Member IMC Group Tungaloy

MillLine

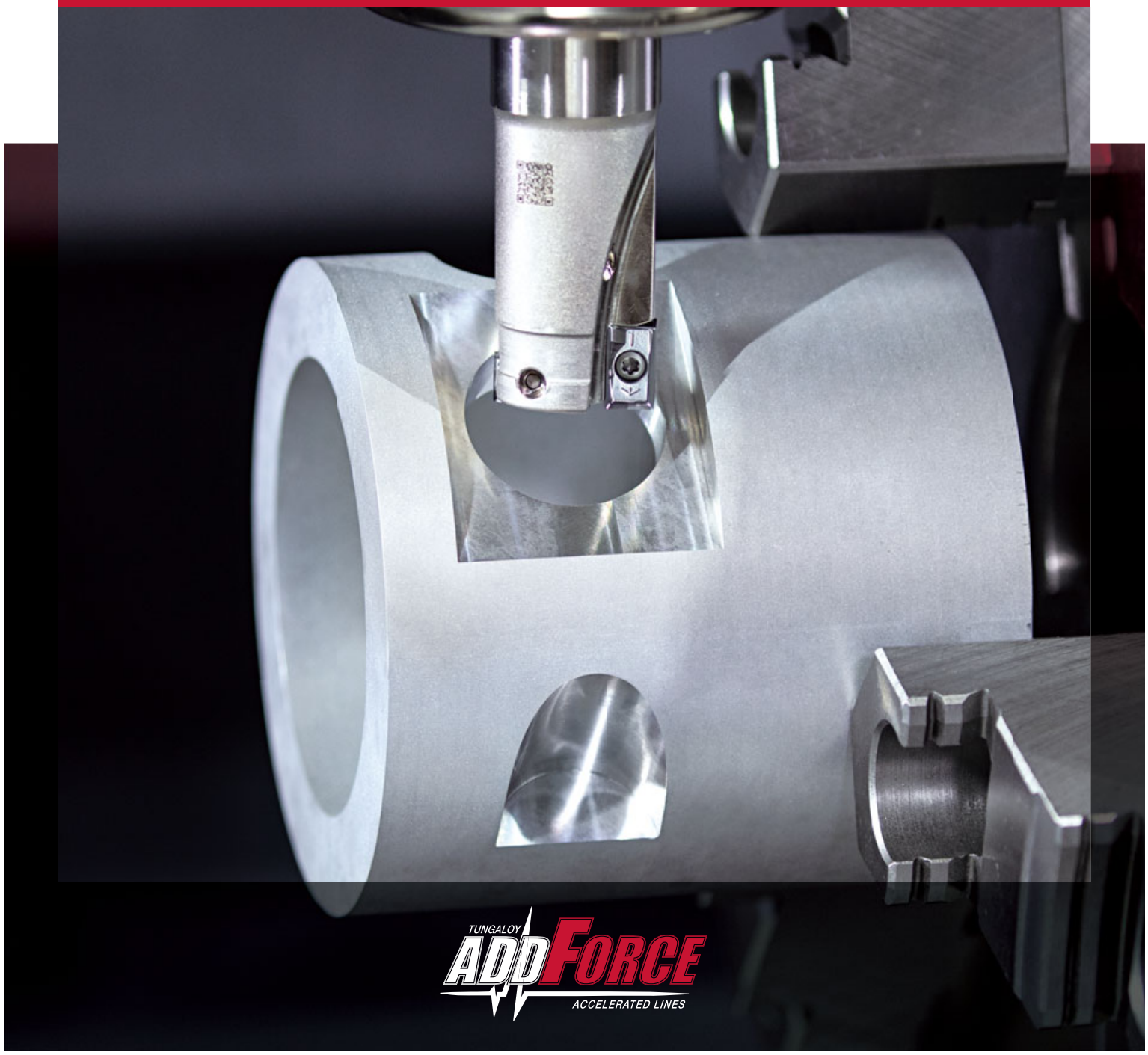
For more information

Multifunctional milling cutter with center cutting edge

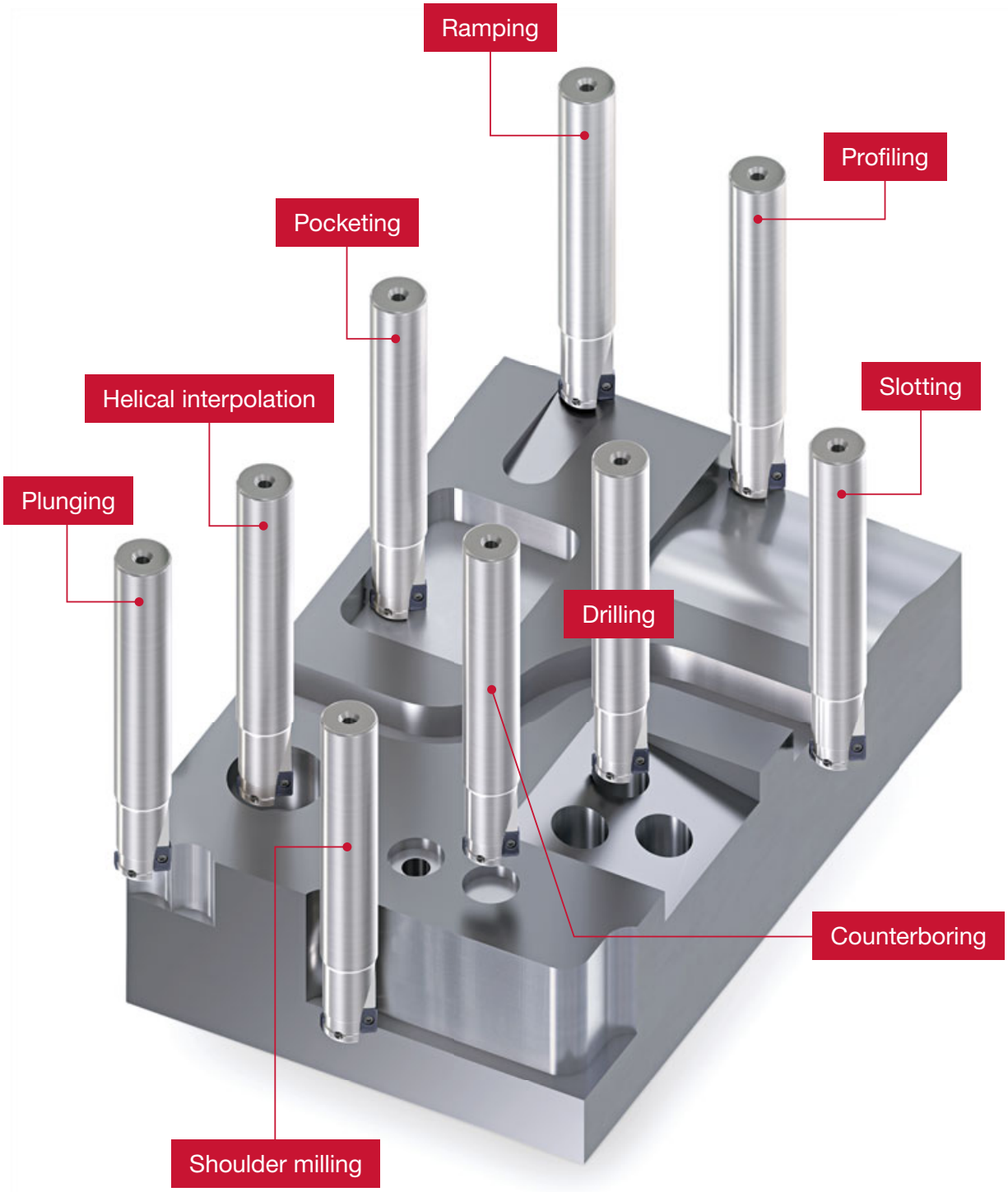
ULTI DOMREC

Tungaloy Report No. 548-G

All-round cutter with center cutting capability
now offers insert geometry for non-ferrous machining



