Quality is more than a word

ESPEC

Highly Accelerated Stress Test System (HAST Chamber)

CAT.NO.E96160-X702

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.
The Highly Accelerated Stress Test Chamber EHS Series
offer high performance, functionality and ease of use,
and are compliant with the international IEC60068-2-66 standard.
Many convenient functions and safety features are included for bias testing.

EHS-211M

EHS-221MD

Utility

Improved functionality and ease-of-use for bias testing.

Chamber interior

Specimen signal terminals

Signal terminals inside chamber

Customized sliding rack (example)

The chamber interior is formed for easier specimen loading

The pressure vessel is of spherical form which distributes pressure evenly and has superior strength. The test area is expanded to its maximum size to easily load printed circuit boards and other specimens.

The double stage model answers the need for diverse test conditions and large capacity (MD type)

The units are designed so that the test condition of each chamber can be set individually, enabling this model to effectively reproduce diverse test conditions on a large number of specimens.

Specimen signal terminals can be added depending on requirements

The standard configuration is 12 specimen signal terminal pins. For double-stage type, 12 pins for each chamber. The EHS-211(M・MD) and 411(M・MD) can be expanded up to a maximum of 60 pins, in 12-pin units (optional), and the EHS-221(M・MD) to 72 pins for each chamber. (optional)

Customized racks that free complicated wiring (sold separately)

We can customize racks to fit the client's specimens to enable voltage and signal application, simply by setting a printed circuit board to the connector. We also offer sliding racks, for easier positioning and wiring of specimen.

Utility

Even greater convenience and safety.

Easy program setting

Program capacity of 10 patterns with 30 steps per pattern. Simple operation using up and down keys for program setting, as well as adjustment of temperature, humidity and time values.

Safe and reliable door

The system employs a button operated automatic door locking mechanism.
It prevents the door from being opened while the test chamber is pressurized.

Automatic humidifying water supply system

At the start of testing, the humidifying water needed for that test is automatically taken from a water tank. A slit on the front side allows the remaining amount of water in the tank to be checked at a glance.

Protection measures for specimen

Standard equipment includes a specimen power supply control terminal, which output contact signals to allow voltage and signals to be applied to the specimen during testing. 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.

Supports anxiety-free use

A variety of protective mechanisms include; overheat/overpressure protector, boil-dry protector, detection of water supply failure and incomplete door-lock, leakage breaker, and temperature sensor disconnection protector. The system also employs an external alarm terminal with an alarm buzzer and lamp. When a problem occurs, those in the vicinity are immediately warned.

Instrumentation panel

The bottom of the unit includes a water tank and storage space for a power supply unit or peripheral equipment.

Control operation

Complies with IEC60068-2-66 standard testing while maintaining compatibility with conventional test methods

Conforms to international IEC60068-2-66 standard

- IEC60068-2-66 is an environmental testing standard of the IEC (International Electro-technical Commission). With ESPEC's unique wet and dry bulb temperature control function, the EHS Series meets all requirements for test equipment and test operation specified in IEC60068-2-66.
  The EHS Series can also satisfy other test conditions of EIAJED 4701, JEDEC and EIA/ JESD22-A110-A as well as IEC.

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

Evaluation of ion migration

Example of the Highly accelerated stress test system with the Ion migration evaluation system

Wet and dry bulb temperature control (M type) conforms to IEC60068-2-66 standard

With ESPEC's unique wet and dry bulb temperature control on M 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.

Free from pressure and temperature shock and drying of specimens after test

In all control modes, abrupt changes in pressure and temperature after testing have been eliminated through mechanisms for gradual depressurization, and air/water discharge. This prevents vaporization of moisture contained in the specimen, and provide accurate test results in correlation to the field.

Control operation

Control functions to enable use of previous data

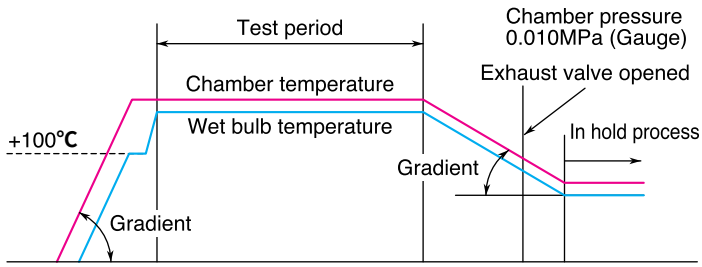
The control mode can be switched to match previous data.

