thermoscientific

Forma Steri-Cycle CO_2 Incubators

Intelligent design, superior cell growth

ThermoFisher SCIENTIFIC

Thermo Scientific Forma Steri-Cycle CO_2 Incubators

Designed to achieve **your next breakthrough**

The **Thermo Scientific™ Forma™ Steri-Cycle series** represents a new era in advanced incubator design for sensitive cultures like stem and primary cells in leading research, pharmaceutical and clinical laboratory applications.

Through a holistic approach to culturing, our newest incubator series provides everything necessary for your most demanding and highly critical applications. By combining our latest technology advancements in contamination control and uniform growth conditions with existing proven and reliable features, you are now able to achieve your goals faster, more reliably, and with less effort.

> Now featuring intuitive electronic lock enhancement automatically locks during sterilization process, preventing unwanted door opening and cycle disruption

> Better solutions for optimal cell growth

Revolutionary Thermo Scientific™ THRIVE™ active airflow technology delivers homogeneous growth conditions fast, avoiding unwanted sample variation.

> Complete contamination control

Proven protection from every direction including ISO class 5 HEPA filtered air, on-demand high-temperature sterilization, and easy to maintain copper.

> Enhanced simplicity

Designed to focus on convenience, allowing you to spend more time on your research and less time managing your incubator.

The Forma Steri-Cycle CO_2 incubator delivers the performance reliability, ease of operation, and value required to support a range of culturing needs from basic research to demanding, leading-edge applications, so you're ready for whatever comes next!

A direct heat CO_2 incubator that better supports you and your science

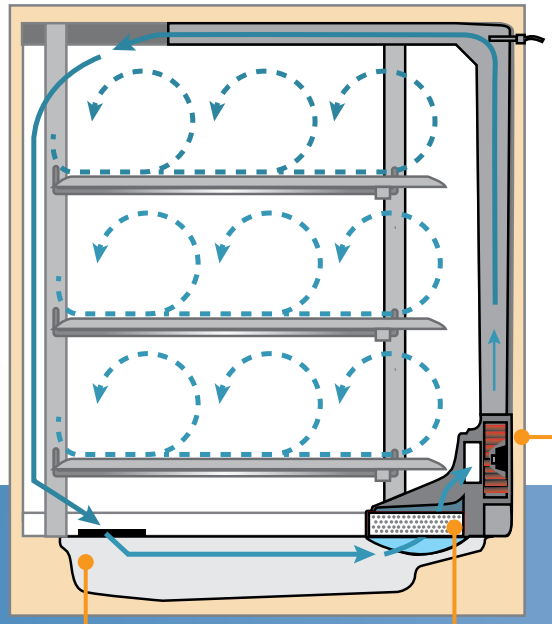
- Choice of either a 165 L (5.8 cu ft) or 255 L (9.0 cu ft) for a variety of applications
- Readily stackable in a compact footprint
- Choice of electropolished stainless steel or 100% pure copper
- Adjustable, perforated shelving
- Easy-to-clean, coved-corner interior with convenient access port
- Reversible exterior door for added flexibility
- 2 year parts and labor warranty

Better solutions for **optimal cell growth**

The Forma Steri-Cycle CO_2 incubator incorporates THRIVE active airflow technology, providing faster recovery and uniformity for consistent results. Your cells experience total recovery of all critical growth parameters in **less than 10 minutes following a 30 second door opening.***

Proprietary THRIVE active airflow technology

In-chamber fan gently and evenly distributes clean, humidified air throughout the chamber ensuring all cells experience the same conditions without the threat of desiccation.



Incoming air first travels over a direct heated water reservoir resulting in 50% faster humidity recovery than with a standard water pan design.**

The in-line HEPA filter cleans the airstream of microbes and particles protecting cultures from contamination.

The precise, variable speed fan with an auto-stop function disables fan operation during door openings to minimize air exchange. Once the door is closed, the fan temporarily accelerates for quick recovery.

*Based on internal testing standards for a 30 second door opening, recovery time calculated to 98% of starting value for temperature and CO_2 and 95% of starting value for humidity

