THERMOTRON

S SERIES TEMPERATURE-HUMIDITY TEST CHAMBERS

Note: Data Sheet for Reference Only - Actual Chamber will vary depending on Model Year, Controls, Options, and Individual Configuration

- **Seven standard models**
- **Standard sizes available in 4, 8, 16, and 32 Ft^3**
- **Humidity range from 20% RH to 95% RH**
- **Maximum temperature ranges from −90°F to +350°F (−67.8°C to +177°C)**
- **Nationwide field services**
- **Immediate operation with suitable power connection**

- **Many standard features include:**
- **Programmable temperature/ humidity controller with digital displays.**
- **Six-pane thermal window with wiper**
- **Interior light**
- **Cascade refrigeration**
- **Stainless steel access port with thermal plug**
- **Casters**
- **One year limited warranty**

Cabinet

- The entire chamber is built of high-quality steel. No wood, fiberboard, plastic or similar materials are used in the construction.
- The interior is constructed of 304 Series, high-nickel content stainless steel with 2B finish. The liner is heliarc welded for hermetic sealing to prevent moisture migration to insulation space.
- The exterior shell is constructed of die-formed, 16 gauge galvaneal, then finished in "Thermotron Blue" lacquer, Federal Standard #595-25184, sprayed over a cleaned and primed surface.
- A floating liner allows minimum thermal contact between the interior and the exterior of the chamber.
- Breaker strips are all stainless steel.
- Nonsettling insulation has a low "K" factor of .26. It is capable of being exposed to temperatures in excess of +350°F (+177°C).
- Gaskets are extruded, designed to be used with seamless corners. two separate gaskets are installed to insure minimum heat loss from the chamber—a silicone inner gasket and a vinyl outer gasket.
- The circular motor is located outside the chamber. It has a solid stainless steel shaft; no extensions are used. Ball bearings are lubricated for life and located out of the conditioned area.
- A hinged instrument panel makes service and calibration easier.
- All hardware is adjustable.

Instrumentation

- Fully programmable single mode controller with proportional-integral algorithm for time proportioned output.
- Chamber operation via manual setpoint mode or previously entered program.
- Two independently programmable channels for temperature and humidity.
- Input and indication of temperature in °C, please specify if °F is required, humidity in % RH.
- 10 character alphanumeric display, 4 digit numeric display, and 10 chamber status indicators.
- Internal RAM storage for up to 10 programs with full program review, edit, expand, and delete capabilities.
- Program entry by response to English language prompts via 23 character keypad.
- Setpoint and display resolution of 1°C or F and 1% RH, typical measuring accuracy 0.25% of span.
- Other features include software calibration, alarm and event outputs, lithium battery backup, keyboard lockout and timed soak.

Electrical System

- The chamber has a solid state, photo-isolated, zero-voltage-switching, heat-power relay.
- All wires are identified.
- The chamber has a fusible link for heater cut off which trips at 460°F (+238°C). Product safety devices are also available as options.
- All motor electrical components, switches, and fuses are located in a self-contained panel.
- All components are fused.
- Channel wiring is contained in "panel channel" and is accessible without completely unlacing or unthreading any wires.
- Master heat and humidity heat contactors are provided.
- A step-down transformer provides 115 volts for the control circuit.
- Identification tabs are provided on pilot lights and switches for all major circuits.
- Wiring meets the national electrical code.

Refrigeration System

- Our refrigeration system has all silphosed or silver soldered joints—no soft solder is used.
- The system is air cooled and capable of starting under various ambient conditions.
- The condensers are manufactured by us to insure that they will meet our exacting standards.
- Cooling coils are heavy-duty copper tubing with specially designed aluminum fins.
- The condenser and vapor tank are ASME certified.
- The system is sealed and balanced to achieve the ultimate performance and reliability.
- Standard Refrigerants 13 and 502 are used. They are available at any refrigeration supply house.

