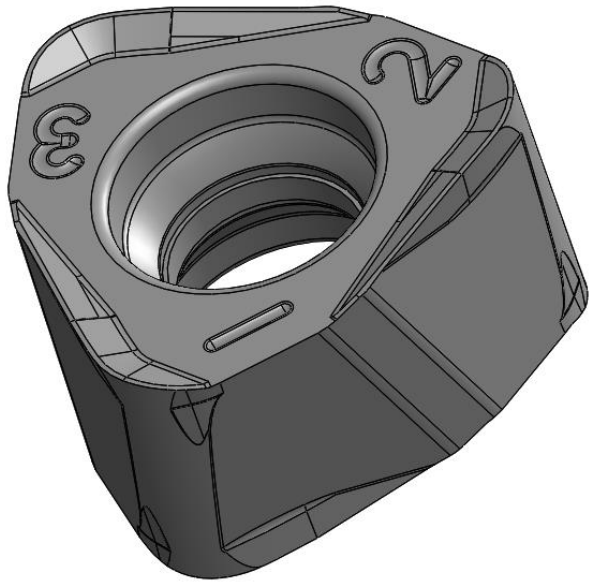
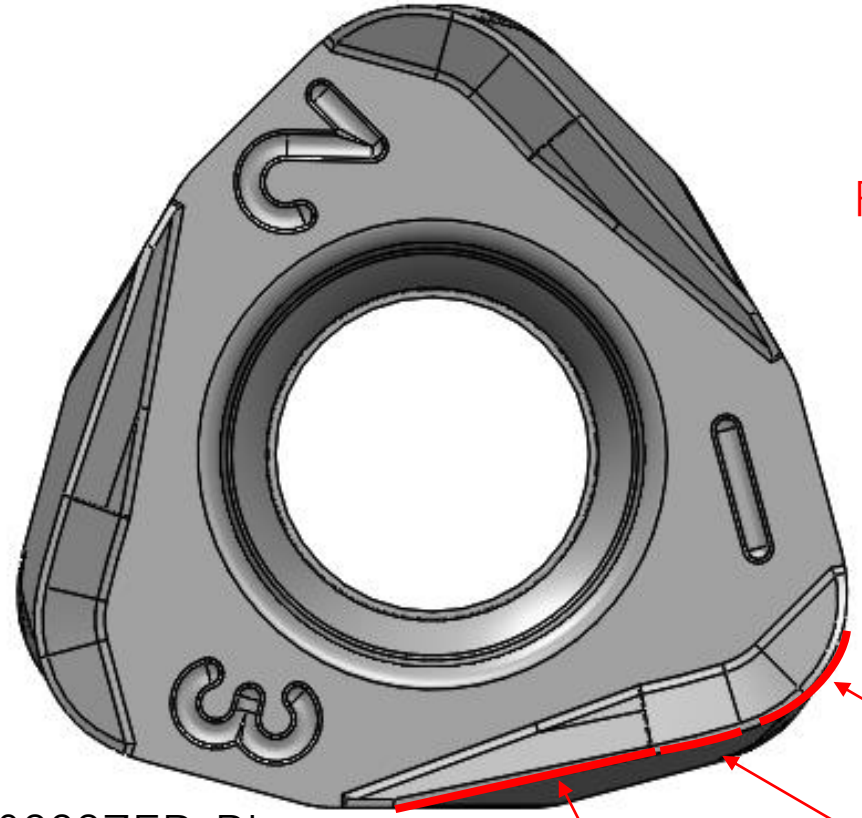
New EXSKS inserts”-PL” type with low cutting force

