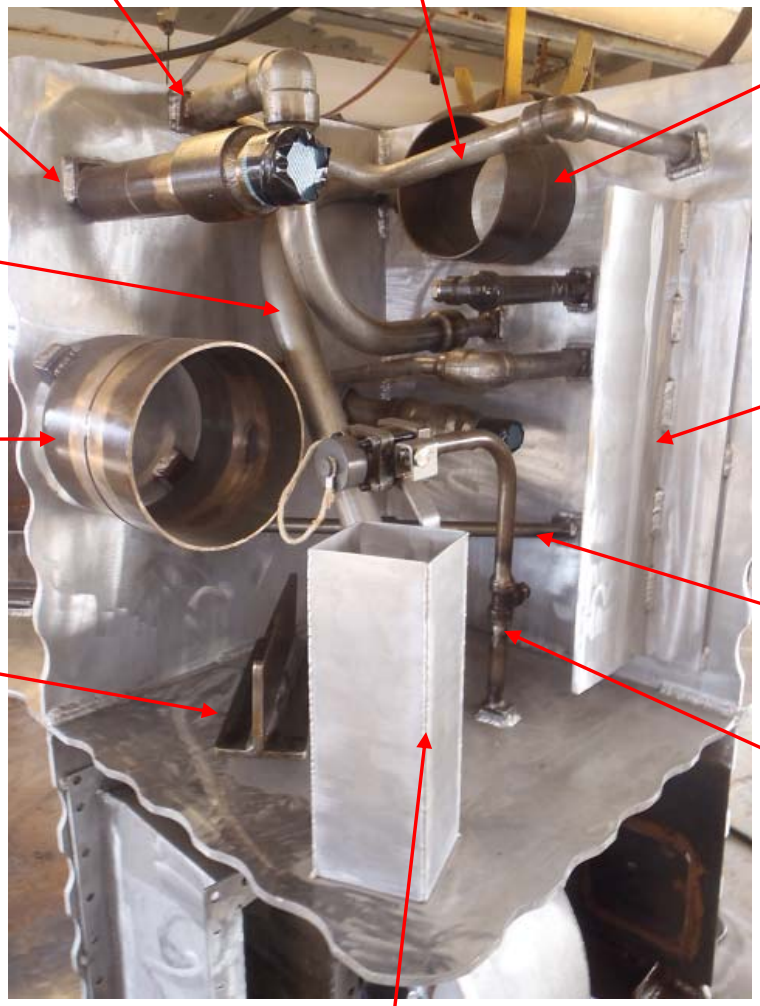
Instructor Key

Side 1A



1A-1
Acceptable

1A-2
Acceptable

1A-3
Acceptable

1A-4
1) Proper alignment
2) Proper fit-up

1A-5
1) Proper weld sequence
2) Proper bead placement (offset with weld on opposite side of T)

