

REGRINDING MANUAL FOR SOLID CARBIDE DRILL
SOLID CARBIDE FLAT BOTTOM DRILLS
MFE Series

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■ Checking conditions of the cutting edge

- Check wear conditions of and damage to the cutting edge.
- If there is serious damage such as fracture on the edge, grind the edge until the damage is all gone.

■ Grinding primary relief face

Fig.1

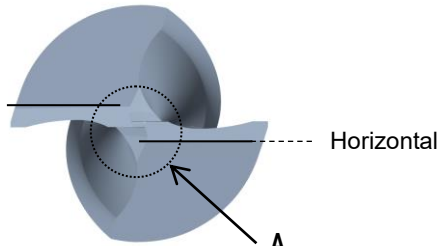


Fig.2

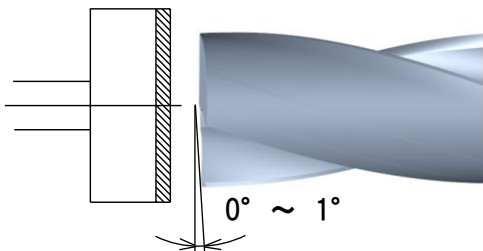


Fig.3

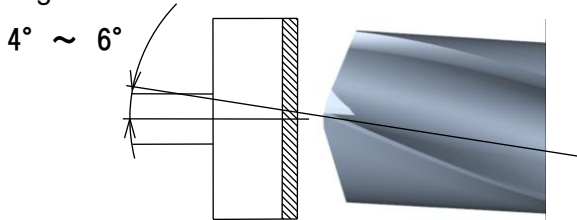


Fig.4

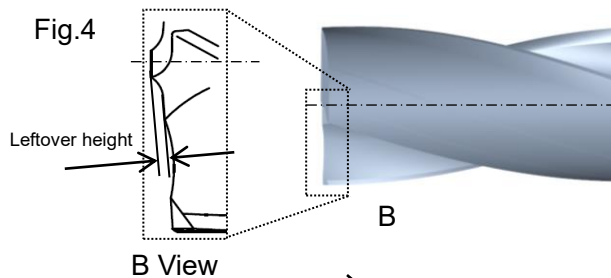
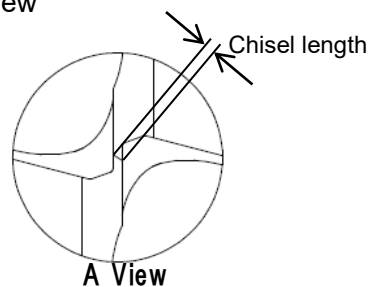


Fig.5



- Install the drill by using collet chuck. As shown in **fig.1**, set the drill phase in order that the corner of center cutting edge and the shoulder of outer peripheral edge become parallel to each other when seen from the top.

- As shown in fig.2, rotate the drill (work head) 0° - 1° so that the point angle will be 178 - 180° .

- As shown in fig.3, set inclination angle of the drill (work head) at 4° ~ 6° . This angle will become primary relief angle.

- As for Fig.4, Grind until leftover debris is equal or less than table value below.

- As for Fig.5, Grind for that chisel length is equal or less than the value on the table below.

Drill diameter (mm)	Leftover height (mm)	Chisel length (mm)
$\Phi 3$ - $\Phi 8$	0.01& under	0.3& under
$\Phi 8$ over $\Phi 20$ & under	0.02& under	0.5& under

- Grind until there is no wear or fracture left on the cutting edge.

- Make sure Lip height (axial runout of front cutting edge) < 0.02 mm.

