

Quality is more than a word



Environmental Chambers

For Solar Panel Testing



ESPEC NORTH AMERICA, INC.

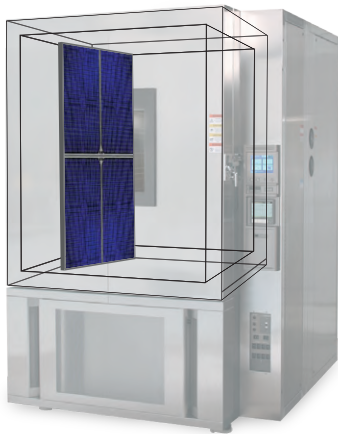
ESPEC's Environmental Chambers Designed for Solar Panel Testing

Solar panels need to pass environmental tests per IEC and/or UL requirements to prove their long-term performance and resistance to temperature and humidity extremes. ESPEC's standard chamber designs for meeting these tests get you up and running quickly.



Chamber Sizes

Three standard chamber sizes allow you to choose the unit that best fits your solar panels and test quantities.



Panels up to 1.2m

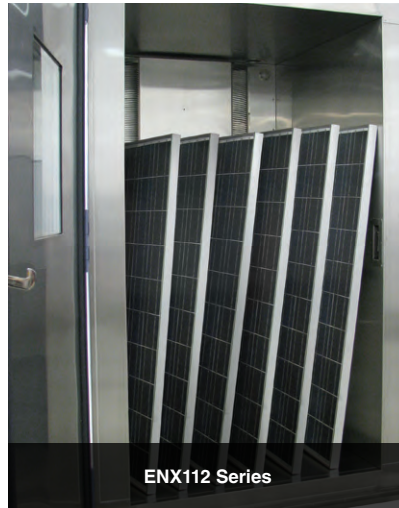


ENX48 Series

Maximum Panel Size: 0.9m x 1.2m
Maximum Panel Capacity: 8
For more information, see page 5



Panels up to 2m



ENX112 Series

Maximum Panel Size: 1.2m x 2m
Maximum Panel Capacity: 12
For more information, see page 6



Panels up to 2.2m



EWSX282 Series

Maximum Panel Size: 1.7m x 2.2m
Maximum Panel Capacity: 20
For more information, see page 7

Solar Features

Specialized Chambers for Solar Panel Tests

ESPEC offers a wide variety of test chambers that allow you to test per the IEC and UL requirements. ESPEC can work with you to decide which equipment has the needed size and features to suit your application. Factors such as desired throughput, testing methodology, floor-space, and budget will affect the final selection.

Our chambers can be used for the following test methods:

- 10.11 Thermal Cycle Test
Requires temperature cycling between 85°C and -40°C, 50 or 200 times.
- 10.12 Humidity Freeze Test
Cycling between hot/humid 85°C/85%RH and subfreezing -40°C ten times, with extended soaks at 85/85.
- 10.13 Damp Heat Test
A long term, 1,000 hour, test at 85°C/85%.

Selecting a Chamber

Because the change rates in the specifications are flexible, you have a choice of selecting a slower system to save cost and utilities, or a faster system to shorten testing time.

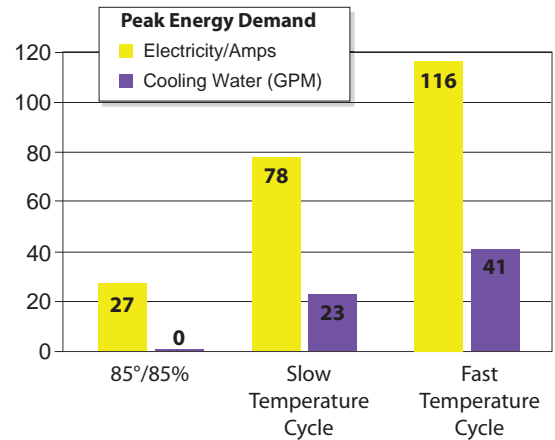
In order for ESPEC to select the proper heating/cooling sub-systems, we will need to know:

- Chamber interior space required
- Total mass of modules and supporting racks to be tested
- Desired heat & cooling rates (Otherwise ESPEC will quote systems to meet both minimum or maximum rates allowed by IEC.)

