

**THERMOTRON**<sup>®</sup>

COMBINED ENVIRONMENT TEST CHAMBERS

Proven Performance and Versatility.



### High Performance Product Testing

Thermotron combined environment test chambers, also known as AGREE Chambers, provide the flexibility to adapt to your changing test requirements. The chambers, available in temperature or temperature/humidity configurations, can be integrated with a Thermotron electrodynamic or repetitive shock shaker. The versatility of the chambers can be further enhanced with the addition of double doors, vertical lift or sliding doors, adjustable height, or floor plug cart assemblies. Standard temperature transition rates of 5°C per minute up to 30°C per minute are available. Faster change rates can be achieved using LN<sub>2</sub> or CO<sub>2</sub> boost or multiple refrigeration machine sections. Thermotron combined environment test chambers incorporate proven performance and versatility to meet or exceed your testing needs.



With our extensive experience and capabilities, Thermotron can also provide:

- Turn-key system integration for single head and multi-head testing requirements utilizing either custom or commercially-off-the-shelf (COTS) instrumentation.
- Stimulus and monitoring capabilities for data acquisition, functional and parametric testing applications.
- Specialized software for system configuration, communication, control and reporting.
- Environmentally, mechanically and electrically robust solutions for uninterrupted testing.
- Control and monitoring for power cycling and voltage margining requirements.
- Reliable product fixturing with minimum mass and superior airflow.
- Dependable test system interconnect wiring.

### 8800 Touch Screen Programmer Controller

With a brilliant 12" color touch screen display, the powerful 8800 Programmer Controller is *Thermotrak II™* and *Direct Link* ready, making operations and data collection easier and more reliable than ever before. Our controller has a Windows look and feel to support familiar and robust operations. The 8800 is ethernet-compatible and web-enabled with an Internet-ready front end for virtual anytime/anywhere access. The 8800 can be easily retrofitted on-site to existing chambers.



The 8800 has an extensive multi-level, password-based security system that protects sensitive data and generates tamper-proof data print outs. A real-time system schematic displays actual refrigeration temperatures and pressures, simplifying trouble shooting and maintenance. The Digital Refrigeration Control provides consistently repeatable test results.

### Vibration Integration

In addition to the extensive line of Temperature Cycling Chambers, Thermotron also manufactures a wide variety of repetitive shock and electrodynamic shakers. These units can be purchased with the AGREE chamber, or be added later as your testing requirements evolve.



### Interface with ECA's and Liquid Chillers

If your test product requires forced air cooling or liquid cooling, Thermotron can provide test equipment to simulate air flow and temperature conditions encountered in actual service. Precise profile programming and control of coolant temperature and flow is provided through the 8800 Programmer Controller. Thermotron has over forty years experience designing and building equipment cooling air (ECA) units and liquid chillers (LCH).

## AGREE Chamber Features and Benefits

### ■ Thermotron-Patented Cascade Refrigeration System

Simplifies chamber maintenance and maximizes performance.

### ■ Brilliant 12" Color Touch Screen Display

Thermotron's 8800 Programmer Controller offers the largest LCD color display on the market, for easy touch screen entry and increased data access on a single display.

### ■ Removable Chamber Floor Design

Allows for interface with electrodynamic, repetitive shock or mechanical vibration systems as well as roll-in carts and solid floor plug assemblies.

### ■ 5°C/Min to 30°C/Min Thermal Change Rates

Provides a high stress environment to help identify potential product weaknesses and reduce test cycle times.

### ■ Full Range Humidity Capability

20% to 95% RH allows testing which can identify corrosion, contamination and moisture susceptibility of products.

### ■ Lighted, Heat-Tempered, Multi-Pane Window

Ergonomic location provides high visibility of products being tested. Fogging and moisture build-up is reduced.

### ■ Microprocessor-Based Dynamic Systems Monitor

Actively monitors the chamber's operating systems, and automatically restarts the chamber after power failures which means less downtime.

### ■ Accurate

Digital Refrigeration Control provides consistently repeatable test results. Improved gradient control for tighter uniformity means greater accuracy.

### ■ Productivity

Our unique product temperature control software optimizes chamber performance based upon the actual conditions the product is experiencing.

### ■ Safety Controls

Thermotron's Therm-Alarm™ protects against temperature extremes. Built-in self diagnostics continually monitor operating systems, tracing problems before they occur and reducing troubleshooting time. A UL listed power panel ensures high-quality safety, design and peace of mind.

