KORLOY TECH-NEWS

We Create Your Tomorrow!

No : 174-1

New

40th Anniversary of KORLOY

Indexable endmill for finest surface finishing

Laser Mill Series

Features

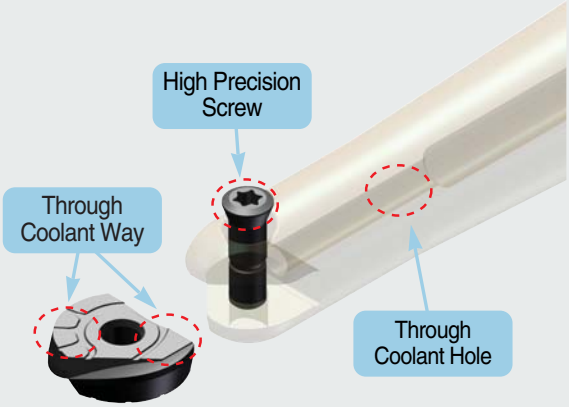
- Indexable endmill for fine finishing of mould
- Long tool life has been achieved due to the excellent cutting performance of the grade
- Optimum machining of mould has been achieved due to the MQL available system
- Easy clamping with simple screw on system
- Variety of holder line up : Steel shank, Carbide shank, Modular type

KORLOY Inc.

Indexable endmill for finest surface finishing

Laser Mill

Features

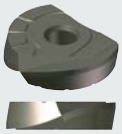


- High tolerance insert
  - Run-out of cutting edge : under 0.02mm
  - Radius form accuracy : under 0.01mm
- Through coolant system

LBE : 3 in 1 System

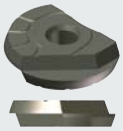
- Three type of insert is available with one holder
- Single screw for clamping of insert - Easy clamping system
- Variety type of holder (Steel shank, Carbide shank, Modular type)
- MQL applicable - Suitable for longer tool life & improved surface quality

LBH



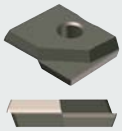
- Helical cutting edge
- Suitable for high-feed condition & hard workpiece
- MQL applicable

LBS



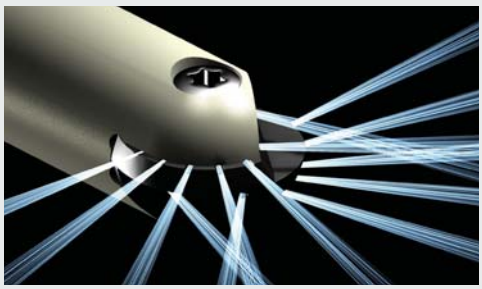
- Straight cutting edge
- Suitable for precise carving
- MQL applicable

LR



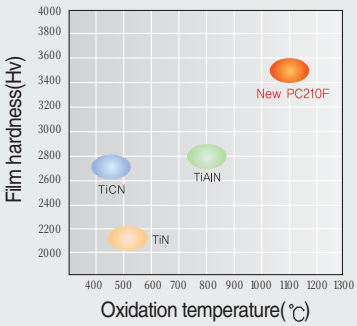
- Straight cutting edge
- Variety of nose-R
- Plan to apply MQL system

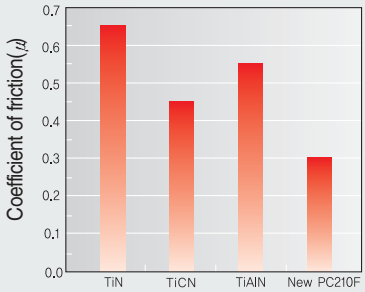
Advantages of MQL system (Minimum quantity lubricant)



- Environmental friendly system
- Decrease coolant cost
- Lubrication of cutting edge
- Improved chip control property (Injection of coolant directly to the cutting edge)
- Increased tool life & improved surface quality

