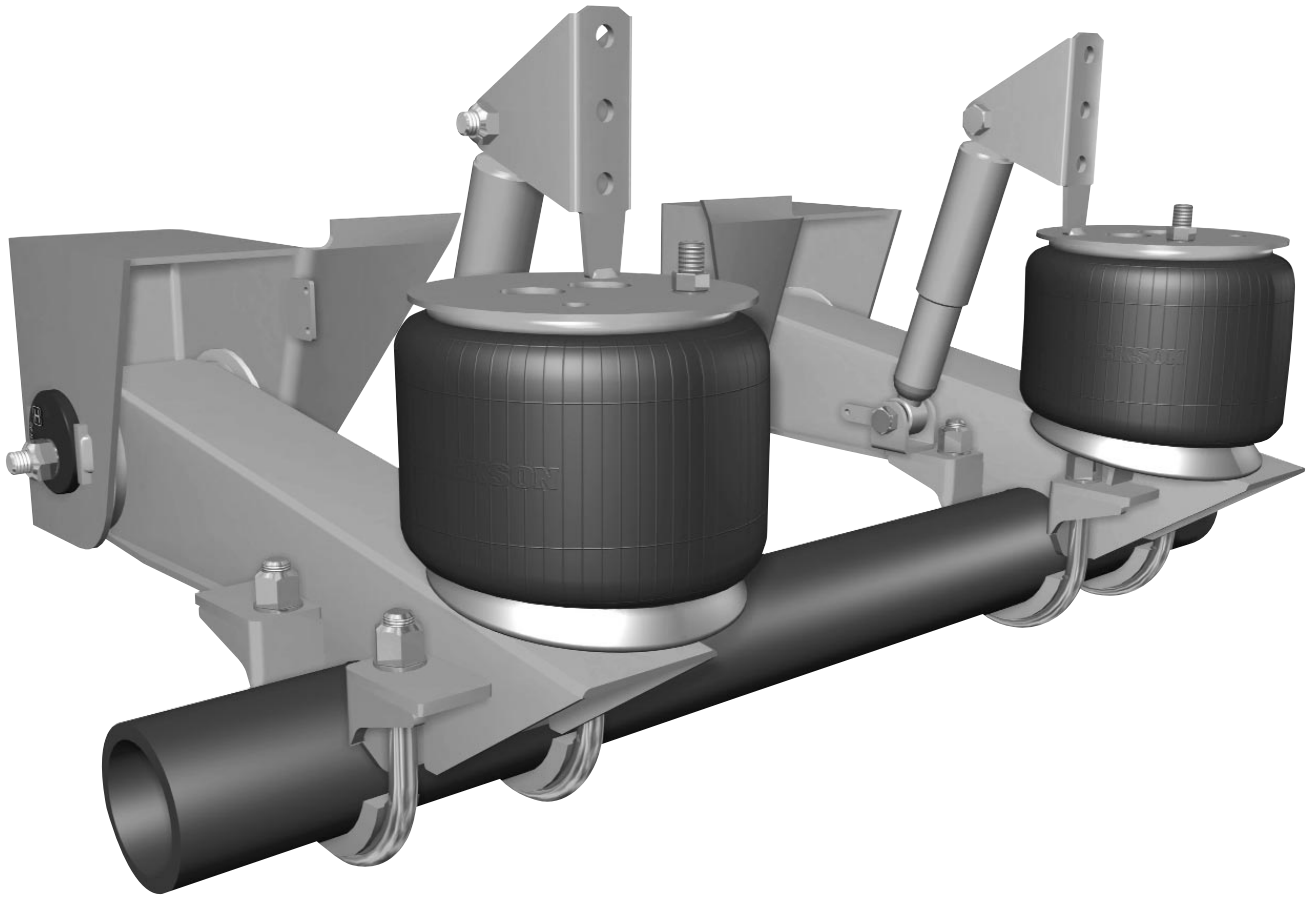
TECHNICAL PROCEDURE

HENDRICKSON SUSPENSION SYSTEMS

SUBJECT: Welding Procedures
LIT NO: L64
DATE: February 2000 **REVISION:** E



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For The Road Ahead

HENDRICKSON

⚠**WARNING: IF THESE PROCEDURES AND SPECIFICATIONS ARE NOT FOLLOWED, DAMAGE TO THE AXLE OR SUSPENSION COULD RESULT. THE RESULTING AXLE OR SUSPENSION DAMAGE COULD CAUSE AN ACCIDENT, PROPERTY DAMAGE AND/OR SERIOUS INJURY.**

NOTE: Suspension U-bolt installation and torquing should occur after completing the axle connection weld and allowing for sufficient cool-down time.

AXLE WELDING PARAMETERS — HT SUSPENSIONS ONLY

NOTE: A welder qualified in 2G position per ANSI/AWS D1.1-94 Section 5 Part C "Welder Qualification" must perform the welding.

NOTE: The specification shown below is for horizontal (2F) positioning. For flat (1F) positioning, see "Alternative Axle Weld Procedure" in the Appendix.

1. Suspension components and their mating parts must be at a minimum temperature of 60ºF (15.5ºC) and free from moisture, dirt, scale, paint and grease.

NOTE: Preheating the axle connection at the axle and suspension seat may be recommended and/or required by the axle manufacturer. Consult axle manufacturer for their axle preheating specifications and the applicable effect on their warranty coverage.

2. All axle welds must be performed in a flat or horizontal position.

3. Achieve spray arc transfer with the following welding parameters:

- Standard Electrode: AWS E-7018 (Oven Dried)
  - — .125 DIA. 120-140 AMPS D.C. ELECTRODE POSITIVE
  - — .156 DIA. 120-160 AMPS D.C. ELECTRODE POSITIVE
- Standard Wire: AWS ER-70S-6
  - — .045 DIA. (i.e., LA-56 or NS-115)
- Optional Wire: AWS ER-70S-3
  - — .045 DIA. (i.e., LA-50 or NS-101)
- Volts: 26-30 DCRP
- Current: 275-325 AMPS
- Wire Feed Speed: 380-420 IPM
- Electrode Extension: $^3/_4$-1 inch
- Gas: 86% Ar 14% CO_2 at 30 to 35 CFH

NOTE: Any deviation from these welding parameters must be approved by Hendrickson Trailer Suspension Systems in writing.

