

ESPEC

Faster Temperature (& Humidity) Chamber

SML-2·SMU-2
SMS-2·SMG-2



CAT.No.E04129

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

A faster temperature and humidity chamber with 1800 L capacity has been developed for reliability testing of increasingly large display devices to be used in automotive components, in car electronics systems, and more.

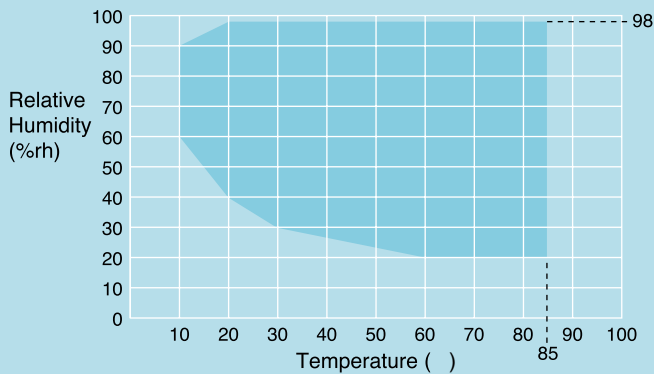
This marks the arrival of a long-awaited large-capacity temperature and humidity chamber capable of providing a temperature change rate of 5 °C/min. or more.

The chamber is packed with numerous features, including a shorter time of delivery, thanks to its standardized component units. Lower power consumption, proper height for specimen setting, and other features.





Temperature & Humidity Controllable Range



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



Wick (Inner chamber)



External view of wick (Right side)



Right side

● 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 change rate of 5 /min. or more. A temperature change rate of 5 /min. or more has been achieved from - 45 to + 155 with Types SMG and SMS, and from - 18 to + 158 with Types SML and SMU (without specimens loaded), thanks to the larger refrigeration systems in this model series. The device features operation within wide temperature ranges: - 70 to + 180 and - 40 to + 180 .

● Power consumption slashed

An improvement in the refrigeration system has resulted in lower power consumption in the large-capacity model temperature and humidity chamber.

● 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.

● Free use of the right and left sides of the device

Since the machine room comprising part of the device is situated in the back of the test area, virtually no maintenance space is required on either side of the equipment, which enables access either from the right or the left.

● Door unlocked from inside the chamber

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

● Easy to set specimens

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

● Large viewing window for specimen observation

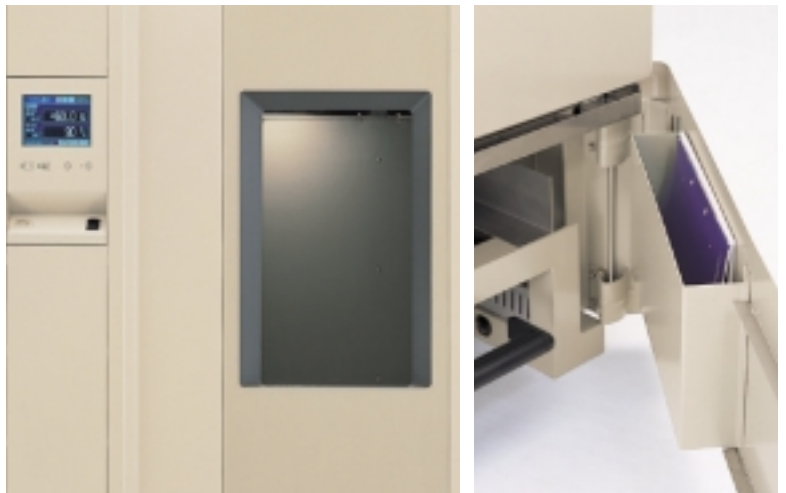
A large viewing window measuring 380mm wide by 590mm high has been adopted that allows inspection of the interior of the test area. A lamp installed above the test area allows easy observation of the specimen.



Inside the chamber (one set of shelves and shelf supports standard equipped)

● New shelves structure (patent pending)

Due to the large size (1200mm wide × 1500mm deep) of the chamber interior, the 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.