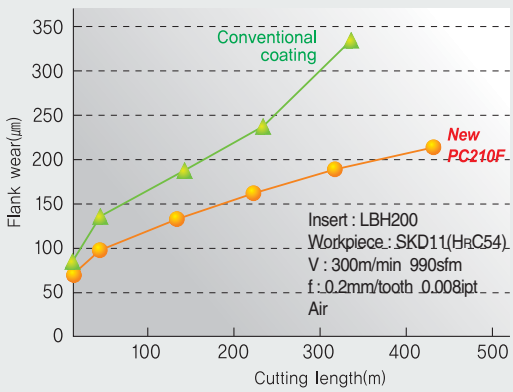
Features of grade



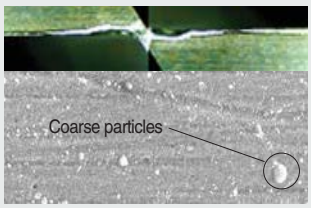


- New PC210F for hardened steel
  - Due to the ultra fine carbide, toughness of cutting edge has been increased
  - Special coating film has been applied for high-speed machining & hardened workpiece
  - High quality of machined surface due to the excellent lubrication property of the film

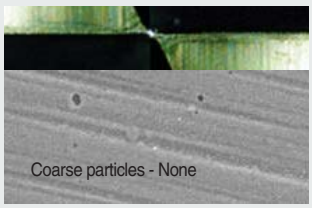
Cutting performance of PC210F



- Conventional coating



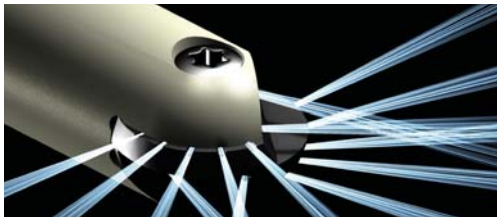
- NEW PC210F



Tool life has been increased over twice due to the improved surface roughness (rare coarse particles)

Indexable endmill for finest surface finishing

Laser Mill



Laser Mill code system

Insert

LBH200

- **Code for insert**: LBS (Straight), LBH (Helical), LR (Corner Radius)
- **Cutting diameter (Ø)**: Ø08, Ø10, Ø12, Ø16, Ø20, Ø25, Ø30, Ø32

Modular head

LBE200-MHD-M10

- **Code for shank**: LBS, LBH, LR Available for all 3 insert
- **Diameter (Ø)**: Ø20
- **Modular Head Adapter**
- **Diameter of thread part**

General shank

LBE200170S-S20-C

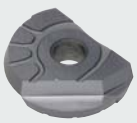
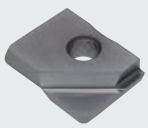
- **Code for shank**: LBS (Straight), LBH (Helical), LR (Corner Radius)
- **Cutting diameter (Ø)**: Ø08, Ø10, Ø12, Ø16, Ø20, Ø25, Ø30, Ø32
- **Shank length**
- **Neck type**: T : Taper, S : Straight
- **Shank Diameter (Ø)**
- **Shank material**: None : Steel, C : Carbide

Modular adapter

MAT-M10-110-S25T-C

- **Modular Adapter**
- **Diameter of thread part**
- **Shank length**
- **Shank Diameter (Ø)**
- **Neck type**: T : Taper, S : Straight
- **Shank material**: None : Steel, C : Carbide

Parts for each insert

Insert			Parts	
				
LBH	**LBS**	**LR**	**Screw**	**Wrench**
LBH080	LBS080	-	ETND02506F	TWP07S
LBH100	LBS100	LBS100-R□□	ETND0307F	TWP08S
LBH120	LBS120	LBS120-R□□	ETND03509	TWP10S
LBH160	LBS160	LBS160-R□□	ETND0413	TWP15S
LBH200	LBS200	LBS200-R□□	ETKD0516	TWP20
LBH250	LBS250	LBS250-R□□	ETKD0620	TWP25
LBH300	LBS300	LBS300-R□□	ETGD0825	TWP40
LBH320	LBS320	LBS320-R□□	ETGD0825	TWP40

