Thermo Scientific Forma Steri-Cycle i160 CO_2 Incubators

Designed to achieve

your next breakthrough

Thermo SCIENTIFIC

Designed to achieve **your next breakthrough**

The **Thermo Scientific™ Forma™ Steri-Cycle i160 CO_2 incubator series** represents a new era in advanced incubator design for sensitive cultures like stem and primary cells in leading research, pharmaceutical and clinical 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.

Better solutions for optimal cell growth

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

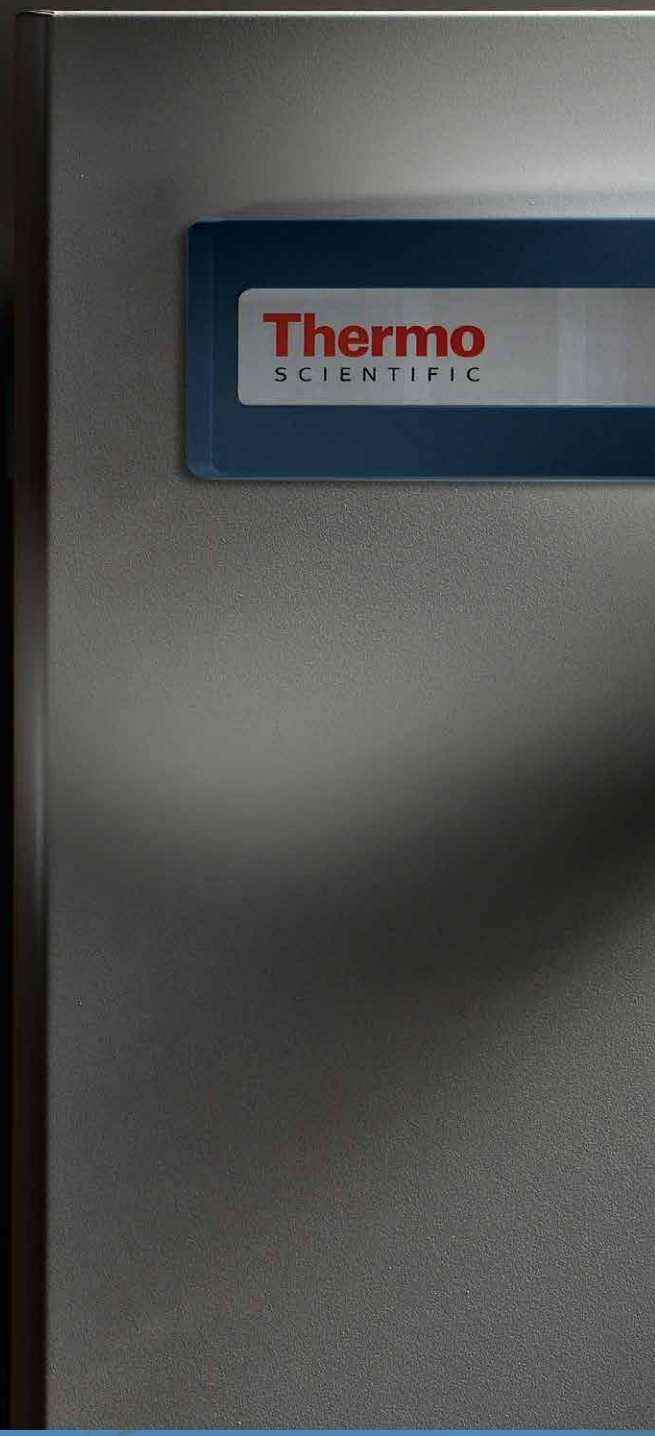
Complete contamination control

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

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 i160 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.

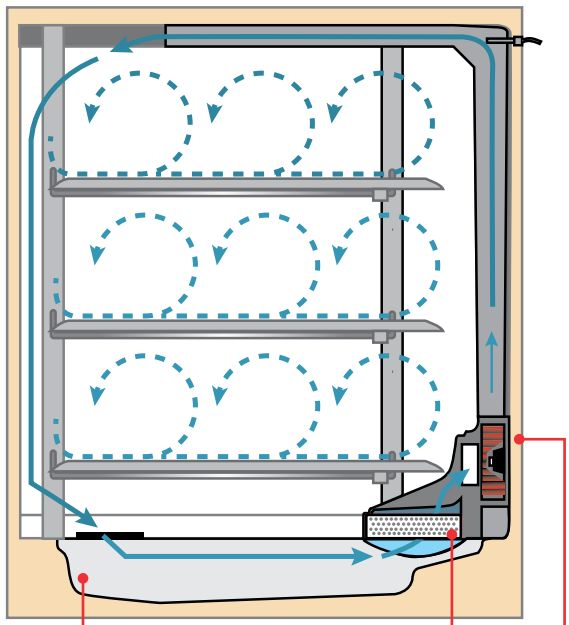
- 165L (5.8 cu ft) in a compact foot print, readily stackable
- Electropolished stainless steel inner chamber
- Adjustable, perforated shelving
- Easy-to-clean, coved corners with convenient access port
- Reversible exterior door for added flexibility
- 2 year parts and labor warranty

