

TANK VALVE WELDING GUIDELINES



IMPORTANT INFORMATION
BE SURE TO RETAIN THE ALUMINUM
WELD POST CAP. IT WILL BE USED
AS A GAGE AFTER FINAL WELDING!

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1. General

The TANK VALVE (or similar) pictured in figure 1.1 is an integrated part of the vessel on which it is mounted. This document is a guideline on how to weld the valve into a dished-bottom vessel. Before starting to weld in the valve, please ensure that all necessary certificates and approvals have been received from Asepco.



Fig 1.1

Be sure to do the following:

- Follow the welding guideline described in this document.
- Use a heat-sink to reduce the risk of warping (recommended).
- Cool the weld zone after each weld. The weld should be cool to touch (80-90 deg F)

2. Safety

There are certain warnings that should be followed when welding your valve into the vessel. Each of these warnings and prohibitions is marked in the manual with symbols as below:



WARNING: Negligence to this warning can result in personal injuries and or material deformities



PROHIBITION: Ignoring these prohibitions will definitely cause damage to personnel and or components



This welding guideline must be read carefully and thoroughly understood before the valve is installed. All prohibitions must be considered. Negligence to follow the instructions can result in material damage of the equipment. Local codes and regulations supersede this welding guideline

3. Welding Checklist for the Valve

- ❑ Welding guideline for the TANK VALVE has been carefully read and understood.
- ❑ All necessary certificates, approvals, etc. have been received from Asepco.
- ❑ Welder is authorized and familiar with this type of welding operation.
- ❑ Orientation for TANK VALVE has been taken into consideration
- ❑ Location of TANK VALVE and distances between welding joints fulfill pressure vessel code.
- ❑ Welding procedure for positioning of welds is followed according to these guidelines.
- ❑ Verification of TANK VALVE fulfills requirements in the “Final Control” section.

4. Positioning of the TANK VALVE

4.1 Orientation:

The TANK VALVE should be oriented on the vessel head to ensure full drainability. In general, this is on center of the tank, installed so that the ferrule face of the valve is horizontal and parallel to the floor.



Ensure that the TANK VALVE actuator can be mounted and dismantled without any obstructions.

4.2 Free distance between welds:

The minimum free distance between two welds is specific for each pressure vessel code. Check the relevant pressure vessel code for the smallest permissible distance (W) between the weld seam of the TANK VALVE and any other weld.

4.3 Location of TANK VALVE:

The location of the TANK VALVE in the dished head should be located so that the requirements for the actual pressure vessel code are fulfilled.

4.4 Making the hole for the TANK VALVE

After consideration of section 4.2 and 4.3, the hole for the TANK VALVE should be made with the same diameter as the TANK VALVE (no more than 0.040" larger).

Minimize the air gap between the TANK VALVE and the edge of the hole. The edge of the hole on the exterior of the head must be ground at a 45 ° angle sloping outwards to create a weld groove. A straight edge no more than 0.060" should be left on the inner edge (fig 1.4).

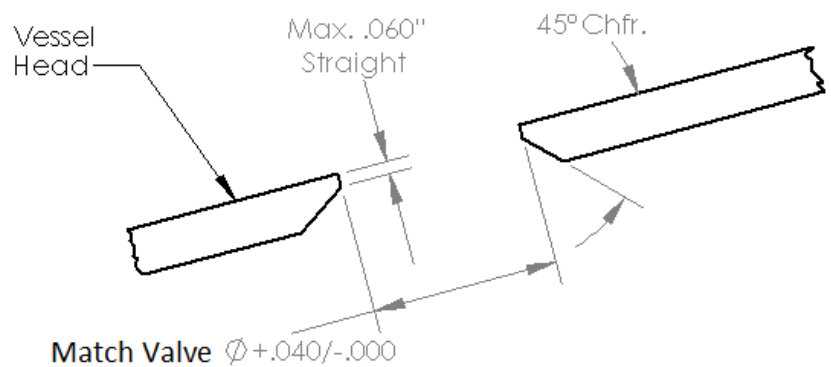


Fig 1.4

4.5 Insertion depth of TANK VALVE

The TANK VALVE must be welded FLUSH to the inner-dished head's ID surface.

5. Welding Instructions

5.1 Before welding

- Ensure the heat number on the TANK VALVE matches TANK VALVE material certificate.
- Set up for the TIG welding method unless this conflicts the local pressure vessel code.
- Prepare to use the proper filler material

5.2 INTERNAL tack welding of the TANK VALVE:

1. Place the TANK VALVE into a pre-drilled hole so that the TANK VALVE is FLUSH with the inner surface of the dish.
2. Tack weld at A and B (fig 1.6). Check the inner surface to ensure the valve is FLUSH.
3. Make necessary corrections if necessary.
4. Tack weld at C and D (fig 1.6).



