

Incubation

CO₂ Incubators

The industry's most complete cell culture solution for highly regulated applications or conventional incubation.



MCO-19AIC



The MCO-19AIC CO₂ incubator is designed for demanding and regulated applications in the biomedical, pharmaceutical, medical research and clinical laboratory. Representing years of research, development and component testing, the MCO-19AIC offers outstanding performance and advanced, multi-level contamination control to provide the ideal solution for cell culture protocols.



Ideal for highly regulated or sensitive applications

The combination of MCO-19AIC incubator performance functions permit use with confidence in high-value cell protocols among hard-to-grow cell lines, cells highly sensitive to contamination, ultra-sensitive media and reagents, or protocols that require strict isolation and decontamination between processes.

These include but are not limited to:

- Stem cell research
- Autologous tissue regeneration and regenerative medicine
- Genomic and proteomic expression
- Esoteric plant and amphibian cell culture
- Hypersensitive and transgenic cell culture
- Low media volume microplate work



Hydrogen Peroxide (H₂O₂) Vapor Decontamination

The use of H₂O₂ decontamination in biological safety cabinets and barrier isolators is a popular alternative to ethylene oxide (EtO) as a safer, more efficient decontamination method and H₂O₂ has long been extensively used in the pharmaceutical industry. In aerospace research, H₂O₂ is used to decontaminate satellites and interplanetary exploration probes.

The MCO-19AIC design allows safe, effective H₂O₂ decontamination

Unlike conventional incubators, the unique features of the MCO-19AIC incubator permit use of the H₂O₂ process in situ with complete safety, zero impact on adjacent equipment or the environment, and a rapid return to service.

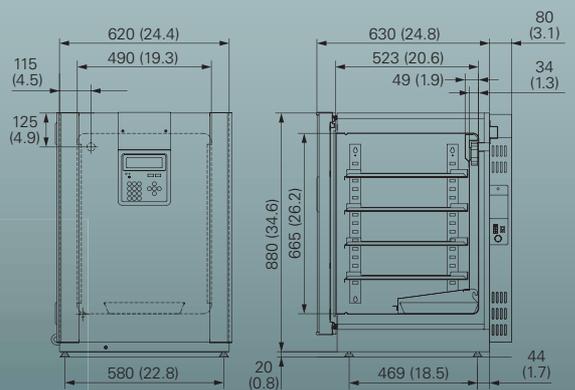
- The H₂O₂ decontamination process functions with the patented Panasonic SafeCell UV system. Following a seven-minute H₂O₂ vaporization, circulation and dwell cycle, vaporization is stopped and the SafeCell UV lamp turned on for up to 90 minutes.
- When exposed to UV light, the H₂O₂ vapor breaks down into water and oxygen, leaving only traces of water droplets. These droplets automatically condense onto a naturally cooler section of the interior floor for easy wipe-up.

- Throughout the entire cycle the MCO-19AIC airflow system continues to gently circulate interior air assuring 100% vapor contact with all interior surfaces, ultimately creating a serial dilution of H₂O₂ as it passes over the UV lamp.
- Orientation of interior sample ports of the single beam, dual detector IR CO₂ sensor creates a slight air flow through the sample chamber, permitting total decontamination of the CO₂ system at the same time.
- Shape and location of interior components such as shelves, shelf brackets, plenum covers and the humidity pan permit the components to remain in the chamber during the decontamination process, conveniently bypassing the need for a separate autoclave cycle.
- Once the cycle is complete, the door locking system is released; the inner door can be opened, interior components repositioned and the incubator is returned to service.

Model	MCO-19AIC(UV)	MCO-19AIC
H ₂ O ₂ Decontamination System	Optional	Optional (also requires SafeCell UV)
SafeCell UV System	Standard	Optional
inCu saFe Copper Enriched Stainless Steel Interior	Standard	Standard
Single Beam, Dual Detector IR CO ₂ Sensor	Standard	Standard
Direct Heat & Air Jacket (DHA) Heating System	Standard	Standard
LCD Graphical Controller/Display, Door Mounted	Standard	Standard



Dimensions



Unit : mm (inch)

Contamination Control



H₂O₂ Contamination Control

- The unique MCO-19AIC H₂O₂ decontamination system (optional) limits downtime to less than three hours when total chamber decontamination with verification is desired.
- All interior components and CO₂ sampling loop are decontaminated in situ; no need for removal and autoclaving.



inCu saFe Construction for Germicidal Protection

- Panasonic offers exclusive use of inCu saFe copper-enriched stainless steel alloy interior surfaces within a technical design created to eliminate contamination sources and to mitigate the effect of airborne contaminants introduced through normal use.
- Chart summarizes test results with four strains of mycoplasma. Results demonstrate how Panasonic inCu saFe copper enriched stainless steel alloy offers germicidal properties of conventional C1100 copper while maintaining both corrosion-proof and discoloration-resistant properties of conventional stainless steel 304.

