

Butt Fusion

Preparation and Settings:

1. Inspect the pipe for cuts, gouges and deep scratches. Damaged pipe should not be fused.
2. Toe in is normal at pipe ends, but may need to be removed to butt fuse pipe to fittings.
3. Verify that the butt fusion heater faces and liners are compatible with the pipe size.
4. Make sure heater face is clean and free from any scratches.
5. Preheat fusion iron to 400 - 450° F (204-232° C)
6. Check heating tool for proper temperature. (Most irons have temperature gauges but Charter Plastics recommends verification with temperature crayons or other measuring device). The temperature measurements should be taken at various places on the heater faces.
7. Interfacial Pressure - Minimum 60 psi - Maximum 90 psi (414-621 kPa; 4.14-6.21 bars)
Interfacial Pressure is used to calculate a fusion joining pressure for hydraulic butt fusion machines.
8. On hydraulic machines, a calculator provided by the equipment manufacturer is used to determine the Fusion Joining Pressure gauge setting.

Interface Pressure and Fusion Machine Hydraulic Fusion Joining Pressure are not the same thing.

Butt Fusion Melt Bead Size Table

Pipe Size	Approximate Melt Bead Size
≤ 1" - 1.25"	1/32" to 1/16"
1.5" - 3"	~1/16"
4" - 8"	1/8" to 3/16"
10" - 12"	3/16" to 1/4"
14" - 24"	1/4" to 7/16"



Butt Fusion Procedures:

1. Wipe off ends of pipe and fitting with a clean, dry, lint-free cloth.
2. Place the components (pipe or pipe and fitting) in butt fusion machine. Allow ends to extend past the alignment clamps 1" (25 mm) for facing purposes. Align the components with the machine then close the clamps. Bring the ends together and check for high/low alignment. Adjust for high/low.
3. Place the trimmer between the pipe or pipe and fitting. Bring the ends of both firmly against the cutting blade and trim a thin, continuous strip of material. When the trimmer stops are against both clamps, the ends should be completely faced. Pull the ends away from the cutting disc and remove the trimmer.
4. Remove shavings being careful not to touch the newly faced ends. Dirt or oil may contaminate the joint.
5. Check alignment of the components by bringing them together and examining the O.D. (outside diameter) junction of the two ends. Misalignment of the pipe or pipe and fitting should not exceed 10% of the pipe wall. If there is a misalignment, make adjustments.
6. Separate and place heating tool between the ends of the pipe. Bring pipe ends in contact with the heating tool under moderate pressure to assure complete contact. Then reduce pressure while still maintaining contact (fingertip pressure) with the heating iron.
7. Observe the melt bead as it develops, maintaining fingertip pressure until the desired bead size (refer to the table) of molten material is visible around the entire circumference of both pipe and fitting ends.
8. When the appropriate melt bead has been achieved, snap the pipe or pipe and fitting, away from the heating tool. Remove heating tool being careful not to remove any molten material from the fusion area. Quickly inspect the ends for even melt pattern over the entire melt area.
9. Within three seconds after removing heating tool, bring pipe ends together until they touch. Increase pressure slightly, applying only enough to obtain a roll back of bead onto the pipe and the fitting ends. When using a hydraulic machine Charter Plastics recommends using an interfacial pressure of 75 psi.
10. Do not apply excess pressure to roll back. Forcing too much of the molten material out can cause a cold joint. Maintain joining pressure by locking machine in place for duration of cooling time.
11. Hold joint in place until the rolled back ends are cool enough to touch. Approximately 30-90 seconds per inch of pipe.
12. Inspect the entire circumference of the fusion joint for uniform rollback of the melt bead. The edges of the bead should be against the pipe and fitting. A good butt fusion exhibits:
 - ✓ Proper rollback of the melt bead
 - ✓ No visible gaps or voids
 - ✓ Proper melt and alignment
13. Wait an additional 30 minutes before subjecting the pipe to rough handling including bending, burying, pressure testing or backfill stress.