SUSPENSION BEAM AND AXLE SETUP — HT SUSPENSIONS

1. Use a **clamping device** to secure the centered axle onto the positioned beams.

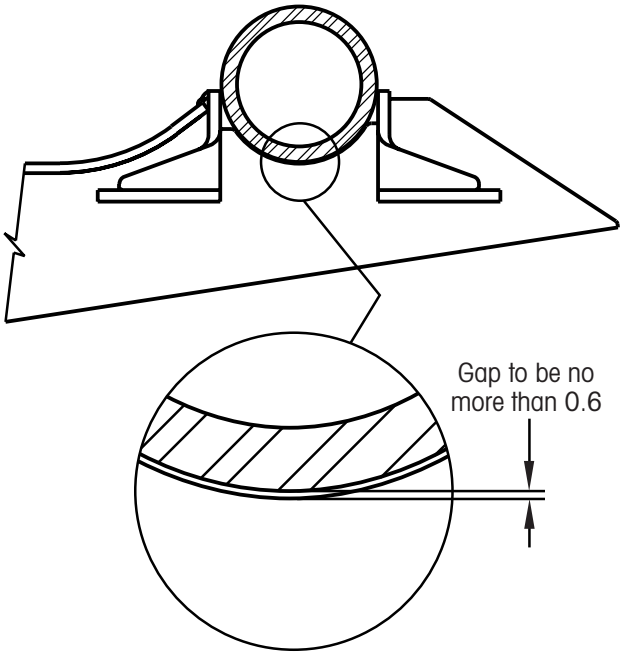
2. Use the Hendrickson locating fixture to properly position the suspension beams.

NOTE: Refer to "Using the 'HT' Series Fixture" in L577 *HT/HS/HK Installation Instructions*.

NOTE: If the Hendrickson locating fixture is not available, then refer to "Axle Installation without Fixturing" in L577 *HT/HS/HK Installation Instructions*.

IMPORTANT: At least one side of each axle seat radius must be tight against the axle. Any resulting gap must be no more than $^{1}/_{16}$ inch (Figure 1).

3. Place a 1-inch long tack weld in the center of each forward trailing arm/axle connection. There is one tack weld per suspension beam (Figure 2).



(All dimensions in inches unless noted)

Figure 1. Axle seat gap

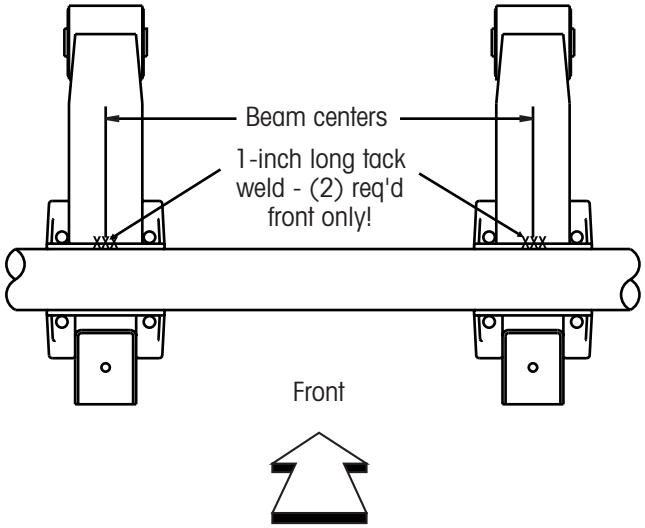


Figure 2. Locations of tack weld

AXLE WELD PROCEDURE — HT SUSPENSIONS

NOTE: If you are adjusting the weld position to the horizontal 2F position, with the suspension beams in the horizontal position, follow the welding procedure shown in Figure 3.

NOTE: If you are welding the 1F position with the suspension beams oriented in the vertical position, refer to the "Alternative Axle Weld Procedure" found in the Appendix.

IMPORTANT: Do not use attachment welds on an INTRAAX® axle.

⚠**CAUTION:** **Avoid all cold laps and undercuts. Fill all craters. Clean weld between each pass. If these steps are not followed, then failure may occur with the axle-to-suspension connection.**

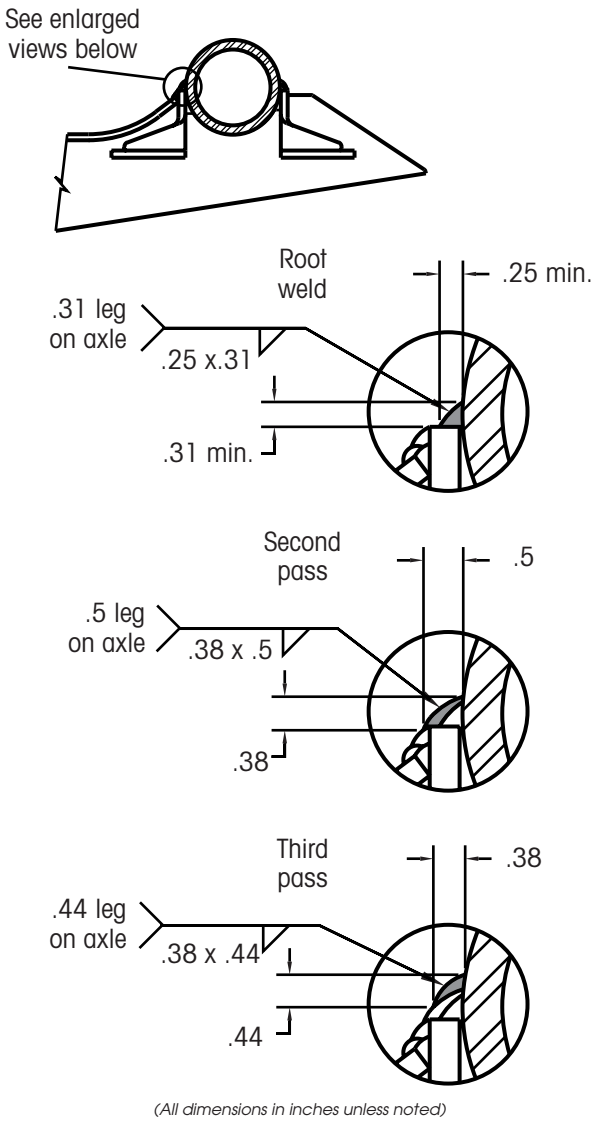


Figure 3. Axle weld passes — all HT suspensions

WELD PASS LENGTH AND PLACEMENT

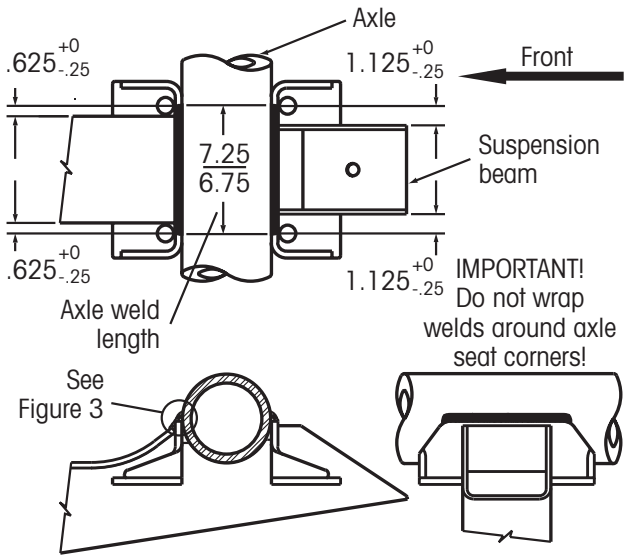
AXLE WELD PASSES — SIZE AND LOCATION

NOTE: All axle seat connections require three weld passes. Figure 3 shows the location and size of each weld. All passes are to be performed as shown.