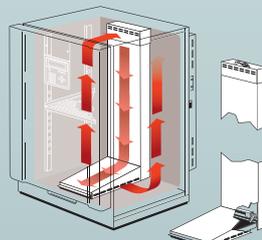
Mycoplasma Strain	Positive Control	Conventional Stainless Steel 304	Panasonic inCu saFe	Conventional Copper C1100
Mycoplasma fermentans PG18	YES	YES	NO	NO
Mycoplasma orale CH19299				
Mycoplasma arginini G230				
Mycoplasma hominis PG21				

"YES" means that mycoplasma strains grew on the material.
"NO" means that no mycoplasma strain grew on the material.



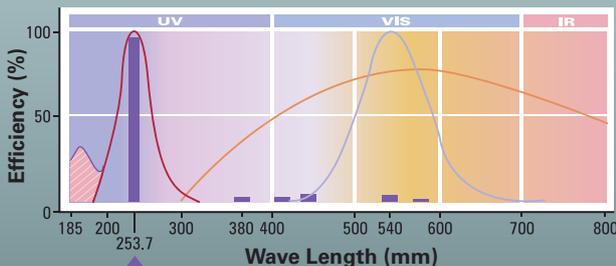
SafeCell UV Decontamination system

- SafeCell UV includes a programmable ultraviolet lamp, isolated from cell cultures, that decontaminates conditioned air and humidity reservoir water to prevent contamination without affecting cell cultures in vitro.



Airflow and water pan decontamination using a UV system

- Contaminants trapped within the humidifying pan at the base of the plenum are destroyed by high intensity, ozone-free ultraviolet light.
- Decontaminated, humidified air is released from the lower plenum for vertical convection through and around the perforated shelves. Interior air motion is suspended when the door is opened, minimizing movement of room air contaminants into the chamber. The unique air duct system also improves temperature recovery characteristics.



The MCO-19AIC(UV) ultraviolet lamp is a highly effective, ozone-free contamination control technique.

- Panasonic Lamp ■ Ozone Release ■ Germicidal Effect ■ Sunlight
- The SafeCell UV lamp cycle is factory set for normal use, and can be re-programmed as desired by entering parameters through the central microprocessor control panel. Program parameters for the H₂O₂ decontamination cycle are non-adjustable for operator safety.

Intelligent Control and Monitoring

Accurate Temperature Control

- The patented Direct Heat and Air Jacket conditioning system precisely regulates temperature through three independent heating zones under microprocessor PID control. Uniform temperatures are further enhanced by gentle fan circulation.



Direct Heat and Air Jacket Conditioning System

- The main heater provides precise temperature control.
- The bottom heater warms the distilled water and controls chamber humidity.
- The outer door heater prevents condensation on the inner door and facilitates quick temperature recovery after door openings.

- To avoid cell culture desiccation, the MCO-19AIC maintains up to 95% RH at 37°C.
- Humidification is achieved by reliable natural evaporation and forced-air circulation and protected by an automatic optical sensor for low water level alerts.



Precise CO₂ Control

- Panasonic proprietary single beam, dual detector infrared CO₂ system offers unprecedented control accuracy and stability by simultaneously measuring two wavelengths for continuous zero calibration.
- Benefits include ultra-fast recovery without overshoot and accurate CO₂ averages during periods of frequent incubator access with multiple door openings.
- An optional semi-automatic, one-point calibration system is available.

Graphic Control Panel

- The MCO-19AIC control and information center includes an intuitive pop-up menu, graphic LCD for inputs, outputs and performance at a glance.



- Overheat indicator
- Digital alphanumeric LCD display.
- Message display
- Pop-up menu
- H₂O₂ decontamination sequence start key
- Menu call button
- Positive feedback tactile entry and function keys
- Positive feedback tactile input buttons
- Display contrast adjustment

Data Management

- Multi-point data logging offers push-button graphical display. Panasonic DAQ system permits remote transmission, data logging and live monitoring.

