THERMOTRON®

SE-Series Environmental Test Chambers

Taking Environmental Product Testing to the Next Level

Thoroughly testing products prior to consumer use is vital to the success of your business. Thermotron's SE-Series Chambers expose products to a variety of temperatures and humidity levels, offering a complete and comprehensive way to improve product reliability.

SE-Series

SE-Series Chambers provide accurate and reliable test results. With more standard features and better performance capabilities than comparable chambers on the market, SE-Series Chambers improve products through dynamic testing solutions.

SE-Series Chamber Advantages

Variety of Sizes
SE-Series Chamber workspaces range from 300 to 3,300 liters to accommodate many product sizes.

Diverse Compressor Sizes
By utilizing high-performance compressors in multiple size configurations, SE-Series Chambers can achieve the change rates you require. Thermotron offers cascade (two compressors) and single-stage (one compressor) chamber models.

Superior, Optimized Airflow
Direct airflow over the product under test improves product temperature change rates, helping achieve superior testing results.

Product Monitoring
Thermotron offers multiple features that assist in monitoring the product under test to maximize test results, including innovative data acquisition and Product Temperature Control.

Unparalleled Control System
The 8800 Controller is standard on all SE-Series Chamber models. The controller is intuitive, robust, and secure. The controller's hardware and software are designed in-house specifically for environmental testing.

Humidity System
The patented, modular humidity system provides a wide range of humidity conditions. Its modular design allows for future upgrades of temperature-only SE-Series Chambers.

Custom Solutions
Can't find an SE-Series Chamber to match your exact testing requirement? Thermotron provides custom chambers to meet individual size or performance needs.

Features

Heated, centered window reduces condensation.

The **8800 Controller** is secure and easy to use.

The **Serial Communication Panel** provides computer and network connections.

A full-range **Humidity System*** reaches dewpoints between -10°C and 87°C.

SE-600

The **Universal Port*** diversifies test lab utilization.

Access Port size and location are user selectable.

The **Data Acquisition Panel (DAQ)** collects and monitors data.

High-Performance Compressors rapidly cool the chamber.

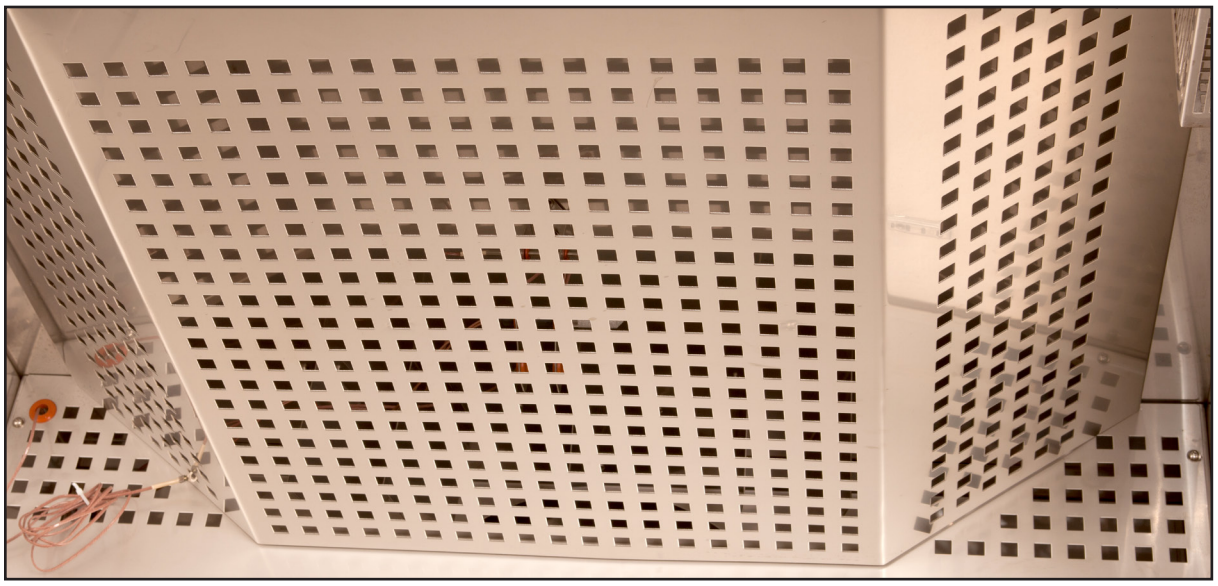
Leveling Pads and Casters facilitate mobility of the chamber.

Inside the Workspace

- With a **4" thick door and 4.5" thick walls**, the chamber is well insulated and stays cool to the touch, protecting the user.
- The **Product Temperature Control (PTC) thermocouple** attaches to the product under test to control and monitor its temperature.
- **Interior lights** illuminate the workspace during a test and while the door is open.
- An advanced **air baffle** design forces air directly over the product for better temperature change rates.
- The **electronic humidity sensor** eliminates the need for thermocouple wicks, producing more repeatable, dependable humidity tests with less downtime.
- The 8800 Controller is configured with a **thermocouple** to control the chamber's heating and cooling systems.

*patented, optional

Enhanced Performance



The air baffle forces airflow directly on the product under test, improving product temperature change rates and workspace conditioning.

Superior Airflow

Maximizing airflow in the workspace is critical to a successful test. Thermotron's innovative air baffle is designed to evenly distribute air directly over the product*. The forceful, direct airflow ensures the entire product is conditioned.

Superior airflow enhances product temperature change rates, tightens temperature gradients, and improves uniformity throughout the chamber's entire workspace. Test repeatability and consistent, accurate results are just two benefits the air baffle provides.

SE-300

Boost Cooling and Heating

Additional features that enhance SE-Series Chambers' cooling and heating performance are:

LN_2 Boost and CO_2 Boost
Liquid nitrogen (LN_2) boost and carbon dioxide (CO_2) boost are cooling injection systems that enable faster pull-downs and dissipation of heat from the product under test.

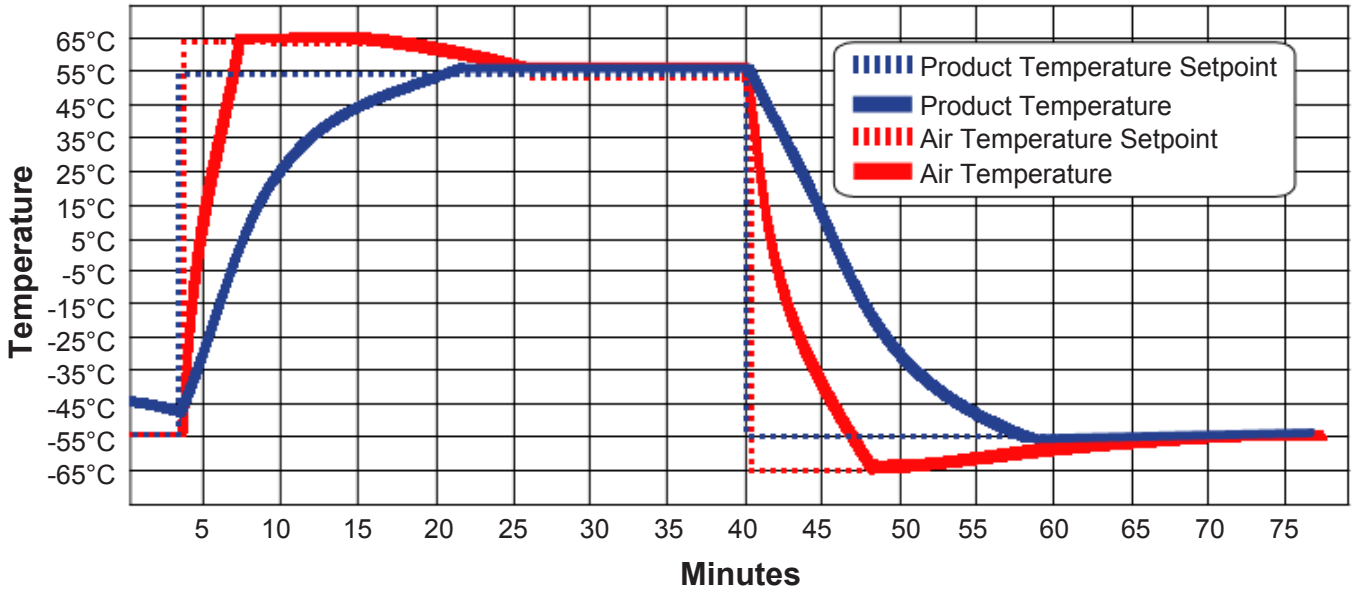
Extra Heat
Adding the extra heat feature to your chamber accelerates the chamber's heating capabilities to improve air and product temperature change rates.