### ■ Customized Solutions

Thermotron Combined Environment Chambers can be customized in many ways. Let us put our design experience and

customization capabilities to work to meet your individual testing needs.

### ■ Service After the Sale

Our Combined Environment Chambers include a comprehensive service and support program to protect your investment throughout the life of your chamber. Thermotron's warranty backs every chamber sold, lowering the ongoing cost of ownership.

## Additional Options / Benefits

- Dry Air Purge to reduce moisture condensation on product.
- Cable notch for quick product interconnect.
- Liquid Nitrogen for increased performance.
- Refrigeration Quiet Package to reduce compressor noise level.
- Vibration Sound Deadening to reduce shaker noise level.
- Air Cooled Condenser for facilities where water is not available.
- Electrical Disconnect may be necessary to meet local electrical codes.
- CSA Electrical Compliance for Canadian applications.
- CE Mark for European applications.
- Chart Recorder for hard copy documentation.
- Custom Sizes to meet any test needs.
- Vertical lift or sliding doors.
- AGREE Chambers can be configured to move up & down and/or back & forth.
- Electrodynamic Shaker Interface for mission profile or real world testing.
- RS Repetitive Shaker interface for HALT testing.

## Multiple Environment Testing Applications

- Solder Joint Reliability.
- High Performance Testing and Screening for aerospace, automotive, communications, defense, and electronics applications.
- Combined Environment Reliability Test.
- AGREE Mission Profile.
- Key Life Testing.
- Multiple Environment Over Stress Test (MEOST).

## TEMPERATURE AND VIBRATION TESTING

Model	Interior Dimensions W x D x H Inches / Centimeters	Volume Cubic Feet / Liters	Air Change Rates with lbs of Aluminum +71°C to -54°C (+160°F to -65°F)	Recommended Minimum Service @ 460/3/60 *	Shipping Weight lbs / kg	Window Size inches / centimeters
F-12-CHV-5-5	28 x 28 x 30 71 x 71 x 76	12 / 340	6°C / min 100 lbs.	30 amps	2,375 / 1,078	20 x 20 / 51 x 51
F-32-CHV-705-705	40 x 40 x 36 102 x 102 x 91	32 / 906	6°C / min 200 lbs.	60 amps	4,000 / 1,815	20 x 20 / 51 x 51
F-32-CHV-15-15	40 x 40 x 36 102 x 102 x 91	32 / 906	13°C / min 200 lbs.	100 amps	4,300 / 1,951	20 x 20 / 51 x 51
RA-32-CHV-25-25	40 x 40 x 36 102 x 102 x 91	32 / 906	18°C / min 200 lbs.	150 amps	4,375 / 1,985	20 x 20 / 51 x 51
SA-36-CHV-30-30	42 x 42 x 36 107 x 107 x 91	36 / 1,040	30°C / min 250 lbs.	175 amps	4,500 / 2,042	20 x 20 / 51 x 51
F-42-CHV-25-25	54 x 38 x 36 137 x 96 x 91	42 / 1,189	15°C / min 200 lbs.	150 amps	4,450 / 2,019	24 x 24 / 61 x 61
RA-42-CHV-30-30	54 x 38 x 36 137 x 96 x 91	42 / 1,189	20°C / min 250 lbs.	175 amps	4,600 / 2,087	24 x 24 / 61 x 61
F-62-CHV-25-25	54 x 54 x 36 137 x 137 x 91	62 / 1,756	12°C / min 300 lbs.	150 amps	4,500 / 2,042	24 x 24 / 61 x 61
RA-70-CHV-30-30	54 x 54 x 42 137 x 137 x 107	70 / 2,011	13°C / min 300 lbs.	175 amps	5,150 / 2,337	24 x 24 / 61 x 61
F-82-CHV-25-25	54 x 54 x 48 137 x 137 x 122	82 / 2,322	9°C / min 400 lbs.	150 amps	5,000 / 2,269	24 x 24 / 61 x 61
F-110-CHV-30-30	72 x 54 x 48 183 x 137 x 122	110 / 3,117	7°C / min 500 lbs.	175 amps	7,000 / 3,176	2 @ 20 x 20 / 2 @ 51 x 51
F-117-CHV-30-30	78 x 54 x 48 198 x 137 x 122	117 / 3,313	7°C / min 500 lbs.	175 amps	7,500 / 3,403	2 @ 20 x 20 / 2 @ 51 x 51
F-144-CHV-30-30	72 x 72 x 48 183 x 183 x 122	144 / 4,078	6°C / min 600 lbs.	175 amps	9,300 / 4,220	2 @ 20 x 20 / 2 @ 51 x 51