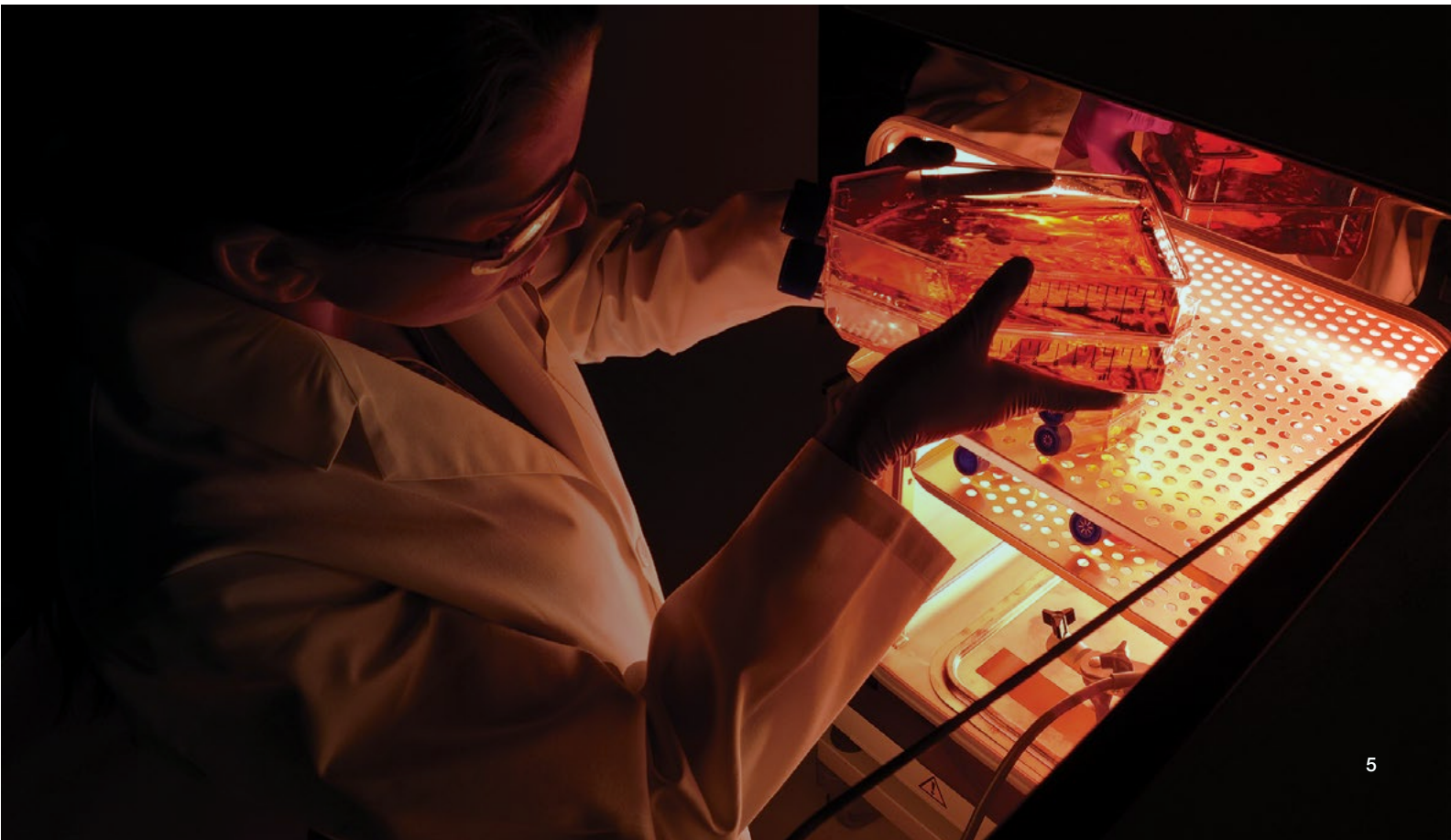
**Comparison of internal testing data to published specifications

Advanced in-situ sensor technology

Probes and gas sensors are positioned in the chamber to respond quickly to any deviations in desired conditions

- Robust design allows maintenance-free, *in situ* location, eliminating the need for removal during sterilization and separate cleaning and handling activities
- Dual temperature probes with PID controller provide over temperature protection by preventing overshoot during recovery; temperatures recover under 5 minutes*
- Oxygen controlled models are equipped with advanced zirconium oxide sensors, enabling a choice of control ranges 1-21% (hypoxic) and 5-90% (hyperoxic)
- On-demand auto-start facilitates easy start-up and calibration

* Temperature recovery time calculated to 98% of starting value, based on internal testing standards of a 30 second door opening on a Forma Steri-Cycle i160 incubator