AXLE WELD LENGTH AND POSITION

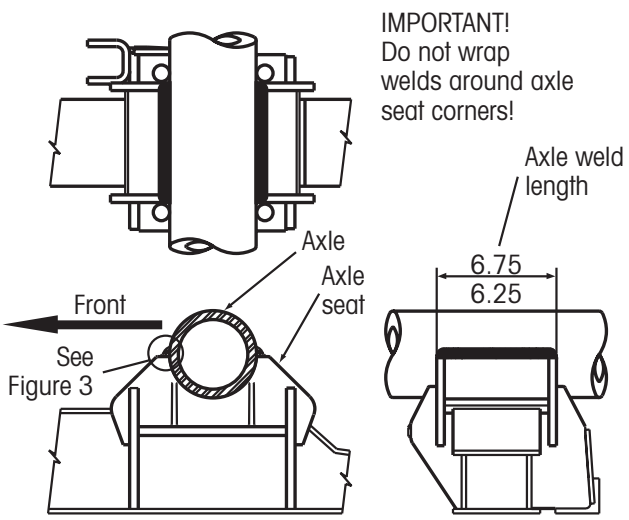
Figures 4a and 4b show the length and position of the axle weld. All weld passes are to be performed as shown.

IMPORTANT: The weld length is dependent on the type of suspension being installed. When installing the HT190T, HT190U, HT230, HT250T, or HT300, use Figure 4a. When installing the HT250U or HT300U, use Figure 4b.



(All dimensions in inches unless noted)

Figure 4a. HT190T, HT190U, HT230, HT250T and HT300T



(All dimensions in inches unless noted)

Figure 4b. HT250U and HT300U

WELD DIRECTION AND SEQUENCING

NOTE: The following instructions for direction and sequence must be followed when applying the weld.

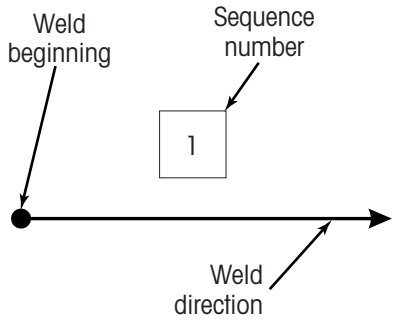


Figure 5a. Weld instructions legend

1. Beginning on the rear side of the axle/seat connection, place four single root pass welds (Figure 5b).

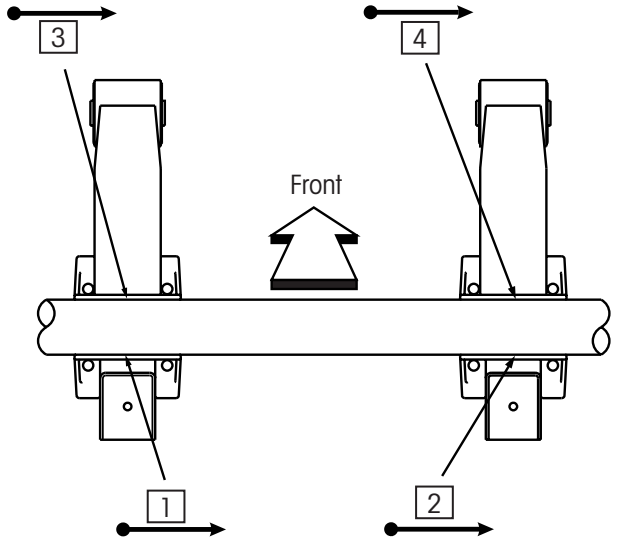


Figure 5b. Root pass sequence

2. Continue with the second and third weld passes after all four root passes (Figure 5c).

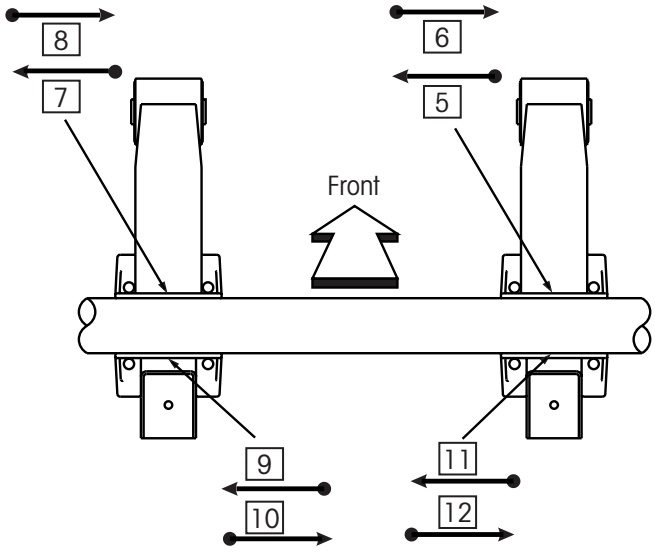


Figure 5c. Second and third pass weld sequences

U-BOLT INSTALLATION — HT SUSPENSIONS

1. Check the U-bolts for thread damage or burrs.

⚠**CAUTION:** **Do not apply additional lubricant to the U-bolt. Failure of the U-bolt could occur.**

2. Install U-bolts and spacers on the axle and through the mounting holes in both suspension beams. Ensure U-bolt spacer fits properly in the mounting area (Figure 7).

3. Install the washers and nuts on the U-bolts and use a wrench to snug the nuts.

4. Check U-bolt spacers to ensure correct positioning on the axle.

5. Tighten the nuts on the U-bolts by alternately tightening opposing corners of the clamp assembly. Use a calibrated torque wrench set from 475-525 ft-lbs (Figure 6).

NOTE: Proper tightening will result in an equal amount of thread visible above the nut on each side of the U-bolt (Figure 7).

