CelCulture®

CO₂ Incubators
Cradle for Beautiful Cells
**Esco CelCulture® CO₂ Incubators**

*Cradle for Beautiful Cells*

**Introducing CelCulture®**

CO₂ incubators are widely used in scientific research to grow and maintain cell cultures. Typical fields of application include tissue engineering, *in vitro* fertilization, neuroscience, cancer research and other mammalian cell research.

Sleek, reliable and intuitive, Esco CelCulture CO₂ incubators provide all-rounded sample protection that brings your scientific dreams one step closer to reality.

**Blower**

Gentle airflow in chamber improves recovery and uniformity

**ULPA filter**

- 99.999% efficient, superior to conventional HEPA filters
- Filters air continuously
- Chamber returns to ISO Class 5 cleanliness in 13 minutes upon door closing to prevent contamination

**Shelving**

- Perforated shelving to improve uniformity
- Anti-tip
- Stainless steel
- Built-in grip
- Dismantles without tools for easy cleaning

**ISOCIDE™ coating**

Antimicrobial coating eliminates 99.9% of surface bacteria within 24 hours of exposure

**Direct heat & air jacket**

- Fast and uniform heating
- Rapid temperature recovery without overshoot
- Air jacket improves chamber stability

**Pilaster**

Can be removed without tools for easy cleaning

**Water pan**

- Precisely heated by base heater to provide high humidity
- Gentle airflow over water surface accelerates humidity recovery

**Leveling feet**

Easily adjustable
Esco CelCulture CO₂ Incubators, Model CCL-170

**SmartSense™ microprocessor interface**
Intuitive, fully equipped control and monitoring system

**CO₂ sensor**
- Choice of TC or IR
- Single beam dual wavelength IR sensor is drift free
- Auto-zeroing

**Outer door**
- Reversible
- Heated to prevent condensation

**Sample port**
Allows direct measurement of chamber atmosphere such as temperature and CO₂ concentration

**Duct work**
- Directs air flow for rapid recovery and excellent uniformity
- Easily removed for cleaning

**Rounded corners**
- Seamless design
- Facilitates cleaning

**Inner door seal**
Airtight to prevent CO₂ leakage thus lowers CO₂ consumption
**VivoCell™ Precise Parameter Control**

*Best uniformity and control among competition*

Different lines represent different sensor positions inside the chamber. Esco CelCulture has uniformity variance of less than ±0.2 °C which means all the samples are evenly heated.

**Fast CO2, temperature and humidity recovery without overshoot**

Precisely tuned sensor and software results in fast recovery of CO2 without overshoot. This ensures uniform CO2 levels even with frequent incubator door openings. Similarly, temperature and humidity recoveries are twice as fast as conventional incubators.

**Direct heat and air jacket**

- Direct heating enables rapid temperature recovery while air jacket provides isolation against ambient temperature fluctuations.
- All six surfaces of the incubator are heated via eight heaters grouped into three control zones:
  - The main heater provides precise temperature control.
  - The bottom heater warms the water pan and controls humidity.
  - The outer door heater prevents condensation on glass door and facilitates temperature recovery.

**VentiFlow™ forced convection**

- No disturbance to cell culture.
- Blower automatically stops when door is opened, to minimize mixing of chamber and room air.
- Accelerates recovery of chamber air to ISO Class 5 Cleanliness after door closing to prevent contamination.
- Improves CO2, humidity and temperature uniformity.

- Filtered air circulates across water pan to accelerate humidifying process.
An ULPA filter filters the chamber air continuously to keep chamber at ISO Class 5 cleanliness. This ensures all contaminants from the room air and chamber air are filtered and only clean air is recirculated. ULPA filters operate at 99.999% efficiency, superior to conventional HEPA filters which are 99.99% efficient. Chamber achieves ISO Class 5 Cleanliness condition after a mere 13 minutes following a door closing.

