

X. Reference Drawings

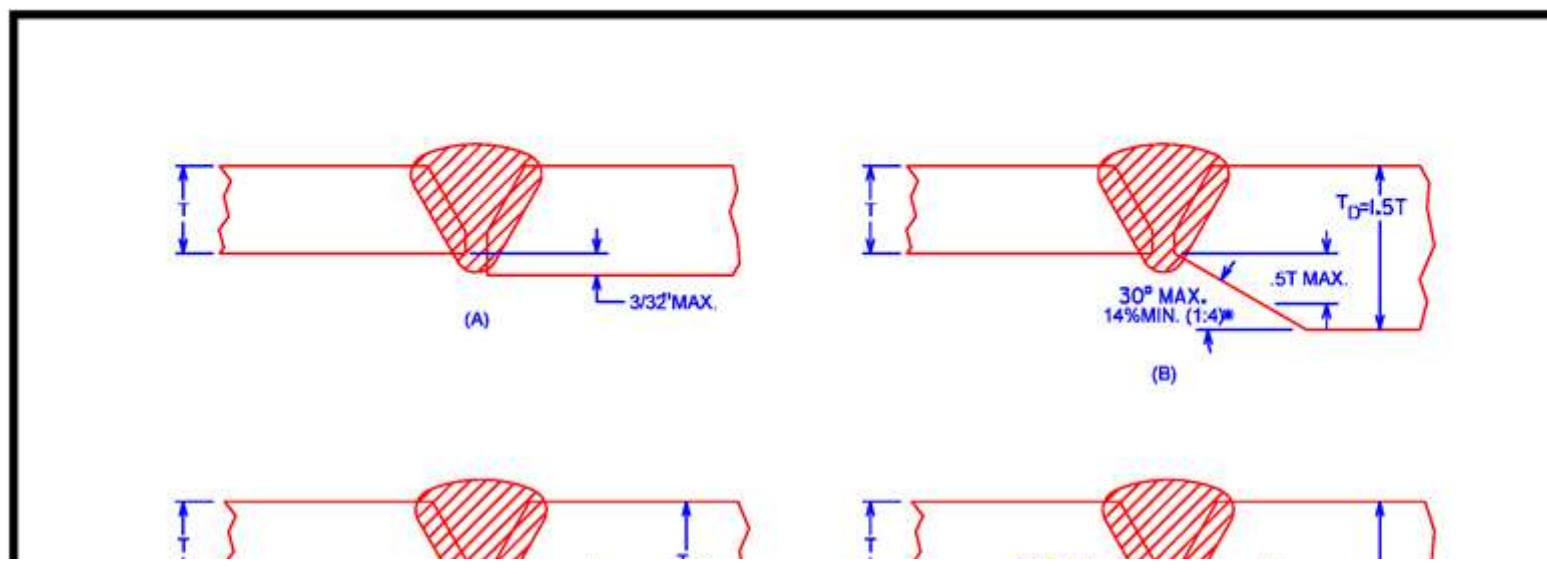
DENC and DESC Welding Manual - Version 2019.1 May 1, 2019

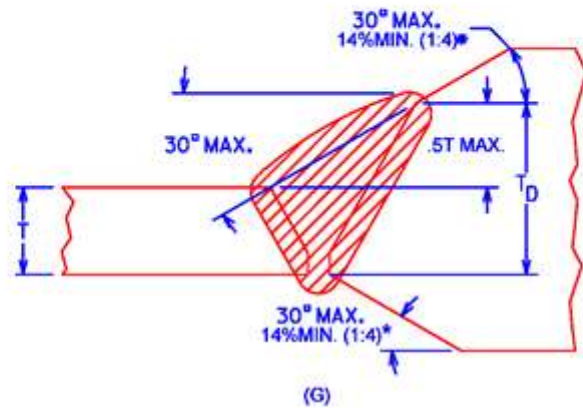
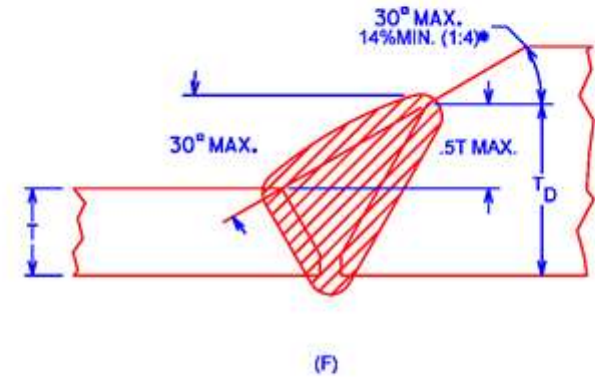
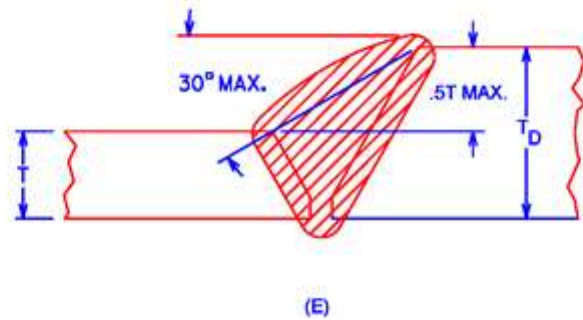
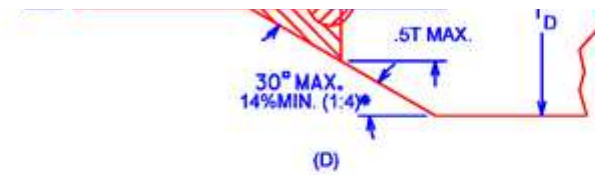
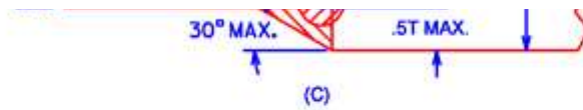
The listed drawings contain standards that shall be followed during the construction and maintenance of steel pipelines.