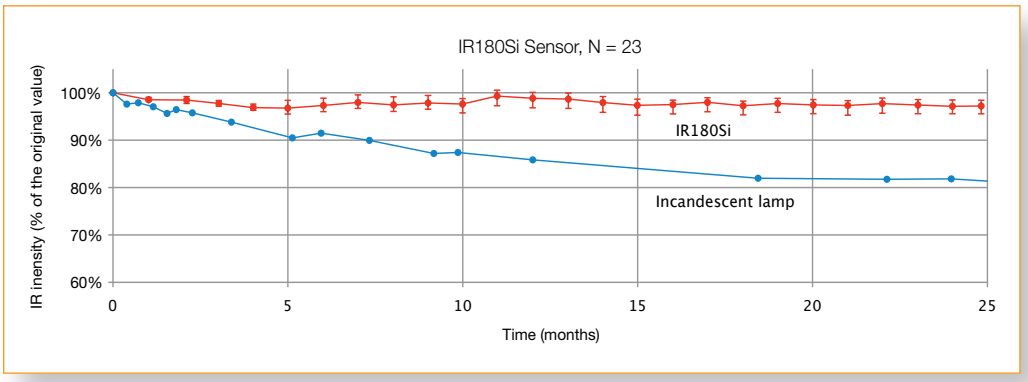


Choice of accurate and reliable CO_2 sensor technology

Temperature resistant, bulb-free IR CO_2 sensor with MEMS emitter technology

Temperature resistant IR180Si infrared CO_2 sensor replaces the traditional incandescent IR light source with silicon MEMS emitter technology that improves stability and reliable service life. This sensor is ideal for labs looking for the best of both technologies for advanced, high volume, or value culturing.

- Internal auto-calibration eliminates drift due to changes in ambient conditions that can affect traditional IR sensors
- IR180Si CO_2 measurement not affected by changes in temperature, humidity, oxygen, or barometric pressure**
- Highly responsive with recovery under 5 minutes from door openings



A traditional IR sensor contains an incandescent bulb that puts out less light as it ages, resulting in sensor drift. The IR180Si eliminates this problem. Our silicon MEMS emitter is designed to retain intensity over time, lasting up to 50% longer than ordinary IR sensors.

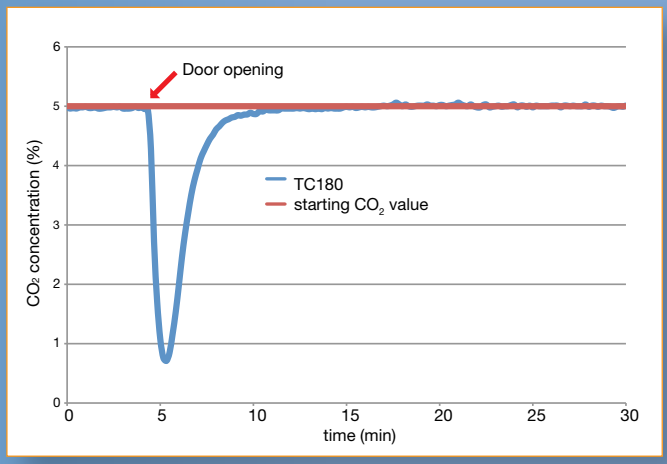
Proprietary TC sensor solution

The TC180 sensor offers the performance advantages of traditional IR technologies without the limiting lifespan of a standard incandescent bulb. This sensor is ideal for everyday cell culture applications.

- Improved stability with internal humidity compensation minimizing drift between calibrations
- CO2 values unaffected by changes in humidity, enabling fast recovery from a routine door opening
- Economical, long service life

*CO_2 recovery time calculated to 98% of starting value, based on internal testing standards of a 30 second door opening

**Information cited based on sensor manufacturer's data



TC180 (Forma i160 incubator)
CO_2 recovery under 6 minutes from a door opening of 30 seconds.

Large capacity Forma Steri-Cycle i250 CO_2 Incubator is ideal for high volume cell culture vessels like the Thermo Scientific™ Nunc™ EasyFill™ Cell Factory™

New Large Capacity Forma Steri-Cycle i250 CO_2 Incubator

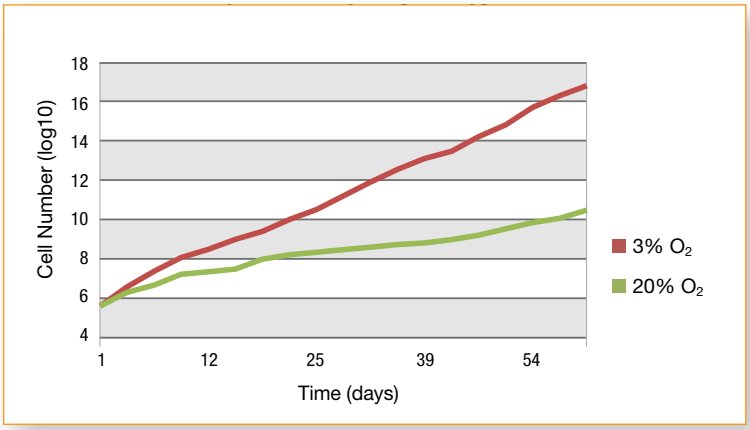
Now you can choose between the 165 L or the 255 L capacity. Pick the CO_2 incubator that's right for your lab's needs.