Power Saver

The Power Saver mode works with the 8800 Controller to determine whether to run in single-stage or cascade mode, depending on temperature setpoint and cooling throttle. If the setpoint is lower than -20°C or the throttle is more than 80%, the controller will switch the chamber to cascade mode. If the setpoint is above -20°C, and the throttle is less than -10%, the system will switch to Power Saver single-stage mode. When running in single-stage mode, the chamber decreases the amount of energy needed to run, reducing energy costs.

**in chambers with a workspace width less than 48"*

Product Temperature Control



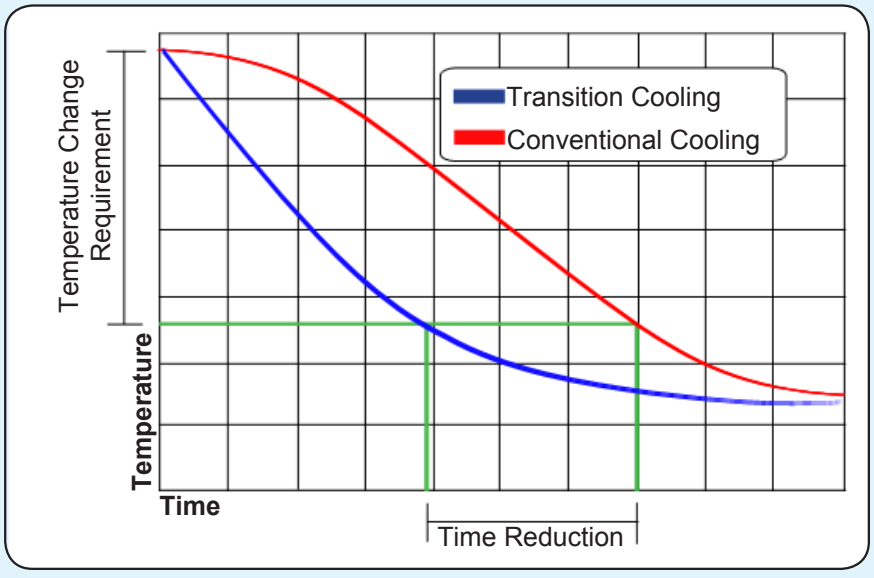
Product Temperature Control (PTC) is a software and thermocouple system used to increase product temperature ramp rates with user-defined temperature offsets. This feature is set up and controlled through the 8800 Controller.

During conventional environmental testing, the workspace air temperature setpoint is achieved before the product temperature reaches it. The product temperature will lag behind and approach the air temperature at an exponentially decreasing rate. PTC reduces product ramp times by up to 50% by over-driving the chamber's conditioning system until the product temperature achieves the desired setpoint.

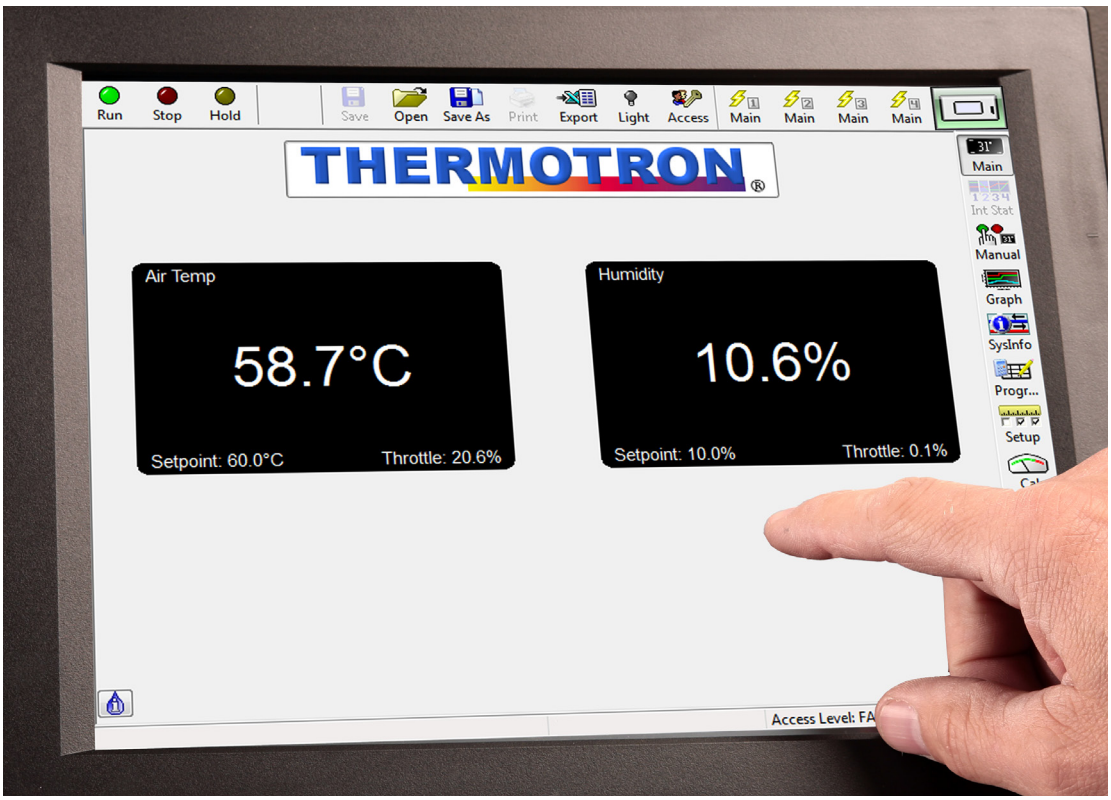
In the above example, the workspace air temperature reaches 65°C and holds until the desired product temperature setpoint of 55°C is achieved. Once the product temperature approaches the setpoint, the air temperature converges with the product temperature so both are at 55°C. This ensures accurate test results for your product during environmental testing. PTC works for both heating and cooling.

Transition Cooling

This innovative feature boosts performance and reduces chamber energy consumption. Single-stage refrigeration systems perform best in higher temperature ranges, while cascade refrigeration systems perform best in lower temperature ranges. Transition Cooling combines the benefits of both systems. With a sophisticated control logic that enables the refrigeration system to switch from single-stage at high temperature to cascade operation at low temperature, the Transition Cooling feature speeds ramp times up to 30% while reducing power consumption.



