Quality is more than a word

ESPEC

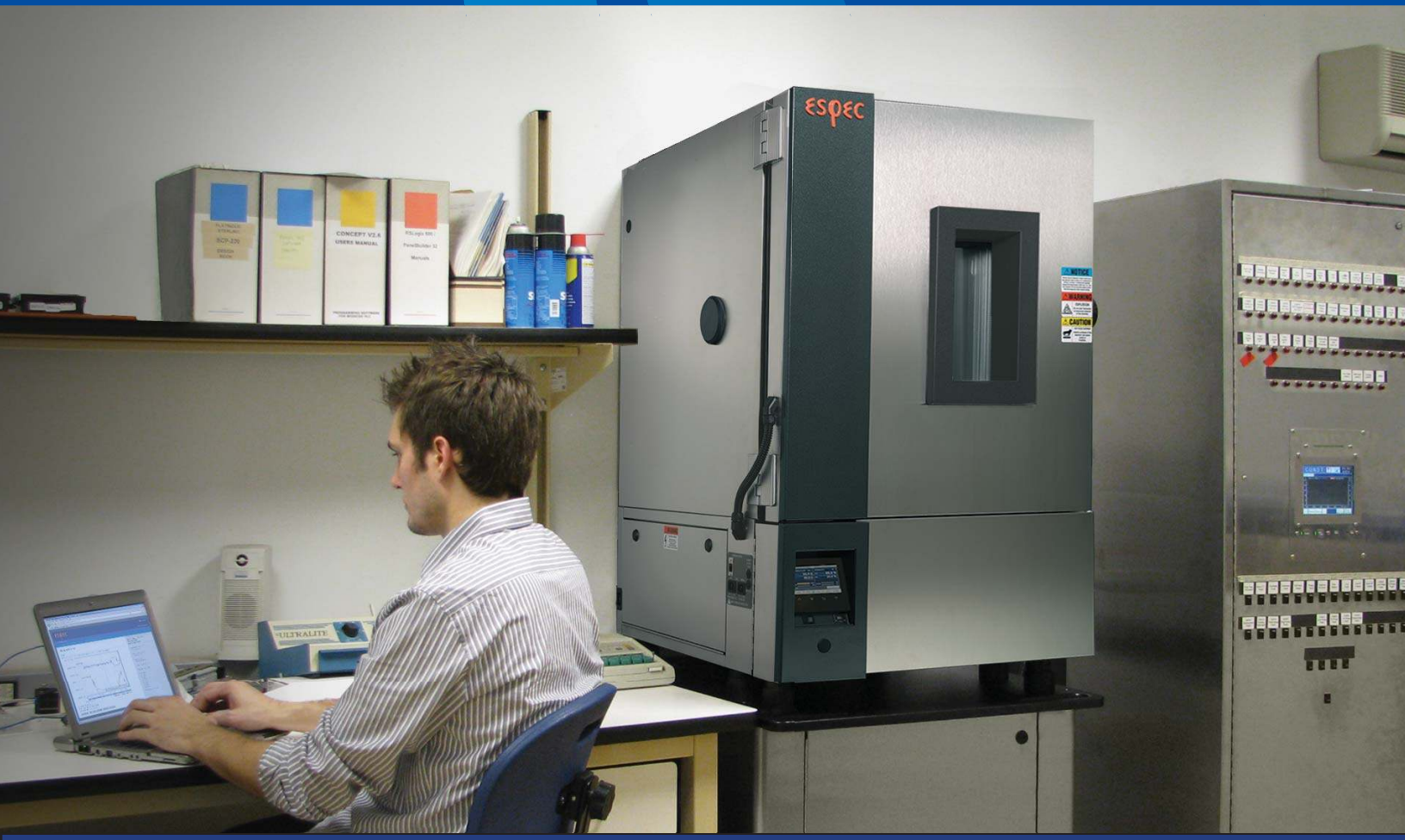
Benchtop Test Chambers

Temperature and Humidity

ESPEC NORTH AMERICA, INC.