Viewing window

Pocket

● Pocket for printed material

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

● Four models with 1800L capacity

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

● Paperless recording (Optional)

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



Shelves storage space

Control operation



Instrumentation panel

● Instrumentation integrated into the door

To minimize the required installation space for the device, the instrumentation section has been integrated into the door. The instrumentation produces indications on a bright, easy-to-view color LCD, which features an interactive touch-screen system.

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	User's pattern: 20 program patterns <ul style="list-style-type: none"> • 99 steps per one pattern • pattern linking possible ROM pattern: 10 program patterns
Setting and indication ranges	Temp : - 75 to + 185 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	<ul style="list-style-type: none"> • Time signal function • Input burn-out detection function • Upper and lower temperature & humidity limit alarm function • Self-diagnostic function • Alarm indication function • Power failure protection function • Timer function (automatic start/stop) • Refrigerator capacity automatic control function • Trend graph display function • Help function

● Program monitoring



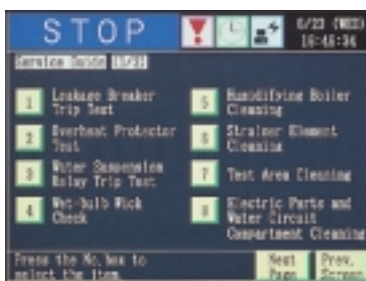
● Program setting



● Alarm

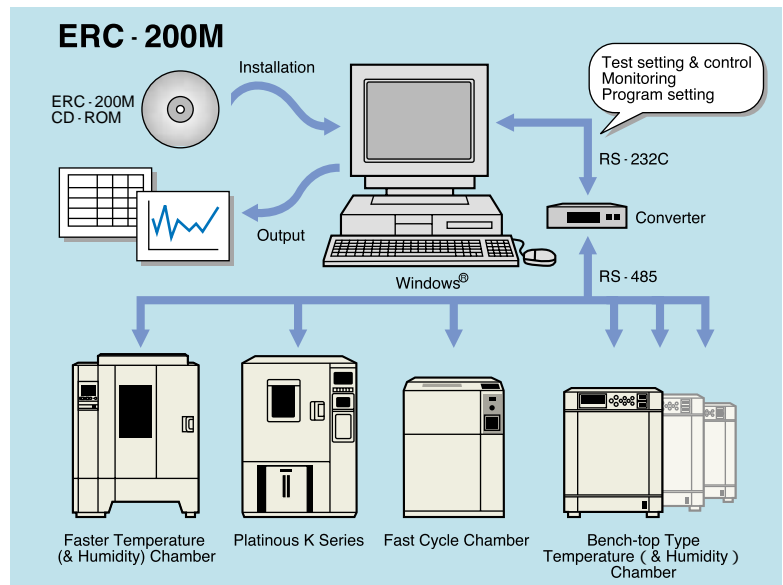


● Service guide



Communication Network of Environmental Test Chambers

Faster temperature (& humidity) chamber incorporates the communication port RS-485 as standard to cope with the [E-PILOT 21], which is a newly developed centralized control system. [E-PILOT 21] not only serves as a system for centralized control of environmental chambers, but also establishes an open network including specimen measurement function and remote chamber main-tenance function.



E . PILOT (ERC-100S)

The high-level of functions offered by ERC-200M is included in a non-networked package, meant for a single chamber to be interfaced with your personal computer. The RS-232C communications port option is required, but the software is free.

For one-to-one users

If you are not ready to establish a network of test chambers, this software would be an ideal trial of the capabilities of our ERC-200M package.

Freeware

ERC-100S can be downloaded from our website for free at www.espec.co.jp/english.

E . PILOT (ERC-200M)

Control, monitoring, programming, and datalogging for up to 16 ESPEC chambers can be performed through a single PC. RS-485 from ESPEC chambers connect via a serial bus converter to RS-232C on the PC.

Remote operation

Have full control of test chambers while sitting in your office.

Potential savings

Because the ERC-200M allows program operations to be run directly from the PC, test chambers with less-expensive single-setting controllers can be used.

E-BUS version available

For existing units with E-BUS system, ERC-100M is available.