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Acceptable Designs for Unequal Wall Thickness	1
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Reference drawings are shown below, each with a link to the pdf version for printing.

Figure 1 - Acceptable Design for Unequal Wall Thickness (click [here](#) for pdf version)





T_D = WALL THICKNESS OF THICKER SECTION
 T = WALL THICKNESS OF THINNER SECTION

- NO MIN. WHEN MATERIALS JOINED HAVE EQUAL YIELD STRENGTH

FIGURE 1
ACCEPTABLE DESIGNS FOR
UNEQUAL WALL THICKNESS


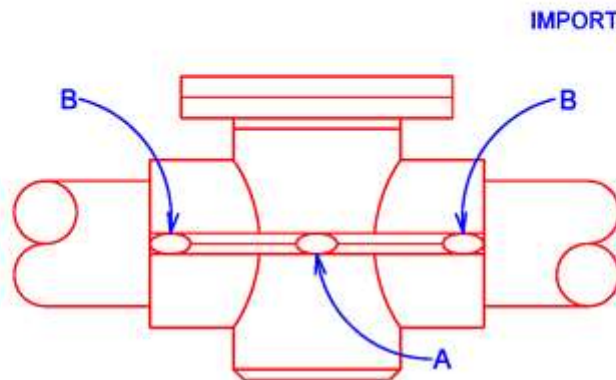
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Figure 2 - Sequence of Beads for Split Fittings (click [here](#) for pdf version)

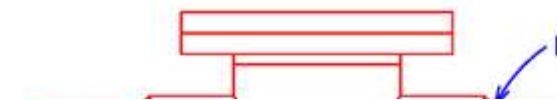
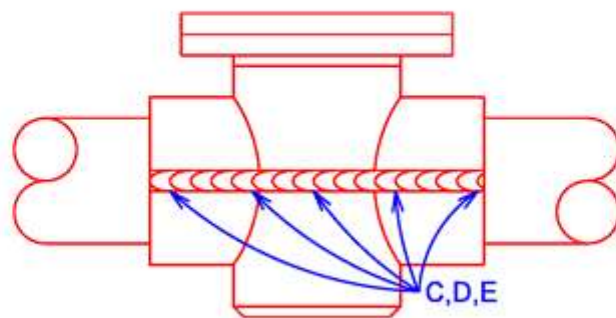


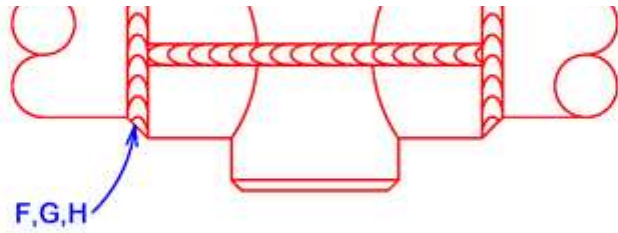
IMPORTANT:

Two welders simultaneously welding a circumferential weld must weld in opposite quadrants of the pipe to reduce heat input. (Minimum fitting temperature of 150 F to 250 F shall be maintained throughout the welding process)

USE THE APPROPRIATE PSNC WELDING PROCEDURE

- A. Level fitting as much as possible and securely bind in place. Tack the middle of the longitudinal weld bevels on each side.
- B. Tack each end of the longitudinal weld bevels on each side.
- C. Run stringer bead on each longitudinal weld area. Complete bead on one side before starting on the other side.
- D. Run "HOT PASS" bead on each longitudinal weld area. Complete bead on one side before starting on the other side.
- E. Run filler and cap beads on each longitudinal weld. Complete each side before starting the other side. The longitudinal welds shall be completed before starting circumferential welds.
- F. Run stringer bead on one of the circumferential weld areas. Complete the entire bead before starting next bead.
- G. Run "HOT PASS" bead on the same circumferential weld area. Complete the entire bead before starting next bead.
- H. Run filler and cap beads on the same circumferential weld area.





