



Cell culture

Reliable water jacket performance

Forma Series 2 Water Jacketed
CO₂ Incubators

Efficient protection

Water jacket technology

Thermo Scientific™ Forma™ Series 2 Water Jacketed CO₂ Incubators combine precise CO₂ control with a choice of TC or IR sensors, outstanding temperature stability, and excellent parameter recovery characteristics, with innovative continuous contamination control technology. No wonder they are a top choice for researchers in academic, clinical, biotech and R&D labs around the world.



The Series 2 Water Jacketed Incubators are readily stackable to preserve floor space (hardware included as standard).

Security of proven water jacket technology

Maximum thermal stability and quick recovery are enabled with our unique triple wall construction, providing optimal protection against temperature loss in the event of an unexpected power outage.

Total contamination control

Helps minimize the risk of airborne contaminants entering the incubator upon door openings, with a validatable in-chamber HEPA air filtration system, maintaining your cultures in cleanroom-like ISO Class 5* air quality conditions.

Adaptable to your specific requirements

Configure the roomy 184 L / 6.5 cu.ft capacity Series 2, to your specific needs and work environment, with a choice of CO₂ sensors, reversible door swings and a host of options including available oxygen control, relative humidity monitoring, naturally effective copper interiors, datalogging and IQ/OQ documentation kits.

*Third party tested/independently verified. Test results and testing protocol are available upon request. Please contact your local sales representative for information.

Features for contamination control

Helping minimize the risk of product loss and downtime

Designed for easy cleaning

- Polished stainless steel interior with 100% coved corners designed to simplify cleaning, saving time and reducing contamination risk.
- Sturdy stainless steel shelves and supports can be readily removed without tools for easy cleaning, autoclaving or adjustment.
- Inner door gasket is removable and cleanable, and adjusts continually to enable a tight seal.
- Snap fit in-chamber HEPA filter can be easily removed without tools, as needed. The Series 2 messaging center display informs you when the HEPA should be replaced.

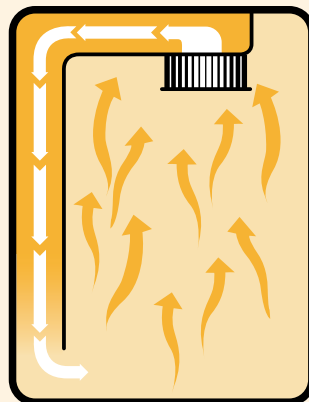
100% HEPA filtration for rapid response class 100 air quality

- The in-chamber HEPA air filtration system continuously filters the entire chamber volume every 60 seconds, reducing particulates to ISO Class 5 cleanroom levels, to help preserve your aseptic culturing environment.
- The HEPA filter entraps particulate air contaminants of all sizes and prevents their escape. Airborne contaminants are the primary source of contamination in most cell culture lab settings. Efficiency and long term effectiveness of the HEPA filter airflow system protect your cultures and help minimize downtime.
- Optimized air flow system has been designed not to interfere with samples or incubator function.
- ISO Class 5 air quality conditions are typically achieved within 5 minutes following a routine door opening.

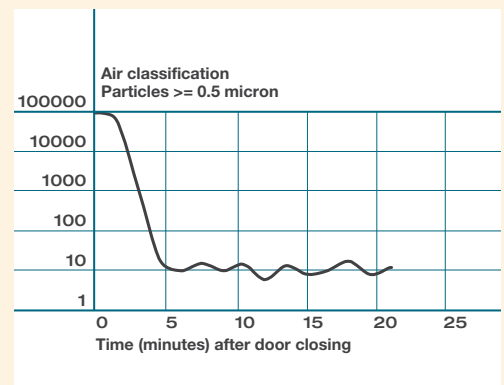
- **Volatile Organic Compounds (VOC) filtration system**
An optional built-in VOC filtration system removes volatile organic vapors which could pose risk to sensitive cultures. Its molecular sieve technology captures potentially toxic chemicals commonly found in products such as lab solvents, cleaning agents and plastics, which may find their way into the incubator.
- This easily installed, low maintenance filtration system is effective and long lasting in high humidity conditions, such as in a CO₂ incubator.
- Examples of chemicals/vapors filtered include alcohols (ethanol and methanol), alkanes (decane, heptane, hexane), aromatics (toluene, xylene, benzene, styrene), and olefins (cyclohexane).



