

Quality is more than a word

ESPEC

Faster Temperature (& Humidity) Chamber

SM series



Stress of 5°C/min. achieved with the large-capacity 1800L models.

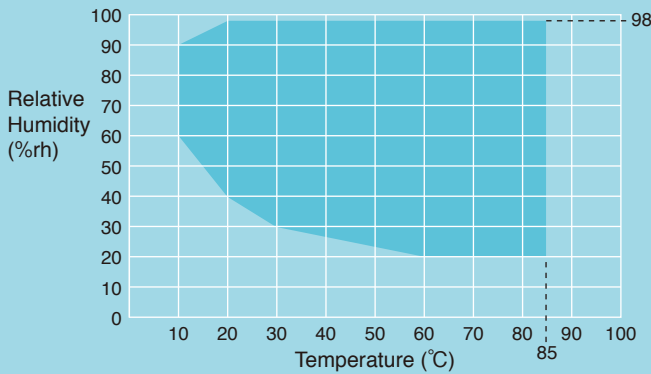
The faster 1800L temperature and humidity chamber can handle the reliability testing of large display devices used in automotive components, car electronics systems and other devices. The chamber can achieve a temperature change rate of 5°C/min, and in addition to making specimen setting easier, it now allows for central control and remote monitoring via an internet browser.





Characteristics

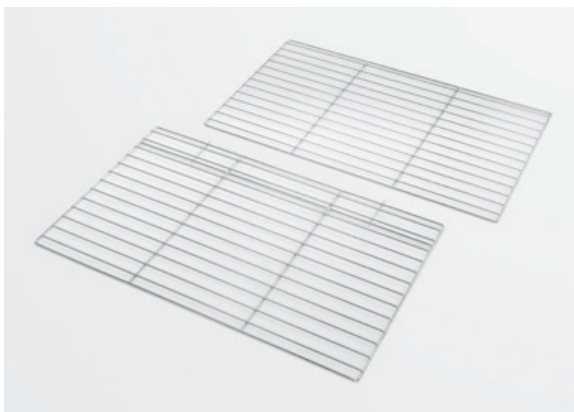
● Temperature & Humidity Control Range



*When the chamber is operated below +30°C to +40°C, continuous operation is restricted due to the dew condensation in the cooler (also functions as a dehumidifier).



Test area (one set of shelves and shelf supports equipped as standard)



Shelf

● Application of high stress of 5°C/ min. or more now possible

This faster temperature (& humidity) chamber enables the application of high stress to the specimen at a steep temperature rate of change of 5°C/min. or more based on IEC60068-3-5, IEC60068-3-6 (without specimens loaded), thanks to the larger refrigeration systems installed in this series.

The chamber features operation within wide temperature ranges: -70°C to +180°C and -40°C to +180°C.

● Four models with 1800L capacity

Two models are available for each of the temperature ranges from -40°C to +180°C / -70°C to +180°C, with a humidity model (from 20 to 98%rh) also available for each type. Thus, a chamber model can be selected from four models to suit the intended application at best.

● Easy to set specimens

For cases in which specimens are set in the chamber using a hand-lift, an insertion hole has been provided at the bottom of the chamber, and the test area has also been lowered, so that large-sized specimens and heavy articles can easily be inserted or withdrawn.

● Shelves structure (Japanese patent no.4418691)

Due to the large size (1200mm wide×1500mm deep) of the test area, shelves are relatively heavy. With this in mind, shelves have been designed in a two-piece structure. Moreover, storage space is provided at the bottom of the device to hold the shelves.

● Free access of the chamber

Since the machinery compartment is located in the back of the test area, virtually no maintenance space is required on either side of the equipment, enabling access either from the right or the left.

Characteristics

● Viewing Windows as Standard

Equipped with viewing windows as standard, and chamber lamp (LED lamps) provide greater visibility.



Viewing window

● Door unlocking system inside the chamber

A door unlocking handle is installed inside the chamber, so that the door can be opened from inside, should someone be locked in by mistake.



