXHU10
LPSX10U2.00B1.00L3.0R04	3.011	2.000	4	40	1.862	1.000	1.023	4.094	0.236	0.374	2.19	With	AXHU10, SXHU10
LPSX10U2.50B1.00L3.0R04	3.011	2.500	4	40	2.354	1.000	1.023	3.750	0.236	0.374	3.31	With	AXHU10, SXHU10
LPSX10U2.50B1.00L3.0R05	3.011	2.500	5	50	2.354	1.000	1.023	3.750	0.236	0.374	3.45	With	AXHU10, SXHU10
LPSX10U3.00B1.25L3.0R06	3.011	3.000	6	60	2.874	1.250	1.259	4.000	0.314	0.500	5.38	With	AXHU10, SXHU10

Metric	APMX	DC	ZEFP	CICT	DCSMFS	DCONMS	CBDP	LF	b	KWW	WT(kg)	Air hole	Insert
LPSX10M050B22.0L054R04	54	50	4	28	45	22	20	68	6.3	10.4	0.63	With	AXHU10, SXHU10
LPSX10M050B22.0L076R04	76.5	50	4	40	45	22	20	91	6.3	10.4	0.87	With	AXHU10, SXHU10

Note: Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the set bolt.

SPARE PARTS	N	() · · ·			
Designation	Clamping screw	Grip	Torx bit	Coolant nozzle	Shell locking bolt
LPSX10U2.00B0.75L3.0R04	CSTB-4M	H-TBS	BT15S	SSHM4-4-OH08	C0.375X3.0
LPSX10U2.00B1.00L2.1R04	CSTB-4M	H-TBS	BT15S	SSHM4-4-OH08	C0.500X2.5
LPSX10U2.00B1.00L3.0R04	CSTB-4M	H-TBS	BT15S	SSHM4-4-OH08	C0.500X3.5
LPSX10U2.50B1.00L3.0R04	CSTB-4M	H-TBS	BT15S	SSHM4-4-OH08	C0.500X3.5
LPSX10U2.50B1.00L3.0R05	CSTB-4M	H-TBS	BT15S	SSHM4-4-OH08	C0.500X3.5
LPSX10U3.00B1.25L3.0R06	CSTB-4M	H-TBS	BT15S	SSHM4-4-OH08	SD10-54
LPSX10M050B22.0L054R04	CSTB-4M	H-TBS	BT15S	SSHM4-4-OH08	CAP-CM10X1.5X55-H
LPSX10M050B22.0L076R04	CSTB-4M	H-TBS	BT15S	SSHM4-4-OH08	CM10X80

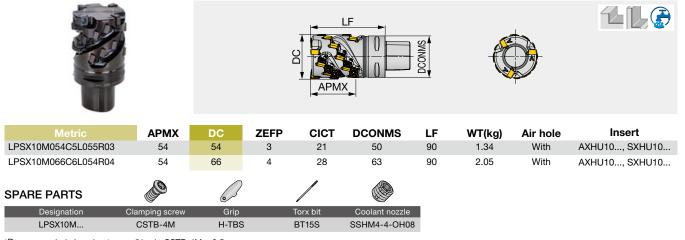
*Recommended clamping torque: CSTB-4M = 2.58 lbs·ft, 3.5 N·m

LPSX10**C

Square shoulder mill for roughing, with screw clamp system, with TungCap connection



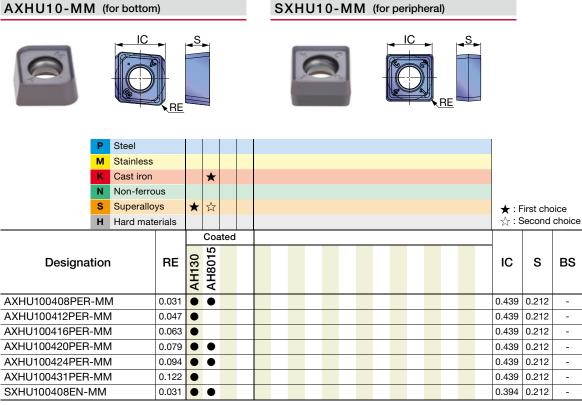
GAMP: Bottom insert +0.3°, Peripheral insert +15.5° GAMF: Bottom insert -18°, Peripheral insert -22°