(continued on page 4)

Thermotron S Series Temperature/Humidity Test Chamber Performance

THERMOTRON MODEL NUMBER	SM-4S	SM-8S	SM-8C	SM-16S	SM-16C	SM-32S	SM-32C
TEMP PULL DOWN FROM +75°F (+23°C) AMBIENT WITHOUT LOAD	MINUTES	MINUTES	MINUTES	MINUTES	MINUTES	MINUTES	MINUTES
−20°F (−28.9°C)	50	50	—	40	—	60	—
−40°F (−40°C)	—	—	25	—	20	—	20
−65°F (−53.9°C)	—	—	40	—	30	—	65
−90°F (−67°C)	—	—	60	—	60	—	90
TEMP HEAT-UP FROM +75°F (+23°C) AMBIENT WITHOUT LOAD							
+200°F (+93.3°C)	18	18	18	20	20	25	25
+350°F (+177°C)	30	30	30	55	55	60	60
CAPACITY FOR HOLDING LIVE LOAD	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS	WATTS
0°F (−17.8°C)	200	200	550	1000	1000	800	1000
−20°F (−28.9°C)	50	50		800	—	600	
−40°F (−40°C)	—	—	350	—	700	—	700
−65°F (−53.9°C)	—	—	200	—	400	—	400
95% RH	200	200	200	400	400	400	400
50% RH	500	500	500	750	750	750	750

Performance:

Performance is based upon operation at 60 hz and 75°F (23.9°C) ambient air and may vary slightly at other ambient temperatures. Chambers are designed for use under normal laboratory conditions. For other applications, please consult factory.

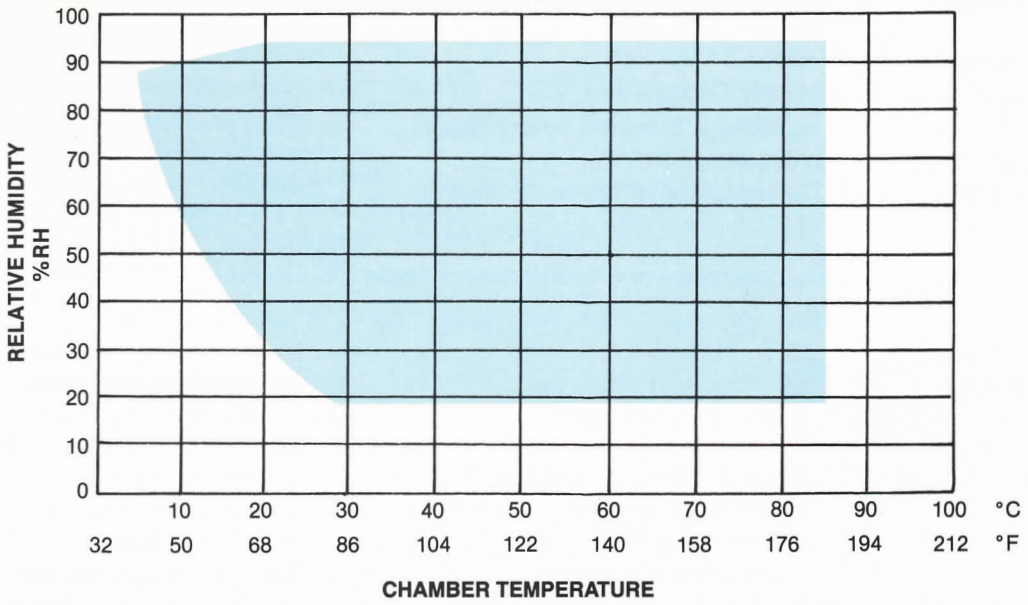
Humidity performance meets most MIL-STD test specifications. Additional humidity conditions available on request.