* The series of application softwares and network systems are provided on a separate basis from the chamber.

E . PILOT (ERC-300M)

Set up an Intranet Web-PILOT site to allow monitoring of up to 16 chambers through one PC (possible with E-BUS communications system). Monitor the settings and operation of your chambers from any PC on the Intranet. Web-based method allows display of chamber information across many computer platform types.

E . PILOT (Lab-VIEW)

Provides an interlocking system of testing and measuring devices that allows customers currently using Lab-VIEW to link to ESPEC chambers, opening new horizons for environmental testing. Optional E-BUS communications interface is required.

Driver software to connect test chambers are provided for free

Lab VIEW drivers are available to give the basic building blocks for addressing ESPEC equipment. Drivers required for connecting ESPEC products to a personal computer is provided for free. For further information, please contact your nearby ESPEC sales office.

CMS . J30

This is a fully customizable system that provides centralized control, centralized monitoring, remote operation and specimen data management of ESPEC products (up to 32 units of which 16 are dedicated to centralized monitoring) by the use of a PC. (E-BUS compatible)

* Please contact us for further information.

SPECIFICATIONS

Model	SML-2	SMU-2	SMS-2	SMG-2
Power supply	200V AC 3 3W 50/60Hz, 220V AC 3 3W 60Hz, 380V AC 3 4W 50Hz and 400 VAC 3 4W 50Hz Power supply variation: Within $\pm 10\%$ of rated voltage			
Maximum current (A)	200V AC	109	86	120
	220V AC	73	51	86
	380V AC	56	45	63
	400V AC	57	45	64
Temperature & humidity control system	Balanced Temperature (& Humidity) Control system (BT(H)C system)			
Operable ambient temperature range	Ambient temperature range: 0 ~ + 40 Cooling water temperature range: + 5 ~ + 32			
Performance*1	Temperature range*2	- 40 ~ + 180		- 70 ~ + 180
	Humidity range*2	20 ~ 98%rh	—————	20 ~ 98%rh
	Temperature fluctuation*2	± 0.5 (- 40 ~ + 100) ± 0.7 (+ 101 ~ + 180)		± 0.5 (- 70 ~ + 100) ± 0.7 (+ 101 ~ + 180)
	Humidity fluctuation*2	$\pm 3\%$ rh	—————	$\pm 3\%$ rh
	Temperature uniformity*2	± 1.5		
	Humidity uniformity*2	$\pm 5\%$ rh	—————	$\pm 5\%$ rh
	Temperature cycling rate*3	- 18 + 158 5 /min. or more without specimen (Average)		- 45 + 155 5 /min. or more without specimen (Average)
	Lowest attainable temperature*2	- 40		- 70
Noise*4	65dB			
Construction	Exterior material	Rust-proofed cold-rolled steel plate		
	Interior 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 functions as a dehumidifier)			
Refrigeration system	Refrigeration system	Mechanical single-stage refrigeration system		Mechanical type cascade refrigeration system
	Refrigerator capacity	7.5kW		7.5kW + 7.5kW
	Refrigerator	Scroll-type refrigerator, Water-cooled condenser, Cascade condenser (SMS, SMG only), Refrigeration capacity controller (Electronic-type automatic-expansion valve system), Coolant (R404A, R23 SMS, SMG only)		
Blower for in-chamber agitation	Sirocco fan (Direct-coupled electric motor type, 100W \times 4)			
Humidifying water supply	Equipment water supply system (Pure water: Permittivity 0.1 to 10 μ S/cm) (Supply water pressure: 0.07 to 0.5MPa)	—————	Equipment water supply system (Pure water: Permittivity 0.1 to 10 μ S/cm) (Supply water pressure: 0.07 to 0.5MPa)	—————
Fittings	Viewing window (380W \times 590H mm), Chamber lamp, Integrating hour meter (0 to 99999 hours), Cable port (50 mm, one each on right and left sides)			
Load capacity of floor in chamber	100kg			
Inside dimensions (mm)*5	1200W \times 1000H \times 1500D			
Outside dimensions (mm)*5	1400W \times 1900H \times 2726D			
Capacity (L)	1800			
Weight (kg)	1250		1400	
Utility requirements	Cooling water pressure	0.2 ~ 0.5MPa		
	Cooling water flow rate	2350 L/h (Reference temperature + 25), 4400 L/h (Reference temperature + 32)		
	Diameter of pipe joint	32A		

*1 Measured when the refrigeration-capacity setting is for automatic control at an ambient temperature of + 23 , with no specimen loaded and the volume of the contents is within the capacity.

