

Choosing the Right Cup Size

Cup size (sometimes referred to as nozzle or lava cones), play an intricate part in welding pipe open butt groove joints. The size and length of the cup being used is normally determined by the joint design and root opening. Wall thickness and joint design is the biggest determining factor. The side to side movement while welding the root and hot passes are also determined by travel speed and amperage. Most cups today do not have the size number printed on the cup itself. The size can be determined by measuring the inside diameter of the cup opening. For example, a number 4 cup measures 1/4" across the inside diameter of the opening, a number 5 cup has an opening of 5/16", a number 6 cup has an opening of 3/8", a number 7 has an opening of 7/16" and a number 8 cup measures 1/2" across the inside diameter. An industry standard is the cup size will increase by increments of 1/16".

Starting with the root pass, the cup size will typically start with a number 4 or 5 so the cup is resting on both outer bevels of the pipe, this is a "2" point contact. As the groove joint fills it is important to increase the size of the cup until the cup walking technique can be used. The inside of the cup should be at least three times the tungsten diameter to provide adequate shielding gas coverage.

When welding titanium, stainless or other alloys it is a good practice to use a gas lens for the umbrella of shielding gas with minimal turbulence. With this, you can maximize the shield gas coverage and be able to extend your tungsten out further. Rule of thumb, if your cup is a number 6 (3/8"ID) the tungsten should not stick out past the end of the cup by 3/8".

For wall thickness of 1" to 3" a medium 1/8" gas lens with a 3" long #6 lava cone is recommended for the root pass and a large 1/8" jumbo gas lens with #8/10 lava cone is recommended for the hot pass.

These are only recommendations; you should always read and understand the procedure specifications that are unique to each job site.