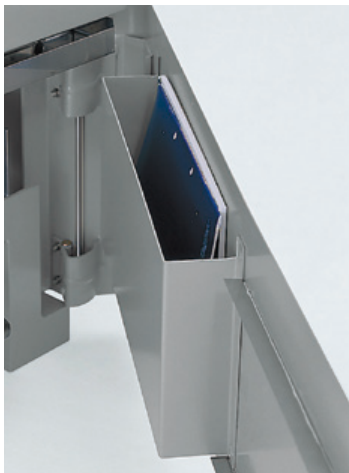
Door unlocking system

● Simple replacement of wick

The wick located at the upper rear of the test area must be replaced periodically in order to maintain high precision of humidity measurement at all times. To this end, the wick has been designed for easy replacement from the exterior.

● Pocket for printed material

A pocket is provided at the lower front of the chamber to store printed material such as the operation manual.



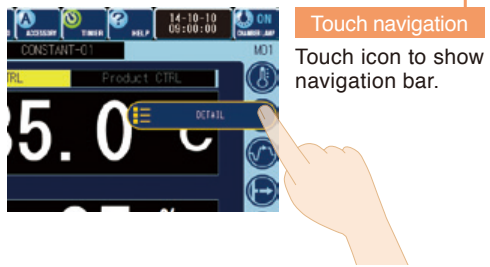
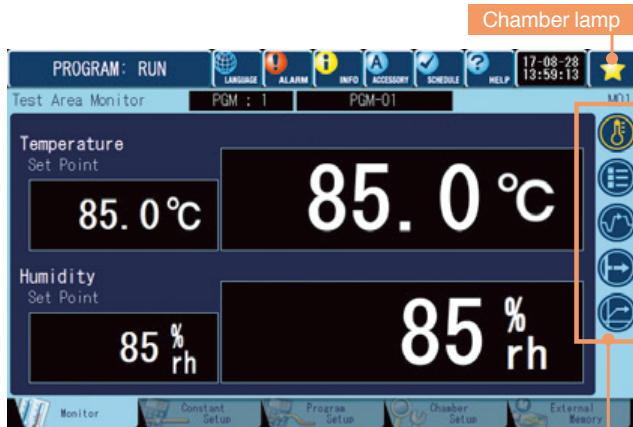
Wick installation (Test area)



External view of wick (Right side)

Control operation

N instrumentation P-310



Information

- **Color LCD Touch Panel**

A 7-inch wide color LCD fitted with LED backlight. Tabs are displayed at the bottom of the screen to help access to other screens.

- **Multilingual support**

The language used by the instrumentation can be changed with the screen settings (Japanese / English).

- **Information notification**

The INFO icon will blink when chamber information requiring attention.

- **Registering test patterns**

Program operation: 40 patterns (99 steps per program)
Constant operation: 3 patterns

- **Test data records**

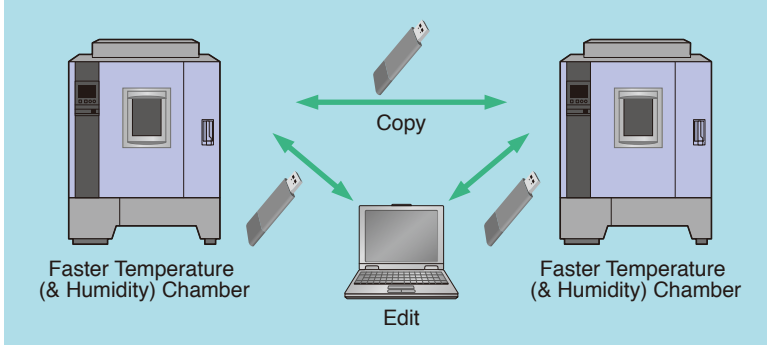
Temperature & humidity settings and measurement values can be recorded on the internal memory and external memories.

- **Copy test profiles**

Share the test profiles among chambers via USB memory* instead of PC.

* USB memory not included.

- **Program Copy and Computer Editing**



* Some items may not be copied between different models and chambers with different options.

Chambers can be operated from PC and tablet

Remote monitoring and control (Ethernet connection)

The chambers are equipped with unique web applications that enable chamber status to be confirmed and operated from a web browser screen (PC or tablet terminal). It is also possible to start operations with a PC or other device from a remote location.



Image

Editing test profiles with a browser

It is possible to edit the test profiles registered in the chamber through a web browser.

