

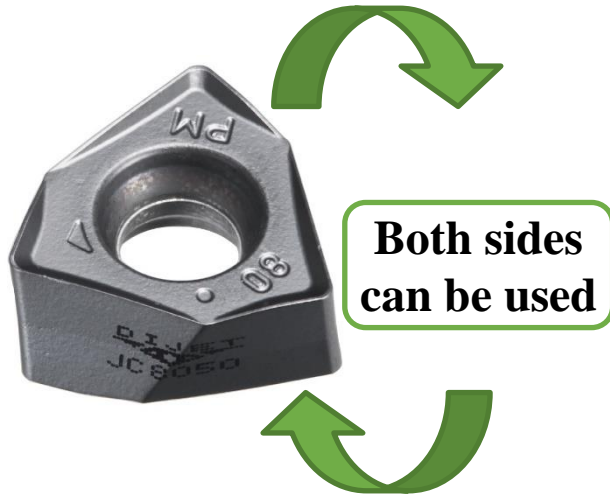
SHOULDER 6

~EXSIX type~

Double-sided 6 corner shoulder cutter



Feature of 『Shoulder 6』



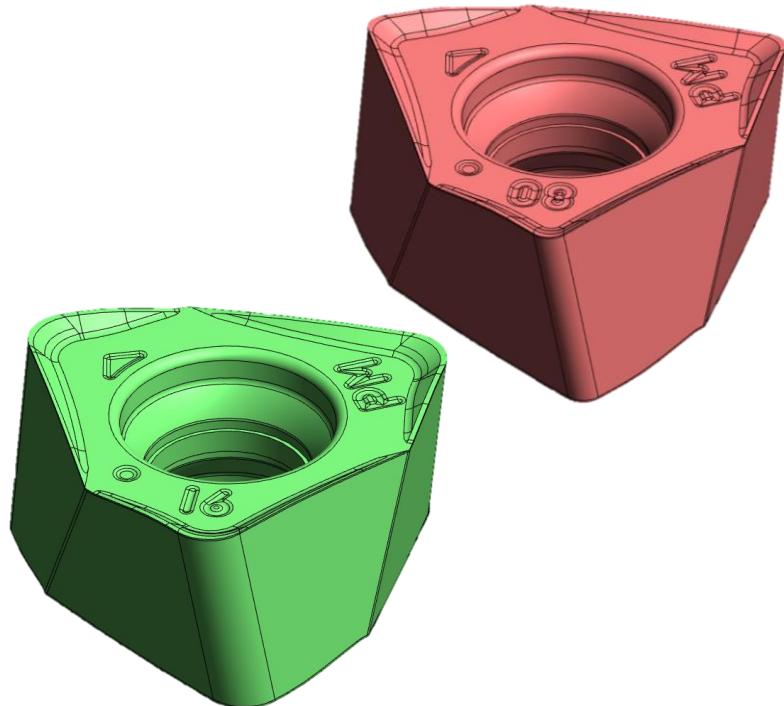
- Double-sided insert with **6 cutting edges**
- **Max. ap 10mm**
- **High rigidity insert** with 7.5 mm thickness
- Corner R lineup **R0.8, R1.6**
- Low cutting force shape with **unique 3D breaker**

- Tool diameter : **D50 – D160mm**
- Due to arc-geometry on the periphery cutting edge, the cusp height can be smaller even in case of large ap
⇒ **Achieves high efficient & high precision machining for side wall**
- Body's A.R. has a positive due to unique 3D insert
⇒ **Achieves low cutting force**



Insert of 『Shoulder 6』

YCMU0907**08**ZER-PM
YCMU0907**16**ZER-PM



Grade

JC8050: Good for Chipping-resistance

Carbon steel
Mold steel
(35HRC or less)

JC8118: Good for wear-resistance

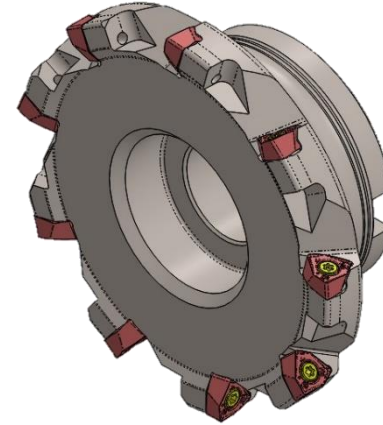
Cast iron・Nodular Cast iron
Hardened steel
(50HRC or less)

CUTTER BODY (Metric)

