Quality is more than a word

ESPEC

Highly Accelerated Stress Test System (HAST Chamber)

GOOD DESIGN

CAT.NO.E17160-X2510

Creates temperature, humidity and pressure environments to IEC60068-2-66 standard.

Humidity resistance evaluation tests for electronic components
Customers require test results that correlate accurately to those from the field in a minimal amount of time.
ESPEC HAST EHS series provide high usability and a variety of performance capabilities to meet IEC60068-2-66 standard and other international standards with convenient functions and safety features for bias testing.

Lineup

Double Stage

21 L Model		51 L Model	
Single Stage Type	Double Stage Type	Single Stage Type	Double Stage Type
Size: ϕ294 × D318 mm	Size: ϕ294 × D318 mm	Size: ϕ394 × D426 mm	Size: ϕ394 × D426 mm

▲ Photo shows the single-stage model

▲ Photo shows the double-stage model

The double-stage stacked chamber structure doubles the available test capacity.

Large Capacity Models

* Class-1 Pressure Vessel

76 L Model	130 L Model	180 L Model
Single-Chamber Long Type	**Single-Stage Type**	**Single-Chamber Long Type**
Size: ϕ394 × D626 mm	Size: ϕ548 × D560 mm	Size: ϕ548 × D760 mm

* For detailed specifications, see pages 7–8.

* The products shown (including on the cover) are equipped with optional features (emergency stop switch, specimen signal terminal, and specimen signal terminal cover).

Features

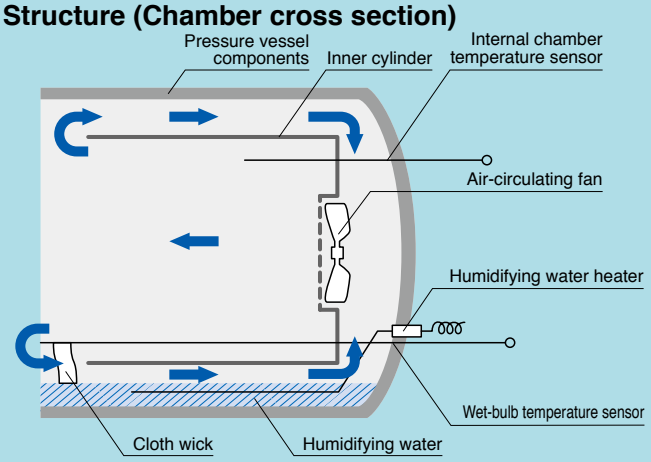
Designed for humidity resistance testing, life testing and accelerated testing

Chamber interior

Maximized testing area

The cylindrical pressure vessel distributes pressure evenly and offers superior strength. Expanding the test area to the maximum size allows for easy loading of printed circuit boards and other specimens.

Structure (Chamber cross section)

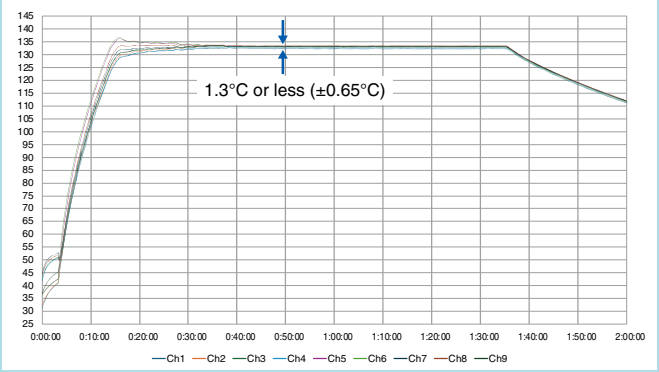


Prevention of dew condensation and wetting of specimens

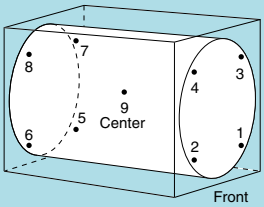
Compared with natural convection test systems, the double cylindrical structure and proprietary air-conditioning system prevents dew condensation and water droplets falling on the specimen. Temperature control and operation of the test area fan before and after testing also prevents dew condensation and droplets from forming on samples, ensuring highly reliable testing results. (Featuring dry and wet-bulb temperature control and unsaturated control)

Internal chamber temperature distribution measurement data (example)

EHS-222M



Test conditions
Temperature and humidity settings: 130°C/85%rh
Control system: Unsaturated test
Measurement points: 9 points as shown in the figure on the right



Air-circulating fan for high-accuracy testing

The provision of an air-circulating fan reduces temperature and humidity variation in the test area and allows for uniform stress to be applied to a specimen. Compared to the double-chamber configuration, the single-chamber configuration includes an air-circulating fan, so temperature and humidity variation is reduced.

Features

Flexible and visually easy-to-identify design terminals

Color coding for improved visibility

Specimen signal terminals for bias testing include 12 pins per chamber as standard with expansion by 12-pin units possible (with a maximum of 72 pins optionally available). Color-coded terminals (black = negative, red = positive) improve visibility and make complicated wiring connection work easier.

Specimen signal terminals (internal)

Specimen signal terminals (external)

Protection measures for specimen

Equipped with a specimen power supply control terminal which allows voltage and signals to be applied to the specimen. When a problem occurs, specimens and chamber are fully protected. Power supply to the specimen is halted, and protection mechanisms for preventing overheating and boil-dry are activated.

Design innovations for more efficient wiring

To reduce wiring labor and improve ease of installation, multiple wiring-friendly features are available. These help prevent connection errors and shorten work time.

Removable terminal blocks:
Allows multiple pins to be inserted or removed at once.