TUNGALOY ADDFORCE ACCELERATED LINES


Ramping
Profiling
Pocketing
Helical interpolation
Slotting
Plunging
Drilling
Counterboring
Shoulder milling

TUNGALOY ADDFORCE MILL

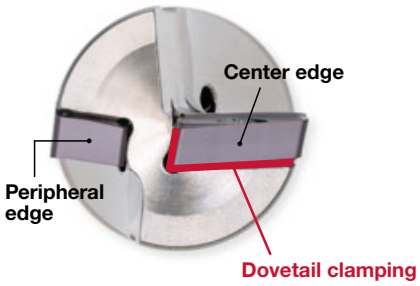
ACCELERATED MILLING

DOMULTIREC

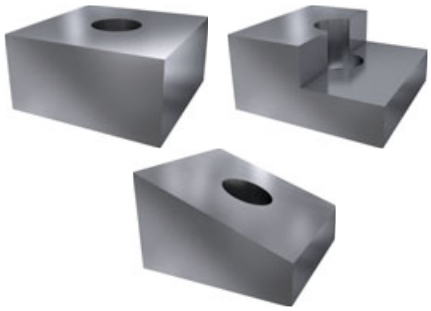
Multifunction cutter design used for a variety of applications combines multiple processes into a single operation

From flat-bottom holes to profile machining, the all-round cutter offers new geometry for non-ferrous machining

Features



Thick insert design and dovetail interlocking for maximum tool reliability



Drilling on irregular surfaces made easy

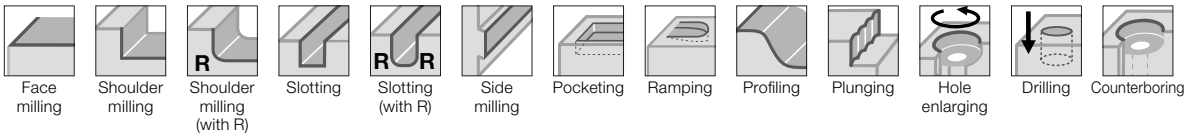
Able to feed in all directions

Insert lineup

Tool dia. DC (mm)	ø12, ø13	ø16, ø17	ø20, ø21	ø25, ø26	ø32, ø33	ø40
APMX (mm)	5	7	9	11	14.5	18
Insert size	06	08	10	12	16	19

* As of July 2024.

Applications capabilities with **DoMultiRec**

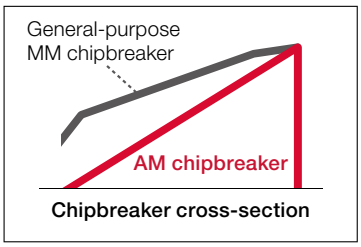


New

AM chipbreaker for non-ferrous machining

Polished insert surface
» Ensures built-up edge resistance

Large rake angle and sharp cutting edge
» Provides light cutting action

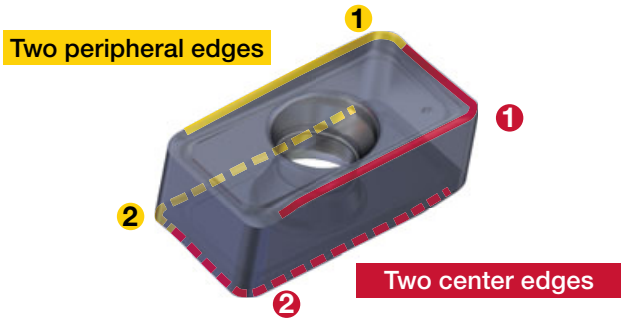


Optimized center edge geometry
» Improves chip evacuation

Ground-to-precision insert
» Provides excellent part quality

Maximum cost per edge for shoulder cutters with a center cutting edge

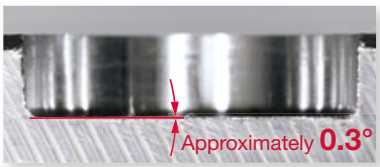
A single insert can be used either for center edge or peripheral edge and can be used twice in each position – four total cutting edges for highest insert economy.



Flat hole bottom

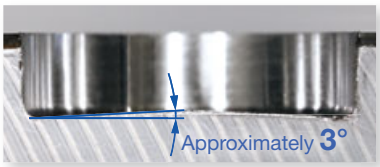
Easy to make hole bottoms as flat as possible. Also makes it suitable for counter boring.

DOMREC ULTI



Flat hole bottom
(Slant angle ≈ **0.3°**)

Competitor



Conical bottom
(Slant angle ≈ **3°**)

Insert size 12	DC = 25 mm
Cutter	: EVLX12M025C25.0R02 (DC = 25 mm, CICT = 2)
Insert	: LXMU120408PER-MM AH3225
Cutting speed	: *Vc* = 150 m/min
Feed per tooth	: *fz* = 0.07 mm/t
Hole depth	: 5 mm
Overhang length	: 45 mm
Coolant	: Dry

The optimized bottom edge design ensures a flat hole bottom.

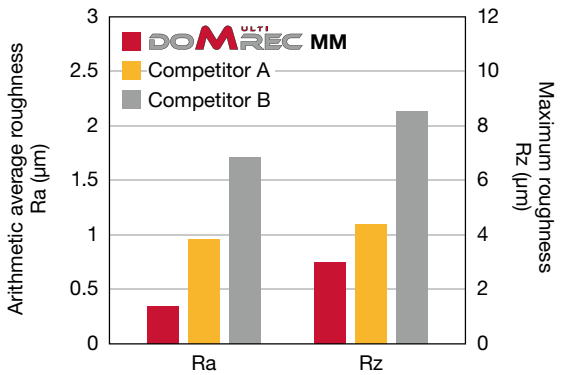
See page 17 for more information on the bottom edge design

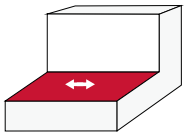
High machining accuracy

Excellent surface finish quality and wall accuracy

Surface roughness

Insert size 10 | DC = 20 mm



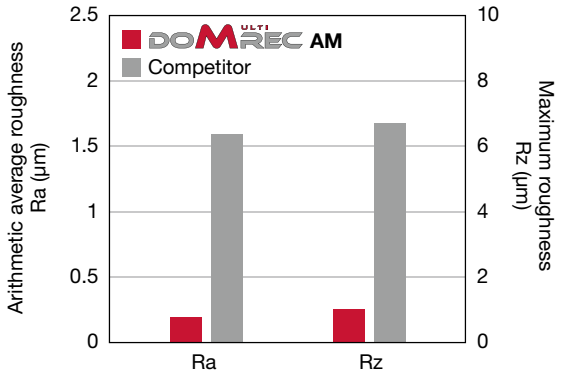


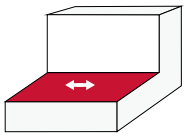
P

Cutter	: EVLX10M020C20.0R02 (DC = 20 mm, CICT = 2)
Insert	: LXMU10T308PER-MM AH3225
Workpiece material	: S55C / C55 (210HB)
Cutting speed	: *Vc* = 140 m/min
Feed per tooth	: *fz* = 0.07 mm/t
Depth of cut	: *ap* = 1 mm
Width of cut	: *ae* = 12.5 mm
Overhang length	: 40 mm
Coolant	: Dry

Better surface quality than competitors.