*2 The performance specifications conform to JTM K01-1998.

*3 The measurement point is in the center of the chamber, in compliance with IEC60068-3.5.

*4 The measurement is conducted in a room with minimal echo, such as an anechoic chamber, and the value (A-characteristic) is measured at a point 1 meter from the front of the equipment, at a height of 1.2 meters. Compliant with JIS-Z-8731.

*5 Excluding protrusions

ACCESSORIES

Cable hole rubber plug (Silicone sponge rubber, 50mm)	2
Shelf support, 18-8 Cr-Ni stainless steel (Class CP)	1 set
Shelf, 18-8 Cr-Ni stainless steel plate	1 set
Load capacity of shelf	50kg
Cartridge fuse, Class A, 250V	
For SML, SMS, SMG	6
For SMU	4
Wet-bulb wick (For SML, SMS)	1 box
User's Manual	1 copy

MODEL

SM -2

Temperature & humidity range

L : - 40 / 20 ~ 98%rh

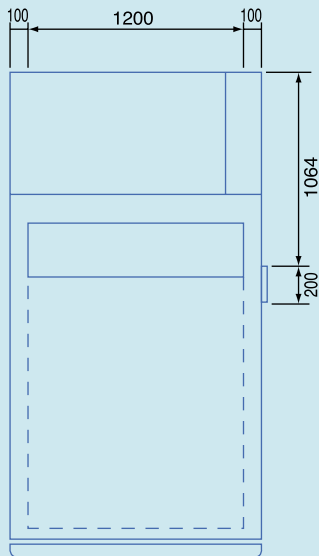
U : - 40

S : - 70 / 20 ~ 98%rh

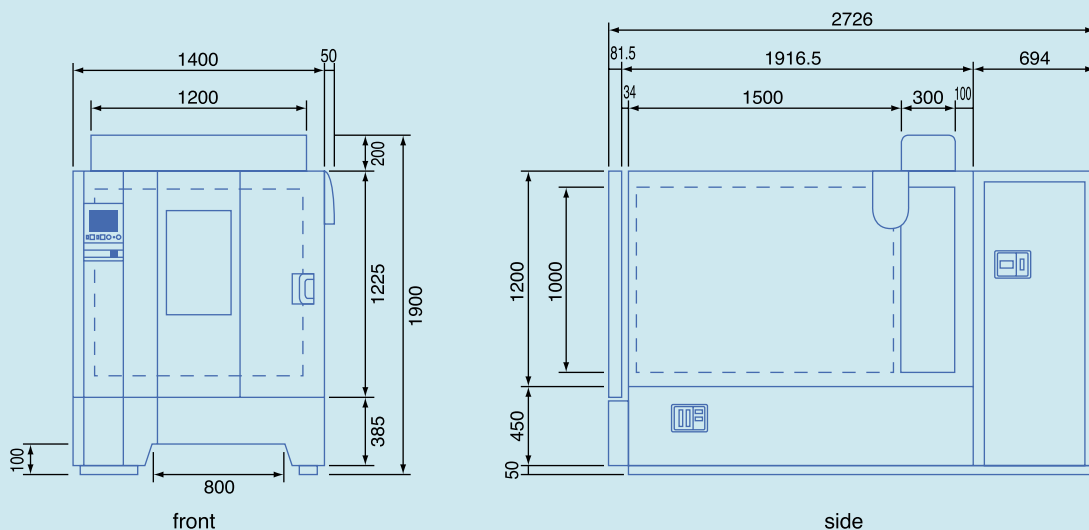
G : - 70

DIMENSIONS

unit : mm



upside



front

side

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
 Air circulator temperature switch
 Control circuit overload and short circuit protection fuse
 Electric parts compartment panel switch
 Refrigerator high 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)

OPTIONS

Paperless recorder

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

[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)

Language: English

* Settings may be modified.