Indexable endmill for finest surface finishing

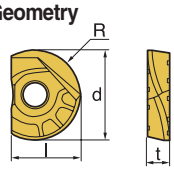
Laser Mill

LBH INSERT

■ USE

■ Recommended range

■ Geometry



"R" accuracy ±0.005mm

Available holder	Designation	Grade			Dimensions(mm)			
		PC210F			R	d	l	t
LBE	LBH080	●			4	8	7	2.4
	LBH100	●			5	10	8.5	2.6
	LBH120	●			6	12	10	3
	LBH160	●			8	16	12	4
	LBH200	●			10	20	15	5
	LBH250	●			12.5	25	18.5	6
	LBH300	●			15	30	22.5	7
	LBH320	●			16	32	23.5	7

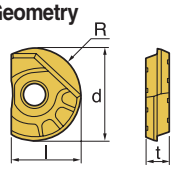
● Stock item ○ Under preparing for stock

LBS INSERT

■ USE

■ Recommended range

■ Geometry



"R" accuracy ±0.005mm

Available holder	Designation	Grade			Dimensions(mm)			
		PC210F			R	d	l	t
LBE	LBS080	○			4	8	7	2.4
	LBS100	○			5	10	8.5	2.6
	LBS120	○			6	12	10	3
	LBS160	○			8	16	12	4
	LBS200	○			10	20	15	5
	LBS250	○			12.5	25	18.5	6
	LBS300	○			15	30	22.5	7
	LBS320	○			16	32	23.5	7

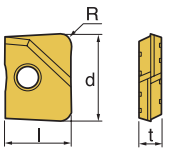
● Stock item ○ Under preparing for stock

LR INSERT

■ USE

■ Recommended range

■ Geometry



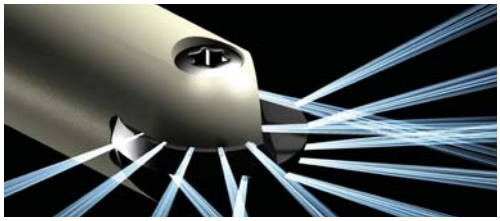
"R" accuracy ±0.005mm

Available holder	Designation	Grade			Dimensions(mm)			
		PC210F			R	d	l	t
LBE	LR100-R05	●			0.5	10	8.5	2.6
	LR100-R10	●			1.0			
	LR100-R20	●			2.0			
	LR120-R05	●			0.5	12	10	3
	LR120-R10	●			1.0			
	LR120-R20	●			2.0			
	LR160-R05	●			0.5	16	12	4
	LR160-R10	●			1.0			
	LR160-R20	●			2.0			
	LR160-R30	●			3.0			
	LR200-R05	●			0.5	20	15	5
	LR200-R10	●			1.0			
	LR200-R20	●			2.0			
	LR200-R30	●			3.0			
	LR250-R10	●			1.0	25	18.5	6
	LR250-R20	●			2.0			
	LR250-R30	●			3.0			
	LR300-R10	●			1.0	30	22.5	7
	LR300-R20	●			2.0			
	LR300-R30	●			3.0			
	LR320-R10	●			1.0	32	23.5	7
	LR320-R20	●			2.0			
	LR320-R30	●			3.0			

● Stock item ○ Under preparing for stock

Indexable endmill for finest surface finishing

Laser Mill



Steel Shank

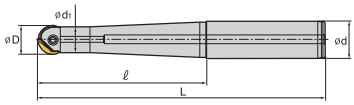


Fig. 1

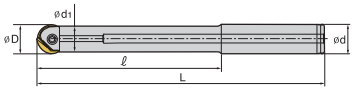
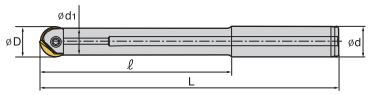