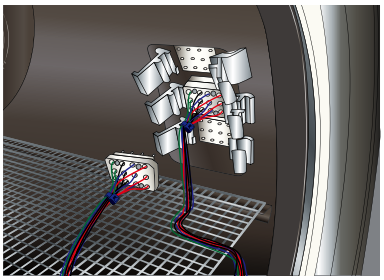
Sliding panel-mounted terminal blocks:
The terminal block slides forward for easier accessibility and improved work efficiency.

Selectable connection system:
Changing the connection between the specimen and leads to crimp terminals eliminates soldering and simplifies use.

Remote operation from a PC for more efficient testing

- Remote control via Ethernet connection
- Edit programs directly in a web browser
- Display sampling data in graph form
- Email notifications when an alarm occurs

■ Options

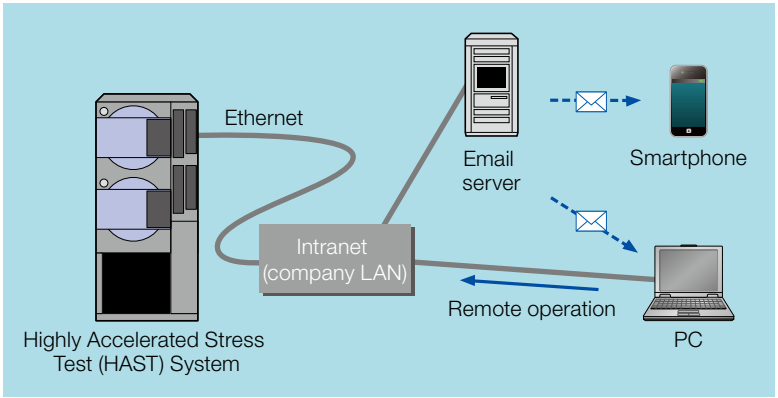


Removable terminal blocks

Sliding panel-mounted terminal blocks

■ Customer-selectable configuration

Crimp-terminal type
* Requires design support



Features

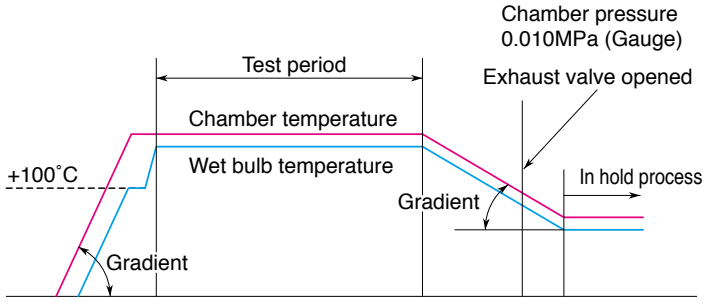
Control functions that make use of conventional test data

The control functions can be selected from dry & wet-bulb temperature control (M/MD type), unsaturated control, and wet-saturated control according to the conventional test data.

With the addition of Air-HAST mode (for M/MD type only), four different types of testing can be performed on one chamber.

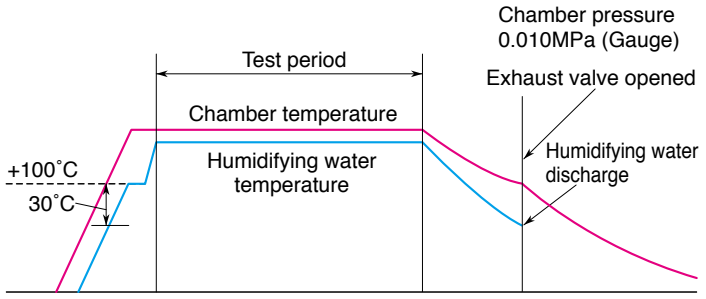
Three modes of operation control

Wet and dry bulb temperature control (M/MD type)



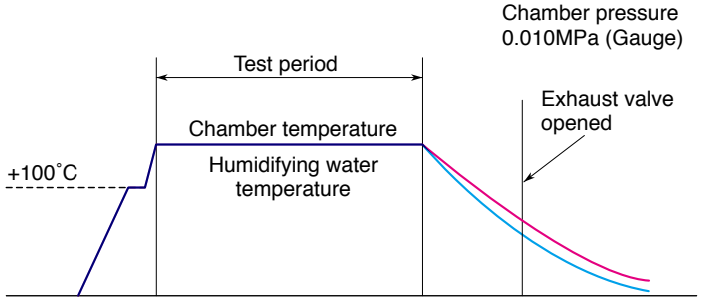
- The temperature and humidity gradient before and after testing can be controlled.
- After testing is complete and chamber pressure reaches 0.010MPa (Gauge), only air is discharged; humidifying water is retained.
- In the hold process, temperature and humidity inside the chamber are maintained at the specified level. (+50 to +95˚C/75 to 95%rh)

Unsaturated control (humidifying water temperature control)



- During temperatureheat - up when condensation can easily occur on the specimen, the temperature of the humidifying water automatically increases while keeping it 30˚C lower than the chamber temperature.
- After testing is complete, the chamber is left to cool and depressurize naturally until chamber pressure reaches 0.010MPa (Gauge). Then both air and water are discharged.