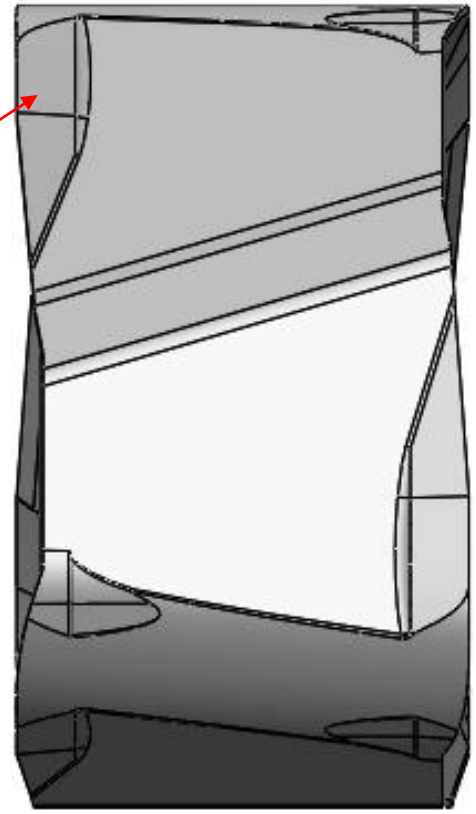


WNMU090828ZER-PL

DIJET INDUSTRIAL CO., LTD.

Features





Relief angle : +5°

Corner R2.8

R20

Cutting edge angle:12°

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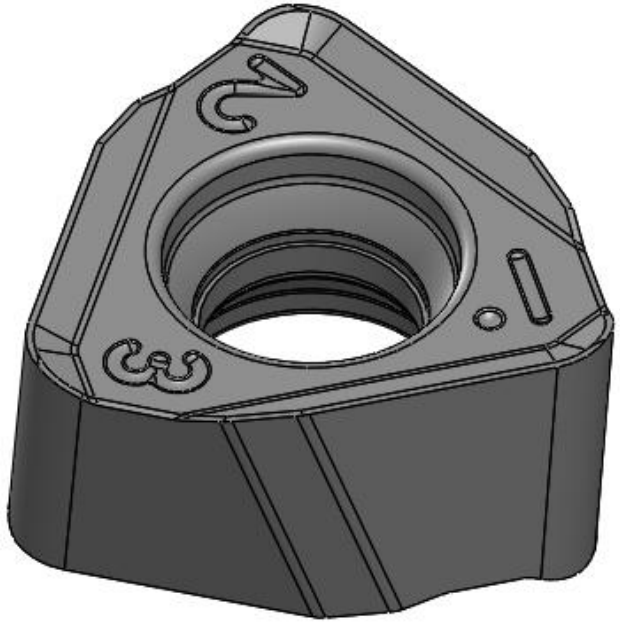
Prevent chatter with low cutting edge angle during high feed machining

Reduce fluctuation of cutting force with combination straight +R edge during pocket milling

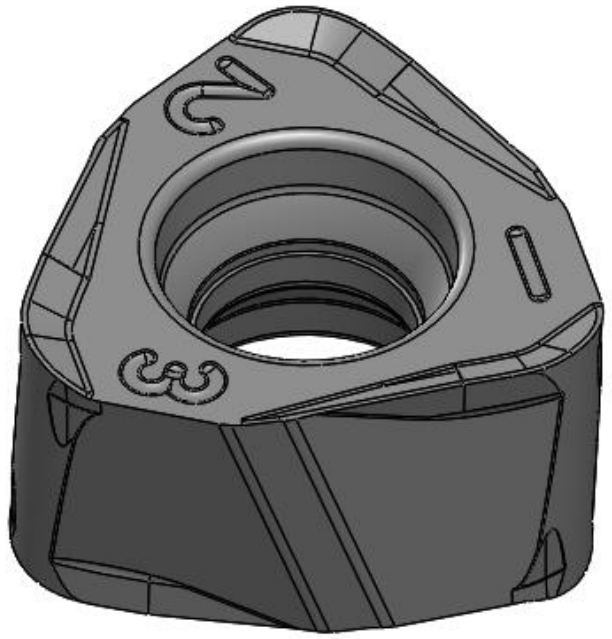
How to choose inserts



WNMU090720ZER-PM

MAX.ap= 3mm
Suitable for face milling or pocket and copy milling with high D.O.C.(ap=1.4mm or more)

Good for soft matetial
Steel(38HRC or less)

