

Ultra View Temperature (& Humidity) Chamber

PWL•PWU



Full visibility, with improved ease-of-use and greater functionality. High-performance temperature and humidity chambers with a glass viewing door.

The Ultra View Temperature and Humidity Chamber provides a clear view of the entire chamber interior, enabling continuous observation of specimens during testing.

The doors feature large, multilayer EC (electro-coated) glass panes. These panes allow for a temperature range of -40°C to $+120^{\circ}\text{C}$.

This new series is based on the Platinous K Series, the leader among temperature and humidity chambers worldwide, and represents the realization of a simple design concept: easy viewing, greater functionality.





PWL-3KP

PWL-4KP



*The viewing window reach-in ports are optional.



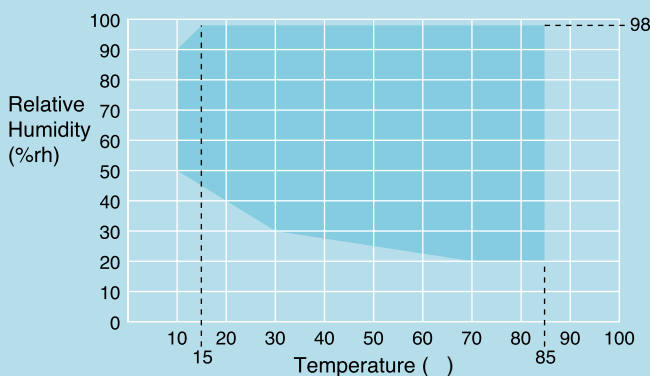
- **High performance by special glass**

EC (deposit metal electro-coated) multi-layer glass ensures high performance while eliminating the earlier problems of reduced temperature range and uneven temperature distribution.

- **Supports high-temperature, high-humidity testing**

Until now, glass doors limited the maximum temperature to + 80 °C, but the Ultra View Temperature and Humidity Chamber allows a greatly increased maximum temperature of + 120 °C. This feature now enables high-temperature testing of products like on-board vehicle components.

- **Temperature & Humidity Controllable Range**
(at + 23 °C ambient temperature, non-loaded)

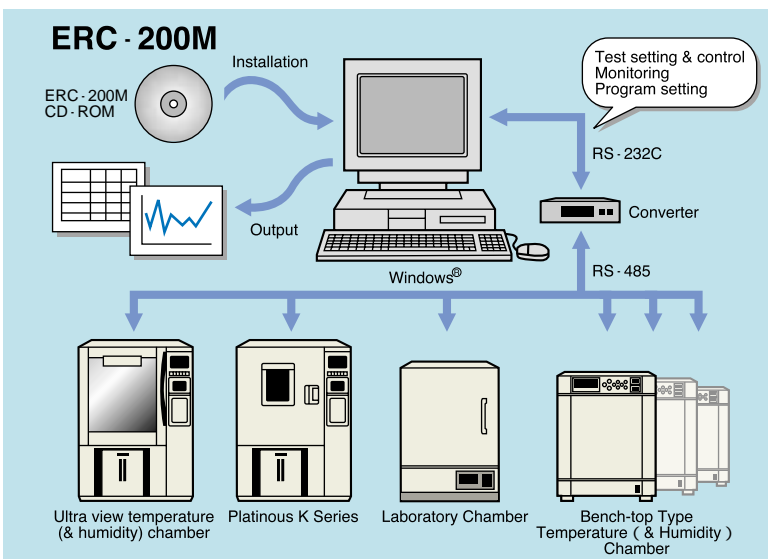


- **High-precision temperature and humidity control over a wide range**

The use of a refrigeration system equipped with an electronic auto-expansion valve featuring stepless control makes it possible to realize high-precision temperature and humidity control over a wide range. The lower limit of the temperature control range is + 10 °C (at 50 to 90%rh) and the lower limit of the humidity control range is 20% rh (at + 70 °C to + 85 °C).

- **Communication Network of Environmental Test Chambers**

The Ultra View Temperature (and Humidity) Chamber includes an RS-485 communication port, enabling remote operation via ESPEC's [E-Pilot 21]. This software suite not only serves as a system for centralized control of environmental chambers, but also establishes an for specimen measurements and remote maintenance.



- **Clear from dew condensation for increased visibility (patent pending)**

Both sides of the viewing window are temperature-controlled to prevent dew condensation due to temperature/humidity changes enabling a clear view of specimens throughout the entire test process.

