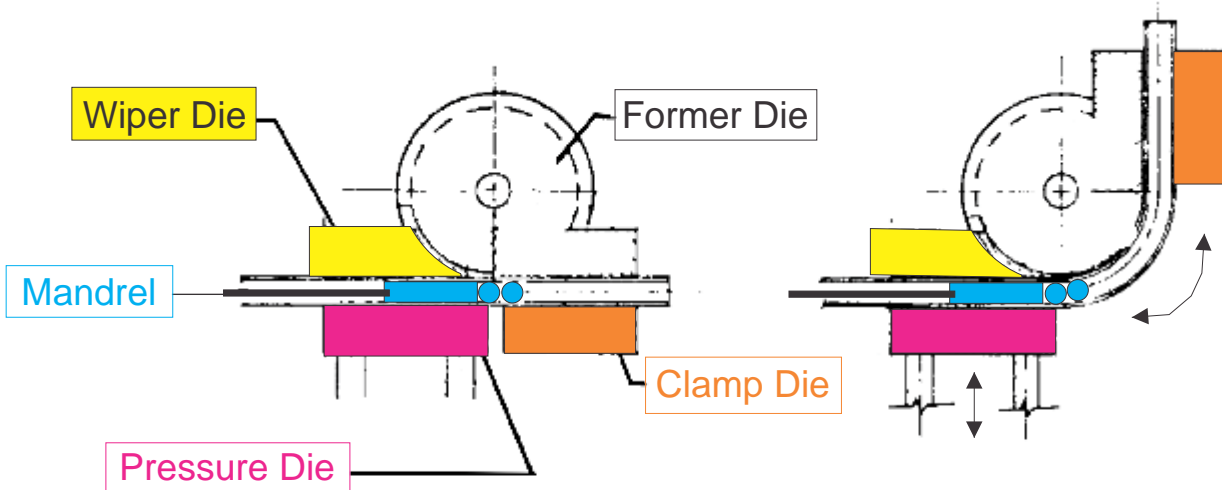


## Technical Resources from [Trick-Tools.com](http://Trick-Tools.com)

### What is Mandrel Bending?

Mandrel bending is a widely misunderstood bending term. Many customers and even some bending companies refer to the bending dies as mandrels or shoes. Technically the mandrel is a part of the tooling set but does not exist in most bending applications.



The mandrel actually goes inside the tube and is held by a mandrel rod to support the tube at the tangent point of the bend. The mandrel is then extracted after the bend is complete or within the last few degrees of bending. This requires a machine with a bed longer than the tube being bent and strong enough to support the forces against the mandrel.



Common mandrels configurations include the plug, ball, disc or multi-ball or disc design. The type of mandrel required varies depending on the wall thickness of the tube, radius required, and type of material being bent.



Mandrel bending can create a bend much tighter than empty bending as well as improve the appearance of bend. Radii as tight as one times the diameter of the tube (1D) are possible, whereas with empty bending (bends without an internal mandrel) acceptable radii are usually two to three times the diameter (2-3D). This is especially useful for automotive exhaust applications or when a fluid or gas is being flowed through a tube. Most chassis or frame tube bending applications do not require a mandrel and even though the bend may appear stronger the outer wall of the tube is actually stretched thinner by the mandrel bending process. For more questions regarding bending applications please call or email the bending experts at Van Sant Enterprises.