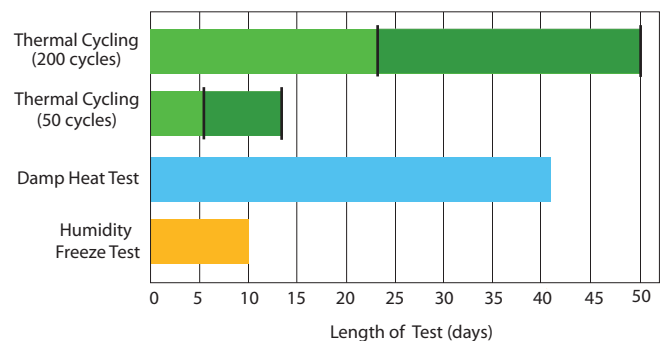
Lengthy IEC and UL Tests

All three of the IEC 61215 & 61646 environmental tests ESPEC chambers are used for can be done in the same test chamber. It may be better, however, to consider multiple chambers to save time and electricity due to the lengths of the tests:


- The temperature cycling test may last up to seven weeks.
- The damp heat test is six weeks long.
- The damp heat test requires only minimal refrigeration, reducing capital and energy costs if a dedicated model is selected for this test.



Chamber utility requirements can vary depending on the tests and desired performance. This chart shows different solid walk-in chamber peak demand.



The IEC and UL tests can take a significant amount of time to complete. Purchase of multiple chambers may be beneficial to save time.



For an in-depth look into the IEC and UL test methods, and how to select the right chamber, please refer to the **ESPEC Solar Application Guide**.

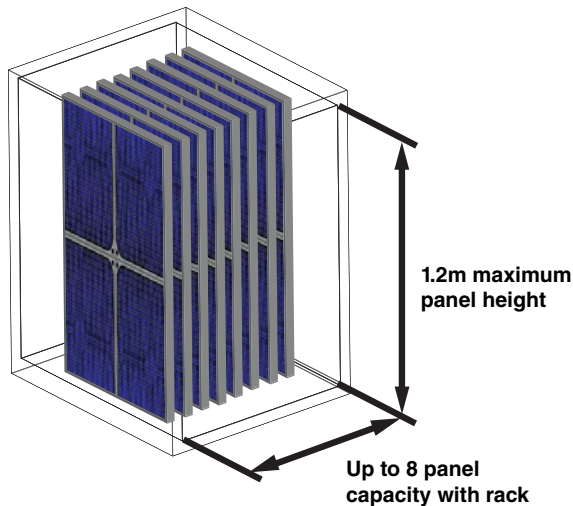
Download it FREE at www.espec.com/pv

ENX48 Series

Your choice for testing smaller PV modules is ESPEC's ENX48 series. This series can be customized to suit slightly larger panels.

These models provide a variety of performance capabilities to meet maximum or minimum change rates, based on your lot sizes and desired throughput. The ENX48 incorporates the features of our popular Platinum and Global-N lines.

Most models utilize modern scroll compressors for maximum performance while allowing a small footprint and unparalleled service access.



The models come in different performance versions, depending on your planned use. More powerful performance allows you to complete the temperature-cycling test (10.11) faster, or with a maximum number of modules. There also is a 'damp-heat' (10.13) only model ENL48-CCA that saves you capital-cost and energy costs by having only minimal refrigeration.

- Stainless steel exterior & interior
- Viewing window
- Touch-screen programmer/controller
- Product temperature control mode option for easier IEC & UL test compliance
- Cable port for testing panels in-place
- Optional module rack with rollers

Model	ENX48	ENL48
Interior Dimensions (W x D x H)	44" x 36" x 53" 1118 x 914 x 1346 mm	
Exterior Dimensions (W x D x H) *	66" x 74" x 111" 1676 x 1867 x 2819 mm	
Interior Volume	48 cu. ft.	
Temperature Range	-70 to 180°C	15 to 180°C
Humidity Range	10 to 95%	30 to 95%