Follow above instructions. Do not overheat the material.

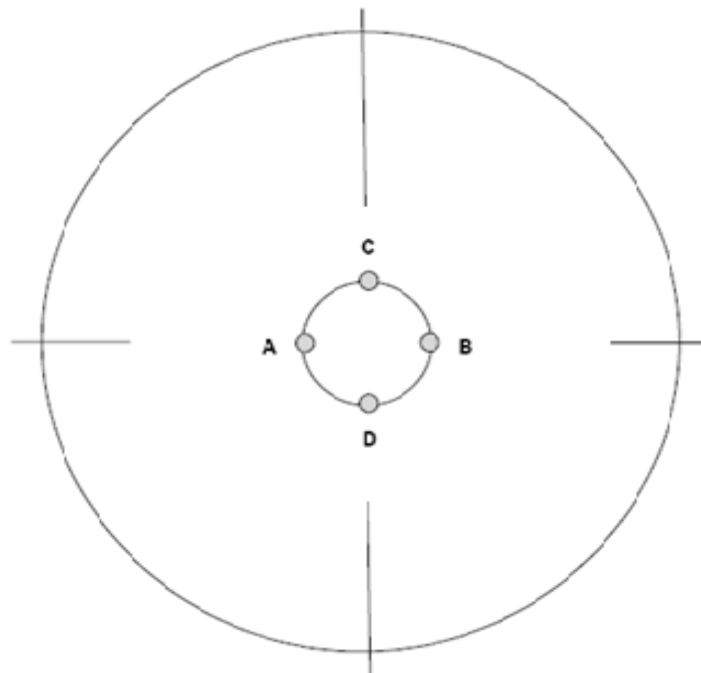


Fig 1.6, Tack Welding from **INSIDE** the vessel head

5.3 EXTERNAL tack welding of the TANK VALVE:

- 1) Start with the dished head turned upside down on a clean working surface and fill it with protective gas (keep the gas flowing during the welding process).
- 2) Tack weld the TANK VALVE as follows
 - a) Start with A then B then C then D per figure 1.7
 - b) Next follow the numbers as indicated 1 through 12 in fig 1.7



Follow above instructions. Do not overheat the material.

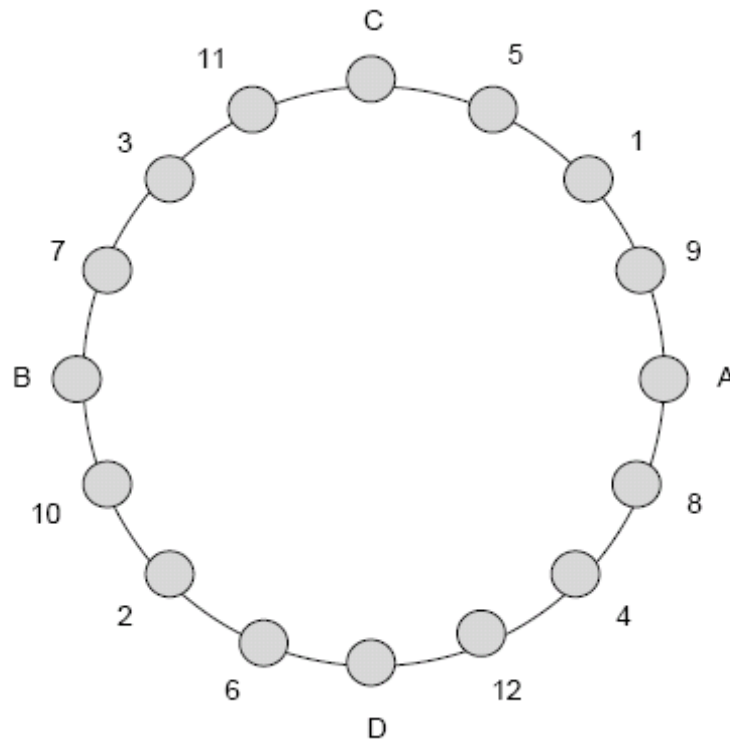


Fig 1.7, Tack Welding from OUTSIDE the vessel head

5.4 Final EXTERNAL welding of the TANK VALVE:

1. Using the appropriate filler material weld the TANK VALVE in the progression shown in Fig 1.8.
2. Always weld in a clockwise movement from tack to tack
3. **Be sure to cool the weld zone with COMPRESSED AIR in between welds until it is cool to touch (80-90 deg F).**
4. Repeat the welding process identified in steps 1-3 above until the weld profile is shaped like a fillet weld with no undercut present.



Follow above instructions. Do not overheat the material.