8800 Controller



Intuitive, Robust, Secure.

Thermotron's exclusive Windows®-based 8800 Controller makes chamber operation and data collection easy and reliable on a 12" color touchscreen. Quick navigation buttons provide shortcuts to user-selected screens. The 8800 Controller is standard on all SE-Series Chambers.

Multi-level, password-based security system protects data.

Download test data to common spreadsheet formats.

ThermoTrak II™ connects up to 32 controllers to one PC.

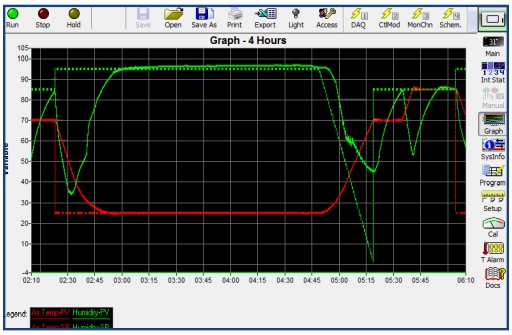
Activity Log records and retains 10+ years of chamber history.

Product Temperature Control improves product change rates by over-compensating the air temperature to control the product temperature.

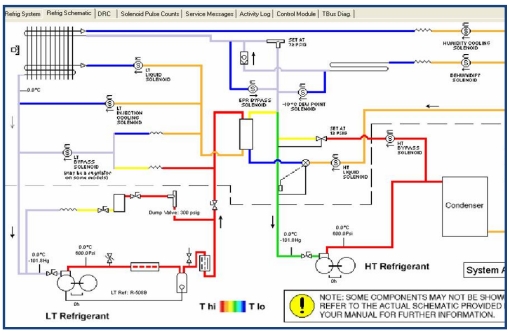
Data Acquisition (DAQ) monitors and controls products while providing additional thermocouple monitoring.

The System Monitor detects excessive refrigeration pressures and temperatures and notifies users when problems occur.

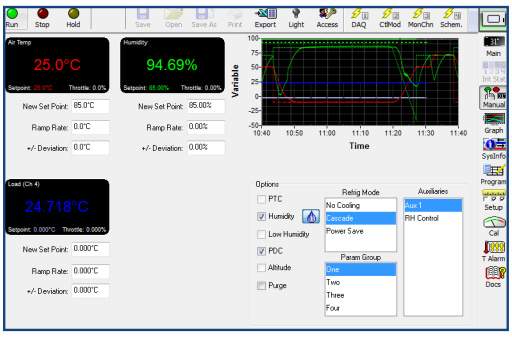
The optional Product Dewpoint Control prevents condensation by maintaining the product at a higher temperature than the dewpoint of the surrounding air.



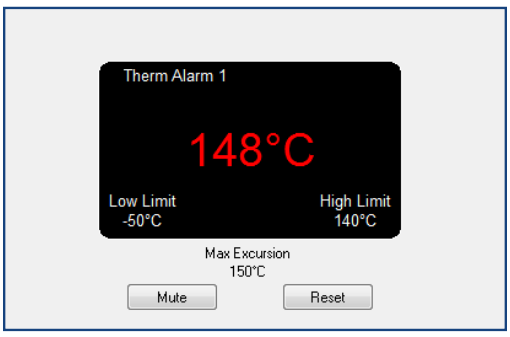
Graphing Screen expands capabilities with enhanced test monitoring and reporting.



Refrigeration Schematic Screen assists with electronic refrigeration monitoring and troubleshooting.



Program Entry allows users to load, view, and edit profiles manually or with step-by-step assistance.

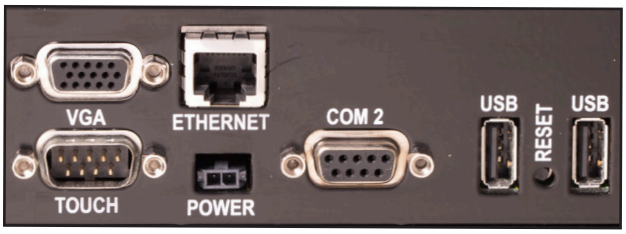


Therm-Alarm® prevents temperatures from exceeding user-defined limits.

Additional Optional Features

- ► The **Universal Port**, located in the side wall of a SE-Series Chamber, diversifies test lab utilization.
- ► The **AST Module** is a Universal Port accessory that turns a SE-Series Chamber into a HALT chamber.
- ► A **remote conditioning blower** delivers conditioned air from the chamber to a remote enclosure.
- ► The **extra heat** feature accelerates the chamber's heating capabilities in order to improve air and product temperature change rates.
- ► **Liquid nitrogen (LN_2) boost** enables faster temperature pull-downs and provides back-up cooling in the unlikely event of a mechanical refrigeration failure.
- ► **Extended temperature range** increases chamber performance to 232°C.
- ► **Dry air purge** and **gaseous nitrogen (GN_2) purge** minimize moisture in the workspace.
- ► **E-stop button** shuts down the chamber immediately in case of emergency.
- ► A **door lock** prevents the chamber door from opening during a test.
- ► A **cable notch** is a recess in the door frame that enables easy routing of cabling from the product under test to the exterior of the chamber.
- ► **Glove ports** allow users to safely handle products under test inside the workspace.
- ► **Inner glass doors** have ports that allow product handling without releasing conditioned air.
- ► **Shelves** increase product loading capacity, allowing for more effective use of testing space.
- ► **Reinforced floors** support heavy product loads.
- ► **Product loading carts** improve material handling efficiency by easily transferring products into the chamber.
- ► A **quiet package** incorporates sound deadening material inside the chamber base to minimize noise levels.
- ► A **remote air-cooled condenser** transfers heat from the chamber to outside the facility.
- ► The **oxygen monitor** analyzes ambient oxygen levels outside of the chamber to protect users.
- ► An **extended warranty** is available on the parts and/or labor of your equipment.
- ► **Preventive maintenance** and **calibration agreements** help keep equipment in optimal condition, minimizing chamber downtime.

Serial Communications Panel



Keep connected with the Serial Communications Panel, featuring computer, Internet, Ethernet, and USB connections all while powering the 8800 Controller. The Serial Communications Panel provides the ability to securely export and transfer sensitive test data including graphs and reports. Included in the serial communications panel are:

- ► 2 USB Ports
- ► RS-232
- ► Ethernet
- ► GPIB/IEEE-488 *(optional)*

SE-2000

Modular Humidity System

Temperature-humidity SE-Series Chamber models include a patented, modular, full-range humidity system. Precise uniformity and tight control characterize the high-performance specifications of this humidity system.

With excellent low-humidity accuracy, the electronic humidity sensor (located in the workspace) eliminates the need for thermocouple wicks and float tanks. A steam generator achieves high volumes of moisture with consistent water vapor levels and more repeatable test results.

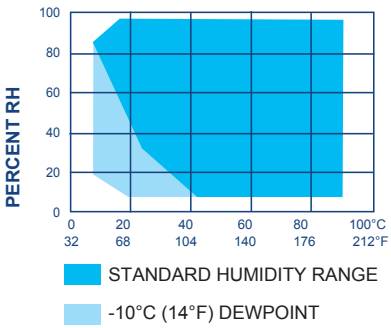
The humidity system can be configured with a direct-feed facility hook-up or a self-contained refillable water reservoir. If using the water reservoir, the humidity water purification and recirculation system is recommended to keep the water within the working limits of the chamber.

A demineralizer cartridge and water reservoir viewing windows allow users to see important levels without opening the doors.

