ROBEN MANUFACTURING, INC.
Setting Standards For Quality
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Lethal Service Design & Fabrication

Roben Manufacturing: Mastering ASME Compliance for Lethal Service Vessels

Roben Manufacturing adheres strictly to ASME Section VIII, Division 1 in designing and producing pressure vessels for **Lethal Service**. This comprehensive overview highlights Roben's advanced technical compliance, emphasizing detailed welding and fabrication standards, stringent non-destructive testing (NDT) methods, and robust design considerations.

Detailed ASME Requirements and Roben Manufacturing's Implementation

Welding and Fabrication Standards:

- **100% Radiography of Butt Welds** (UW-2(a), UW-11(a)(1)): All butt welds in lethal service vessels undergo 100% radiographic inspection to detect subsurface anomalies like cracks or voids. Roben utilizes advanced digital radiography techniques to enhance detection accuracy.
- **Restrictions on ERW Pipe and Weld Types** (UW-2(a), VIII-1-01-118): ERW pipes are typically seamless but welded pipe can be used if the long seam is fully radiographed. Roben also employs ultrasonic testing alongside radiography to ensure seam integrity.
- **Post-Weld Heat Treatment (PWHT)** (UW-2(a)): Mandatory for carbon steel and low alloy materials to reduce residual stress. Roben's controlled heat treatment processes are meticulously monitored for optimal material properties.

Material and Design Restrictions:

- **Prohibition of Certain Materials and Designs** (UW-2(a)(1) (b & c), VIII-1-92-211): Roben does not utilize slip-on flanges and certain flange-to-shell attachments for Lethal Service design. Instead, advanced full penetration welds are utilized for all nozzles and other critical connections to ensure robust joint integrity.
- **Special Configurations for Nozzles** (VIII-I-98-23): Roben employs specialized machining and welding techniques to ensure full penetration on all Category D welds (typically nozzles).

Nozzle Design and Integration for Lethal Service Vessels

Types of Nozzles and Compliance Considerations:

- **Weld Neck and Long Weld Neck Nozzles**: Preferred for their ability to provide a smooth transition from pipe to nozzle and reducing stress concentrations. Roben uses automated welding processes for attachment, ensuring seamless and robust welds inspected via ultrasonic testing and X-ray radiography.

Non-Destructive Testing (NDT) Methods

- **Advanced Radiographic and Ultrasonic Inspection**: Beyond

standard requirements, Roben utilizes **P**hased **A**rray **U**ltrasonic **T**esting (PAUT) for detailed inspections, especially in complex geometries and thick-walled components.
- **Magnetic Particle and Dye Penetrant Inspection**: These techniques are used to detect minute surface discontinuities, particularly in non-ferrous materials, ensuring vessel integrity.

Hydrostatic and Pneumatic Testing Restrictions

- **Hydrostatic Testing** (UG-99(g), (k)): No vessel leaves Roben's facility without undergoing rigorous hydrostatic testing to ensure it can withstand operational pressures without leakage. Digital pressure transducers are used to record and analyze test data for accuracy.
- **Pneumatic Testing Restrictions** (UG-100(d)(4)): Roben avoids pneumatic testing due to potential hazards, except under specific code case allowances.

Code Case Considerations and Adaptations

- **Adherence to Latest Code Cases**: Roben stays current with amendments and interpretations within ASME Section VIII, incorporating changes like those found in Code Cases 2321-1 for PWHT and 2346-1 for alternative rules in head-to-shell attachments.

Documentation and Compliance Marking

- **Detailed Record Keeping** (UG-120(d)(1), Appendix W Table W-3): Each vessel's fabrication process is documented in exhaustive detail, including material certificates, NDT reports, and compliance checks.
- **Compliance Markings** (UG-116(c)): Every Lethal Service vessel is marked with an "L" stamp, alongside other requisite data to signify compliance with the lethal service criteria outlined by ASME.

Conclusion

Roben Manufacturing's rigorous adherence to ASME Section VIII, Division 1 for Lethal Service vessels underscores our commitment to using advanced NDT methods such as UT and X-ray radiography, employing robust welding and design practices. By focusing on high-quality materials and precise engineering, Roben ensures that each vessel not only meets but exceeds the necessary safety and design standards for Lethal Service as required by the ASME Code. This dedication to quality and safety solidifies Roben's position as a leader in the pressure vessel manufacturing industry.

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