



IS 16542 : 2016 Direct Insertion Type Storage Water Tank for All Glass Evacuated Tubes Solar Collector — Specification

Direct insertion-type storage water tanks are designed for solar water heating systems, where evacuated glass tubes (solar collectors) are directly connected to the tank allowing transfer of solar heat directly to the water. The system operates as a vented unit, maintaining internal pressure equal to atmospheric pressure, enhancing energy efficiency by minimizing heat loss. This type of system is ideal for residential solar water heating.

Consumers expect solar storage tanks to be durable, resistant to leakage & corrosion, and maintain consistent water temperature across varying weather conditions. They also expect that the materials used will not contaminate the water.

IS 16542:2016 addresses these consumer concerns by detailing specifications for materials, construction, and performance.

1. Material and insulation:

- The **inner tank** must be made from stainless steel, mild steel, or galvanized steel. Stainless steel with minimum thickness of 0.5 mm to 0.6 mm whereas mild and galvanized steel with at least 1.5 mm and 2.0 mm thickness, respectively. Anti-corrosive coatings (150-micron enamel or food-grade) are required to ensure longevity and resistance to corrosion.
- **Outer cladding** must be pre-painted galvanized steel or alternatives such as aluminium or stainless steel.
- **Insulation** consists of a 50-mm thick polyurethane foam (PUF) layer with a density of 28-36 kg/m³ to minimize heat loss and maintain temperature.

2. Protective Seals and Anode:

- **Seals:** Inner and outer seals must be made from high-temperature silicon rubber and EPDM rubber, ensuring resilience to temperature changes.
- **Sacrificial Anode:** An optional magnesium anode may be provided in areas with high dissolved solids or chlorides in water for additional protection against corrosion.

3. Performance and Durability Testing:

- **Leakage Test:** No leakage when tested at 0.5 bar for 5 minutes.

- **Thermal Shock Test:** The inner and outer seals undergo repeated heating and cooling cycles to test their durability.
 - **Heat Retention Test:** The tank must have a heat loss coefficient of less than $2 \text{ W}/(\text{m}^2 \text{ }^\circ\text{C})$, ensuring energy efficiency.
4. **Marking and Certification:** Tanks must be marked with the manufacturer's name, water capacity, serial number, material of construction, and insulation thickness, along with the BIS Standard Mark for quality assurance.