The low humidity option incorporates dry air purge and a bubbler humidity system to control humidity at ultra-low dewpoints. This eliminates the two problems associated with adding hot steam to a cold environment: heat that needs to be taken out of the system and steam generator oscillation, both of which negatively affect the test results.

Humidity test numbers can be viewed, monitored, and controlled through the 8800 Controller. If you have a temperature-only chamber, the modular humidity system can be added as a field retrofit.

SE-Series HUMIDITY RANGE



Full-Range Humidity Specifications*

Humidity Range[1]	10% to 98% RH
Dry Bulb Temperature Range	7°C to 88°C (45°F to 190°F)
Dewpoint Temperature Range	7°C to 87°C (45°F to 188°F)
Extended Dewpoint Condition	-10°C (14°F)
Humidity Control[2]	±2.5% RH
Humidity Uniformity[3]	±1.0% RH

*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.

1. Limited by a 7°C (45°F) minimum dewpoint temperature and a maximum dry bulb temperature of 88°C (190°F).

2. At a dry bulb temperature above 20°C (68°F).

3. Based upon temperature uniformity specifications, this value is ± 1.5 RH for 56" wide SE-Series Chambers.

Universal Port

The patented Universal Port is installed in the side wall of SE-Series Chambers, expanding their capabilities by diversifying equipment utilization, increasing lab productivity, and reducing capital investment costs.

The Universal Port interfaces with interchangeable modules and accessories that characterize different stress testing and simulation techniques, allowing the chamber to serve multiple purposes.

With the Universal Port, a temperature chamber can become a HALT chamber, thermal shock chamber, or a remote conditioner without needing to purchase an additional chamber.

The height of the Universal Port, modules, and accessories are consistent across all SE-Series Chamber models. The stainless steel port reduces moisture migration and heat leak. A full-sealing structural plug fills the portal with a pressurized fit when the port is not in use.

Universal Port Module and Accessory Options

Adding the Universal Port option to your chamber diversifies your capital equipment purchase and allows you to be prepared for future growth and ever-changing testing needs. The following modules and accessories are currently available for purchase with your SE-Series Chamber with the Universal Port option.

- ► RSL-16 Portable Shaker
- ► AST Module
- ► Remote Blower Package
- ► Thermal Shock Module
- ► Walk-In Conditioning Module
- ► Workspace Add-on Module
- ► Workspace Extension Module
- ► Bulkhead ESS Connector Plate
- ► Workspace Extension Enclosures
- ► Additional Window
- ► Glove Ports
- ► Test Station Platform

SE-600 with RSL-16 Portable Shaker

Universal Port is available on SE-600 or larger.
Universal Port Size: 32"H x 18"W. Custom sizes available.

Chamber Specifications

From workspaces to compressors, Thermotron SE-Series Chambers come with a variety of choices. The following pages outline the most common sizes offered for cascade, single-stage, and accelerated performance models according to chamber size, compressor(s), humidity capabilities, and airflow. All SE-Series Chambers can be custom designed, engineered, and manufactured to meet specific testing needs.

	Interior Dimensions WxDxH	Volume	Exterior Dimensions WxDxH	Airflow	Temperature Uniformity*
SE-300	24x26.25x28 in. 61x67x71 cm.	10.2 ft^3 289 L	35x70x78 in. 89x178x198 cm.	500 CFM	±0.5ºC (±0.9ºF)
SE-400	32x26.25x28 in. 81x67x71 cm.	13.6 ft^3 385 L	43x70x78 in. 109x178x198 cm.	750 CFM	
SE-600	40x26.25x34 in. 102x67x86 cm.	20.7 ft^3 586 L	49x70x83 in. 124x178x211 cm.	1,000 CFM	
SE-1000	40x39.25x38.25 in. 102x100x97 cm.	34.8 ft^3 986 L	49x83x87 in. 124x211x221 cm.	1,000 CFM	
SE-1157	48x33.25x44.25 in. 122x84x112 cm.	40.9 ft^3 1,157 L	56x83x87 in. 142x211x221 cm.	2,500 CFM	±0.7ºC (±1.3ºF)
SE-1200	40x39.25x46 in. 102x100x117 cm.	41.8 ft^3 1,184 L	49x83x95 in. 124x211x241 cm.	1,000 CFM	±0.5ºC (±0.9ºF)
SE-1400	48x39.25x44.25 in. 122x100x112 cm.	48.2 ft^3 1,366 L	56x83x87 in. 142x211x221 cm.	2,000 CFM	±0.7ºC (±1.3ºF)
SE-1700	48x42x52 in. 112x107x132 cm.	60.7 ft^3 1,718 L	56x92x95 in. 142x234x241 cm.	2,500 CFM	
SE-2000	48x48x52 in. 122x122x132 cm.	69.3 ft^3 1,965 L	56x92x95 in. 142x234x241 cm.	2,000 CFM	
SE-2700	48x66x52 in. 122x168x132 cm.	95.3 ft^3 2,700 L	56x116x95 in. 142x295x241 cm.	2,500 CFM	
SE-3000	48x72x52 in. 122x183x132 cm.	104 ft^3 2,945 L	56x116x95 in. 142x295x241 cm.	2,000 CFM	
SE-3027	48x74x52 in. 122x188x132 cm.	107 ft^3 3,027 L	56x124x95 in. 142x315x241 cm.	2,500 CFM	
SE-3300	48x80x52 in. 122x203x132 cm.	116 ft^3 3,272 L	56x124x95 in. 142x315x241 cm.	2,000 CFM	

All chamber windows are 15x19 inches / 38x48cm. Custom window sizes available.
*Temperature Control: ±0.3ºC (±0.5ºF). Standard deviation from mean, measured at -25°C (-13°F) or 100°C (212°F).

Accelerated Performance

Accelerated Perfomance SE-Series Chambers are paired with specific compressors for superior performance in order to achieve the testing results you expect from Thermotron.

Performance

	Cooling Performance						Heating Performance						IEC+		Cooling Product Temp		Heating Product Temp	
	Measured at the Supply Air*														Measured on the Product**			
	Minutes			Cº/Minute			Minutes			Cº/Minute			Minutes		Minutes			
	180º to -65ºC		71º to -65ºC		85º to -40ºC		-65º to 180ºC		-65º to 71ºC		-40º to 85ºC		Cooling	Heating	71º to -65ºC	85º to -40ºC	-65º to 71ºC	-40º to 85ºC
SE-300-10-10	**20**	**12.3ºC**	**13**	**10.5ºC**	**6**	**20.8ºC**	**11**	**22.3ºC**	**5**	**27.2ºC**	**4**	**31.3ºC**	13	9	36	26	32	30
SE-400-15-15	**17**	**14.4ºC**	**9**	**15.1ºC**	**5**	**25ºC**	**9**	**27.2ºC**	**4.5**	**30.2ºC**	**4**	**31.3ºC**	9	7	24	21	24	23
SE-1157-30-30	**14**	**17.5ºC**	**8**	**17ºC**	**5**	**25ºC**	**11**	**22.3ºC**	**5**	**27.2ºC**	**4.5**	**27.8ºC**	10	8	27	23	26	25
SE-1400-20-20	**21**	**11.7ºC**	**12**	**11.3ºC**	**7**	**17.9ºC**	**15**	**16.3ºC**	**8**	**17ºC**	**7**	**17.9ºC**	13	14	28	24	27	26
SE-1700-30-30	**16**	**15.3ºC**	**9**	**15.1ºC**	**7**	**17.9ºC**	**12**	**20.4ºC**	**6**	**22.7ºC**	**5**	**25ºC**	12	9	28	24	27	26
SE-2000-20-20	**23**	**10.7ºC**	**13**	**10.5ºC**	**8**	**15.6ºC**	**16**	**15.3ºC**	**8**	**17ºC**	**7**	**17.9ºC**	15	15	29	25	28	27
SE-2700-30-30	**19**	**12.9ºC**	**11**	**12.4ºC**	**8**	**15.6ºC**	**13**	**18.8ºC**	**7**	**19.4ºC**	**6**	**20.8ºC**	14	10	31	27	30	29
SE-3000-20-20	**28**	**8.8ºC**	**16**	**8.5ºC**	**10**	**12.5ºC**	**19**	**12.9ºC**	**9**	**15.1ºC**	**8**	**15.6ºC**	18	18	32	28	31	30
SE-3027-30-30	**20**	**12.3ºC**	**11**	**12.4ºC**	**8**	**15.6ºC**	**13**	**18.8ºC**	**7**	**19.4ºC**	**6**	**20.8ºC**	14	10	32	28	31	30