M type:
- Wet and dry bulb temperature control
- Unsaturated control
- Wet saturated control

Standard type:
- Unsaturated control
- Wet saturated control

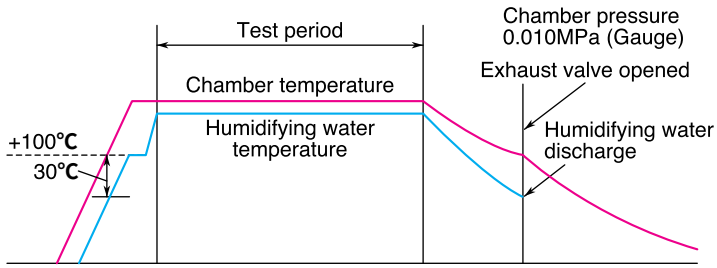
Three modes of operation control

〈Wet and dry bulb temperature control (M type)〉



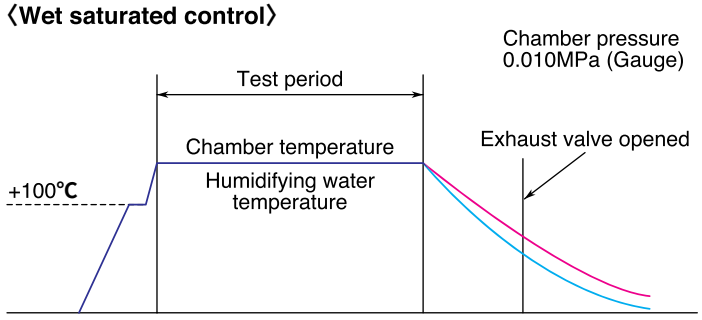
- The temperature and humidity gradient before and after testing can be controlled.
- After testing is complete and chamber pressure reaches 0.010MPa (Gauge), only air is discharged; humidifying water is retained.
- In the hold process, temperature and humidity inside the chamber are maintained at the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

〈Unsaturated control (humidifying water temperature control)〉



- During temperature heat-up when condensation can easily occur on the reverse side of the specimen, the temperature of the humidifying water automatically increases while keeping it 30℃ 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.