1A-6
1) Quality tacks
2) Proper fit-up

1A-7
1) Acceptable

1A-8
1) Quality tacks
2) Quality weld
3) Proper weld size

1A-9
1) Proper weld size
2) Proper bead sequence

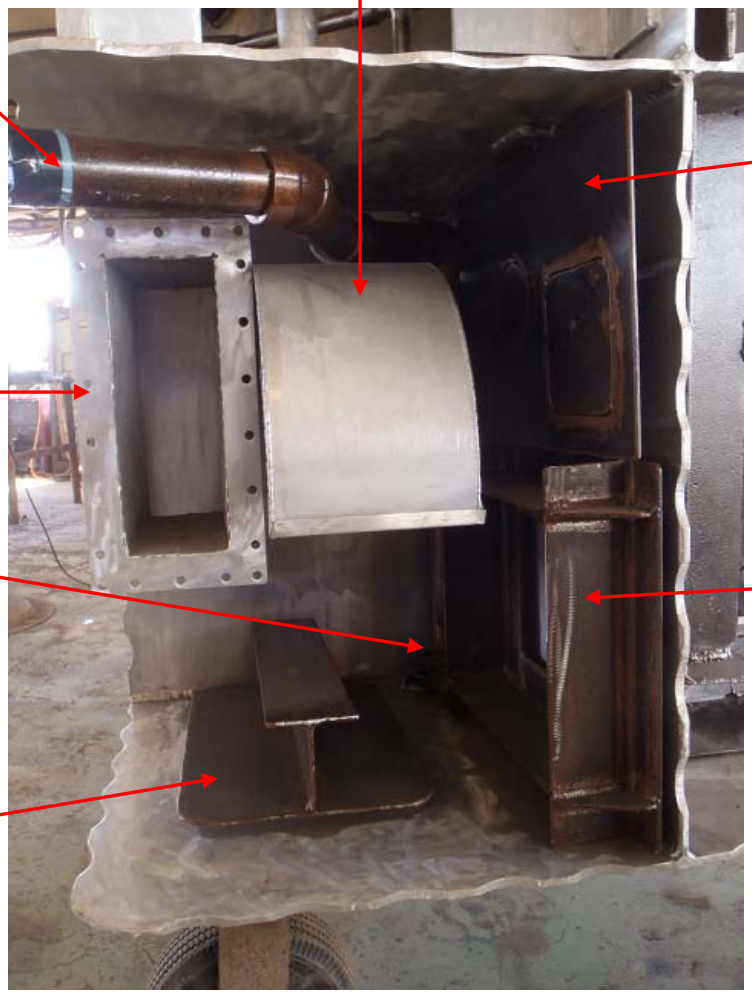
1A-10
1) Proper tacks
2) Proper fit-up

1A-11
Acceptable

Side 1B

1B-2
1) Proper weld size
2) Reduced distortion

1B-1
1) Proper alignment
2) Proper fit and weld



1B-3
1) Proper fit-up
2) Proper root-gap to minimize weld size and distortion

1B-7
Acceptable

1B-6
Acceptable

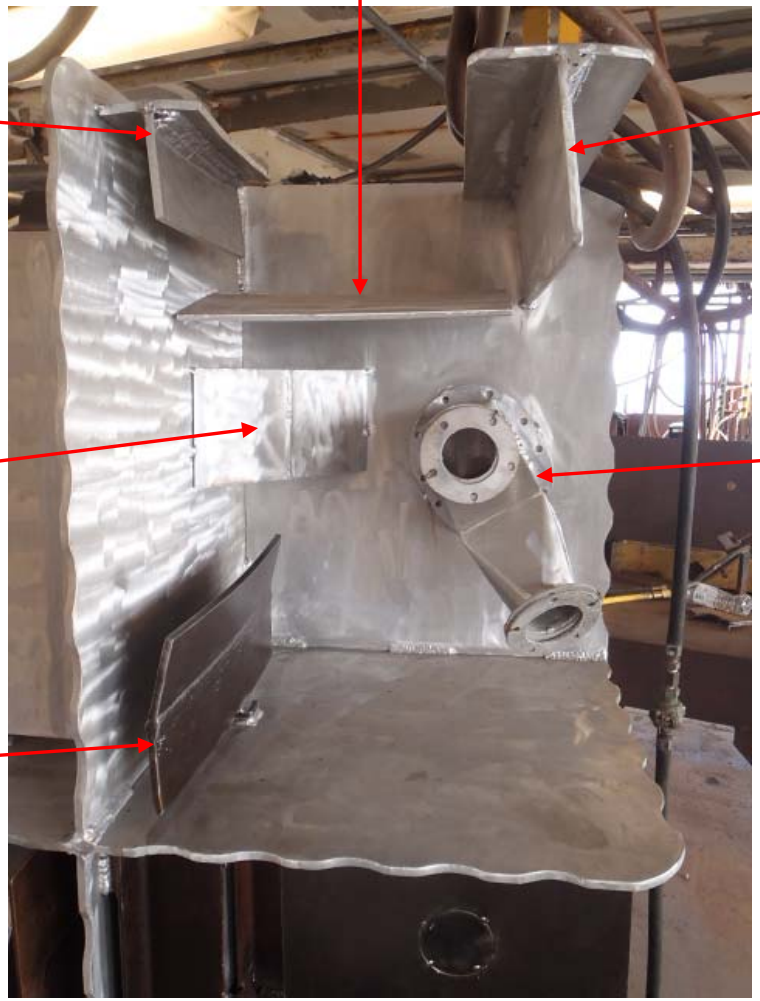
1B-4
1) Proper fit and alignment
2) Proper weld size