EXSIX-5053R-22



EXSIX-9160R-40

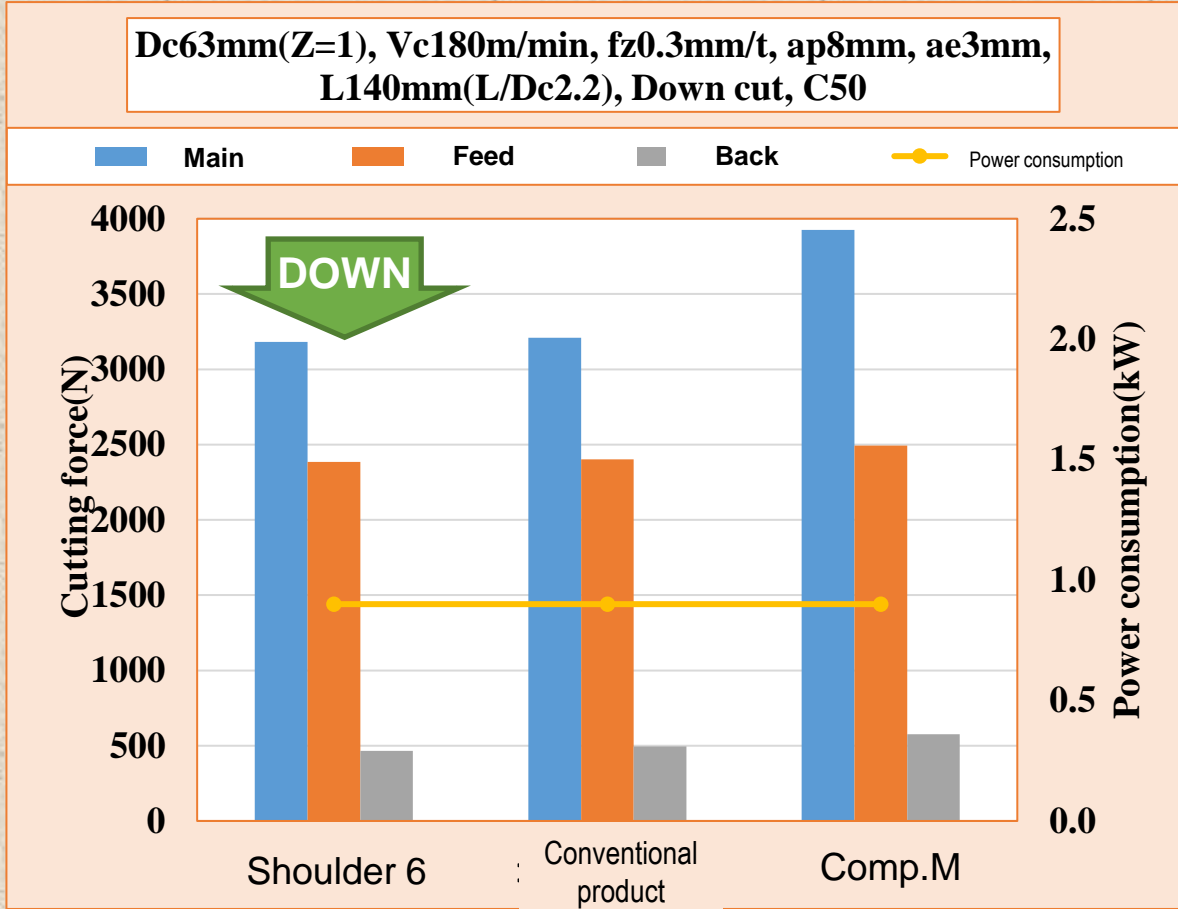
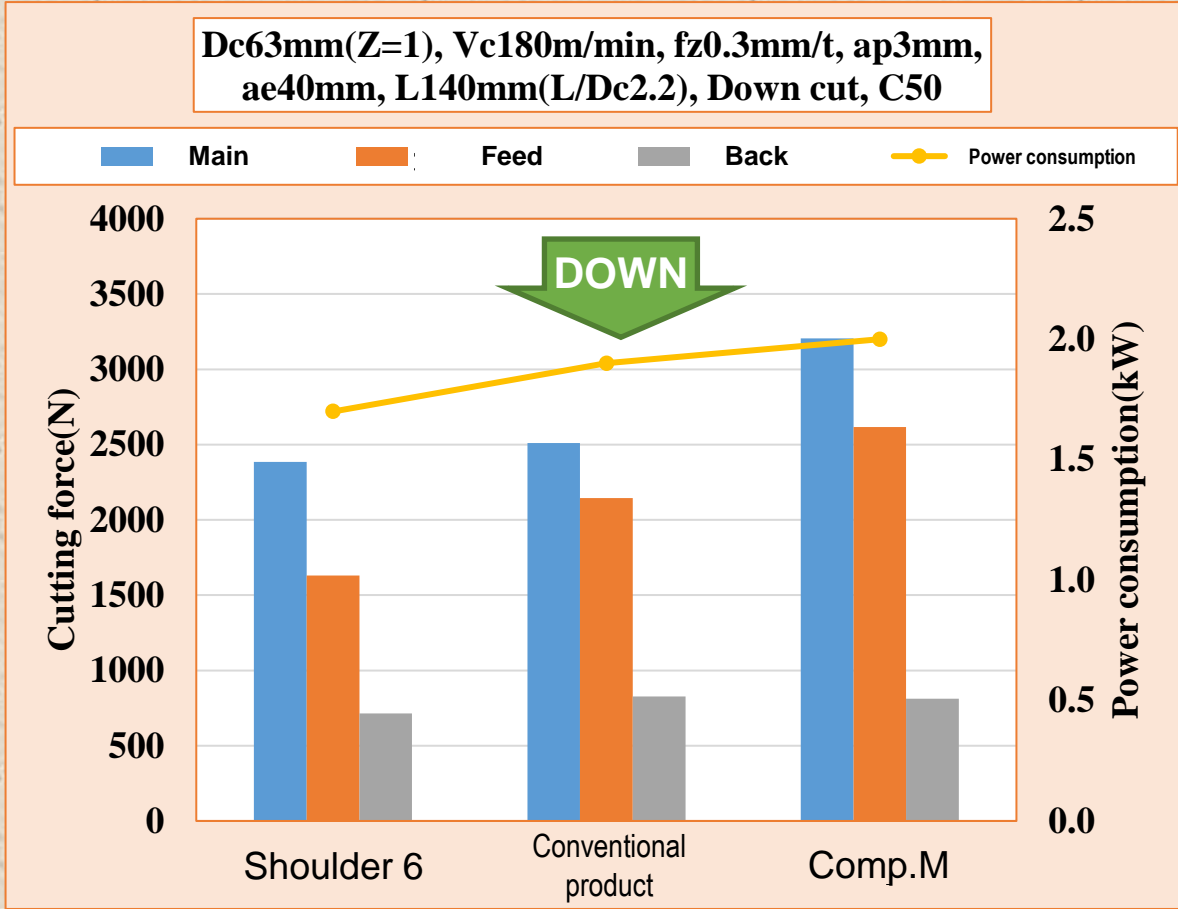