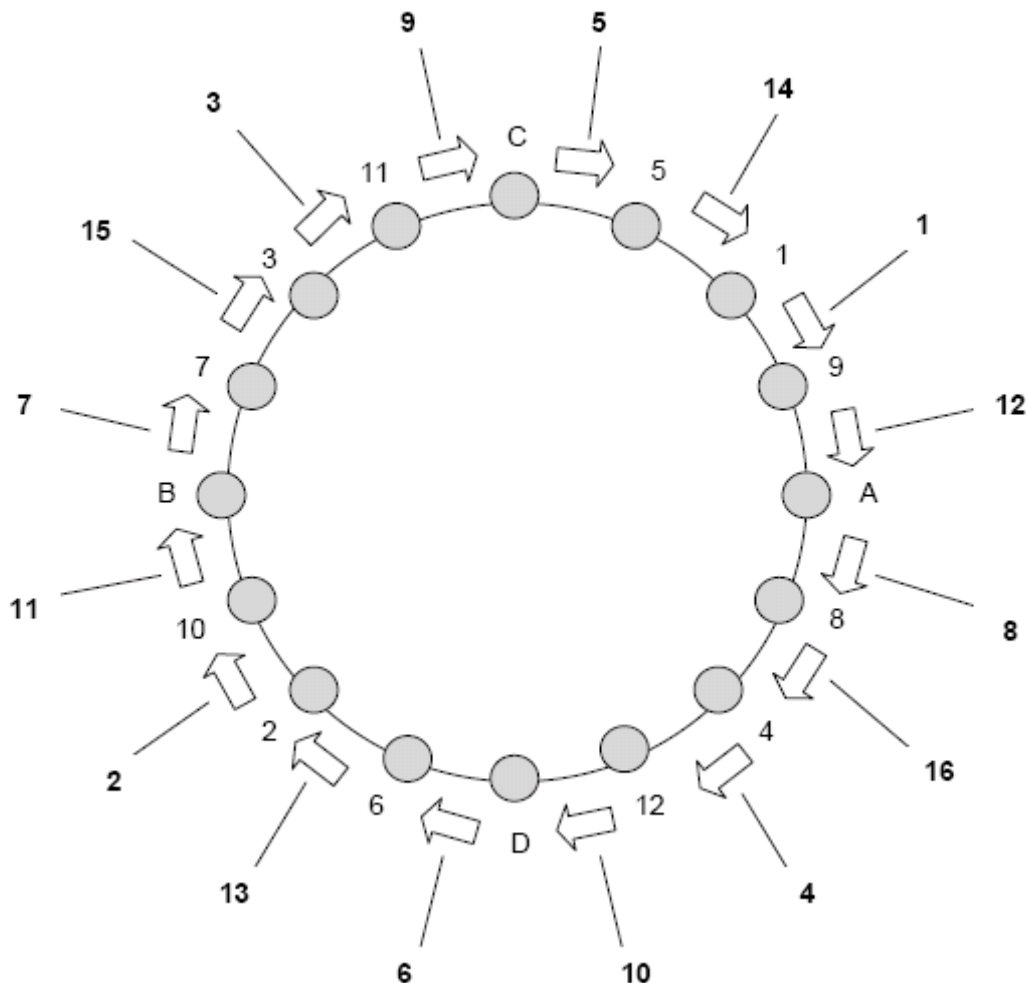


Fig 1.8, Tack to Tack EXTERNAL welding

5.5 Final INTERNAL welding of the TANK VALVE:

1. Turn the dished head over and fill any imperfections in the weld seam. Use the appropriate filler material if needed.
2. Be sure to cool the weld zone in between welds until it is cool to touch (80-90 deg F).



Do not overheat the material.

6. Grinding / Polishing

After cooling the welds can be ground and polished to the final finish required by the specifications. In addition to the above welding procedure the conditions below should also be taken into consideration.

- When polishing the welds ensure that full penetration has been achieved
- If there are weld imperfections they must be addressed immediately

7. Final control (Optional)

The final step in the welding operation should be to check the TANK VALVE for deformation. This can be done by completing the following steps:

1. Ensure the valve is completely cooled to room temperature (~70F)
2. Coat the interior seat with riboflavin
3. Use a fresh (or previously cleaned) diaphragm and install on a manual actuator
4. Turn the actuator to FULL OPEN position
5. Install the actuator
6. Close the actuator until it just touches the seat (you will feel minor resistance on the handle)
7. Open the actuator
8. Remove the actuator
9. Check the circumference of the diaphragm for even distribution of riboflavin (use a blacklight to see this clearly)

If the circumference is evenly coated the valve has minimal or no warping. If it is not even then we recommend to do a pressure test to further determine if the valve is installed correctly.

If the valve does not pass a pressure test then most likely it has been warped out of specifications. We then suggest the valve is removed and a new valve is reinstalled.

For more help with installation call Asepco for personal assistance.