

Design & Analysis of AHWR Pressure Vessels

Design and Analysis of different pressure vessels of AHWR process systems has been carried out as per the ASME Boiler and Pressure Vessel Code requirements. The general design and analysis procedure followed described below:



1. Inputs by Process Engineer

- Pressure Vessel Dimensions (L & D)
- Design and Service loads
- Seismic Categorization
- Safety Classification

2. Design By Rule

- Design of shells & heads for Internal/External Pressure & Dead Weight
- Nozzle reinforcement calculations
- Design of Vessel supports (i.e. Saddle, Legs, Lugs or Skirt) & Stiffeners
- Design of Lifting lugs

3. Design By Analysis

- Detailed FE analysis of the vessels is carried out as per the requirements of the ASME Sec-III NB/NC/ND
- The stresses are categorized into P_m , P_m or $P_L + P_b$, Q & F

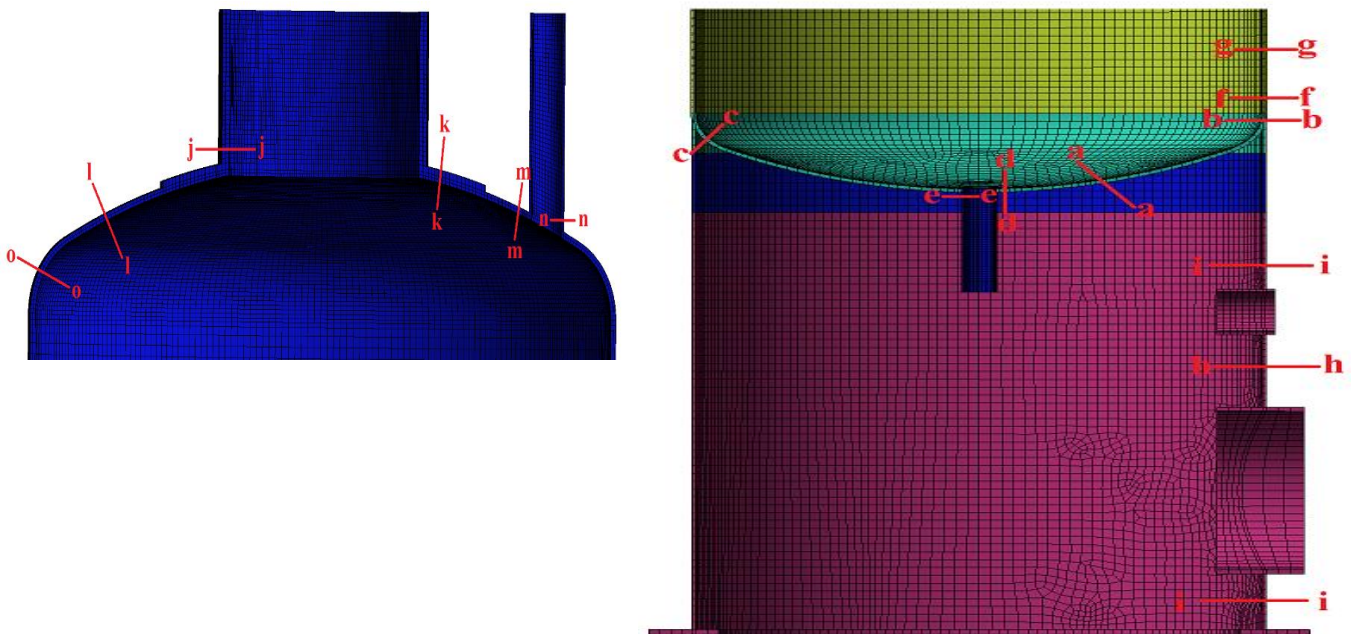


Fig 1. Stress Classification Lines in FE Model of Poison Preparation Tank

- Parameters like Vessel shell & head thk., nozzle reinf. & supports thickness are calculated till the actual stress \leq allowable
 - Anchor Bolts are qualified as per procedure given in Sec III NF
- ## 4. 3D Modelling in CATIA S/w

- 3D Modelling of the Pressure Vessels in CATIA S/w is carried out
- The 3D model is also used for Plant design applications and for preparation of 2D drawing.

