

The National Renewable Energy Centre of Spain -CENER- is a technology centre specialized in applied research and development as well as in the promotion of renewable energies. CENER is divided into six departments: Wind Energy, Photovoltaic Solar Energy, Solar Thermal Energy, Biomass Energy, Bioclimatic Architecture and Renewable Energy Grid Integration.

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TESTING SERVICES – SOLAR COLLECTOR TESTING TO THE EN 12975 STANDARD



DURABILITY TEST

Incoming component inspection:

The original state and characteristics of the collectors are recorded so any changes during the tests can be identified.

Internal pressure:

The collector must withstand 1.5 times the maximal operating pressure for 15 min with no deformation or loss.

High-temperature resistance:

No signs of damage after irradiating the unfilled collector at 1000 W/m^2 for at least 1 h.

Outdoor exposure:

Inspection of materials resistance: at least 14 MJ/m^2 .daily irradiation for 30 days and at least 850 W/m^2 radiation intensity for 30 h.

External thermal shock:

After at least 1 hr irradiation at 850 W/m^2 , sudden rainfall is simulated by spraying with cold water for 15 min.

Internal thermal shock:

After at least 1 h irradiation at 850 W/m^2 , sudden inflow of cold water for 5 minutes.

Penetration of rainwater:

After 4 h of constant rain, the inside of the collector is examined for penetration of water.

Mechanical loads:

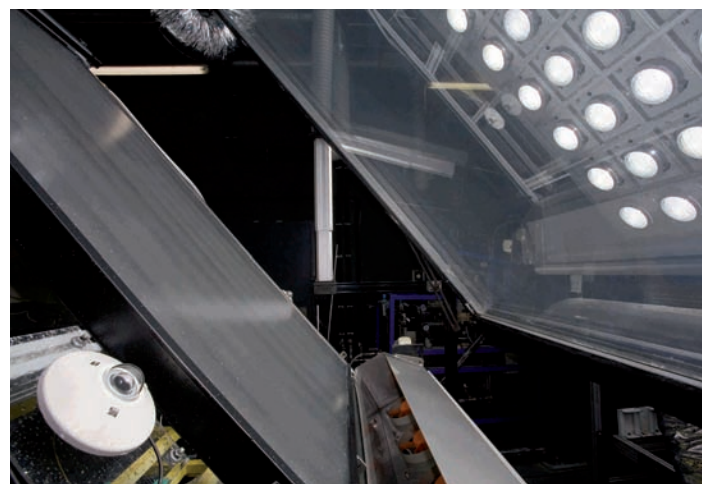
The collector must withstand snow and wind loads up to 1000 Pa.

Impact resistance (optional):

Either a 150g steel ball is dropped from increasing heights onto the collector cover or 25mm ice balls are shot at a corner of it at a speed of 23 m/s.

Final inspection:

If the full series has been completed, the collector is dismantled and inspected. All abnormalities shall be reported and accompanied by a photograph.



THERMAL PERFORMANCE TEST

Steady-state performance measurement:

Under the steady-state procedure, practically all test conditions (inlet temperature, volume flow rate, irradiation, etc.) must be constant. Characteristic curves are then calculated using indoor or outdoor measuring points.

Dynamic performance measurement:

In contrast to the steady-state procedure, in the quasi-dynamic test, the irradiation must be varied. The test method and recommended test sequence evaluate the combined dependence of collector efficiency on the effective thermal capacitance, incidence angle modifier (IAM), wind speed, and sky temperature.