- I. Repeat steps F-H for the opposite circumferential weld area.

NOTE:
COMPLETE THE ENTIRE
BEAD BEFORE STARTING
THE NEXT BEAD.

**FIGURE 2
SEQUENCE OF BEADS
FOR SPLIT FITTINGS**


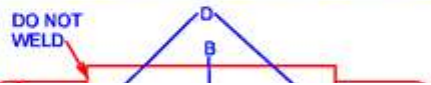
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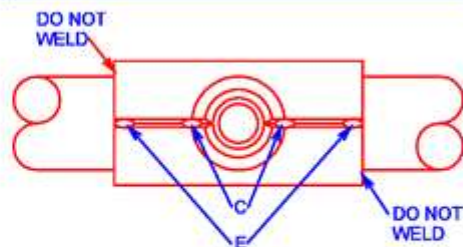
Figure 3 - Sequence of Beads for Split Reinforcing Fittings (click [here](#) for pdf version)

REINFORCING BAR VIEW - TACK WELDS

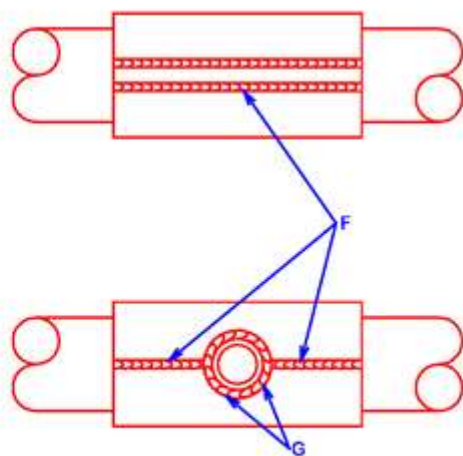




BRANCH VIEW - TACK WELDS



COMPLETED WELDS



to be welded to the pipeline and is for reinforcement only. A weld connecting the branch of the fitting to the branch of the pipeline or fitting being reinforced is the only weld to be made that connects the fitting to the gas carrying facilities.

USE THE APPROPRIATE PSNC WELDING PROCEDURE

- Grind tack weld off the branch connection and one side of the reinforcing bar. Separate fitting and leave reinforcing bar attached to one half of the split fitting. Complete the fillet weld where the reinforcing bar is attached to fitting.
- Place both halves of the fitting around the pipe area and branch or fitting to be reinforced and draw together as tightly as possible. Tack weld the center of the non-welded side of the reinforcing bar to the other half of the split fitting.
- Tack weld each side of the butt weld bevel at the base of the branch making sure not to weld directly to any of the gas carrying pipes or fittings.
- Tack weld the reinforcing bar on each side making sure not to weld to the pipeline.
- Tack weld the butt weld bevel at the ends of the bevels nearest the pipeline.
- Run alternating weld beads on the reinforcing bar and butt weld bevel areas until each weld is complete. Be sure to complete each bead on these areas before starting the next bead.
- Finally, weld the branch or fitting being reinforced to the split fitting by completing the stinger, hot pass and fill and cap beads. Complete each bead before starting next bead.

NOTE:
COMPLETE THE ENTIRE
BEAD BEFORE STARTING
THE NEXT BEAD.