Wet saturated control

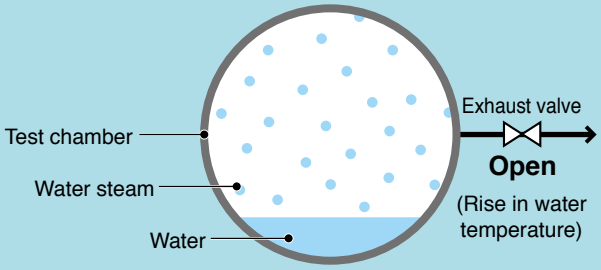


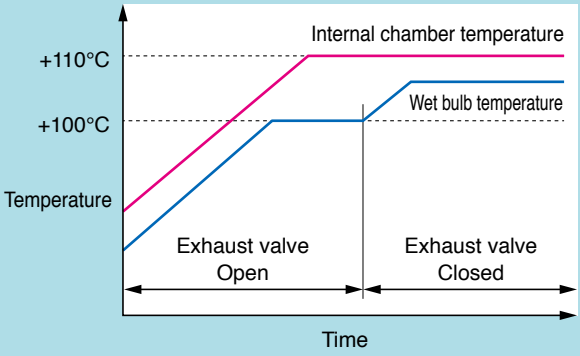
- Chamber temperature is controlled through a humidifying heater. (chamber temperature = humidifying water temperature)
- After testing is complete, the chamber is left to cool and depressurize naturally until chamber pressure reaches 0.010MPa (Gauge). Then only air is discharged; humidifying water is retained.

Features

Reproduction of near-constant temperature and humidity testing environment with Air-HAST (option)

Normal HAST environment

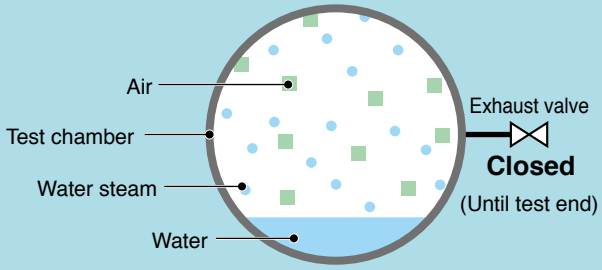


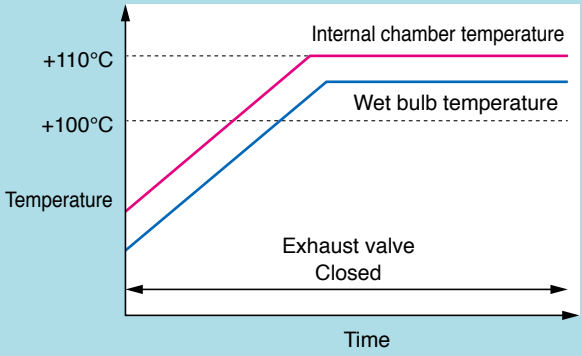


Temperature is increased to generate water steam, at which point air in the test area escapes through the exhaust valve.

High temperature | High humidity | Pressure

Air-HAST environment





Exhaust valve is closed in the rising step for pressurization with air still in the chamber. (Atmospheric pressure + Water steam pressure)

High temperature | High humidity | Pressure + Air

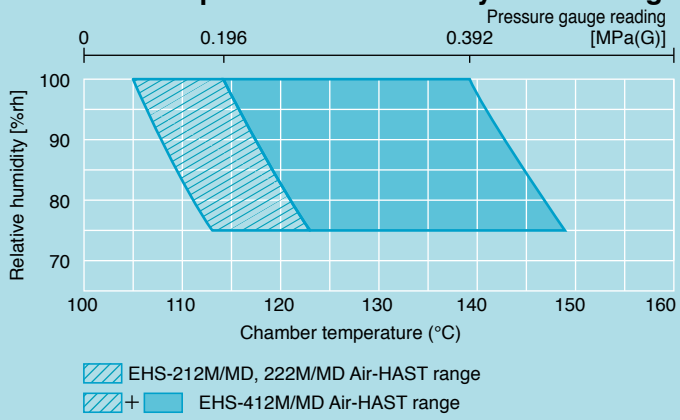
Air-HAST function (option for M/MD type)

Depending on the specimen, not only water steam but also oxidation and other specimen surface conditions can cause failure.
By leaving air in the test area, the Air-HAST function adds air to the high-temp, high-humidity, and pressurized environment for effective accelerated testing of specimens for which the oxygen in air affects degradation, such as with surface oxidation. (Acceleration may not be seen for some specimen.)

Whisker humidity-resistance evaluation testing (Japanese patent No. 5066143)

Evaluation examples for whisker evaluations of mounting boards are limited. One of the main reasons for this is because the testing time can be as long as 1000 or 3000 hours.
To shorten these testing times, ESPEC conducts lead-free solder whisker evaluation of mounting boards using Air-HAST. The results confirmed accelerated effects with testing at 85°C and 85%rh humidity.

Air-HAST temperature and humidity control range



Accelerated testing examples for whisker evaluation

Temperature cycling test	−40 ↔ +85°C	3000 cycles
High temperature and high humidity test	+55°C/85%rh	3000 hours
	+85°C/85%rh	1000 hours
Air-HAST	+110°C/85%rh (Air pressure 130kPa)	200 hours