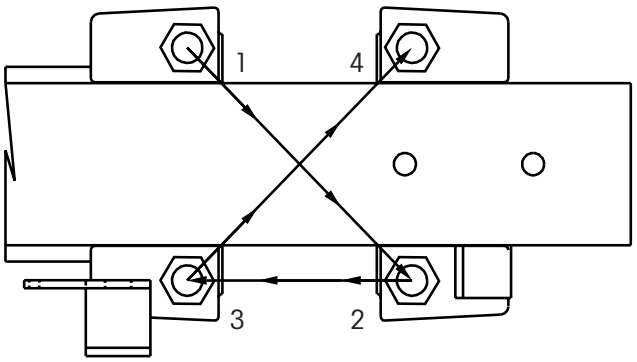


Figure 6. U-bolt nut tightening sequence

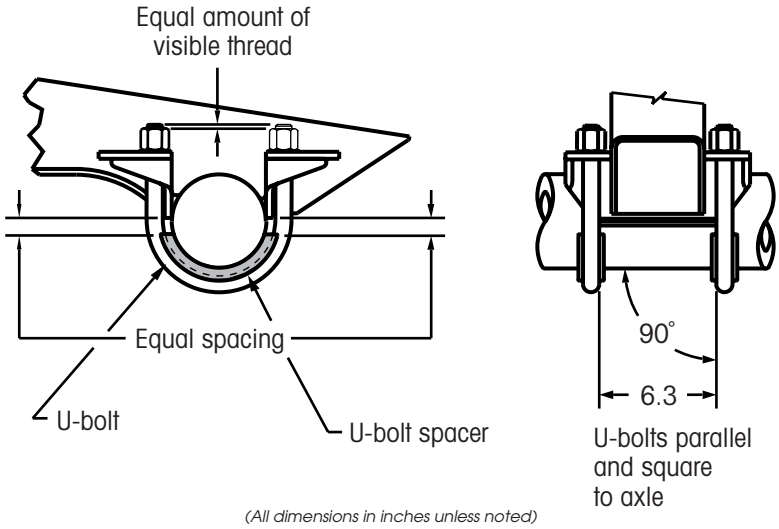


Figure 7. U-bolt positioning with U-bolt spacer

FRAME BRACKET, CROSSMEMBER, UPPER SHOCK BRACKET AND AIR SPRING MOUNTING WELDING PROCEDURES

Weld all miscellaneous suspension componentry using the parameters at the beginning of this section.

The following figures are examples of typical suspension installations. The procedures illustrated may need to be adapted due to varying trailer designs.

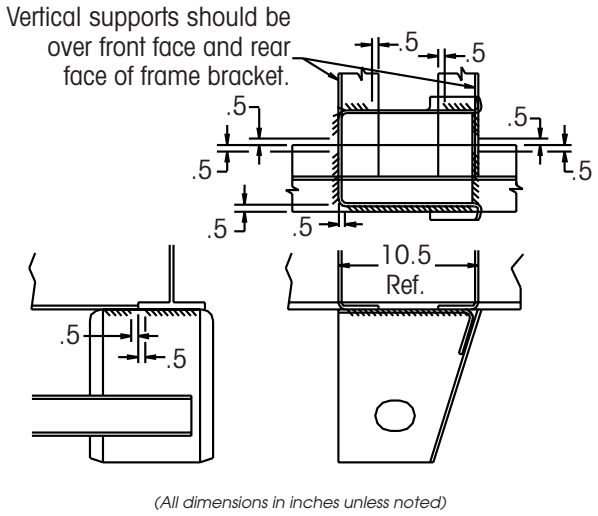
NOTE: Unless otherwise noted, all welds are to be $^1/_4$ inch minimum.

IMPORTANT: Starting and stopping points should be **no closer than $^1/_2$ inch** from the mating edge of the suspension component and the trailer frame and/or the crossmembers.

NOTE: It is the responsibility of the suspension installer and the vehicle designer to provide both adequate vehicle frame design and proper securing method for the suspension system.

NOTE: The suspension installer has the responsibility to determine the proper welding parameters for the materials being used. For specifications of the suspension component material, contact Hendrickson.

The attachments shown are designed to properly support the suspension. The suspension frame brackets are not to be used as a structural component of the trailer. Close attention should be paid to the attachment of the trailer crossmember to the trailer main rail to ensure that the frame bracket does not support this connection. Contact Hendrickson Trailer Suspension Systems at (330) 456-7288 with any questions concerning this connection.



(All dimensions in inches unless noted)

