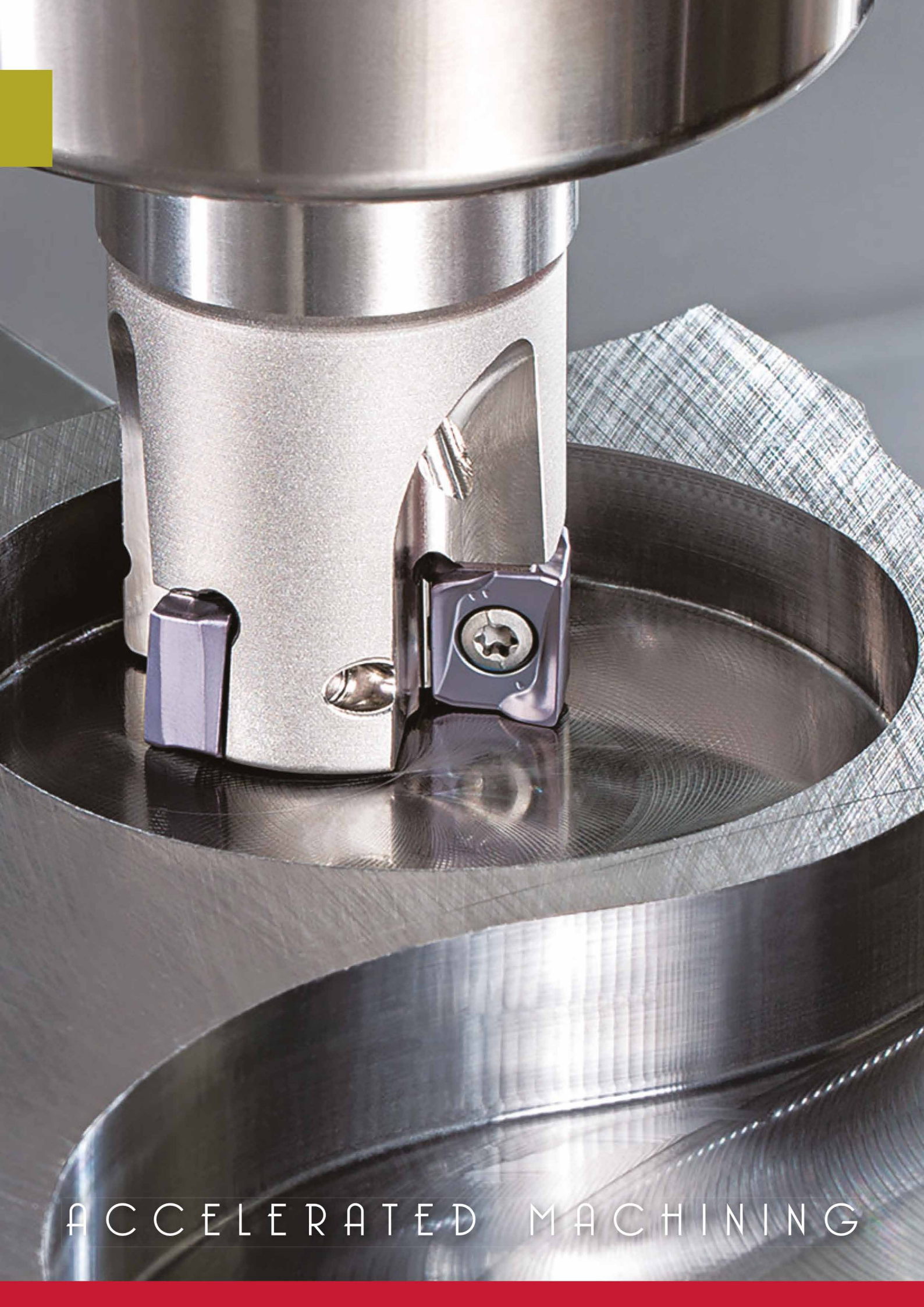


Strong, Free-cutting Edges **Guarantee Maximum Machining Efficiency and Stability**



INDUSTRY 4.0
FEED the SPEED!



