

Thermal Shock Chamber

TSE-11-A



ESPEC offers a compact, but high performance thermal shock chamber ideal for the requirements of test standards of small and low-volume specimen.

Equipped with superior temperature recovery performance capable of answering the requirements of severe test specifications, this thermal shock model offers a wide test area in a compact, slim design.



User-friendly

A high performance compact package to meet severe test requirements.

- **A temperature recovery time of less than 5 minutes is achieved in 2 zones (+ 150 and - 65) without auxiliary cooling.**

By realizing a temperature recovery time of less than 5 minutes for the upstream air in the 2 zones (+ 150 and - 65), we have achieved performance equivalent to that of a large thermal shock chamber without having to use auxiliary cooling by means of liquid carbon dioxide, which was required in previous compact thermal shock chamber.

- **Complies with MIL-STD-883E and other test standards.**

This compact thermal shock chamber satisfies the temperature cycle test requirements of MIL-STD-883E and other test standard (see page 5).

- **Vibration shock to samples is minimized during movement of the test area.**

The soft-move mode is used to reduce vibration shock when moving from the high-temperature chamber specimens are to the low-temperature chamber in the test area.

- **Uniform temperature distribution across specimens.**

High temperature uniformity performance ensures consistent stress on specimens.

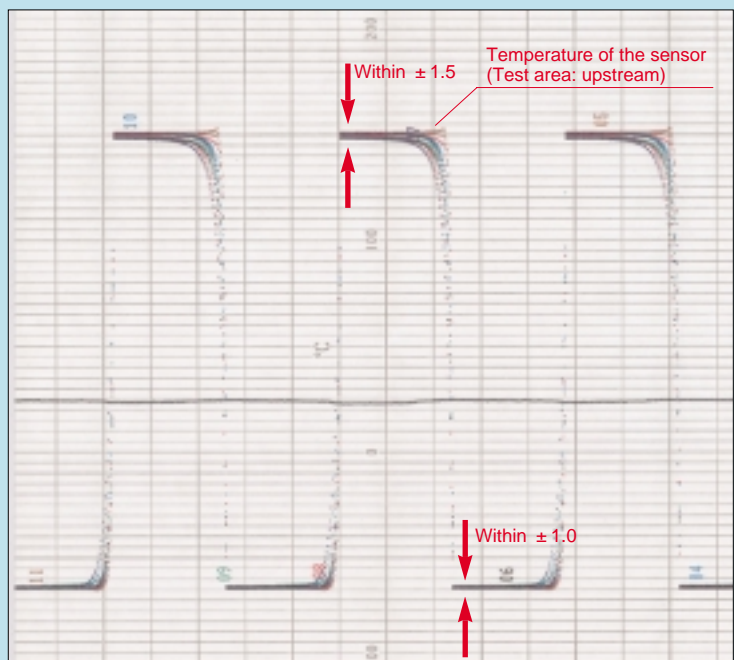


High-temperature exposure

Low-temperature exposure

● Examples of temperature uniformity

Test conditions	Temperature uniformity measurement method
High temperature exposure + 150 30 min	Thermocouples were embedded in 10 plastic molded ICs (16 pin DIPs), which were then placed on two levels in each of the corners and in the center of a specimen basket.
Low temperature exposure - 65 30 min	
Specimen Plastic molded IC 2kg	

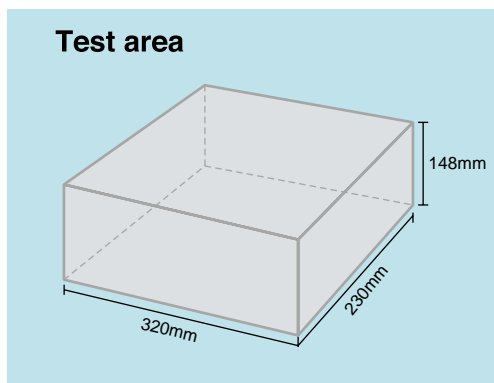




Control panel

Instrument specification

Setting	Interactive key input by touch panel
Display	TFT Color LCD
Number of test patterns	RAM (selected entry): a maximum of 20 patterns can be entered ROM (built-in): contains 10 test standard patterns
Auxiliary functions	<ul style="list-style-type: none"> • Test continuity selection • Overheat/overcool protection • Stable time control • Automatic defrost • Test halt preset • Automatic power shut-off • Trend graph display • Time signal • RS-485 • Timer preset • Sensor traceability • Power failure/recovery operation selection • Programmed time display • Test completion mode selection • Exposure time reduction • Alarm history display • Program memory



Cable port
(50mm, shown with cap installed)



- **Uses a color LCD interactive touch-screen system employed throughout the Thermal Shock Chamber Series.**

A color LCD panel design is employed that allows easy settings by just touching the screen in accordance with the display. The test pattern, test area temperature, number of temperature cycles, upstream/downstream control, trend graph display are all displayed on the visible screen.