FIGURE 3
SEQUENCE OF BEADS FOR

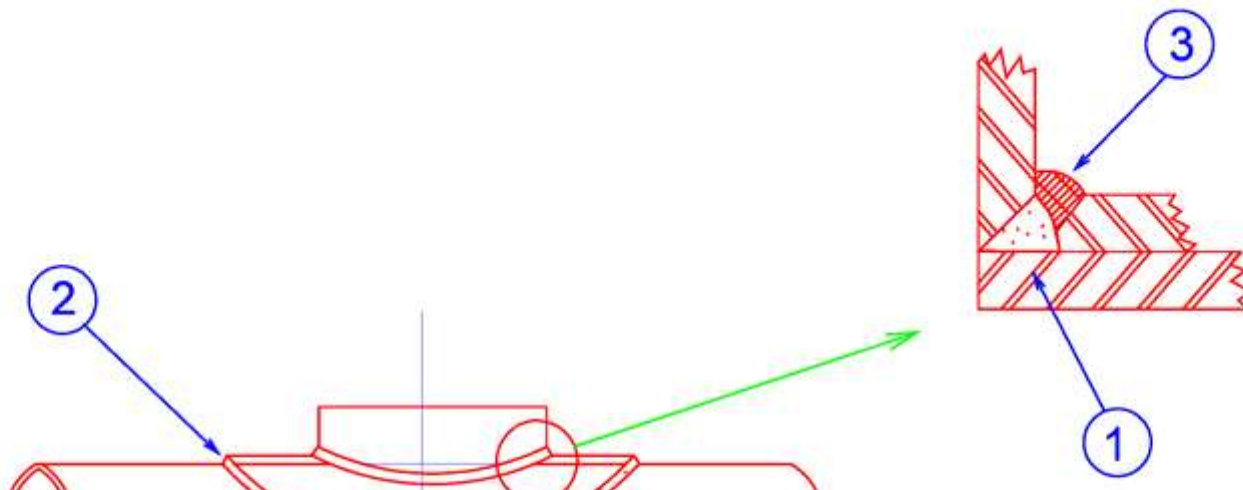


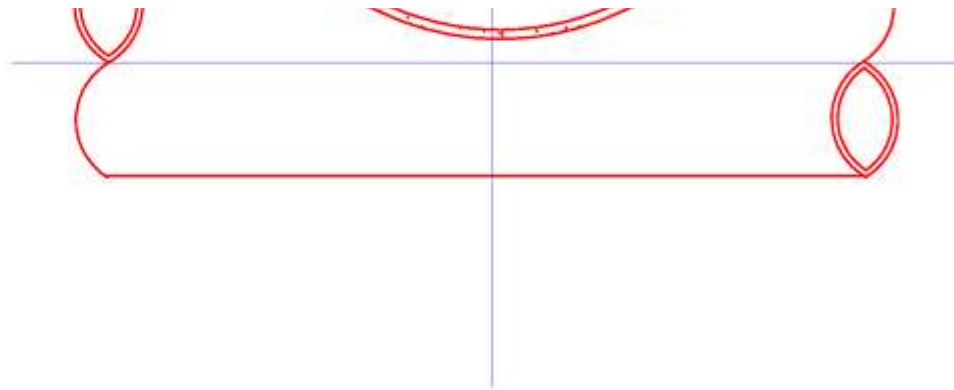
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Figure 4 - Welding Sequence - Reinforcing Pad (click [here](#) for pdf version)





**FIGURE 4
WELDING SEQUENCE-
REINFORCING PAD**

**NOTE:
THIS IS A SUGGESTED WELDING
SEQUENCE; OTHERS MAY BE
FOLLOWED AT THE DISCRETION
OF THE COMPANY.**


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Figure 5 - Welding Sequence - Reinforcing Saddle (click [here](#) for pdf version)