Better solutions for
optimal cell growth

The Forma Steri-Cycle i160 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 door opening.***

Innovative 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.



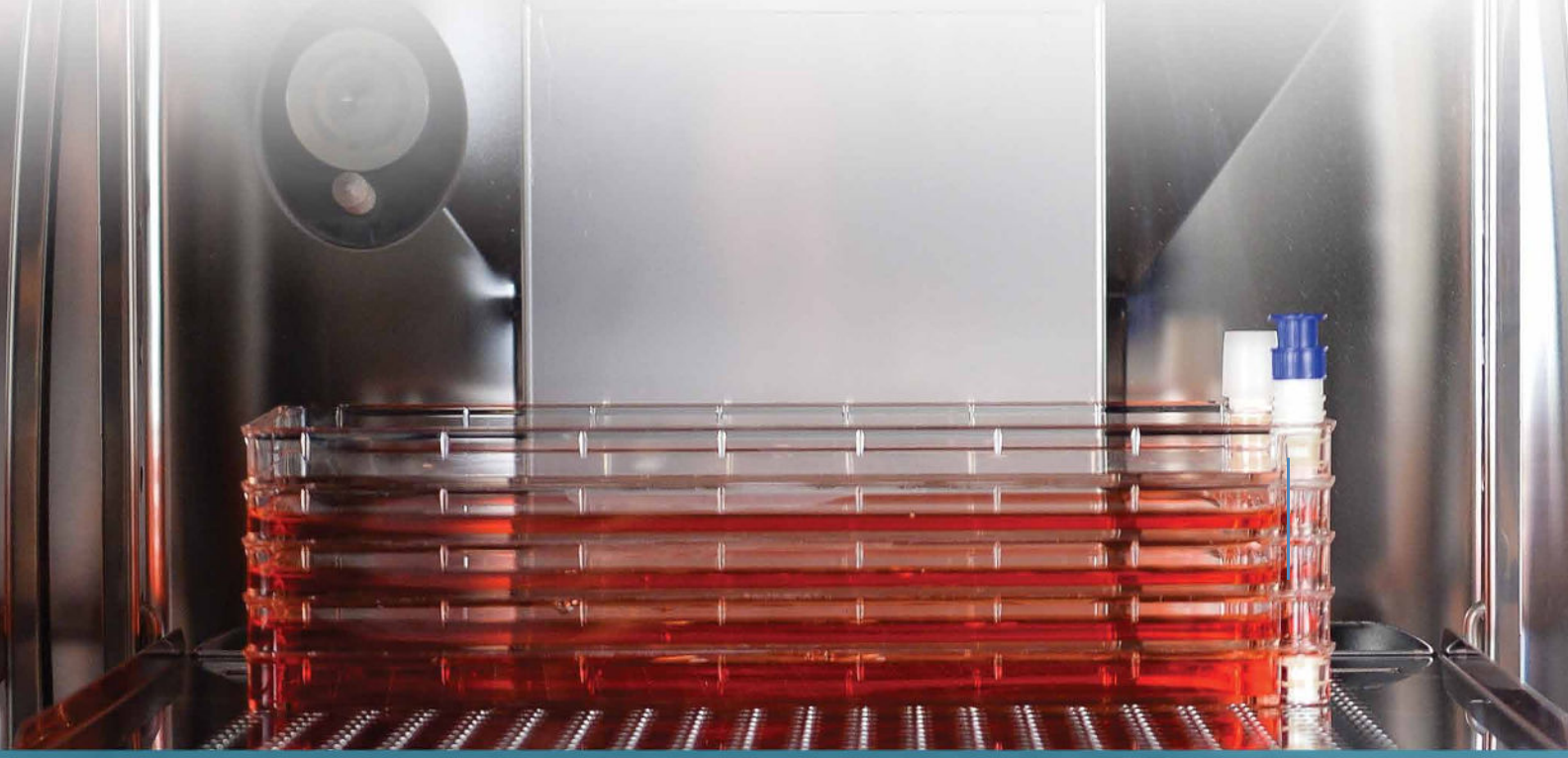
Incoming air first travels over a direct heated water reservoir resulting in 50% faster humidity recovery than with a standard water pan design.**