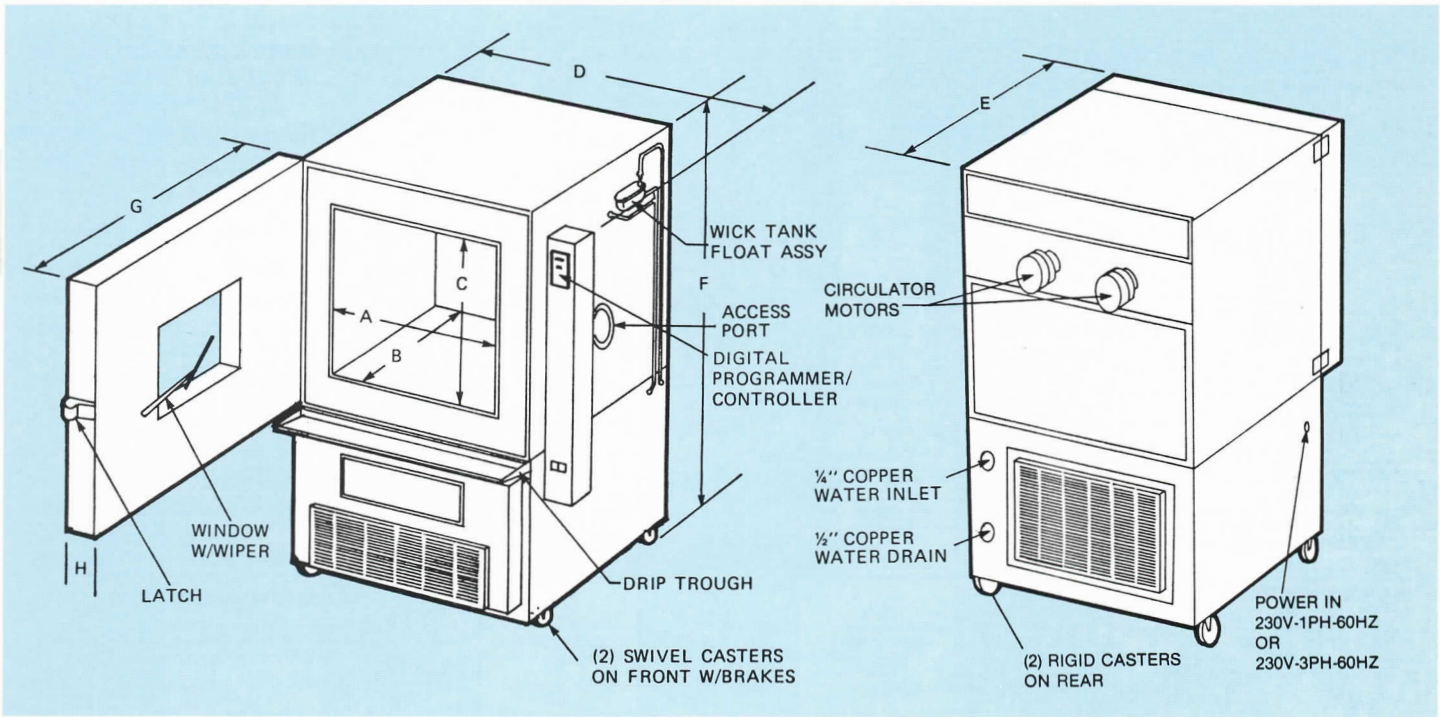
Temperature Control:

The chamber conditioning and circulating equipment enables a temperature stability within ±2°F dry bulb and wet bulb temperatures from control point after stabilization at the control sensor.

Humidity Range: 20% to 95%: See chart below for exact conditions possible.

CHART MB-2





THERMOTRON MODEL NUMBER	WORKSPACE DIMENSIONS			OVERALL CHAMBERS MOVE-IN DIMENSIONS			DOOR DIMENSIONS	
	(A) WIDE IN/CM	(B) DEEP IN/CM	(C) HIGH IN/CM	(D) WIDE IN/CM	(E) DEEP IN/CM	(F) HIGH IN/CM	(G) WIDE IN/CM	(H) THICK IN/CM
SM-4	20 / 51	20 / 51	20 / 51	34 / 87	41 / 103	67 / 169	28 / 71	4 / 10
SM-8	24 / 61	24 / 61	24 / 61	38 / 96	45 / 113	71 / 180	32 / 81	4 / 10
SM-16	30 / 76	30 / 76	30 / 76	48 / 122	56 / 142	78 / 198	42 / 107	6 / 15
SM-32	38 / 96	38 / 96	38 / 96	56 / 143	67 / 162	87 / 221	50 / 127	6 / 15

- The liquid-injection circuit cools the compressor to insure long compressor life.

Safety Features

- Overload protection is inherent, preventing the compressors from exceeding specification limits.
- Over temperature runaway protection provided by way of a fusible link which trips at +460°F (+238°C).
- All machinery is enclosed for personnel safety.
- A fan guard prevents contacts with the circulator fan.

Humidify/Dehumidify

- Humidity is provided by our vapor pressure generator.
- Dehumidification is provided by the refrigeration system with a direct expansion coil.
- Continuously balanced, noncycling operation of the refrigeration compressor assures long component life and precision humidity control.
- When you only require temperature cycling, the humidity system switch can disable the total humidity generating system.

Specifications subject to change.