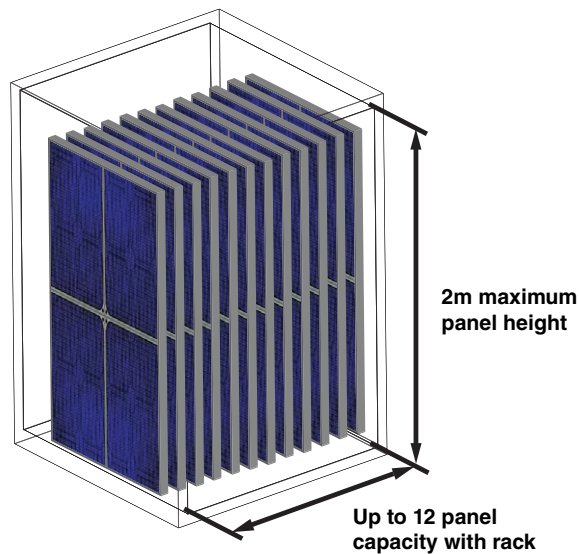
UL / IEC Test	10.11 Thermal Cycle Test			10.12 Humidity Freeze Test		10.13 Damp Heat
Change Rates	44°C/hr	100°C/hr	120°C/hr	72°C/hr	200°C/hr	
ENX48-6CWL	450 lb	100 lb	100 lb	200 lb	-	Yes
ENX48-12CWL	900 lb	350 lb	250 lb	500 lb	-	Yes
ENX48-15CW	2100 lb	900 lb	750 lb	1250 lb	300 lb	Yes
ENL48-CCA	-	-	-	-	-	Yes

* Model ENX48-15CW exterior is 80" x 115" x 111" (2032 x 2908 x 2819 mm)

ENX112 Series

The ENX112 chambers have a large enough interior for testing full-size PV modules, while using the least amount of floorspace.

The unit's door opens to give full access to the chamber for maximum loading of solar panels. The interior is just 150mm from the floor for minimal lifting required when loading or unloading. The controller is on the door to save even more floorspace.



The models come in different performance versions, depending on your application. More powerful performance allows you to complete the temperature-cycling test faster, or with a maximum number of modules. There also is a 'damp-heat' only model that saves you capital-cost and energy.

- Compact footprint of 1.6m x 2.5m
- Stainless steel interior
- Viewing window
- Touch-screen programmer/controller
- Product temperature control mode option for easier IEC & UL test compliance
- Cable port for testing panels in-place
- Three optional module racks with rollers
(Five, eight, and twelve slot racks available)

Model	ENX112	ENL112
Interior Dimensions (W x D x H)	48" x 48" x 84" 1219 x 1219 x 2134 mm	
Exterior Dimensions (W x D x H) *	63" x 98" x 99" 1600 x 2494 x 2499 mm	
Interior Volume	112 cu. ft.	
Temperature Range	-70 to 150°C	15°C to 150°C
Humidity Range	10 to 95%	30 to 95%

UL / IEC Test	10.11 Thermal Cycle Test			10.12 Humidity Freeze Test		10.13 Damp Heat
Change Rates	44°C/hr	100°C/hr	120°C/hr	72°C/hr	200°C/hr	
ENX112-6CWL	300 lb	-	-	50 lb	-	Yes
ENX112-12CWL	750 lb	200 lb	100 lb	350 lb	-	Yes
ENX112-15CW	1950 lb	750 lb	600 lb	1100 lb	150 lb	Yes
ENL112-CCA	-	-	-	-	-	Yes