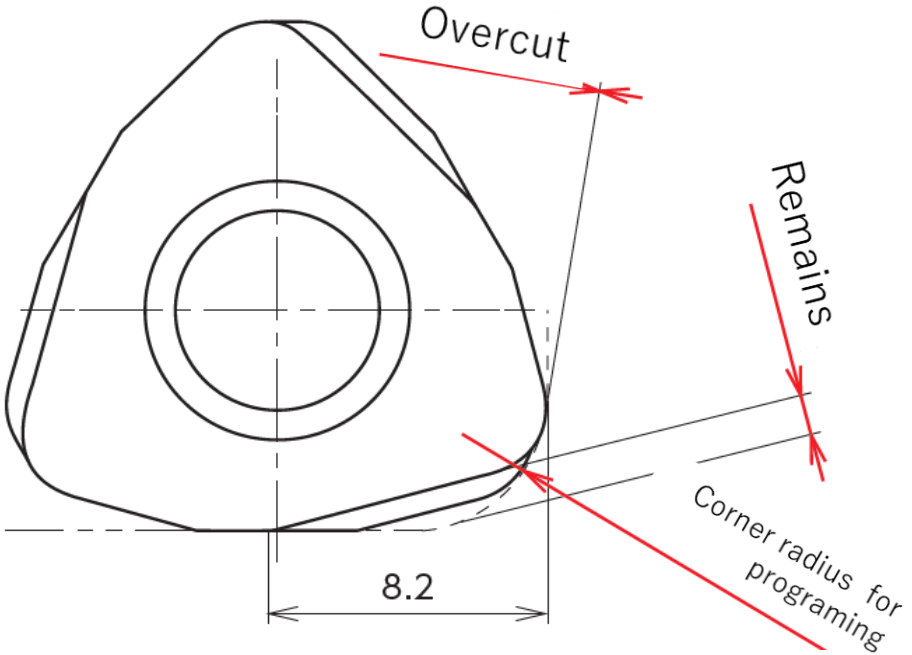


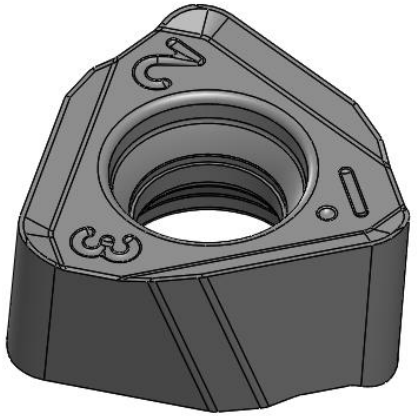
WNMU090828ZER-PL

MAX.ap= 2.1mm
Suitable for pocket and copy milling with middle D.O.C.(ap=0.6～1.2mm)

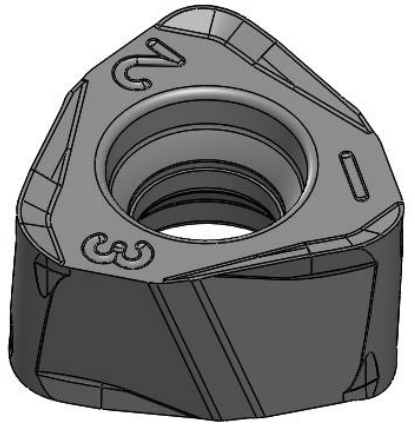
Good for hard matetial
Steel(40～50HRC)

Definition of corner shape for programing





WNMU090720ZER-PM



WNMU090828ZER-PL

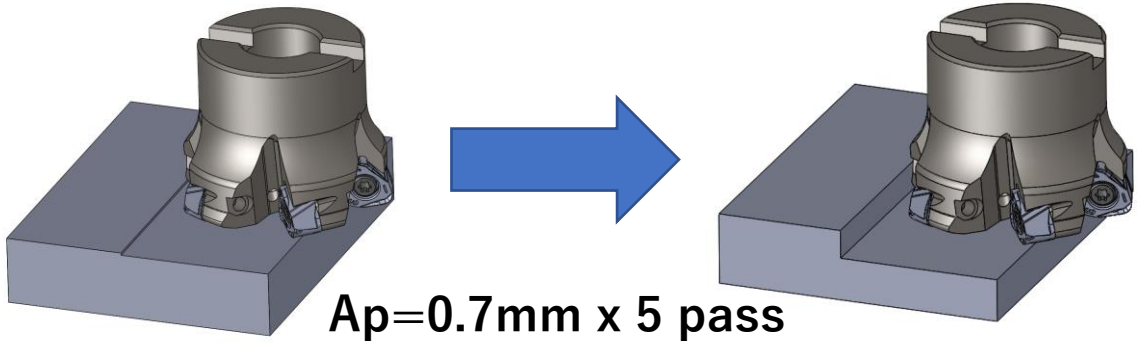
Corner radius for programing	Overcut	Remains
R3.0	0	1.42
R3.5(Standard)	0	1.32
R4.0	0.025	1.20