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



optimal cell growth

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
- **New!** 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

Save valuable incubator space with Thermo Scientific Nunc EasyFill Cell Factory systems.
www.thermoscientific.com/easyfill

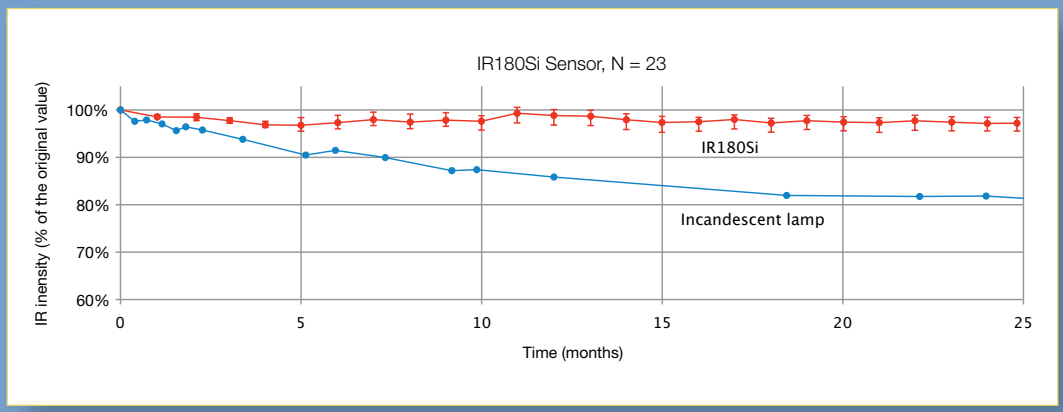
* Temperature recovery time calculated to 98% of starting value, based on internal testing standards of a 30 second door opening

Choice of accurate and reliable CO_2 sensor technology

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

New 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

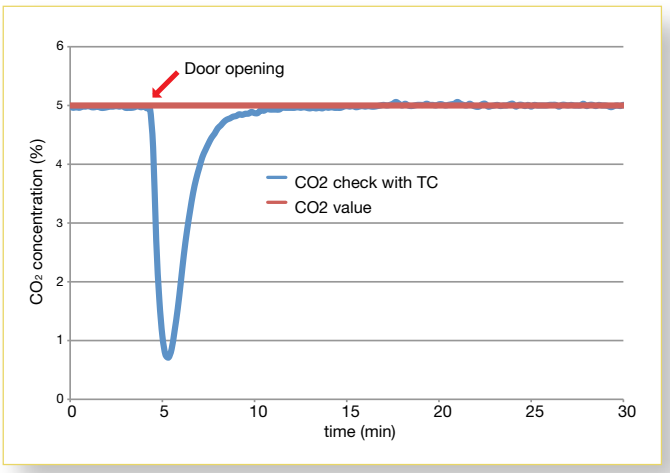


A traditional IR sensor contains an incandescent bulb that puts out less light as it ages, resulting in sensor drift. The IR180Si eliminates this problem. Our silicon MEMS emitter is designed to retain intensity over time, lasting up to 50% longer than ordinary IR sensors.

Innovative TC sensor solution

The NEW TC180 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
- CO_2 values unaffected by changes in humidity, enabling fast recovery from a routine door opening
- Economical, long service life



TC180 – CO_2 recovery under 6 minutes from a door opening of 30 seconds.

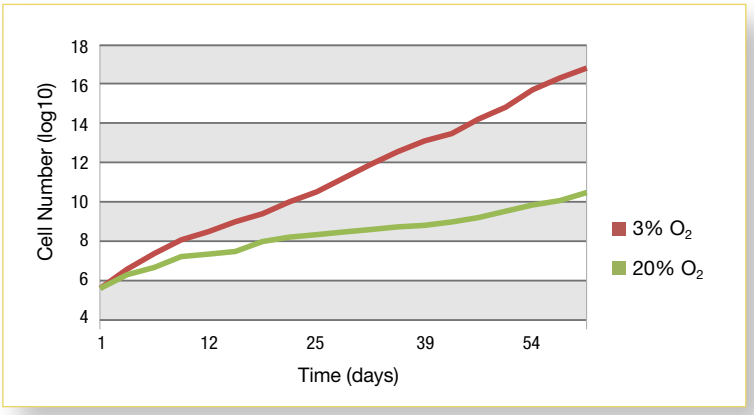
*CO_2 recovery time calculated to 98% of starting value, based on internal testing standards of a 30 second door opening

**Information cited based on sensor manufacturer's data

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 i160 incubator, you can select the incubator for your O_2 range: simulate hypoxic (1-21%) environments for primary cell, stem cell and embryo culturing 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.

