



## Case Study #21

### Liquid Hydrogen Storage Tank for Aerospace Application



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#### Highlights:

- Largest Liquid Hydrogen (LH<sub>2</sub>) tank produced in India
- Liquid Nitrogen (LIN) shielding technology incorporated in the overall design of the ground storage tank to minimize evaporation in accordance with customer's stringent specification.

**Location:** Sri City, India

#### Scope of Project:

- Cooperative technology effort with Satish Dhawan Space Center SHAR
- Engineering and manufacture of 120m<sup>3</sup> LH<sub>2</sub> storage tank
- Stored liquid hydrogen is used as a propellant for satellite launch rockets



#### Application:

The cryogenic vessel is a critical part of the launch site ground infrastructure and stores liquid hydrogen, which is used as propellant for the satellite launch rockets.

#### Project Background:

Chart's VRV subsidiary was commissioned by the Indian Space Research Organization (ISRO), to engineer and build a large cryogenic tank for liquid hydrogen storage. All work was carried out at the Sri City facility to comply with the 'Make in India' initiative.

#### System Configuration:

120,000 liter gross capacity horizontal cryogenic storage tank (India's largest ever). Deep cryogenic technology with a working temperature of -253°C. To meet the client's stringent maximum evaporation rate requirements, VRV engineered an internal shield system utilizing liquid nitrogen. The tank accommodates withdrawal of both liquid and gaseous hydrogen.

#### Significant Accomplishments:

- Chart VRV design exceeded contractual net evaporation rate (NER) requirement by 20%
- Suspension system designed to meet thermo-structural requirements for acceleration loads
- Largest tank of its kind produced in India
- Chart VRV design advances deep cryogenic storage technology for liquid hydrogen