Overcut	Remains
0	**1.17**
0	**1.07**
0.01	**0.94**

Reduce the man – hours in the post-process by reducing remains

Cutting force comparison(P21,1.2312:40HRC)

TOYODA　PV7 (18.5kw)
Vertical M/C　BT50



Ap=0.7mm x 5 pass

1 pass(Face milling)　　5 pass(Corner milling)

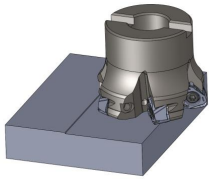
Material：P21(NAK80,40HRC)
Cutting condition
n=450rpm
Vc=90m/min
Vf=680mm/min
fz=1.5mm/t
Ap=0.7mmX5pass
Ae=45mm
1N down cut　Air blow(Internal)

Tool：φ63mm (z=1)
Arbor:DSA-22-100-63-BT50
Reach: 150mm

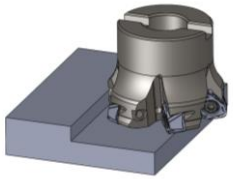
Cutting force & chips comparison(P21,1.2312,40HRC)

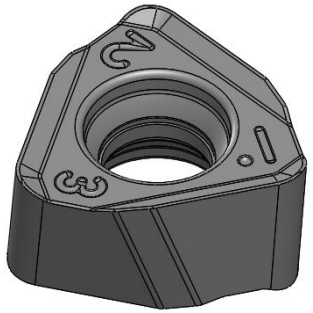
Main force
Feed force
Back force

1 pass(Face milling)

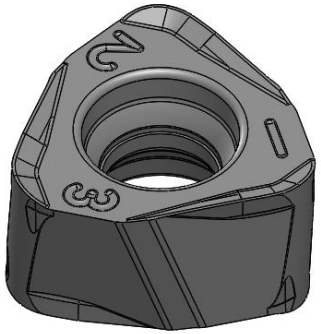


5 pass(Corner milling)





WNMU090720ZER-PM



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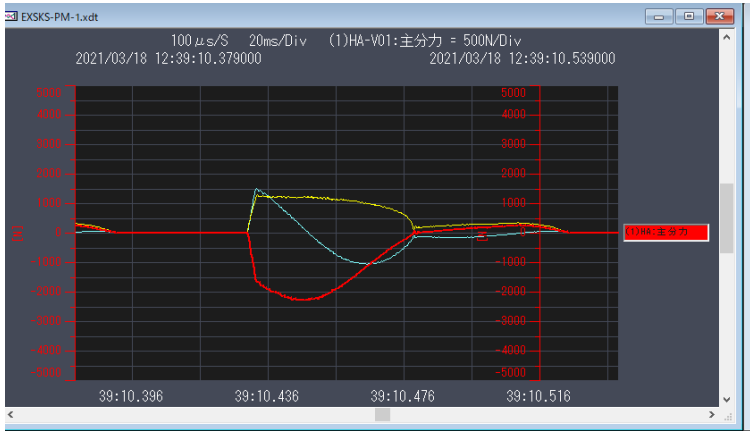
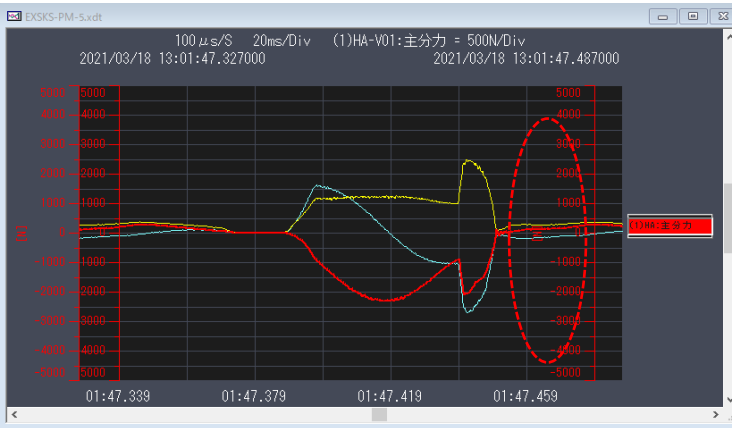
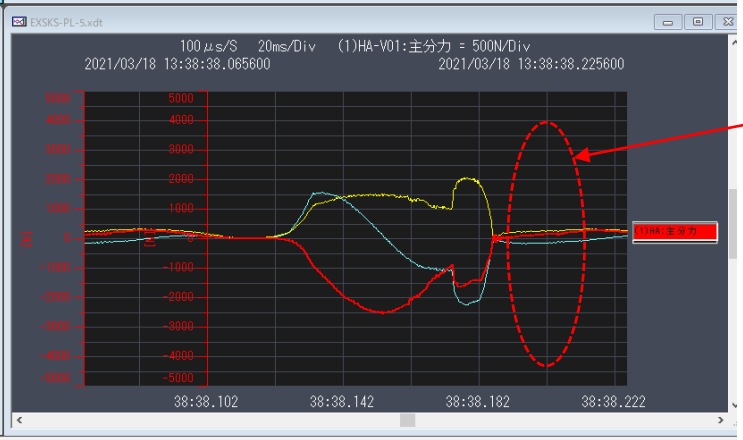
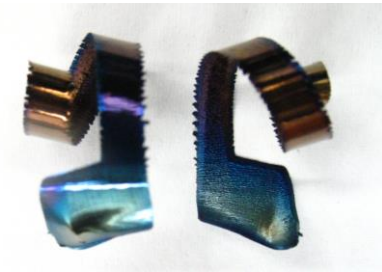