1B-5
1) Proper fit and alignment
2) Proper weld size
3) Equally balanced heat input on both sides of tee to minimize angular distortion

Side 2A

2A-2
1) Angular distortion due to unbalanced heat input and lack of restraint when welded
2) Misalignment

2A-1
1) Proper bead sequence (outside fillet)
2) Grossly overwelded (outside fillet)
3) Improper bead sequence (inside fillet)



2A-3
1) Angular distortion due to unbalanced heat input across tee web
2) Overwelded (outside fillet)

2A-6
1) Incomplete weld (backside butt)
2) Under-fill (outside butt)

2A-4
Acceptable

2A-5
1) Overweld
2) Angular distortion

Side 2B

2B-2
1) Forced fit insert causing residual stress buildup prior to welding
2) Dishing distortion

2B-1
1) Misaligned top piece
2) Poor fit-up
3) Poor cutting causing fit and weld difficulties
4) Oversized root opening

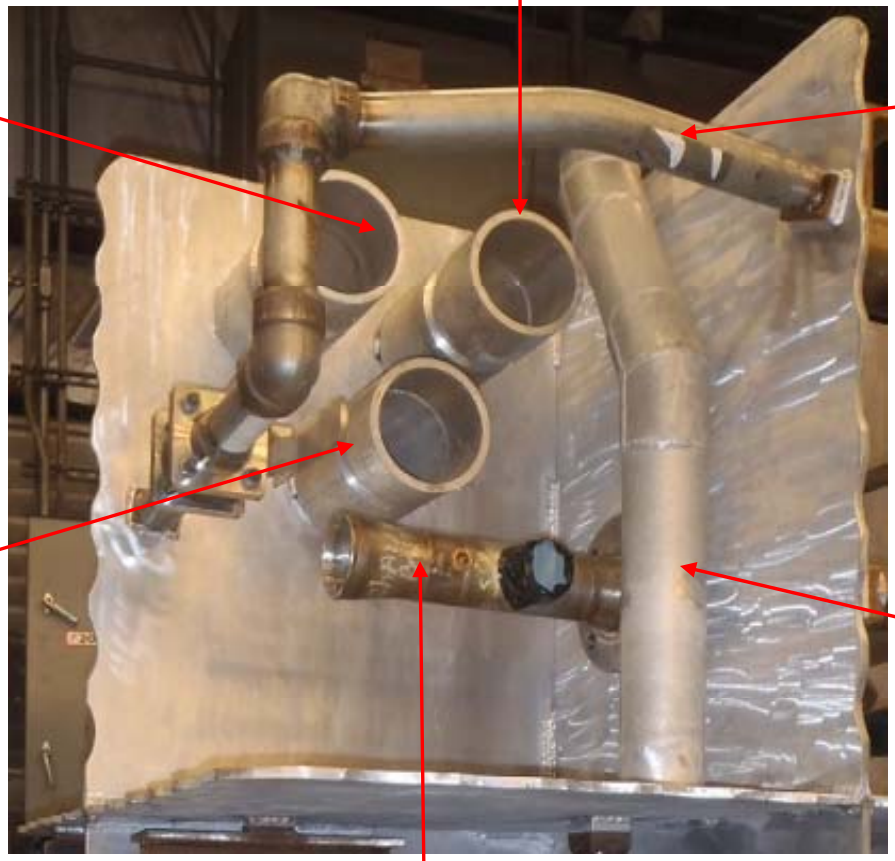
2B-3
1) Poor cutting
2) Poor fit-up
3) Enlarged root gap
4) Poor quality tacks

2B-4
1) Misaligned tee
2) Poor tacks
3) Blow through
4) Arc marks

Side 3A

3A-2
1) Misalignment

3A-1
1) Tacks have incomplete penetration
2) Tacks have incomplete fusion
3) Melt through



3A-3
1) Arc marks
2) Undersized weld on top side, will cause rework, additional heat and distortion