Sturdy stainless steel shelves and supports can be removed without tools for easy cleaning or adjustment.



The HEPA Filter Airflow System continuously filters the entire chamber volume every minute to provide an aseptic culturing atmosphere.



AIR QUALITY DEFINED

Federal Standard 209E and International Standard ISO 14644-1 define air quality classifications (e.g., Class 1, 10, 100 and ISO Class 1, 2, etc.). ISO 14644-1 defines Class 5 as no more than 3,520 particles 0.5 micrometer and larger per cubic meter of air. ISO Class 5 is equal to Federal Class 100.

Trustworthy water jacket technology

Stable parameters even with power supply issues

Temperature retention and quick recovery are especially important for researchers working with critical cell cultures. Our water jacketed incubator enables maximum thermal protection and quick recovery from swings in ambient temperature and power variations.

- Durable triple wall cabinet construction enables optimal temperature uniformity. The Series 2 water jacketed incubator holds temperature remarkably well and recovers to a uniform interior value.
- Heated dual pane inner glass door minimizes bothersome condensation which enables an improved responsiveness and a fast temperature recovery.

Do you trust your power supply?

Power outages can be detrimental to your cultures. If you aren't completely confident in your power supply, consider the security of a Series 2 Incubator.

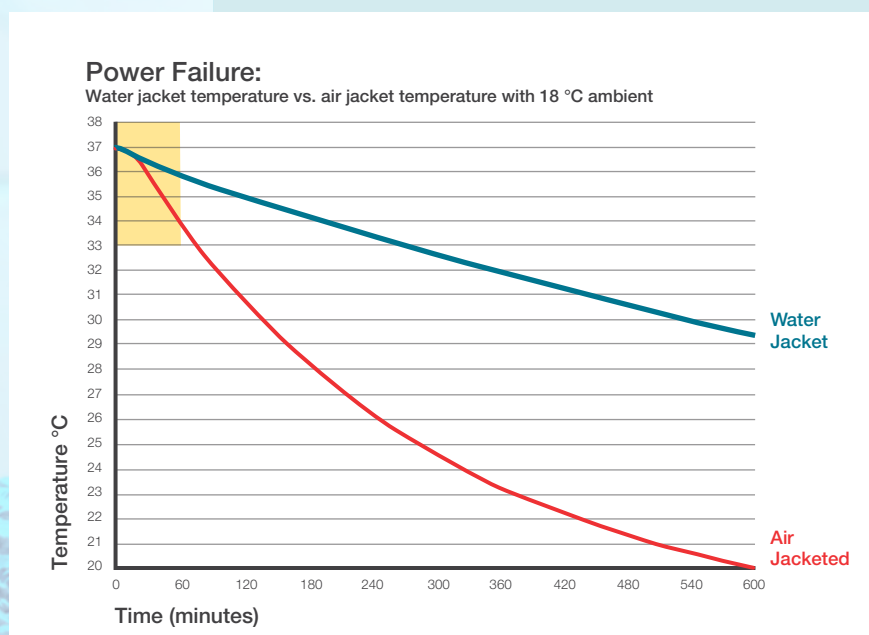
- Product testing during a power failure in an 18°C (64.4F) ambient resulted in the water jacketed incubator's temperature gradually dropping only 1°C – from 37°C to 36°C (98.6F to 96.8F) – in 1 hour and approximately 7.6°C in 10 hours.
- The air jacketed incubator's temperature dropped 3°C – from 37°C to 34°C (98.6F to 93.2F) – in 1 hour and 17°C in 10 hours.

Easy to configure and use

- Quality construction. Reliable performance. Intuitive controls shared by other products with the Forma name. The Series 2 Incubator is designed for long life and ease of use.

Control O₂ within the culture

- Researchers seeking to experiment with the effect of suppressed oxygen concentration upon their cultures can select a Series 2 model with both CO₂ and O₂ control capabilities. Individual O₂ display facilitates set point and monitoring of desired O₂ levels in a range of 0 – 20% for hypoxic studies.