"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

Exclusive condensation free humidification system

Our unique integral 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 notice of refill needed
- Humidity reservoir may be filled without removing shelves or cultures and is easily drained through built-in copper drain
- CO_2 and optional N_2/O_2 gases are pre-humidified before entering the chamber, providing a more constant, uniform environment

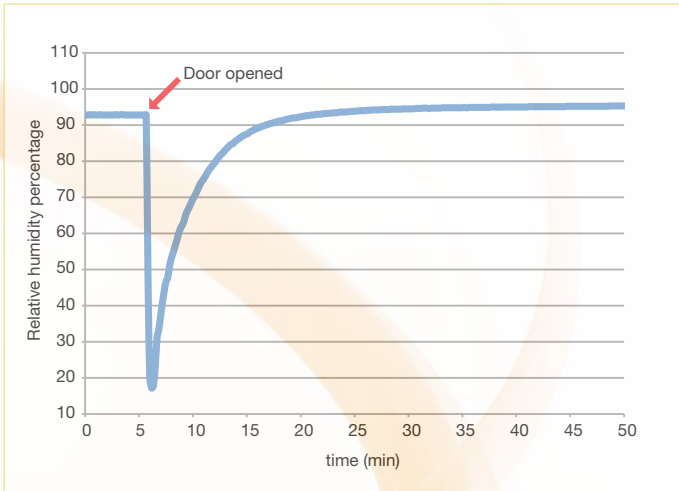
Evaporation is 4X faster at 80% than at > 93% humidity*. Maximum humidity with rapid recovery is critical to limit water evaporation from media that results in toxic concentrations.

*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 30 second door opening.**

**Humidity recovery time calculated to 95% of starting value, based on internal testing standards of a 30 second door opening.



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/m^3.*
Normal flora on our skin equals 10,000 microorganism/cm^2.** These can enter your incubator during routine door openings.

Forma Steri-Cycle i160 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.

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

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.

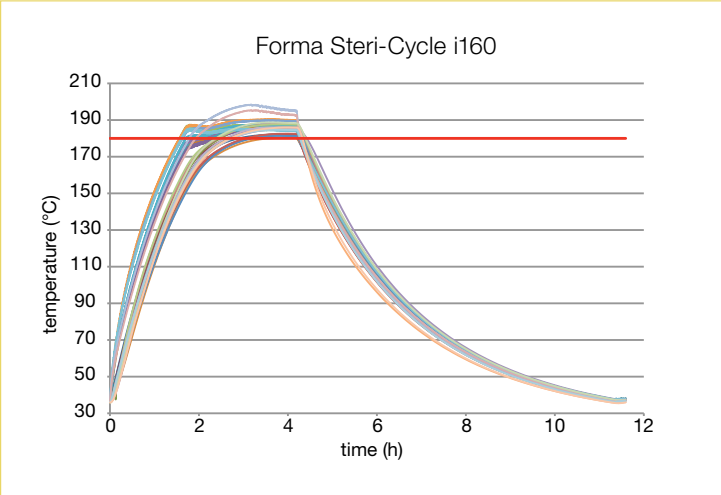
www.thermoscientific.com/easyflasks

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

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.