ACCELERATED MACHINING



Optimized cutting edge integrity for **maximum productivity and tool reliability**

Inserts for Best Economy and Efficiency!

Broad range of economical inserts



■ Superior cutting edge integrity



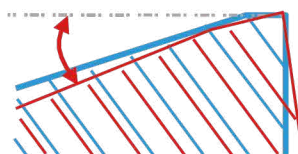
Common negative insert for shoulder milling



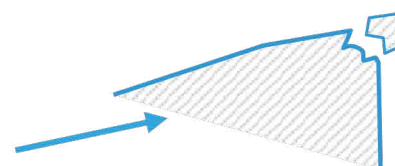
DOREC

Obtuse cutting edge

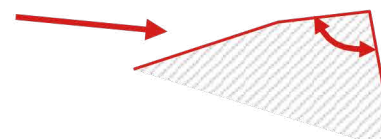
— **DOREC**
— Common insert profile



Higher rake angle!



Where negative inserts fail ...



Obtuse cutting edge does not fracture!

■ Higher feed-per-tooth capability

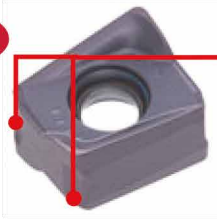
Feed per tooth: f_z (mm/t)

	0.1	0.15	0.2	0.25	0.3	0.35	0.4
Competitor	◎	◎	◎	x : Tool damage			
DOREC	◎	◎	◎	◎	◎	○	○

Cutter : TPQ11R050M22.0-06 (DC = 50 mm, z = 6)
 Insert : LQMU110708PXER-MJ AH3135
 Grade : AH3135
 Material : S55C (200HB)
 Cutting Speed : 200 m/min
Cutting depth : 4 mm
 Cutting width : 42.5 mm
 Coolant : Dry
 Machine : Vertical M/C, 22 kW

Optimized insert geometry

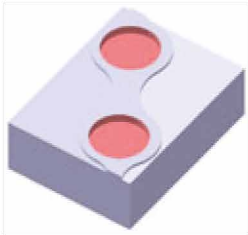
New



Unique clearance design enables
3D milling

■ Better machining efficiency by high-feed circular ramping

Comparison of M.R.R.

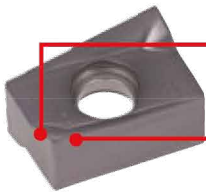


Circular ramping
Material: S55C / C55 (200HB)
Machine: Ver MC, BT50



Cutting conditions	DOREC	Competitor
Cutter	EPQ11R032M32.0-03 (DC = 32 mm, z = 3)	DC = 32 mm, z = 3
Insert	LQMU110708PXER-MJ AH3135	2-edged inserts P30 equivalent
Cutting speed: Vc (m/min)	200	
Depth of cut: ap (mm)	2 (pitch of a helix)	
Feed per tooth: fz (mm/t)	0.4	0.2
Metal removal rate: Q (cc/min)	152.8	76.4
Width of cut: ae (mm)	ø62 mm, Hole making	

Universal insert geometry for superior surface finish



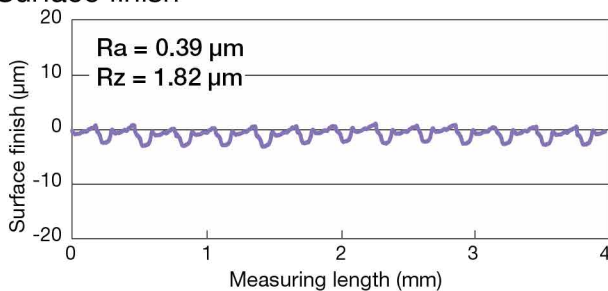
Wiper edge for high surface finish quality

Free cutting geometry

■ Free-cutting geometry and superior surface finish

Provides free cutting as positive inserts and wiper effect

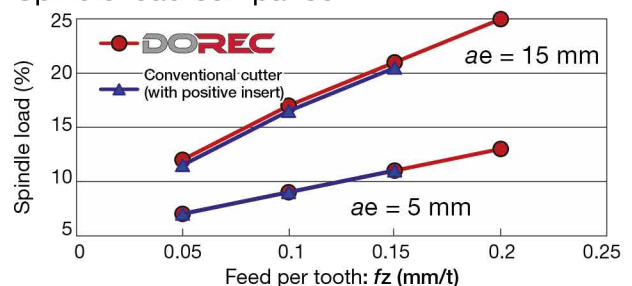
Surface finish



► Superior surface finish quality achieved by economical inserts!

