Technical Instructions for Welding of PBM Radial Diaphragm Valves

1. General

This technical instruction is for the welding of tank pads and welding end connections on PBM Radial Diaphragm valves. Please read the instructions carefully and save them for future reference.

2. Radial Diaphragm Valve End Connections

Radial diaphragm valves should be installed in the vertical position, under a tank/vessel. For valves with extended butt weld outlets, it is not necessary to disassemble the valves before welding.

Prior to welding of valves with short butt weld outlets, the valves should be disassembled and the diaphragm and seals removed from the parts to be welded. 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 seals of the valve. These chills must be sufficient to prevent exceeding the following temperatures:

Seat & Seal Material	Temperature	Seat & Seal Material	Temperature
Silicone – Platinum Cured	275°F	V-TEF™ - Chemically Modified Teflon	400°F
EPDM – Ethylene Propylene Diene Monomer	275°F	FKM – Viton A Fluoropolymer Elastomer	400°F

When welding, the radial diaphragm valve should be completely open. Heat passing through a partially open valve may unevenly deform the diaphragm. The individual component being welded should be attached to the ground. **DO NOT GROUND ACROSS THE VALVE.**

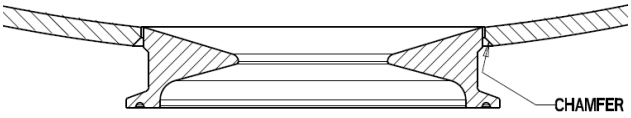
3. Valve Pads

Valve pads may be welded directly to a tank or to a section of piping. Remove the valve body and seals 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 diaphragm and seals. The valve body should be installed after the pad cools and after the pad has been cleaned.

1. Provide external cooling on the pad and the tank or piping. (Copper chills are preferred.)
2. Control interpass temperature to a reasonable value.
3. 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.
4. Stagger welding into a few 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

5. **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.
6. If preheat is required, use minimum preheat temperatures.
7. **Note: PBM standard weld pads are .19" thick weld prep for 1/2" and 3/4" valves, and .25" thick weld prep for 1" through 3" valves. For thicker weld prep, consult factory.**



4. Cleaning After Welding

One of the leading causes of diaphragm and seal damage is improper cleaning, or the lack of cleaning, after welding. Failure to remove weld slag and other particulates may cause diaphragm and seal damage when the valve is cycled.
Note: Internal geometry is important and excessive grinding/buffing that changes geometry could cause sealing issues.

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