- **Brighter chamber interior**

A fluorescent light is fitted above the viewing window to provide adequate lighting to specimens.

- **Optional reach-in ports on the door glass**

The reach-in ports covers can be swung open and closed sideways with the press of a button. The simple locking mechanism allows the covers to be detached and reattached easily. The reach-in ports covers can also be detached when handling test pieces for extended periods.

- **Dew condensation protection maintained even with the reach-in ports installed (patent pending)**

The inclusion of the reach-in ports renders dew condensation more likely to occur around the holes. We have therefore developed an innovative system to prevent this phenomenon, ensuring a clear operator view.



Type 4 model (The viewing window reach-in ports are optional.)



With covers open (The viewing window reach-in ports are optional.)



Type 4 (The viewing window reach-in ports are optional.)



● Door self-closing prevention and unlocking function

The hinges are designed to prevent the doors from closing on their own. Doors are held open at 60 °and 120 °.

Moreover, a door unlocking handle (type 4 model only) is installed inside the chamber, so that the door can be opened from the inside in the event someone is locked in by mistake.

● Detailed safety precautions

The electric circuit compartment is kept completely separate from the water circuits to prevent damage in the event of water leak. A number of additional safety devices and features are also included, such as a warning buzzer when the door is opened halfway.



Condenser filter

● Door dew tray

The door is equipped with a dew tray to prevent dripping when the door is opened and closed.

● Easy cleaning of condenser filter

The condenser filter on the left side of the chamber can be removed and reinstalled for easy cleaning (excluding model 4).

● Cartridge tank system for easy water supply

The water supply system uses a fixed tank as well as a cartridge tank. An warning buzzer goes off user when the cartridge tank is empty. The fixed tank allows uninterrupted water supply while the cartridge tank is removed for filling.

● Unnecessary manual feeding/ draining of humidification water

Setting the drain switch to AUTO automatically feeds or drains water inside the humidification tray depending on the operational status. As a result, during temperature pull-down at temperatures below 0 °C, the humidifying water does not require manual draining, so the water can be fed and drained automatically during both temperature and temperature-humidity operations.



Left: Cartridge tank
Right: Stationary tank

Programming operation mode

- Variety of program settings provided**

In addition to 10 standard programs, up to 20 program patterns can be stored in memory (1 pattern consisting of 99 steps; patterns can be linked).

Each step can be set in one-minute unit up to 999 hours and 59 minutes, and inserted, copied or deleted. Completed patterns can be verified on the display screen, and operation can be started from an intermediate step within the program pattern.

- Alarm buzzers and displays**

In the event of a problem, a description and time of occurrence of the problem are displayed on the alarm screen, with the cause, corrective actions and recovery method displayed on a subsequent screen.

- Trend Graph Display**

In addition to displaying temperature, humidity and other operating status parameters, a record of previous operation is also displayed in graph form.

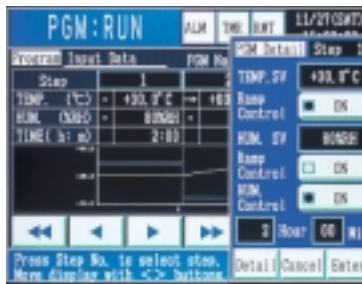
- Built-in Timer Functions**

Built-in timer functions enable the chamber to be started or shut down automatically at a preset time. A timer operation can be set for month, date, day of the week and time.