Displaying data in trend-graph

Settings and measured data saved in the chamber can be displayed in graphs on a web browser.

E-mail notifications

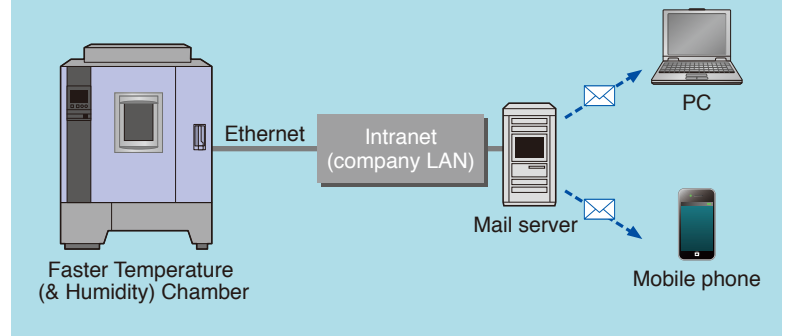
Details on alarms that have been triggered will be sent to pre-registered e-mail addresses. It is also possible to transmit e-mails when testing has finished.

* An Intranet environment is required to transmit e-mails.

Login privileges

Privileges \ Screen	Chamber monitor	Constant/ Program setup	Run/Stop	Configuration
Administrator	✓	✓	✓	✓
Operator	✓	✓	✓	
User	✓			

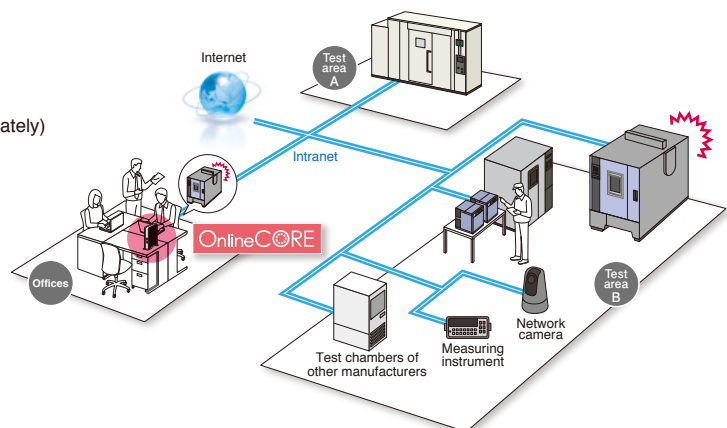
Email alert



ESPEC OnlineCore

OnlineCORE (Sold separately)

Central control system recommended for multiple environmental test chambers installations



*Please contact ESPEC for more information, about which products can be connected.