Compact chambers with extended testing ranges

ESPEC's Criterion benchtop chambers offer two sizes and a variety of testing ranges. With many options, they can be configured to accommodate your specific requirements. Their narrow footprint saves valuable lab space.



Benchtop Features

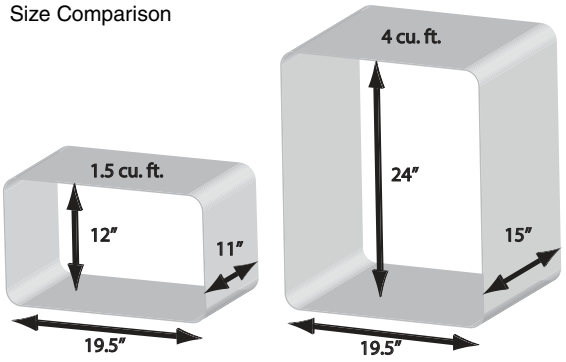
Models save valuable lab space

ESPEC introduces our expanded Criterion Series. With a narrower footprint and increased performance, these test chambers provide an economical and space-saving solution for cramped labs needing to do a variety of temperature (and humidity) testing.

All of the Criterion models have a 19.5 inch wide interior, which is 3.5 inches more than traditional benchtops, yet the exterior is 20% narrower. The four cubic foot models have the largest workspace found in a benchtop unit, while maintaining the smallest exterior footprint.

For additional space savings, the refrigeration system ventilates out the top, and utility connections are on the sides, thus allowing installation directly against a wall. With the electrical system behind the hinged control panel, minimal space allowance is required on the sides, as well.

Size Comparison



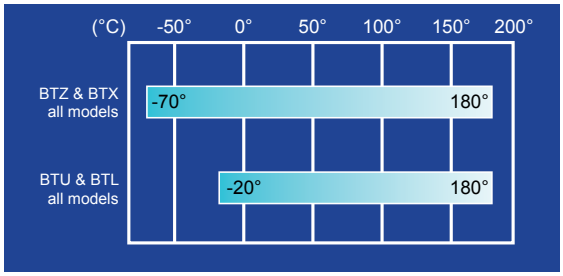
The Criterion series has two chamber sizes: 1.5 and 4 cubic feet. The interior width for both sizes is 19.5 inches. The exterior footprint for both sizes is the same, just 30.25" x 33.5".

Big chamber performance

The extended temperature ranges of the Criterion series make testing at extreme conditions possible without buying a larger, stand-alone chamber. Units are available that go as cold as -70°C.

The four cubic foot models also offer a choice of humidity control. With a range from 10 to 95%, you can maximize your testing options. A low humidity system can extend this range even farther. (See humidity chart on page 7 for details.)

Temperature Range Comparison



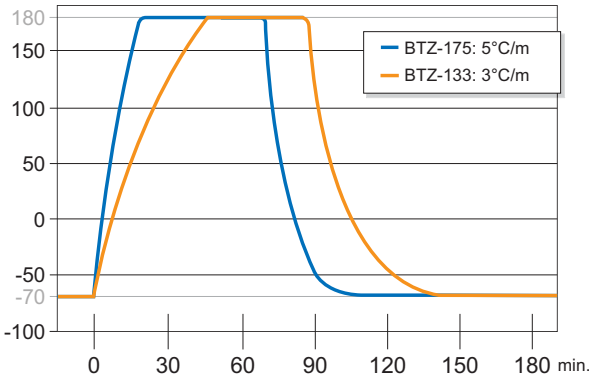
The BTZ & BTX models have extended cold temperature ranges without requiring liquid nitrogen. The BTU & BTL still offer sub-freezing testing capability.

Faster temperature changes

The Criterion series can cycle temperatures at rates up to 5°C/minute without requiring liquid nitrogen. Significant test time can be saved, as well as creating added thermal stress on your samples.

To demonstrate performance, ESPEC uses the international standard IEC 60068 3-5 measured at the supply air. Temperature cycles are run from hot to cold extremes, and the middle 80% of the transition is timed to determine performance. Your actual cycling results will vary depending on methodology, including the start and end temperatures, and the amount of samples loaded.