Figure 8. Typical frame bracket-to-frame attachment

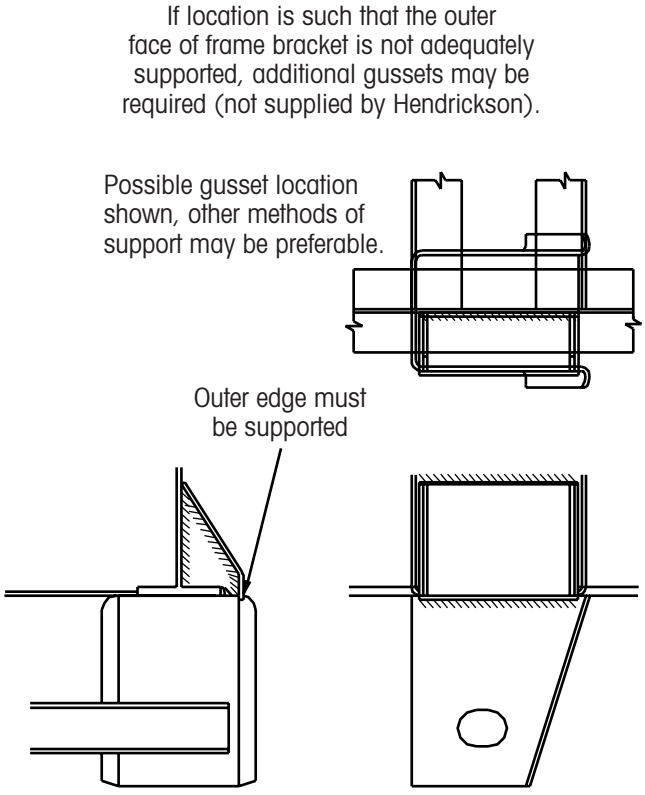
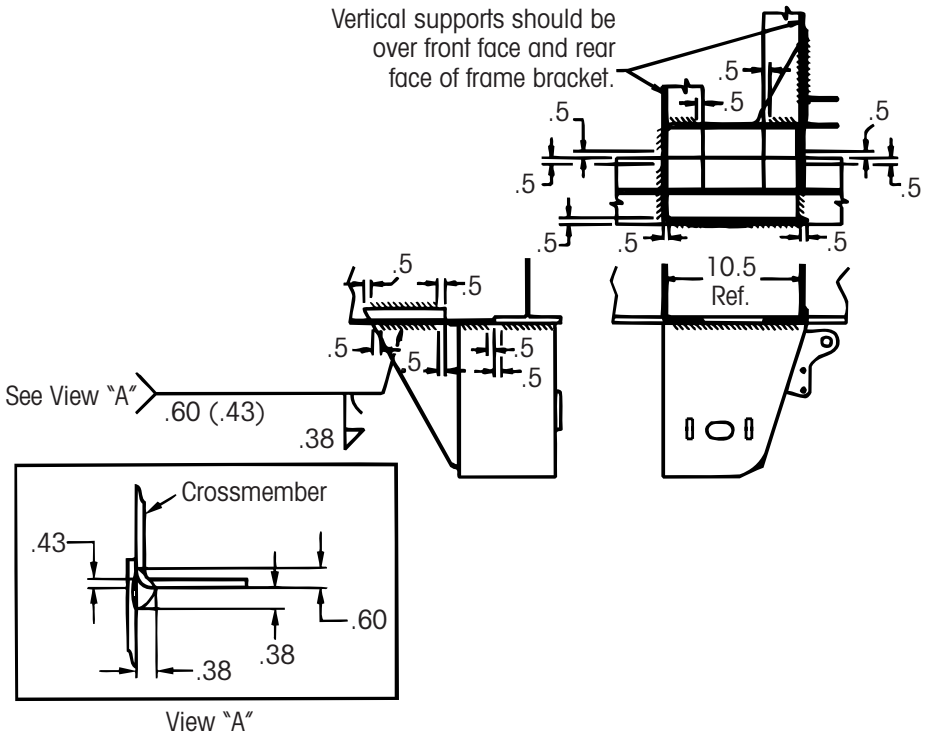
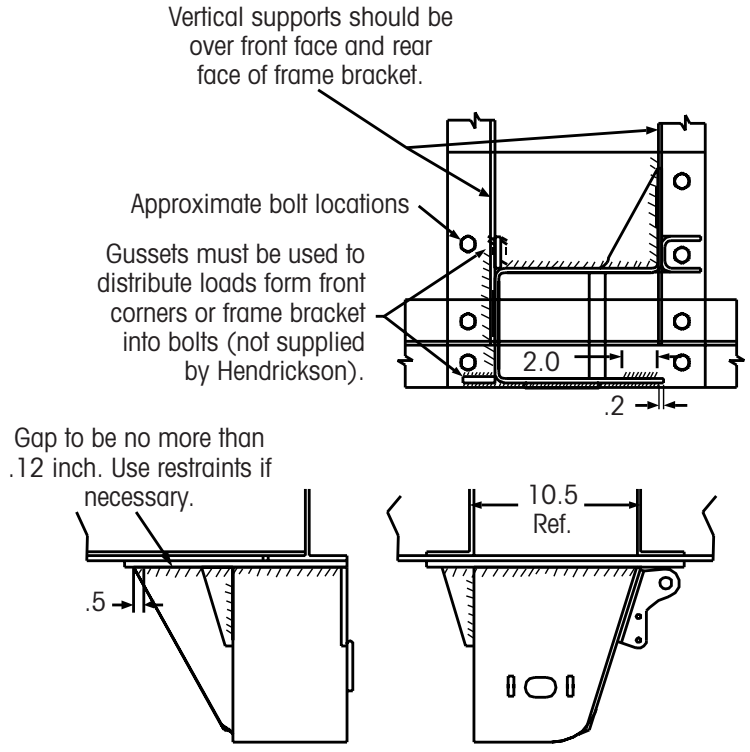


Figure 9. Severe offset frame bracket attachment; winged or wingless



(All dimensions in inches unless noted)

Figure 10. Typical winged frame bracket-to-frame attachment



(All dimensions in inches unless noted)

Figure 11. Frame bracket-to-mounting plate attachment (customer supplies bolt-on plate and gussets)

WELDING THE AIR SPRING MOUNTING PLATE

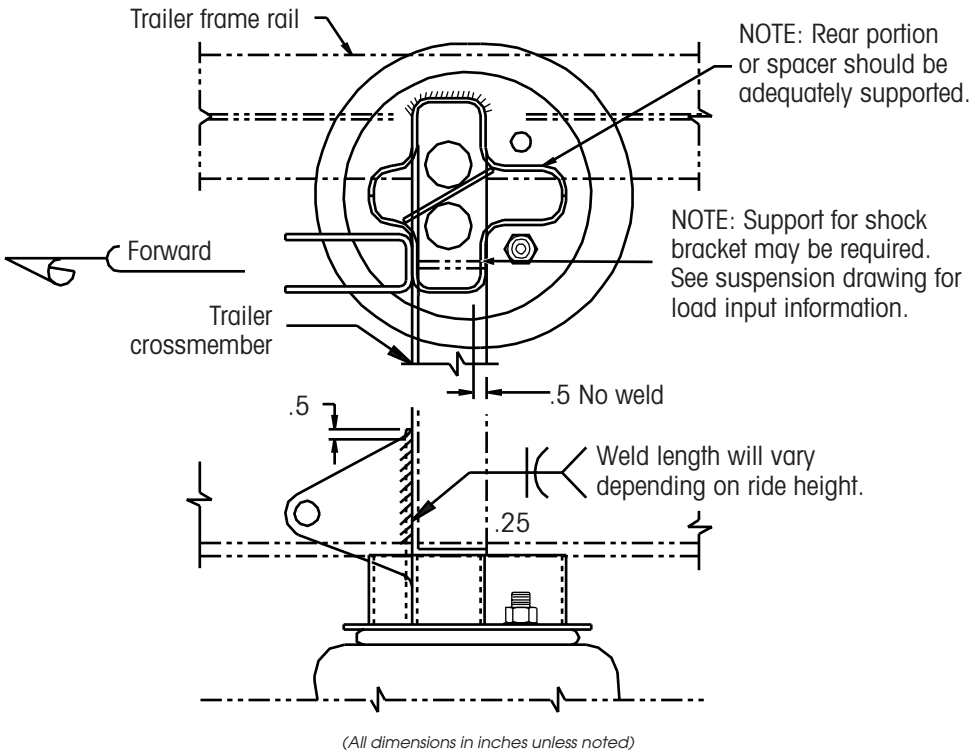


Figure 12. Air spring spacer attachment

NOTE: DO NOT ATTACH the air spring mounting plate or air spring to **BOTH** the trailer main rail and the trailer crossmember. The air spring mounting is not designed to resist the movement between the trailer crossmember and the main rail.