Instrumentation

- Program setting**



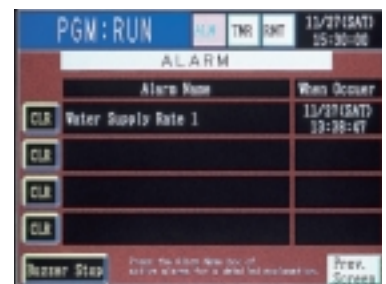
- Trend graph**



- Timer setup**



- Alarm**



SPECIFICATIONS

Model	PWL-2KP	PWL-3KP	PWL-4KP	PWU-2KP	PWU-3KP	PWU-4KP	
Power supply	200V AC 3 3W 50 / 60Hz, 220V AC 3 3W 60Hz, 380V AC 3 4W 50Hz						
Maximum current (A)	200V	22.5	23.0	36.0	15.0	28.0	
	220V	22.0		34.0	14.0	26.5	
	380V	11.0		22.0	10.5	13.5	
Temperature (and humidity) control system	Balanced Temperature & Humidity Control system (BTHC system)			Balanced Temperature Control system (BTC system)			
Operating temperature	0 to +40 (+32 to +104°F)						
Performance*1	Temperature range	-40 to +120 (-40 to +248°F)					
	Humidity range	20 to 98%rh					
	Temperature fluctuation	±0.3 (-40 to +100) [±0.54°F (-40 to +212°F)] ±0.5 (+100.1 to +120) [±0.9°F (+212.2 to +248°F)]					
	Humidity fluctuation	±2.5%rh					
	Temperature uniformity (-40 to +100 (-40 to +212°F) +100.1 to +120 (+212.1 to +248°F)	±0.5 (±0.9°F)		±1.0 (±1.8°F)	±0.5 (±0.9°F)		±1.0 (±1.8°F)
		±0.75 (±1.3°F)		±1.5 (±2.7°F)	±0.75 (±1.3°F)		±1.5 (±2.7°F)
	Humidity uniformity	±3.0%rh		±5.0%rh	—————		
	Temperature heat-up rate	-40 to +120 within 50min					
	Temperature pull-down rate	+20 to -40 within 60min					
	Construction	Exterior material	18 Cr stainless steel plate (hairline finish)				
Interior material		18-8 Cr- Ni stainless steel plate (2B polish)					
Insulation		Glass wool, Rigid polyurethane foam (for main unit)					
Refrigeration system	Refrigerator	Hermetically sealed rotary compressor (compatible with HFC refrigerants)					
	Refrigeration system	Mechanical single-stage refrigerator system (air-cooled condenser)					
	Refrigerator capacity	1.5kW		1.5kW 2units	1.5kW		1.5kW 2units
	Expansion mechanism	Electronic auto-expansion valve system					
	Cooler	Plate fin cooler (also functions as dehumidifier)			Plate fin cooler		
		1		4	1		4
R404A							
Heater	Nichrome strip wire heater						
Humidifier	18-12-2.5 Cr- Ni-Mo stainless steel sheathed heater (surface evaporating system)			—————			
Chamber air circulator	Cross-flow fan		Sirocco fan	Cross-flow fan		Sirocco fan	
Fittings	Cable port (inside diameter 50mm, 1pc), Chamber lamp (fluorescent lamp), Integrating hour meter, Time signal (2 points), Casters with adjusters						
	Viewing window effective size	W470 × H720mm (18.5 × 28.3 in)	W570 × H820mm (22.4 × 32.2 in)	W970 × H970mm (38.1 × 38.1 in)	W470 × H720mm (18.5 × 28.3 in)	W570 × H820mm (22.4 × 32.2 in)	W970 × H970mm (38.1 × 38.1 in)
Accessories	Cable port rubber plug (50mm), Shelves (shelf supports, shelves: 2 sets), Plug type fuse, Wet-bulb wick (PWL only), Instruction manual						
Inside dimensions*2	W500 × H750 × D600mm (19.6 × 29.5 × 23.6 in)	W600 × H850 × D800mm (23.6 × 33.4 × 31.5 in)	W1000 × H1000 × D800mm (39.3 × 39.3 × 31.5 in)	W500 × H750 × D600mm (19.6 × 29.5 × 23.6 in)	W600 × H850 × D800mm (23.6 × 33.4 × 31.5 in)	W1000 × H1000 × D800mm (39.3 × 39.3 × 31.5 in)	
Outside dimensions	W910 × H1590 × D1039mm (35.8 × 62.6 × 40.9 in)	W1010 × H1690 × D1239mm (39.7 × 66.5 × 48.7 in)	W1410 × H1970 × D1239mm (55.5 × 77.5 × 48.7 in)	W910 × H1590 × D1039mm (35.8 × 62.6 × 40.9 in)	W1010 × H1690 × D1239mm (39.7 × 66.5 × 48.7 in)	W1410 × H1970 × D1239mm (55.5 × 77.5 × 48.7 in)	
Chamber capacity (L)	225	408	800	225	408	800	
Weight (kg)	310	370	560	300	360	550	
Water supply	Water supply system	Pump out system				—————	
	Tank capacity (front face of the chamber)	20L		40L	—————		
	Water quality	Electrical conductivity 0.1~10µS/cm				—————	

*1 At +23 ambient temperature, non-loaded, refrigerator capacity set to auto.

