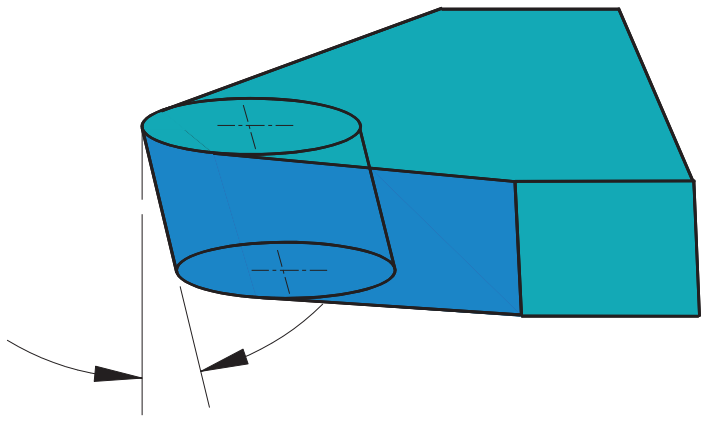
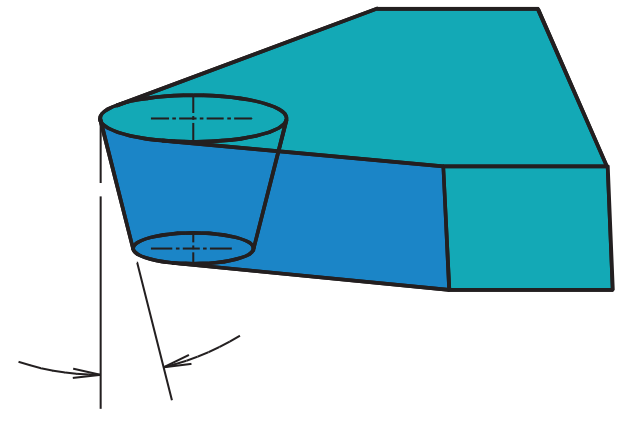
DIAMOND TOOL FRONT CLEARANCE OPTIONS

CYLINDRICAL CLEARANCE



CONICAL CLEARANCE



Cylindrical and **Conical** clearance tools have their respective advantages and disadvantages as cutting tools. Each has its place in manufacturing.

Cylindrical tools are

- a 'tilted cylinder'. This allows for a constant radius size (through re-lapping) and a slightly stronger structure.
- have an 'elliptical effect' caused by the tilted cylinder and rake combination. The amount of arc required has a big influence on the 'elliptical effect'.

Conical tools have

- a true circular shape (no elliptical effect)…Only when used with a 0° rake.
- the same cutting clearance all round the radius.
- a slightly weaker construction.
- a reducing radius size upon re-lapping.

Elliptical Deviation on Cylindrical Tools

Some Real Numbers…

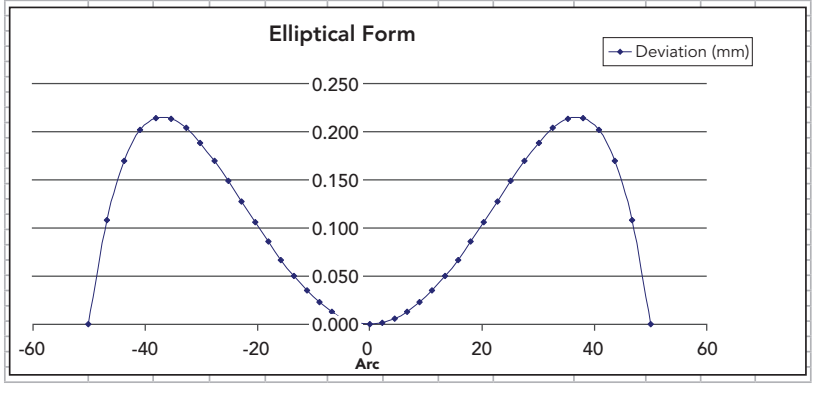
The elliptical form for a typical tool:

Radius: 0.25mm Front Clearance: 12
Rake Angle: 0° Arc: **100°**

Effective Waviness: **0.214423µm**

Calculation of Elliptical Form for a Cylindrical Tool

Radius	0.25	mm	0.009843	in			
Front Cl	12	Degrees					
Rake	0	Degrees					
Arc (+/-)	50	Degrees					
Best fit Radius	0.2464643	mm			Maximum Deviation	0.214423	um



The elliptical form for a typical tool:

Radius: 0.25mm Front Clearance: 12
Rake Angle: 0° Arc: **40°**

Effective Waviness: **0.004976µm**

Calculation of Elliptical Form for a Cylindrical Tool

Radius	0.25	mm	0.009843	in			
Front Cl	12	Degrees					
Rake	0	Degrees					
Arc (+/-)	20	Degrees					
Best fit Radius	0.2448569	mm			Maximum Deviation	0.004976	um