Cutter : TPQ18R050M22.0E03
(DC = 50 mm, z = 3)
Insert : LQMU1808008PNER-MJ
Grade : AH725
Workpiece material : S55C / C55 (200HB)
Cutting speed : Vc = 150 m/min
Feed per tooth : fz = 0.1 mm/t
Depth of cut : ap = 10 mm
Width of cut : ae = 50 mm
Coolant : Wet
Machine : Vertical M/C, BT50

Spindle load comparison

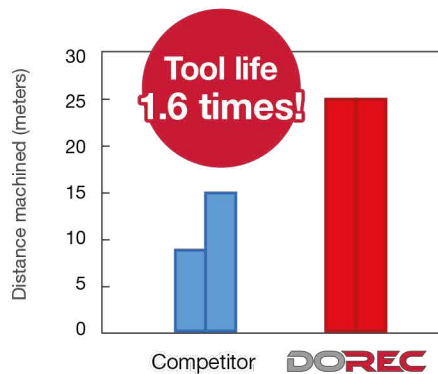


► Similar load levels as a conventional tool!

Cutter : EPQ18R040M32.0W03
(DC = 40 mm, z = 3)
Insert : LQMU1808008PNER-MJ
Workpiece material : S55C / C55 (200HB)
Cutting speed : Vc = 150 m/min
Depth of cut : ap = 16 mm
Coolant : Wet
Machine : Vertical M/C, BT50

CUTTING PERFORMANCE

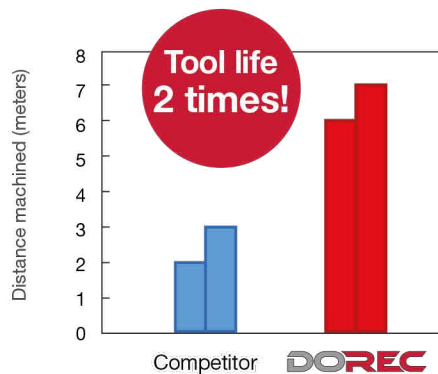
Tool life comparison: steel machining



Cutter : TPQ11R050M22.0-06 (DC = 50 mm, z = 6)
 Insert : LQMU110708PXER-MJ
 Grade : AH3135
 Workpiece material : S55C (200HB)
 Cutting speed : $V_c = 150$ m/min
 Feed per tooth : $f_z = 0.2$ mm/t
 Cutting depth : $a_p = 5.0$ mm
 Cutting width : $a_e = 30$ mm
 Coolant : Dry
 Number of inserts : 1 insert
 Machine : Vertical M/C, 22 kW

A combination of strong cutting edge geometry and high wear resistant AH3135, treated by PremiumTec, yielded longer tool life and superior machining stability over the competitor's.

Tool life comparison: stainless steel machining



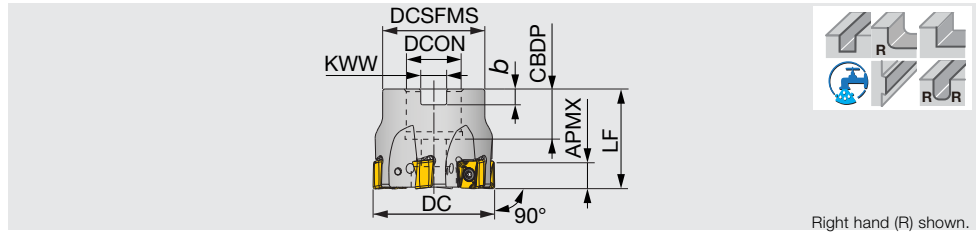
Cutter : TPQ11R050M22.0-06 (DC = 50 mm, z = 6)
 Insert : LQMU110708PXER-MJ
 Grade : AH3135
 Workpiece material : SUS304 (180HB)
 Cutting speed : $V_c = 150$ m/min
 Feed per tooth : $f_z = 0.2$ mm/t
 Cutting depth : $a_p = 5.0$ mm
 Cutting width : $a_e = 30$ mm
 Coolant : Dry
 Number of inserts : 1 insert
 Machine : Vertical M/C, 22 kW