Performance for effective inside capacity (inside capacity minus 1/6 of the space between the two corresponding interior faces inside the chamber).

Temperature & humidity range, fluctuation, and uniformity are according to JTM·K 01-1998 (Standard for performance of temperature and humidity chambers) of the Japan Testing Machinery Association.

*2 Excluding protrusions.

SAFETY DEVICES

Leakage breaker for power supply
 Boil dry protector (PWL only)
 Refrigerator overload relay
 Air circulator temperature switch
 SSR overload & short circuit protecting circuit breaker
 Electric parts compartment door switch (PWL only)
 Water circuit box door switch
 Thermal fuse
 Control circuit overload & short circuit protection fuse
 Specimen power supply control terminals
 Overload relay for condenser heat exhaust fan
 Upper and lower temperature (& humidity) limit alarms
 (built inside temperature (& humidity) controller)
 Burn-out circuit
 (built inside temperature (& humidity) controller)
 Watchdog timer
 (built inside temperature (& humidity) controller)
 Overheat protector (independent type)
 Refrigerator high pressure switch
 Reverse prevention relay
 Compressor temperature switch
 Cooling box door switch (PWU only)

MODEL

P W - 2 K P
 Capacity
 2 : 225L
 3 : 408L
 4 : 800L
 Temperature (and Humidity) range
 L : - 40 to + 120 / 20 to 98%rh
 U : - 40 to + 120

TEMP. (& HUMID.) PROGRAM INDICATOR-CONTROLLER

Operating mode	Program operation, Constant operation
Display	TFT Color LCD display (6.5in)
Setting	Analog touch panel method
Program capacity	RAM pattern: 20 program patterns • 99 steps per one pattern • pattern linking possible ROM pattern: 10 program patterns
Setting and indication ranges	Temp : - 45 to + 125 (- 45 to + 105 / With reach-in ports) Humid: 0 to 100%rh Time : 0 to 999 hours 59 minutes
Setting and indication resolution	Temp : 0.1 Humid: 1%rh Time : 1 minute
Input	Thermocouple type T (Copper/Copper-Nickel)
Control	PID control
Communication function	RS-485
Auxiliary functions	Time signal function Power failure protection function Input burn-out detection function Timer function (automatic start/stop) Upper and lower temperature & humidity limit alarm function Refrigerator capacity automatic control function Self-diagnostic function Trend graph display function Alarm indication function Help function



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 introduce corrosive substances into the chamber for they might deteriorate the cooler. Stainless evaporator which is optional, with high-resistance to corrosion is also available.



CAUTION

Be sure to read the instruction manual before operation.

Please contact us for non-standard specification.

OPTIONS

Water cooled specification

The standard condenser on the refrigeration system is replaced with a water-cooled type. (type 3•4 only)

Cable port

A through hole of 25, 50, or 100mm dia. is provided on the wall (top plate or left side) of the chamber to allow electrical cables to be introduced into the chamber.

*Equipped with rubber plug.



Cable port

Cable port rubber plug

The additional silicon sponge rubber port plug.

Viewing window reach-in ports

The viewing window in the door of the main unit is fitted with reach-in ports to allow test specimens to be manipulated inside the test chamber. The covers can be removed if they obstruct manipulation or observation.

- Internal diameter: 130 mm
- Quantity: 1 pair
(one each on left and right)

New specifications when reach-in ports are fitted.

Temperature range:
- 40 to + 100

Temperature heat-up rate:
- 40 to + 100
within 45min

*Standard performance may not be achieved if operated with the reach-in ports open.

Precision internal chamber

The precision internal chamber prevents any contact between circulating air and the specimens, and maintains uniformity in distribution of temperature and humidity.

- Air velocity: below 0.5 m/s
- Temperature/humidity fluctuation:
 ± 0.5 / $\pm 2.5\%$ rh
- Temperature/humidity uniformity:
 ± 0.75 / $\pm 5.0\%$ rh
- Outside dimensions:(effective cross)
Type 2—W400 × H590 × D400mm
(W335 × H435mm)
Type 3—W500 × H740 × D600mm
(W435 × H585mm)
Type 4—W900 × H840 × D600mm
(W835 × H685mm)

Stainless evaporator

The evaporator can be changed to the stainless evaporator to protect chamber from the test product.