Ergonomic and Practical Design

Cabinet Design

- The 170-liter capacity, low profile cabinet is stackable with the field-reversible doors.
- Convenient, space efficient inventory management is simplified through a system of adjustable, extendable, perforated shelves.

Security

- A door ajar alarm warns if the outer door is left open.
- A physical interlock and neutralization sequence in H₂O₂ decontamination process assures operator safety.

H₂O₂ Decontamination Cycle



Rapid, Effective and Safe H₂O₂ Decontamination Cycle with minimum downtime

Industry-first, Panasonic unique high-speed decontamination system utilizing vaporized H₂O₂ offers time-saving and documented chamber decontamination with complete safety.

- Full decontamination process takes less than three hours, saving valuable time. For example, if the decontamination cycle is started at 9 am, the unit will be ready for use in the afternoon.
- All interior components are decontaminated in situ. No need for time-consuming removal and autoclaving.

- After decontamination H₂O₂ vapor is decomposed to harmless water and oxygen by UV light.
- Outer door is automatically locked during the decontamination cycle by the electric interlock system to ensure operator safety.
- Unlike a high heat decontamination incubator, Panasonic's unique H₂O₂ decontamination cycle does not emit high heat. Therefore, when two MCO-19AIC are stacked, one incubator can be decontaminated without affecting the temperature in the other.

H₂O₂ Decontamination Process*

Preparation



Preparation

Remove all interior components

Clean the chamber

Reposition the interior components to the specified positions for in situ decontamination

H₂O₂ set up

Pour a bottle of Panasonic H₂O₂ reagent into the H₂O₂ vapor generator

Position the H₂O₂ vapor generator in the chamber

Decontamination



The H₂O₂ decontamination cycle is monitored for safety and cycle status. A physical interlock and neutralization sequence assures total decontamination and operator safety.

1. Start Cycle



When the H₂O₂ button is pressed a confirming message prompts the user to proceed with the decontamination cycle or cancel. The outer door is automatically locked.

2. H₂O₂ Vapor Cycle



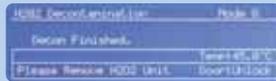
Once the door locks automatically, the cycle starts. The flashing H₂O₂ display confirms the process and counts down remaining H₂O₂ vaporization time.

3. UV Resolution



The H₂O₂ vapor generator automatically completes after a 7 minute cycle. UV lamp comes ON. The flashing UV Resolve display counts down remaining time in the UV cycle as H₂O₂ is reduced to water and trace oxygen.

4. Cycle Complete



When the cycle is complete the door lock releases automatically. The H₂O₂ vapor generator and cable can be disconnected and removed and all interior components restored to their normal position.



H₂O₂ solution vaporization begins.



H₂O₂ vapor fills the chamber.



UV lamp comes on to reduce H₂O₂ to water and oxygen.

130 mins

Finish



Wipe out the chamber.

Reposition the interior components to their normal positions.

Start/Resume culture



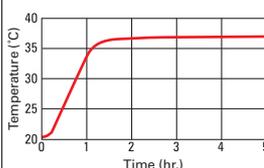
Decontamination started at 9 am enables cultures to be started or resumed by the afternoon.

* The decontamination time shown above is a guide. Actual process time may differ depending on chamber cleaning time and set-up time.

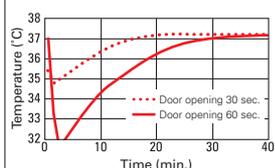
- Decontamination requires Panasonic exclusive H₂O₂ reagent
- During decontamination, the door is locked by the electric interlock to prevent inadvertent opening.
- Above decontamination process is done by using standard interior items. Additional shelves and dishes may impair the effect of decontamination.

