

Ball Valves

Valves with extended ends for butt welding to piping or tubing need not be disassembled prior to welding as the extended ends will absorb enough of the heat generated during welding to prevent excessive temperature at the seats and seals. The valve should be open during welding to enable purging of inert gas and to aid in dissipating heat. A valve should never be in the partially open or partially closed position during welding.

If the valve does not have extended ends for butt welding, valve disassembly is needed prior to welding to prevent welding heat from damaging the seats or seals. Valves with Socket Weld, Sil Braze, or Solder Joint ends should always be disassembled prior to welding.

Note: Valves with UHMWPE seats or seals should be disassembled prior to welding regardless of the type of end connections installed.

If disassembly is impractical, provide external cooling (chills) between the heat source and the seats and seals of the valve. The chills should be sufficient to prevent exceeding the following temperatures:

Seat & Seal Material	Temperature
TFM™ – Chemically Modified TFE	400°F
PEEK - Polyetheretherketone	550°F
RTFE - Glass Reinforced PTFE	400°F
S/S TFE - Stainless Steel Reinforced	450°F
PTFE	
VTFE- Virgin PTFE	350°F
UHMWPE - Ultra High Molecular Weight Polyethylene	180°F

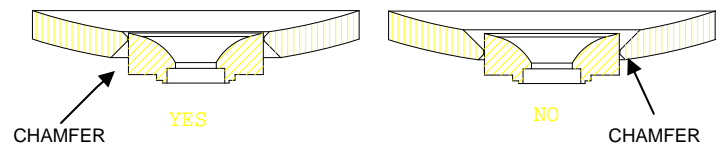
Valve Pads

Valve pads may be welded directly to a tank or to a section of piping. Because excessive temperature may damage the valve's elastomeric seats and seals, the valve body must be removed from the pad prior to welding. The valve body should be installed after the pad cools and has been cleaned.

Pad distortion could hinder valve operation. To minimize distortion of the pad from welding:

- Provide external cooling on the pad and the tank or piping. (Copper chills are preferred.)
- Control interpass temperature to a reasonable value.
- Weld at minimal current to reduce heat. Reduction of heat reduces the amount of metal shrinkage per unit time, as well as the force tending to distort the pad. Welding with reduced heat may require additional passes and time.
- Stagger welding into a number of steps around the 360° circumference. An example of such staggering would be to complete a pass in the following sequence:

12	to	2	o'clock
6	to	8	o'clock
10	to	12	o'clock
4	to	6	o'clock
8	to	10	o'clock
2	to	4	o'clock
- Do not weld to an unnecessary thickness. Weld only to the thickness needed to meet pressure vessel code or strength requirements. If practical, the weld preparation angle should not exceed 37.5°. Chamfering the weld preparation angle should be done on the tank exterior (*not interior*), if practical (see diagram below). Limiting heat build-up is of extreme importance on thick-walled tanks. If excessive heat distortion occurs, the pad may require re-machining for the valve to operate correctly.
- If preheat is required, use minimum preheat temperatures.



Cleaning After Welding, Soldering, or Brazing

One of the leading causes of seat and seal damage is improper cleaning, or the lack of cleaning, after welding, soldering or brazing. Failure to remove weld slag and other particulates may cause seat and seal damage when the valve is cycled.