Fig. 2

Designation	Stock	Fig	Dimensions(mm)					Parts		Insert
			ØD	ℓ	L	Ød1	Ød	Clamp screw	Wrench	Size(Ø)
LBE080035T-S12	●	1	8	35	91	7.2	12	ETND02506F	TWP07S	8
LBE080055T-S12	●	1	8	55	111	7.2	12			
LBE080075T-S12	●	1	8	75	131	7.2	12			
LBE100035T-S12	●	1	10	35	91	9	12	ETND0307F	TWP08S	10
LBE100055T-S12	●	1	10	55	111	9	12			
LBE100075T-S12	●	1	10	75	131	9	12			
LBE120035S-S12	●	2	12	35	91	10.4	12	ETND03509	TWP10S	12
LBE120055T-S12	●	1	12	55	111	10.4	12			
LBE120085T-S16	●	1	12	85	145	10.4	16			
LBE160035S-S16	●	2	16	35	95	14	16	ETND0413	TWP15S	16
LBE160065T-S16	●	1	16	65	125	14	16			
LBE160100T-S20	●	1	16	100	170	14	20			
LBE200040S-S20	●	2	20	40	110	17.5	20	ETKD0516	TWP20	20
LBE200075T-S20	●	1	20	75	145	17.5	20			
LBE200115T-S25	●	1	20	115	195	17.5	25			
LBE250045S-S25	●	2	25	45	125	22	25	ETKD0620	TWP25	25
LBE250090T-S25	●	1	25	90	170	22	25			
LBE250135T-S32	●	1	25	135	225	22	32			
LBE300055S-S32	●	2	30	55	145	27	32	ETGD0825	TWP40	30
LBE300105T-S32	●	1	30	105	195	27	32			
LBE300160T-S32	●	1	30	160	250	27	32			
LBE320055S-S32	●	2	32	55	145	29	32	ETGD0825	TWP40	32
LBE320105T-S32	●	1	32	105	195	29	32			
LBE320160T-S32	●	1	32	160	250	29	32			

● Stock item ○ Under preparing for stock

Carbide Shank



Designation	Stock	Dimensions(mm)					Parts		Insert
		ØD	ℓ	L	Ød1	Ød	Clamp screw	Wrench	Size(Ø)
LBE080080S-S08C	○	8	80	136	7.2	8	ETND02506F	TWP07S	8
LBE080100S-S08C	○	8	100	156	7.2	8			
LBE100080S-S10C	○	10	80	136	9	10	ETND0307F	TWP08S	10
LBE100120S-S10C	●	10	120	176	9	10			
LBE120100S-S12C	○	12	100	156	10.4	12	ETND03509	TWP10S	12
LBE120150S-S12C	●	12	150	206	10.4	12			
LBE160100S-S16C	○	16	100	160	14	16	ETND0413	TWP15S	16
LBE160150S-S16C	●	16	150	210	14	16			
LBE200120S-S20C	●	20	120	190	17.5	20	ETKD0516	TWP20	20
LBE200170S-S20C	●	20	170	240	17.5	20			
LBE250140S-S25C	○	25	140	220	22	25	ETKD0620	TWP25	25
LBE250170S-S25C	●	25	170	250	22	25			
LBE300140S-S32C	○	30	140	230	27	32	ETGD0825	TWP40	30
LBE300170S-S32C	●	30	170	260	27	32			
LBE320140S-S32C	○	32	140	230	29	32	ETGD0825	TWP40	32
LBE320170S-S32C	●	32	170	260	29	32			

● Stock item ○ Under preparing for stock

Indexable endmill for finest surface finishing

Laser Mill

Modular Adapter

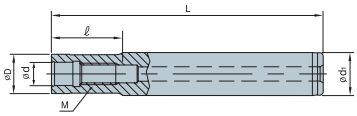


Fig 1. Straight Neck Adapter

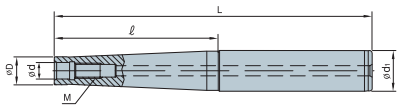
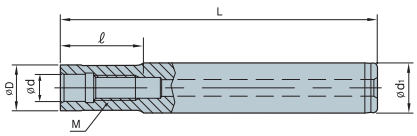