Dia.	Cat. No.	No. of teeth	Height	Boss dia.	Bore dia.	Oil hole
50	EXSIX-4050R-22	4	40	47	22	Yes
63	EXSIX-5063R-22	5	40	50	22	Yes
80	EXSIX-6080R-27	6	50	56	27	Yes
100	EXSIX-7100R-32	7	50	85	32	Yes
125	EXSIX-8125R-40	8	63	100	40	Yes
160	EXSIX-9160R-40	9	63	100	40	No

Cutting force comparison

Low depth of cut

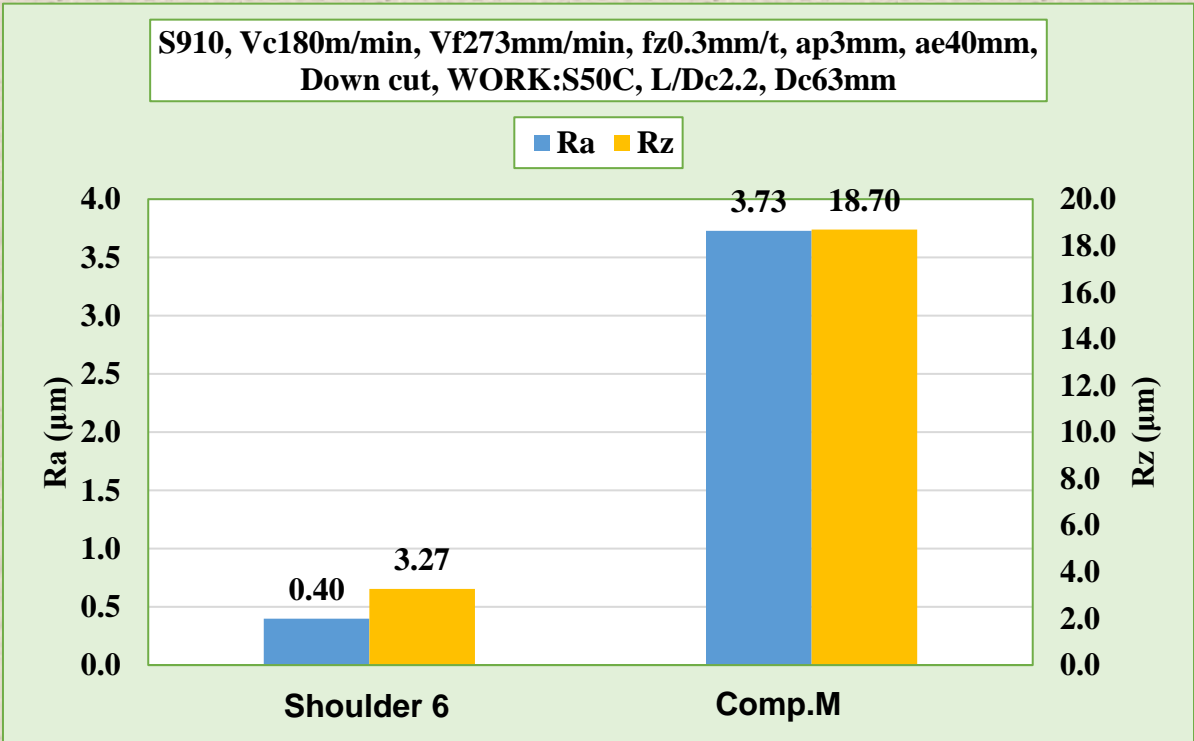
High depth of cut



Surface finish comparison

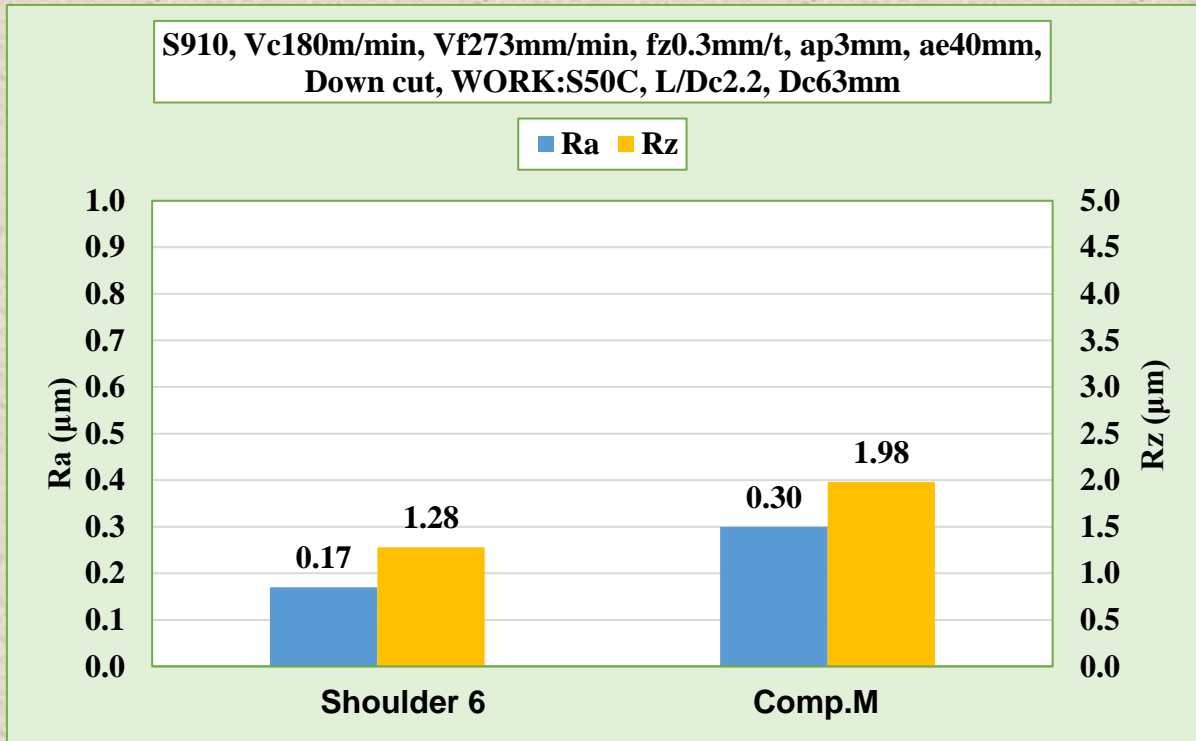
Low depth of cut

Side wall



Good chip evacuation due to Positive Axial rake

Bottom face



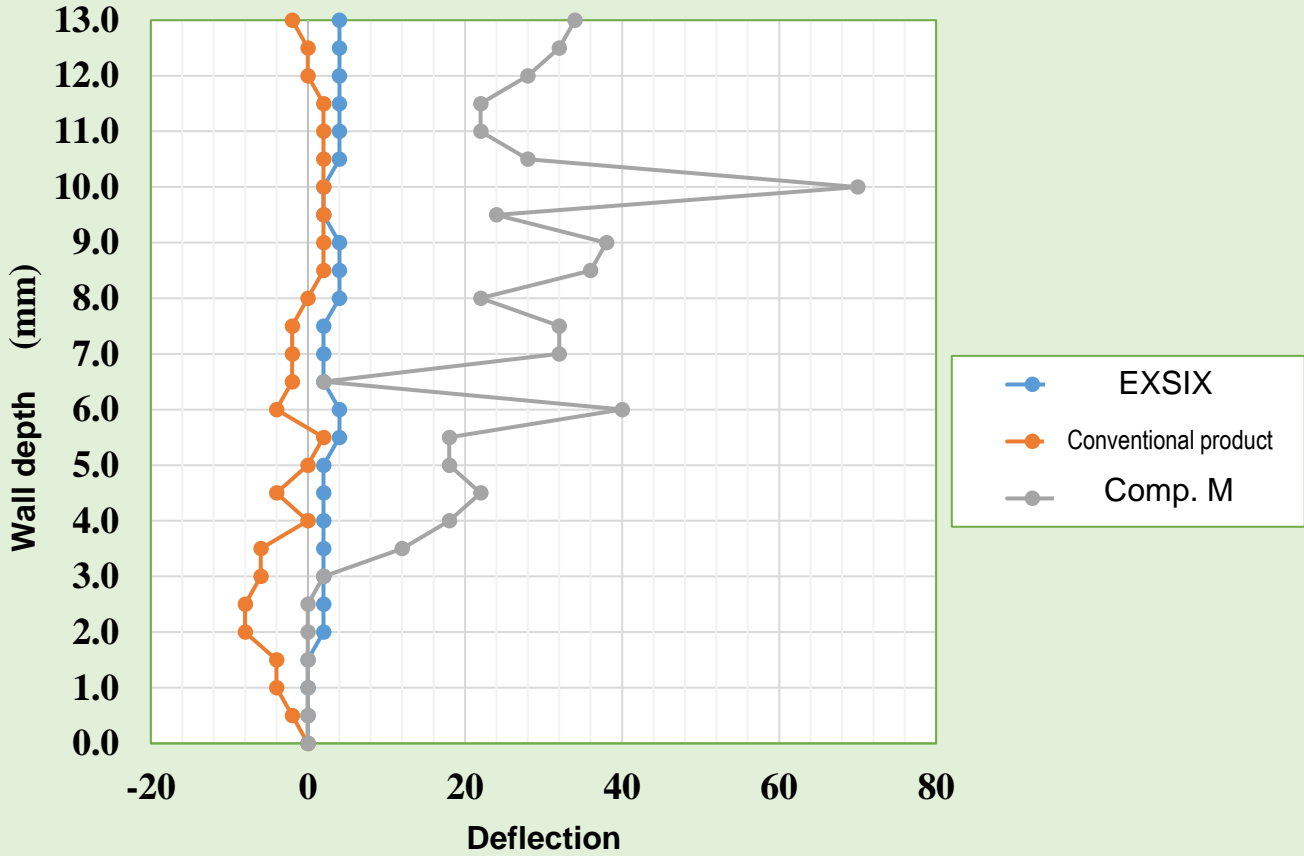
Excellent machined surface due to the effect of wiper edge