Free cutting action with reduced built-up edge and thermal cracks. Superior cutting edge integrity eliminated notch wear, delivering more stable and longer tool life over the competitor's.

TPQ11,18

Square shoulder milling cutter, bore type, with rectangular double-sided LQMU inserts

A.R. = +4° ~ +5°, R.R. = +13° ~ +15°



Right hand (R) shown.

Designation	APMX	DC	z	DCSFMS	LF	DCON	CB DP	KWW	b	Kg	Air hole	Insert
TPQ11R040M16.0E04	9	40	4	35	40	16	20	8.4	5.6	0.2	with	LQMU1107...
TPQ11R050M22.0E06	9	50	6	41	40	22	20	10.4	6.3	0.4	with	LQMU1107...
TPQ11R063M22.0E07	9	63	7	47	40	22	20	10.4	6.3	0.5	with	LQMU1107...
TPQ11R080M25.4-10	9	80	10	55	50	25.4	26	9.5	6	1.1	with	LQMU1107...
TPQ11R080M27.0E10	9	80	10	58	50	27	26	12.4	7	1	with	LQMU1107...
TPQ11R100M31.7-12	9	100	12	66	50	31.75	32	12.95	8	1.6	with	LQMU1107...
TPQ11R100M32.0E12	9	100	12	66	50	32	32	14.4	8	1.6	with	LQMU1107...
TPQ18R050M22.0E03	16	50	3	47	40	22	20	10.4	6.3	0.4	with	LQMU1808...
TPQ18R063M25.4-04	16	63	4	55	50	25.4	26	9.5	6	0.7	with	LQMU1808...
TPQ18R063M27.0E04	16	63	4	58	50	27	26	12.4	7	0.5	with	LQMU1808...
TPQ18R080M25.4-05	16	80	5	55	50	25.4	26	9.5	6	0.9	with	LQMU1808...
TPQ18R080M27.0E05	16	80	5	58	50	27	26	12.4	7	0.9	with	LQMU1808...
TPQ18R100M31.7-06	16	100	6	70	50	31.75	32	12.95	8	1.4	with	LQMU1808...
TPQ18R100M32.0E06	16	100	6	66	50	32	32	14.4	8	1.4	with	LQMU1808...
TPQ18R125M38.1-08	16	125	8	80	63	38.1	38	15.9	10	2.9	with	LQMU1808...
TPQ18R125M40.0E08	16	125	8	82	63	40	38	16.4	9	2.9	with	LQMU1808...
TPQ18R160M50.8-09	16	160	9	100	63	50.8	38	19	11	4.1	without	LQMU1808...
TPQ18R160M40.0E09	16	160	9	100	63	40	38	16.4	9	4.1	without	LQMU1808...

SPARE PARTS

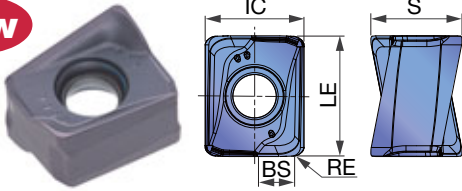


Designation	Clamping screw	Grip	Grip 1	Torx bit	Center bolt
TPQ11R040M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM8x30H
TPQ11R050M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM10x30H
TPQ11R063M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM10x30H
TPQ11R080M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM12x30H
TPQ11R100M...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	TMBA-M16H
TPQ18R050M...	SR14-591	-	H-TB	BT20M	CM10x30H
TPQ18R063M...	SR14-591	-	H-TB	BT20M	CM12x30H
TPQ18R080M...	SR14-591	-	H-TB	BT20M	CM12x30H
TPQ18R100M...	SR14-591	-	H-TB	BT20M	TMBA-M16H
TPQ18R125M...	SR14-591	-	H-TB	BT20M	TMBA-M20H
TPQ18R160M...	SR14-591	-	H-TB	BT20M	-