- Ideal for scale-up research and development
- 255 L chamber accommodates high throughput and large culture vessels
- Strengthened stainless steel models for increased weight capacity
- Optional reinforced shelves for large capacity, low media level culturing

Added culturing flexibility with variable oxygen control

Many cell types thrive best in CO_2 incubators with reduced oxygen. Culturing cells at lower oxygen concentration will better simulate physiological conditions, resulting in cell behaviors that are more predictive of the *in vivo* environment.

Our variable oxygen control (or "tri-gas") incubators will generate conditions to help your cells grow faster and healthier. With the Forma Steri-Cycle CO_2 incubator, you can select the incubator for your O_2 range: simulate hypoxic (1-21%) environments for primary cell, stem cell and embryo research applications, or hyperoxic (5-90%) conditions for research in lung, retina and other sensitive tissues.



Primary Cell Growth in Atmospheric and Physiological Oxygen

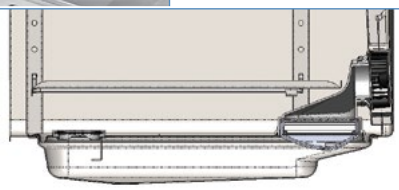
Cells cultured in low oxygen (hypoxia) will generally grow faster, live longer, and show lower stress.

Adapted from Parrinello et al. Nature Cell Biology 2003.

With segmented inner doors, accessing separate sections of the incubator is convenient, minimizing recovery time and contamination risk.

"Our lab mandates this [5% oxygen in the tri-gas incubator] in order to mimic conditions in the body, so that cells are as close to those conditions as possible and nothing is different. All of the signals for proper epigenetics are there."

Stem cell researcher at
biomedical research institute



Recessed covered humidity pan

Exclusive condensation free humidification system

Our unique integrated covered humidity reservoir maximizes relative humidity without condensation ensuring a dry inner chamber, preventing a breeding ground for contaminants.

- Providing stable, high relative humidity levels, the integrated 3 liter reservoir allows more space for samples than standard pan designs
- The reservoir cover eliminates standing water in the culture area while limiting particles and spilled media from settling into the reservoir
- Water level is continuously monitored and displayed on the Thermo Scientific™ iCAN™ touchscreen with advanced refill reminder
- Humidity reservoir may be filled without removing shelves or cultures and is easily drained through built-in copper drain
- CO2 and optional N2/O2 gases are pre-humidified before entering the chamber, providing a more constant, uniform environment

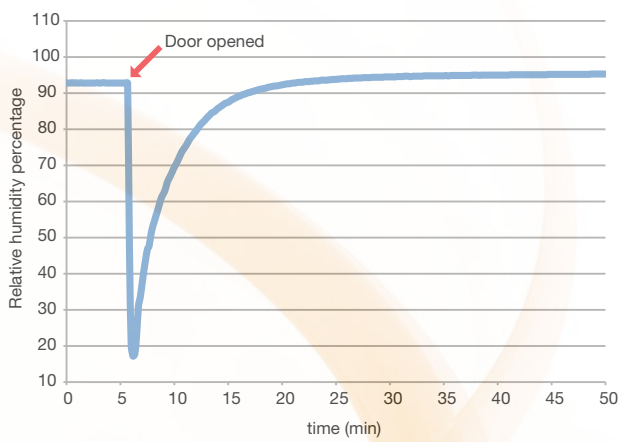
Evaporation is 4X faster at 80% than at ≥ 93% humidity*. Maximum humidity with rapid recovery is critical to limit water evaporation from media that could result in toxicity.

*Esser, P and Weitzmann, L. Evaporation From Cell Culture Plates. Thermo Scientific 2011, TILSPNUNCBU02 0111

Directly heated reservoir boosts 5X faster recovery than removable pan designs.

Relative humidity recovery is less than 10 minutes with extended 30 second door opening.**

**Humidity recovery is measured to 95% of starting value.



Complete **contamination control**

Protect your cultures with proven technologies

Our advanced contamination control technologies are designed to protect your valuable cultures, eliminate the loss of time and resources while providing convenient added security for your research work.

"Normal" indoor air contains 30-700 microorganisms/m³.*
Normal flora on our skin equals 10,000 microorganism/cm².**
These can enter your incubator during routine door openings.

* Stryjakowska-Sekulska et al. 2007.
** Grice et al. 2008

Forma Steri-Cycle CO_2 incubators deliver the latest innovations in contamination control technologies that protect the incubator air, surfaces and humidification water.

Cultures are continuously protected 24/7, and convenient on-demand high temperature sterilization offers simplified cleaning protocols.