Deflection comparison

Low depth of cut

Deflection

Dc63mm(Z1), S910, Vc180m/min, Vf273mm/min, fz0.3mm, ap3mm, ae40mm, L/Dc2.2, Down cut, C50



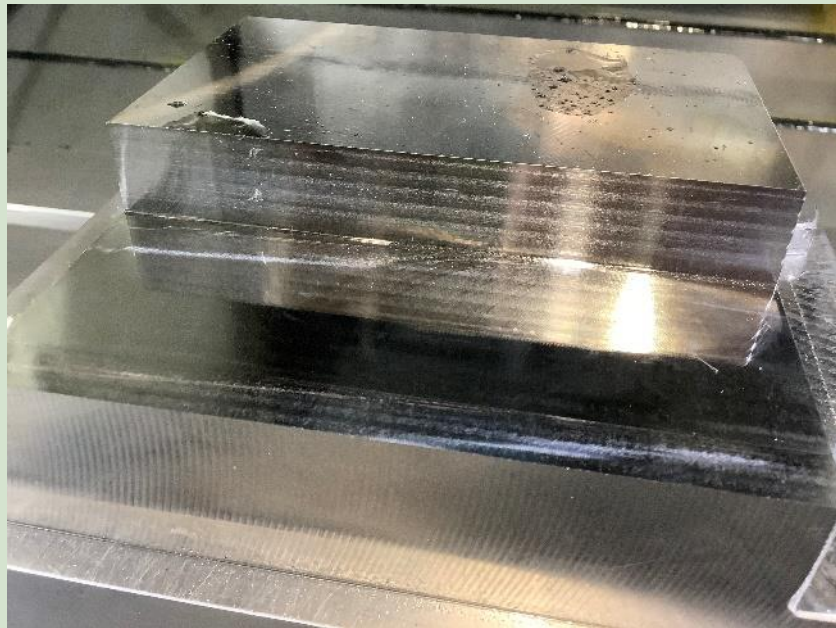
- Good chip evacuation due to Positive Axial rake
- High precision machining surface with circular arc cutting edge