SPECIFICATIONS

Model		SML-21	SMU-21	SMS-21	SMG-21	
System		Balanced Temperature (& Humidity) Control system (BT(H)C system)				
Performance ^{*1}	Temperature range	-40 to +180°C (-40 to +356°F)		-70 to +180°C (-94 to +356°F)		
	Humidity range	20 to 98% rh	—	20 to 98% rh	—	
	Temperature fluctuation	±0.5°C (-40 to +100°C) ±1.0°C (+101 to +180°C)		±0.5°C (-70 to +100°C) ±1.0°C (+101 to +180°C)		
	Humidity fluctuation	±5% rh	—	±5% rh	—	
	Temperature variation in space	3°C				
	Temperature rate of change	5°C/min. no specimen (Average)		5°C/min. no specimen (Average)		
	Lowest attainable temperature	-40°C		-70°C		
Construction	Exterior material	Cold-rolled rust-proofed treated steel plate				
	Test area material	18-8 Cr-Ni stainless steel plate (2B polish)				
	Insulation	Glass wool				
	Heater	Fin-type sheathed heater				
	Humidifying boiler	18-12-2.5 Cr-Ni-Mo stainless steel sheathed heater	—	18-12-2.5 Cr-Ni-Mo stainless steel sheathed heater	—	
	Cooler	Plate fin cooler (Also works as a dehumidifier)				
	Air circulator	Sirocco fan (Direct-coupled electric motor type, 100 W×4)				
	Refrigerator unit	System	Mechanical single stage refrigeration system		Mechanical cascade refrigeration system	
Refrigerator		Scroll-type compressor, Water-cooled condenser, Cascade condenser (SMS, SMG only), Electronic expansion valve system, Refrigerant (R404A, R23 (SMS, SMG only))				
Chamber total load resistance		100 kg				
Inside dimensions (mm) ^{*2}		W1200×H1000×D1500 (W47.2×H39.3×D59.0 inch)				
Outside dimensions (mm) ^{*2}		W1400×H1900×D2737 (W55.1×H74.8×D107.7 inch)				
Capacity		1800 L				
Weight		1250 kg		1400 kg		
Equipment		Drain hose, Cable port×2 (φ50 mm, each side), Chamber lamp, Time signal terminal, Specimen power supply control terminal, Ethernet port (LAN), USB memory port, Viewing window (W295×H380 mm),				
Accessories		Cable port rubber plug (Silicone sponge rubber, φ50mm), Shelf brackets, Shelf (front, back), Strainer, Strainer element, Nipple, Spacer for frame, Cartridge fuse, Wet-bulb wick, Operation Manual *Power cable is not included.				
Utility requirements	Allowable conditions	Ambient temperature range: 0 to +40°C (+32 to +104°F) Cooling water temperature range: +5 to +32°C (+41 to +89.6°F)				
	Power supply ^{*3}	200V AC 3φ 3W 50/60Hz	109 A	86 A	120 A	
		220V AC 3φ 3W 60Hz	97 A	75 A	109 A	
		380V AC 3φ 4W 50Hz	56 A	45 A	63 A	
		400V AC 3φ 4W 50Hz	57 A	45 A	64 A	
	Cooling water supply pressure	0.2 to 0.5MPa				
	Cooling water supply rate	2350 L/h (Reference temperature +25°C), 4400 L/h (Reference temperature +32°C)				
Piping connection size	32 A					
Humidifying water supply	water quality	Electrical conductivity 0.1 to 10μs/cm	—	Electrical conductivity 0.1 to 10μs/cm	—	
	Supply water pressure	0.07 to 0.5MPa	—	0.07 to 0.5MPa	—	
Noise level ^{*4}		Max. 65dB				

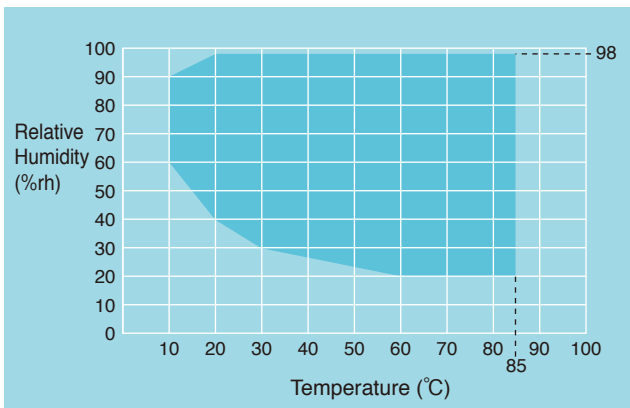
*1 The performance values are based on IEC 60068-3-5:2001, and IEC 60068-3-6:2001. Performance figures are given for a +23°C ambient temperature, a +25°C refrigerator cooling water temperature, no specimens inside the test area and refrigerator capacity set to auto.

*2 Excluding protrusions

*3 Voltage fluctuation: ±10% of rated value.

*4 Noise level was measured in an anechoic room at a height of 1.2 m from the floor and a distance of 1 m from the chamber front panel (ISO 1996-1:2003 A-weighted sound pressure level).

TEMPERATURE & HUMIDITY CONTROL RANGE



*When the chamber is operated below +30°C to +40°C, continuous operation is restricted due to the dew condensation in the cooler (also functions as a dehumidifier).