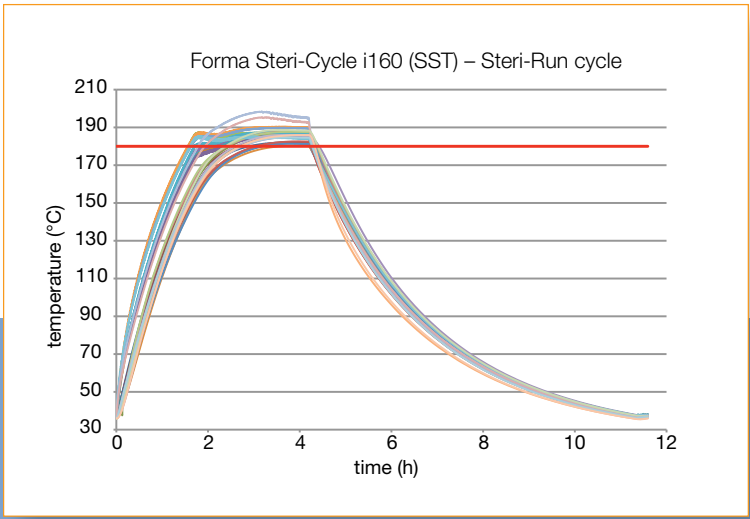
Expand the growth of even your most finicky cells with specialty coated Thermo Scientific™ EasYFlasks™, featuring a unique angled neck for full access to the growth surface when pipetting.

thermoscientific.com/easyflasks

High-temperature sterilization with push button simplicity

Our exclusive Thermo Scientific™ Steri-Run™ high temperature sterilization cycle reaches 180°C on all chamber surfaces and is independently proven to achieve total sterilization and a 12 log Sterility Assurance Level (SAL). With the push of a button, the simple overnight routine provides fast, easy elimination of microbial contaminants and eliminates the need for separate autoclaving of parts.

- Fully automatic 180°C cycle assures total, uniform sterilization of all chamber surfaces (12 log SAL)
- Independent third party tests prove elimination of biological contaminants including fungal mold, vegetative and spore forms of bacteria, including mycoplasma
- Avoids the physical constraints and variation associated with UV germicidal lamps and the ongoing costs, handling and storage of potentially toxic germicides
- Now featuring intuitive electronic lock that automatically engages, providing convenient, worry-free sterilization



Validation that all surfaces reach 180°C with 47 point test on all chamber areas including the glass door and shelves.

The U.S. and E.U. Pharmacopeias no longer recommend a given temperature and time for sterilization. Instead, they require proof of performance. To meet requirements of a 12 log SAL, a 6 log reduction of biological indicator endospores must be demonstrated in half the time.

Microorganisms Eliminated During the Steri-Run Cycle*

Microorganism	ATCC #	Average Positive Control*	Number Recovered*	Log Reduction*
Aspergillus brasiliensis	16404	$2.98x10^4$	NG**	-4.5
Escherichia coli	25922	$2.22x10^4$	NG	-4.3
Mycoplasma pneumoniae	15531	$1.25x10^6$	NG	-6.1
Bacillus atrophaeus spores	51189	$2.16x10^7$	NG	-7.3
Geobacillus stearothermophilus spores	12980	$4.81x10^6$	NG	-6.7

*Average based on 3 independent tests performed on different days.

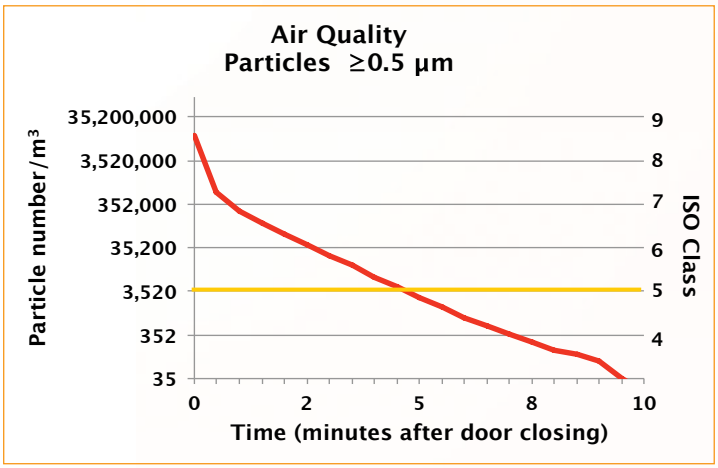
** NG = No Growth

Independent third party testing proved the Steri-Run cycle, when heated to 180°C for 45 minutes, eliminated all microorganisms validating that the full 90-minute cycle meets requirements for a >12 log sterility assurance level (SAL).

HEPA Air Filtration for Air Purity

Airborne particulates are a primary source of contamination in most lab settings. Our advanced HEPA filter technology protects your cultures, providing ISO Class 5 clean room-like air quality conditions within only five minutes after a 30-second door opening.

- Entire chamber air volume is filtered every 60 seconds
- Featuring a space saving configuration, the HEPA filter is readily replaceable with minimal cost



Our unique HEPA air filtration design reaches ISO Class 5 cleanroom air quality and recovers to that quality of air after a door closing within 5 minutes as tested in accordance with ISO 14644-1 and ISO 14644-3.