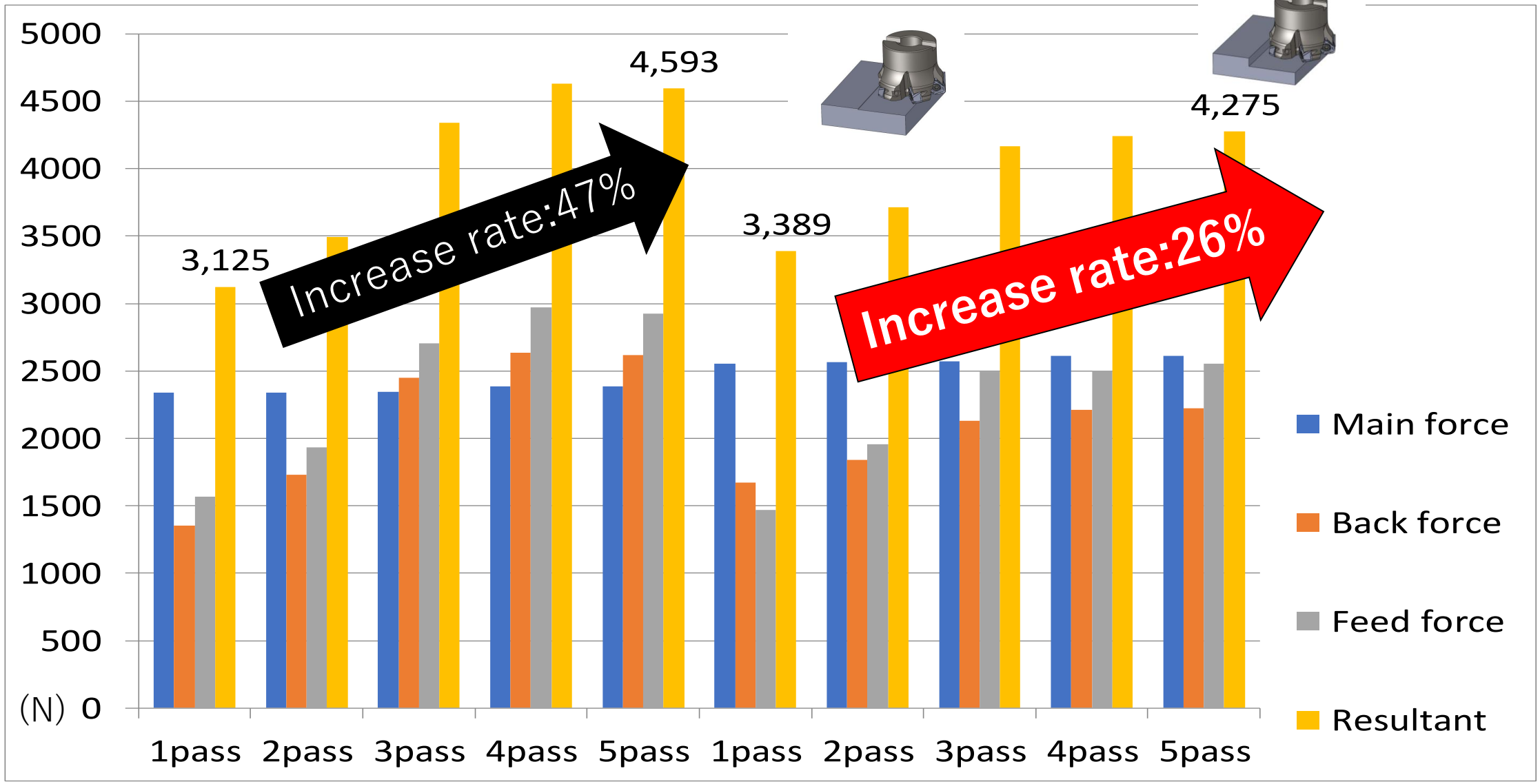


Chips shape



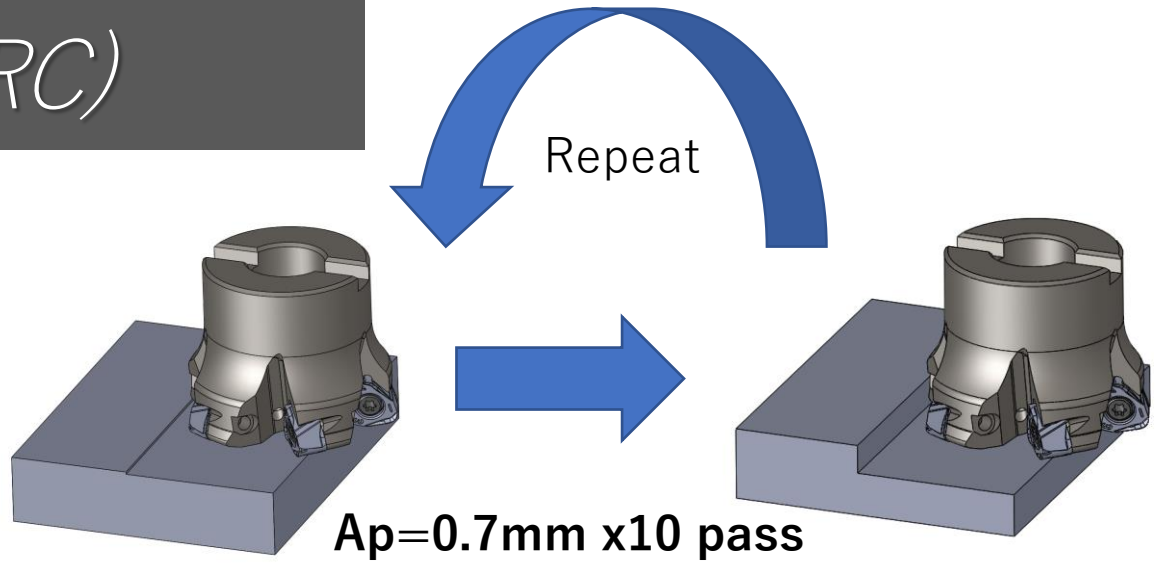
Prevent the rise of cutting force during corner milling

Cutting force comparison(P21,1.2312:40HRC)



Tool life comparison(P21,1.2312:40HRC)