*Air temperature (empty chamber)

**SE-300 and SE-400s are tested with 25 lbs/11 kg of aluminum sheets, all other models are tested with 50 lbs/23 kg aluminum sheets.

+IEC specification based on the time the chamber takes to pass through the middle 80% of the full temperature range when conducting a transition over this range.

Utilities

	Approx. Shipping Weight lbs / kg	Electrical Requirements Full Load Amps				Inlet Water Gal / Liters per Minute				Noise Level - dBA Heating / Cooilng
		208/3/60	230/3/60	460/3/60	400/3/50	29ºC / 85ºF	24ºC / 75ºF	18ºC / 65ºF	13ºC / 55ºF	
SE-300-10-10	1,660 / 753	103	94	47	50	16 / 60	9 / 34	7.5 / 28	6 / 23	60 / 76
SE-400-15-15	1,860 / 844	121	112	56	59	24 / 91	14 / 53	11 / 42	8 / 31	
SE-1157-30-30	3,825 / 1,735	249	226	113	117	65 / 246	32 / 121	22 / 83	16 / 60	
SE-1400-20-20	3,325 / 1,508	173	157	79	82	40 / 151	22 / 83	18 / 68	14 / 53	
SE-1700-30-30	4,000 / 1,814	249	226	113	117	65 / 246	32 / 121	22 / 83	16 / 60	
SE-2000-20-20	3,500 / 1,587	173	157	79	82	40 / 151	22 / 83	18 / 68	14 / 53	
SE-2700-30-30	4,500 / 2,041	249	226	113	117	65 / 246	32 / 121	22 / 83	16 / 60	
SE-3000-20-20	4,000 / 1,814	173	157	79	82	40 / 151	22 / 83	18 / 68	14 / 53	
SE-3027-30-30	4,670 / 2,118	249	226	113	117	65 / 246	32 / 121	22 / 83	16 / 60	

Noise Level: A weighted sound pressure level measured at a distance of 1.0 meter (39.4 inches) from the equipment surface and a height of 1.6 meters (63 inches) from the floor in free-field conditions, using a calibrated instrument.

Cascade Performance

-70° to 180°C (-94° to 356°F)

		Cooling Performance						Heating Performance						IEC+		Cooling Product Temp		Heating Product Temp	
		Measured at the supply air*														Measured on the product**			
		Minutes		ºC/Minute				Minutes		ºC/Minute				Minutes		Minutes			
		180º to -65ºC		71º to -65ºC		85º to -40ºC		-65º to 180ºC		-65º to 71ºC		-40º to 85ºC		Cooling	Heating	71º to -65ºC	85º to -40ºC	-65º to 71ºC	-40º to 85ºC
SE-300	SE-300-2-2	75	3.2ºC	48	2.8ºC	35	3.5ºC	36	6.8ºC	17	8ºC	16	7.8ºC	55	31	90	72	40	38
	SE-300-4-4	45	5.4ºC	26	5.2ºC	17	7.4ºC	22	11.1ºC	9	15.1ºC	8	15.6ºC	32	19	52	36	33	31
	SE-300-6-6	33	7.4ºC	21	6.4ºC	12.5	10ºC	22	11.1ºC	9	15.1ºC	8	15.6ºC	23	19	39	28	33	31
SE-400	SE-400-6-6	42	5.8ºC	24	5.6ºC	15	8.3ºC	30	8.1ºC	14	9.7ºC	12	10.4ºC	30	25	42	33	30	28
	SE-400-10-10	25	9.8ºC	15	9ºC	9	13.8ºC	18	13.6ºC	7.5	18.1ºC	6.5	19.2ºC	17	16	27	23	25	24
SE-600	SE-600-3-3	68	3.6ºC	41	3.3ºC	28	4.4ºC	37	6.6ºC	17	8ºC	16	7.8ºC	52	34	60	48	40	38
	SE-600-6-6	50	4.9ºC	30	4.5ºC	22	5.6ºC	37	6.6ºC	17	8ºC	16	7.8ºC	36	34	48	40	40	38
	SE-600-7.5-7.5	40	6.1ºC	26	5.2ºC	18	6.9ºC	26	9.4ºC	12	11.3ºC	11	11.4ºC	30	23	42	35	33	32
	SE-600-10-10	28	8.7ºC	17	8ºC	11	11.3ºC	19	12.8ºC	9	15.1ºC	8	15.6ºC	20	15	30	25	26	25
	SE-600-15-15	22	11.1ºC	13	10.4ºC	9	13.8ºC	11	22.2ºC	7	19.4ºC	6	20.8ºC	15	9	26	23	24	23
SE-1000	SE-1000-3-3	78	3.1ºC	50	2.7ºC	35	3.5ºC	43	5.6ºC	20	6.8ºC	19	6.5ºC	64	41	68	53	44	41
	SE-1000-6-6	56	4.3ºC	36	3.7ºC	26	4.7ºC	43	5.6ºC	20	6.8ºC	19	6.5ºC	43	41	53	46	44	41
	SE-1000-7.5-7.5	47	5.2ºC	32	4.3ºC	22	5.7ºC	31	7.9ºC	13	10.5ºC	12	10.4ºC	37	29	46	39	36	34
	SE-1000-10-10	34	7.2ºC	21	6.4ºC	13	9.6ºC	21	11.6ºC	10	13.6ºC	9	12.8ºC	26	19	32	26	27	26
	SE-1000-15-15	27	9ºC	16	8.5ºC	11	11.3ºC	12	20.4ºC	8	17ºC	7	17.8ºC	17	10	28	24	25	24
SE-1200	SE-1200-3-3	84	2.9ºC	55	2.4ºC	40	3.1ºC	47	5.2ºC	22	6.1ºC	21	5.9ºC	70	45	72	56	48	44
	SE-1200-6-6	62	3.9ºC	40	3.4ºC	30	4.1ºC	47	5.2ºC	22	6.1ºC	21	5.9ºC	49	45	56	49	48	44
	SE-1200-7.5-7.5	52	4.7ºC	35	3.9ºC	25	5ºC	34	7.2ºC	14	9.7ºC	13	9.6ºC	41	32	48	41	38	36
	SE-1200-10-10	37	6.6ºC	23	5.9ºC	15	8.3ºC	23	10.6ºC	11	12.3ºC	10	12.5ºC	29	21	34	27	28	27
	SE-1200-15-15	29	8.4ºC	18	7.5ºC	12	10.4ºC	13	18.8ºC	9	15.1ºC	8	15.6ºC	19	11	29	25	26	25
SE-1400	SE-1400-3-3	95	2.6ºC	61	2.2ºC	43	2.9ºC	49	5ºC	23	5.9ºC	22	5.7ºC	80	47	76	59	50	46
	SE-1400-6-6	66	3.7ºC	42	3.2ºC	32	3.9ºC	49	5ºC	23	5.9ºC	22	5.6ºC	53	47	58	51	50	46
	SE-1400-7.5-7.5	55	4.5ºC	37	3.7ºC	27	4.6ºC	35	7ºC	14	9.7ºC	13	9.6ºC	44	33	50	43	40	38
	SE-1400-10-10	39	6.2ºC	24	5.6ºC	16	7.8ºC	24	10.2ºC	11	12.3ºC	10	12.5ºC	31	22	36	29	29	28
	SE-1400-15-15	30	8.1ºC	19	7.1ºC	12	10.4ºC	14	17.5ºC	8	17ºC	7	17.8ºC	21	11	30	26	27	26
SE-2000	SE-2000-3-3	100	2.4ºC	65	2ºC	45	2.7ºC	51	4.8ºC	24	5.6ºC	23	5.4ºC	85	49	79	62	52	48
	SE-2000-6-6	70	3.5ºC	44	3ºC	34	3.6ºC	51	4.8ºC	24	5.6ºC	23	5.4ºC	60	49	60	53	52	48
	SE-2000-7.5-7.5	58	4.2ºC	39	3.5ºC	29	4.3ºC	37	6.6ºC	16	8.5ºC	15	8.3ºC	49	35	52	45	42	40
	SE-2000-10-10	41	5.9ºC	25	5.4ºC	17	7.4ºC	25	9.8ºC	12	11.3ºC	11	11.3ºC	31	23	37	31	30	29
	SE-2000-15-15	31	7.9ºC	20	6.8ºC	12	10.4ºC	14	17.5ºC	8	17ºC	7	17.8ºC	24	12	31	27	28	27
SE-3000	SE-3000-6-6	85	2.9ºC	54	2.5ºC	42	2.9ºC	64	3.8ºC	31	4.3ºC	29	4.3ºC	71	59	70	61	58	54
	SE-3000-7.5-7.5	70	3.5ºC	47	2.9ºC	35	3.6ºC	45	5.4ºC	20	6.8ºC	18	6.9ºC	58	41	60	51	48	45
	SE-3000-10-10	50	4.9ºC	30	4.5ºC	21	5.9ºC	30	8.1ºC	14	9.7ºC	13	9.6ºC	38	28	42	35	34	32
	SE-3000-15-15	38	6.4ºC	25	5.4ºC	16	7.8ºC	17	14.4ºC	9	15.1ºC	8	15.6ºC	30	15	35	31	31	30
SE-3300	SE-3300-6-6	90	2.7ºC	57	2.4ºC	45	2.8ºC	68	3.6ºC	33	4.1ºC	31	4ºC	74	62	73	63	61	57
	SE-3300-7.5-7.5	74	3.3ºC	50	2.7ºC	38	3.3ºC	48	5.1ºC	21	6.5ºC	19	6.6ºC	61	44	63	53	50	47
	SE-3300-10-10	53	4.6ºC	32	4.3ºC	23	5.4ºC	32	7.6ºC	15	9.1ºC	14	8.9ºC	40	30	44	37	36	34
	SE-3300-15-15	40	6.1ºC	27	5ºC	17	7.4ºC	18	13.6ºC	10	13.6ºC	9	13.9ºC	31	16	36	32	32	31
	SE-3300-20-20	30	8.2ºC	17	8ºC	11	11.4ºC	19	12.9ºC	10	13.6ºC	9	13.9ºC	19	17	33	29	32	31