HEPA filters are rated for their efficiency of capturing 0.3 µm sized particles, since this is the most penetrating size.
In fact, larger and smaller particles are caught even more efficiently.

Easy to maintain 100% solid copper

More cell culture professionals are choosing Thermo Scientific incubators with 100% pure copper interiors.

- Naturally easy-to-clean, no special handling required
- Copper surfaces provide long service life and are safe for cultured cells
- Durability, reliability, and recyclability makes copper a smart, sustainable choice

"Everything we do is cell based. The main thing I've noticed is my ability to maintain my cells. There is just no comparison since we got the copper. I've had stainless steel incubators before but the comfort level you can have with the copper is simply amazing."

Laboratory Manager with 14 years experience working with all types of mammalian cell lines, including adherent, suspension, hybridomas and transformed stem cells

Enhanced Simplicity

The Forma Steri-Cycle series was designed to simplify your interaction with the incubator. Spend more time pursuing your science and less time managing your equipment.

Main screen with a bright LED display provides at-a-glance monitoring even from a distance.

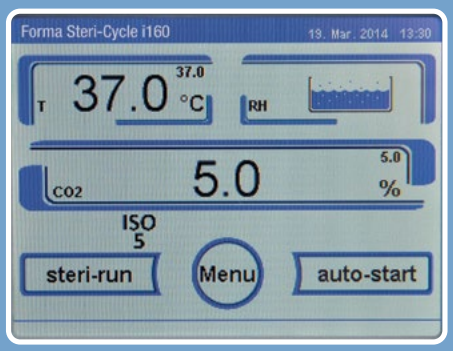
iCAN Touchscreen Interface

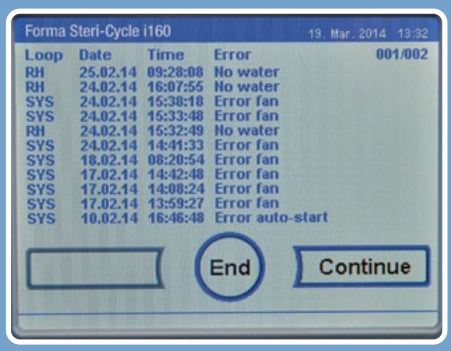
Total control at your fingertips

The intelligent iCAN interface provides complete data visibility to monitor all incubator interaction, featuring door-mounted position for easy access, on-screen menu prompts, error and usage logs, data logging, performance trend graphing and multiple language selection.

New rH monitoring assures the proper humidity level with blue, full line icon. Low water alarm indicates critical low humidity levels requiring water addition.

ISO 5 icon indicates the chamber has reached clean room air quality, protecting your cultures.





On-demand data and error logs provide a downloadable history of activity and conditions including parameter changes and alarms.

Optimized chamber design for easy maintenance and monitoring

- Conveniently manage reminders for HEPA filter, Steri-Run sterilization cycle and Autostart automatic calibration functions
- Programmable access code ensures additional security for your settings and information
- Selectable languages simplify operation: English, Spanish, German, French, Italian, Japanese and Mandarin
- For easier water handling, humidity reservoir may be filled or drained without the removal of shelves or cultures
- Easy-to-clean, coved corners with convenient access port

Data collection

Retire your laboratory notebook, data collection is easy with a Forma Steri-Cycle incubator. A data collection software disc is supplied with each unit, to facilitate data capture from the unit's convenient rear mounted USB output port.

Optional 4-20 mA signal output is available for interfacing with external data collection systems, such as Thermo Scientific™ Smart Vue™ remote monitoring system which is ideal for GMP environments with external sensors and CFR-21 compliant software packages.