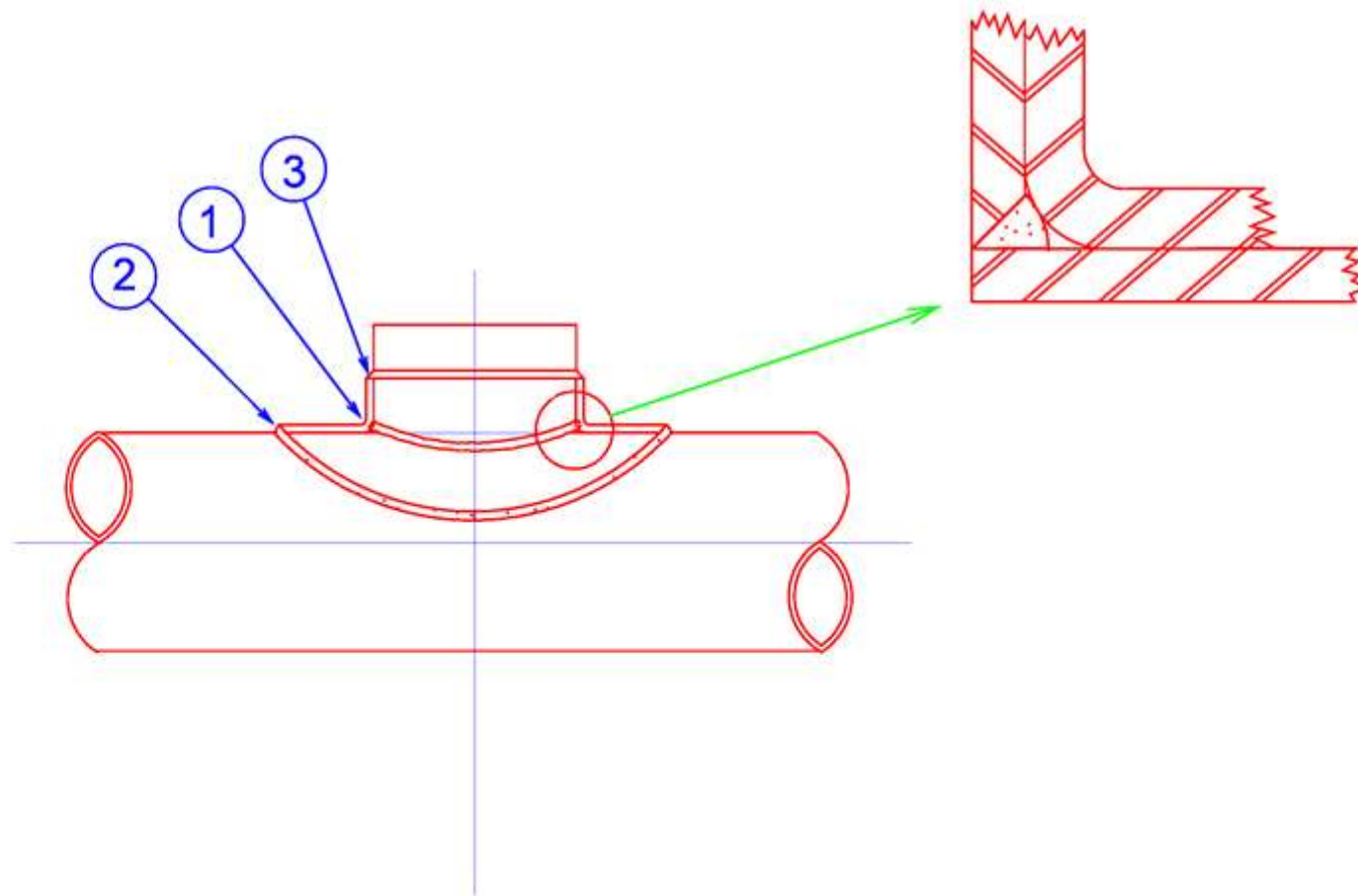


FIGURE 5

NOTE:
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WELDING SEQUENCE-
REINFORCING SADDLE


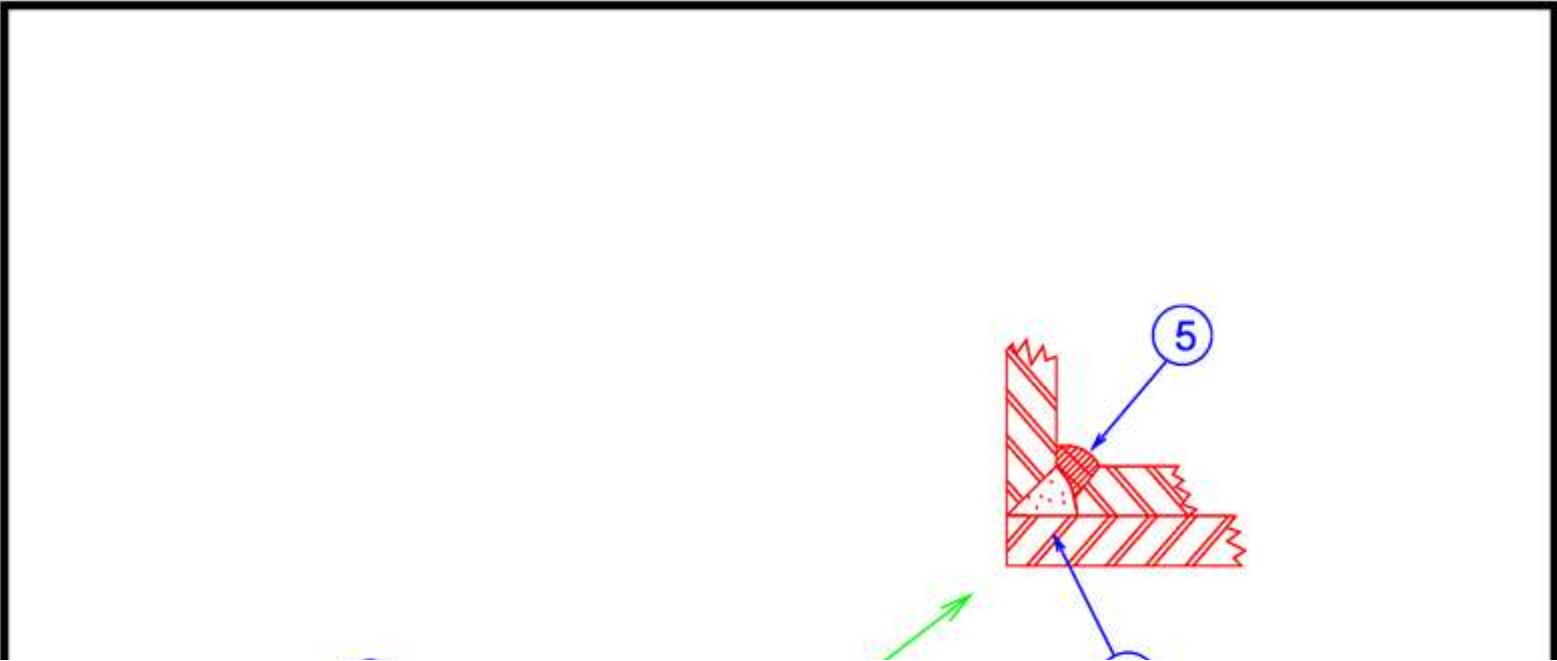
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Figure 6 - Welding Sequence - Encirclement Sleeve (click [here](#) for pdf version)



