

# Technical Instructions for Welding, Soldering, Or Brazing of PBM Ball Valves



## 1. General

This Technical instruction is for the welding of tank pads and welding, brazing, or soldering end connections on PBM ball valves. Please read the instructions carefully and save them for future reference.

## 2. Ball Valve End Connections

2-way valves may be installed in either direction with the valve in the "open" position. For flanged, threaded, or extended butt weld valves, it is not necessary to disassemble the valves before installation. **Note: Any PBM ball valves with UHMWPE seats and seals should still be disassembled prior to the welding, soldering, or brazing.**

Prior to welding, soldering or brazing of other PBM valves, the valves should be disassembled and the seats and seals removed from the parts to be welded, soldered or brazed. If the valve is not disassembled, excessive temperature may damage the valve's elastomeric parts.

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

<u>Seat &amp; Seal Material</u>	<u>Temperature</u>	<u>Seat &amp; Seal Material</u>	<u>Temperature</u>
VTFE- Virgin PTFE	350°F	TFM™ - Chemically Modified Teflon	400°F
RTFE - Glass Reinforced PTFE	400°F	PEEK - Polyetheretherketone	550°F
S-TEF® - Stainless Steel Reinforced PTFE	450°F	UHMWPE - Ultra High Molecular Weight Polyethylene	180°F

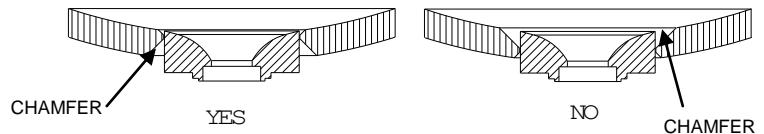
When welding, soldering or brazing, the ball valve should be completely open. Heat passing through a partially open ball may unevenly deform the seats. The individual end connection being welded should be attached to the ground. **DO NOT GROUND ACROSS THE VALVE.**

## 3. Valve Pads

Valve pads may be welded directly to a tank or to a section of piping. Remove the valve body from the pad prior to welding. The valve body should NOT be installed on the pad during welding, because excessive temperature may damage the valve's elastomeric seats and seals. The valve body should be installed after the pad cools and after the pad has been cleaned.

- 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 and, hence, 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.



## 4. 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.