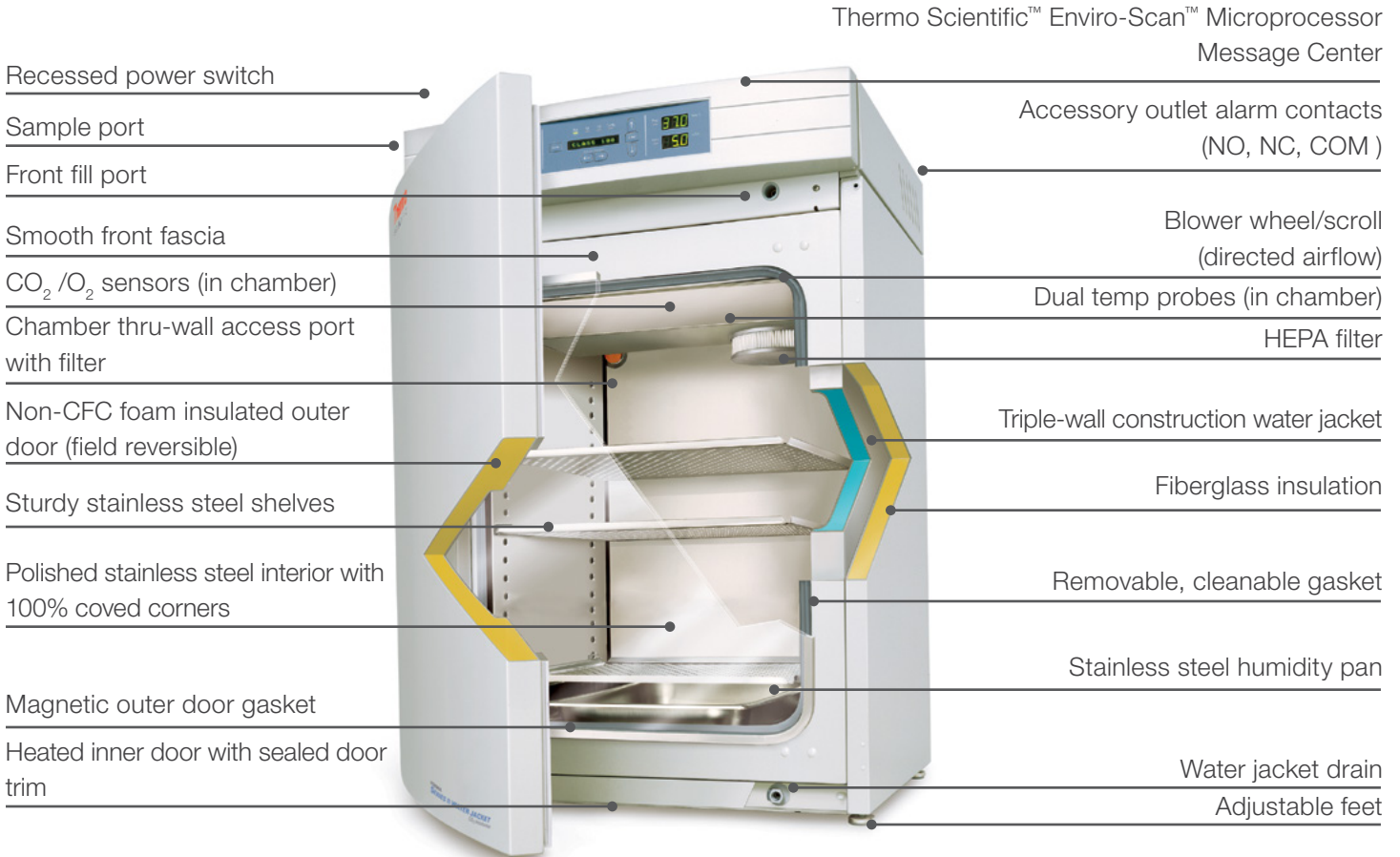


Security of proven water jacket technology:

Should the power go out or the ambient temperature swing, the Series 2's triple wall construction holds the temperature better than an air jacket or double wall water jacket design.