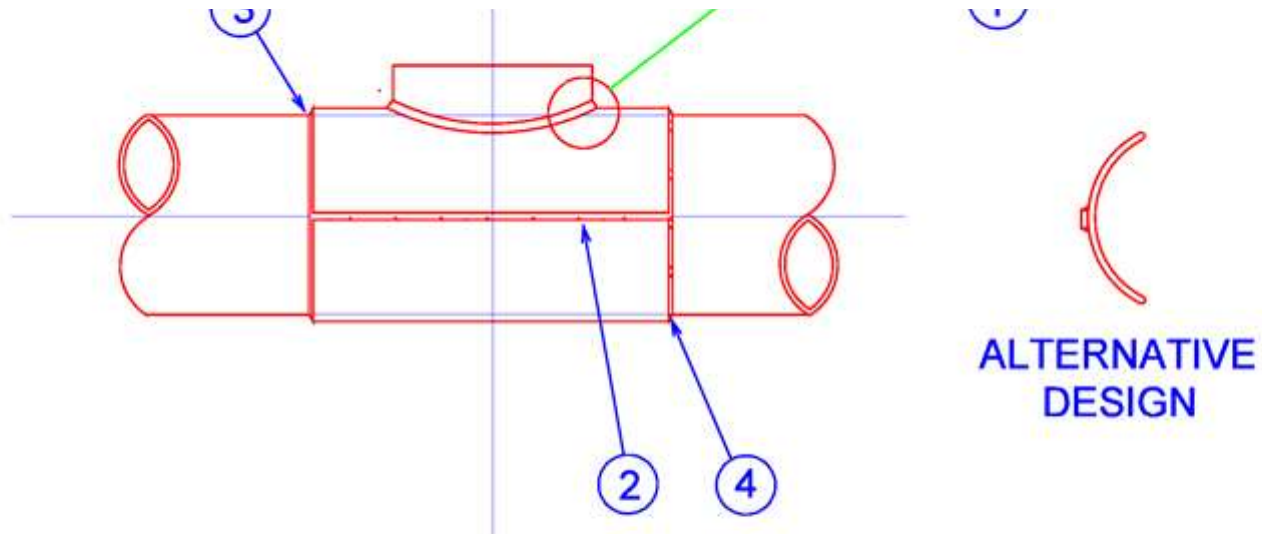


FIGURE 6
WELDING SEQUENCE-
ENCIRCLEMENT SLEEVE

NOTE:
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FOLLOWED AND CIRCUMFERENTIAL
WELDS NUMBERS 3 AND 4 NEED
NOT BE MADE.