*Air temperature (empty chamber)

**SE-300 and SE-400s are tested with 25 lbs/11 kg of aluminum sheets, all other models are tested with 50 lbs/23 kg aluminum sheets.

SE-2000-3-3 limited to -68°C.

Performance is based upon laboratory ambient conditions of 23.9°C, and may vary slightly.

+IEC specification based on the time the chamber takes to pass through the middle 80% of the full temperature range when conducting a transition over this range.

Thermotron equipment is not designed to process hazardous materials. Consult an application engineer if hazardous materials are involved.

Additional accessories may impact performance. Specifications subject to change without notice.

Cascade Utilities

-70° to 180°C (-94° to 356°F)

		Approx. Shipping Weight lbs / kg	Electrical Requirements Full Load Amps				Inlet Water Gal / Liters per Minute				Noise Level - dBA Heating / Cooling
			208/3/60	230/3/60	460/3/60	400/3/50	29ºC / 85ºF	24ºC / 75ºF	18ºC / 65ºF	13ºC / 55ºF	
SE-300	SE-300-2-2	1,330 / 603	46	46	23	24	Air-Cooled				60 / 68
	SE-300-4-4	1,410 / 640	57	55	28	29					60 / 76
	SE-300-6-6	1,450 / 658	65	62	31	33	12 / 46	7 / 26	5 / 19	3.5 / 13	
SE-400	SE-400-6-6	1,575 / 714	68	65	33	35	Air-Cooled				60 / 76
	SE-400-10-10	1,785 / 810	92	83	42	44	16 / 60	9 / 34	7.5 / 28	6 / 23	
SE-600	SE-600-3-3	1,680 / 762	56	55	28	29	Air-Cooled				60 / 74
	SE-600-6-6	1,740 / 789	66	63	32	34					60 / 76
	SE-600-7.5-7.5	1,800 / 816	93	84	42	44					
	SE-600-10-10	2,040 / 925	89	81	41	42	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-600-15-15	2,115 / 959	122	110	55	58	24 / 91	14 / 53	11 / 42	8 / 31	
SE-1000	SE-1000-3-3	1,840 / 834	56	55	28	29	Air-Cooled				60 / 74
	SE-1000-6-6	1,900 / 862	66	63	32	34					60 / 76
	SE-1000-7.5-7.5	1,960 / 889	93	84	42	44					
	SE-1000-10-10	2,200 / 998	89	81	41	42	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-1000-15-15	2,275 / 1,032	122	110	55	58	24 / 91	14 / 53	11 / 42	8 / 31	
SE-1200	SE-1200-3-3	1,930 / 875	56	55	28	29	Air-Cooled				60 / 74
	SE-1200-6-6	1,990 / 902	66	63	32	34					60 / 76
	SE-1200-7.5-7.5	2,050 / 930	93	84	42	44					
	SE-1200-10-10	2,290 / 1,039	89	81	41	42	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-1200-15-15	2,365 / 1,073	122	110	55	58	24 / 91	14 / 53	11 / 42	8 / 31	
SE-1400	SE-1400-3-3	1,980 / 898	63	61	31	33	Air-Cooled				60 / 74
	SE-1400-6-6	2,040 / 925	73	70	35	37					60 / 76
	SE-1400-7.5-7.5	2,100 / 952	100	91	45	48					
	SE-1400-10-10	2,340 / 1,061	96	88	44	46	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-1400-15-15	2,415 / 1,095	129	117	58	61	24 / 91	14 / 53	11 / 42	8 / 31	
SE-2000	SE-2000-3-3	2,155 / 977	63	61	31	33	Air-Cooled				60 / 74
	SE-2000-6-6	2,215 / 1,005	73	70	35	37					60 / 76
	SE-2000-7.5-7.5	2,275 / 1,032	100	91	45	48					
	SE-2000-10-10	2,515 / 1,141	96	88	44	46	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-2000-15-15	2,590 / 1,175	129	117	58	61	24 / 91	14 / 53	11 / 42	8 / 31	
SE-3000	SE-3000-6-6	2,715 / 1,231	73	70	35	37	Air-Cooled				60 / 76
	SE-3000-7.5-7.5	2,775 / 1,259	100	91	45	48					
	SE-3000-10-10	3,015 / 1,367	96	88	44	46	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-3000-15-15	3,090 / 1,401	129	117	58	61	24 / 91	14 / 53	11 / 42	8 / 31	
SE-3300	SE-3300-6-6	2,885 / 1,308	73	70	35	37	Air-Cooled				60 / 76
	SE-3300-7.5-7.5	2,945 / 1,336	100	91	45	48					
	SE-3300-10-10	3,185 / 1,444	96	88	44	46	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-3300-15-15	3,260 / 1,478	129	117	58	61	24 / 91	14 / 53	11 / 42	8 / 31	
	SE-3300-20-20	4,170 / 1,891	173	157	79	82	40 / 151	22 / 83	18 / 68	14 / 53	

