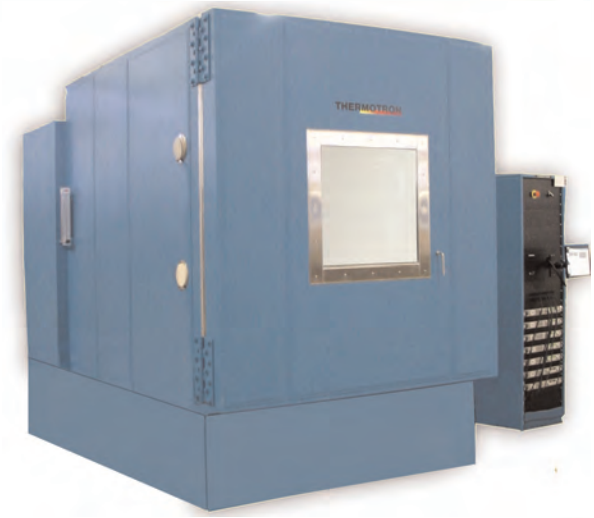
THERMOTRON®

NEW PRODUCT HIGHLIGHT: SOLAR PANEL TEST SYSTEM

The customer was looking for a large temperature/ humidity chamber that would be able to test multiple solar panels and would provide specific temperature and humidity specifications. What Thermotron was able to provide was a total solar panel test solution complete with chamber, fixture and test data collection software.



The Chamber

With a volume of 113 cubic feet (2,662 liters), Thermotron's F-113 provides a large workspace for testing a multitude of solar panels simultaneously. A solid construction insulated floor allows the chamber to withstand a load of up to 900 pounds (408 kg). Two 4" (10 cm) diameter ports located on each side of the chamber allow for wiring access to and from the products under test. A cable slot was built into the door for additional easy wiring access.

The chamber meets customized temperature and humidity performance based on IEC 61646 Thin-film terrestrial photovoltaic (PV) modules Design qualification and type approval and ASTM E1171 specifciations. The chamber can expose 880 lbs (399 Kg) of solar modules and up to 4,000 watts to temperatures from 0°C to -40°C (32°F to -40°F). A high output humidity system provides more heat to the humidity system resulting in more steam and a higher output of humidity. This humidity system is able to maintain 85% RH when transition from 85°C to ambient temperatures and is able to conform to the IEC 61646 Humidity Freeze test. Customer supplied compressed dry air or gaseous nitrogen (GN2) can be used to purge the chamber, lowering the dew point and reducing condensation.

A sophisticated system has been put in place for product monitoring and temperature control. A ten channel thermocouple data logger, mounted on the side of the chamber, canbe configured to monitor product temperatures. Two additional control modules have been added to provide a total of 14 analog outputs configured and wired for customer supplied power supplies. Utilizing product temperature to control heating and cooling processes rather than test space air temperature, a mechanical relay will open if the product monitor thermocouple exceeds a user defined temperature (in this case +196°C), and the chamber circulators will be disabled.

Additionally, the customer requested that the 8800 Programmer Controller be mounted in a remote console along with customer provided power supplies. The 19" (48 cm)console utilizes 15' (456 cm) of interconnect allowing it to be placed on either side of the chamber.

The Fixture

This solar panel fixture is designed to hold 60 panels during the long temperature soak tests or 30 panels during the fast temperature transition tests. The supporting structure of the fixture is manufactured from anodized aluminum bars and stainless steel fasteners. The panels are supported by carbon-filled Teflon guides that machined with slots to ensure adequate and consistent spacing between products. The Teflon material was chosen for its durability at high temperature and humidity levels and to protect the edges of the panels during loading and unloading. The fixtures allow routing for wiring harnesses providing power and sensing to each product.

The Software

For customers also needing a way to monitor multiple values, Thermotron has developed a software capable of monitoring up to ten chambers from a single computer and store the data in a custom database format. This software solution communicates with the chamber controllers and record time & date, test profile name, humidity, air and product temperatures, and other test information at customer-defined intervals. The software also allows remote monitoring of the tests.

DESIGN CHARACTERISTICS:

Chamber Interior Dimensions:	54"W x 60"D x 60"H / 137 cm x 152 cm x 152 cm
Chamber Exterior Dimensions:	78"W x 140"D x 95"H / 198 cm x 366 cm x 241 cm
Temperature Range:	-73°C to +177°C (-100°F to 350°F)
Temperature Change Rate:	3.3°C per minute from 0°C to -40°C with 880 lbs with up to 4,000 watts
Humidity Range:	20 to 95% RH
Humidity Performance:	85% ±5% while ramping at approximately 1°C/minute per the ASTM E1171 specification with 4,000 watts
Window:	One 24" x 24" (61 cm x 61 cm) multi-pane, heated window

FEATURES AND BENEFITS:

- A heated multi-pane window measuring 24" x 24" / 61 cm x 61 cm provides large viewing areas.
- Operators are protected by safety features such as door locks, interior door release and emergency power off switches.
- 4" access ports with plugs allow easy access to products when needed. Additional access ports can be accommodated.
- Sophisticated product monitoring system insures test results are accurate.
- Compressed dry air/GN2 injection system keeps moisture from condensing and freezing on evaporator coils.
- Specialized temperature and humidity performance per industry specifications.

OTHER APPLICATIONS:

Because this chamber meets performance standards and specifications, it can be used by a variety of solar panel manufacturers. Available in sizes ranging from 12 cubic feet to 168 cubic feet with compressor sizes from 5 to 30 horsepower, Thermotron's fast change rate chambers have become a chosen solution for a variety of clients in different industries.

The fixtures provided hold up to 60 solar panels. Constructed of anodized aluminum bars and utilizing durable Teflon guides, the fixture ensures adequate and consistent spacing between products.

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