[Temperature and humidity type]

Temperature range: - 100 ~ + 200

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 card (32MB)

Language: English

* Settings may be modified.



Paperless recorder

Temperature recorder (digital)

• RJ25 - 100 to + 200 6 dots

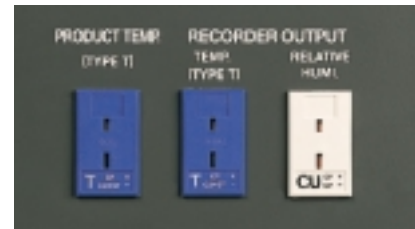
Temperature and humidity recorder (digital)

• RJ15 - 100 to + 200 /0 to 100%rh
6 dots

Connecting terminal for temp and humid recorder

Output terminals for chamber temperature and humidity.

*Cannot be installed in conjunction with a recorder



Connecting terminal for temp and humid recorder

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 board 1
- Connecting position:
Right side of the main unit (front)
- Accessories:
Thermocouple, Type T 1
(0.32mm, 6m)
Connector 1



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 put corrosive substances in the chamber. If a specimen or humidifying water emitting corrosive elements is used with the device, the cooler section in particular may become corroded, eventually leading to a shorter period of resistance to product corrosion. Stainless steel evaporators designed to protect corrosion resistance are available for optional purchase.

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

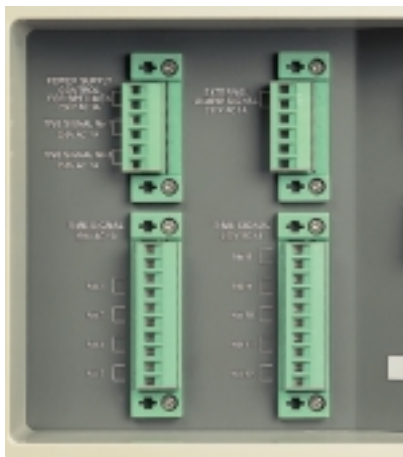


Be sure to read the instruction manual before operation.

OPTIONS

Expansion of relay contacts

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



External alarm terminal

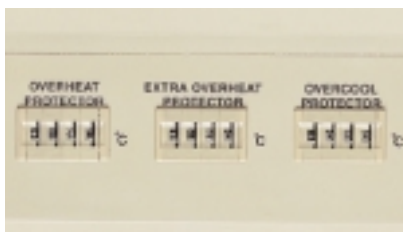
If the safety device of the chamber activates, the alarm is notified to a distance via the external alarm terminal.

Emergency stop switch

Stops the chamber immediately.

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.



Overheat and overcool protector

Overcool protector

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

Integrating hour meter with reset

This integrating hour meter can be reset if necessary.
(Added to the integrating hour meter of standard device)



Integrating hour meter with reset

Water supplier

Water supply circuit to supply pure water for humidification.

Defrost circuit

Quickly defrosts the refrigeration circuit (dehumidifier).

Frost-free circuit

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

Shelf, Shelf bracket

Standard specification shelves and shelf brackets are added as required.

Fixture for securing body

Fastens the equipment on the floor surface with bolts.

Cable port

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

*Equipped with rubber plug.

Cable port rubber plug

The additional silicon sponge rubber port plug.

Communication functions

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

- 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

Thermocouple

Thermocouple measures the temperature of specimens.

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

Power cord

- 5, 10m (200, 220VAC only)

*The chamber does not come with a power cable.

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JIS Q 9001:2000
Registration Number
JSAQ 004



JAB Certificate Number
R001



RE 009



051

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 9001:2000 (JIS Q 9001:2000) through the Japanese Standards Association (JSA).

ISO 14001 (JIS Q 14001)

Environmental Management System Assessed and Registered

ESPEC GROUP

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ESPEC ENGINEERING CORP.

ESPEC KANSAI CORP.

ESPEC ENVIRONMENTAL TEST

TECHNOLOGY CENTER CORP.

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