3A-6
1) Improper fit-up

3A-4
1) Lack of fusion on top weld
2) Overlap
3) Fabrication scars

3A-5
Acceptable

Side 3B

3B-1
1) Undersized weld
2) Misaligned intercostal member

3B-2
1) Bad tack

3B-6
1) Slight overweld

3B-3
1) Distortion due to poor fit and welding practices

3B-5
1) Misalignment
2) Cocked joint

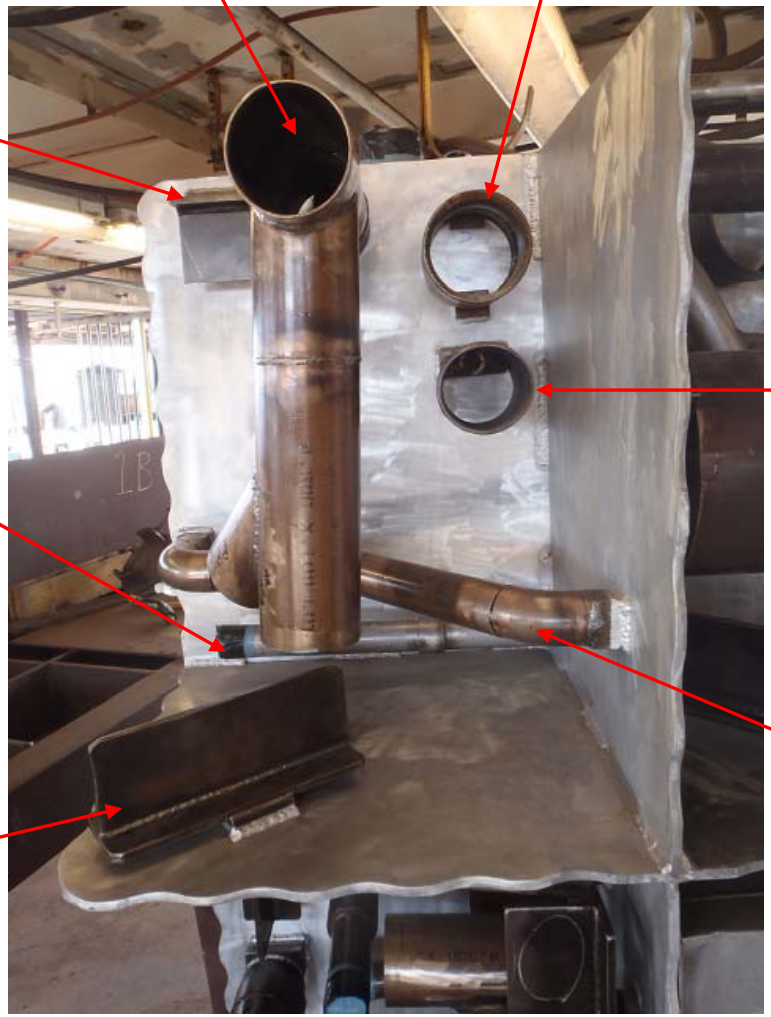
3B-4
1) Pipe ovality
2) Misalignment due to incorrect fit methods for pipe ovality

Side 4A

4A-2
1) Overweld (top)

4A-3
1) Under-fill on cap

4A-1
1) Bad weld – spatter (backside fillet)
2) Good weld (front fillet)