■ Grinding secondary relief face

Fig.6

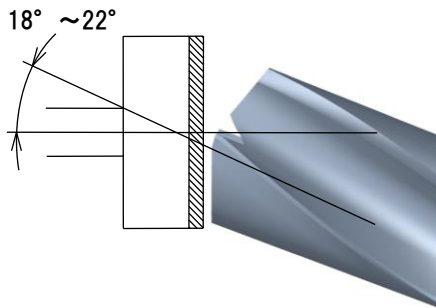


Fig.7

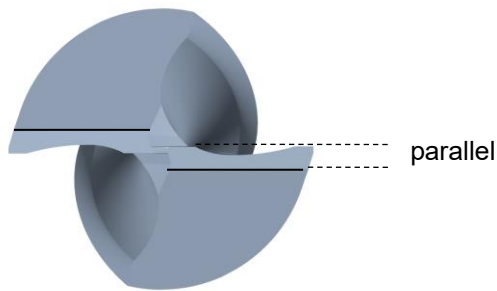
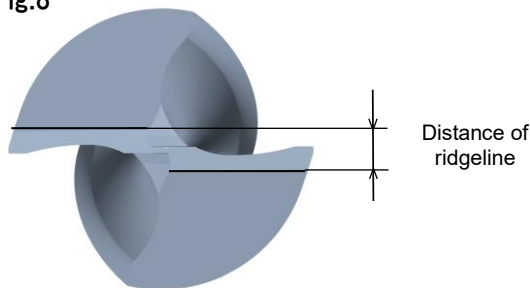


Fig.8



- After grinding primary relief face, grind secondary relief face.
- As shown in fig.2, rotate the drill (work head) 0° - 1° so that the point angle will be 178° - 180° .
- As shown in fig.6, set inclination angle of the drill (work head) at 18° - 22° . This angle will become secondary relief angle.
- After secondary relief grinding, the ridgeline is formed.
- As shown in fig.7 the ridgeline is preferably parallel to thinning cutting edge.
- Make sure the distance of ridgeline shown in fig.8 is under control of table below.

Diameter(mm)	Distance of ridgeline (mm)
$\Phi 3.0 - \Phi 4.0$	0.45
$\Phi 4.0$ over- $\Phi 5.5$	0.65
$\Phi 5.5$ over- $\Phi 6.5$	0.85
$\Phi 6.5$ over- $\Phi 8.0$	1.05
$\Phi 8.0$ over- $\Phi 9.0$	1.20
$\Phi 9.0$ over- $\Phi 10.5$	1.40
$\Phi 10.5$ over- $\Phi 11.5$	1.60
$\Phi 11.5$ over- $\Phi 13.0$	1.80
$\Phi 13.0$ over- $\Phi 14.0$	2.00
$\Phi 14.0$ over- $\Phi 15.5$	2.20
$\Phi 15.5$ over- $\Phi 16.5$	2.40
$\Phi 16.5$ over- $\Phi 18.0$	2.60
$\Phi 18.0$ over- $\Phi 19.0$	2.80
$\Phi 19.0$ over- $\Phi 20.0$	3.00

■ Grinding thinning face (Z-thinning)

Fig.9

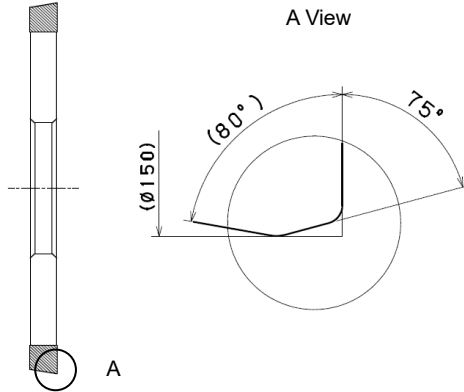


Fig.10

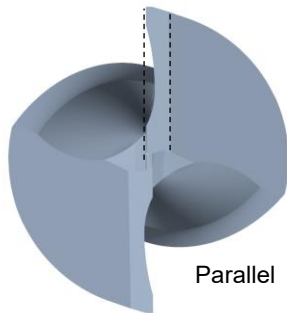
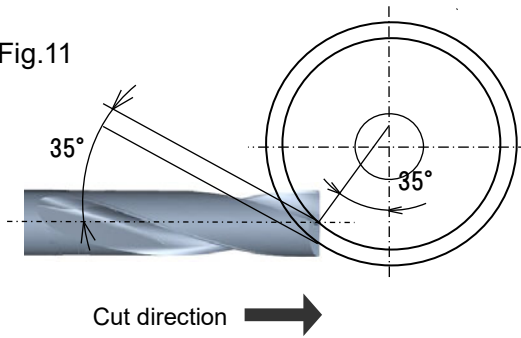


Fig.11



- After grinding secondary relief face, grind thinning face. Type of the thinning is **Z-thinning**.
- Please use wheel with chamfer for Z-thinning. Please refer to geometry of thinning wheel(P8)
- As shown in **fig.10**, set the drill phase so that the ridgeline and thinning edge are parallel.
- Set the vertical position of the wheel so that the open angle of the thinning from the drill center will be 35° , as shown in **fig.11**.