TOYODA　PV7 (18.5kw)
Vertical M/C　BT50

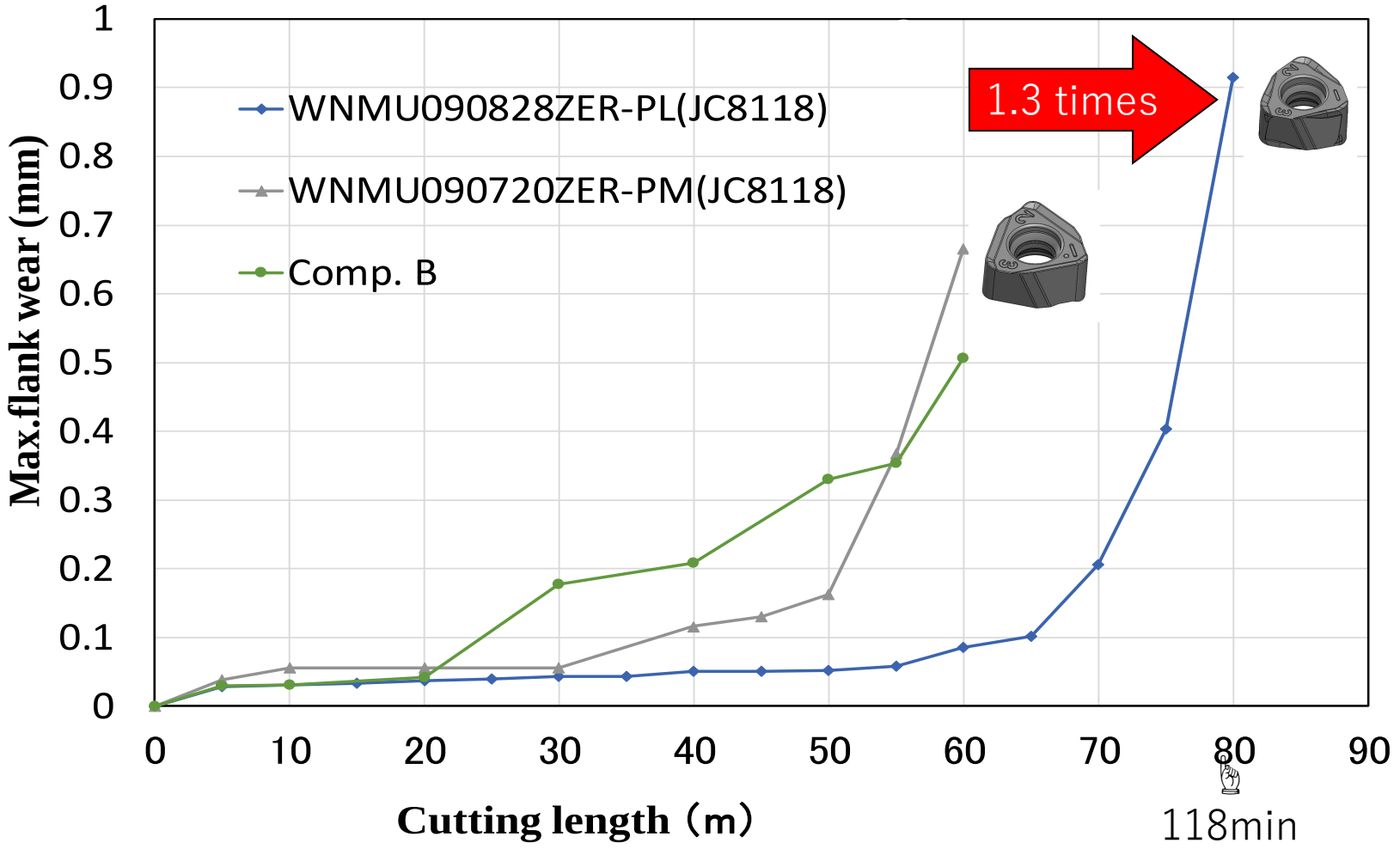


1 pass(Face milling)　　10 pass(Corner milling)

Material：P21(1.2312,40HRC)
Cutting condition
n=450rpm
Vc=90m/min
Vf=680mm/min
fz=1.5mm/t
Ap=0.7mm X10pass
Ae=45mm
1N down cut　Air blow(Internal)

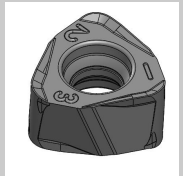
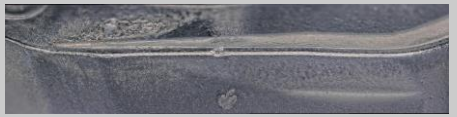
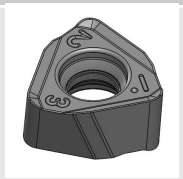
Tool：ϕ63mm (z=1)
Arbor:DSA-22-200-63-BT50
Reach: 250mm