		Forma Steri-Cycle i160 CO_2 Incubator	Forma Steri-Cycle i250 CO_2 Incubator
Construction	Chamber volume	165 L (5.8 cu.ft.)	255 L (9.0 cu ft)
	Interior chamber	electropolished stainless steel or 100% solid copper	
	Exterior chamber	18 gauge (1 mm), cold-rolled steel, powder coated	
	Access port	42 mm diameter	
	Data outputs	remote alarm contacts, USB, and optional 4-20 mA	
Dimensions	Internal dimensions (w x h x d)	470 x 607 x 576 mm	607 x 670 x 629 mm
		18.5 x 23.9 x 22.7 inches	23.9 x 26.4 x 24.8 inches
	External dimensions (w x h x d)	637 x 900 x 880 mm	774 x 968 x 934 mm
		25.1 x 35.4 x 34.6 inches	30.5 x 38.1 x 36.8 inches
	Operating weight	83 kg (without accessories), (183 lbs)	97.5 kg (215 lbs)
Shelves	Dimensions (w x d)	423 x 465 mm (16.7 x 18.3 in)	560 x 500 mm (22.05 x 19.68 in)
	Number standard/maximum	3/10	3/12
	Max. load per shelf/total load	10/30 kg (22/66 lbs)	10/30 kg (CU models), 14/42 kg*(SST models)
	Construction	perforated, adjustable	
Electrical	Rated voltage	1/N/PE AC (± 10%), 230, 220 V, 120 V, 100 V	
	Nominal kW consumption (Steri-Run)	0.56 (1.06) – 230 V, 0.51 (0.97) – 220 V	0.76 (1.26)- 230 V, 0.69 (1.16) -220 V)
		0.55 (1.01) - 120 V, 0.39 (0.72) – 100 V	0.75 (1.25)-120 V, 0.53(0.89)-100 V
	Rated frequency	50/60 Hz	
	Heat emission to environment at 37°C	0.06 kWh/h	0.07 kWh/h
	During Steri-Run:	0.26 kWh/h (average), 0.78 kWh/h (heating time), 0.59 kWh/h (hold time)	
Temperature	Control	±0.1°C	
	Range	3°C above ambient to 55°C	
	Uniformity	< ±0.3°C	
	Ambient range	18...34°C	
	Tracking alarm	±1°C	
Sterilization cycle	Cycle temperature	180°C on all internal surfaces	
	Cycle duration	Under 12 hours	
Humidity	RH	>_93% @ 37°C	
	Humidity reservoir	max. 3 L / min 0.5 L	
CO_2	Control	± 0.1%	
	Range	1-20%	
	Tracking alarm	±1%	
	Inlet pressure	12-15 PSI (0.8-1.0 barr)	
	Gas purity	min. 99.5 or medical quality	
	CO_2 inlet	1/8" hose (barbed)	
O_2	Control	± 0.1%	
	Range	1-21% or 5-90%	
	Tracking alarm	±1%	
	Inlet pressure	12-15 PSI (0.8-1.0 barr)	
	Gas purity	min. 99.5 or med. quality	
	O_2 inlet	1/8" hose (barbed)	

* Equal distribution on the shelf

Select the Forma Steri-Cycle incubator that best meets your culturing needs

Forma Steri-Cycle i160 CO_2 Incubator	Stainless Steel Interior	100% Copper Interior
TC Sensor		
Single chamber with TC CO_2 sensor, 100 V 50/60 Hz *	51033551	51033550
Single chamber with TC CO_2 sensor, 120 V 50/60 Hz	51033553	51033552
Single chamber with TC CO_2 sensor, 230 V 50/60 Hz	51033555	51033554
Dual chamber with TC CO_2 sensor, stacking adapter, and roller dolly 120 V 50/60 Hz	50162973	50162994
Dual chamber with TC CO_2 sensor, stacking adapter, and roller dolly 230 V 50/60 Hz	50163010	50163011
IR Sensor		
Single chamber with IR CO_2 sensor, 100 V 50/60 Hz *	51033567	51033566
Single chamber with IR CO_2 sensor, 120 V 50/60 Hz	51033561	51033560
Single chamber with IR CO_2 sensor, 230 V 50/60 Hz	51033563	51033562
Dual chamber with IR CO_2 sensor, stacking adapter, and roller dolly 120 V 50/60 Hz	50162974	50163005
Dual chamber with IR CO_2 sensor, stacking adapter, and roller dolly 230 V 50/60 Hz	50163012	50163013

Units are easily stackable. Required stacking adapter provides efficient heat dissipation to operate Steri-Run in one unit while culturing in the other without process disruption.

Ideal for use inside your CO_2 incubator

Thermo Scientific™ CO_2 Resistant Shaker

Provides reliable around-the-clock operation ideally suited to keep your cells alive and flourishing within your working environment.

Forma Steri-Cycle i250 CO_2 Incubator	Stainless Steel Interior	100% Copper Interior
TC Sensor		
Single chamber with TC CO_2 sensor, 100 V 50/60 HZ	51033591	51033590
Single chamber with TC CO_2 sensor, 120 V 50/60 HZ	51033593	51033592
Single chamber with TC CO_2 sensor, 230 V 50/60 HZ	51033555	51033554
IR Sensor		
Single chamber with IR CO_2 sensor, 100 V 50/60 HZ	51033607	51033606
Single chamber with IR CO_2 sensor, 120 V 50/60 HZ	51033601	51033600
Single chamber with IR CO_2 sensor, 230 V 50/60 HZ	51033603	51033602