Performance Comparison



The Criterion chambers respond quickly to setpoint changes. The BTZ-175 can save 30 minutes or more per cycle.

Benchtop Features

Space-saving design

An innovative new layout of system components helps make Criterion chambers have the smallest footprint.

Keeping the refrigeration compressors and blower fan to the back of the chamber also reduces noise to the room.

Useful safety features

To protect from the risk of overheating, there are three levels of protection:

1. Settable within the programmer
2. An independent settable monitor
3. A thermal fuse

In addition, a specimen power terminal allows the user to safely operate powered equipment inside or with the chamber. If the chamber is shut down, the interlocked device will also be shut down.

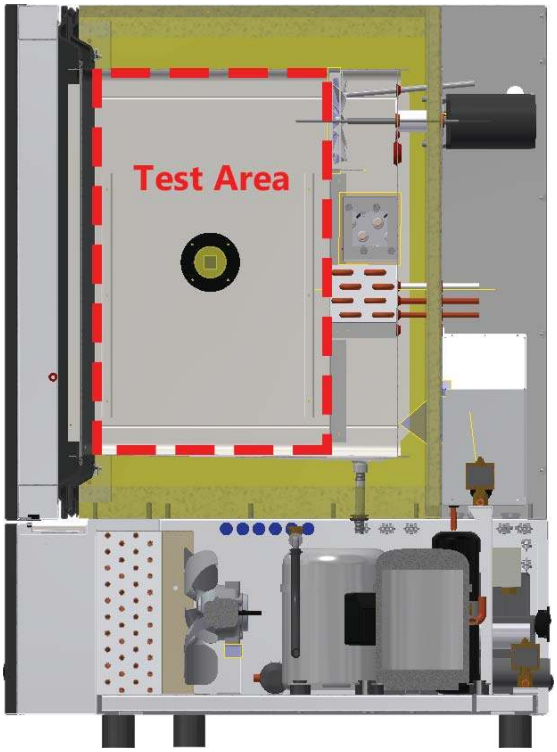
Highly reliable operation

The Criterion platform has been re-engineered from the ground-up to be consistent, reliable, and easy to maintain. ESPEC stands behind the chambers with a comprehensive one-year parts and on-site labor warranty.

Quality cabinet construction

ESPEC is meticulous about making a chamber that is more than just functional.

- Stainless steel exterior and interior
- Rounded corners for easy cleaning
- Full thermal break around doorframe and door
- Rotating door latch is easy and secure
- Dual-layer insulation of fiberglass and expanded foam for thermal integrity
- One 2" (50mm) diameter cable port on the left, with an impervious, flexible silicone plug
- Easy lift-off service panels
- Floor drain and drip-tray under the doorframe



The chamber's fan continuously circulates conditioned air from the test area to the plenum (to the right of the test area), where the heaters, cooling coil, and humidity inlet are located. (BTX-475 model shown).

A nonmetallic thermal break around the door and doorframe stops transfer of heat/cold to the exterior (BTZ-133 model shown).

Instrumentation

Watlow F4T controller

The F4T is the newest programmer/controller from Watlow, now with an easy to use touch-screen. It stores up to 40 different test profiles. Programming step-types available are: ramp, soak, jump/repeat, auto-start, and end.

The F4T includes an Ethernet interface with familiar Modbus protocol. Optional software is available for full remote management and datalogging capability. One event relay with external output terminal is included for activating other equipment during operation.

Options

Cabinet Options

- Roll-around cart with storage cabinet (suitable for chart recorder placement)
- Cable ports: 2", 4", or 6" diameter (50, 100, or 150mm). One 2" port is standard on the left wall.
- Adjustable stainless-steel shelving
- Heated viewing window with interior light, 6"x6" (6"x12" for 4 cubic foot models)

Operational Options

- Liquid nitrogen (LN_2) injection boost for faster cooling
- Emergency stop 'mushroom' button
- Safety features for testing lithium ion batteries or other potentially volatile products.