Insert size 10 | DC = 20 mm





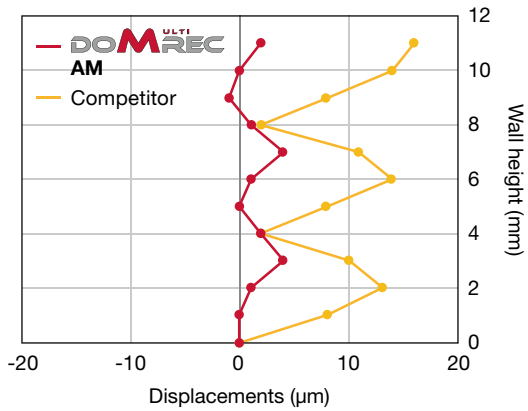
N

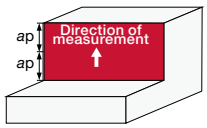
Cutter	: EVLX10M020C20.0R02 (DC = 20 mm, CICT = 2)
Insert	: LXGU10T302PFR-AM KS05F
Workpiece material	: A5052 / AlMg2.5
Cutting speed	: *Vc* = 600 m/min
Feed per tooth	: *fz* = 0.06 mm/t
Depth of cut	: *ap* = 4 mm
Width of cut	: *ae* = 15 mm
Overhang length	: 60 mm
Coolant	: Wet

Better surface quality than the competitor.

Wall accuracy

Insert size 10 | DC = 20 mm





N

Cutter	: EVLX10M020C20.0R02 (DC = 20 mm, CICT = 2)
Insert	: LXGU10T302PFR-AM KS05F
Workpiece material	: A5052 / AlMg2.5
Cutting speed	: *Vc* = 600 m/min
Feed per tooth	: *fz* = 0.06 mm/t
Depth of cut	: *ap* = 4 mm x 3 pass
Width of cut	: *ae* = 5 mm
Overhang length	: 60 mm
Coolant	: Wet

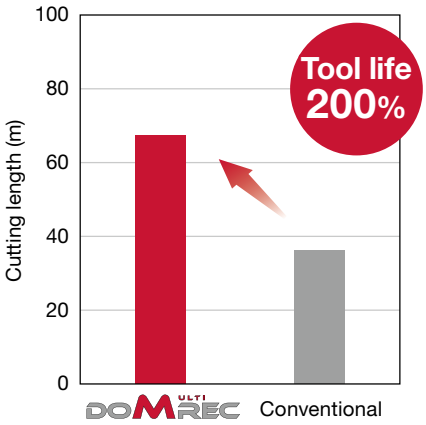
Better wall straightness than the competitor.

Cutting performance

Tool life

P S55C / C55 (195HB)

Insert size 10 | DC = 20 mm



DOMREC

No edge fracture

Conventional

Edge fracture occurred due to low cutting edge strength

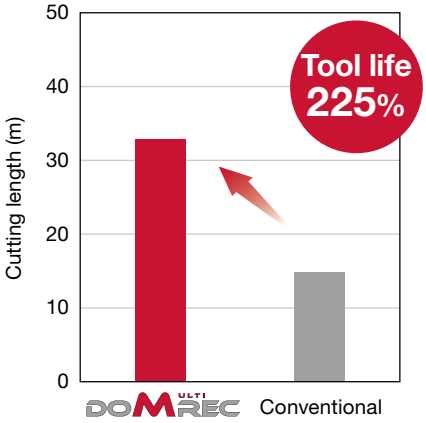
Shoulder milling

Cutter	: EVLX10M020C20.0R02 (DC = 20 mm, CICT = 2)
Insert	: LXMU10T308PER-MM AH3225
Cutting speed	: *Vc* = 150 m/min
Feed per tooth	: *fz* = 0.1 mm/t
Depth of cut	: *ap* = 4 mm
Width of cut	: *ae* = 12.5 mm
Overhang length	: 30 mm
Coolant	: Dry

Strong cutting edge design eliminated edge fracture, providing longer tool life.

P NAK80 (40HRC)

Insert size 08 | DC = 16 mm



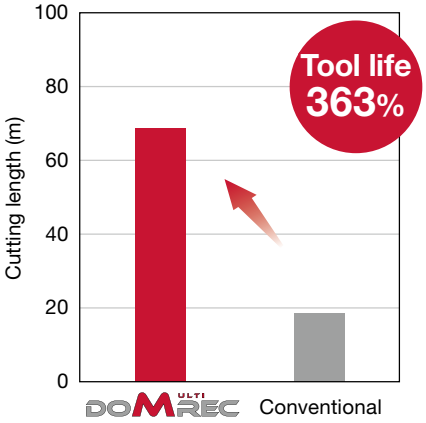
Shoulder milling

Cutter	: EVLX08M016C16.0R02 (DC = 16 mm, CICT = 2)
Insert	: LXMU080304PER-MM AH8015
Cutting speed	: *Vc* = 70 m/min
Feed per tooth	: *fz* = 0.06 mm/t
Depth of cut	: *ap* = 4 mm
Width of cut	: *ae* = 11.2 mm
Overhang length	: 32 mm
Coolant	: Dry

Eliminated edge chipping during machining of extremely hard pre-hardened steel, providing longer tool life.

K FC250 / 250 (162HB)

Insert size 10 | DC = 20 mm



Shoulder milling

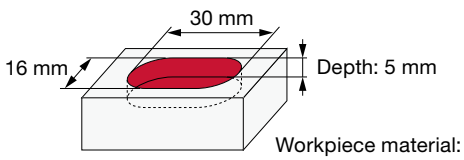
Cutter	: EVLX10M020C20.0R02 (DC = 20 mm, CICT = 2)
Insert	: LXMU10T308PER-MM AH8015
Cutting speed	: *Vc* = 200 m/min
Feed per tooth	: *fz* = 0.12 mm/t
Depth of cut	: *ap* = 7 mm
Width of cut	: *ae* = 12 mm
Overhang length	: 60 mm
Coolant	: Dry

Wear-resistant AH8015 provided long tool life in cast iron.

Practical examples

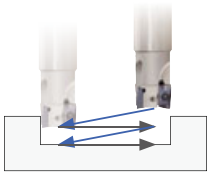
Case 1 Making short closed slots

With the ramping method, the pass depth is minimal due to the short cutting length of the slot and shallow ramp down angle, leading to an increased number of passes.
Use the **drilling + endmilling** method (peck milling method) for increased d.o.c. and reduced number of passes, dramatically improving machining efficiency.



Conventional method (linear ramping)

The pass depth is restricted by short cutting length, increasing the number of passes.



Shoulder milling cutter
DC = 16 mm, CICT = 2

Ramping

Cutting speed	: *Vc* = 150 m/min
Feed per tooth	: *fz* = 0.1 mm/t
Feed speed	: *Vf* = 600 mm/min
Ramping angle	: 3°
Depth of cut	: *ap* = 0.75 mm
Number of passes	: 14 passes

Machining time: 19.6 sec.