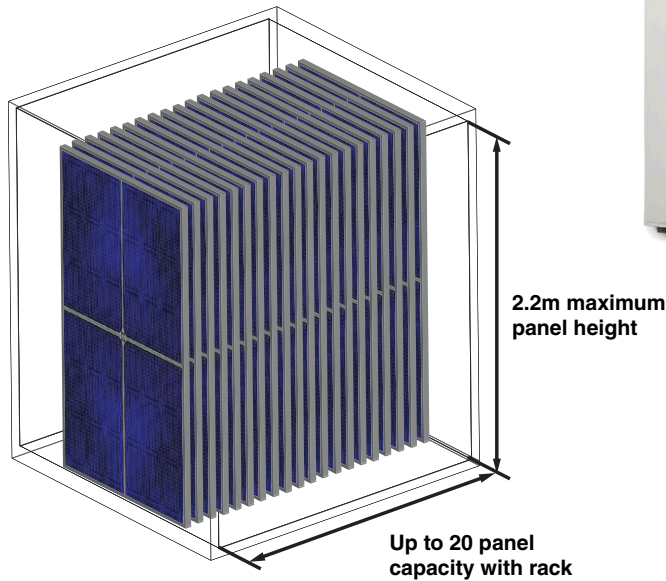
* Model ENX112-15CW exterior is 63" x 135" x 99" (1600 x 3416 x 2499 mm)

EWSX282 Series

ESPEC's solid construction walk-ins are desirable for testing large loads of PV modules where throughput is important. Test capacity of almost 2,000 kg. is possible.

Hermetically welded seams and stainless-steel interior ensure integrity under extreme conditions required by IEC & UL.

Ask for ESPEC's walk-in brochure for further details on this series.



- Large interior volume
- Viewing window
- Touch-screen programmer/controller
- Product temperature control mode option for easier IEC & UL test compliance
- Cable port for testing panels in-place
- Optional module rack with rollers



Model	EWSX282	EWSL282
Interior Dimensions (W x D x H)	72" x 72" x 94" 1829 x 1829 x 2388 mm	
Exterior Dimensions (W x D x H)	93" x 160" x 109" 2347 x 4061 x 2769 mm	93" x 129" x 109" 2347 x 3274 x 2769 mm
Interior Volume	282 cu. ft.	
Temperature Range	-70 to 150°C	15 to 150°C
Humidity Range	10 to 95%	30 to 95%

UL / IEC Test	10.11 Thermal Cycle Test			10.12 Humidity Freeze Test		10.13 Damp Heat
Change Rates	44°C/hr	100°C/hr	120°C/hr	72°C/hr	200°C/hr	
EWSX282-12CWL	300 lb	-	-	-	-	Yes
EWSX282-15CW	1500 lb	400 lb	300 lb	750 lb	-	Yes
EWSX282-22CW	2550 lb	900 lb	700 lb	1400 lb	100 lb	Yes
EWSX282-30CW	4350 lb	1750 lb	1450 lb	2250 lb	450 lb	Yes
EWSL282-2CA	-	-	-	-	-	Yes

ESPEC NORTH AMERICA, INC.

www.espec.com

4141 Central Parkway, Hudsonville, MI 49426, U.S.A.
Tel: 1-616-896-6100 Fax: 1-616-896-6150

ESPEC EUROPE GmbH

Dachauer Strasse 11, D-80335, Munchen, Germany
Tel: 49-89-1893-9630 Fax: 49-89-1893-96379

ESPEC ENVIRONMENTAL EQUIPMENT (SHANGHAI) CO., LTD.

F5, ShenHua Financial Building, NO 1 NingBo Road,
Huangpu District Shanghai, 200002, P.R. China
Tel: 86-21-51036677 Fax: 86-21-63372237

ESPEC SOUTH EAST ASIA SDN. BHD.

No.10 -1, Jalan Dagang SB 4/2, Taman Sungai Besi Indah
Off Jalan Sungai Besi, 43300 Seri Kembangan
Selangor Darul Ehsan Malaysia
Tel: 60-3-8945-1377 Fax: 60-3-8945-1287

ESPEC (CHINA) LIMITED

Suite 618, 6th F, Ocean Centre, Harbour City, Kowloon,
Hong Kong
Tel: 852-2620-0830 Fax: 852-2620-0788

ESPEC CORP.

www.espec.co.jp/english

3-5-6, Tenjinbashi, Kita-ku, Osaka 530-8550, Japan
Tel: 81-6-6358-4741



DANGER

Not for use with specimens which are explosive or flammable, or which contain such substances. To do so could be hazardous, as this may lead to fire or an explosion.