

Graver Geometry

The narrower the geometry the weaker the point
The wider the geometry the stronger the point.
The greater the face angle the stronger the point
The lesser the face angle the weaker the point
The shorter the heel length the easier the point will dive in
The longer the heel length the more difficult form the point to dive in

A cut of 1mm in depth with a 90 degree graver will produce a cut line width of 1mm
A cut of 1mm in depth with a 120 degree graver will produce a cut line width of 3.6mm

There are therefore two things that control point strength. A wider geometry and a steeper face angle
A steeper face angle will push the metal as it cuts

A lower face angle will cut through the metal easily. But break more readily depending on the material being cut. It can also dive into the metal more readily.

So knowing the effects of geometry as it pertains to graver geometry will allow us to choose the best geometry for any situation.

Example :

If I want to cut an even straight line, then using a steeper face angle with a longer heel will produce the best result.

Problems and exceptions,

If you are cutting stainless steel the effect of a steeper face angle causing the cutter to push the metal as it cuts will work harden the metal as it cuts causing the point to dull or break easier. The same is true with titanium.

The better choice for creating a stronger point in this case would be to use a wider geometry with a lower face angle.

The other factor to, then consider is the cutter material itself. Stainless steel will cut better with HSS steel gravers.

Other factors that effect cutting results,

Cutting speed will also give different result depending on the material being cut. For stainless a slower cutting speed will give better results because the graver will be allowed to again cut instead of pushing the metal.

To determine the best speed for a given metal you need to experiment. Generally gimmy metal cuts more efficiently with faster speeds. Harder and tougher material cuts better with slower speeds.

If when your cutting the graver wants to come up out of the cut then your cutting too fast. The correct speed will allow th graver to stay down in the metal and let the cutter move forward easily.