High feed milling cutter
DC = 16 mm, CICT = 2

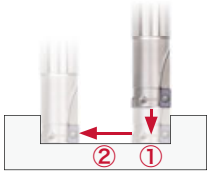
Ramping

Cutting speed	: *Vc* = 150 m/min
Feed per tooth	: *fz* = 0.8 mm/t
Feed speed	: *Vf* = 4800 mm/min
Ramping angle	: 2°
Depth of cut	: *ap* = 0.5 mm
Number of passes	: 20 passes

Machining time: 3.5 sec.

Accelerated solution (drilling + endmilling)

A combination of ① drilling followed by ② endmilling will greatly reduce the number of passes.



DOMULTIREC DC = 16 mm, CICT = 2

①Drilling

Cutting speed	: *Vc* = 150 m/min
Feed	: *f* = 0.1 mm/rev
Feed speed	: *Vf* = 300 mm/min
Machining depth	: 5 mm
Machining time	: 1 sec.

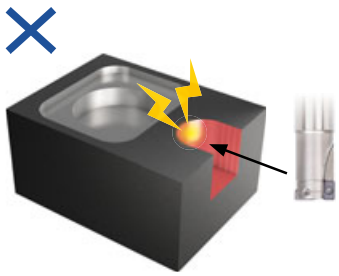
②Endmilling

Cutting speed	: *Vc* = 150 m/min
Feed per tooth	: *fz* = 0.1 mm/t
Feed speed	: *Vf* = 600 mm/min
Depth of cut	: *ap* = 5 mm
Number of passes	: 1 pass
Machining time	: 1.4 sec.

Machining time: 2.4 sec.
(① + ②)

Case 2 Opening a slot with a closed end

Instead of simply endmilling into the side of the material, which often results in chattering at the end, use **drilling + endmilling** method. This eliminates chatter, while providing stability.



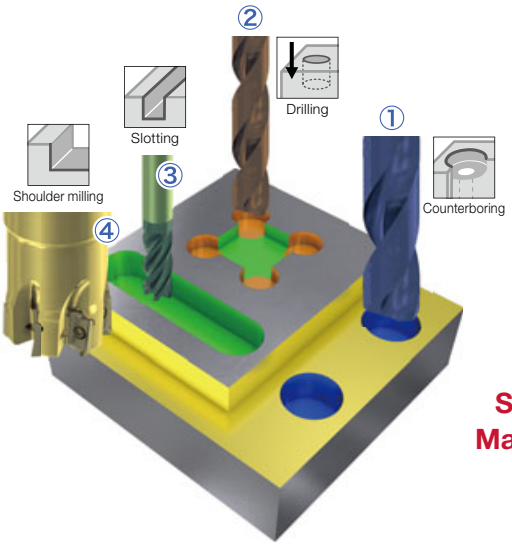
Endmilling into the side of the material often results in chatter at the end of closed slot.

Instead, drill into the material, thus eliminating chatter, then endmill out of the material.

Case 3 Reduced costs by combining multiple processes

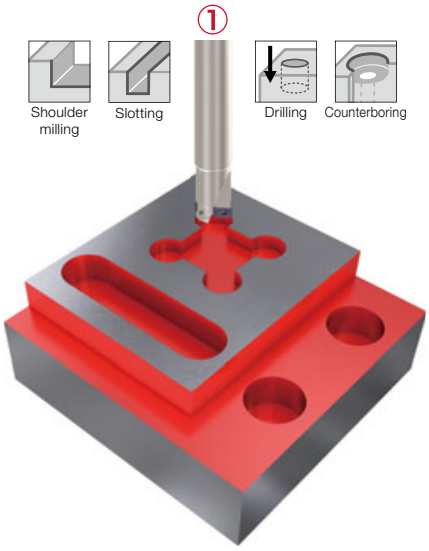
Conventional operations

Requires 4 different tools



DoMultiRec operation

Requires just 1 tool for all four processes

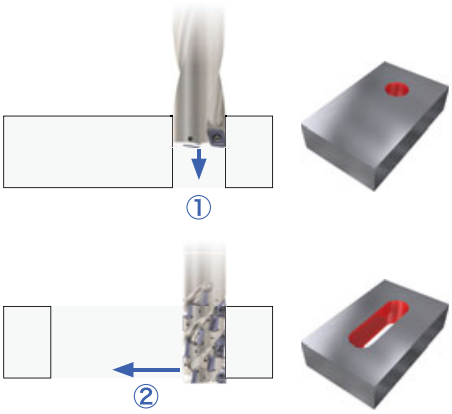


Reduced tool cost,
Simplified processes,
Maximize ATC utilization

Case 4 Improved efficiency due to combining multiple processes

Conventional operations

①Drilling
②Slot opening using roughing cutter



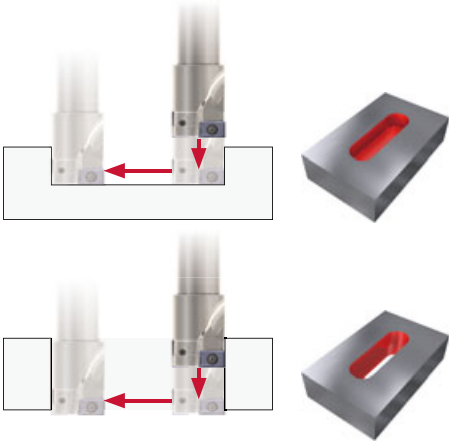
①Indexable drill
DC = 40 mm, CICT = 2
Cutting speed : *Vc* = 100 m/min
Feed per revolution : *f* = 0.1 mm/rev

②Roughing cutter
DC = 32 mm, CICT = 4
Cutting speed : *Vc* = 50 m/min
Feed per tooth : *fz* = 0.06 mm/t

Machining time: 3.2 min.
(①+②)

DoMultiRec operation

Drilling + Endmilling



DC = 40 mm, CICT = 2

Cutting speed : *Vc* = 200 m/min
Feed per tooth : *fz* = 0.08 mm/t

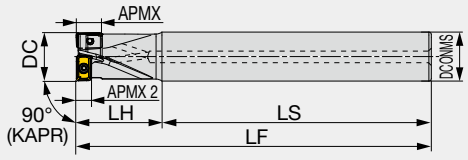
Machining time: 2.2 min.

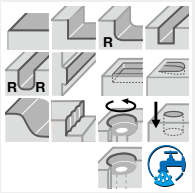
Reduced machining time,
Minimized setup time,
Simplified machine programming

EVLX06/08/10/12/16/19

Multi-functional square shoulder milling cutter,
with screwed-on inserts and center cutting edge

GAMP: Center insert -2.6° ~ -4.4°, Peripheral insert +6.1° ~ +7.1°
GAMF: Center insert +0.2° ~ +1.3°, Peripheral insert -15.7° ~ -15°





