

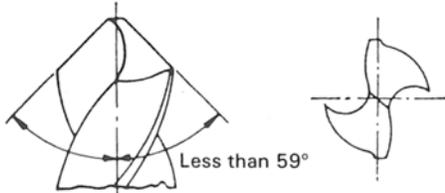


# ACE

technical reference

## Common Inaccuracies of Point Grinding and their Effects

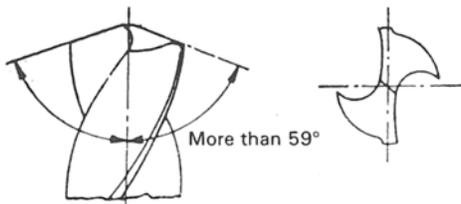
Fig. 1 Point Angle too Acute



**INCORRECT**

Standard twist drills are fluted to produce straight cutting lips with a point angle of  $118^\circ$ . If the point angle is less than  $118^\circ$ , to any appreciable extent, the cutting lips become convex in shape and the cutting efficiency is reduced.

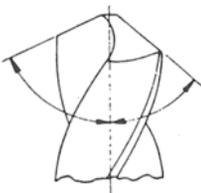
Fig. 2 Point Angle too Obtuse



**INCORRECT**

When the angle is ground much in excess of  $118^\circ$ , the cutting lips become concave or hooked. This weakens the outer corners and impairs the efficiency of the drill.

Fig. 3 Point Angle Unequal



In this instance, instead of each cutting lip being inclined at an angle of  $59^\circ$  to the drill axis, one angle is larger than the other, although the extreme point of the drill is central with the drill axis.

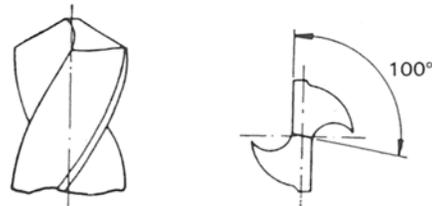
The shorter cutting lip, (the one which makes the largest angle with the axis) does most of the work. The drill is forced to the opposite side of the hole, producing an oversized hole.

Fig. 4 Point Angle Equal but One Cutting Lip is Longer



When this condition applies, the chisel edge of the drill is off center to the axis resulting in oversized holes and submitting both drill and machine to undue strain.

Fig. 5 Effect of Insufficient Clearances



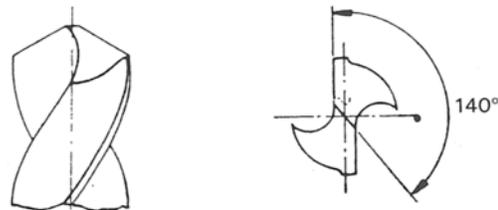
**INCORRECT (A)**

**INCORRECT (B)**

**(A) Initial:** This will cause the drill to rub instead of cutting cleanly as a result of which the drill may split up the web.

**(B) Chisel:** This is indicated by a chisel edge angle of considerably less than  $130^\circ$ . This also causes the drill to rub. The chisel edge builds up and early failure of the drill is likely.

Fig. 6 Effect of Excessive Clearances



**INCORRECT (A)**

**INCORRECT (B)**

**(A) Initial:** This causes lack of support behind the cutting lips, and in consequence they may chip or break under normal feeds.

**(B) Chisel:** This is indicated by a chisel edge angle in excess of  $130^\circ$ . This causes the chisel edge to lengthen preventing the drill from centralizing properly. Oversized and out-of-round holes will be produced.

### Point Grinding Precautions

It is most important that care be exercised when sharpening a drill. The correct grit and grade of grinding wheel should be used. Full details and recommendations may be obtained from the manufacturers. Either grind drills dry, or under a flood of water. The halfway method of having a trickle of water is to be avoided. Minute cracks are caused by stresses imposed due to local heating and quenching. This can cause the drill to break as soon as it is put to into use, creating a serious hazard to the operator. Dipping the tool into water immediately after grinding should be avoided.