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

Microorganisms Eliminated During the Steri-Run cycle*

Microorganism	ATCC #	Average Positive Control*	Number Recovered*	Log Reduction*
Aspergillus brasiliensis	16404	2.98×10^4	NG**	-4.5
Escherichia coli	25922	2.22×10^4	NG	-4.3
Mycoplasma pneumoniae	15531	1.25×10^6	NG	-6.1
Bacillus atrophaeus spores	51189	2.16×10^7	NG	-7.3
Geobacillus stearothermophilus spores	12980	4.81×10^6	NG	-6.7

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

** NG = No Growth

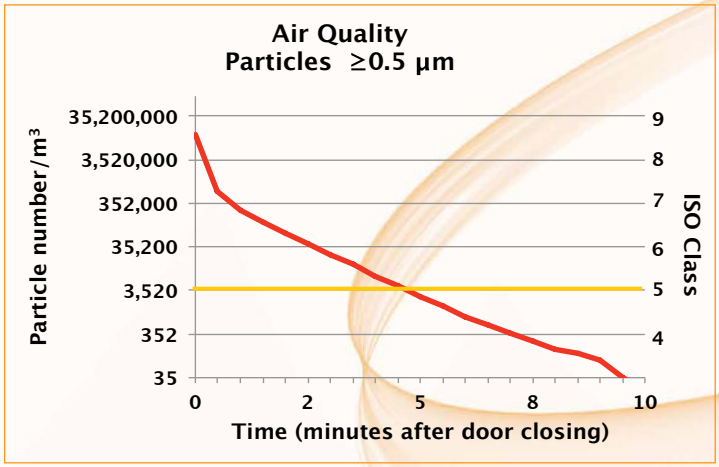
Independent third party testing proved the Steri-Run cycle, when heated to 180ºC for 45 minutes, eliminated all microorganisms – validating that the full 90-minute cycle meets requirements for a >12 log SAL.

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 Class ISO-5 clean room-like air quality conditions within only five minutes after a 30-second door opening.

- Chamber air is processed every 60 seconds to ensure air quality
- 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 ISO14644-1 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, over 99.998%

Enhanced Simplicity

The Forma Steri-Cycle i160 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.

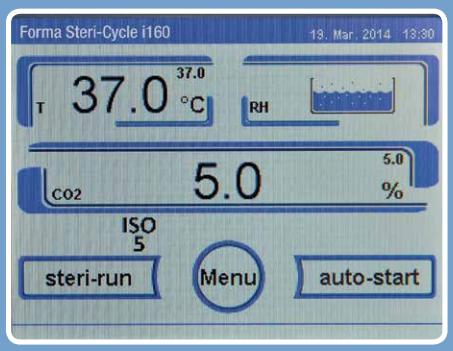
iCAN™ Touchscreen Interface

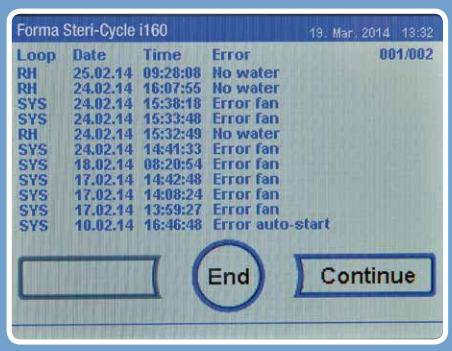
Total control at your fingertips

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.

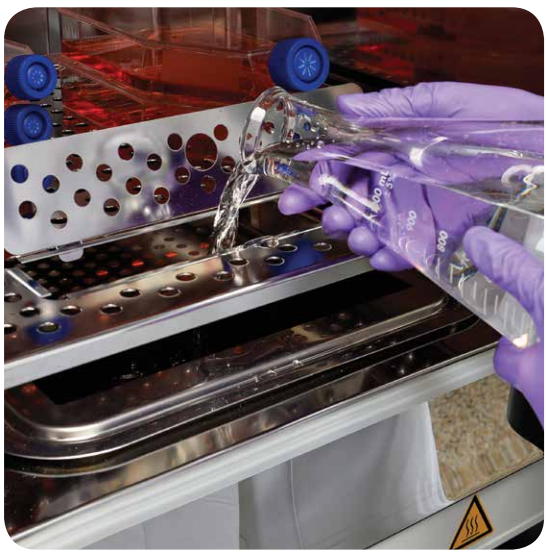




On-demand data and error logs provide a downloadable history of activity and conditions including parameter changes and alarms.

Data collection

Retire your laboratory notebook, data collection is easy with a Forma Steri-Cycle i160 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.