Designation	APMX	APMX 2	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EVLX06M012C12.0R02	5	2.8	12	2	12	60	20	80	0.06	With	LXM/GU06...
EVLX06M012C12.0R02L	5	2.8	12	2	12	85	35	120	0.09	With	LXM/GU06...
EVLX06M013C12.0R02L	5	2.8	13	2	12	95	25	120	0.09	With	LXM/GU06...
EVLX08M016C16.0R02	7	4	16	2	16	100	30	130	0.18	With	LXM/GU08...
EVLX08M016C16.0R02L	7	4	16	2	16	130	50	180	0.25	With	LXM/GU08...
EVLX08M017C16.0R02L	7	4	17	2	16	155	25	180	0.26	With	LXM/GU08...
EVLX10M020C20.0R02	9	4	20	2	20	110	35	145	0.31	With	LXM/GU10...
EVLX10M020C20.0R02L	9	4	20	2	20	130	60	190	0.41	With	LXM/GU10...
EVLX10M021C20.0R02L	9	4	21	2	20	160	30	190	0.42	With	LXM/GU10...
EVLX12M025C25.0R02	11	6	25	2	25	105	45	150	0.51	With	LXM/GU12...
EVLX12M025C25.0R02L	11	6	25	2	25	150	75	225	0.77	With	LXM/GU12...
EVLX12M026C25.0R02L	11	6	26	2	25	190	35	225	0.8	With	LXM/GU12...
EVLX16M032C32.0R02	14.5	7	32	2	32	100	50	150	0.83	With	LXM/GU16...
EVLX16M032C32.0R02L	14.5	7	32	2	32	165	90	255	1.45	With	LXM/GU16...
EVLX16M033C32.0R02L	14.5	7	33	2	32	205	50	255	1.5	With	LXM/GU16...
EVLX19M040C32.0R02	18	10	40	2	32	100	55	155	1.03	With	LXM/GU19...
EVLX19M040C32.0R02L	18	10	40	2	32	200	55	255	1.6	With	LXM/GU19...

SPARE PARTS

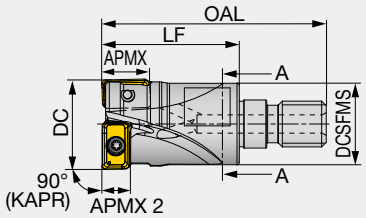

Designation	Clamping screw	Wrench
EVLX06...	CSPB-1.8FL4.3	IP-6DB
EVLX08...	CSPB-2.2	IP-7D
EVLX10...	SR M2.5X0.45-L6 IP7	IP-7D
EVLX12...	TS30100I/HG-P	IP-9D
EVLX16...	CSTB-4L090	T-15D
EVLX19...	CSTB-5	T-20D

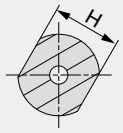
Recommended clamping torque: CSPB-1.8FL4.3 = 0.5 N·m, CSPB-2.2, SR M2.5X0.45-L6 IP7 = 1 N·m, TS30100I/HG-P = 2 N·m, CSTB-4L090 = 3.5 N·m, CSTB-5 = 5 N·m

HVLX06/08/10/12/16-M

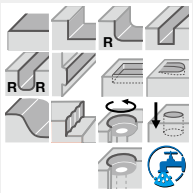
Multi-functional square shoulder modular milling cutter (TungFlex), with screwed-on inserts and center cutting edge

GAMP: Center insert -2.6° ~ -4.4°, Peripheral insert +6.1° ~ +7.1°
GAMF: Center insert +0.2° ~ +1.3°, Peripheral insert -15.7° ~ -15°





A-A cross section



Designation	APMX	APMX 2	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HVLX06M012M06R02	5	2.8	12	2	34.5	20	7	10	M6	0.02	With	LXM/GU06...
HVLX06M013M06R02	5	2.8	13	2	34.5	20	7	10	M6	0.02	With	LXM/GU06...
HVLX08M016M08R02	7	4	16	2	42	25	10	14.5	M8	0.03	With	LXM/GU08...
HVLX08M017M08R02	7	4	17	2	42	25	10	14.5	M8	0.04	With	LXM/GU08...
HVLX10M020M10R02	9	4	20	2	49	30	15	17.8	M10	0.05	With	LXM/GU10...
HVLX10M021M10R02	9	4	21	2	49	30	15	17.8	M10	0.06	With	LXM/GU10...
HVLX12M025M12R02	11	6	25	2	57	35	17	23	M12	0.1	With	LXM/GU12...
HVLX12M026M12R02	11	6	26	2	57	35	17	23	M12	0.1	With	LXM/GU12...
HVLX16M032M16R02	14.5	7	32	2	63	40	22	28.8	M16	0.21	With	LXM/GU16...
HVLX16M033M16R02	14.5	7	33	2	63	40	22	28.8	M16	0.21	With	LXM/GU16...

SPARE PARTS

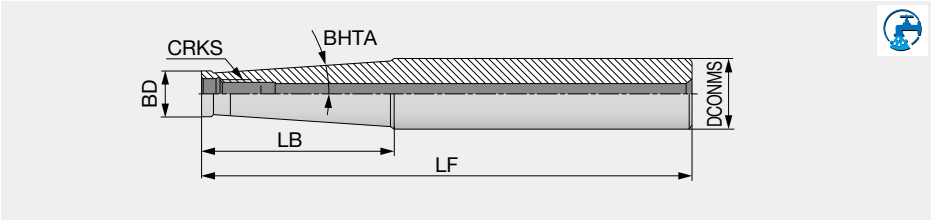

Designation	Clamping screw	Wrench
HVLX06...	CSPB-1.8FL4.3	IP-6DB
HVLX08...	CSPB-2.2	IP-7D
HVLX10...	SR M2.5X0.45-L6 IP7	IP-7D
HVLX12...	TS30100I/HG-P	IP-9D
HVLX16...	CSTB-4L090	T-15D

Recommended clamping torque: CSPB-1.8FL4.3 = 0.5 N·m, CSPB-2.2, SR M2.5X0.45-L6 IP7 = 1 N·m, TS30100I/HG-P = 2 N·m, CSTB-4L090 = 3.5 N·m

TUNGFLEX

SM

Steel modular shank

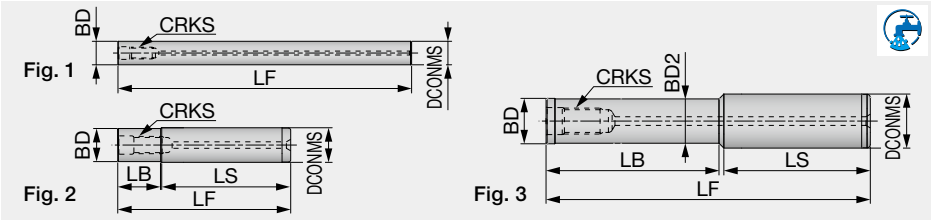


Designation	CRKS	DCONMS	LF	LB	BD	BHTA	Shank type
SM06-L60C10	M6	10	60	20	9.7	0°	Cylindrical
SM06-L105-C12	M6	12	105	60	9.7	1.2°	Cylindrical
SM06-L125-C16	M6	16	125	60	9.7	3.3°	Cylindrical
SM08-L73C16	M8	16	73	25	13	0°	Cylindrical
SM08-L128-C16	M8	16	128	80	13	0.9°	Cylindrical
SM08-L170-C20	M8	20	170	66.8	13	3.3°	Cylindrical
SM10-L80C20	M10	20	80	30	18	0°	Cylindrical
SM10-L130-C20	M10	20	130	80	18	0.6°	Cylindrical
SM10-L200-C25	M10	25	200	57.2	19	3.3°	Cylindrical
SM12-L86-C25	M12	25	86	30	21	5.1°	Cylindrical
SM12-L200-C32	M12	32	200	78	21	4.4°	Cylindrical
SM16-L95-C32	M16	32	95	35	29	1.7°	Cylindrical
SM16-L230-C32	M16	32	230	50	29	1.8°	Cylindrical