4A-4
1) Overweld

4A-7
1) Undersized weld

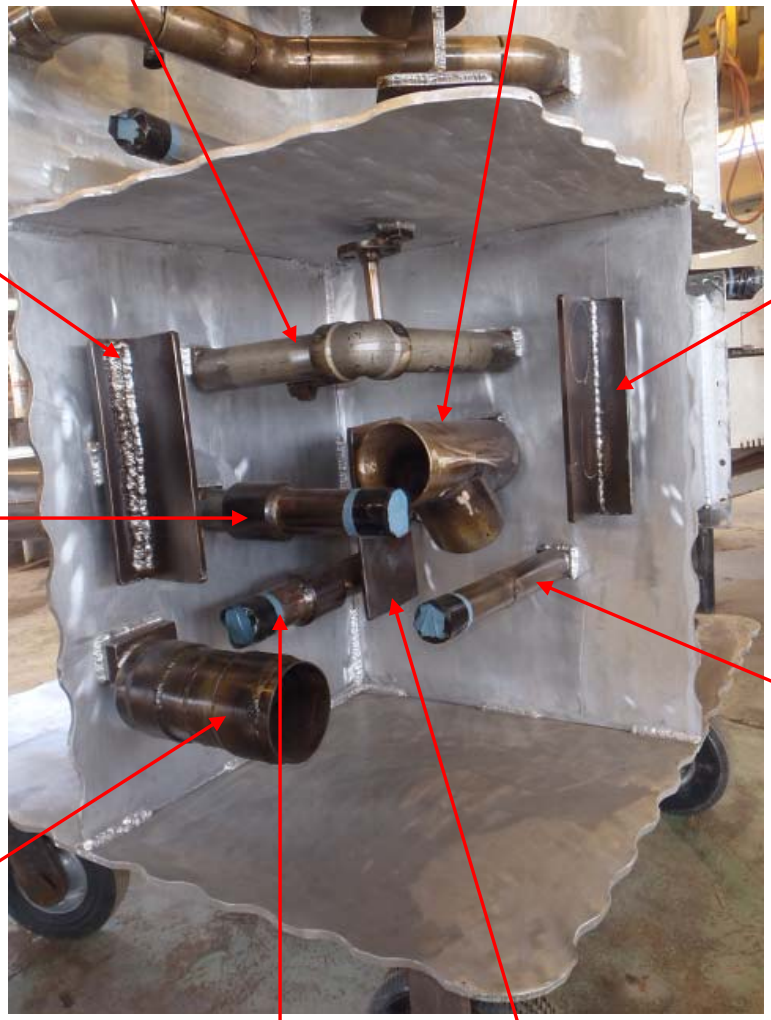
4A-6
1) Unbalanced heat input
2) Undersized weld (near side fillet)
3) Oversized weld (far side fillet)
4) Undercut (far side fillet)

4A-5
1) Poor weld prep
2) Poor fit-up
3) Poor tacks

Side 4B

4B-2
1) Cocked joint
2) One joint not cleaned/prepped

4B-3
1) Undercut



4B-1
1) Bad weld – spatter (backside fillet)
2) Good weld (front fillet)

4B-4
1) Undersized weld
2) Fabrication scars

4B-9
1) Proper weld size per pipe thickness

4B-5
1) Burn through

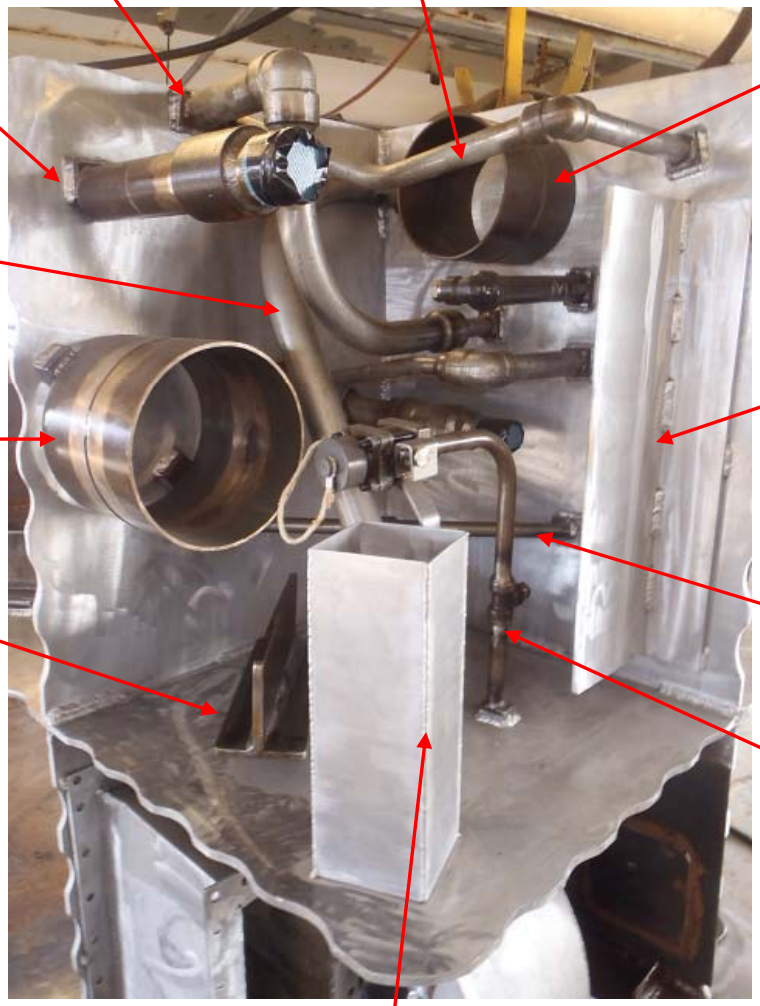
4B-8
1) Poor weld
2) Scarring
3) Needs cut and redone or scrapped