Shoulder cutting

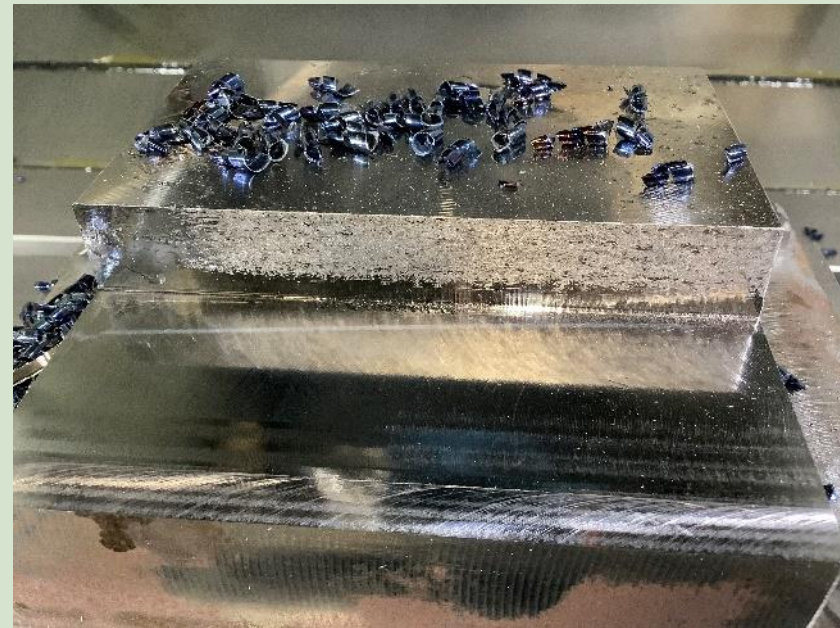
Machined surface

Low D.O.C

Shoulder 6