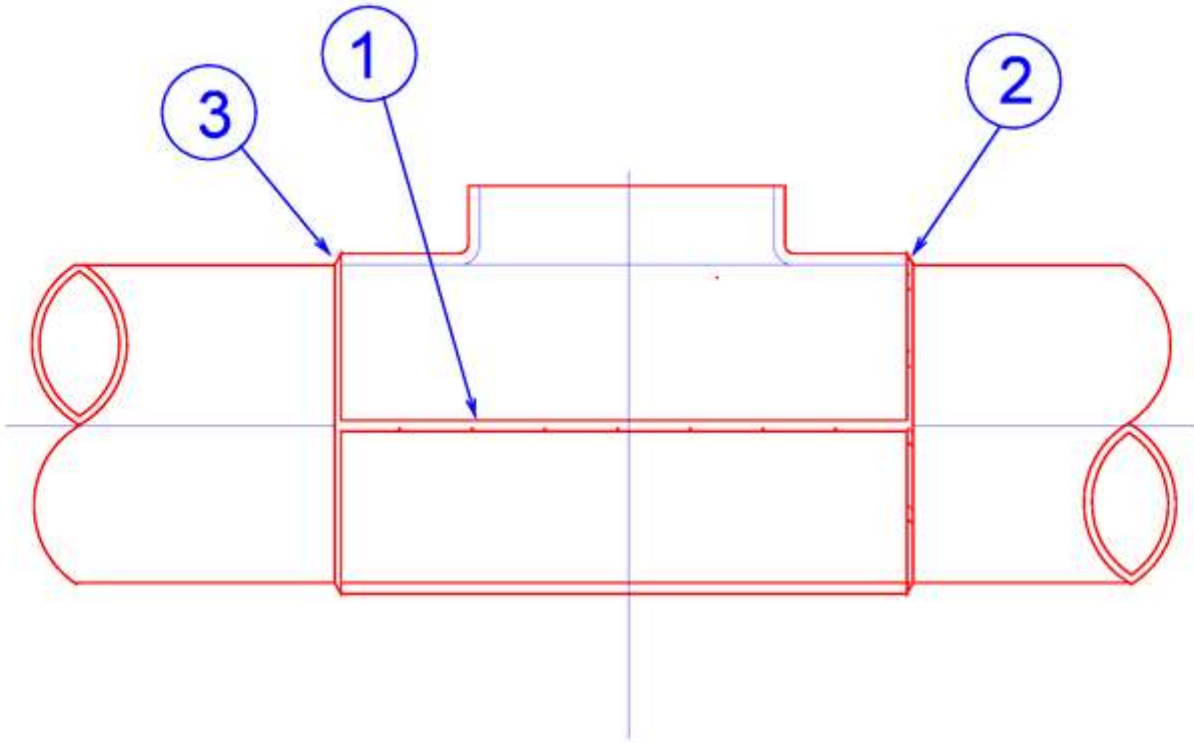
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Figure 7 - Welding Sequence - Encirclement Tee (click [here](#) for pdf version)



**FIGURE 7
WELDING SEQUENCE-
ENCIRCLEMENT TEE**

1. THIS IS A SUGGESTED WELDING SEQUENCE; OTHERS MAY BE FOLLOWED AT THE DISCRETION OF THE COMPANY
2. WHEN IN OPERATION, THE FITTING IS AT PIPELINE PRESSURE
3. SEE FIGURE 3 FOR MORE DETAILS.


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Figure 8 - Welding Sequence - Encirclement Sleeve and Saddle (click [here](#) for pdf version)