4B-7
Acceptable

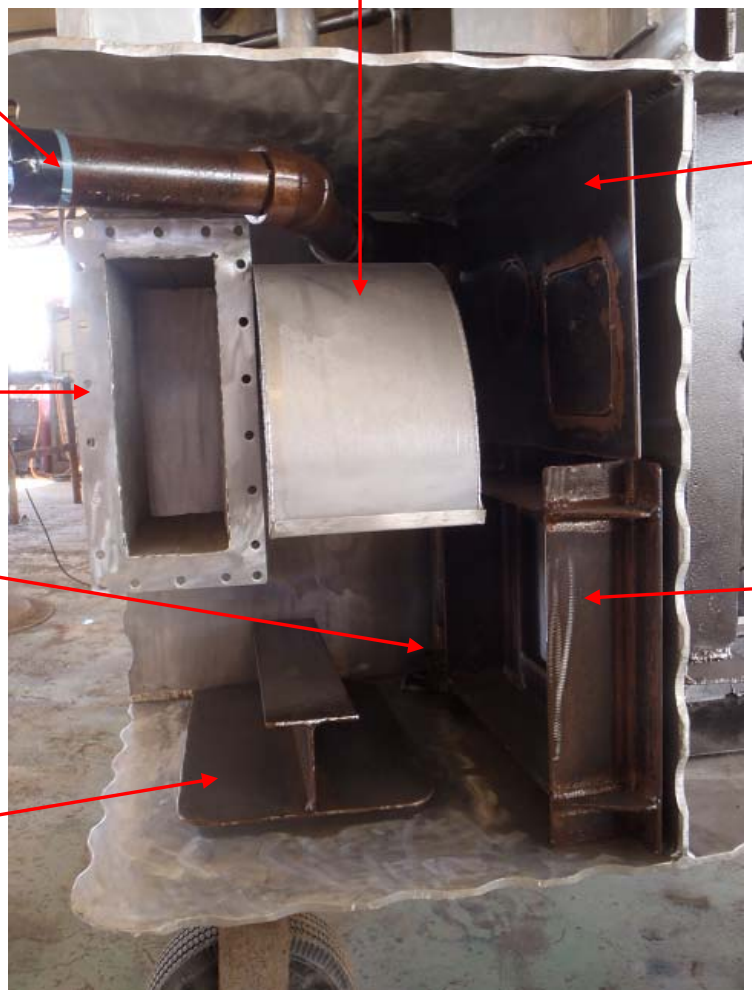
4B-6
1) Overweld
2) Bowing distortion

Student Packet