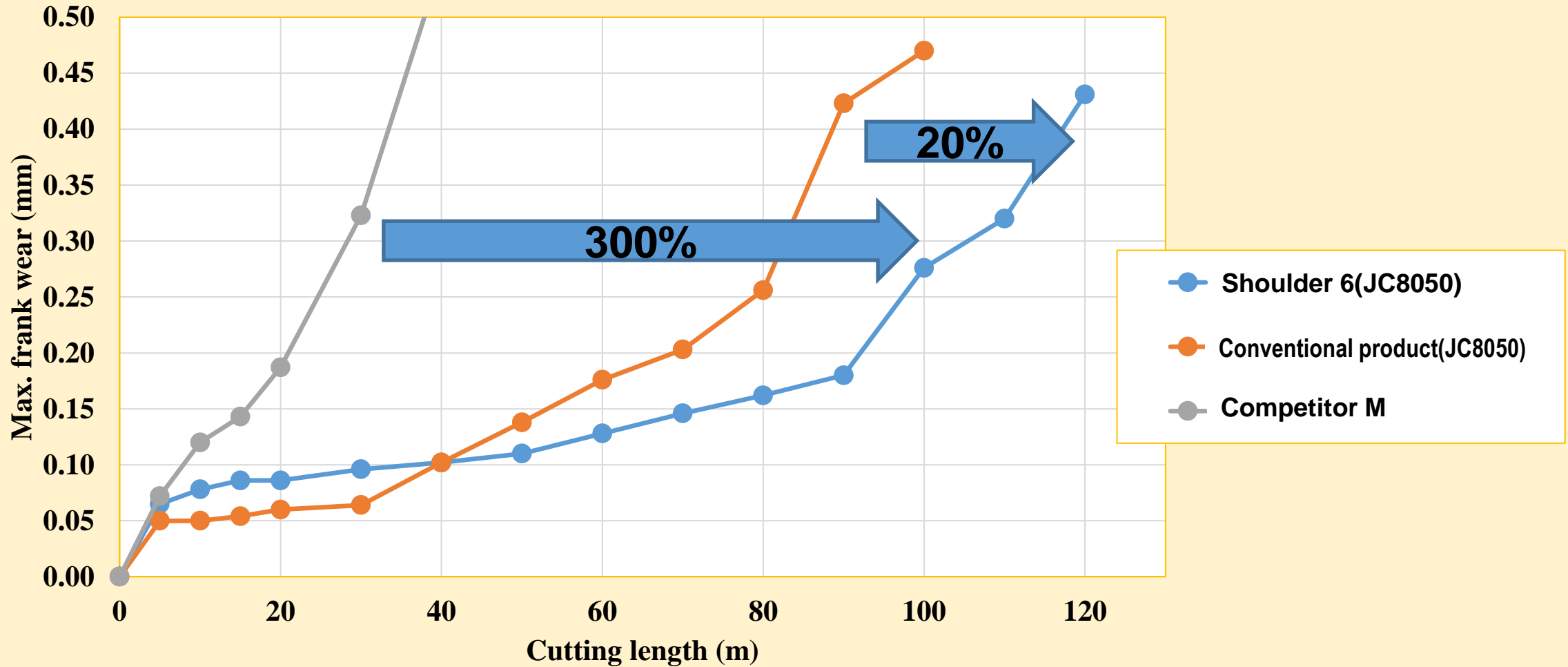


Competitor M



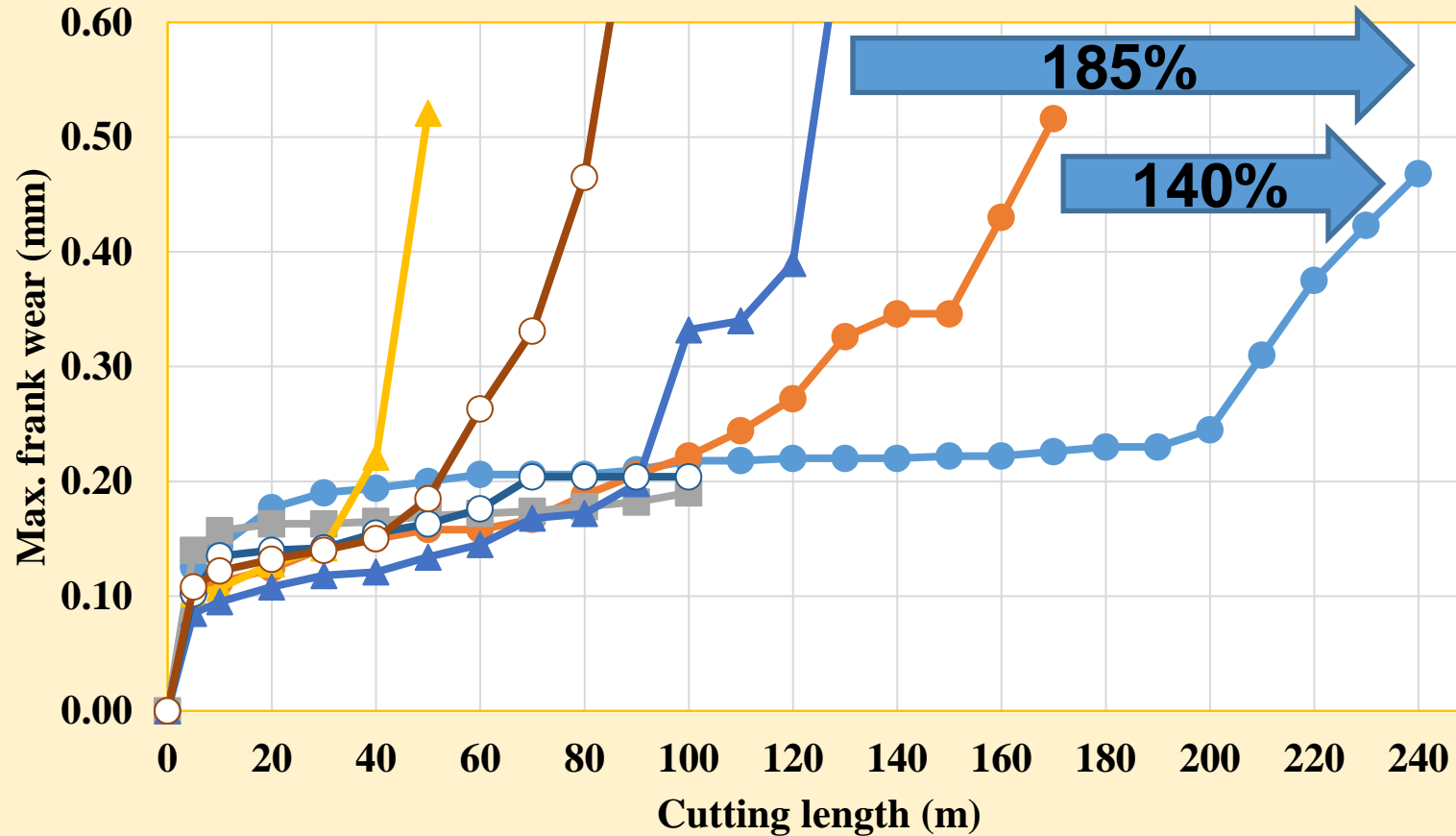
Tool life comparison(1.2311:P20)