Thermotron S Series Temperature/Humidity Test Chamber Specifications

THERMOTRON MODEL NUMBER		SM-4S	SM-8S	SM-8C	SM-16S	SM-16C	SM-32S	SM-32C
WORKSPACE	LITERS	113	226	226	453	453	906	906
VOLUME	CU. FT.	4	8	8	16	16	32	32
VOLTAGE ± 5% (1 OR 3 PHASE Specify)					230/1/60 CYCLE OR 230/3/60 CYCLE			
RECOMMENDED MINIMUM SERVICE	1PH	30	30	40	60	60	60	60
AMPS AT 230 VOLTS	3PH	25	25	35	45	45	45	45
TEMPERATURE	°F	−20 to +350	−20 to +350	−90 to +350	−20 to +350	−90 to +350	−20 to +350	−90 to +350
RANGE	°C	−28.9 to +177	−28.9 to +177	−67.8 to +177	−28.9 to +177	−67.8 to +177	−28.9 to +177	−67.8 to +177
APPROX.	LB.	700	800	875	1370	1395	1850	1875
SHIPPING WEIGHT	KG.	317	363	397	621	633	839	850
CHAMBER HEATER WATTAGE (KW)		2	2	2	3.5	3.5	3.5	3.5
COMPRESSOR SIZE		(1) 1 HP SINGLE STAGE SYSTEM	(1) 1 HP SINGLE STAGE SYSTEM	(2) 1 HP CASCADE SYSTEM	(1) 2 HP SINGLE STAGE SYSTEM	(2) 2 HP CASCADE SYSTEM	(1) 2 HP SINGLE STAGE SYSTEM	(2) 2 HP CASCADE SYSTEM
CIRCULATOR MOTOR		(1) 1/15 HP 3000 RPM	(1) 1/15 HP 3000 RPM	(1) 1/15 HP 3000 RPM	(2) 1/15 HP 3000 RPM	(2) 1/15 HP 3000 RPM	(2) 1/15 HP 3000 RPM	(2) 1/15 HP 3000 RPM
CASTERS		(2) 3" Rigid (2) 3" Sw/Brakes	(2) 3" Rigid (2) 3" Sw/Brakes	(2) 3" Rigid (2) 3" Sw/Brakes	(2) 4" Rigid (2) 4" Sw/Brakes	(2) 4" Rigid (2) 4" Sw/Brakes	(2) 4" Rigid (2) 4" Sw/Brakes	(2) 4" Rigid (2) 4" Sw/Brakes
WINDOW	IN	12x12	12x12	12x12	20x20	20x20	20x20	20x20
	CM	30x30	30x30	30x30	51x51	51x51	51x51	51x51
ACCESS PORT		(1) 2" RIGHT SIDE	(1) 2" RIGHT SIDE	(1) 2" RIGHT SIDE	(1) 4" RIGHT SIDE	(1) 4" RIGHT SIDE	(1) 6" RIGHT SIDE	(1) 6" RIGHT SIDE
HUMIDITY HEATER WATTAGE (KW)		1.5	1.5	1.5	4.5	4.5	4.5	4.5
*HUMIDITY RANGE		20% to 95%	20% to 95%	20% to 95%	20% to 95%	20% to 95%	20% to 95%	20% to 95%
**HUMIDITY	GPH	½	½	½	1	1	1	1
WATER	LPH	1.9	1.9	1.9	3.8	3.8	3.8	3.8

*With dry bulb range of +40°F to + 185°F (4.4°C to +85°C) as limited by +40°F + (4.4°C) dewpoint.

See chart MB-2 for exact conditions possible.

**NOTE: The humidity system requires water that is neither scale forming, corrosive, nor super pure. Water with a specific resistance in the range of 50,000 to 200,000 OHMS/CM should be used. Therefore, we strongly recommend using the optional water demineralizer to be used with tap water. Water consumption is based on operating at full capacity.

Chamber Options

1. Demineralizer
2. Refrigeration Gauges
3. Electrical Disconnect Switch
4. Access Ports w/Plugs (Additional or substituted for standard)
5. Glove Ports
6. Recirculating System
7. Shelving
8. Transformer Packages (for other than 230 volt power)
9. LN_2 Injection System
10. CO_2 Injection System
11. GN_2 Purge

Programmer/Controller Options

1. Multi-Option Board, including:
   - —Digital Printer Output
   - —Real Time Clock
   - —Analog Output for Recording
2. Relay Output Board with 4 Relays
3. IEEE-488 or RS-232 Computer Interface
4. Memodyne Printer

Instrumentation Options

1. Adjustable Hi/Low Temp Limits
2. Circular Chart Recorders.

(The addition of accessories may impact performance.)

Form No. TI5-022 3/88 Printed In U.S.A.