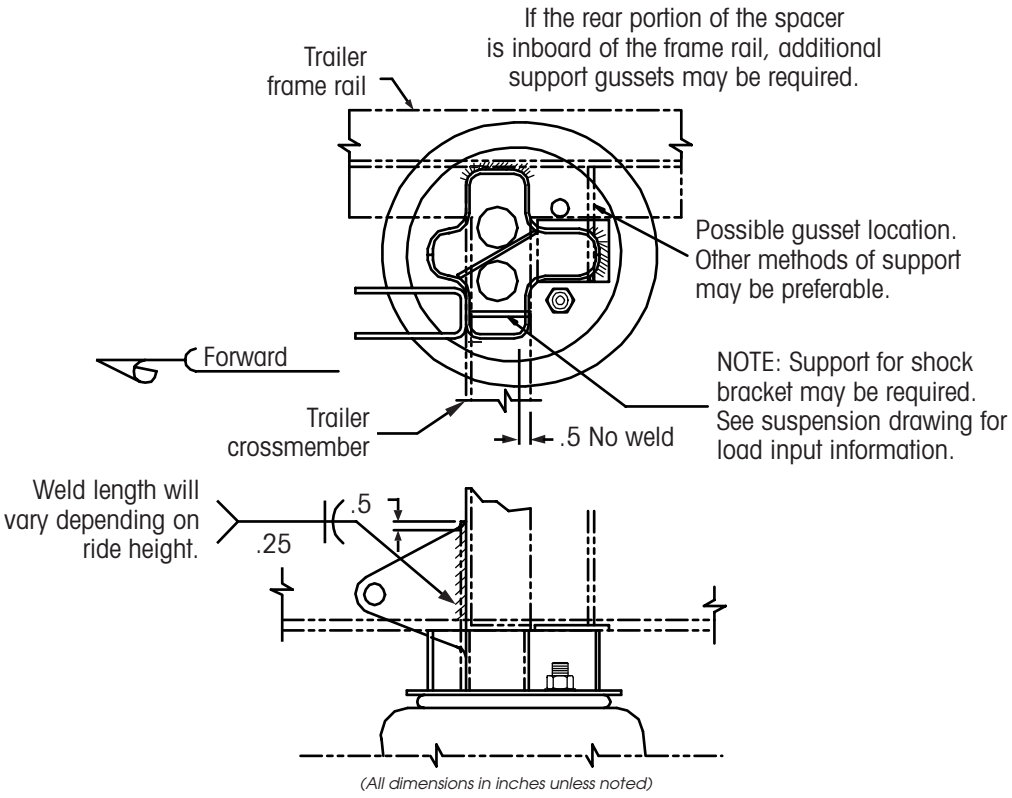


Figure 13. Severe offset mounting with spacer

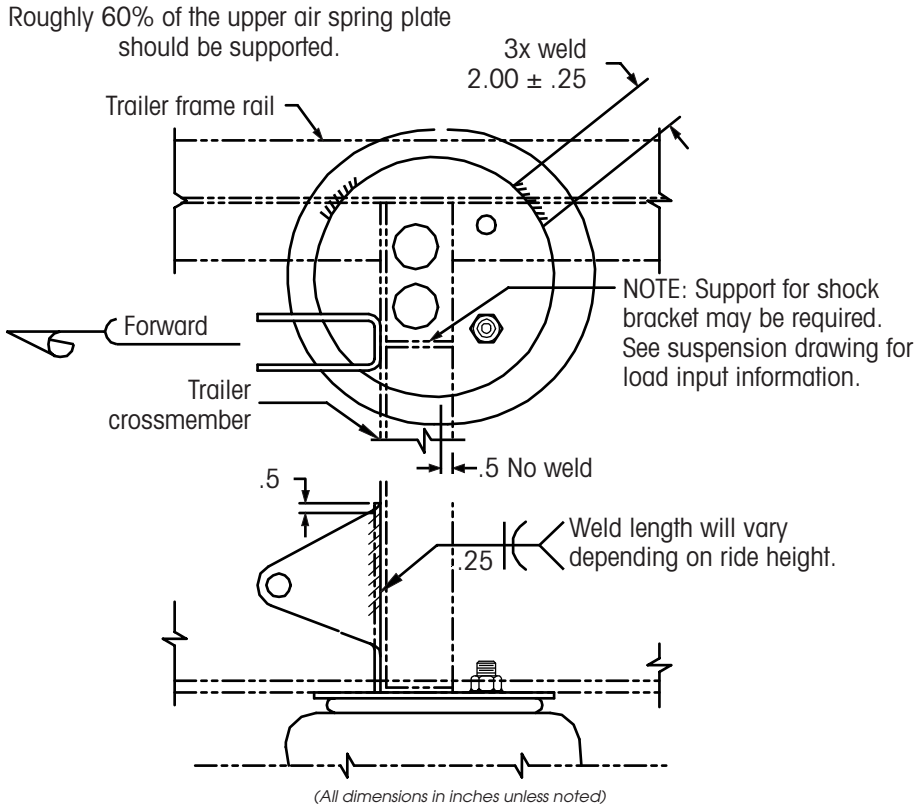


Figure 14. Air spring mounting plate attachment

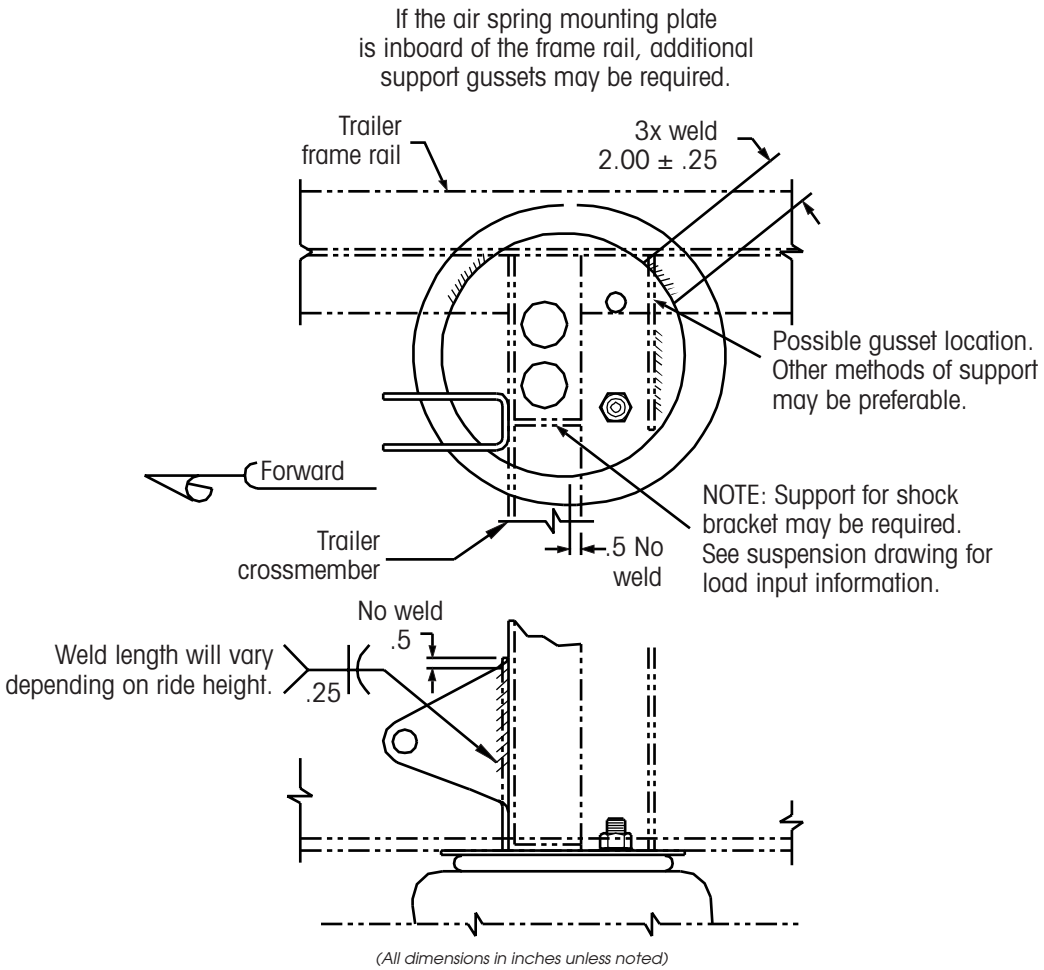