Fig 2. Taper Neck Adapter

Designation		Stock	Fig	Dimensions(mm)					
				M	ØD	Ød1	Ød2	ℓ	L
MAT	M06-020-S10S	●	1	M6	9.5	6.5	10	20	70
	M06-040-S12T	●	2	M6	9.5	6.5	12	40	96
	M06-065-S16T	●	2	M6	9.5	6.5	16	65	125
	M6B-020-S12S	●	1	M6	11	6.5	12	20	76
	M6B-040-S12S	●	1	M6	11	6.5	12	40	96
	M6B-065-S16T	●	2	M6	11	6.5	16	65	125
	M6B-080-S16T	●	2	M6	11	6.5	16	80	160
	M08-020-S16S	●	1	M8	14.5	8.5	16	20	80
	M08-040-S16T	●	2	M8	14.5	8.5	16	40	100
	M08-065-S16T	●	2	M8	14.5	8.5	16	65	125
	M08-080-S20T	●	2	M8	14.5	8.5	20	80	150
	M08-110-S25T	●	2	M8	14.5	8.5	25	110	190
	M10-030-S20S	●	1	M10	18	10.5	20	30	100
	M10-050-S20T	●	2	M10	18	10.5	20	50	120
	M10-070-S20T	●	2	M10	18	10.5	20	70	140
	M10-090-S25T	●	2	M10	18	10.5	25	90	170
	M10-110-S25T	●	2	M10	18	10.5	25	110	190
	M10-130-S32T	●	2	M10	18	10.5	32	130	220
	M12-030-S25S	●	1	M12	22.5	12.5	25	30	110
	M12-050-S25T	●	2	M12	22.5	12.5	25	50	130
	M12-070-S25T	●	2	M12	22.5	12.5	25	70	150
	M12-090-S25T	●	2	M12	22.5	12.5	25	90	170
	M12-110-S32T	●	2	M12	22.5	12.5	32	110	200
	M12-175-S40T	●	2	M12	22.5	12.5	40	175	300
	M16-035-S32S	●	1	M16	28.5	17	32	35	125
	M16-055-S32T	●	2	M16	28.5	17	32	55	145
	M16-080-S32T	●	2	M16	28.5	17	32	80	170
	M16-120-S32T	●	2	M16	28.5	17	32	120	210
	M16-175-S40T	●	2	M16	28.5	17	40	175	300

● Stock item ○ Under preparing for stock

Carbide Modular Adapter

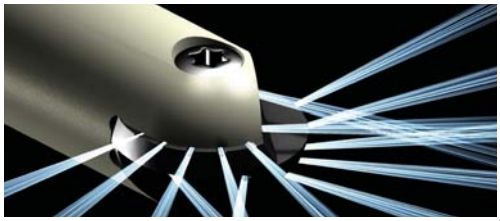


Designation		Stock	Dimensions(mm)					
			M	ØD	Ød	Ød1	ℓ	L
MAT	M08-080-S16S-C	○	M08	14.5	8.5	16	80	150
	M08-110-S16S-C	○	M08	14.5	8.5	16	110	180
	M08-150-S16S-C	○	M08	14.5	8.5	16	150	250
	M10-090-S20S-C	○	M10	18	10.5	20	90	170
	M10-110-S20S-C	○	M10	18	10.5	20	110	200
	M10-175-S20S-C	○	M10	18	10.5	20	175	300
	M12-090-S25S-C	○	M12	22.5	12.5	25	90	170
	M12-110-S25S-C	○	M12	22.5	12.5	25	110	200
	M12-175-S25S-C	○	M12	22.5	12.5	25	175	300
	M16-080-S32S-C	○	M16	28.5	17	32	90	180
	M16-120-S32S-C	○	M16	28.5	17	32	120	210
	M16-175-S32S-C	○	M16	28.5	17	32	175	300