Humidity Options

- Solid-state humidity sensor in place of wet-bulb
- External water supply tank with recirculating capability
- Water supply tank system as a roll-around cart for the unit
- Water filter (de-ionizing type)
- Extended low humidity range to 5°C/15% (see chart, page 7)

Instrumentation Options

- Web Controller for network access via web browser
- RS-485 or RS-232 serial interface
- Chino paperless recorders with Ethernet and email alarms
- Honeywell circular-chart recorders
- Control sensor outputs for customer use

Cart

Paperless recorder

Cable port

Window

ESPEC humidity system expertise

Controlling humidity in a small environmental chamber can be especially challenging. ESPEC's expertise in humidity control brings intelligent design that is carefully integrated into the BTL-433 & BTX-475. The humidity subsystems are designed for reliability, convenience, and performance:

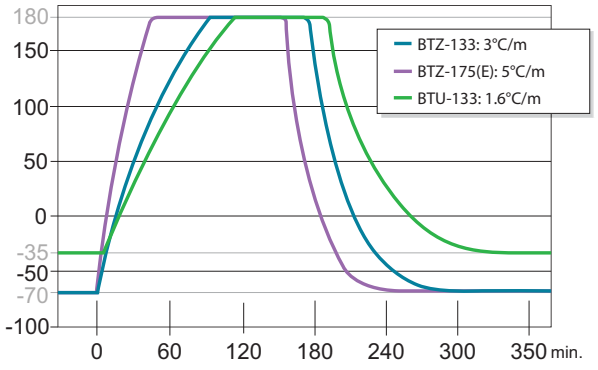
- An external steam generator allows expanded range and is easy to maintain.
- A separate de-humidification coil improves low humidity control and range.
- The wet-bulb humidity sensor is an accurate “primary measurement method”. It is economical, easy to maintain, and reliable because it has no risk of failure due to over-saturation.
- Direct water supply connection is standard, with options for water filtering and external tank.

Steam generator removes for easy cleaning

SPECIFICATIONS - 1.5 CU. FT. MODELS

Model	BTZ-133	BTZ-175	BTZ-175E	BTU-133
Temperature Range	-70 to 180°C (-94 to 354°F)			-20 to 180°C (-4 to 354°F)
Change Rate (per IEC 60068 3-5)	3.5°C/m heat-up 3°C/m cool-down	5°C/m heat-up 5°C/m cool-down		2°C/m heat-up 1.6°C/m cool-down
Temperature Fluctuation	± 0.5°C per IEC 60068 3-5			
Temperature Gradient	± 1.5°C (up to 100°C) per IEC 60068 3-6			
Live Load Capacity	160 W to -40°C	300 W to -40°C		200 W to 0°C
Interior Volume	1.5 cu. ft (42 L)			
Interior (W x D x H)	19.6" x 11" x 12" (500 x 280 x 300 mm)			
Exterior (W x D x H)	30.25" x 33.5" x 34" (770 x 850 x 865 mm)			
Heaters	500 W	1000 W		500 W
Refrigeration	1/3-hp x2 (cascade)	3/4-hp x2 (cascade)		1/3-hp x1 (single-stage)
Air Circulation	100 cu. ft./min. (2.8 m³/min.)			
Site Requirements				
Electrical Supply	115V 1ph 60Hz 20A	208/230V 1ph 60Hz 20A	230V 1ph 50Hz 20A	115V 1ph 60Hz 20A
Weight	300 lbs. (136 kg)	400 lbs. (181 kg)		275 lbs. (125 kg)
Sound Level	65 dBA (1 meter away from door)			
Heat to Room	5,100 BTU/Hr	9,000 BTU/Hr		3,600 BTU/Hr
Gravity Drain	3/8" NPT			
Room Temperature	Performance assured when room temp. is steady, 18 to 27°C (65 to 80°F)			

Chart shows example of heating and cooling ramps during IEC 60068 3-5 qualification (see page 3).