Features in detail

Practical and easy to use



Not shown: Inner door switch, ergonomically designed inner door knob, and optional lock for inner door

Easy-to-use control panel

Touchbutton simplicity

Run – CLASS 100 timing reminder appears after door is closed for five minutes, message changes to describe alarm conditions

Setpoint – Set temp, overtemp, CO₂, O₂

Calibration – Calibrate temp, CO₂, O₂, RH

Programming buttons

Audible/visual alarm

Alarm silence

Optional built-in gas guard system

Mode select

Scroll for program parameters

System configuration – Configure Audible On/Off, Access Code, HEPA Filter Change Reminder, RS-485 Interface, Automatic Tank Selector, Audible/Visual Alarms, Display Temp/RH (selectable), Display CO₂ /O₂ (selectable)

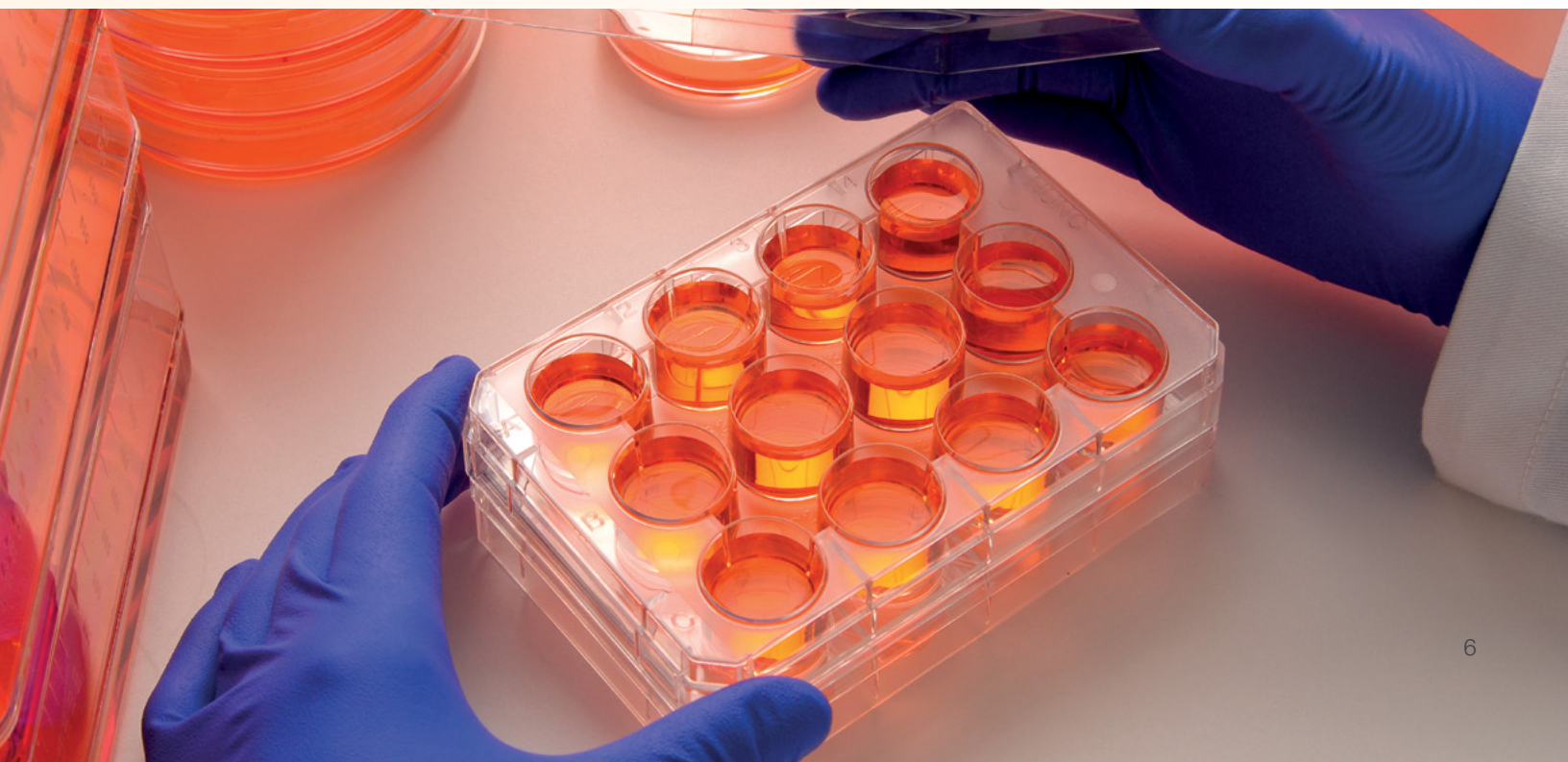


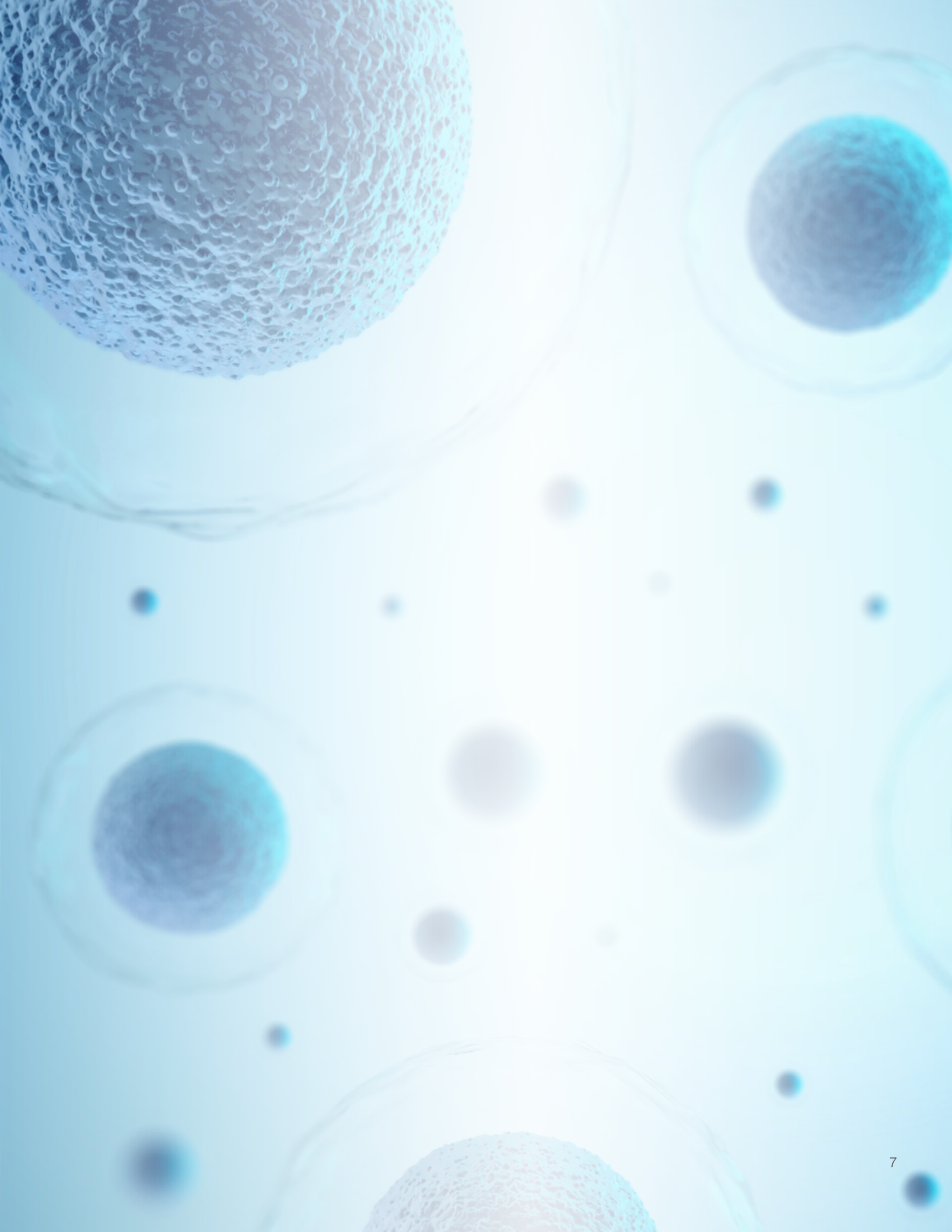
Temperature display

CO₂ display

Gas inject indicator

Heater On indicator





Specifications

Details	
Temperature	
Control	±0.1°C
Range	5°C above ambient to 55°C (131F)*
Uniformity	±0.2°C @ 37°C (98.6F)
Tracking alarm	User-programmable high/low
Temperature safety	
Sensor	Precision thermistor
Controller	Independent analog electronic
Setability	0.1°C
CO ₂ /O ₂	
CO ₂ /O ₂ control	Better than ±0.1%
CO ₂ range	0-20%
O ₂ range	1-20%
Inlet pressure	15 PSIG (1.0 bar)
CO ₂ sensor	T/C or IR
O ₂ sensor	Fuel cell
Readability & setability	0.1%
Tracking alarm	User-programmable high/low
Humidity	
RH	Ambient to 95% @ 37°C (98.6F)
