

Fabrication Process for Large Diameter Thin Wall Vessels

Rick Shepherd

Ward Tank and Heat Exchanger Corp







Topics

- SS/Duplex/Ni. Alloy
- ASME code vs. API and non-code tanks
- Design
- Material
- Welding process review
- Integrity
- Hydro testing
- Shipping/handling
- Safety







SS/Duplex/Nickel Alloy

- Advanced use of stainless steel/duplex
- Used in place of carbon steel
- Used for reduction of chloride stress corrosion
- Newly developed corrosive processes
- Long term cost benefits (life cycle)
- Corrosion allowance
- Higher allowables producing thinner material









ASME Code Vs. API & Non-code Tanks

■ ASME code

- Calc thickness per ASME Sect VIII, Div1
- Calc nozzle thickness
- Calc repads
- Calc hydro pressure plus static head

■ API & non-code

- Thicknesses per App S & J (shop fab)
- Suggested nozzle thicknesses
- Calc repad thickness but typically not req'd
- Air/soap test or water fill
- Manway is standard plate flange design



Design to Assist in Deformation Reduction or Elimination in Horizontal Shop Fabrication

- Stiffening rings
- Spiders
- Large openings
- Supports (with or without pads)
- Vertical fabrication

Large Openings



Vertical Fabrication





Welding Process Review

- Procedures & processes
- Wire availability
- Customer specifications
- Heat input (hottest to coolest per inch of weld)
 - GTAW
 - SAW
 - SMAW
 - FCAW
 - GMAW
- Welder qualifications



Integrity During Fabrication

- Review
- Stiffening rings
- Internal rounding rings or spiders
- Rolling bands
- Width of turning rolls

Stiffening Rings



Stiffening Rings and Turning Roll Location



Spiders



Proper Turning Rolls





Hydro Testing

- Design
- Vertical or horizontal?
- Drain and vent locations are critical
- Temporary saddles for hydro test and shipping









Shipping & Handling

- Saddles - design
- Trucking
- Permits
- Blocking
- Plant entrances
- Offloading















Safety Handling

- Hydro-test
- Loading/shipping
- Off loading







A decorative vertical bar on the left side of the slide, featuring a series of horizontal stripes in black, white, and gray. The stripes vary in width and color, creating a striped pattern.

Questions??