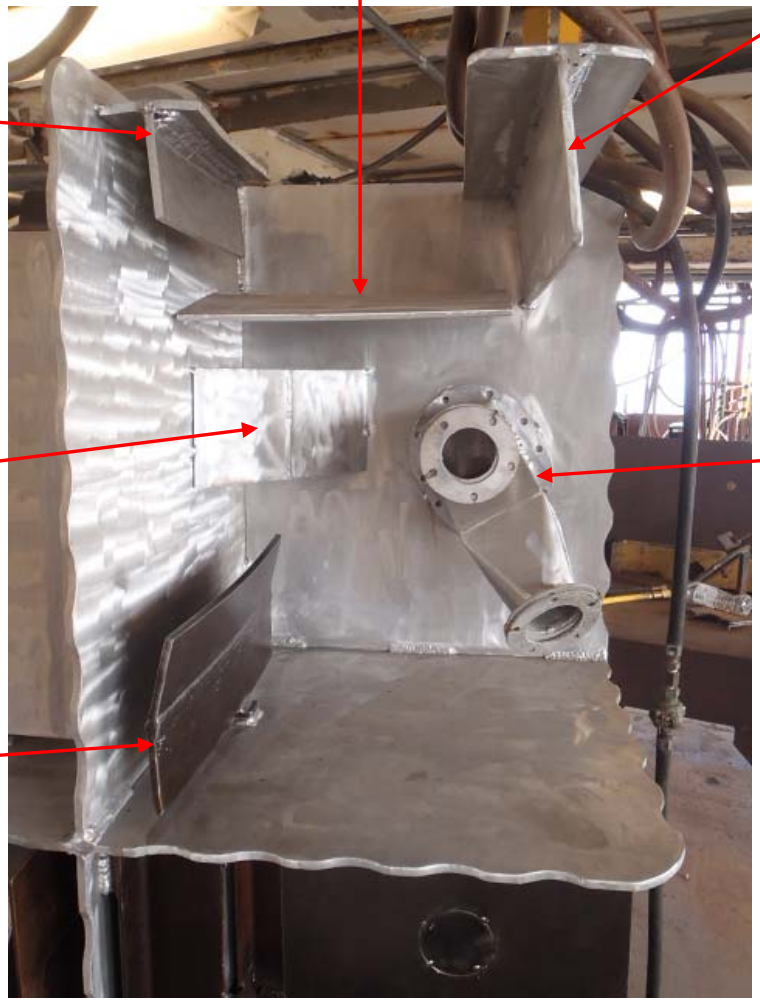
Side 1A



Side 1B

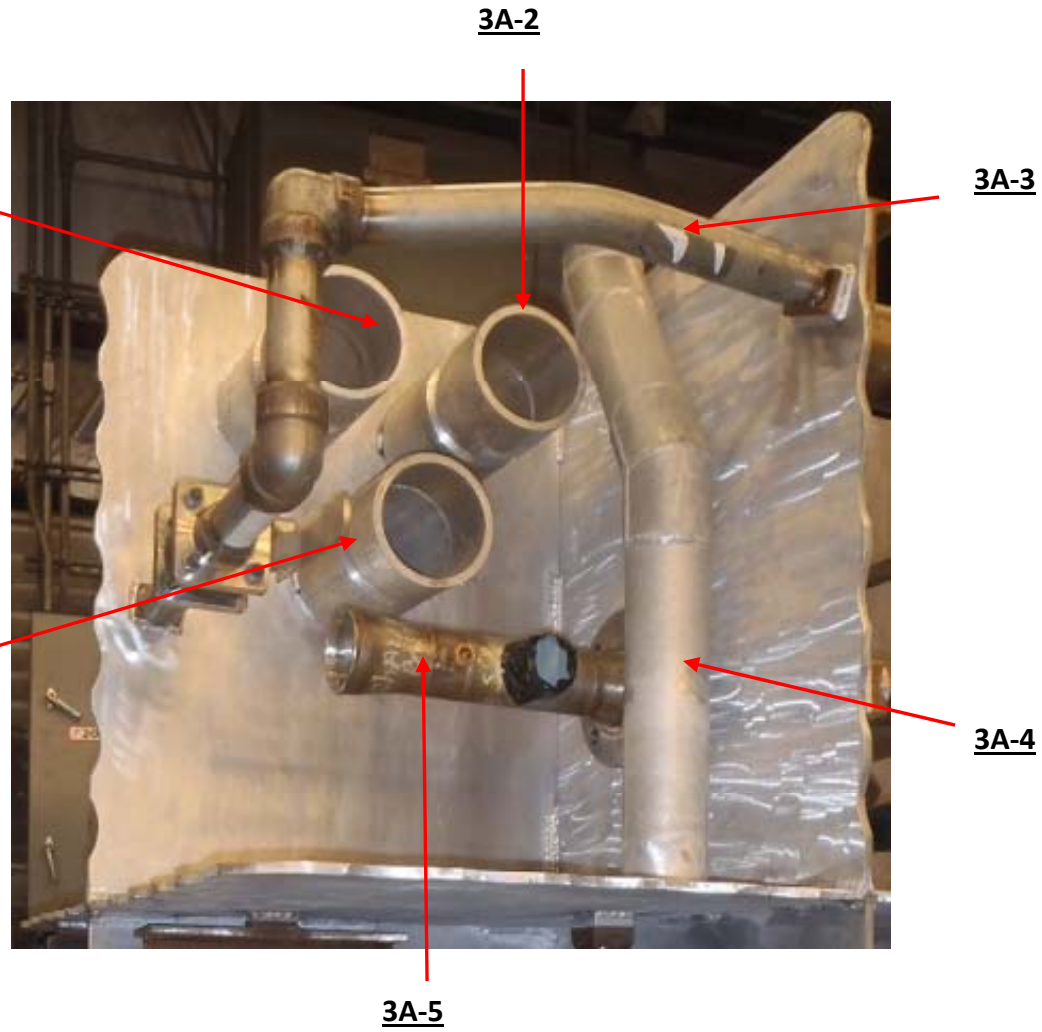