Humidity pan	3.2 qt. (3.0 liters) standard
Display (opt.)	In 1% increments
Fittings	
Fill port	3/8" hose (barbed)
Drain port	1/4" hose (barbed)
Access port	1.3" (3.3cm) with removable silicone plug with filter
CO ₂ inlet	1/4" hose (barbed)
Unit heat load	
115V/230V	344 BTUH (100 Watt)

*50°C (122F) on Model 3120 (3121), 45°C (113F) on Models 3130 (3131) and 3140 (3141).

Shelves	
Dimensions	18.5" x 18.5" (47.0 cm x 47.0 cm)
Construction	Stainless steel, perforated
Surface area	2.4 sq. ft. (0.2 sq. m)
Maximum per chamber	40.8 sq. ft. (3.8 sq. m)
Standard, maximum	3, 16
Maximum shelf load/ shelf	Shelf load limit 35 lbs. (16 kg) slide in and out 50 lbs. (23 kg) stationary
Construction	
Water jacket volume	11.7 gal. (43.5 liters)
Interior volume	6.5 cu. ft. (184.1 liters)
Interior	Type 304, mirror finish, stainless steel
Exterior	18 gauge, cold-rolled steel, powder coated
Outer door gasket	Four-sided, molded, magnetic vinyl
Inner door gasket	Removable, cleanable, feather-edged, silicone
Electrical	
3110/3120/3130/3140	115V, 50/60 Hz, 3.6 FLA (Operating range 90-125V)
3111/3121/3131/3141	230V, 50/60 Hz, 2.0 FLA (Operating range 180-250V)
Circuit breaker/ power switch	6 Amps/2 Pole
Convenience receptacle	75 Watts max. (one per chamber)
Plug	115V: NEMA 5-15P Plug 230V: CEE 7/7 Plug
Alarm contacts	Power interruption; deviation of temp, CO ₂ , O ₂ , RH; customer connections through jack on back of unit
Data outputs (opt.)	RS-485, 0-1V, 0-5V, 4-20 milliamp (select one)