SPECIFICATIONS

Model			EHS-211(M)	EHS-211MD	EHS-221(M)	EHS-221MD	EHS-411(M)	EHS-411MD
System			Single vessel type					
Control method	System		Fixed value continuous temperature and humidity control; program operation; humidity control when temperature is rising or falling (M/ MD type)					
	Temperature and humidity setting		Direct setting of temperature and relative humidity					
	Control		PID control, SSR drive system					
Power supply			200V AC 1φ 50/60Hz, 220V AC 1φ 50/60Hz, 230V AC 1φ 50Hz *					
Pressure vessel type			Small pressure vessel (as specified in the Japanese Enforcement Order of Industrial Safety & Health Law, item 6, Aritcle 1)					
Total load current		200V	15.0A	30.0A	20.0A	40.0A	15.0A	30.0A
		220V	14.0A	28.0A	18.5A	37.0A	14.0A	28.0A
		230V	13.5A	27.0A	17.5A	35.0A	13.5A	27.0A
Noise level			below 46dB	below 50dB	below 46dB	below 50dB	below 46dB	below 50dB
Performance	Unsaturated control	Temperature control range	+105.0 to +142.9℃ (+221 to +289.2°F)				+105.0 to +162.2℃ (+221 to +324°F)	
		Humidity control range	75 to 100%rh					
		Pressure range	0.020 to 0.196MPa (Gauge)				0.020 to 0.392MPa (Gauge)	
		Temperature and humidity fluctuation	±0.5℃/ ±3%rh					
		Temperature uniformity	±0.5℃ at 100%rh, ±0.7℃ at 75%rh					
		Heat up and pressurization time (at RT+23℃)	0→0.196MPa (Gauge) Approx. 30 min.		0→0.196MPa (Gauge) Approx. 60 min.		0→0.392MPa (Gauge) Approx. 45 min.	
	Wet saturated control	Temperature control range	+105.0 to +132.9℃ (+221 to +289.2°F)				+105.0 to +151.1℃ (+221 to +304°F)	
		Pressure range	0.020 to 0.196MPa (Gauge)				0.020 to 0.392MPa (Gauge)	
		Temperature fluctuation	±0.5℃					
		Temperature uniformity	±0.5℃					
		Heat up and pressurization time (at RT+23℃)	0→0.196MPa (Gauge) Approx. 45 min.		0→0.196MPa (Gauge) Approx. 75 min.		0→0.392MPa (Gauge) Approx. 60 min.	
	Wet and dry bulb temperature control (M type)	Temp. heat-up: Temperature control range	+105.6 to +142.9℃ (+221 to +289.2°F)				+105.0 to +151.1℃ (+221 to +324°F)	
		Temp. heat-up: Humidity control range	75 to 95%rh					
		Temp. heat-up: Heat up and pressurization time (at RT+23℃)	0→0.196MPa (Gauge) Approx. 60 min.		0→0.196MPa (Gauge) Approx. 90 min.		0→0.392MPa (Gauge) Approx. 75 min.	
		Test process: Temperature control range	+105.6 to +142.9℃ (+221 to +289.2°F)				+105.0 to +162.2℃ (+221 to +324°F)	
		Test process: Humidity control range	75 to 98%rh					
		Test process: Pressure range	0.020 to 0.196MPa (Gauge)				0.020 to 0.392MPa (Gauge)	
		Test process: Temperature and humidity fluctuation	±0.5℃/ ±3%rh					
		Test process: Temperature uniformity	±0.5℃ at 98%rh, ±0.7℃ at 75%rh					
		Temp. pull-down: Temperature control range	+50.0 to +95.0℃ (+112 to +203°F)					
		Temp. pull-down: Temperature pull-down time (at RT+23℃, no specimen)	From +142.9℃/ 75%rh to +85.0℃/ 85%rh Approx. 120 min.				From +162.2℃/ 75%rh to +85.0℃/ 85%rh Approx. 120 min.	
		Hold process: Temperature control range	+50.0 to +95.0℃ (+112 to +203°F)					
		Hold process: Humidity control range	75 to 95%rh					
	Wet-bulb wick		Can be used continuously for about 200 hours (with no specimen: +162.2℃/ 75%rh)					

* This equipment is in compliance with the requirements of the European Community Directives. (CE Marking)

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.

CAUTION

Be sure to read the instruction manual before operation.