- **Large 10.9-liter-capacity test area**

Features a 10.9-liter test area, twice that of our previous model. The volume that can be processed is greatly increased, and a 210 × 297mm printed circuit board can be tested in the horizontal position.

- **A mechanism to prevent specimen from dropping.**

In addition to the drive unit brake, there is other protection mechanism to prevent specimens from dropping in the test area when the chamber stops operation.

- **Easy wiring for applying power or measuring specimens.**

A cable port is provided on the side to allow easy wiring of specimens for measurement during high and low-temperature cycle tests.

- **Total safety measures.**

Test area drive is automatically halted when door is opened, and it is automatically locked during operation. Other redundant safety mechanisms are also used to ensure user safety.

- **Equipped with casters for mobility**

Eco-friendly

Incorporates many features for environmental protection (energy conservation, recycling, ozone layer protection)

● Reduced power consumption

Reduced power consumption is an important issue for our customers. This compact thermal shock chamber employs number of measures such as refrigeration capacity variable control by electronic auto-expansion valve and the use of a titanium interior material aimed specifically at energy savings.

● Small footprint

Vertical design saves space. Required installation space is only 26 inch.

● Material indication for recycling

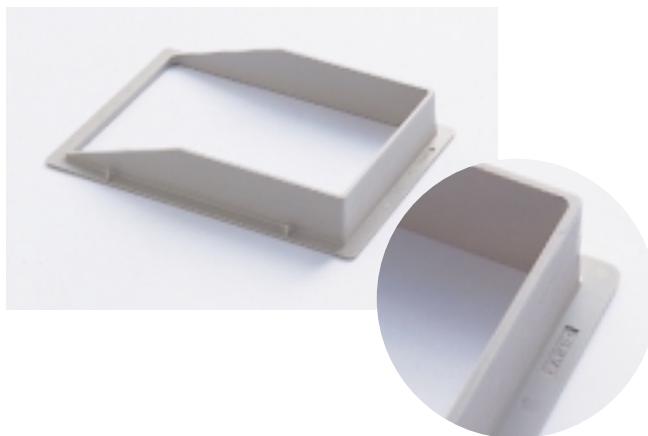
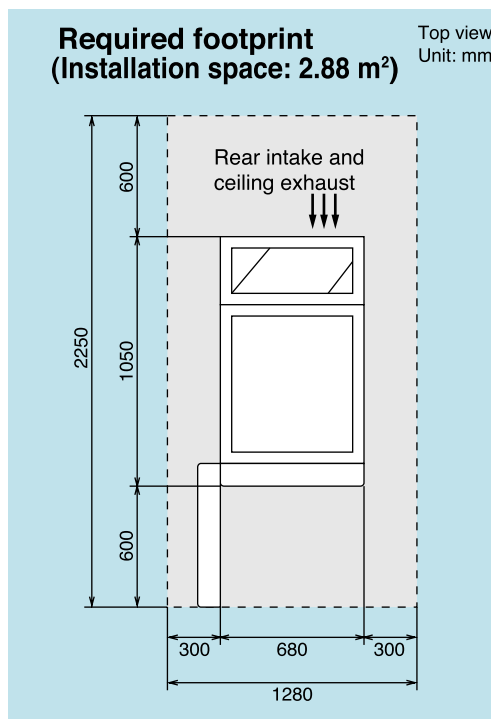
Various environmental protection measures have been taken such as indicating materials on plastic molded parts and employing a structure that makes it easy to remove recyclable parts to accommodate future recycling of the unit.

● Uses HFC to protect the global environment

The refrigerant used for the refrigerator is an HFC which causes no damage to the ozone layer, and thus complies with the measures for ozone layer protection specified by the Montreal Protocol.

● Paperless Recording (optional)

The paperless recorder makes it easy record the temperatures of different components, such as the chamber temperature, on a memory card (Compact Flash).