1.5 cu. ft.
(this page)

4 cu. ft.
(next page)

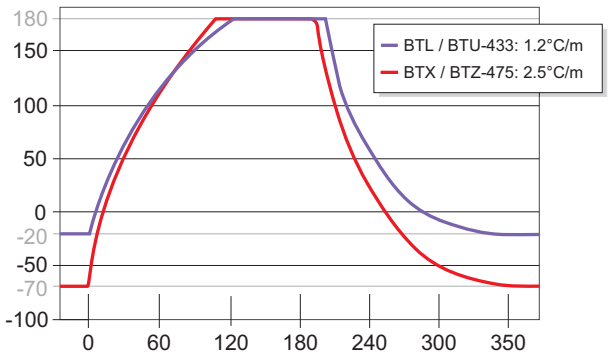
Accessories included with each chamber:

- Silicone plug for standard cable port
- Power cable with plug (115V is NEMA 5-20, 208/230V is NEMA 6-20)
- Box of wet-bulb wicks (BTL/BTX)
- Operation & programming manuals, parts list & schematics (via download)

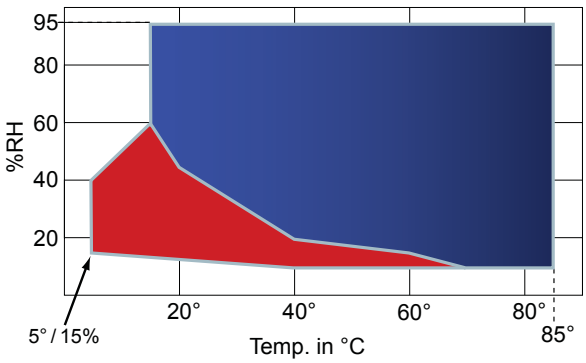
SPECIFICATIONS - 4 CU. FT. MODELS

Model	BTL-433	BTX-475	BTZ-475	BTU-433
Temperature Range	-20 to 180°C (-4 to 354°F)	-70 to 180°C (-94 to 354°F)		-20 to 180°C (-4 to 354°F)
Change Rate (per IEC 60068 3-5)	1.5°C/m heat-up 1.2°C/m cool-down	2.75°C/m heat-up 2.5°C/m cool-down		1.5°C/m heat-up 1.2°C/m cool-down
Temperature Fluctuation	± 0.5°C, per IEC 60068 3-5			
Temperature Gradient	± 1.5°C (up to 100°C), per IEC 60068 3-6			
Live Load Capacity	160 W to 0°C	300 W to -40°C		160 W to 0°C
Humidity Range	10 to 95% RH, per chart below		-	
Humidity Fluctuation	±5% RH per IEC 60068 3-5 except measured in supply air		-	
Interior Volume	4 cu. ft (110 L)			
Interior (W x D x H)	19.6" x 15" x 23.6" (500 x 380 x 600 mm)			
Exterior (W x D x H)	30.25" x 33.5" x 46" (770 x 850 x 1170 mm)			
Heaters	500 W	1000 W		500 W
Refrigeration	1/3-hp x1 (single-stage)	3/4-hp x2 (cascade)		1/3-hp x1 (single-stage)
Air Circulation	200 cu. ft./min. (5.6 m³/min.)			
Site Requirements				
Power Supply	115V 1ph 60Hz, 20A	208/230V 1ph 60Hz 20A		115V 1ph 60Hz, 20A
Weight	325 lbs. (147 kg)	550 lbs. (250 kg)		325 lbs. (147 kg)
Sound Level	65 dBA (1 meter away from door)			
Heat to Room	3,600 BTU/Hr	9,000 BTU/Hr		3,600 BTU/Hr
Gravity Drain	3/8" NPT			
Humidity Water Supply	Supply: 3/8" NPT, 30-50 psig Typical usage: 0.5 gallon/day Purity required: 0.2 µS/cm to 10 µS/cm		-	
Room Temperature	Performance assured when room temp. is steady, 18 to 27°C (65 to 80°F)			

Chart shows example of heating and cooling ramps during IEC 60068 3-5 qualification (see page 3).



Controlled humidity range for BTL-433 & BTX-475 models (without live load). Optional low humidity range shown in red.



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DANGER

Not for use with specimens which are explosive or flammable, or which contain such substances. To do so could be hazardous, as this may lead to fire or an explosion.

BTL-BTZ CRITERION (A)
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