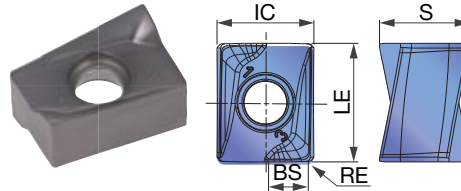
INSERTS

LQMU11-PXER-MJ

New



LQMU11/18-PNER-MJ



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated								LE	S	IC	BS	Cutter	
			AH120	AH140	AH725	AH3135										
LQMU110704PNER-MJ	0.4	9	●	●	●							11	8.3	9	1.5	EPQ11R, TPQ11R
LQMU110708PNER-MJ	0.8	9	●	●	●							11	8.3	9	1.1	EPQ11R, TPQ11R
LQMU110708PXER-MJ	0.8	9	●			●						11	8.3	9	1.1	EPQ11R, TPQ11R
LQMU110716PNER-MJ	1.6	9	●	●	●							11	8.3	9	0.3	EPQ11R, TPQ11R
LQMU110720PNER-MJ	2	9	●									11	8.3	9	-	EPQ11R, TPQ11R
LQMU180804PNER-MJ	0.4	16	●	●	●							17.5	10.9	11.5	2.0	EPQ18R, TPQ18R
LQMU180808PNER-MJ	0.8	16	●	●	●							17.5	10.9	11.5	1.6	EPQ18R, TPQ18R
LQMU180816PNER-MJ	1.6	16	●	●	●							17.5	10.9	11.5	0.8	EPQ18R, TPQ18R
LQMU180824PNER-MJ	2.4	16	●	●	●							17.5	10.9	11.5	-	EPQ18R, TPQ18R

●: Line up

STANDARD CUTTING CONDITIONS

LQMU11-PXER-MJ

ISO	Workpiece material	Hardness	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steel S15C, etc. C15E, etc.	- 200HB	AH3135	100 - 250	0.1 - 0.25 [*]
	Alloy steel S55C, etc. C55, etc.	- 300HB	AH3135	100 - 230	0.1 - 0.2 [*]
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	AH3135	100 - 230	0.1 - 0.2 [*]
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	AH3135	90 - 180	0.1 - 0.25 [*]
K	Grey cast iron FC250, etc. 250, etc.	150 - 250HB	AH120	140 - 250	0.1 - 0.25 [*]
	Ductile cast iron FCD400, etc. 450-10S, etc.	150 - 250HB	AH120	110 - 200	0.1 - 0.25 [*]
S	Titanium alloys Ti-6Al-4V, etc.	-	AH120	30 - 60	0.08 - 0.2 [*]
	Superalloys Inconel 718, etc.	-	AH120	20 - 50	0.06 - 0.1 [*]
H	Hardened steel	SKD61, etc.	AH120	45 - 70	0.08 - 0.15 [*]
		SKD11, etc.	AH120	40 - 65	0.06 - 0.1 [*]

LQMU11/18-PNER-MJ

ISO	Workpiece material	Hardness HB	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steel S15C, etc. C15E, etc.	- 200	AH725	100 - 250	0.1 - 0.25 [*]
	High carbon steel S45C, S55C, etc. C45, C55, etc.	200 - 300	AH725	100 - 230	0.1 - 0.2 [*]
	Alloy steel SCM440, SCR415, etc. 42CrMo4, etc.	150 - 300	AH725	100 - 230	0.1 - 0.2 [*]
	Tool steel D2, etc. X153CrMoV12, etc.	- 300	AH725	100 - 180	0.1 - 0.2 [*]
M	Stainless steel SUS304, etc. X5CrNi18-9, etc.	-	AH140	90 - 180	0.1 - 0.25 [*]
K	Grey cast iron FC250, etc. 250, etc.	150 - 250	AH120	140 - 250	0.1 - 0.25 [*]
	Ductile cast iron FCD400, etc. 450-10S, etc.	150 - 250	AH120	110 - 200	0.1 - 0.25 [*]
S	Superalloys Inconel 718, Ti-6Al-4V, etc.	-	AH725	20 - 50	0.08 - 0.2 [*]

