



## IS 12933 (Part 2):2003 - SOLAR FLAT PLATE COLLECTOR-SPECIFICATION PART 2 COMPONENTS

A solar flat plate collector is a widely used solar energy device for heating fluids, such as water or air. It consists of an insulated, flat, dark-colored plate that absorbs sunlight, converting it into thermal energy.

This standard specifies the requirements for various components of solar flat plate collector for water heating.

### Key Components and Materials

- 1) **Cover Plate:** It allows the sunlight to reach the absorber, must be made of **tempered or toughened glass** with a minimum **solar transmittance of 82%**. The glass must be **free of bubbles** and have a **smooth surface** for optimal performance.
- 2) **Collector Box:** Providing structural support and housing for the components, the collector box can be constructed from various materials, including **aluminum, fiberglass, galvanized steel, or hot-rolled carbon steel**. Each material has a **specified minimum thickness** to ensure durability, and **corrosion-resistant coatings** may also be applied.
- 3) **Absorber:** Responsible for absorbing sunlight and transferring heat to the water, the absorber comprises risers, headers, and an absorber sheet. Materials commonly used in the absorber include **copper, aluminum, stainless steel, or mild steel with protective coatings**. **Selective or non-selective coatings** can be applied to enhance heat absorption.
- 4) **Insulation:** To minimize heat loss and maximize efficiency, proper insulation is essential. The standard mandates insulation at the **back and sides of the collector box**
- 5) **Gaskets and Grommets:** These components ensure the system's airtightness and prevent water leakage. Materials such as **neoprene, silicon, or EPDM rubber** are commonly used for gaskets and grommets.

**Testing -** IS 12933 (Part 2) outlines various testing procedures to guarantee the quality and performance of solar flat plate collector components such as:

- 1) **Abrasion Resistance:** Ensuring the components can withstand wear and tear from environmental factors.
- 2) **Transmittance:** Verifying the cover plate's ability to transmit sufficient sunlight.
- 3) **Temperature and Pressure Leakage:** Evaluating the system's ability to withstand operational temperatures and pressures without leaks.
- 4) **Bonding:** Ensuring the secure attachment of different components for long-term reliability.