Tool life comparison(P21,1.2312:40HRC)

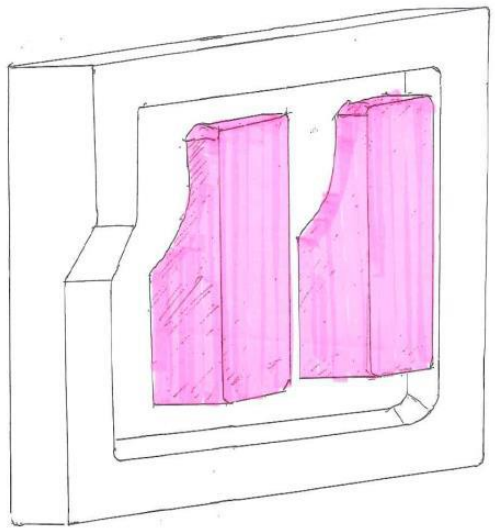


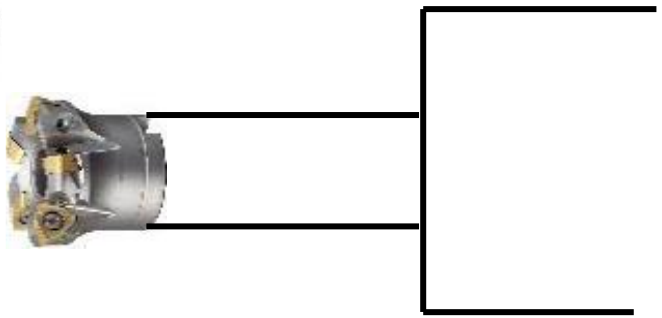
Material：P21(1.2312,40HRC)
Cutting condition
n=450rpm
Vc=90m/min
Vf=680mm/min
fz=1.5mm/t
Ap=0.7mm X10pass
Ae=45mm
1N down cut　Air blow(Internal)
Tool dia: ϕ 63mm
Reach: 250mm

Damaged condition of insert

	20m	40m	60m	80m
 **WNMU090828 ZER-PL(JC8118)**				
 WNMU090720 ZER-PM(JC8118)				
Comp.B				

Cutting data① (P21:1.2312 40HRC)





Tool life
EXSKS : 44.6 min.
Comp.A : 30 min.

Tool No. Inserts No.	EXSKS-6080R WNMU090828ZER-PL JC8118
Competitor	TD6N5080B-6 WOMU140620ER-FB JCP4120
Wear or chipping	Small chipping
Evaluation	Achieved longer tool life, reduced cutting force, and reduced cutting noise compared to Comp. A.

Work	Part name	Plastic Mold
	Material	P21:1.2312
	Hardness	40HRC
Tool	Tool	6N-Φ80mm
Cutting conditions	Spindle speed Cutting speed	600 min^{-1} 150 m/min
	Feed speed Chip load	3,600 mm/min 1.0 mm/t
	Ap	1 mm
	Ae	55 mm
	Coolant	Air blow(Internal)

Cutting data② (P21:1.2312 40HRC)

Total cutting length
PM(JC8050) : 100 m
PL(JC8050) : 310 m

Tool No. Inserts No.	EXSKS-8125R WNMU090828ZER-PL JC8050
Competitor	EXSKS-8125R WNMU090828ZER-PM JC8050
Wear or chipping	Normal Wear
Evaluation	Machining efficiency is also improved compared to the conventional PM, realizing 3 times longer tool life.

Work	Part name	Cavity
	Material	P20H : 1.2311
	Hardness	36-38HRC
Tool	Tool	6N-Φ80mm
Cutting conditions	Spindle speed Cutting speed	250 min^{-1} 98 m/min
	Feed speed Chip load	2,500 mm/min 1.0 mm/t
	Ap	1.2 mm(PM : 1.0 mm)
	Ae	95 mm
	Coolant	Air blow(External)

Recommended grade for each machining type

Wear resistance

Chipping resistance

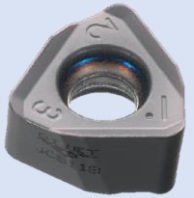
Super unstable machining

JC7560

Unstable machining

JC8050

Stable machining



JC8118