Large Capacity Models

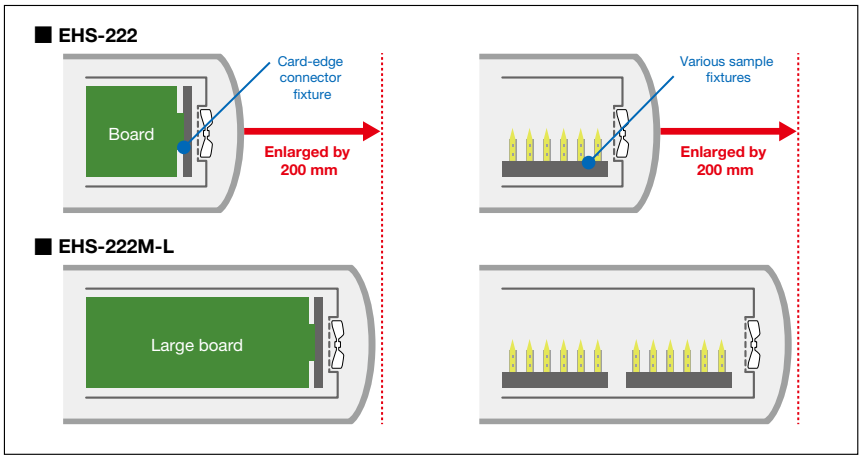
* Class-1 Pressure Vessel

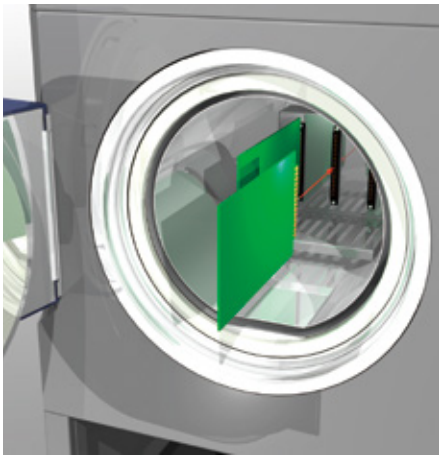
NEW Deeper Model for Large PCBs/High-Volume EHS-222M-L

This model is capable of simultaneous testing of several large PCBs, such as multilayer PCBs used for motherboards, or batches of many specimens. Statistically reliable data can be obtained more rapidly, which leads to faster test cycles.
This can help reduce both development time and testing costs, for more efficient product development.

Improved Testing Efficiency

Image of internal chamber size comparison





Expanded depth

Expanded 200 mm compared with the 51 L model (EHS-222M)
► Internal dimensions: φ394 mm × **D626 mm**

Supports large boards

Accommodates boards up to approximately 470 mm × 290 mm, offering flexibility for a wide range of specimen sizes.

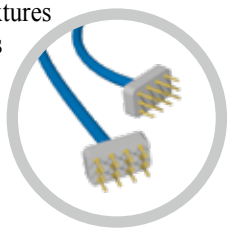
High-voltage/multi-pin support

Enables energized testing up to 1000 V/1 A × 120 pins.

* 120-pin configuration example

Improved Work Efficiency

As pin count increases, wiring becomes more complex. Connector-block fixtures simplify the process for improved work efficiency and more stable test environments.



Model	EHS-222M-L
Pressure range	0.019 to 0.193 MPa (Gauge)
Interior volume	76 L
Interior dimensions	ϕ 394 × D626 (604) mm ( ): dimensions excluding fan guard protrusion.
External dimensions (W × H × D mm)	1000 × 1713 × 1200
Weight	310 kg
Heat up and pressurization time (unsaturated control)	Within 70 min.
Heat up and pressurization time (wet-saturated control)	Within 100 min.
Heat up and pressurization time (dry and wet-bulb temperature control, temperature increase)	Within 90 min.
Heat up and pressurization time (dry and wet-bulb temperature control, temperature decrease)	Within 130 min.

Large Capacity Models

* Class-1 Pressure Vessel

Large Capacity HAST Chambers EHS-432 EHS-432M EHS-432M-L EHS-432-L

These models provide even larger capacities, accommodating more specimens than the deeper type EHS-222M-L model. Various customizations are available to meet your testing needs, including long-depth configurations, with an ultra large capacity of 350 L. An automatic door option is also available.

Model	EHS-432 EHS-432M	EHS-432M-L EHS-432-L
Pressure range	0.019 to 0.389 MPa (Gauge)	
Interior volume	130 L	180 L
Interior dimensions	ϕ 548 × D560 mm	ϕ 548 × D760 mm
External dimensions (W × H × D mm)	800 × 1575 × 1260	800 × 1575 × 1460
Heat up and pressurization time (unsaturated control)	Approx. 90 min.	Approx. 120 min.
Heat up and pressurization time (wet-saturated control)	Approx. 90 min.	Approx. 120 min.
Heat up and pressurization time (dry and wet-bulb temperature control) (M type only)	Approx. 120 min.	Approx. 150 min.

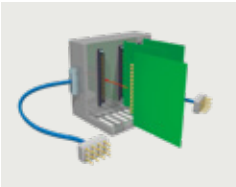
* Class-1 pressure vessel:
The large models (large-board/high-volume models and large-capacity HAST chambers) fall under the class-1 pressure vessel category as defined by Japanese regulations. The following procedures are required at least 30 days prior to delivery and installation: Submission of an Installation Notification and Completion Inspection Application and Completion Inspection to the local Labor Standards Inspection Office. In addition, an operations chief of work handling ordinary first class pressure vessels must be appointed to oversee the operation and management of the equipment.

For overseas export, restrictions concerning pressure vessels may apply depending on the regulations of the respective country.
Please contact us for further details.

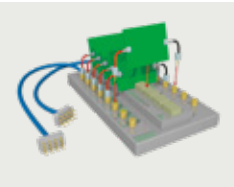
TEST FIXTURE AND EVALUATION SYSTEM SOLUTIONS

Wide Range of Test Fixtures

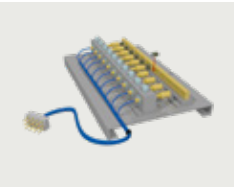
In HAST testing, fixtures that ensure stable application of voltages and currents even in high-humidity environments are essential. Defects in the fixtures may lead to retesting and unnecessary costs. Leveraging our extensive expertise, we provide dedicated fixtures optimized for each sample to provide stable test environments and highly reliable evaluation results.