Dimensions	
Exterior	26.0"W x 39.5"H x 25.0"F-B (66.0 cm x 100.3 cm x 63.5 cm)
Interior	21.3"W x 26.8"H x 20.0"F-B (54.1 cm x 68.1 cm x 50.8 cm)
Weight	
Net	265 lbs. (120.2 kg)
Net operational	365 lbs. (165.6 kg)
Shipping (motor)	324 lbs. (147.0 kg)

Ordering information

Product name	CO ₂	O ₂	Voltage	Cat. No.
Forma Series 2 Water Jacketed CO ₂ Incubator	T/C	No	115V 50/60 Hz	3110
	T/C	No	230V 50/60 Hz	3111
	IR	No	115V 50/60 Hz	3120
	IR	No	230V 50/60 Hz	3121
	T/C	Yes	115V 50/60 Hz	3130
	T/C	Yes	230V 50/60 Hz	3131
	IR	Yes	115V 50/60 Hz	3140
	IR	Yes	230V 50/60 Hz	3141

Choice of T/C or IR Sensor

Select a T/C sensor when chamber temp and RH are relatively constant. Typically, a T/C sensor has a longer life than an IR sensor. Select an IR sensor when temp and RH levels are changed frequently. With either sensor, elevated RH is critical to prevent desiccation.



All units are UL Listed to United States and Canadian requirements and bear the CE Mark.



Remote monitoring

4-20mA signal output is included for interfacing with external data collection systems such as the Thermo Scientific™ Smart-Vue™ Pro Remote Monitoring System which provides external sensors and CFR-21 compliant software packages suitable for GMP environments. The Smart-Vue Pro system offers a customizable and scalable architecture that is compatible across multiple brands and equipment types, offering self-installation and long range capabilities.

