

# Benchmark

## ST-45 and ST-180 Series CO<sub>2</sub> Incubators

**ST Series**  
(ST-45 and ST-180)



**ST Series Plus**  
(ST-45 Plus and ST-180 Plus)



**Precision temperature control**  
six-sided heating, Ambient +5 to 60°C



**Heated door and door frame**  
prevents chamber/door condensation



**Excellent accuracy and recovery**  
with dual beam IR sensor for measuring CO<sub>2</sub>



**PLUS models include:**

- High heat decontamination
- Digital humidity control
- Split Inner door

**Benchmark** Scientific

With our unique and proprietary heat distribution technology, the Benchmark ST Series of CO<sub>2</sub> incubators provide the highest levels of temperature accuracy with minimal fluctuation (within 0.1°C). The six-side heating system, in combination with a low speed internal fan, uniformly spreads air throughout the chamber (without air exchange from the external environment). The chamber walls are constructed of high grade (304) stainless-steel, and all corners are rounded, preventing the accumulation of dirt/debris.

For added security, all models feature an internal alarm to alert the user if the CO<sub>2</sub> percentage changes, or the temperature fluctuates by more than 1°C from the set point. In addition, a “quick-cal” calibration button allows for quickly adjusting the chamber temperature to match that of a properly calibrated external thermometer.

Two series (standard and PLUS) are each available in 45L and 180L chamber sizes. PLUS models include advanced programming for high heat decontamination (at 125°C), a unique split inner glass door for access to the chamber without exposing it fully to the external environment and programmable humidity percentage, up to 95%.



**Constant Monitoring & Controls**

Throughout the incubation, digital microprocessor controls provide constant monitoring over the temp. and CO<sub>2</sub>%. In the event of a deviation, an audible alarm alerts the user.

**Dual Beam IR Sensor**

InfraRed (IR) CO<sub>2</sub> sensor provides accurate measurement and control over the CO<sub>2</sub> density (percentage)

**Stackable Design**

The incubators can conveniently be stacked to provide increased sample capacity.

**Rounded Stainless-Steel Chamber**

The stainless steel (SS-316) internal chamber provides excellent temperature uniformity. The seamless design features rounded corners for easy cleaning.

**6-Sided Direct Heating**

Precision heat control over all 6 sides of the fully sealed chamber minimizes air flow and reduces the concern of contamination.



## ST and ST-Plus Series:



### Adjustable shelf height

The included stainless steel shelves can be raised/lowered to the appropriate height for fitting a variety of vessel types. In the 45L models, 2 shelves are included and a maximum of 7 can be installed. In the 180L models, 3 shelves are included and a maximum of 18 can be installed.

### Sealed inner glass door

The inner glass door is transparent, allowing visualization of samples without fully exposing the chamber to the ambient environment. This improves performance and reduces energy waste.



### Optional orbital shaker

An optional, orbital shaker can be purchased for suspension cell culture applications. The shaker fits conveniently in the bottom of the chamber and includes a remote controller for adjusting the settings without opening the chamber door.

### Heated door and frame

The six-sided, direct heating design provides the highest level of temperature uniformity ( $\pm 0.4^{\circ}\text{C}$ ). In addition, the heated door and door frame prevent the forming of condensation on the inner glass door.



## ST-Plus Series:



### Digital humidity control

For delicate cells prone to desiccation, the PLUS series of CO<sub>2</sub> incubators allows for control over the relative humidity. Humidity can be controlled up to 95 percent utilizing a reservoir to vaporize and inject moisture into the chamber.

### Split inner door (45L)

Each time that the door of a CO<sub>2</sub> incubator is opened, sample contamination is at risk. With the unique design of the Benchmark PLUS models, access to samples can be achieved by opening a small window within the glass door, reducing this risk by up to 80%. Two windows are included in the 45L model.



### High heat decontamination

Contamination of samples can result in a large loss of both time and money. To prevent contamination the PLUS models include a convenient high heat decontamination cycle that exposes the chamber to 125°C for 8 hours.

### Split inner door (180L)

Similar to the above, the 180L PLUS model features a split inner door, but with 6 compartments. When opening just the small window compartment as opposed to the entire door, not only is there reduced risk of contamination, but this minimizes wasted heat and CO<sub>2</sub> from exiting the chamber.