## TEMPERATURE/HUMIDITY AND VIBRATION TESTING

F-16-CHMV-5-5	28 x 28 x 36 71 x 71 x 91	16 / 453	5°C / min 50 lbs.	40 amps	2,375 / 1,078	20 x 20 / 51 x 51
F-40-CHMV-705-705-2	40 x 40 x 44 102 x 102 x 112	40 / 1,132	5°C / min 100 lbs.	70 amps	4,000 / 1,815	20 x 20 / 51 x 51
F-40-CHMV-15-15-2	40 x 40 x 44 102 x 102 x 112	40 / 1,132	5°C / min 400 lbs.	125 amps	4,300 / 1,951	20 x 20 / 51 x 51
F-40-CHMV-25-25-2	40 x 40 x 44 102 x 102 x 112	40 / 1,132	10°C / min 250 lbs.	150 amps	4,375 / 1,985	20 x 20 / 51 x 51
F-52-CHMV-705-705-2	54 x 38 x 44 137 x 96 x 112	52 / 1,473	5°C / min 50 lbs.	70 amps	4,075 / 1,848	24 x 24 / 61 x 61
F-52-CHMV-25-25-2	54 x 38 x 44 137 x 96 x 112	52 / 1,473	5°C / min 400 lbs.	150 amps	4,450 / 2,019	24 x 24 / 61 x 61
F-74-CHMV-25-25-2	54 x 54 x 44 137 x 137 x 112	74 / 2,096	5°C / min 400 lbs.	150 amps	4,500 / 2,042	24 x 24 / 61 x 61
F-94-CHMV-25-25-2	54 x 54 x 56 137 x 137 x 142	94 / 2,662	5°C / min 350 lbs.	150 amps	5,000 / 2,269	24 x 24 / 61 x 61
F-126-CHMV-25-25-3	72 x 54 x 56 183 x 137 x 142	126 / 3,568	5°C / min 300 lbs.	150 amps	7,000 / 3,176	2 @ 20 x 20 / 2 @ 51 x 51
F-136-CHMV-25-25-3	78 x 54 x 56 197 x 137 x 142	136 / 3,852	5°C / min 300 lbs.	150 amps	7,500 / 3,403	2 @ 20 x 20 / 2 @ 51 x 51
F-168-CHMV-25-25-3	72 x 72 x 56 183 x 183 x 142	168 / 4,758	5°C / min 250 lbs.	150 amps	9,300 / 4,220	2 @ 20 x 20 / 2 @ 51 x 51

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\* Other voltages are available.

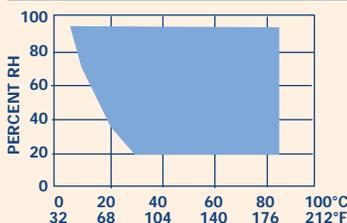
Performance is based upon 60 Hz and 23.9°C (75°F) ambient air, and may vary slightly at other ambient temperatures. Chambers are designed for use under normal operating conditions. For other applications, please consult Thermotron.

The addition of accessories may impact performance. Certain options may increase move-in dimensions. Contact Thermotron if dimensions are critical.

Special order options are available, please check with Thermotron.

Specifications subject to change.

### AGREE SERIES HUMIDITY RANGE



STANDARD HUMIDITY RANGE

### FULL RANGE HUMIDITY SPECIFICATIONS

Humidity Range <sup>1</sup>	20% to 95% RH
Dry Bulb Temperature Range	4.4°C to 85°C (40°F to 185°F)
Dewpoint Temperature Range	4.4°C to 85°C (40°F to 185°F)
Humidity Control <sup>2</sup>	±2.5% RH
Humidity Uniformity <sup>3</sup>	±1.0% RH

<sup>1</sup> Limited by a +4.4°C (+40°F) minimum dew point temperature and a maximum dry bulb temperature of +85°C (+185°F).

<sup>2</sup> At a dry bulb temperature above +20°C (+68°F).

<sup>3</sup> Based upon temperature uniformity specifications.

Relative humidity indication at or near the physical limits may be affected by sensor accuracy and control tolerance. An optional humidity package can be added for applications requiring humidity levels lower than those covered by the full range humidity system.