Paperless recorder (optional) *Sample photo

TEST STANDARD (TSE-11-A compliant)

Test standard		Exposure temperature			Exposure time		Temp recovery time	Number of cycles	Test starting point		
		High temp	Ambient temp*	Low temp	High/ low temp	Ambient temp*					
MIL-STD-883E (Method No. 1010.7)	A	+ 85	+ 10 0	—	- 55	0 - 10	more than 10 min	—	Specimen temp within 15 min. at worst condition	Minimum 10 cycles	Low or high temp
	B	+ 125	+ 15 0								
	C	+ 150	+ 15 0								
	D	+ 200	+ 15 0								
	F	+ 175	+ 15 0								
JIS C 0025		+ 70 ±2 + 85 ±2 + 100 ±2 + 125 ±2 + 155 ±2 + 175 ±2 + 200 ±2	Ambient temp	- 5 ±3 - 10 ±3 - 25 ±3 - 40 ±3 - 55 ±3 - 65 ±3	3 hours 2 hours 1 hour 0.5 hour 3 hours if not specified	less than 10 sec	less than 10% of exposure time	5 cycles if not specified	Low temp		
JASO D 001	1	+ 85	Ambient temp	- 40	Less than 0.2 kg 1 hour + 15 min 0	Short exposure is recommendable	Upstream of specimen within 5 min.	6 cycles	High temp		
	2	+ 75			0.2 ~ 0.8 kg 2 hours + 15 min 0						
	3	+ 120			0.8 ~ 1.5 kg 3 hours + 15 min 0 More than 1.5 kg 4 hours + 15 min 0						
EIAJ ED-2531A		+ 60 ±2 + 65 ±2 + 70 ±2 + 75 ±2 + 80 ±2 + 85 ±2 + 90 ±2 + 95 ±2 + 100 ±2	Ambient temp	0 ±3 - 5 ±3 - 10 ±3 - 15 ±3 - 20 ±3 - 25 ±3 - 30 ±3 - 35 ±3 - 40 ±3 - 45 ±3 - 50 ±3	3 hours 2 hours 1 hour 0.5 hour 3 hours if not specified	less than 10 sec	less than 10% of exposure time	5 or 10 cycles	Low temp		

The noted specification tests include only those tests applicable to TSE-11-A. For further information, please contact us.

* Ambient temperature at exposure temperature and exposure time represent the temperature and time when moving from high temperature chamber to low temperature chamber.

SPECIFICATIONS

Model		TSE-11-A			
System		2-zone system by means of vertical movement of specimen			
Operation temperature		0 ~ + 40 (+ 32 to + 104° F)			
Performance*3	Test area	High temp. exposure range	+ 60 ~ + 200 (+ 140 to + 392° F)		
		Low temp. exposure range	- 65 ~ 0 (- 85 to + 32° F)		
		Temperature fluctuation*1	± 0.5 (± 0.9° F)		
	High temp chamber	Pre-heat upper limit	+ 200 (+ 392° F)		
		Temp. heat-up rate*2	Within 30 min from ambient temp. to + 200 (+ 392° F)		
	Low temp chamber	Pre-cool lower limit	- 80 (- 112° F)		
		Temp. pull-down rate*2	Within 90 min from ambient temp. to - 80 (- 112° F)		
	Temperature recovery performance	Recovery conditions	<ul style="list-style-type: none"> • 2 zones High temperature exposure : + 150 (+ 302° F), 30min Low temperature exposure : - 65 (- 85° F), 30 min • Sensor position : Upstream of specimen • Specimens: plastic molded IC 2kg 		
		Recovery time	within 5 min		
	Construction	Outer shell	Painted steel		
Interior		18-8 Cr-Ni stainless steel plate (SUS 304), titanium plate			
Insulation		Glass wool, foamed polyurethane			
Heater		Stripped wire heater			
Cooler		Plate fin cooler, cold accumulator			
Air circulator		Sirocco fan			
Refrigerator unit	Refrigeration sytem	Mechanical cascade refrigeration system			
	Compressor	Rotary 1.5 kW			
	Refrigerant	R508A R404A			
	Condenser	Air-cooled condenser			
Components		Cable port (1pc, inside diameter 50mm, on right side of chamber), Specimen power supply control terminal, Time signal (2), Integrating hour meter without reset, power cord			
Test area load capacity		8kg			
Specimen basket load capacity		2kg (equally distributed load)			
Inside dimensions (W × H × D)		320 × 148 × 230mm (12.6 × 5.8 × 9 in)			
Outside dimensions (W × H × D)*4		680 × 1625 × 1050mm (26.8 × 64 × 41.3 in)			
Weight		approximately 390kg			
Power supply (Power supply deviation: rating ± 10%)		200V AC 3 3W 50/60Hz	220V AC 3 3W 60Hz	380V AC 3 4W 50Hz	400/415V AC 3 4W 50Hz (EU spec.)
Full load current		26A	25A	17A	17A
Exhaust heat quantity*3		17,585kJ/h			
Noise		60dB or less (At 1m from front of chamber, 1.2m from floor. (A-characteristic) depending on environment)			

*1 Performance indicators conform to JTM K01-1998 of Japan Testing Machinery Association.