TUNGFLEX

SM-C-H

Carbide modular shank

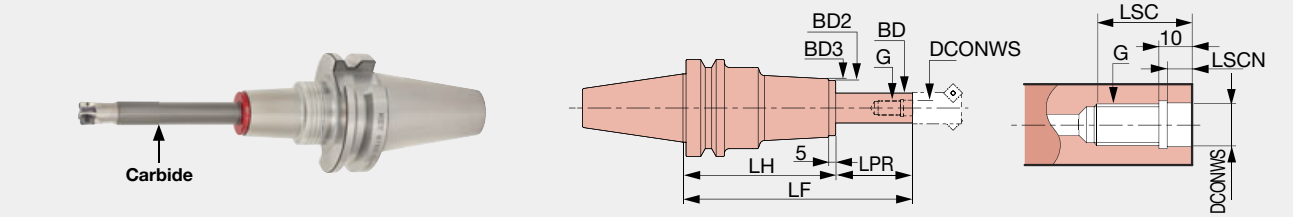


Designation	CRKS	DCONMS	LF	LB	LS	BD	BD2	Fig.
SM06-L100-C10-C-H	M6	10	100	-	-	10	-	1
SM06-L150-C10-C-H	M6	10	150	-	-	10	-	1
SM06-L100-C12-C-H	M6	12	100	-	-	12	-	1
SM06-L150-C12-C-H	M6	12	150	-	-	12	-	1
SM08-L80-20-C16-C-H	M8	16	80	20	59.6	15.3	-	2
SM08-L100-40-C16-C-H	M8	16	100	40	59.6	15.3	-	2
SM08-L150-80-C16-C-H	M8	16	150	80	69.6	15.3	-	2
SM08-L200-100-C16-C-H	M8	16	200	100	98.2	13	12.5	3
SM08-L200-140-C16-C-H	M8	16	200	140	59.6	15.3	-	2
SM08-L250-180-C16-C-H	M8	16	250	180	69.6	15.3	-	2
SM10-L80-20-C20-C-H	M10	20	80	20	59.2	18.5	-	2
SM10-L100-40-C20-C-H	M10	20	100	40	59.2	18.5	-	2
SM10-L150-80-C20-C-H	M10	20	150	80	69.2	18.5	-	2
SM10-L200-100-C20-C-H	M10	20	200	100	99.2	18.5	-	2
SM10-L200-140-C20-C-H	M10	20	200	140	58.7	18	17.5	3
SM10-L200-140-C20-C-H-N	M10	20	200	140	59.2	18.5	-	2
SM10-L250-130-C20-C-H	M10	20	250	130	118.7	18	17.5	3
SM10-L250-180-C20-C-H	M10	20	250	180	68.7	18	17.5	3
SM10-L250-180-C20-C-H-N	M10	20	250	180	69.2	18.5	-	2
SM10-L300-180-C20-C-H	M10	20	300	180	118.7	18	17.5	3
SM10-L300-230-C20-C-H	M10	20	300	230	68.7	18	17.5	3
SM12-L100-40-C25-C-H	M12	25	100	40	59.5	24	-	2
SM12-L150-80-C25-C-H	M12	25	150	80	67.7	21	20.5	3
SM12-L150-80-C25-C-H-N	M12	25	150	80	69.5	24	-	2
SM12-L200-100-C25-C-H	M12	25	200	100	97.7	21	20.5	3
SM12-L200-100-C25-C-H-N	M12	25	200	100	99.5	24	-	2
SM12-L200-140-C25-C-H	M12	25	200	140	57.7	21	20.5	3
SM12-L250-130-C25-C-H	M12	25	250	130	117.7	21	20.5	3
SM12-L250-180-C25-C-H	M12	25	250	180	69.5	24	-	2
SM12-L300-180-C25-C-H	M12	25	300	180	117.7	21	20.5	3
SM12-L300-180-C25-C-H-N	M12	25	300	180	119.5	24	-	2
SM12-L300-230-C25-C-H	M12	25	300	230	67.7	21	20.5	3
SM16-L100-40-C32-C-H	M16	32	100	40	58.5	29	-	2
SM16-L150-80-C32-C-H	M16	32	150	80	68.5	29	-	2
SM16-L200-100-C32-C-H	M16	32	200	100	98.5	29	-	2
SM16-L200-140-C32-C-H	M16	32	200	140	58.5	29	-	2
SM16-L250-130-C32-C-H	M16	32	250	130	118.5	29	-	2
SM16-L250-180-C32-C-H	M16	32	250	180	68.5	29	-	2
SM16-L300-180-C32-C-H	M16	32	300	180	118.5	29	-	2
SM16-L300-230-C32-C-H	M16	32	300	230	68.5	29	-	2
SM16-L350-230-C32-C-H	M16	32	350	230	118.5	29	-	2
SM16-L350-280-C32-C-H	M16	32	350	280	68.5	29	-	2

TUNGFLEX

BT-RSG (Screw clamping head holder)

TungFlex modular tooling system with BT shank



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

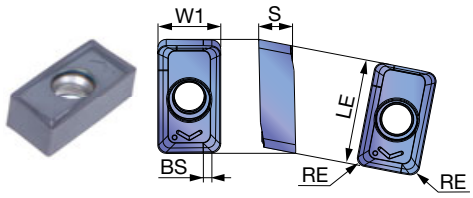
Manufactured by: MST corporation

For more modular products.

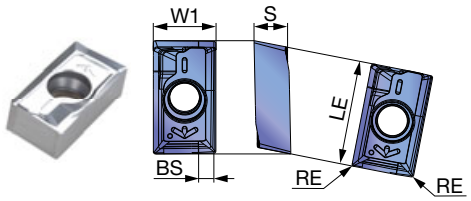
e-catalog

INSERTS

LXMU-MM (for general purpose)



New LXGU-AM (for non-ferrous machining)



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	AH3225	AH120	AH8015	KS05F	LE	W1	S	BS
LXMU060204PER-MM	0.4	5	●		●		6	3.9	2.32	0.6
LXMU080304PER-MM	0.4	7	●	●	●		7.7	5	2.8	0.8
LXMU10T304PER-MM	0.4	9	●		●		10	6	3.2	1.2
LXMU10T308PER-MM	0.8	9	●	●	●		10	6	3.2	0.8
LXMU120404PER-MM	0.4	11	●		●		12.2	7.1	4.2	1.2
LXMU120408PER-MM	0.8	11	●	●	●		12.2	7.1	4.2	0.8
LXMU160504PER-MM	0.4	14.5	●		●		15.7	9.4	5.22	1.6
LXMU160508PER-MM	0.8	14.5	●		●		15.7	9.4	5.27	1.2
LXMU190608PER-MM	0.8	18	●		●		19	12.5	6.82	1.2
New LXGU060202PFR-AM	0.2	5				●	6	3.9	2.3	0.8
New LXGU080302PFR-AM	0.2	7				●	7.7	5	2.8	1
New LXGU10T302PFR-AM	0.2	9				●	10	6	3.2	1.4
New LXGU120402PFR-AM	0.2	11				●	12.2	7.1	4.2	1.4
New LXGU120404PFR-AM	0.4	11				●	12.2	7.1	4.2	1.2
New LXGU160504PFR-AM	0.4	14.5				●	15.7	9.4	5.3	1.6

● : New product
● : Line up

CAUTION WHEN INSTALLING THE INSERTS

Ensure that the insert is not lifted in the seat and there is no gap between the insert and seat.