Noise Level: A weighted sound pressure level measured at a distance of 1.0 meter (39.4 inches) from the equipment surface and a height of 1.6 meters (63 inches) from the floor in free-field conditions, using a calibrated instrument.

Air-cooled indicates that an onboard condenser is standard and a water-cooled condenser is optional. Chambers with listed water requirements can be built with remote air-cooled condensers.

Single-Stage Performance

-40° to 180°C (-40° to 356°F)

		Cooling Performance						Heating Performance						IEC+		Cooling Product Temp		Heating Product Temp	
		Measured at the Supply Air*														Measured on the Product			
		Minutes			°C/Minute			Minutes			°C/Minute			Minutes		Minutes			
		180° to -35°C		71° to -35°C		85° to -20°C		-35° to 180°C		-35° to 71°C		-20° to 85°C		Cooling	Heating	71° to -35°C	85° to -20°C	-35° to 71°C	-20° to 85°C
SE-300	SE-300-2	60	3.6°C	38	2.8°C	25	4.2°C	32	6.7°C	13	8.1°C	13	8°C	38	26	60	46	30	30
	SE-300-4	42	5.1°C	28	3.7°C	17	6.1°C	18	11.9°C	7	15.1°C	7	15°C	28	16	50	40	25	25
SE-600	SE-600-4	54	3.9°C	35	3°C	23	4.5°C	31	6.9°C	13	8.1°C	13	8°C	36	28	56	39	31	31
	SE-600-6	43	5°C	26	4°C	18	5.8°C	31	6.9°C	13	8.1°C	13	8°C	29	28	44	33	31	31
	SE-600-7.5	35	6.1°C	23	4.6°C	16	6.6°C	22	9.8°C	10	10.6°C	10	10.5°C	24	18	40	31	29	29
	SE-600-10	27	8°C	18	5.8°C	10	10.5°C	16	13.4°C	7	15.1°C	7	15°C	17	14	34	28	24	24
	SE-600-15	22	9.8°C	14	7.6°C	7	15°C	9	23.8°C	4	26.5°C	4	26.2°C	14	6	31	27	22	22
SE-1000	SE-1000-4	67	3.2°C	46	2.3°C	32	3.2°C	36	5.9°C	15	7°C	15	7°C	43	34	66	48	33	33
	SE-1000-6	52	4.1°C	33	3.2°C	22	4.7°C	36	5.9°C	15	7°C	15	7°C	36	34	49	39	33	33
	SE-1000-7.5	43	5°C	29	3.7°C	19	5.5°C	26	8.3°C	11	9.6°C	11	9.5°C	29	22	45	36	31	31
	SE-1000-10	30	7.2°C	20	5.3°C	12	8.7°C	20	10.8°C	8	13.2°C	8	13.1°C	20	17	36	29	25	25
	SE-1000-15	25	8.6°C	16	6.6°C	9	11.7°C	10	21.5°C	5	21.2°C	5	21°C	17	8	35	28	23	23
SE-1200	SE-1200-4	75	2.9°C	53	2°C	36	2.9°C	40	5.3°C	17	6.2°C	17	6.1°C	47	38	72	55	36	36
	SE-1200-6	60	3.5°C	39	2.7°C	26	4°C	40	5.3°C	17	6.2°C	17	6.1°C	40	38	55	44	36	36
	SE-1200-7.5	47	4.6°C	32	3.3°C	22	4.8°C	29	7.4°C	12	8.8°C	12	8.8°C	32	25	49	40	33	33
	SE-1200-10	32	6.7°C	22	4.8°C	13	8°C	22	9.7°C	9	11.7°C	9	11.6°C	22	19	37	30	26	26
	SE-1200-15	28	7.7°C	18	5.9°C	10	10.5°C	11	19.5°C	5	21.2°C	5	21°C	19	9	36	28	24	24
SE-1400	SE-1400-4	80	2.9°C	54	2°C	38	2.8°C	41	5.2°C	17	6.2°C	17	6.2°C	50	39	74	57	37	37
	SE-1400-6	62	3.5°C	40	2.7°C	26	4°C	41	5.2°C	17	6.2°C	17	6.2°C	43	39	57	45	37	37
	SE-1400-7.5	49	4.4°C	33	3.2°C	22	4.8°C	30	7.2°C	12	8.8°C	12	8.8°C	34	26	51	41	34	34
	SE-1400-10	34	6.3°C	23	4.6°C	13	8.1°C	22	9.8°C	9	11.8°C	9	11.7°C	23	19	37	30	26	26
	SE-1400-15	29	7.4°C	19	5.6°C	10	10.5°C	11	19.5°C	5	21.2°C	5	21°C	20	9	36	28	24	24
	SE-1400-20	25	8.6°C	16	6.6°C	7	15°C	12	17.9°C	5	21.2°C	5	21°C	14	10	35	27	24	24
SE-2000	SE-2000-4	88	2.4°C	56	1.8°C	40	2.6°C	44	4.8°C	18	5.8°C	18	5.8°C	56	42	80	62	40	40
	SE-2000-6	65	3.3°C	43	2.4°C	28	3.7°C	44	4.8°C	18	5.8°C	18	5.8°C	45	42	62	50	40	40
	SE-2000-7.5	52	4.1°C	35	3°C	24	4.4°C	32	6.7°C	13	8.2°C	13	8.1°C	36	29	54	45	36	36
	SE-2000-10	37	5.8°C	25	4.2°C	14	7.5°C	24	8.9°C	10	10.6°C	10	10.5°C	25	21	38	31	27	27
	SE-2000-15	31	6.9°C	21	5°C	11	9.5°C	12	17.9°C	6	17.6°C	6	17.5°C	21	10	37	29	25	25
	SE-2000-20	27	8°C	17	6.2°C	8	13.1°C	14	15.4°C	6	17.6°C	6	17.5°C	15	12	36	28	25	25
SE-3000	SE-3000-6	80	2.7°C	52	2°C	34	3.1°C	53	4.1°C	23	4.6°C	23	4.6°C	55	50	71	58	46	46
	SE-3000-7.5	66	3.3°C	44	2.4°C	28	3.8°C	40	5.4°C	16	6.6°C	16	6.6°C	44	37	62	52	41	41
	SE-3000-10	48	4.5°C	32	3.3°C	18	5.8°C	28	7.7°C	12	8.8°C	12	8.8°C	33	26	44	36	31	31
	SE-3000-15	37	5.8°C	25	4.2°C	14	7.5°C	15	14.3°C	7	15.1°C	7	15°C	25	13	42	33	29	29
	SE-3000-20	32	6.7°C	21	5°C	10	10.5°C	17	12.6°C	7	15.1°C	7	15°C	18	15	41	31	29	29
SE-3300	SE-3300-6	85	2.5°C	55	1.9°C	36	2.9°C	57	3.8°C	25	4.2°C	25	4.2°C	58	54	75	61	49	49
	SE-3300-7.5	70	3.1°C	47	2.3°C	30	3.5°C	43	5°C	17	6.2°C	17	6.2°C	47	39	65	55	43	43
	SE-3300-10	51	4.2°C	34	3.1°C	19	5.5°C	30	7.2°C	13	8.2°C	13	8.1°C	35	28	46	38	33	33
	SE-3300-15	39	5.5°C	27	3.9°C	15	7°C	16	13.4°C	8	13.3°C	8	13.1°C	26	14	43	34	30	30
	SE-3300-20	34	6.3°C	22	4.8°C	11	9.5°C	18	11.9°C	8	13.3°C	8	13.1°C	19	16	42	32	30	30