*2 Temperature heat-up/pull-down rate imply performance of each temperature chamber.

*3 At ambient temperature + 23 .

*4 Excluding protrusions.



DANGER

Do not use specimens which are explosive or inflammable, or which contain such substances. To do so could be hazardous, as this may lead to fire or explosion.

Do not place corrosive materials in the chamber. If corrosive substances or humidifying water is used, the life of the unit may be significantly shortened.

Do not place life forms or substances that exceed allowable heat generation.



CAUTION

Be sure to read the instruction manual before operation.

SAFETY DEVICES

Leakage breaker (200, 220, 380, 400/ 415V AC)
Circuit breaker (400V AC)
Electric parts compartment door switch
Temperature switch for overheat protection of high-temperature chamber
Temperature switch for overheat protection of low-temperature chamber
Overheat protector for high-temp. chamber (Built-in controller)
Overheat/ overcool protectors for low temp. chamber. (Built-in controller)
Test area overheat and overcool protectors (Built-in controller)
Test area overheat / overcool protectors
Refrigerator high pressure switch
Thermal relay for compressor
Compressor temperature switch
Air circulator temperature switch
Thermal relay for air circulator
Motor inverter
Motor reverse prevention relay
High-temperature chamber door switch
Low-temperature chamber door switch
Test area hold
Door lock mechanism
Fuse
Specimen power supply control terminal

ACCESSORIES

Specimen basket (stainless steel, 5 mesh screen)
W320 x H35 x D230mm
Withstand load: 2kg (equally distributed) 2
Fuse (glass tube 5 A) 1 each
Rubber plug 2
Wirefisher 1
User's manual 1

OPTIONS

Paperless recorder

Records temperature inside the chamber. Additional inputs may also be recorded

Number of inputs:

PL1S: 1 (5 more but turned OFF*)

Data saving cycle: 1 sec

PL3S: 3 (3 more but turned OFF*)

Data saving cycle: 1 sec

PL3L: 3 (3 more but turned OFF*)

Data saving cycle: 5 sec

Temperature range: - 100 to + 220

External recording media :

CF memory card (32 MB)

* Settings may be modified.



Paperless recorder

Temperature recorder (digital)

- 100 to + 220 /100mm

RK-61: 1pen

RK-63: 3 pens

RK-64: 6 dots



Temperature recorder

Temperature recorder for future installation

Preparation of a power cable, temperature sensor, and a grounding wire for additional installation in the future.

OPTIONS

Terminal for recorder

Serves to output temperature within test area, high temp chamber, low temp chamber.



Terminal for recorder

External alarm terminal

If the safety device of the chamber activates, the external alarm terminal will notify the alarm to distant place.

Emergency stop switch

Stops the chamber immediately.



Emergency stop switch

Specimen basket

Equivalent to standard accessory.
• Material: stainless steel (5 mesh)



Specimen basket

Thermocouple

Thermocouple measures the temperature of specimens.

- T JIS C 1602 with ball attached

Auxiliary cooling injector (LCO₂)

Used to reduce the temperature recovery time of low temperature exposure by injecting liquefied carbon dioxide at beginning of exposure.

Auxiliary cooling injector (LN₂)

Used to reduce the temperature recovery time of low temperature exposure by injecting liquefied nitrogen at beginning of exposure.

Extra overheat protector

Additional preventive measures can be taken for excessive temperature rise in the chamber, in addition to the standard double equipped overheat protector.



Additional overheat protector

Total cycle counter

Indicates cycle counts.

- Display range: 1~99999999
(with resetting function)



Cable port rubber plug

Prevents air leakage from the cable port.

Fixture for securing body

Used to bolt the chamber to the floor.

Power cord

Used to connect to the primary power source.

- 5, 10m

Color specifications

Chamber can be painted to a desired color according to a color sample.

Communication functions

Computer interface

- GP-IB
- RS-232C
- E-BUS

*Select one other than standard RS-485.

Communication cable

- RS-485 5, 10m
- GP-IB 2, 4m
- RS-232C 1.5, 3, 5m
1.5, 3, 5m for extension
- E-BUS 5, 10m

Some photographs listed in this catalog contain Japanese display.

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JAB Certificate Number
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051

ISO 9001/JIS Q 9001
Quality Management System Assessed
and Registered

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ISO 14001 (JIS Q 14001)
Environmental Management System Assessed and Register

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