Side 2A



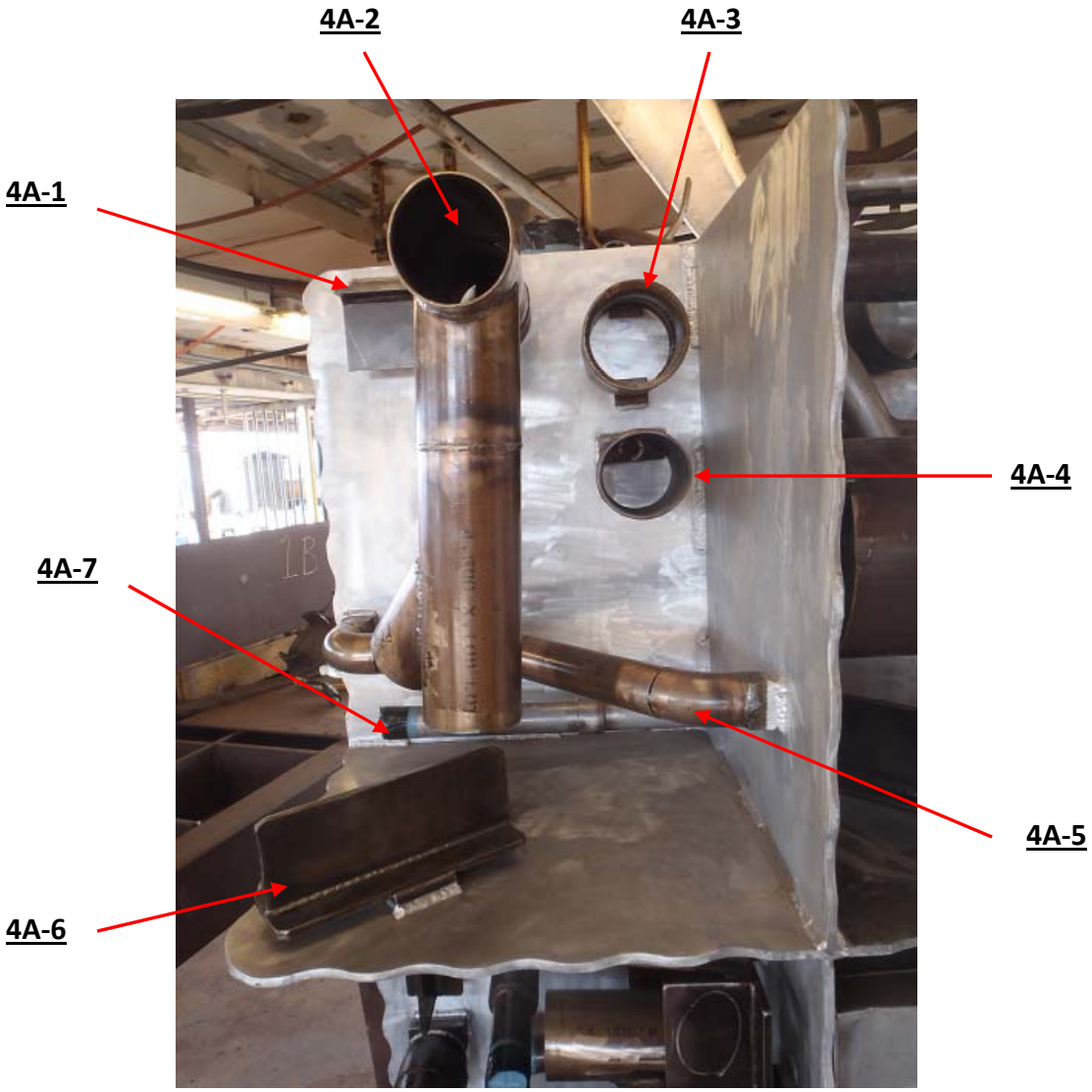
Side 2B

Side 3A



Side 3B

Side 4A



Side 4B