Learn more at [thermofisher.com/smart-vuepro](https://www.thermofisher.com/smart-vuepro)

Accessories and options

Accessories are customer installed unless indicated otherwise. In addition to providing a standard line of equipment and accessories, we will manufacture custom accessories to meet your specific requirements. Contact us for details.

Description		Cat. No.
RH display		
Humidity (RH) display, readable in 1% increments, includes low RH programmable alarm (alerts you of need to add water to humidity pan), factory installed		190643
Shelving, ductwork, and humidity pan		
Stainless steel	Stainless steel shelf and channels	190884
Solid copper components	Solid copper interior ductwork (in place of stainless steel components); includes copper interior ductwork, four shelves, and humidity pan; factory installed at time of order	190656
	Copper interior ductwork	1900057
	Copper perforated shelf with channels	190879
	Copper humidity pan (Fig. 01)	237020
Filters* and decontamination kit		
Replacement HEPA filter (Fig. 04)		760175
HEPA value pack (4 filters)		760209
10 disposable polypropylene in-line filters		760210
HEPA filter replacement kit, includes HEPA, in-line, and access port filters		1900067
Replacement HEPA ² VOC filter		760200
HEPA ² VOC filter replacement kit, includes HEPA2, in-line and access port filters		1900094
HEPA ² VOC filtration system (kit), converts HEPA filter airflow system to HEPA ² filtration system, includes HEPA ² filter and two silicone plugs		760199
Decontamination kit, includes sample port, HEPA filters, sensor gasket, wheel, and miscellaneous components		190651
Door kit, lock, and right hand door swing		
Independent inner glass door kit (eight glass doors with latches), mounts inside heated inner glass door, is removable and can be autoclaved (Fig. 02)		190650
Door lock for heated inner glass door		190646
Right hand door swing, factory installed at time of order		190666
CO₂ and N₂ accessories		
Built-in gas guards to monitor CO ₂ or N ₂ , automatically switch from one cylinder to the other when supply is exhausted, factory installed	CO ₂ gas guard	190640
	N ₂ gas guard	190642
Regulators with barbed connection and shut off valve	Two-stage CO ₂ gas regulator (Fig. 03)	965010
	Two-stage N ₂ gas regulator	961027
Wall clamp for a CO ₂ bottle, includes cylinder holder with web strap		950316
Roller base and stand		
Roller base (heavy-duty steel) with dual-wheel, swivel locking casters and leveling feet; pre-drilled for easy attachment; raises unit 2.8" (7.1cm) off the floor (Fig. 06)		190647
Stand (heavy-duty steel) with leveling feet, raises unit 6.5" (16.5 cm) off the floor		190648
Data outputs (select one), factory installed		
RS-485 interface		190523
4-20 milliamp		190512
0-5V analog		190543
0-1V analog		190544

*HEPA and HEPA² filters are rated a minimum 99.97% efficient at 0.3 microns. Filters are easily replaced without tools.

Accessories and options

Description	Cat. No.
Thermo Scientific™ Sensaphone™ Telephone Dialing Systems	
Interface with standard touch-tone phone system for up to four input channels	400047
Interface with standard touch-tone phone system for up to eight input channels	400134
6", 7 Day circular chart recorders	
Single pen, 120V	201155
Single pen, 220V	201156
Dual pen, 120V, 2 probes, temp/temp (for stacked incubators)	201157
Dual pen, 120V, 1 probe, temp/RH	201159
Dual pen, 220V, 1 probe, temp/RH	201160
Miscellaneous accessories	
Sealed modular incubator chamber, purge with any gas mixture to create a "mini-incubator" inside your incubator for unusual gas and temperature (Fig. 05) controlled experiments, dimensions: 12.0" (30.5 cm) circular chamber, 4.7" (11.9 cm) high	190043
Chamber cooling coil, use with refrigerated water bath/circulator to operate incubator at lower than ambient temperatures, factory installed	190645



Fig. 01 | Copper humidity pan and shelves



Fig. 02 | Inner glass door kit



Fig. 03 | Two-stage CO₂ gas regulator



Fig. 04 | HEPA air-filter (VOC)



Fig. 05 | Sealed modular incubator chamber



Fig. 06 | Roller base and stand

Learn more at thermofisher.com/co2

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