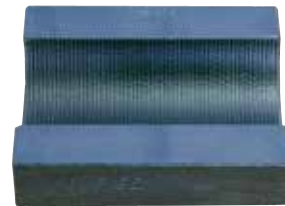


Ercolina mandrel systems incorporate five (5) individual tooling components to effectively support the profile during bending process. These components; **Center former**, **pressure die**, **clamp die**, **wiper die** and **flexible mandrel** are specific to material type, dimension and centerline radius (former & wiper).

## TOOLING COMPONENTS OF MANDREL BENDING



**Center Former / Bend Die:** Primary tool which determines bend radius. Manufactured from tool steel or alloy steel and heat treated depending on requirements. Clamp face is serrated to assist grip strength.



**Clamp Die:** Matches center former clamp surface. The clamp die's primary function is to hold tube securely to the center former.



**Pressure Die:** Maintains constant pressure on tube at tangent where the bend occurs, providing reactionary force to make the bend. Length of the pressure die depends on the degree of bend (DOB) of part being bent and the machine design.



**Wiper Die:** Manufactured to match center former radius. Mounts into the groove of the center former with tip positioned near tangent point of bend. Primary function is to prevent wrinkling on the inside radius of the tube. Wiper dies are typically manufactured from AMPCO® bronze.

## Mandrel Tooling Information



**Mandrels:** Primary function of the mandrel is to prevent inside diameter of the tube from collapsing. Choosing the correct mandrel is very important in determining the quality of bend. Basic styles of mandrels are:

1. **Plug mandrel** used for heavier walled tube or large CLR bending.
2. **Thin wall mandrel (close pitch mandrel)** used mostly for thin wall tubing. Thin wall style mandrels use the same style linkage as standard mandrels except the link size is the next size smaller than it would be on a standard mandrel. For example, where a standard style mandrel would use a #10 size link, a thin wall style mandrel would use a #9 size link. The ball segments are now closer together and provide more support needed for thin walled tube bending. Strength is sacrificed for more support.



2" Stainless Steel  
.065 wall – 3" CLR  
Cutaway to show mandrel



Spring Collet



Segmented Collet

**Collet:** The collet is mounted in the tailstock of machine and holds material securely in carriage. Collets are size-specific and must match the tooling mounted on machine.

**Bending Lubrication:** Comes in several different forms such as oil, grease, and paste. The kind of lubrication used will depend on material to be bent. A generous amount of lubrication may be applied to mandrel and inside of tube, however precautions should be taken to avoid getting lubrication on center former and clamp die. Proper lubrication is important to making good bends.

Bending lubricant is a must in most applications. Proper lubricant will significantly improve the bending process and part quality. After you bend the tube, you're probably going to clean it, weld it, or assemble. Select and use the correct lubricant.

Stainless steels have higher tensile strengths and yield strengths than carbon steels, and require more energy generating more heat. Heat builds up, lubricant moves away from bend. Use lubricants with additives that reduce the amount of heat generated.

## MOUNTING MANDREL TOOLING INSTRUCTIONS