Fixtures for boards
(Card edge type)

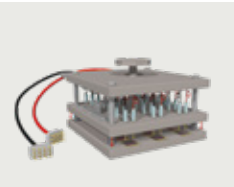


Fixtures for boards
(Insert type)



Fixtures for capacitors
(Probe type)

Fixtures for capacitors
(Chip-clip type)



Fixtures for wafer chips

Electrochemical Migration Evaluation System (Insulation Resistance/Leakage Current Measurement)

- Allows for insulation resistance measurement during testing when combined with a HAST chamber
- Allows for evaluation of deterioration and leakage characteristics under energized conditions similar to actual use environments
- Eliminates the need to remove specimens for measurement to improve testing efficiency
- Along with the HAST chamber, comprehensive support is provided from installation to after-sales service

Features

Conforms to international IEC 60068-2-66 standard

Temperature and humidity control for support of various test standards

With ESPEC's unique wet and dry bulb temperature control on M/MD type chamber, temperature and humidity are measured directly using a wet and dry bulb temperature sensor. This ensures highly precise temperature and humidity control over the entire testing process, from before testing to the post-testing temperature decrease or hold process.
After testing is complete, the temperature and humidity are allowed to drop for a fixed period. In the hold process, the chamber is kept at a fixed environment until the door is opened and specimens are removed. This makes it possible to place a specimen in a constantly controlled temperature/humidity environment, and keep it from drying after returning to atmospheric pressure.

IEC 60068-2-66, an environmental testing standard of the IEC (International Electrotechnical Commission)

The Highly Accelerated Stress Test System EHS Series uses ESPEC's unique dry and wet-bulb temperature control to satisfy the test system conditions and test operations specified in the IEC 60068-2-66 standard.

* ESPEC was directly involved in drawing up the IEC60068-2-66 standard, and our technical concepts and measurement data were used in its development.

APPLICABLE STANDARDS

Standard No. Standard Name Applications	Test conditions			
	Temperature (°C)	Humidity (%rh)	Biased	Time (h)
IEC 60068-2-66 (JIS C 60068-2-66) Damp heat, steady state (unsaturated pressurized vapour) Electrics/electronics	110±2	85±5	Optional	96,192,408 (0, +2)
	120±2	85±5		48,96,192 (0, +2)
	130±2	85±5		24,48,96 (0, +2)
IEC 60749-4 HAST Electrics/electronics; Semiconductors	110±2	85±5	Continuous/ intermittent	264 (0, +2)
	130±2	85±5		96 (0, +2)
JEITA (EIAJ) Semiconductor devices Unsaturated steam pressure testing ED-4701/100A, Method 103	110±2	85±5	Continuous	24 (0, +8) 48 (0, +8) 96 (0, +8) 168 (0, +8) 500 (0, +8)
	120±2	85±5		
	130±2	85±5		
JESD22-A118B Unbiased HAST Semiconductors	110±2	85±5	None	264 (0, +2)
	130±2	85±5		96 (0, +2)
JESD22-A110E HAST Semiconductors	110±2	85±5	Continuous/ intermittent	264 (0, +2)
	130±2	85±5		96 (0, +2)
JESD22-A102E Unbiased Autoclave Semiconductors	121±2	100±5	None	24 (0, +2) 48 (0, +2) 96 (0, +5) 168 (0, +5) 240 (0, +8) 336 (0, +8)
AEC-Q100-Rev-H Biased HAST/Unbiased HAST Automotive semiconductors	110±2	85±5	Continuous/none	264 (0, +2)
	130±2	85±5		96 (0, +2)
JPCA-ET08 Unsaturated pressurized vapour Printed circuit boards	110±2	85±5	Continuous	96,192,408 (0, +2)
	120±2	85±5		48,96,192 (0, +2)
	130±2	85±5		24,48,96 (0, +2)