Figure 15. Severe offset mounting without spacer

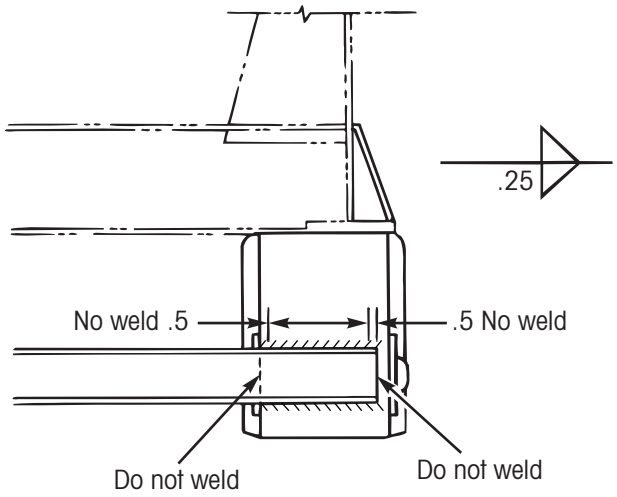
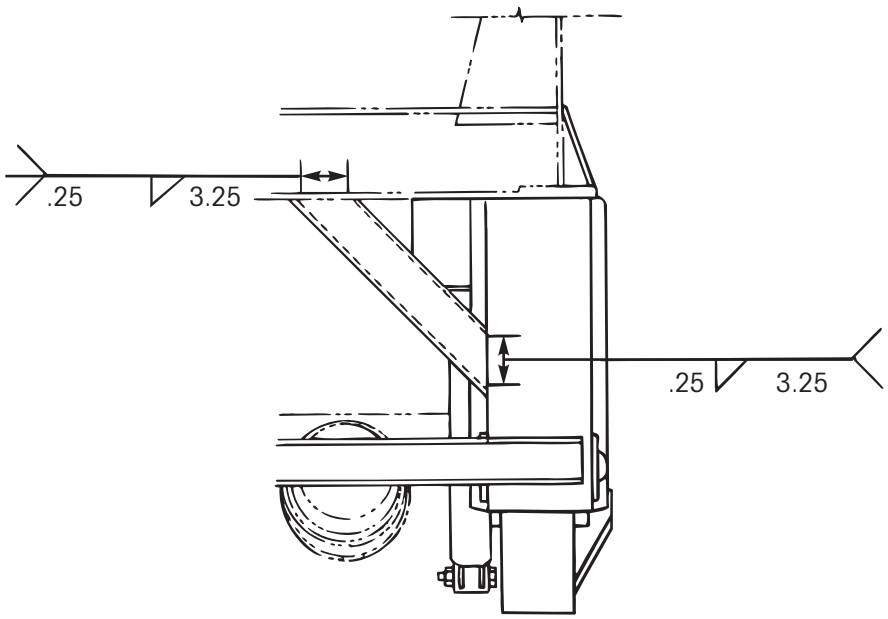


Figure 16. C-channel attachment to frame bracket



(All dimensions in inches unless noted)