Fig.12

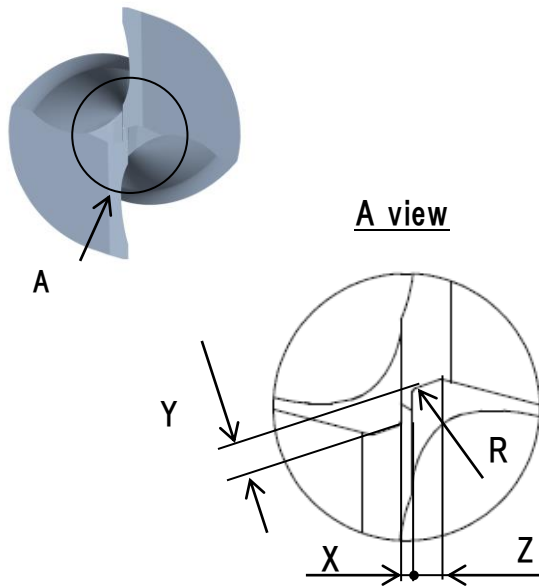
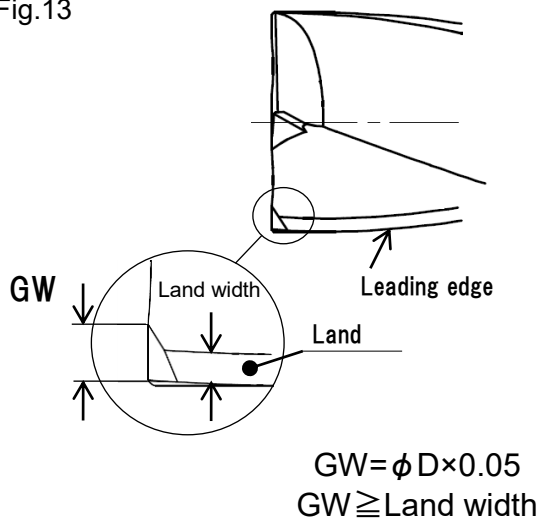


Fig.13



- Please refer to fig.12 and fig.13 and each below dimension table, so that thinning dimension is under control of X,Y,GW table.

※GW width should be bigger than land width.

X·Y dimension table

Diameter (mm)	X(mm)	Y(mm)
Φ3-Φ8&under	0.13 ~ 0.17	0.27 ~ 0.33
Φ8over-Φ20&under	0.18 ~ 0.22	0.37 ~ 0.43

Z·R dimension table

Diameter (mm)	Z(mm)	R(mm)
Φ3-Φ4.5&under	0.05~ 0.15	(0.1less)
Φ4.5over-Φ8&under	0.15~ 0.25	(0.1less)
Φ8over-Φ11.5&under	0.25~ 0.35	(0.1)
Φ11.5over-Φ14&under	0.35~ 0.45	(0.1)
Φ14over-Φ18&under	0.45~ 0.55	(0.2)
Φ18over-Φ20&under	0.55~ 0.65	(0.2)

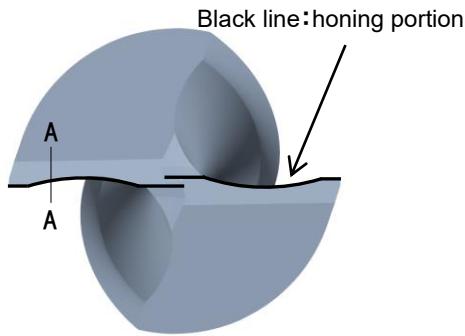
GW dimension

$GW = \phi D \times 0.05$

Diameter (mm)	GW tolerance
Φ3.0-Φ12.5&under	±0.05
Φ12.5 over-Φ14&under	±0.07
Φ14.0 over-Φ18.0&under	±0.10
Φ18.0 over-Φ20.0&under	±0.13