For more information

Peripheral edge

Center edge

GRADES

AH3225 P M S

- 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

AH120 P K

- PVD grade with a well-balanced wear and fracture resistance
- Ideal for general machining of steel and stainless steel

AH8015 H 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

KS05F N

- Fine-grained cemented carbide grade with high wear resistance
- Extremely sharp edge is suitable for non-ferrous materials

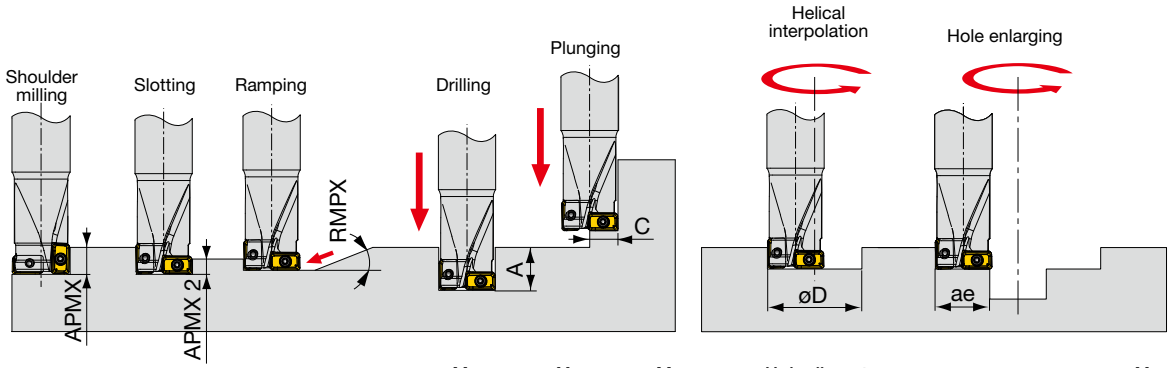
STANDARD CUTTING CONDITIONS

ISO	Workpiece materials		Hardness	Chip-breakers	Grades	Cutting speed *Vc* (m/min)	Drilling (ZEFP = 1)[1] Feed per revolution *f* (mm/rev)	Shouldering / Helical interpolation[1], [2] Feed per tooth *fz* (mm/t) 06	08	10, 12, 16, 19
P	Low carbon steel S15C, SS400, etc. C15E4, E275A, etc.		- 200 HB	MM	AH3225	100 - 300	0.03 - 0.08	0.05 - 0.2	0.05 - 0.25	0.05 - 0.3
	Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.		- 300 HB	MM	AH3225	100 - 250	0.03 - 0.08	0.05 - 0.2	0.05 - 0.25	0.05 - 0.3
	Prehardened steel NAK80, PX5, etc.		30 - 40 HRC	MM	AH3225	80 - 180	0.03 - 0.06	0.05 - 0.15	0.05 - 0.2	0.05 - 0.25
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.		-	MM	AH3225	80 - 180	0.03 - 0.08	0.05 - 0.15	0.05 - 0.2	0.05 - 0.22
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.		150 - 250 HB	MM	AH8015	100 - 300	0.03 - 0.1	0.05 - 0.2	0.05 - 0.25	0.05 - 0.3
	Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc.		150 - 250 HB	MM	AH8015	100 - 250	0.03 - 0.08	0.05 - 0.15	0.05 - 0.2	0.05 - 0.25
N	Aluminium alloy Si < 13%		-	AM	KS05F	400 - 800	0.03 - 0.08	0.05 - 0.2	0.05 - 0.25	0.05 - 0.3
	Aluminium alloy Si ≥ 13%		-	AM	KS05F	100 - 200	0.03 - 0.08	0.05 - 0.2	0.05 - 0.25	0.05 - 0.3
S	Titanium alloys Ti-6Al-4V, etc.		-	MM	AH3225	20 - 60	0.03 - 0.06	0.04 - 0.1	0.04 - 0.15	0.04 - 0.15
	Superalloys Inconel 718, etc.		-	MM	AH8015	20 - 40	0.03 - 0.06	0.04 - 0.1	0.04 - 0.15	0.04 - 0.15
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	MM	AH8015	50 - 150	0.03 - 0.05	0.04 - 0.1	0.04 - 0.15	0.04 - 0.15
		SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	MM	AH8015	40 - 70	0.03 - 0.05	0.04 - 0.1	0.04 - 0.15	0.04 - 0.15

(1) In the following cases, feed as if the cutter has a single effective cutting edge (ZEFP = 1):
- Hole making
- Helical interpolating for holes with a hole diameter (øD) ≤ 1.25x the tool diameter (DC)
- The axial D.O.C. exceeds APMX2 (See page 17 for APMX2)

(2) The tool is prone to vibration when the tool overhang exceeds 3.5xD and cause poor part quality. Make sure to use the axial cutting depth (*ap*) that do not exceed the value indicated in the APMX2 column. Also reduce the cutting speed and feed rate to 50% of the recommended speed.
(See page 17 for APMX2)

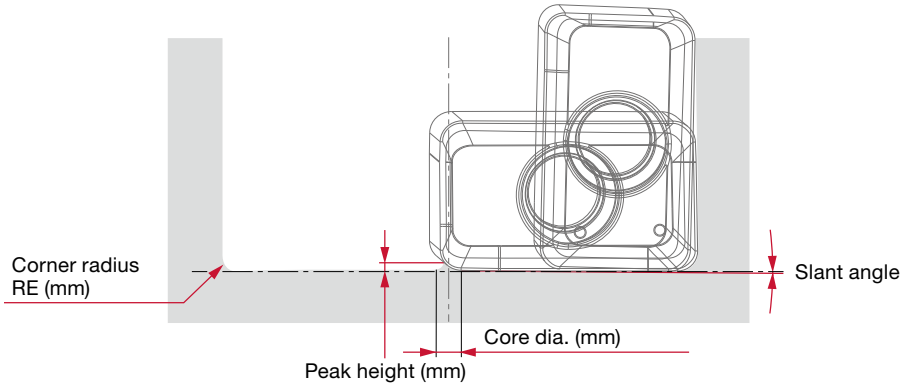
APPLICATION RANGE



Designation	DC	Max. depth of cut APMX	Max. depth of cut APMX 2	Max. drilling depth* A	Max. cutting width in plunging C	Max. ramping angle RMPX	Hole diameters (w/ flat bottom) machinable øDmin	Hole diameters (w/ flat bottom) machinable øDmax	Hole diameters machinable øDmin	Hole diameters machinable øDmax	Max. cutting width engagement *ae*
E/HVLX06M012…	12	5	2.8	6	6	90°	13	22.75	12	23.75	10
EVLX06M013…	13	5	2.8	6	6.5	90°	15	24.75	13	25.75	11
E/HVLX08M016…	16	7	4	12	8	90°	17	30.75	16	31.75	14
EVLX08M017…	17	7	4	12	8.5	90°	19	32.75	17	33.75	15
E/HVLX10M020...	20	9	4	15	10	90°	22	37.95	20	39.15	18
EVLX10M021…	21	9	4	15	10.5	90°	23.35	39.95	21	40.95	19
E/HVLX12M025...	25	11	6	18.5	12.5	90°	26.65	47.85	25	48.95	23
EVLX12M026…	26	11	6	18.5	13	90°	28.65	49.85	26	50.95	24
E/HVLX16M032...	32	14.5	7	16	16	90°	33.65	61.85	32	62.95	30
EVLX16M033…	33	14.5	7	16	16.5	90°	35.65	63.85	33	64.95	31
EVLX19M040...	40	18	10	20	20	90°	42.55	77.85	40	78.95	38

*** Note when drilling:**
The maximum drilling length possible without using the peck drilling method is 5 mm. For longer drilling lengths (> 5 mm), always use the peck drilling method or dwell the drill. This is especially important when working with low carbon steel, stainless steel, aluminium alloys, or other gummy metals.
Additionally, always use internal air or cutting fluid to thoroughly remove chips from the hole.