*The performance with this option is not identical to the standard performance partly. For further information, please contact us.

Floor load resistance

To enhance floor load capacities inside the chamber.

- Up to 100kg
- Up to 200kg
- Up to 300kg

Shelf, Shelf bracket

Standard specification shelves and shelf brackets are added as required.

Load resistance shelf

Use load resistance shelf when the total weight of the specimens exceeds the maximum allowable load of the standard shelf.

- Type 2 to 3: up to 30kg
(max. of three shelves)
- Type 2 to 4: up to 50kg
(max. of two shelves)

Allowable load of standard shelves
Type 2: 10kg
Type 3: 10kg
Type 4: 30kg

Specimen basket

For small specimen that cannot be put on the shelf.

- Basket 1
size: W350 × H35 × D270mm
load capacity:
3kg equally distributed load
material: stainless (4 mesh)
number of baskets that can be placed per shelf: Type 2—2
Type 3—4
Type 4—6
- Basket 2
size: W700 × H35 × D450mm
load capacity:
5kg equally distributed load
material: stainless (4 mesh)
number of baskets that can be placed per shelf: Type 3—1
Type 4—2

*The basket should be set on shelf.

*Specimen volume should not be more than the shelf load capacity.

*Leave enough space around the basket for air circulation to ensure effective operation.

OPTIONS

OPTION	PWL	PWU
Water cooled specification (excluding model 4)		
Cable port		
Cable port rubber plug		
Viewing window reach-in ports (excluding model 4)		
Precision internal chamber		
Stainless evaporator		
Floor load resistance		
Shelf, Shelf bracket		
Load resistance shelf		
Specimen basket		
Additional overheat protector		
Overcool protector		
Defrost circuit		
Frost-free circuit		
Operating panel cover		
Filter clogged alarm		
Trouble buzzer		
Rotating type warning signal light		
External alarm terminal		
Emergency stop switch		
Temperature attainment output		
Humidifier delay control		—
Integrating hour meter with reset		
Paperless recorder		
Temperature and humidity recorder		—
Temperature recorder		
Temperature sensor terminal		
Connecting terminal for temp & humid recorder		—
Time up output		
Additional relay contact		
Thermocouple		
Temp & humid recorder for future installation		—
Temp recorder for future installation		
Communication functions		
Communication cable		
Power cord		
Power plug		
Water purifier (WS-1)		—
Water supplier (B, C, D)		—
Additional water supply tank		—

OPTIONS

Additional overheat protector

To prevent overheating inside the chamber and prevent the specimens from being damaged, an upper temperature limit alarm and overheat protector have been incorporated in the chamber as standard. An additional overheat protector can be installed.

Overcool protector

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

Defrost circuit

Quickly defrosts the refrigeration circuit(dehumidifier).

Frost-free circuit

Prevents the refrigeration circuit (dehumidifier) from frosting, thus enabling continuous chamber operation.

Operating panel cover

Plastic cover for the operating panel.

Filter clogged alarm

An indicator lights up if clogging of the refrigerator condenser filter causes the cooling air flow velocity to fall below its specified value.

Trouble buzzer

If a malfunction occurs, the buzzer sounds to warn you of the malfunction.

Rotating type warning signal light

A signal light to light up when malfunction occurs. (selection of red or yellow)

External alarm terminal

If the safety device of the chamber activates, the alarm is notified to a distance via the external alarm terminal.

Emergency stop switch

Stops the chamber immediately.

Temperature attainment output

When temperature and humidity in the chamber reach the set values, the chamber outputs contact signals. This output is used for adjusting the timing for measurement or application of electrical current to specimens, and also prevents condensation from forming on specimens.

Humidifier delay control

To protect specimens from condensation, humidity control starts after temperature reaches the set value.

Integrating hour meter with reset

This integrating hour meter can be reset if necessary. (An integrating hour meter is available as standard.)

Paperless recorder

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

[Temperature type]

Temperature range: - 100 ~ + 200

Number of inputs:

Temperature 1 (5 more but turned OFF*)

Data saving cycle: 5 sec

External recording media:

CF memory card (32MB)

* Settings may be modified.