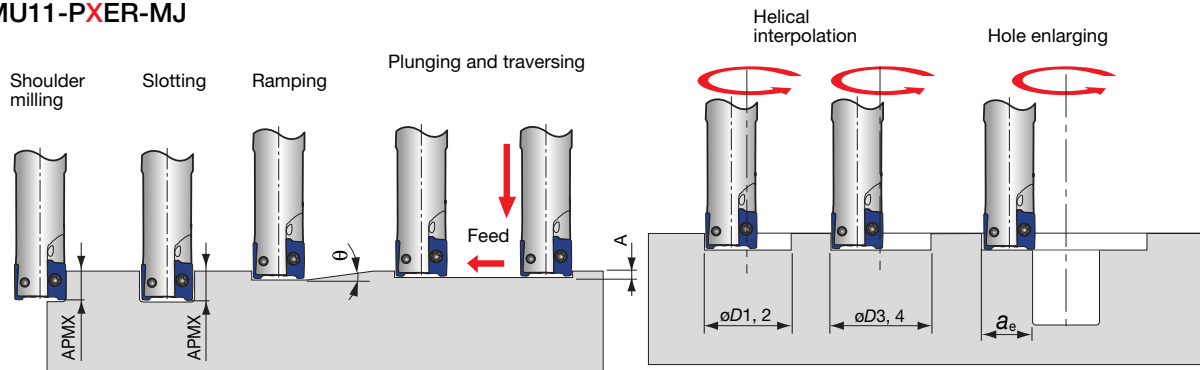
* When using LQMU11 inserts, see page 13 for proper feed per tooth setting.

· For applications with poor chip evacuation, use air gun to remove chips from the machining area to avoid chip re-cutting and part damage.

· To machine cast surface with unstable cutting depths or interruptions, it is recommended to lower the feed rate (fz) to the lowest parameter in the recommended range.

· Rigidity of the machine and/or workpiece and the spindle power capability greatly influence the cutting conditions. For applications with large cutting width/depth and/or long tool overhang, start with a Vc and fz in the lower range of the recommended cutting parameters and monitor the machine stability.

APPLICATION RANGE

New LQMU11-PXER-MJ

Designation	DC	Max. depth of cut APMX	Max. ramping angle θ	Max. plunging A	Min. machining $\phi D1$	Max. machining			RE	Max. cutting width in enlarging ae
EPQ11R025...	25	9	1.8°	0.6	35	$\phi D2^*$ 46.8	$\phi D3$ 49	$\phi D4^*$ 48.5	0.8	24.1
EPQ11R032...	32	9	1.3°	0.6	48	60.8	63	62.5	0.8	31.1
TPQ11R040...	40	9	0.9°	0.6	64	76.8	79	78.5	0.8	39.1
TPQ11R050...	50	9	0.7°	0.6	84	96.8	99	98.5	0.8	49.1
TPQ11R063...	63	9	0.5°	0.6	110	122.8	125	124.5	0.8	62.1
TPQ11R080...	80	9	0.4°	0.6	144	156.8	159	158.5	0.8	79.1
TPQ11R100...	100	9	0.3°	0.6	184	196.8	199	198.5	0.8	99.1

*For a flat bottom

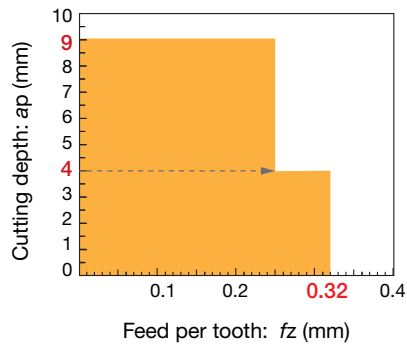
NOTE WHEN USING LQMU11 INSERTS

Maximum feed rate per tooth varies depending on the cutting depth and width.