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 of 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
- No special tools required for assembly and disassembly of interior components

construction	**Chamber volume**	165L (5.8 cu.ft.)
	Interior chamber	electropolished stainless steel
	Exterior chamber	18 gauge (1 mm), cold-rolled steel, powder coated
	Access port	42 mm diameter
	Data outputs	remote alarm contacts, USB
dimensions	**Internal dimensions (w x h x d)**	470 x 607 x 576 mm
		18.5 x 23.9 X 22.7 in
	External dimensions (w x h x d)	637 x 900 x 880 mm
		25.1 x 35.4 x 34.6 inches
	Shipping dimensions (w x h x d)	755 x 1010 x 1205 mm
	Operating weight	83 kg (without accessories), (183 lbs)
	Shipping weight	98 kg, (216 lbs)
shelves	**Dimensions (w x h)**	423 x 465 mm (16.7 x 18.3 in)
	Number standard/maximum	3/10
	Max. load per shelf/total load	10/30 kg (22/66 lbs)
	Construction	perforated, adjustable
electrical	**Rated voltage**	1/N/PE AC (± 10%), 120V
	Nominal kW consumption (Steri-Run)	0.55 (1.01) - 120V
	Rated frequency	50/60 Hz
	Heat emission to environment at 37°C	0.06 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	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 temperature	Under 12 hours
humidity	**RH**	≥ 93% @ 37°C
	Humidity reservoir	max. 3L / min 0.5L
CO_2	**Control**	± 0.1%
	Range	1-20%
	Tracking alarm	±1%
	Inlet pressure	12-15 PSI (0.8-1.0 bar)
	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 bar)
	Gas purity	min. 99.5 or med. quality
	O_2 inlet	1/8" hose (barbed)

Select the Forma Steri-Cycle i160 incubator that best meets your culturing needs

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.

Forma Steri-Cycle CO_2 Incubator	Stainless Steel
TC Sensor	
Single chamber with TC CO_2 sensor, 120V 50/60Hz	**51030301**
Single chamber with TC CO_2 sensor and 1-21% O_2 control	**51030387**
Dual chamber with TC CO_2 sensor, stacking adapter, and roller dolly 120V 50/60Hz	**50145518**
IR Sensor	
Single chamber with IR CO_2 sensor, 120V 50/60Hz	**51030532**
Single chamber with IR CO_2 sensor and 1-21% O_2 control	**51030388**
Dual chamber with IR CO_2 sensor, stacking adapter, and roller dolly 120V 50/60Hz	**50145522**

Options and accessories to customize your Forma Steri-Cycle i160 CO_2 incubators

customer installed

Support Frames, Stacking Adapters and Shelving	
Support frame for double chamber, 172 mm high (with castors)	**50145394**
Support frame for double chamber, 200 mm high (without castors)	**50145435**
Support frame for single chamber, 780 mm high (without castors)	**50145436**
Adaptor required for stacking i160 models	**50148171**
Adapter to stack Steri-cycle i160 model with Steri-cycle models 370,371,380, and 381	**50148173**
Additional stainless steel shelf, full-width, 2 support rails	**50051909**
Additional shelf, solid copper, full-width, with 2 support rails	**50051910**
Set of 3 HERAtrays, 1/3 width, in stainless steel (autoclaveable)	**50051913**
Set of 3 HERAtrays, 1/3 width, in solid copper	**50051914**
Set of 2 HERAtrays, 1/2 width, in stainless steel (autoclaveable)	**50058672**
Set of 2 HERAtrays, 1/2 width, in copper	**50061050**
CO_2/O_2 Accessories and Monitoring	
Door lock retrofit kit, key entry, to prevent unauthorized access (requires service installation in field)	**50145438**
Replacement in chamber HEPA filter	**50141920**
Replacement prefilter	**50144774**
CO_2 gas regulator, 2-stage, for gas tank	**95001012**
N_2 gas regulator, 2-stage for gas tank	**95001013**
O_2 gas regulator, 2-stage for gas tank	**95001014**
External gas guard automatic change-over to reserve tank, 120 V, 50/60 Hz	**50059043**
IR gas tester with travel case (for advanced calibration and testing purposes)	**50121515**
IR gas tester interface kit	**50122015**
5 inlet port filters for IR testers	**50060287**

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Belgium +32 53 73 42 41
China +800 810 5118 or
+400 650 5118
France +33 2 2803 2180
Germany national toll free 0800 1 536 376
Germany international +49 6184 90 6000

India toll free 1800 22 8374
India +91 22 6716 2200
Italy +39 02 95059 552
Japan +81 3 5826 1616
Netherlands +31 76 579 55 55
New Zealand +64 9 980 6700
Nordic/Baltic/CIS countries
+358 10 329 2200

Russia +7 812 703 42 15
Spain/Portugal +34 93 223 09 18
Switzerland +41 44 454 12 22
UK/Ireland +44 870 609 9203
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