MODEL

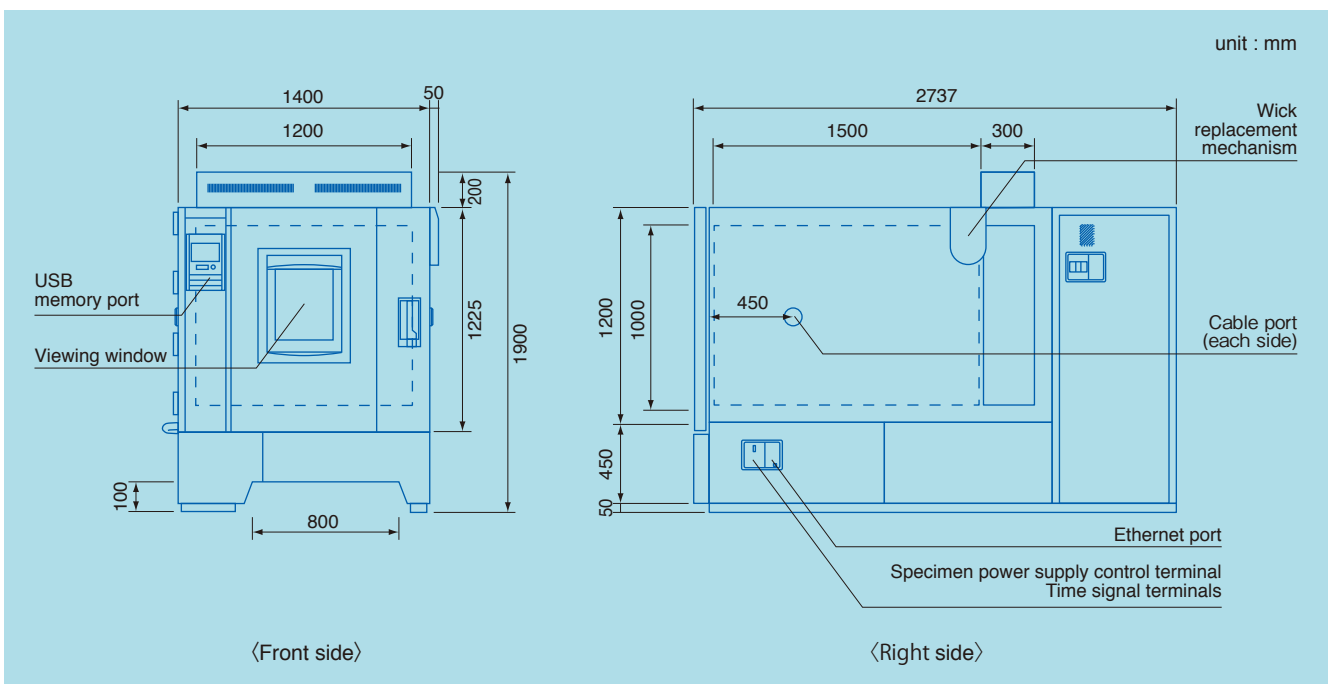
SM □ - 21

Temperature & humidity range
 L : -40°C / 20 to 98%rh
 U : -40°C
 S : -70°C / 20 to 98%rh
 G : -70°C

SAFETY DEVICES

- Leakage breaker for power supply (200 to 380V AC spec.)
- Circuit breaker for power supply (400V AC spec.)
- Circuit breaker for refrigerator
- Boil dry protector (SML, SMS only)
- SSR overload and short circuit protecting circuit breaker
- Temperature switch for air circulator
- Control circuit overload and short circuit protection fuse
- Electrical compartment door switch
- Refrigerator high /low pressure switch
- Thermal fuse
- Temperature switch for compressor
- Specimen power supply control terminal
- Reverse-prevention relay
- Upper and lower temperature (& humidity) limit alarms (built-in temperature (& humidity) controller)
- Burn-out circuit (built-in temperature (& humidity) controller)
- Watchdog timer (built-in temperature (& humidity) controller)
- Overheat protector (independent type)
- Water suspension relay
- Circuit breaker for heater
- Circuit breaker for humidifying heater (SML, SMS only)
- Switch for humidifying boiler water level detection (SML, SMS only)
- Wick insertion port switch (SML, SMS only)

DIMENSIONS / FITTINGS LOCATION



OPTIONS

Power cable

- 5m
- 10m

*AC 200V only

*The chamber does not come with a power cable.

Shelf, Shelf bracket

Equivalent to standard accessory.



Additional cable port

Provided in addition/replacement of the standard cable port (left-side).

*Equipped with rubber plug.

- ϕ 25 mm
- ϕ 50 mm
- ϕ 100 mm

Cable port rubber plug

Comes with the cable port.