[Temperature and humidity type]

Temperature range: - 50 ~ + 150

Humidity range: 0~100%rh

Number of inputs:

Temperature 1 / Humidity 1

(4 more but turned OFF*)

Data saving cycle: 5 sec

External recording media:

CF memory cord (32MB)

* Settings may be modified.



Paperless recorder

Temperature and humidity recorder (digital)

RJ12 - 50 to + 150 /0 to 100%rh
6 dots



Temperature and humidity recorder (digital)

OPTIONS

Temperature recorder (digital)

- RJ04 - 100 to +200 1 pen
- RJ25 - 100 to +200 6 dots

Temperature sensor terminal

Terminal board for wet bulb and dry bulb (and wet bulb) temperature sensor in the chamber.

Connecting terminal for temp & humid recorder

Terminal board for temperature and relative humidity output.

Time up output

At time up, the chamber outputs contact signals using the timer function of temperature (& humidity) controller. This function enables current to flow or to stop flowing through specimens.

Additional relay contact

The standard 2 relay contacts (time signals) can be added to 12 contacts. (10 contacts for PDR and PDL)

Thermocouple

Thermocouple measures the temperature of specimens.

- 2, 4, 6m
- Thermocouple type T (Copper/ copper-Nickel)

Temp. & Humid. recorder for future installation

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

Temperature recorder for future installation

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

Communication functions

Connects chamber to a personal computer, enabling operation control of the chamber.

(Standard: RS-485)

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

Communication cable

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

Power cord

A standard cord is 2.5m long. We provide two other choices.

- 5, 10m

*Not applicable 380V AC power supply specification.

Power plug

The power plug is fitted at the end of the power cord.

*Not applicable 380V AC power supply specification.

Water purifier (WS-1)

Water purifier with reverse osmosis membrane. Produces approx 6.6L per hour (at primary water temp + 10). Water supplier D is required.



Water purifier WS-1

Water supplier

Water supply circuit to supply pure water for humidification.

- Water supplier B
Water supply piping to ion exchange purewater device and water supply circuit of the main body.
- Water supplier C
Water supply circuit connected to user's pure-water piping.
- Water supplier D
Water supply piping for connecting the optional water purifier (WS-1) to the water supply circuit of the main body.

Additional water supply tank

These tanks are used to replenish the standard tank, thus ensuring long-term, continuous operation.

- Capacity 18L

When installing chamber on upper floor with options below, a water leak detector (sold separately) is recommended to be equipped in case water leaks.

- Water cooled specification
- Water purifier
- Water supplier C·D

Some photographs listed in this catalog contain Japanese display.

ESPEC CORP. <http://www.espec.co.jp/english>

Head Office

3-5-6, Tenjinbashi, Kita-ku, Osaka 530-8550, Japan

Tel: 81-6-6358-4741 Fax: 81-6-6358-5500

Europe Branch

Tel: 49-0-89-30765661 Fax: 49-0-89-30767573

ESPEC NORTH AMERICA, INC.

Tel: 1-616-896-6100 Fax: 1-616-896-6150

ESPEC EVALUATION & TEST SYSTEMS, INC.

Tel: 1-408-433-2295 Fax: 1-408-433-2296

ESPEC ENVIRONMENTAL EQUIPMENT (SHANGHAI) CO., LTD.

Head Office

Tel: 86-21-58303322 Fax: 86-21-58661781

BEIJING Rep. Office

Tel: 86-10-64627025 Fax: 86-10-64627036

GUANGZHOU Rep. Office

Tel: 86-20-83317826 Fax: 86-20-83317825

SHENZHEN Rep. Office

Tel: 86-755-83674422 Fax: 86-755-83674228

SUZHOU Rep. Office

Tel: 86-512-68664007 Fax: 86-512-68601994

ESPEC TEST TECHNOLOGY (SHANGHAI) CO., LTD.

Tel: 86-21-68798008 Fax: 86-21-68798088

ESPEC (MALAYSIA) SDN. BHD.

Tel: 60-3-89451377 Fax: 60-3-89451287



JIS Q 9001:2000
Registration Number
JSAQ 004



JAB Certificate Number
R001



RE 009



ISO 9001/JIS Q 9001

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ISO 14001 (JIS Q 14001)

Environmental Management System Assessed and Registered

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ESPEC ENGINEERING CORP.

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ESPEC ENVIRONMENTAL TEST

TECHNOLOGY CENTER CORP.

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