## Technical Data:

Model:	ST-45 (Item: H3550-45)	ST-180 (Item: H3550-180)	ST-45 PLUS (Item: H3551-45P)	ST-180 PLUS (Item: H3551-180P)
Temperature Range:	Ambient +5 to 60°C			
Temperature Accuracy:	$\pm 0.1^{\circ}\text{C}^*$			
Temperature Uniformity:	$\pm 0.4^{\circ}\text{C}^*$			
Temperature Increment:	0.1°C			
Temperature Stability:	0.1°C*			
CO <sub>2</sub> Range:	0 to 20%			
CO <sub>2</sub> Increment:	0.1°C			
CO <sub>2</sub> Accuracy:	$\pm 0.1^{\circ}\text{C}^*$			
CO <sub>2</sub> Sensor:	Dual Beam IR CO <sub>2</sub> Sensor			
High Heat Decontamination	No		Yes	
Programmable Humidity Range:	N/A		Up to 95%	
Chamber Dimensions (W x D x H):	13.2 x 14.2 x 15.4 in. 33.5 x 36.1 x 39.2 cm	18.7 x 20.8 x 28 in. 47.3 x 52.8 x 71 cm	13.2 x 14.2 x 15.4 in. 33.5 x 36.1 x 39.2 cm	18.7 x 20.8 x 28 in. 47.3 x 52.8 x 71 cm
Chamber Volume:	45L	180L	45L	180L
Split Inner Door:	N/A		2 Compartments	6 Compartments
Chamber Material:	Stainless Steel			
Exterior Dimensions (W x D x H):	16.5 x 18.3 x 21.8 in. 42 x 46.5 x 55.3 cm	22 x 26.2 x 37.2 in. 56 x 66.5 x 94.5 cm	16.5 x 18.3 x 21.8 in. 42 x 46.5 x 55.3 cm	22 x 26.2 x 37.2 in. 56 x 66.5 x 94.5 cm
Weight:	77 lbs / 35 kg	172lbs/78kg	77 lbs / 35 kg	172lbs/78kg
Electrical:	120V or 230V, 50-60Hz (350W)			

\* At a set temperature of 37.0°C

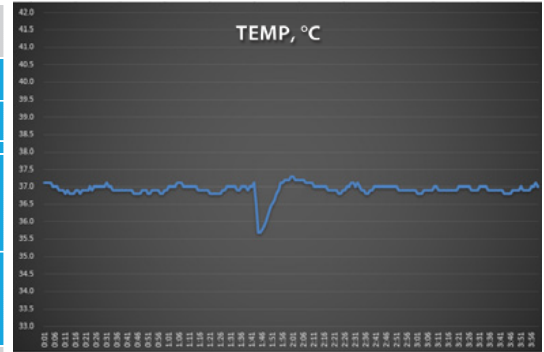
**Ordering Information:**

H3550-45*	Benchmark ST-45 CO <sub>2</sub> Incubator, 45 Liter, 115V with two shelves
H3550-180*	Benchmark ST-180 CO <sub>2</sub> Incubator, 180 Liter, 115V with three shelves
H3551-45P*	Benchmark ST-45 PLUS CO <sub>2</sub> Incubator, 45 Liter, 115V with two shelves. Includes: High heat decontamination, humidity control and split inner door with 2 compartments
H3551-180P*	Benchmark ST-180 PLUS CO <sub>2</sub> Incubator, 180 Liter, 115V with 3 shelves. Includes: High heat decontamination, humidity control and split inner door with 6 compartments

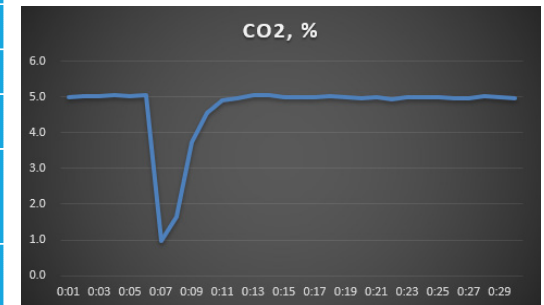
**Optional Accessories**

H3550-45-SH	Additional shelf for 45 liter incubators, 1 each
H3550-180-SH	Additional shelf for 180 liter incubators, 1 each
H3550-45-SK	Stacking kit for 45 liter incubator
H3550-180-SK	Stacking kit for 180 liter incubator (height of top display approximately 135cm)
H2300-REG	Regulator (optional), required for connecting to a CO <sub>2</sub> source
BT4001*	Orbi-Shaker™ CO <sub>2</sub> , remote controlled orbital shaker with flat mat platform (13 x 12in.) For 45L and 180L models Additional platforms, clamps & accessories available, visit <a href="http://www.benchmarkscientific.com">www.benchmarkscientific.com</a>
BT4011*	Orbi-Shaker™ CO <sub>2</sub> XL, remote controlled orbital shaker with flat mat platform (16 x 16.5in.) For 180L models ONLY. Additional platforms, clamps & accessories available, visit <a href="http://www.benchmarkscientific.com">www.benchmarkscientific.com</a>

\*115V with USA Plug. For 230V with EU plug, add (-E)



**Fig. 1. Temperature Recovery Chart:**  
Chamber temperature progression over a 4 hour period with the door being opened for 30 seconds (180L model).



**Fig. 2. CO<sub>2</sub> Recovery Chart:**  
CO<sub>2</sub> percentage progression over a 30 minute period with the door being opened for 30 seconds (180L model)

**Customization Options:**

All incubators can be customized to include the following options. Contact your Benchmark representative for details.

**Oxygen Control**

**O<sub>2</sub>**

Variable oxygen control allows the user to reduce oxygen levels within the chamber to more closely mimic the hypoxic conditions found within the body. In many cases, cells grown in hypoxic conditions will grow more rapidly and live longer.

**Peltier Cooling**

With the added option of thermo-electric cooling (Peltier), the temperature range of the incubators is expanded to allow for sub-ambient temperatures, maintaining as low as 5°C below the ambient temperature.

**UV Lighting**

**UV**

Optional UV lighting can be supplied to provide an additional method of decontamination. UV bulbs (4W) are included on the ceiling of the chamber and beside the circulation fan.

**Copper Chamber**

For enhanced protection against contamination, the incubators can be supplied with a copper chamber.