Interface

- RS-485
- RS-232C
- GPIB

Frost-free circuit

Prevents frost from accumulating on the refrigeration circuit to allow long-term continuous operation.

With models SMS and SMG, it is applicable with all chambers except those equipped with cascade refrigeration.

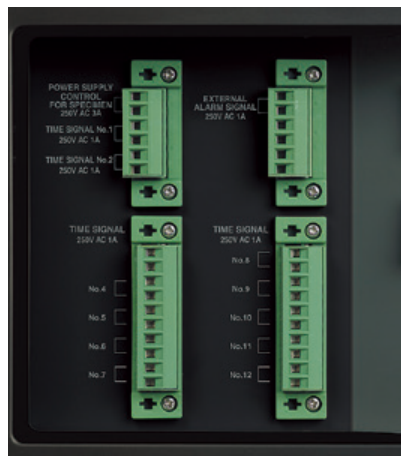
Product temperature monitor

When temperature measurement is performed on the specimen by the temperature sensor, the results are displayed on the instrumentation monitor screen. In programmed operation, the exposure time can be controlled, provided that the specimen temperature is within the available set temperature specifications.

- Measurement point: 1
- Sensor in use: Thermocouple, Type T
- Appurtenances: Terminal board1
- Connecting position:
Right side of the main unit (front)
- Accessories:
Thermocouple, Type T1
(ϕ 0.32mm, 6m)
Connector1

Time signal terminals

Nine relay contacts (time signals) added.
(Two contacts standard equipped)



Paperless recorder

Records temperature of each section such as the temperature inside the chamber.

Recorder location: Top or Left side
Size: 144×144 mm

*External dimensions change when attaching the recorder. (Please refer to the recorder location.)

Display: 5.7inch color touch panel

Data saving cycle: 5 sec.

Internal recording media:

Flash memory: 8MB

External recording media:

CF memory card (256MB)

USB memory port

Language support: ENG, JPN

[Temperature type]

Number of inputs (Initial setting):

Temperature 1

(5 more channels can be turned ON)

[Temperature and humidity type]

Number of inputs (Initial setting):

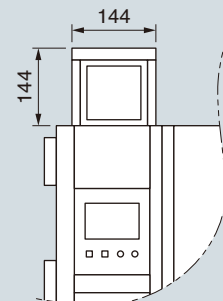
Temperature 1 / Humidity 1

(4 more channels can be turned ON)

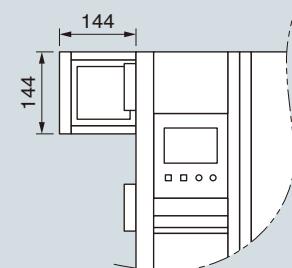


● Recorder location unit:mm

Top



Left side



OPTIONS

Recorder output terminal

- Temperature, humidity
Output terminals for chamber temperature and humidity.

*Cannot be installed in conjunction with a recorder



- Dey-bulb temperature
Terminal boards for dry-bulb sensor in the chamber.
(SMU, SMG only)

Thermocouple

Attached to specimen to measure specimen temperature.

*Thermocouple type T (Copper/ Copper-Nickel)

- 2m
- 4m
- 6m

Anchoring fixtures

Used to bolt the chamber to the floor.

Overcool protector

If the temperature inside the chamber decreases excessively, the chamber stops operating to prevent the specimens from being damaged.

Additional overheat protector

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

External alarm terminal

If the safety device of the chamber is activated, the external alarm terminal will notify it to a remote point.

Emergency stop push button

Stops the chamber immediately.



With guard

Operation manual

- CD
- Booklet

Reports & certificates

- Testing and inspection report
- Test data
- Temperature (& humidity) uniformity measurement
- Calibration report
- Calibration certificate
- Traceability certificate
- Traceability system chart



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.

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ISO 9001/JIS Q 9001

Quality Management System Assessed and Registered

ESPEC CORP. has been assessed by and registered in the Quality Management System based on the International Standard ISO 9001:2015 (JIS Q 9001:2015) through the Japanese Standards Association (JSA).

* Registration : ESPEC CORP.
(Overseas subsidiaries not included)

ISO 14001 (JIS Q 14001)

Environmental Management System Assessed and Registered

ESPEC CORP.
(Overseas subsidiaries not included)