Performance Data

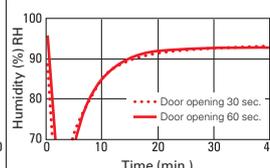
Temperature pull-up characteristics



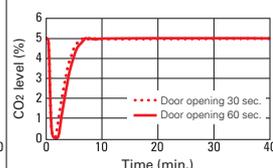
Temperature recovery characteristics



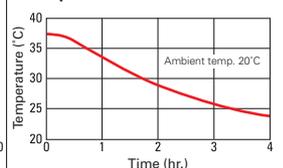
Humidity recovery characteristics



CO₂ level recovery characteristics



Temperature decrease characteristics when power failure occurs



Specifications	MCO-19AIC(UV)	MCO-19AIC
Contamination control		
H ₂ O ₂ decontamination System	Optional	Optional
SafeCell UV system	Standard	Optional
Copper enriched stainless steel interior	Standard	Standard
Environmental performance		
Temperature control range	+5°C above ambient to 50°C (Ambient temperature: 5°C to 35°C)	
Temperature control uniformity	±0.25°C in 25°C ambient, setting 37°C, 5% CO ₂ , no load*	
CO ₂ control range and deviation	0% to 20%, ±0.15% in 25°C ambient, setting 37°C, 5% CO ₂ , no load	
CO ₂ sensor platform	Ceramic based, single beam Infrared sensor, with dual wavelength measurement for continuous auto-zero calibration	
CO ₂ sampling, patent pending	No moving parts; airflow passes over in/out ports to sustain continuous sampling	
CO ₂ calibration	Automatic, continuous zero reference calibration. Optional semi-automatic one point gas calibration system	
Airflow	Gentle vertical airflow, continuous with inner door closed	
Interior humidity	95% RH at 37°C by natural evaporation with humidifying pan with reflective optional low water sensor	
Control, monitoring, alarm		
Temperature and CO ₂ control	P.I.D. control system setpoint resolution 0.1°C, 0.1%	
Display	Alphanumeric LCD digital display messaging	
Data acquisition	Automatic log function of temperature and CO ₂	
Communications	Remote alarm contacts standard. Optional 4-20mA connection. Optional with RS232C/RS485/LAN data ports	
Cabinet design and construction		
Exterior cabinet and door	Galvanized steel with baked-on finish	
Interior and shelves	Copper-enriched stainless steel	
Inner door	Tempered glass	
Insulation	Rigid foam polyurethane	
Outer door	Reversible, heated	
Access port	Single 30mm port with non-VOC silicone stoppers	
Leveling feet	4, Adjustable	
Energy and CO₂ utilities		
Maximum power consumption	310 W	
Maximum heat discharge	1120 KJ/h	
CO ₂ gas connection	4mm to 6mm inner diameter tubing	
CO ₂ gas pressure	0.03MPaG (0.3kgf/cm ² G, 4.3psiG) from two-stage CO ₂ regulator	
CO ₂ gas cylinder changeover system	Optional	Optional
Dimensions, Weights, Capacities		
Interior dimensions (W x D x H)	490 x 523 x 665 (mm) / 19.3 x 20.6 x 26.2 (inch)	
Exterior dimensions (W x D x H) ^{*1}	620 x 710 x 900 (mm) / 24.4 x 27.9 x 35.4 (inch)	
Volume	170 liters (6.0 cu.ft.)	
Shelves	4 supplied as standard (Maximum 15), 450(W) x 450(D) x 12(H) mm, maximum load 7 kg/shelf	
Net weight	93kg (205 lbs)	

Voltage specification by destination		Model No.
Representative destination	Europe 230V, 50Hz (CE)	MCO-19AICUV-PE
	Korea 220V, 60Hz	MCO-19AICUV-PK
	Thailand 220V, 60Hz	MCO-19AICUV-PB
	Taiwan 110V, 60Hz	MCO-19AICUV-PT

* The measurement condition complies with Panasonic specified measuring method.

*1 Exterior dimensions of main cabinet only - see dimension drawings showing handles and other external projections.

Optional Accessories

	MCO-19AIC(UV)	MCO-19AIC
H ₂ O ₂ decon set	MCO-HL-PE* ¹	
H ₂ O ₂ generator	MCO-HP-PW	
H ₂ O ₂ reagent	MCO-H202-PE*/MCO-H202-PV* ²	
Gas auto changer	MCO-21GC-PW	
STD gas auto calibration kit	MCO-SG-PW	
Gas regulator	MCO-100L-PW	
Roller base	MCO-18RB-PW	
Tray	MCO-47ST-PW	

* Appearance and specifications are subject to change without notice.

Caution: Panasonic guarantees the product under certain warranty conditions. Panasonic in no way shall be responsible for any loss of content or damage to content.

The MCO-19AIC(UV)/19AIC are certified as a Class IIa Medical Device (93/42/EEC) for medical purposes of culturing cell tissues, organs and embryos. (for EU countries only)



Panasonic Healthcare Co., Ltd., Biomedical Business Unit is certified for:
Quality management system: ISO9001
Medical devices quality management system: ISO13485



Panasonic Healthcare Co., Ltd., Biomedical Business Unit is certified for:
Environmental management system: ISO14001

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