*Recommended clamping torque (N·m): CSTB-4M = 3.5

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INSERTS



• : Line up

GRADES

AH130 S

- Demonstrates high wear and chipping resistance in the machining of Titanium alloy or heat-resistant alloys
- Remarkable reliability in wet machining

AH8015 Ks

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

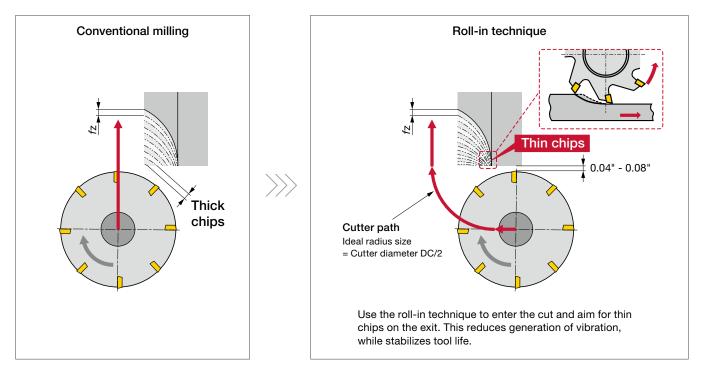


STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
K	Gray cast iron No.250B, No.300B, etc.	150 - 250 HB	First choice	AH8015	330 - 984	0.004 - 0.010
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	First choice	AH8015	330 - 656	0.004 - 0.010
S	Titanium alloys Ti-6AI-4V, etc.	-	First choice	AH130	98 - 196	0.0024 - 0.0079
3	Superalloys Inconel 718, etc.	-	First choice	AH130	66 -164	0.0020 - 0.004

■ Tips on cutter entry into the cut

In conventional end milling method, the cutter generates thick chips when exiting the cut, which causes vibrations and edge chipping. To avoid such results, use the roll-in technique, as shown below, in which the cutter is rolled into the cut in the same direction as the cutter rotation.



Cautions when installing the inserts

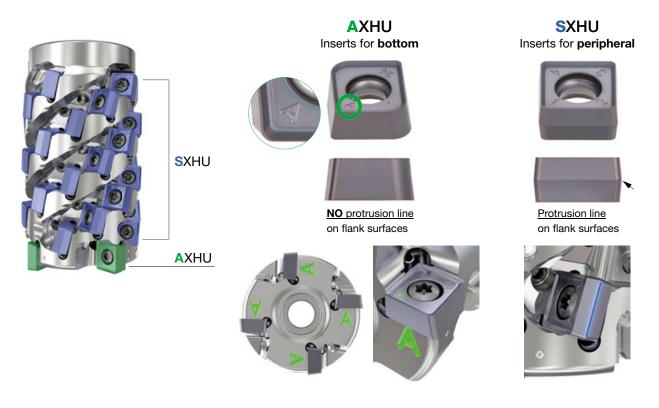
Please make sure the correct inserts are mounted in their respective pockets as shown below. Incorrect installation may result in tool damage and possible human injury.



Scan the QR code to watch the tutorial video

Insert Positioning

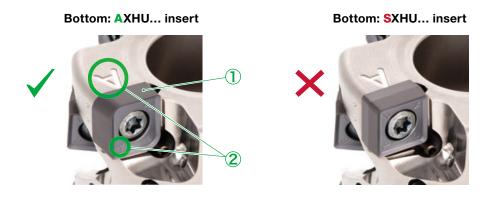
Mount the AXHU inserts on the bottom pockets marked with the matching "A" sign on the cutter body. On the remaining peripheral pockets, install the SXHU inserts.