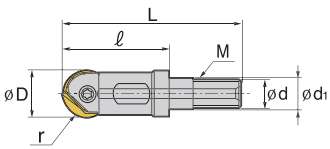
● Stock item ○ Under preparing for stock

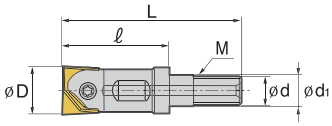
Indexable endmill for finest surface finishing

Laser Mill



Modular Head





Designation	Stock	Dimensions(mm)							Parts		Insert
		M	ØD	r	L	ℓ	Ød	Ød1	Clamp screw	Wrench	Size(Ø)
LBE100-MHD-M06	●	M06	10	5	40	25	6.5	9.5	ETND0307F	TWP08S	10
LBE120-MHD-M06	●	M06	12	6	40	25	6.5	11	ETND03509	TWP10S	12
LBE160-MHD-M08	●	M08	16	8	47	30	8.5	14.5	ETND0413	TWP15S	16
LBE200-MHD-M10	●	M10	20	10	56	35	10.5	18	ETKD0516	TWP20	20
LBE250-MHD-M12	●	M12	25	12.5	69	45	12.5	22.5	ETKD0620	TWP25	25
LBE300-MHD-M16	●	M16	30	15	77	50	17	28	ETGD0825	TWP40	30
LBE320-MHD-M16	●	M16	32	16	77	50	17	29	ETGD0825	TWP40	32

● Stock item ○ Under preparing for stock

Important cutting formulas

Cutting speed

$$V = \frac{\pi \times D \times N}{1000} \text{ (m/min)}$$

RPM

$$N = \frac{V \times 1000}{\pi \times D} \text{ (rpm)}$$

Feed per tooth

$$fz = \frac{F}{N \times Z} \text{ (mm/tooth)}$$

Feed per minute

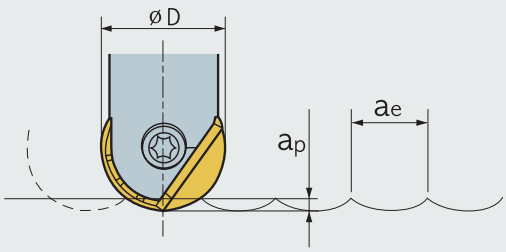
$$F = fz \times N \times Z \text{ (mm/min)}$$

Chip removal amount

$$Q = \frac{ap \times ae \times F}{1000} \text{ (cm}^3\text{/min)}$$

Power requirement

$$W = \frac{Q \times Ks}{1000} \text{ (kW)} \quad H = \frac{W}{0.75} \text{ (HP)}$$



V = Cutting speed(m/min)
D = Cutting diameter(mm)
F = Feed per minute(mm/min)
fz = Feed per tooth(mm/tooth)
Z = Number of tooth
W = Power requirement(kw)
H = Horsepower requirement(HP)
Q = Chip removal amount(cm³/min)
ap = Axial depth of cut(mm)
ae = Radial depth of cut(mm)
Ks = Specific cutting resistance(kg/mm²)
η = Mechanical efficiency(%)

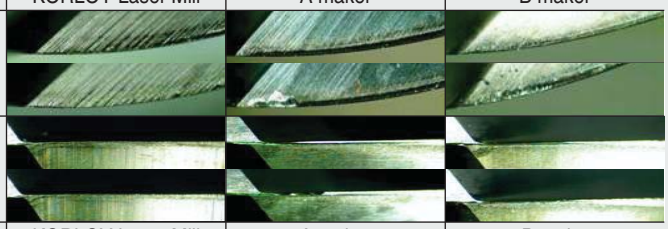
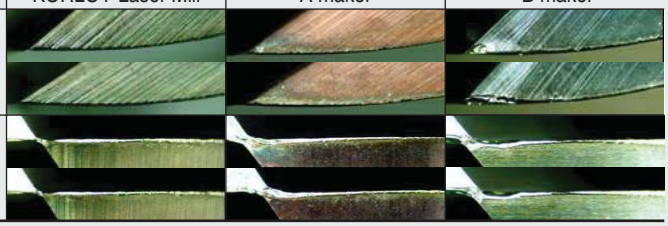
Recommended cutting condition