Options and accessories to customize your Forma Steri-Cycle CO_2 incubators

factory installed*	Forma Steri-Cycle i160 CO_2 Incubator	Forma Steri-Cycle CO_2 Incubator i250
Country Versions		
Electrical configuration for Switzerland	51900300	
Electrical configuration for Great Britain	51900303	
Electrical configuration for Italy	51900306	
Electrical configuration for Australia	51900449	
Electrical configuration for Denmark	51900481	
Electrical configuration for China	51900900	
Chamber Configuration		
Internal 4-20 mA analog data output	51901143	
Right hinge door configuration	51901121	
Internal gas guard for CO_2	51900735	
Internal gas guard for N_2/O_2	51900736	
Stainless steel external outer casing	51901126	
3 door inner gas tight screen (replaces single inner door configuration)	51901144	
6 gas tight inner doors (replaces single inner door configuration)		51901127
6 each of split shelf, copper (for use with 6 gas tight inner door configuration)		51901122
6 each of split shelf, stainless steel (for use with 6 gas tight inner door configuration)		51901123
Reinforced shelves, copper		51901161
Reinforced shelves, stainless steel		51901162
O_2 Control		
1-21% O_2 control	51901137	
5-90% O_2 control	51901138	
1-21% O_2 control with 3 door inner gas tight screen door	51901145	
5-90% O_2 control with 3 door inner gas tight screen door	51901146	
1-21% O_2 control with gas tight screen 6 inner glass doors and 1/2 width shelves		51901133
5-90% O_2 control with gas tight screen 6 inner glass doors and 1/2 width shelves		51901134

* Factory installed options may only be added to single chamber unit part numbers.

External stainless steel option for easy cleaning and GMP environments

HEPA Filter

CO_2 Resistant Shaker

Regulator

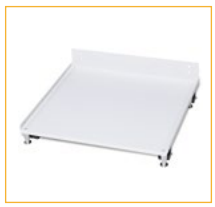
Options and accessories to customize your Forma Steri-Cycle CO_2 incubators

customer installed	Forma Steri-Cycle i160 CO_2 Incubator	Forma Steri-Cycle i250 CO_2 Incubator
Support Frames, Stacking Adapters and Shelving		
Low profile support frame for double chamber, 73 mm high (with castors)	50154551	50154407
Support frame for double chamber, 172 mm high (with castors)	50145394	
Support frame for double chamber, 200 mm high (without castors)	50145435	50149102
Support frame for single chamber, 780 mm high (without castors)	50145436	50149125
Castors for stands	50052528	
Adaptor required for stacking i160 models	50148171	
Adaptor required for stacking i250 models		50154522
Stacking adaptor for Steri-cycle i160 on top of Steri-cycle models 370, 371, 380, and 381	50148173	
Steel shelf, full-width, 2 support rails	50051909	50065793
Additional shelf, solid copper, full-width, with 2 support rails	50051910	50065794
Reinforced shelf, copper		50150644
Reinforced shelf, stainless steel		50150643
Reinforced clip bar shelf, copper	50160247	50160245
Reinforced clip bar shelf, stainless steel	50160246	50160234
Set of 4 HERAtrays, 1/4 width, in stainless steel		50065807
Set of 4 HERAtrays, 1/4 width, in copper		50065808
Set of 3 HERAtrays, 1/3 width, in stainless steel	50051913	50065805
Set of 3 HERAtrays, 1/3 width, in solid copper	50051914	50065806
Set of 2 HERAtrays, 1/2 width, in stainless steel	50058672	
Set of 2 HERAtrays, 1/2 width, in copper	50061050	
Set of 2 HERAtrays, 1/2 width for half width shelves, in stainless steel		50065809
Set of 2 HERAtrays, 1/2 width for half width shelves, in copper		50065810
CO_2/O_2 Accessories and Monitoring		
Replacement in chamber HEPA filter	50141920	
Replacement prefilter	50144774	
Door lock retrofit kit, key entry, to prevent unauthorized access	50145438	
CO_2 gas regulator, 2-stage, for gas tank	3429937	
N_2 gas regulator, 2-stage for gas tank	3429942	
O_2 gas regulator, 2-stage for gas tank	3429943	
External gas guard automatic change-over to reserve tank, 120 V, 50/60 Hz	50059043	
External gas guard automatic change-over to reserve tank, 230 V, 50/60 Hz	50046033	
IR gas tester with travel case (for advanced calibration and testing purposes for CO_2 model)	50121515	
IR Tester for CO_2/O_2	50145789	
IR gas tester interface kit	50122015	
5 inlet port filters for IR testers	50060287	
Shakers for Co_2 incubators		
Thermo Scientific CO_2 resistant, 120 V	88881101	
Thermo Scientific CO_2 resistant, 230 V	88881102	
Thermo Scientific CO_2 resistant with universal platform, 120 V	88881103	
Thermo Scientific CO_2 resistant with universal platform, 230 V	88881104	

Stacking Adaptor

Wheel Frame

High Frame



Castor Frame, 73 mm

Gas Tight Inner Doors with Split Shelves

Stainless Steel and Copper Shelves

Find out more at **thermofisher.com/co2**

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