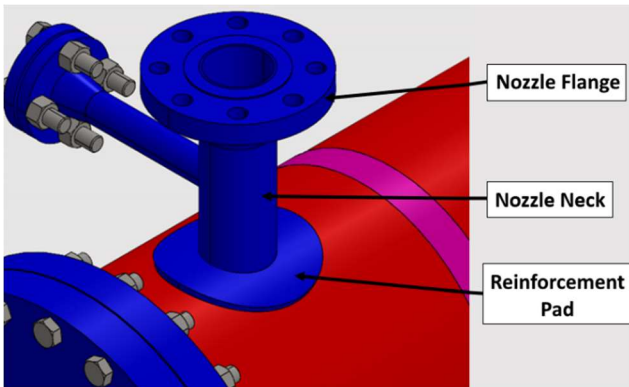


Vessel Nozzle Projection Weld Testing in Nuclear Power Plants

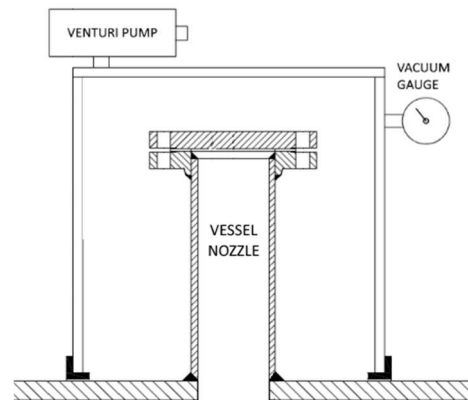
Vessel nozzles are critical connection points on a nuclear reactor pressure vessel, where piping penetrates the vessel wall. These areas include complex welds that experience high pressure, temperature, and continuous thermal cycling. Because of this, nozzle projection welds are among the most sensitive areas for potential cracking and require reliable leak and flaw detection during inspection.

Standard inspection tools often struggle

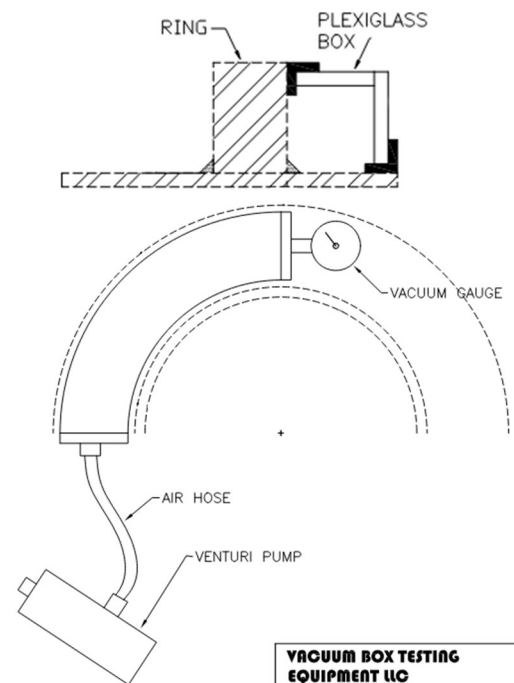


with the curved geometry and limited access around nozzle projections. The combination of vessel curvature, nozzle protrusion, and surrounding hardware makes it difficult to position testing equipment securely while still achieving full coverage of the weld surface.

To address these challenges, custom vacuum box testing solutions can be used to effectively seal around the complex geometry of vessel nozzles. By building a tall-profile vacuum chamber that fully encompasses the nozzle projection, the weld joining the reinforcement pad to the vessel wall can be tested for leaks with a clear, reliable bubble leak inspection.



For the weld between the nozzle flange and nozzle neck, a corner-style vacuum box is fabricated to match the curve of the nozzle profile. This custom approach ensures a proper seal and allows technicians to perform accurate vacuum box bubble leak testing even in tight or irregular areas.



These specialized vacuum boxes provide a practical and dependable method for inspecting vessel nozzle welds, helping ensure equipment integrity and supporting safe operation in demanding industrial and nuclear environments.