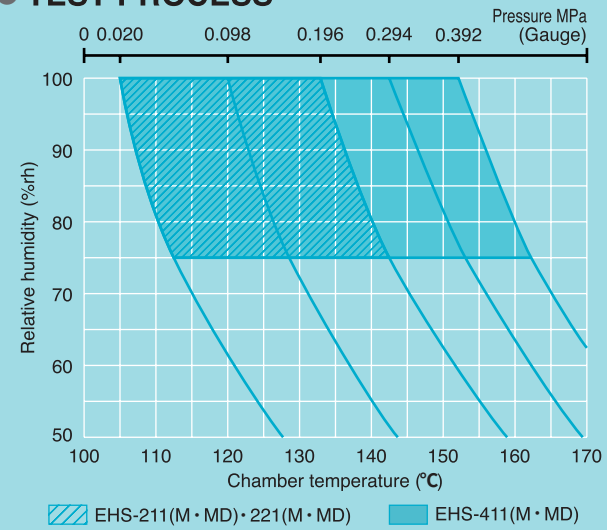
SPECIFICATIONS

Model		EHS-211(M)	EHS-211MD	EHS-221(M)	EHS-221MD	EHS-411(M)	EHS-411MD
Construction	Pressure vessel material	Stainless steel (SUS-316L)					
	Door material	Stainless steel (SUS-316L)					
	Exterior material	Cold-rolled steel plate (SPC. Class1) with melamine resin baked finish (Similar to Munsell 10YR7/1)					
	Insulation material	Glass wool					
	Pressure vessel	Temperature sensor; heater; specimen signal terminals; fan; fan motor; overheating prevention detector; boil-dry prevention detector					
	Door	Automatic locking type (radiating rod system)					
	Test area	Specimen rack and 2 rack holders (per chamber)					
	Control panel	Temperature and humidity indicator; time indicator; key switch; setting keys; process indicator lamps; alarm indicator lamps; door open/ close key					
	Water supply system	Automatic					
	Water supply amount (at start)	1L		1.5L		1L	
	Other	Air outlet valve; air inlet valve; drain filter; drain valve; air lead-in pump; water supply pump; water supply valve					
Accessories	Temperature and humidity controller	Digital setting and display					
	Specimen signal terminals	Connector type, 12-pin (125V AC/DC 1A)					
	Pressure gauge (Bourdon type)	Scale: −0.1 to 0.4MPa (Gauge)				Scale: −0.1 to 1MPa (Gauge)	
	Communication function	RS-485					
Dimensions	Internal capacity of test area (L)	18	18×2	46	46×2	18	18×2
	Internal dimensions of test area (mm)	W255×H255×L318 (W10×H10×L12.5inch)		W355×H355×L426 (W14×H14×L16.8inch)		W255×H255×L318 (W10×H10×L12.5inch)	
	Outer dimensions (mm)	W640×H1483×D850 (W25.2×H58.9×L33.5inch)	W760×H1795×D1000 (W29.9×H70.7×L39.4inch)	W740×H1553×D1000 (W29.1×H61.1×L39.4inch)	W860×H1795×D1000 (W33.9×H70.7×L39.4inch)	W640×H1483×D850 (W25.2×H58.4×L33.5inch)	W760×H1795×D1000 (W29.9×H70.7×L39.4inch)
	Weight (kg)	Approx. 190	Approx. 350	Approx. 230	Approx. 390	Approx. 190	Approx. 350
	Dimensions required for installation (mm)	W690×H1540 (W25.2×H21.3inch)	W810×H1850 (W31.9×H72.8inch)	W790×H1610 (W31.1×H63.4inch)	W910×H1850 (W35.8×H72.8inch)	W690×H1540 (W25.2×H21.3inch)	W810×H1850 (W31.9×H72.8inch)

●For humidifying water, please use pure water of not less than 0.05MΩ·cm (20μS/ cm or below).
●Temperature and humidity indication and control operations for this equipment are based on the Steam Pressure Table of Table A.1, Annex A, IEC Standard 60068-2-66.

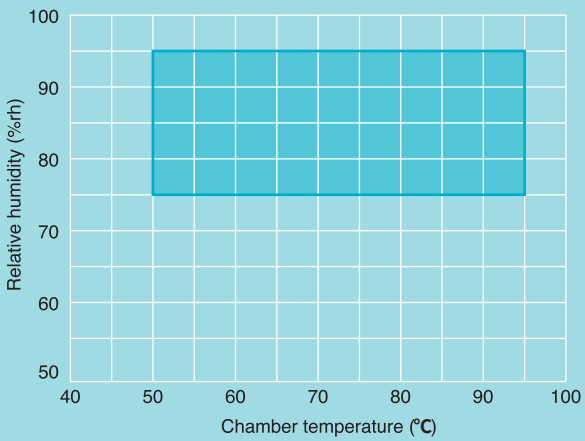
TEMPERATURE AND HUMIDITY CONTROL RANGE

● TEST PROCESS



✳Temperature and humidity indication and control operations for this equipment are based on Table A. 1, Annex A, IEC Standard 60068-2-66.
✳Humidity range is from 75% to 98% rh for wet and dry bulb control.

● HOLD PROCESS



MODEL

EHS – □□1□□

- D : Double stage
- M : M type (Wet and dry bulb temperature control)
- Chamber capacity 1 : 18L, 2 : 46L
- Pressure range 2 : 0.020～0.196MPa (Gauge), 4 : 0.020～0.392MPa (Gauge)

INSTRUMENTATION SPECIFICATION

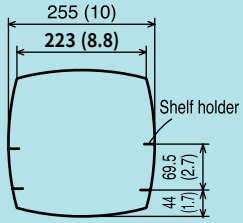
Program control

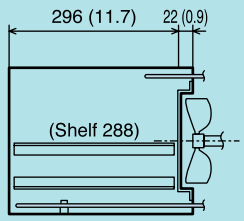
No. of patterns	10
No. of steps	30 steps/ pattern
Control	Ramp, constant setting
Program setting	Loop, skip, end command*
Max. time setting	Total 999.9hrs per pattern

*Time signals can be set for each step when equipped with time signal (option).
Each loop command can repeat the specified steps up to 99 times.