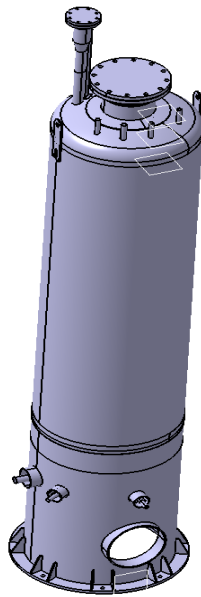
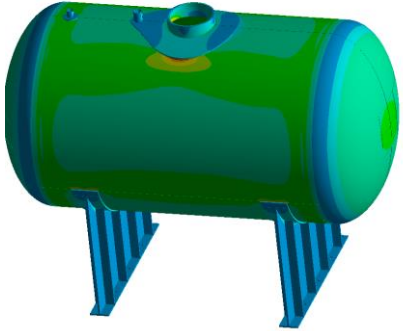
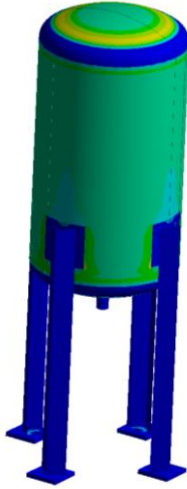
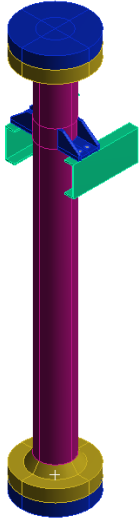
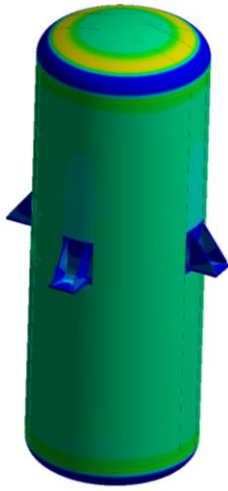


Fig 2. CATIA 3D Model of Poison Preparation Tank

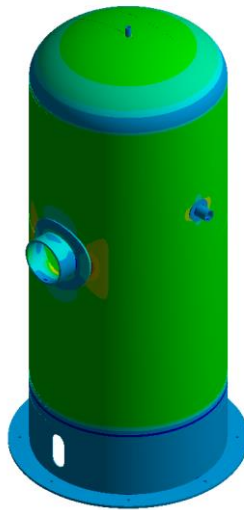
5. 2D Drawing Extraction & Finishing in CATIA S/w

- 2D associative drawing to 3D model is made in CATIA S/w.
- This 2D associative drawing includes all details required for fabrication of the pressure vessel.

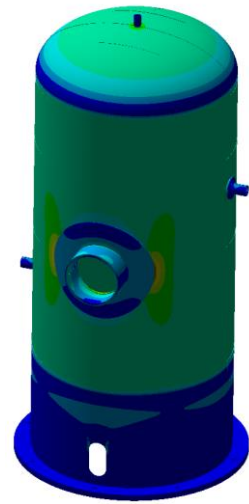
| Highlights of some of the Vessels Designed | | |
|---|---|--|
|  <p>Hydro-Pneumatic tank</p> |  <p>Heavy Water Addition & Transfer Tank</p> |  <p>Poison tank</p> |



Expansion Tank



Main Air Receiver



Bulk Air Receiver



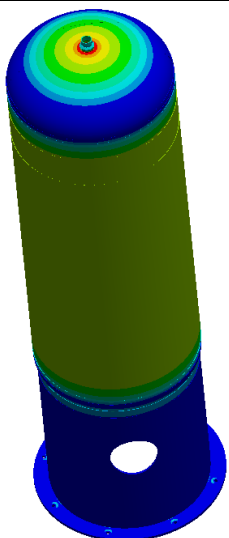
Ion Exchanger



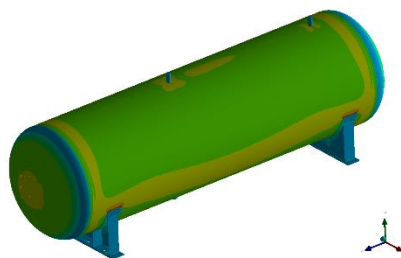
Filter Vessel



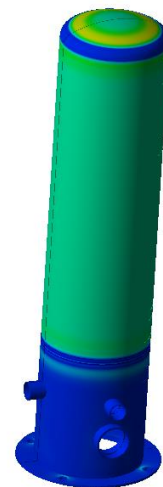
Poison Preparation tank



Helium Tank



Calandria Head Tank



Drain Tank