SPECIFICATIONS

Model				EHS-212 (M)	EHS-212MD	EHS-222 (M)	EHS-222MD	EHS-412 (M)	EHS-412MD
System				Single vessel, unsaturated control, wet saturated control, dry and wet-bulb temperature control					
Pressure vessel type				Small pressure vessel as specified in the Enforcement Order of Industrial Safety and Health Law in Japan					
Performance*1	Unsaturated control		Temperature control range	+105.0 to +142.9°C				+105.0 to +162.2°C	
			Humidity control range	75 to 100%rh					
			Pressure range	0.019 to 0.193 MPa (Gauge)				0.019 to 0.389 MPa (Gauge)	
			Temp. & humidity fluctuation	±0.3°C / ±2.5%rh					
			Temperature variation in space	3.0°C					
			Heat up and pressurization time	0 → 0.193 MPa (Gauge) Approx. 30 min.		0 → 0.193 MPa (Gauge) Approx. 60 min.		0 → 0.389 MPa (Gauge) Approx. 45 min.	
	Wet-saturated control		Temperature control range	+105.0 to +132.9°C				+105.0 to +151.1°C	
			Pressure range	0.019 to 0.193 MPa (Gauge)				0.019 to 0.389 MPa (Gauge)	
			Temperature fluctuation	±0.3°C					
			Temperature variation in space	3.0°C					
			Heat up and pressurization time	0 → 0.193 MPa (Gauge) Approx. 45 min.		0 → 0.193 MPa (Gauge) Approx. 75 min.		0 → 0.389 MPa (Gauge) Approx. 60 min.	
	Dry & wet-bulb temperature control (M/MD type)	Temp. heat-up	Temperature control range	+105.6 to +142.9°C				+105.6 to +162.2°C	
			Humidity control range	75 to 95%rh					
			Heat up and pressurization time	0 → 0.193 MPa (Gauge) Approx. 60 min.		0 → 0.193 MPa (Gauge) Approx. 90 min.		0 → 0.389 MPa (Gauge) Approx. 75 min.	
		Test process	Temperature control range	+105.6 to +142.9°C				+105.6 to +162.2°C	
			Humidity control range	75 to 98%rh					
			Pressure range	0.019 to 0.193 MPa (Gauge)				0.019 to 0.389 MPa (Gauge)	
			Temp. & humidity fluctuation	±0.3°C / ±2.5%rh					
			Temperature variation in space	3.0°C					
		Temp. pull-down	Temperature control range	+50.0 to +95.0°C					
			Temperature pull down time	+142.9°C / 75%rh to +85.0°C / 85%rh		Approx. 120 min.		+162.2°C / 75%rh to +85.0°C / 85%rh	Approx. 120 min.
		Hold process	Temperature control range	+50.0 to +95.0°C					
			Humidity control range	75 to 95%rh					
			Wet-bulb wick	Capable of Approx. 200 hours chamber running time (Figure given for +162.2°C / 75%rh and no specimens)					
Noise emission*2				below 46 dB	below 50 dB	below 46 dB	below 50 dB	below 46 dB	below 50 dB
Construction			Pressure vessel/door construction	Cr-Ni-Mo stainless steel plate					
			Pressure vessel components	Temperature sensor (Thermocouple type T [Copper/ Copper-Nickel] for measuring chamber temperature, humidifying water temperature, wet-bulb temperature), heater, specimen signal terminals, air-circulating fan, fan motor, overheat protector, boil-dry protector					
			Door	Door handle, door lock: Auto-locking mechanism (bank vault), instrumentation, instrumentation power switch					
			Pressure gauge (Bourdon type)	Scale: –0.1 to 0.4 MPa (Gauge)				Scale: –0.1 to 1 MPa (Gauge)	
			Test area	Specimen shelves, shelf brackets for test area: each×2					
Water supply			Water supply system	Automatic water supply					
			Water supply amount (at start)	Approx. 1 L		Approx. 1.5 L		Approx. 1 L	
			Water tank	10 L	20 L	10 L	20 L	10 L	20 L
Components				Specimen signal terminals (connector-type, 12-pin, 125 VAC/VDC, 1 A), specimen power control terminals, external alarm terminals, Ethernet port (LAN port), power cable					
Caster				4	—	4	—	4	—
Dimensions			Interior volume	21 L	21 L × 2	51 L	51 L × 2	21 L	21 L × 2
			Test area dimensions*3	ø294 x D318(296) mm		ø394 x D426(404) mm		ø294 x D318(296) mm	
			Chamber outer dimensions (W x H x D mm)*4	640 x 1483 x 850	760 x 1796 x 1000	740 x 1553 x 1000	860 x 1796 x 1000	640 x 1483 x 850	760 x 1796 x 1000
			Weight	190 kg	350 kg	230 kg	390 kg	190 kg	350 kg
Utility requirements			Allowable ambient conditions	+5 to +40°C (+41 to +104°F)					
	Power supply		200V AC 1ø 50/60Hz	12.5 A	25 A	14 A	28 A	12.5 A	25 A
			220V AC 1ø 50/60Hz	11.4 A	22.8 A	12.7 A	25.4 A	11.4 A	22.8 A
			230V AC 1ø 50Hz	10.9 A	21.8 A	12.2 A	24.4 A	10.9 A	21.8 A

*1 The performance values are based on IEC60068-3-6:2001; Performance figures are given for a +23°C, ambient temperature relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Point of measurement: 1.2 m off floor, 1 m in front of chamber (JIS Z8731)
*3 ( ):dimensions excluding fan guard protrusion.
*4 Excluding protruding parts (fittings/components on rear)

MODEL

EHS–□□2□

- Blank: Standard type
- M: M type (Single stage) – Wet and dry bulb temperature control
- MD: MD type (Double stage) – Wet and dry bulb temperature control

Chamber capacity 1 : 21 L
2 : 51 L

Pressure range 2 : 0.193MPa (Gauge)
4 : 0.389MPa (Gauge)

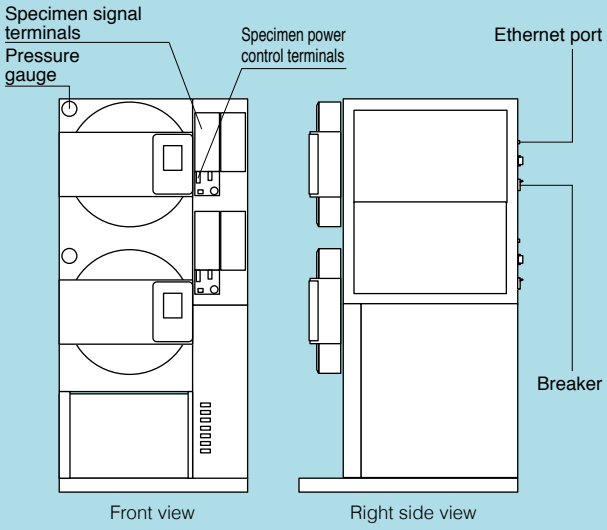
EHS-212
EHS-212M
EHS-412
EHS-412M

EHS-212MD
EHS-412MD

EHS-222
EHS-222M

EHS-222MD

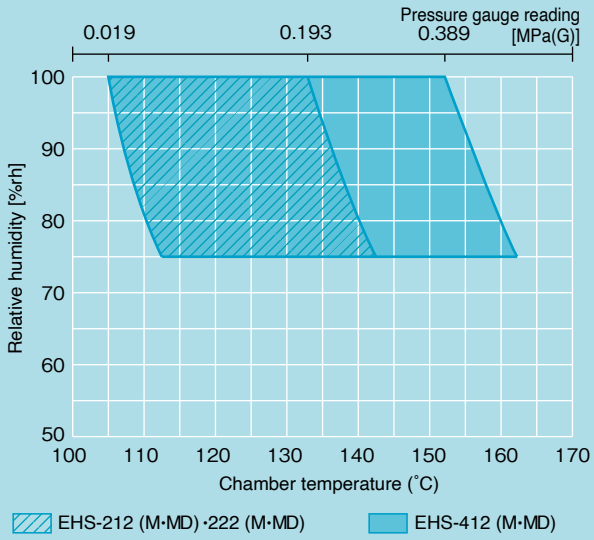
FITTINGS LOCATION



* A main breaker and Ethernet port are equipped on the back of the chamber.