Use proper feed rate as described below.

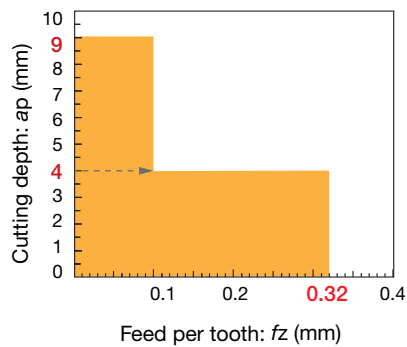
Use caution. Tool may damage if the parameters are not properly set.

Applicable feed rate (for $ae < 10\%$ of tool diameter)



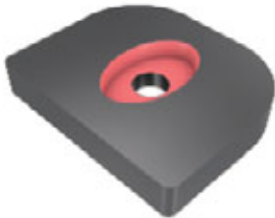
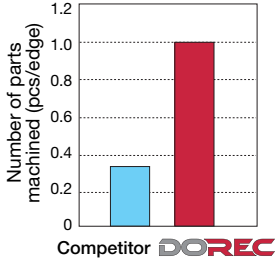
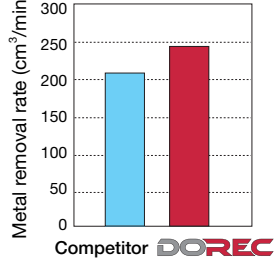
Cutter : TPQ11R050M22.0-06 (DC = 50 mm, z = 6)
 Insert : LQMU110708PXER-MJ
 Grade : AH3135
 Workpiece material : S55C (200HB)
 Cutting Speed : $V_c = 200$ m/min
 Cutting width : $ae = 5$ mm
 Coolant : Dry
 Machine : Vertical M/C, 22 kW

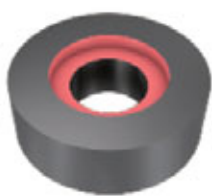
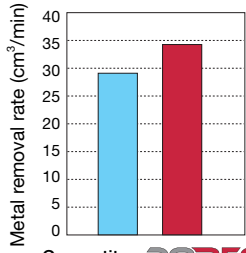
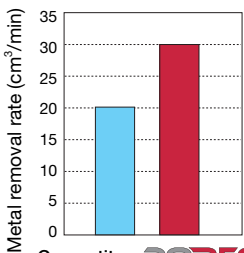
Applicable feed rate (for $ae > 10\%$ of tool diameter)

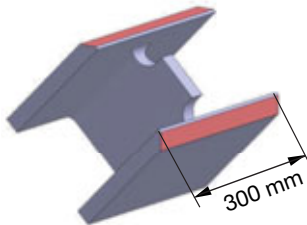
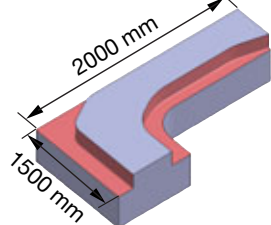
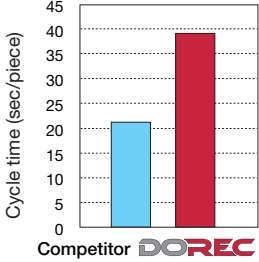
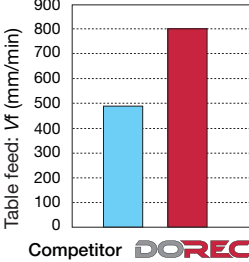


Cutter : TPQ11R050M22.0-06 (DC = 50 mm, z = 6)
 Insert : LQMU110708PXER-MJ
 Grade : AH3125
 Workpiece material : S55C (200HB)
 Cutting Speed : $V_c = 200$ m/min
 Cutting width : $ae = 42.5$ mm
 Coolant : Dry
 Machine : Vertical M/C, 22 kW

