



**J.T. THORPE & SON, Inc.**

Established 1906

**ENGINEERS and CONTRACTORS**

JTT was awarded a turnkey engineering, procurement and installation project that included the redesign and subsequent removal and replacement of the refractory linings in (3) Spherical Hydrogen Reactors complete with stainless steel shroud supply and installation. The existing failed miserably as the reactors performed optimally during dryout but achieved a steel shell temperature of 900°F upon introduction of process flow. JTT was given the lead role on the project, which included coordination and collaboration with UOP process engineers, shroud design, shroud fabrication, refractory design, supply and installation, and mechanical installation of the shrouds. All work was performed safely, ahead of schedule and under budget.

- Process Conditions:
  - Process: Hydrogen Service (70% +/-)
  - Temperature: 900°F
  - Pressure: 400 PSI
- After several meetings with the Customer and the Process Designer, it was decided that the redesign must include a new stainless Steel shroud so as to not RISK further failure by designing for a non-shrouded vessel and end up with a hot shell.
- Based upon process design conditions provided, JTT prepared a preliminary refractory and shroud design / general arrangement that could be reviewed by all parties from a process standpoint. Once the general design was approved and acceptable, a final comprehensive refractory and shroud design was developed by JTT.
- The shroud design became quite intricate whereas the final installed shroud had to be in as spherical shape as possible. The shroud diameter was designed to accommodate the difference in thermal expansion between the SA-321 SS plate shroud and the inside of the refractory lining (Shroud OD = 3" less than refractory ID).

Shop Fabrication of Shroud Lampshade



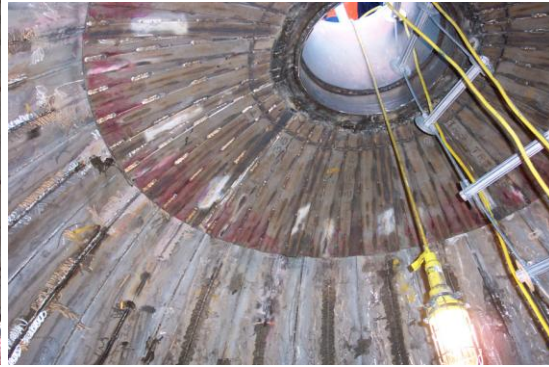
Shop Fabrication of Shroud Bottom Section



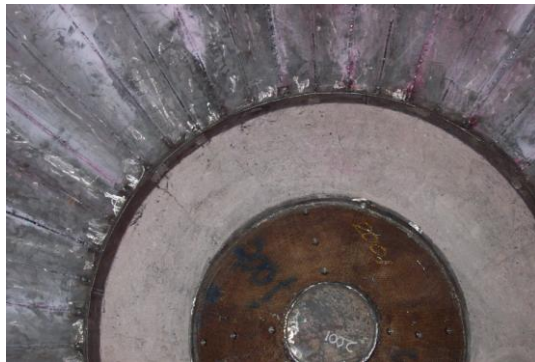
Shop Fabrication of Shroud Bottom Section



Final Shroud Installation – Lampshade



Final Installation Bottom Section



Refractory Installation Top Inlet Nozzle