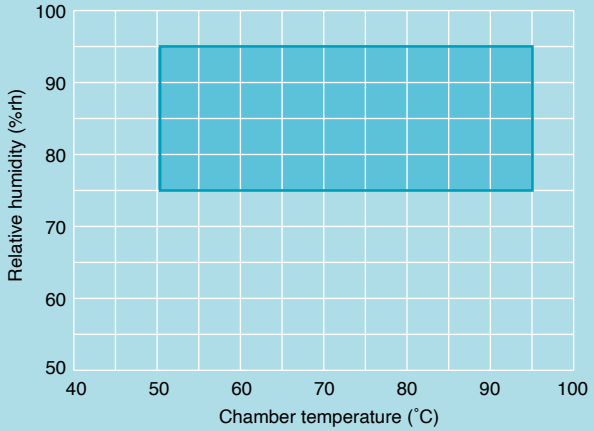
TEMPERATURE AND HUMIDITY CONTROL RANGE

TEST PROCESS



* Humidity range is from 75% to 98% rh for wet and dry bulb control.

HOLD PROCESS



SAFETY DEVICES

- Overcurrent protection (leakage breaker)
- Cartridge fuse for control circuit short-circuit protection
- Electrical compartment door switch
- System error (Error)
- Room temp. compensation burnout detection circuit
- Dry bulb temp. burnout detection circuit
- Humidifying water temp. burnout detection circuit
- Wet bulb temp. burnout detection circuit (for M/MD type only)
- Exhaust air temp. burnout detection circuit
- Absolute upper/lower temp. limit alarm (with built-in temp./humid. controller)
- Air circulating fan/motor rotation alarm
- Overheat protector (variable type)
- Overheat protector (fixed type)
- Heater overcurrent protection
- Humidifier overcurrent protection
- Humidifier dry heat protector
- Humidifier water level detection
- Dry wick detection (for M/MD type only)
- Water tank low-level switch
- Pressure alarm
- Door open alarm
- Door lock alarm
- Atmospheric pressure switch alarm
- Specimen power supply control terminal
- Safety valve

ACCESSORIES

- Shelf ..... (large/small) 1 each

EHS-212(M)/412(M)	Large: 286 (W) × 288 (D) mm
	Small: 234 (W) × 288 (D) mm
EHS-222(M)	Large: 386 (W) × 396 (D) mm
	Small: 280 (W) × 416 (D) mm

- Shelf ..... (large/small) 2 each

EHS-212MD/412MD	Large: 286 (W) × 288 (D) mm
	Small: 234 (W) × 288 (D) mm
EHS-222MD	Large: 386 (W) × 396 (D) mm
	Small: 280 (W) × 416 (D) mm

- Specimen signal terminal Pin type, (125 VAC/VDC, 1 A) ..... 12 (MD type: 24)
- Breaker handle cover ..... 1 (MD type: 2)
- Wet bulb wick (for M/MD type only) ..... 50 (MD type: 100)
- Cartridge fuse 250 V ..... 7 (MD type: 14)
- Hose nipple 1
- Eyebolt ..... 4 (for MD type only)
- Operation manual 1

Safety precautions

- 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 substances in the chamber. If corrosive substances are generated by the specimen, the life of the chamber may be significantly shortened specifically because of the corrosion of stainless steel and copper and because of the deterioration of resin and silicon.
- Do not place life forms or substances that exceed allowable heat generation.
- Be sure to read the operation manual before operation.

OPTION

Continuous water supply

This option is used to continuously supply pure water to the chamber.

Advantage	No need to fill water to the water tank. The water tank can be filled automatically.

Water tank

For supplying water to the built-in water tank.

- 10 L ×3 with cart
  Tank with cock
  Capacity: 10 L × 3
  Cart size: W600 × H920 × D348
- 10 L ×1
  Tank with nozzle
  Capacity: 10 L

10 L ×3 with cart

10 L ×1

Shelves and insulated shelves

Add standard shelves or change to insulated specifications (Teflon coating).

Standard shelves

Insulated shelves

A chamber dew tray (P.14) and other preventive measures (sold separately) are also available to protect floor from water damage.

OPTION

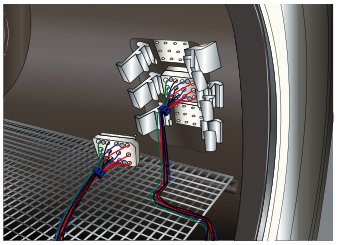
Specimen basket ◎

For small specimens that cannot be placed on the shelf.

Type A: 150 (W) × 50 (H) × 150 (D) mm
Type B: 100 (W) × 50 (H) × 200 (D) mm
Type C: 95 (W) × 20 (H) × 95 (D) mm

Removable terminal block

The terminal block allows terminals with 12 pins in the test area to be removed or attached all at once.
This removable terminal block consists of a connector block (12-pin specimen signal terminal) and a chamber connector (with removal levers).
* Cannot be attached if a slide shelf terminal block is being used.