Check points

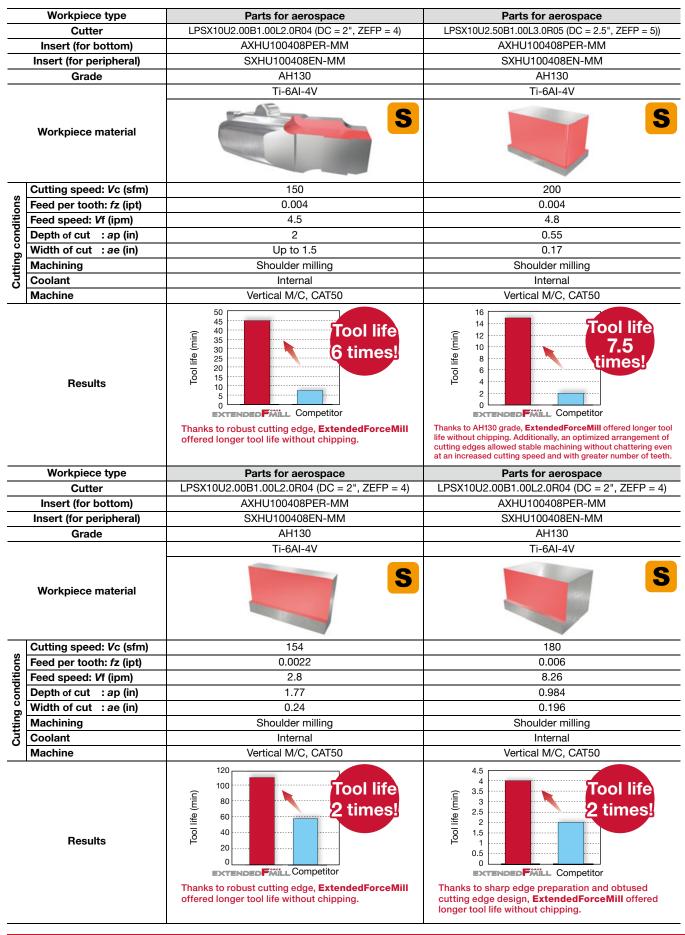
Ensure the following two points for the correct installation of the bottom inserts:

- ① The bottom inserts have a flat flank surface with NO protruded line.
- ② An "A" sign appears on the rake surface of the bottom inserts.





PRACTICAL EXAMPLES



FIXEDTORQUEWRENCH

Achieves high cutting edge precision thanks to uniform clamping force

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Easy setting

Handle

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

Mechanism

Dark green: TORX

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-lubricantresistant.

Light green: TORX PLUS

High repeatability & robustness

Robustness / Fitting

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

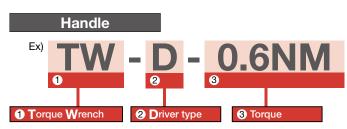
Versatility

TW-B-8IP

TW-B-10IP

TW-B-15IP

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





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

4

4

4

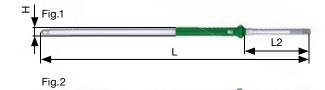


Blade		
Ex) TW	- B -	T6
Torque Wrench	2 C	3 TORX geom.
Designation	Stock	TORX geom.
Designation TW-B-T6	Stock ●	TORX geom. T6
-	Stock ●	
TW-B-T6	Stock ● ●	T6
TW-B-T6 TW-B-T7	Stock	T6 T7
TW-B-T6 TW-B-T7 TW-B-T8	Stock Stock Stock Sto	T6 T7 T8
TW-B-T6 TW-B-T7 TW-B-T8 TW-B-T9	Stock Stock Stock Sto	T6 T7 T8 T9
TW-B-T6 TW-B-T7 TW-B-T8 TW-B-T9 TW-B-T10	Stock Stock Stock Sto	T6 T7 T8 T9 T10

8IP

10IP

15IP



L	L2	Fig.
175	42	1
175	42	1
175	42	1
175	42	1
175	42	1
175	42	1
175	42	2
175	42	2
175	42	2
175	42	2
175	42	2

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