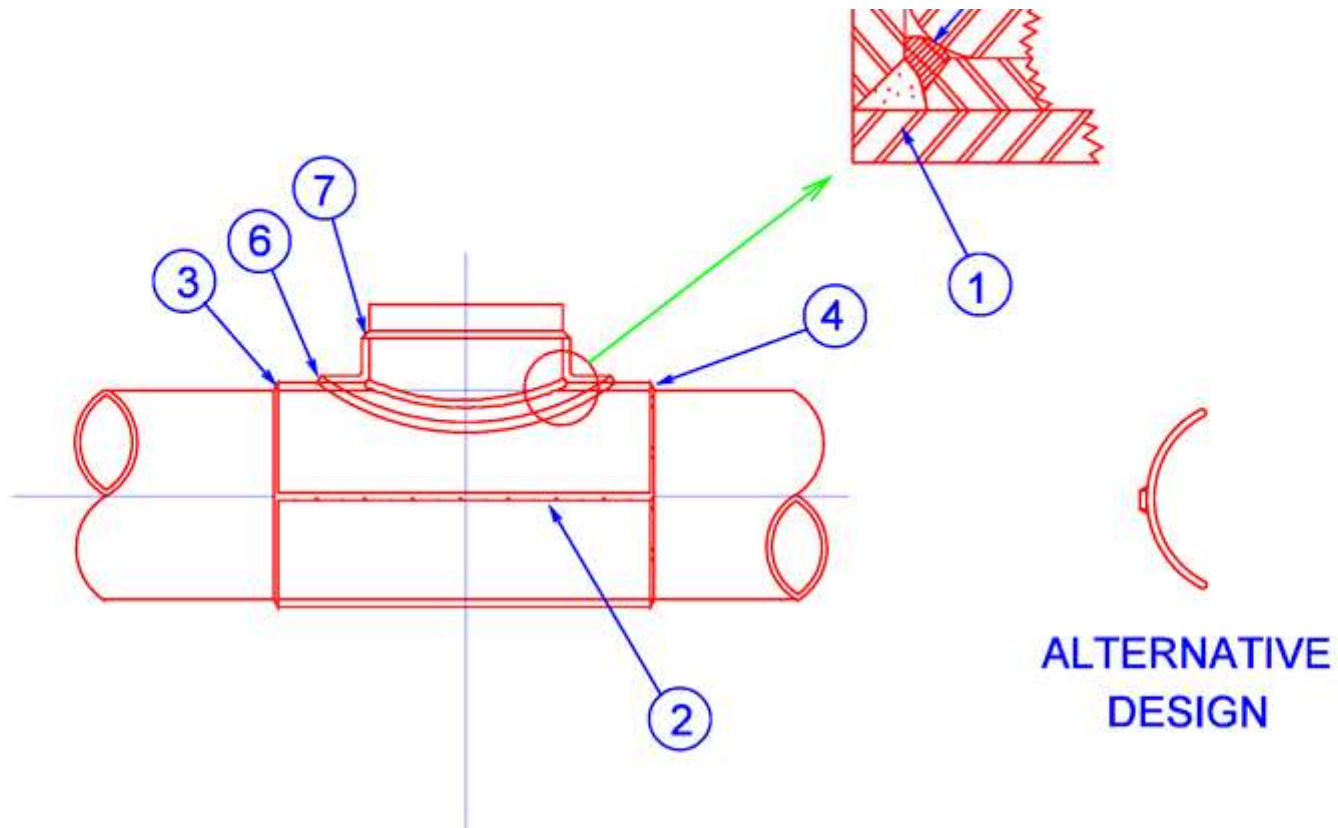


FIGURE 8
WELDING SEQUENCE-
ENCIRCLEMENT SLEEVE
AND SADDLE

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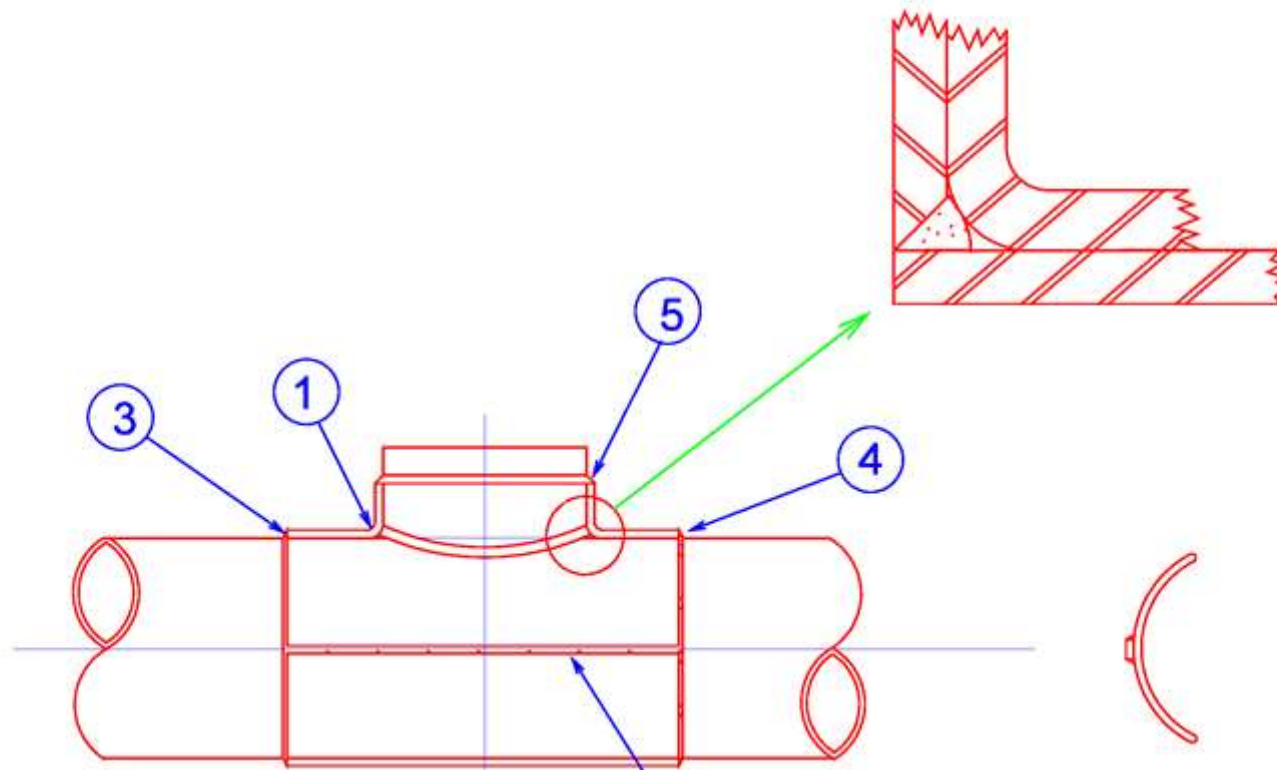


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Figure 9 - Welding Sequence - Encirclement Saddle (click [here](#) for pdf version)




2

ALTERNATIVE
DESIGN

FIGURE 9
WELDING SEQUENCE-
ENCIRCLEMENT SADDLE

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