Workpiece	Hardness (HRC)	Cutting speed V(m/min) (sfm)	Feed rate fz(mm/tooth) (ipt)	Diameter (mm)								ap (mm)	ae (mm)
				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø30	Ø32		
				N	N	N	N	N	N	N	N		
Carbon steel, Alloy steel	under 30	100~200 330~660	0.2~0.25 0.008~0.010	6370	5090	4240	3200	2550	2050	1700	1700	D/10	D/10
Carbon steel, Alloy steel	30~40	80~150 260~490	0.2~025 0.008~0.010	4770	3820	3180	2400	1910	1530	1280	1280	D/15	D/15
Mold steel	30~40	70~100 230~330	0.1~0.15 0.004~0.006	3180	2550	2120	1600	1280	1020	850	850	D/15	D/15
Cast iron(FC, FCD)	20~30	100~200 330~660	0.3~0.35 0.012~0.014	6370	5090	4240	3200	2550	2050	1700	1700	D/10	D/10
Heat-treated alloy	55~65	200~250 660~820	0.2~0.3 0.008~0.012	9150	7320	6100	4575	3660	2930	2440	2440	D/30	D/30

Indexable endmill for finest surface finishing

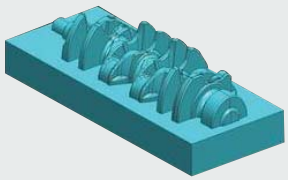
Laser Mill

Wear resistance test

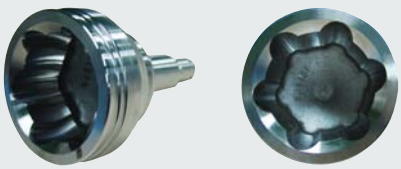
Cutting Condition		Workpiece		
		KORLOY Laser Mill	A maker	B maker
Cutting time : 7hours	SCM440(HRC30), Air V = 458m/min, 1510sfm fz = 0.25mm/tooth, 0.010ipt ap = 1.5mm 0.06inch ae = 1.0mm 0.04inch F(mm/min)=3650 N(rpm) = 7300	Front, back view Top view		
Cutting time : 6hours	SKD11(HRC50), Air V = 376m/min, 1240sfm fz = 0.25mm/tooth, 0.010ipt ap = 2.0mm 0.08inch ae = 2.0mm 0.08inch F(mm/min)=3000 N(rpm) = 6000	KORLOY Laser Mill	A maker	B maker
		Front, back view Top view		

Application examples

Crank shaft (Workpiece : SCM440, HRC 40, MQL)

	Specifications				Workpiece
Holder	LBE200115T-S25				
Insert	LBH200 (PC210F)				
Cutting condition	V	fz	ap	ae	
	200m/min 660sfm	0.25mm/tooth 0.01ipt	0.5mm 0.02inch	0.2mm 0.008inch	

CV-Joint (Workpiece : S53C, HRC35, Air)

	Specifications			Workpiece
Holder	LBE200115T-S25			
Insert	LBH200 (PC210F)			
Cutting condition	V	fz	ap	
	200m/min 660sfm	0.15mm/tooth 0.006ipt	1.0mm 0.04inch	

Safety note

1) Insert should be correctly clamped in seat part of cutter
2) In case of noise from chattering, reduce L (overhang length) or decrease feed rate, spindle speed and axial depth of cut
3) Reduce spindle speed or axial depth of cut when the power of machine is not powerful enough
4) Use coolant or air for smooth chip removal and long tool life
5) Reduce axial depth of cut, spindle speed and feed approx.30~50% of recommendation in machining of high hardness material (HRC50~60)

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