Dc63mm, S750, Vc150m/min, Vf225mm/min, fz 0.3mm/t, ap8mm, ae3mm, L/Dc2.2,
Up and down cut, Air blow, 1.2311(P20) by 1 insert



Tool life comparison(0.7040:60-40-18)

Dc63mm, S1010, Vc200m/min, Vf303mm/min, fz 0.3mm/t, ap 8mm, ae 3mm,
L/Dc2.2, Up and down cut, Wet(Internal) by 1 insert



185%

140%

- DIJET EXSIX JC8118
- DIJET EXSAP JC8118
- Competitor M PVD
- ▲ Competitor Q CVD
- ▲ Competitor Q PVD
- Competitor B PVD
- Competitor B CVD

Shoulder milling

EXSIX-5063R-22 , (Φ63mm)
YCMU090708ZER-PM JC8118
Mat'l : 1055
(Cutting condition)
 $n = 1,000 \text{ min}^{-1}$
 $V_f = 1,500 \text{ mm/min}$, (59.1 ipm)
 $f_z = 0.3 \text{ mm/t}$, (.012 ipt)
 $a_p = 4 \text{ mm}$, (.16")
 $a_e = 0.8 \text{ mm}$, (.032")

『Shoulder 6』 & 『Shoulder Extreme』

	25	32	40	50	63	80	100	125
Double-sided 4 corner	← EXSAP (Max.ap 15mm) →							
Double-sided 6 corner	← EXSIX (Max.ap 10mm) →							

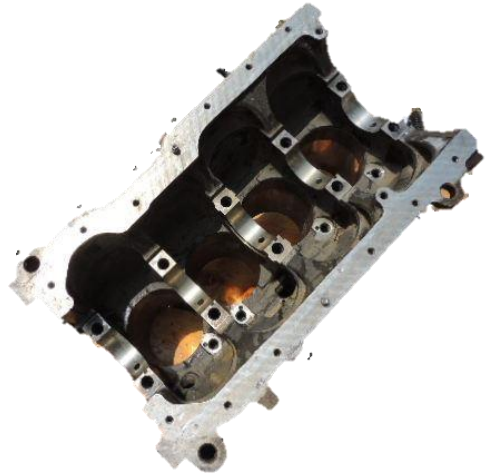
▪ Achieves high precision shoulder milling with **high ap and narrow ae.**
 ⇒ The optimum machining area is near to semi-finishing.

▪ Achieves high precision shoulder milling with **Low ap and wide ae.**
 ▪ Insert thickness and screw size are larger than EXSAP, and the tool life in roughing operation is good.
 ⇒ Demonstrate ability in roughing area



Roughing bottom face

Tool No.	EXSIX-4050R-22	Work	Part name	Stamping die
Inserts No.	YCMU090708ZER-PM JC8118		Material	Cast iron 0.6025
Competitor	EXSAP-5050R ZNGU170916ZER-PM JC8118	Tool	Hardness	-
Wear or chipping	Wear		Tool	4N-Φ50mm
Evaluation	In the case of EXSAP, the screw sometimes breaks, but in EXSIX it does not. Also Tool life is excellent.	Cutting conditions	Spindle speed	800 min ⁻¹
			Cutting speed	125 m/min
			Feed speed	800 mm/min
Chip load	0.25 mm/t			
Ap	4 mm			
Ae	50 mm			
		Coolant	Air blow	



Comp.C



EXSIX



Roughing bottom face

Tool No.	EXSIX-4050R-22	Work	Part name	Stamping die
Inserts No.	YCMU090708ZER-PM JC8118		Material	Cast iron 0.6025
Competitor	Comp. C ϕ 50-5N AXMT170508PEER-G ACK3000		Hardness	-
Wear or chipping	Wear		Tool	4N- Φ 50mm
Evaluation	Tool life was the same, but the number of inserts was small, so production cost can be reduced.		Cutting conditions	Spindle speed
		Cutting speed		120 m/min
		Feed speed		380 mm/min
		Chip load		0.124 mm/t
			Ap	5 mm
			Ae	40 mm
			Coolant	Wet (Internal)