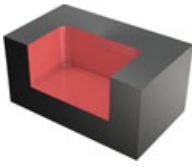
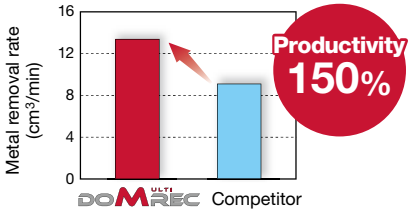
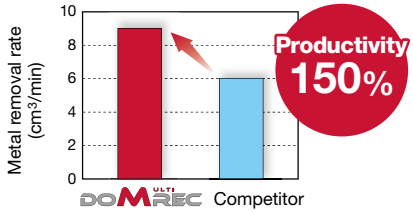
HOLE BOTTOM PROFILE AFTER DRILLING

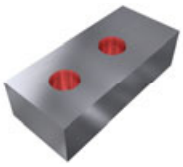
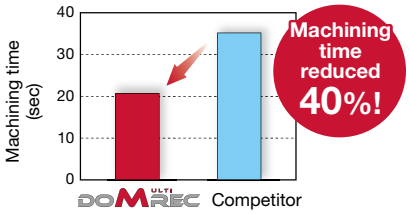
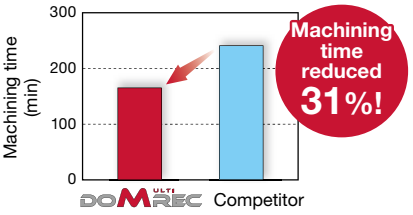


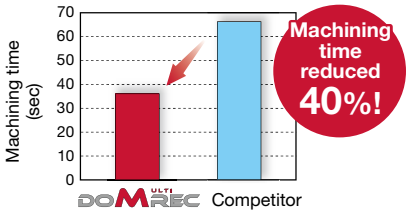
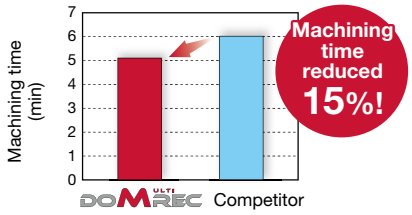
Insert size	6		8		10			12			16		19
Tool dia.	D12, D13		D16, D17		D20, D21			D25, D26			D32, D33		D40
RE (mm)	0.2	0.4	0.2	0.4	0.2	0.4	0.8	0.2	0.4	0.8	0.4	0.8	0.8
Peak height (mm)	0.98		1.21		1.95		1.95	1.66		1.66	1.21	1.21	2.39
Core dia. (mm)	1.34		1.9		1.22		2.02	1.59		2.36	1.35	2.11	2.28
Slant angle	Conical shape with ≈ 0.3° slant angle												

Note: The above values may differ depending on the cutting conditions.

PRACTICAL EXAMPLES

Workpiece type	Machine part	Machine part
Cutter	EVLX12M026C25.0R02L (DC = 26 mm, CICT = 2)	EVLX12M026C25.0R02L (DC = 26 mm, CICT = 2)
Insert	LXMU120408PER-MM	LXMU120408PER-MM
Grade	AH3225	AH3225
Workpiece material	Cast stainless steel	SCM420 / 18CrMo4
	Insert size 12  M	Insert size 12  P
Cutting conditions: Machining	Counterboring, Slotting	Shoulder milling
Cutting conditions: Cutting speed: *Vc* (m/min)	60	118
Cutting conditions: Feed per tooth: *fz* (mm/t)	0.07	0.31
Cutting conditions: Feed speed: *Vf* (mm/min)	102.8	900
Cutting conditions: Depth of cut : *ap* (mm)	5	2
Cutting conditions: Width of cut : *ae* (mm)	26	5
Cutting conditions: Coolant	External	Air blast
Cutting conditions: Overhang length (mm)	40	100
Cutting conditions: Machine	Vertical M/C, BT40	Vertical M/C, BT50
Results	 **DoMultiRec** generated soft cutting, while eliminating chatter and cutting edge fracture. 1.5 times productivity was achieved.	 Thanks to strong cutting edges, **DoMultiRec** enabled higher feed rate than the competitor without causing chipping on the cutting edge. 1.5 times productivity was achieved.

Workpiece type	Machine part		Cylinder liner	
Cutter	EVLX06M012C12.0R02L (DC = 12 mm, CICT = 2)		EVLX19M040C32.0R02L (DC = 40 mm, CICT = 2)	
Insert	LXMU060204PER-MM		LXMU190608PER-MM	
Grade	AH3225		AH8015	
Workpiece material	S45C / C45		FC250 / 250	
	Insert size 06  P		Insert size 19  K	
Cutting conditions: Machining	Drilling	Hole enlarging	Drilling	Shoulder milling
Cutting conditions: Cutting speed: *Vc* (m/min)	98	98	80	80
Cutting conditions: Feed per revolution: *f* (mm/rev)	0.06	-	0.08	-
Cutting conditions: Feed per tooth: *fz* (mm/t)	-	0.1	-	0.15
Cutting conditions: Depth of cut : *ap* (mm)	3	3	10	10
Cutting conditions: Width of cut : *ae* (mm)	-	2.5	-	40
Cutting conditions: Coolant	Wet		Dry	
Cutting conditions: Overhang length (mm)	50		100	
Cutting conditions: Machine	Horizontal M/C, BT40		Horizontal M/C, BT50	
Results	 **DoMultiRec** enabled a single tool to perform multiple operations, significantly reducing tool cost. Increased cutting data achieved 40% machining time reduction.		 **DoMultiRec** enabled a single tool to perform multiple operations, significantly reducing tool cost. Increased cutting data achieved 31% machining time reduction.	

Workpiece type		Vacuum pump component				Marine machinery component
Cutter		EVLX10M021C20.0R02L (DC = 21 mm, CICT = 2)				HVLX10M020M10R02 (DC = 20 mm, CICT = 2)
Insert		LXGU10T302PFR-AM				LXGU10T302PFR-AM
Grade		KS05F				KS05F
Workpiece material		A5052 / AlMg2.5				A5056 / AlMg5
		Insert size 10  N				Insert size 10  N
Cutting conditions	Machining	Helical interpolation	Drilling	Pocketing	Shoulder milling	Face milling
	Cutting speed: *Vc* (m/min)	628	189	189	189	189
	Feed per tooth: *fz* (mm/t)	0.1	0.07	0.06	0.08	0.17
	Depth of cut : *ap* (mm)	2	4.5	4.5	8.5	1
	Width of cut : *ae* (mm)	20	20	14	5	20
	Coolant	Wet	Wet			
	Machine	Horizontal M/C, BT30	Vertical M/C, BT40			
Results		 Having combined drilling and end milling processes into a single operation, **DoMultiRec** provided reduced tooling cost per part. The combined processes also allowed 40% reduction of machining time.				 Having combined multiple processes to a single operation, **DoMultiRec** provided reduced tooling cost per part. The combined processes also allowed 15% reduction of machining time.	

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