PRACTICAL EXAMPLES

Workpiece type		Flange sheet	Machine parts
Milling cutter		TPQ11R080M27.0E10 ($\phi 80$, $z = 10$)	TPQ11R050M22.0E06 ($\phi 50$, $z = 6$)
Insert		LQMU110708PXER-MJ	LQMU110708PXER-MJ
Grade		AH3135	AH3135
Workpiece material		Martensitic stainless steel	S55C / C55
			
Cutting conditions	Cutting speed: V_c (m/min)	180	180
	Feed per tooth: f_z (mm/t)	0.15	0.15
	Feed speed: V_f (mm/min)	1074	1035
	Depth of cut: ap (mm)	1.0 (at 1.0 mm helix pitch)	9 (competitor's $ap = 8$)
	Width of cut: ae (mm)	50	26
	Application	Hole enlargement by helical interpolation	Shoulder milling
	Coolant	Dry	External supply
	Machine	Vertical M/C, BT50	Vertical M/C, BT50
Results		 Strong cutting edge Tool life 3 times! Competitor DOREC Competitor's positive round inserts repetitively fractured. DoRec insert's multifunctional geometry provided stable machining thanks to its strong cutting edge geometry.	 Free cutting action Improved productivity 1.1 times! Competitor DOREC Overloaded cutting force and vibration were causing the competitor's inserts unpredictable tool life. DoRec insert's multifunctional geometry is optimized for chatter stability, ensuring reliable machining.

Workpiece type		Base plate	Eccentric countersink
Milling cutter		TPQ11R040M16.0E04 (ø40, z = 4)	EPQ11R032M32.0-03 (ø32, z = 3)
Insert		LQMU110708PXER-MJ	LQMU110708PXER-MJ
Grade		AH120	AH3135
Workpiece material		SS400 / E275A	SUS304
		 P	 M
Cutting conditions	Cutting speed: V_c (m/min)	176	150
	Feed per tooth: f_z (mm/t)	0.15 (Competitor: $f_z = 0.12$)	0.45 (Competitor: $f_z = 0.3$)
	Feed speed: V_f (mm/min)	860 (Competitor: $V_f = 720$)	2000 (Competitor: $V_f = 1350$)
	Depth of cut: a_p (mm)	4 (0.38°ramp approach)	1.0 (at 1.0 mm helix pitch)
	Width of cut: a_e (mm)	10	15
	Application	Hole enlargement, helical interpolation	Hole enlargement, helical interpolation
	Coolant	External supply	External supply
Machine		Vertical M/C, BT50	Vertical M/C, BT40
Results		 Superior cutting edge integrity Productivity up 120%! Competitor DOREC Competitor's inserts fractured at high feed rates. DoRec inserts enabled stable machining at higher feed rates thanks to its unique insert geometry.	 Free-cutting action and superior edge integrity Productivity up 150%! Competitor DOREC Competitor's inserts fractured at high feed rates, and repetitive notch wears shortened the tool life. DoRec inserts enabled stable machining at higher feed rates thanks to its superior cutting edge integrity, extending tool life 1.3x .

Workpiece type		Machine part	Press mold
Milling cutter		EPQ11R032M32.0-03	TPQ18R080M25.4-05
Insert		LQMU110708PNER-MJ	LQMU180816PNER-MJ
Grade		AH725	AH120
Workpiece material		SS400 / E275A (150HB)	FC250 / GG25 / 250 (180HB)
			
Cutting conditions	Cutting speed: V_c (m/min)	200	200
	Feed per tooth: f_z (mm/t)	0.2	0.2
	Feed speed: V_f (mm/min)	1194	800
	Depth of cut: a_p (mm)	8	12
	Width of cut: a_e (mm)	4	20 - 60
	Application	Side milling	Shoulder milling
	Coolant	Dry	Dry
	Machine	Vertical M/C, BT50	Vertical M/C, BT50
Results		 Superior cutting edge integrity Improved productivity 1.8 times! Competitor DOREC Competitor's inserts repeatedly fractured. DoRec inserts enabled machining at higher feed rates thanks to its superior edge integrity.	 Superior cutting edge integrity Productivity up 160%! Competitor DOREC Superior edge integrity enabled machining at higher feed rates, improving cycle time.



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