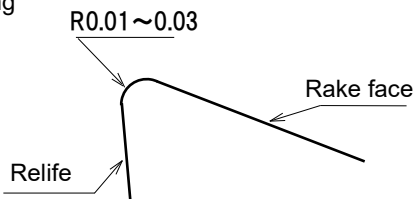
■ Honing

Fig.14

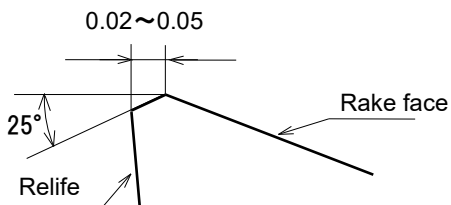


Cross section A-A

●R-honning



●Chamfer honning

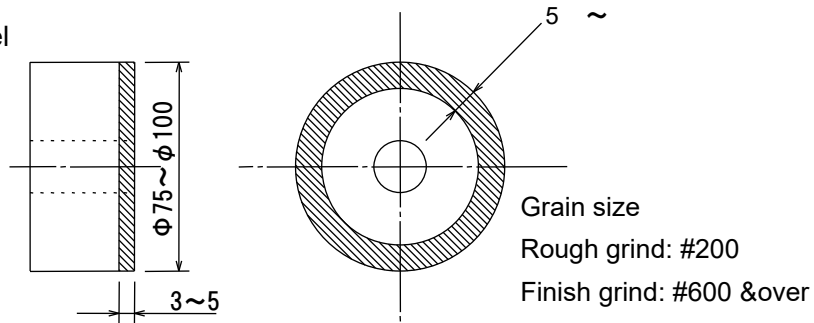


- After grinding thinning face, this is the last procedure for regrinding.
- The portion to be honed is whole cutting edge, as shown in fig.14.
- Please make R0.01~0.03 hone as shown cross section A-A.
- If R honing is impossible, make chamfer hone with at least #600 diamond file as alternative approach.

- This is the end of regrinding. Please ascertain that all the following specifications are fulfilled before using MFE drill again.
- Lip height difference (axial runout of front cutting edge) < 0.02mm
- There is no damage left on the cutting edge.
- There is no grinding burr.

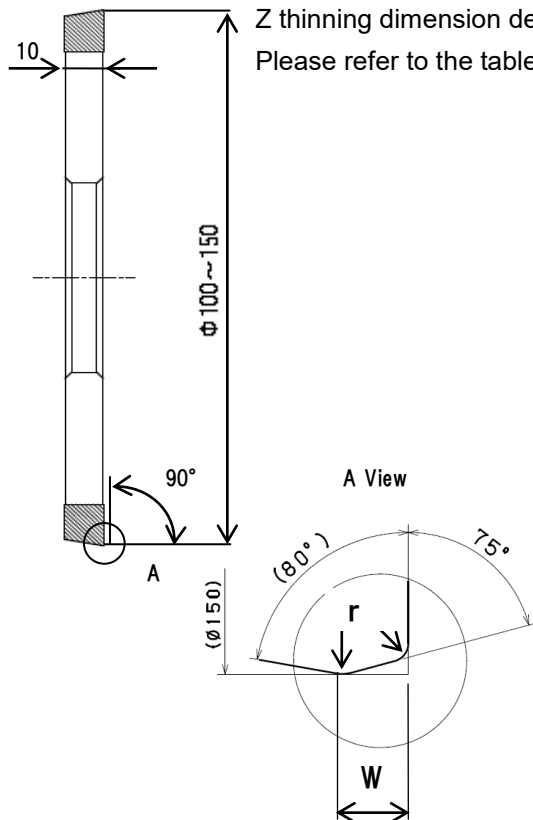
■ Grinding tools for primary , secondary relief

Diamond wheel



■ Grinding tools for thinning face

Z thinning dimension depends on drill diameter.
Please refer to the table below.



Diameter(mm)	W(mm)	r(mm)
$\Phi 3.0\text{-}\Phi 4.5\text{\&less}$	0.11	0.1\&less
$\Phi 4.5\text{over-}\Phi 8.0\text{\&less}$	0.21	0.1\&less
$\Phi 8.0\text{ over-}\Phi 11.5\text{\&less}$	0.31	$0.05\sim$ 0.15
$\Phi 11.5\text{ over-}\Phi 14.5\text{\&less}$	0.41	$0.05\sim$ 0.15
$\Phi 14.5\text{ over-}\Phi 18.0\text{\&less}$	0.52	$0.15\sim$ 0.25
$\Phi 18.0\text{ over-}\Phi 20.0\text{\&less}$	0.62	$0.15\sim$ 0.25

Grain size: #400& over

■ Grinding tools for honing (in case of chamfer honing)

Diamond file



Round file
Grain size: #600