Figure 17. Frame bracket knee brace attachment

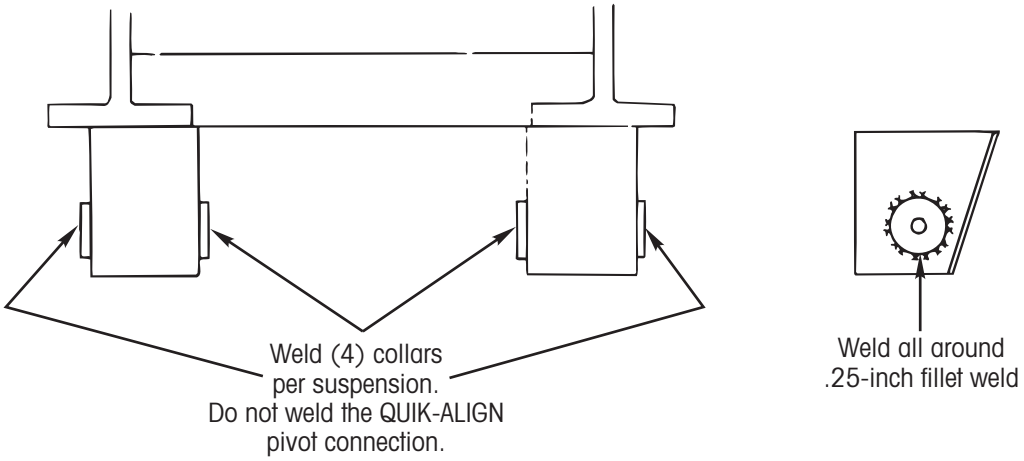


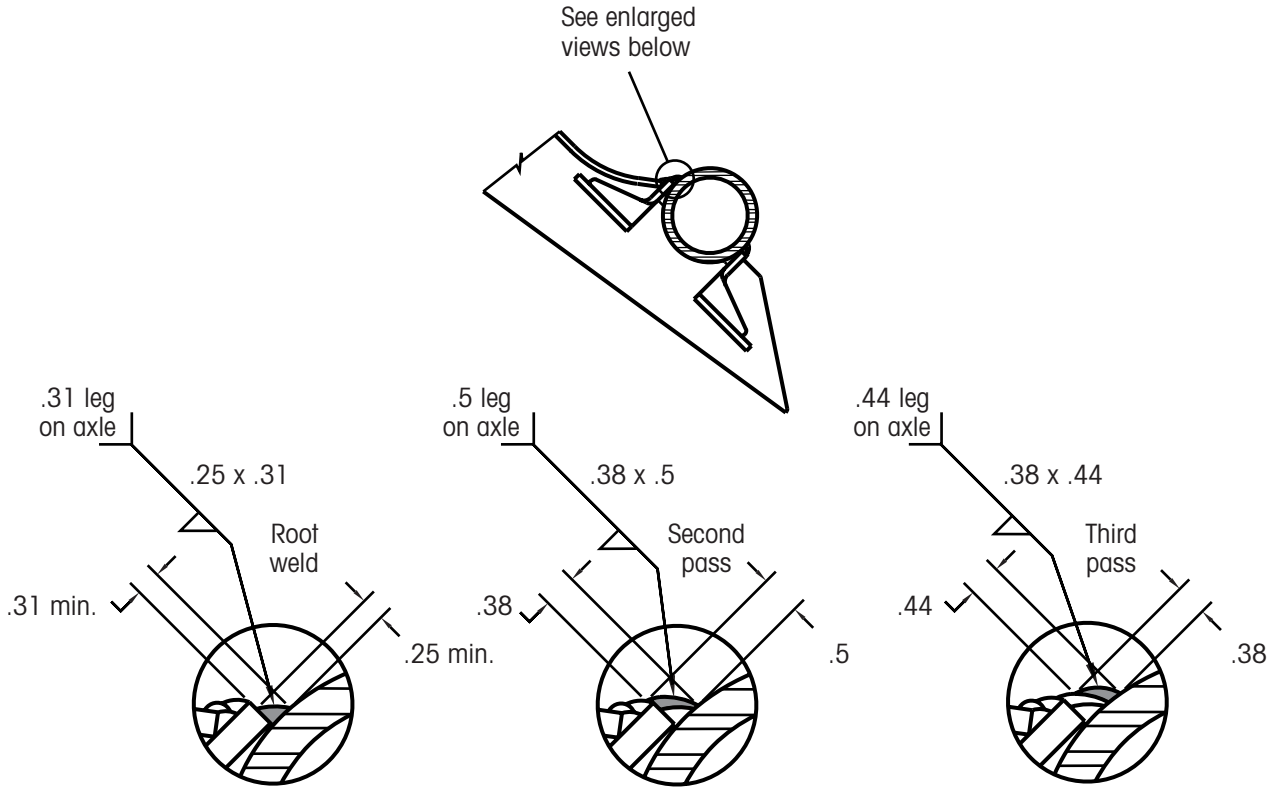
Figure 18. Welding collars

APPENDIX A: ALTERNATIVE AXLE WELD PROCEDURE

NOTE: If you are adjusting the weld position to the flat position 1F with the suspension beams in the vertical position, follow the alternative welding procedure shown in Figure A1.

NOTE: If you are welding the 2F position, refer to the AXLE WELD PROCEDURE — HT SUSPENSIONS section found on page 4.

⚠**CAUTION:** **Avoid all cold laps and undercuts. Fill all craters. Clean weld between each pass. If these steps are not followed, then failure could occur with the axle-to-suspension connection.**



(All dimensions in inches unless noted)

Figure A1. Axle weld passes — all HT suspensions

WELD PASS LENGTH AND PLACEMENT

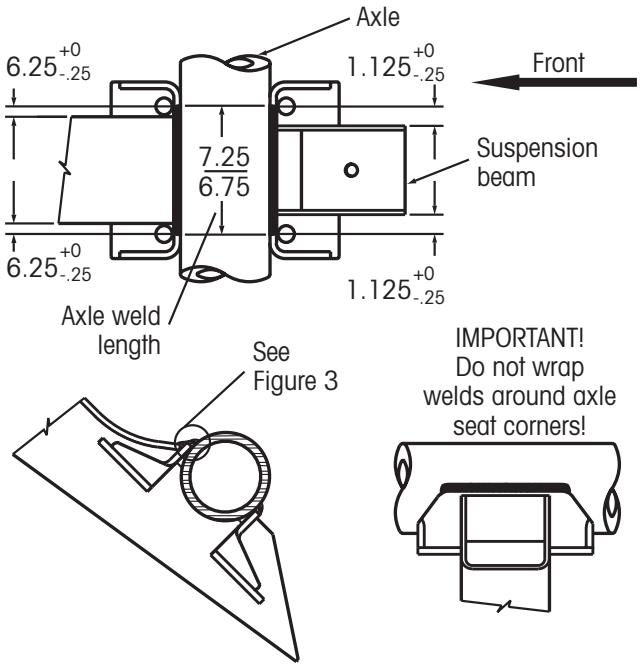
AXLE WELD PASSES — SIZE AND LOCATION

NOTE: All axle seat connections require three weld passes. Figure A1 shows the location and size of each weld. All passes are to be performed as shown.

AXLE WELD LENGTH AND POSITION

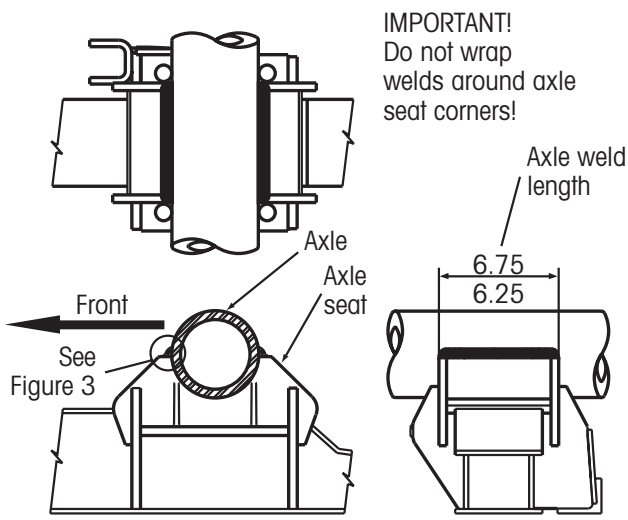
Figures A2 and A3 show the length and position of the axle weld. All weld passes are to be performed as shown.

IMPORTANT: The weld length is dependent on the type of suspension being installed. When installing the HT190T, HT190U, HT230, HT250T, or HT300, use Figure A2. When installing the HT250U or HT300U, use Figure A3.



(All dimensions in inches unless noted)

Figure A2. HT190T, HT190U, HT230, HT250T and HT300T



(All dimensions in inches unless noted)

Figure A3. HT250U and HT300U

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