*Air temperature (empty chamber)

**SE-300 and SE-400s are tested with 25 lbs/11 kg of aluminum sheets, all other models are tested with 50 lbs/23 kg aluminum sheets..

SE-2000-4 limited to -35°C.

Performance is based upon laboratory ambient conditions of 23.9°C, and may vary slightly.

+IEC specification based on the time the chamber takes to pass through the middle 80% of the full temperature range when conducting a transition over this range.

Thermotron equipment is not designed to process hazardous materials. Consult an application engineer if hazardous materials are involved.

Additional accessories may impact performance. Specifications subject to change without notice.

Single-Stage Utilities

-40° to 180°C (-40° to 356°F)

		Approx. Shipping Weight lbs / kg	Electrical Requirments Full Load Amps				Inlet Water Gal / Liters per Minute				Noise Level - dBA Heating / Cooilng
			208/3/60	230/3/60	460/3/60	400/3/50	29ºC / 85ºF	24ºC / 75ºF	18ºC / 65ºF	13ºC / 55ºF	
SE-300	SE-300-2	1,260 / 571	47	46	23	24	Air-Cooled				60 / 68
	SE-300-4	1,300 / 590	57	55	28	29					60 / 74
SE-600	SE-600-4	1,500 / 680	54	53	27	28	Air-Cooled				60 / 74
	SE-600-6	1,550 / 703	61	59	30	31					60 / 76
	SE-600-7.5	1,600 / 726	78	75	38	39					
	SE-600-10	1,835 / 832	69	67	33	34	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-600-15	1,885 / 855	93	89	44	46	24 / 91	14 / 53	11 / 42	8 / 31	
SE-1000	SE-1000-4	1,660 / 753	54	53	27	28	Air-Cooled				60 / 74
	SE-1000-6	1,710 / 776	61	59	30	31					60 / 76
	SE-1000-7.5	1,760 / 798	78	75	38	39					
	SE-1000-10	1,995 / 905	69	67	33	34	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-1000-15	2,045 / 927	93	89	44	46	24 / 91	14 / 53	11 / 42	8 / 31	
SE-1200	SE-1200-4	1,750 / 794	54	53	27	28	Air-Cooled				60 / 74
	SE-1200-6	1,800 / 816	61	59	30	31					60 / 76
	SE-1200-7.5	1,850 / 839	78	75	38	39					
	SE-1200-10	2,085 / 946	69	67	33	34	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-1200-15	2,135 / 986	93	89	44	46	24 / 91	14 / 53	11 / 42	8 / 31	
SE-1400	SE-1400-4	1,800 / 816	61	60	30	32	Air-Cooled				60 / 74
	SE-1400-6	1,850 / 839	68	66	33	35					60 / 76
	SE-1400-7.5	1,900 / 862	86	82	41	43					
	SE-1400-10	2,135 / 968	78	73	37	38	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-1400-15	2,185 / 991	102	95	48	50	24 / 91	14 / 53	11 / 42	8 / 31	
	SE-1400-20	2,675 / 1,213	122	113	57	59	40 / 151	22 / 83	18 / 68	14 / 53	
SE-2000	SE-2000-4	1,975 / 896	61	60	30	32	Air-Cooled				60 / 74
	SE-2000-6	2,025 / 918	68	66	33	35					60 / 76
	SE-2000-7.5	2,075 / 941	86	82	41	43					
	SE-2000-10	2,310 / 1,048	78	73	37	38	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-2000-15	2,360 / 1,070	102	95	48	50	24 / 91	14 / 53	11 / 42	8 / 31	
	SE-2000-20	2,850 / 1,293	122	113	57	59	40 / 151	22 / 83	18 / 68	14 / 53	
SE-3000	SE-3000-6	2,525 / 1,145	68	66	33	35	Air-Cooled				60 / 76
	SE-3000-7.5	2,575 / 1,168	86	82	41	43					
	SE-3000-10	2,810 / 1,274	78	73	37	38	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-3000-15	2,860 / 1,297	102	95	48	50	24 / 91	14 / 53	11 / 42	8 / 31	
	SE-3000-20	3,350 / 1,519	122	113	57	59	40 / 151	22 / 83	18 / 68	14 / 53	
SE-3300	SE-3300-6	2,695 / 1,222	68	66	33	35	Air-Cooled				60 / 76
	SE-3300-7.5	2,745 / 1,245	86	82	41	43					
	SE-3300-10	2,980 / 1,351	78	73	37	38	16 / 60	9 / 34	7.5 / 28	6 / 23	
	SE-3300-15	3,030 / 1,374	102	95	48	50	24 / 91	14 / 53	11 / 42	8 / 31	
	SE-3300-20	3,520 / 1,596	122	113	57	59	40 / 151	22 / 83	18 / 68	14 / 53	

Noise Level: A weighted sound pressure level measured at a distance of 1.0 meter (39.4 inches) from the equipment surface and a height of 1.6 meters (63 inches) from the floor in free-field conditions, using a calibrated instrument.

Air-cooled indicates that an onboard condenser is standard and a water-cooled condenser is optional. Chambers with listed water requirements can be built with remote air-cooled condensers.

Service and Support

Thermotron's comprehensive service department supports your equipment purchase for years after the sale.

Factory-trained Field Service Engineers are located across the United States and throughout the world to assist with equipment start-up, after-delivery service, and preventive maintenance and calibration agreements. Thermotron provides field calibrations accredited to the ISO 17025 and ANSI/NCSL Z-540-1 calibration standards by A2LA under certificate number 1917.01.

Our Parts Department is available for regular and overnight delivery of important parts for your equipment.

Technical Advisors are available to answer questions and offer advice regarding start-up, service, operation, troubleshooting, and repair of your equipment.

Training Specialists are available to perform comprehensive on-site training at your facility or at our headquarters in Holland, Michigan. Training sessions are customized to ensure proper instruction in the principles of your equipment's operation.

No matter what your service needs are, our worldwide service professionals are available and ready to help over the phone or in person.

Custom Solutions

SE-Series Chambers can be fully customized to fit unique product sizes or to meet special performance requirements. Customers can specify chamber size and performance, as well as additional features such as extended temperature ranges, minimal spark packages, and product fixtures. Contact Thermotron to learn more about our custom solutions.

SE-1504 with bi-parting doors

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