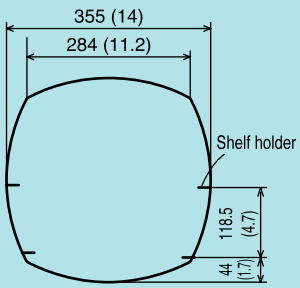
TEST AREA DIMENSION DIAGRAM

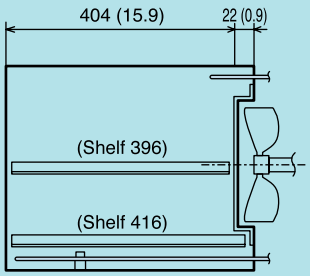
● EHS-211(M・MD)・411(M・MD) Units: mm (inch)





● EHS-221(M・MD)





Front view　　Right side view (cross-section)

SAFETY DEVICES

- Overheat protector
- Boil-dry protector
- Overpressure prevention switch
- Power failure default circuit
- Leakage breaker
- Safety valve
- Temperature sensor disconnection alarm
- Air-circulating fan/motor rotation alarm
- Wet-bulb wick dry alarm
- Door lock alarm
- Water suspension relay
- External alarm terminal
- Specimen power supply control terminal

ACCESSORIES

《EHS–211(M)・221(M)・411(M)》

- Shelves ..... large×1, small×1
  - EHS-211(M)・411(M) large : 248 W×288 Dmm
  - small : 229 W×288 Dmm
  - EHS-221(M) large : 348 W×396 Dmm
  - small : 285 W×416 Dmm
- Fuse (250V 3A) 2
- Plug for external alarm terminal and specimen power supply control terminal 2
- Cable clamp 1
- Wet-bulb wick (for type M) 50
- Portable water tank ..... 1 (10L polyethylene tank)
- Brush 1
- Water drain hose nipple 1
- Instruction manual 1

《EHS-211MD・221MD・411MD》

- Shelves ..... large×2, small×2
  - EHS-211MD・411MD large : 248 W×288 Dmm
  - small : 229 W×288 Dmm
  - EHS-221MD large : 348 W×396 Dmm
  - small : 285 W×416 Dmm
- Fuse (250V 3A) 4
- Plug for external alarm terminal and specimen power supply control terminal 4
- Cable clamp 2
- Wet-bulb wick (for type M) 100
- Portable water tank ..... 1 (10L polyethylene tank)
- Brush 1
- Water drain hose nipple 1
- Instruction manual 1

OPTIONS

Paperless recorder

Records temperature, humidity and pressure inside the chamber. Additional inputs may also be recorded.
Temperature range: 0 to +200℃
Humidity range: 0 to 100%rh
Pressure range:
−0.1 to 0.5MPa (Gauge)
Number of inputs (Initial setting):
Temperature 1
Humidity 1
Pressure 1
(3 more channels can be turned ON)
Data saving cycle: 5 sec
External recording media:
CF memory card (32MB)
Language support: ENG, JPN, CHN

Paperless recorder Portable type

Temperature, humidity and pressure recorder

Records: Test area temperature
Test area relative humidity
Test area pressure
Recorder scale plate:
0 to +200℃/ 0 to +100%rh
−0.1 to 0.5MPa (Gauge)

Time signal

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

Additional specimen signal terminals

EHS-211(M)・411(M)
……12pins (6ch*)×up to 4 sets
EHS-211MD・411MD
……12pins (6ch*)×up to 4 sets per chamber
EHS-221(M)
……12pins (6ch*)×up to 5 sets
EHS-221MD
……12pins (6ch*)×up to 5 sets per chamber

* The numbers of channels given are for configurations with two I/O systems.

EHS-221
Standard 12 pins
Optional 12 pins×5 sets
total 72 pins

Teflon-coated shelves

Standard shelves (large, small) with Teflon coating.

Specimen baskets

Type A: 150W×50H×150Dmm
Type B: 100W×50H×200Dmm
Type C: 95W×20H× 95Dmm

Antiseismic brace

Used to fit chamber onto the floor.

Communication function

Enables management of chamber operation
・E-BUS
・RS-232C

* Select one other than standard RS-485.

Communication cable

・RS-485 5, 10m
・E-BUS 5, 10m
・RS-232C 1, 2, 4m

■Some photographs listed in this catalog contain Japanese display.