Advantage	Improved wiring workability

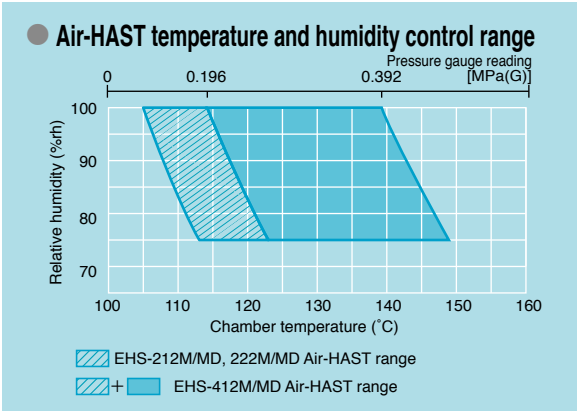
Slide shelf terminal block

A slide shelf terminal block is equipped in the front of the test area. This terminal block allows wiring to be done outside the test area.
* Cannot be attached if removable terminal blocks are being used.

Advantage	Improved wiring workability

Air-HAST function (for M/MD type only) ◎

This function pressurizes the test area with the air remaining.



Specimen signal terminals ◎

Terminal rated capacity:AC/DC 125V 1A
EHS-212 (M)/412 (M)
12-pin (6-channel*) ×4
EHS-212MD/412MD
12-pin (6-channel*) ×4 ×2
EHS-222 (M)
12-pin (6-channel*) ×5
EHS-222MD
12-pin (6-channel*) ×5 ×2
* The numbers of channels given are for configurations with two I/O systems.
* To protect from electric shock and protect wiring, specimen signal terminal cover (option) is recommended.

EHS-222MD (Option 12-pin ×5 / Standard 12-pin)

Advantage	Allows for energizing of large numbers of specimens

Specimen signal terminal cover ◎

The protective cover prevents direct contact with the specimen signal terminal block outside the test area.

Interface

Communication ports to connect the chamber to a PC.
• RS-485
• RS-232C

Pressure monitoring function

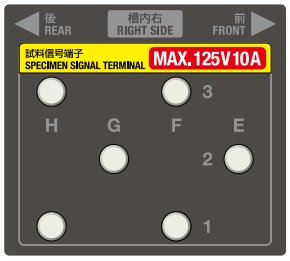
The monitored pressure can be shown on the monitor screen and trend graph screen of instrumentation panel.

◎ Additional equipment can be added after purchasing the chamber.

OPTION

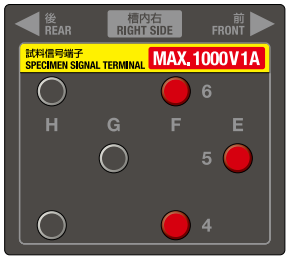
Specimen signal terminal for high current ◎

This option changes the standard terminal (125V AC/DC, 1 A) to higher current specimen signal terminal (125V AC/DC, 10 A).
Type 1: 6-pin (3-channel)
up to 5 sets
Type 2: 6-pin (3-channel)
up to 6 sets
* Cannot be attached if a specimen signal terminal block for high voltage is being used.



Specimen signal terminal for high voltage ◎

This option changes the standard terminal (125V AC/DC, 1 A) to higher voltage specimen signal terminal (1000V AC/DC, 1 A).
Type 1: 6-pin (3-channel)
up to 5 sets
Type 2: 6-pin (3-channel)
up to 6 sets
* Cannot be attached if a specimen signal terminal block for high current is being used.



Time signal output terminal

Contact output specifications
• Operation: on/ off at each step
• Number of channels: 2

Paperless recorder-portable type

A temperature & humidity recorder that utilizes a liquid-crystal display fitted with a touch-panel. Records temperature, humidity and pressure inside the chamber.
Display: 5.7-inch TFT color LCD
Temperature range: 0 to +200°C
Humidity range: 0 to 100%rh
Pressure range: −0.1 to 0.5 MPa (Gauge)
Number of inputs: 1 (3 more channels can be turned ON)
Data saving cycle: 5 sec
Internal recording media: Flash memory 8 MB
External recording media: CF memory card port (Includes a 256 MB CF card)
USB memory port

Temp. humid. pressure recorder-portable type

Temperature range: 0 to +200°C
Humidity range: 0 to 100%rh
Pressure range: −0.1 to 0.5 MPa (Gauge)

Wet-bulb wick ◎

Same as the standard accessory.
1 set (50 pieces)

Emergency stop switch

This switch is used to stop the chamber manually in case of emergency
• Without a guard
• With a guard


With a guard

Anchoring fixtures ◎

This option uses for fixing the chamber to the floor.
* Anchoring fixtures when installing the dew tray are also available.

Status indicator light

This option is used for remotely checking the status of the chamber. Please select lighted or blinking, and requirement of buzzer sound.

Color				
Red	Yellow	Green	Blue	White

Chamber status
• In operation
• Main power on
• Instrumentation power on
• Main power on or instrumentation power on
• Abnormality

Location:
Single stage type: Chamber top
Double stage type(MD type): Chamber top left side for the upper unit, top right side for the lower unit(as shown in the image)

Chamber dew tray

A chamber dew tray is installed below the chamber in the unlikely case there would be water leakage.

Model	Size (W×H×D mm)
EHS-212 (M) EHS-412 (M)	698×50×968
EHS-222 (M)	798×50×1118
EHS-212MD EHS-412MD	884×50×1198
EHS-222MD	984×50×1198

Operation manual ◎

• CD
• Booklet

◎ Additional equipment can be added after purchasing the chamber.

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