Validated SwiftCon™ overnight decontamination cycle

- Use of 90°C moist heat kills most microorganisms.
- SwiftCon™ completes within 15 hours.
- Chamber is cool and dry at the end of the cycle. No further wipe down is needed.

Gas injection lines are filtered

- All gas injection lines are filtered via 0.2 micron in-line filter to remove impurities and contaminants before being injected into the chamber.
- In-line filters are field replaceable external to the incubator.

ISOCIDE™ antimicrobial coating

- Chamber is made of type 304 stainless steel. Main body is electrogalvanized steel with ISOCIDE™ antimicrobial coating. Esco ISOCIDE™ is an antimicrobial inhibitor that eliminates 99.9% surface bacteria within 24 hours of exposure. Isocide is integrated into the coating and cannot be washed out or diminished by repeated cleaning.
• Comprehensive, user-configurable alarms:
  - Temperature
  - CO₂
  - Humidity (if installed)
  - O₂ (if installed)
• CelAlert™ alarm system reminds user to replace parts.
  - CO₂ tank depletion reminder in addition to CO₂ tank low alarm. Automatic calculation of how much CO₂ gas is left in the tank provides fail proof reminder that alerts user one week before the gas is depleted. This gives user some buffer time to place order for new tanks.
  - ULPA reminder will alert user to replace ULPA filter.

• Intelligent data and event logger records all incubator parameters for on screen recall. 16 Mb built-in flash memory guarantees long term storage of data.

• Diagnostic interface and on line quick help provide comprehensive solutions to frequently encountered problems.
Rear Panel

Power Supply Inlet
The Power Supply Inlet connects the incubator unit to the power source.

Cooling Fan
The Cooling Fan prevents the electrical panel from overheating.

RS485 Communication Port
The RS485 provides serial communication port for PC. It can be daisy chained from product to product and connected to PC.

Analog Port (Optional)
The Analog Port allows the incubator to output analog signals representing temperature, CO₂/O₂* concentration and relative humidity, depending on the options available in the incubator. This allows the incubator to be connected to an in-house data acquisition or alarm system.

Alarm Contact
A set of relay contacts located on the rear of the unit is provided to monitor temperature, humidity or CO₂ alarms. The alarm contacts can be connected to a remote alarm system.

CO₂ Gas Supply Inlet
The CO₂ Gas Supply Inlet connects the CO₂ gas supply with the Incubator unit.

N₂ Gas Supply Inlet
The N₂ Gas Supply Inlet is only applicable for models with N₂* Control function.

Gas Inline Filter
Inline filter are provided to remove any contaminants from gas supply.

Access Port
Allows cables, hoses or additional sensors to be routed into the work space. Rubber stopper with controlled leak is installed as standard configuration and is part of standard accessories.

* O₂ and N₂ functions are applicable to tri-gas models only. Tri-gas models will be available on 2011
CelCulture CO₂ Incubators Sensors
Vaisala IR Sensor

Vaisala’s IR sensor is a versatile instrument for measuring CO₂ level inside the Incubator. The CARBOCAP® sensor is silicon based and its operation is based on the NDIR Single-Beam Dual-Wavelength principle.

IR based sensor are not affected by water vapor, dust and most chemicals. The single beam dual wavelength technology (one reference and one measurement) ensures a drift free sensor that does not require calibration by the user.

Operating principle
The light source is positioned to shine at the IR detector so that the light travels a fixed distance to the detector, where the intensity of the light is measured. A Fabry-Perot Interferometer (FPI) is positioned just in front of the IR detector. The FPI is a tunable filter which allows only certain wavelengths of light to pass through to the detector.

Carbon dioxide absorbs certain wavelengths of light and not others, so the FPI is designed to pass light at a CO₂ absorption wavelength (4.26 μm) and a nearby, non-absorbing wavelength. When the sensor is operating, the FPI is regularly tuned back and forth between the two wavelengths. At the CO₂ absorption wavelength, the intensity of detected light is reduced in proportion to the concentration of CO₂ in the optical path. The light intensity measured at the non-absorbing wavelength serves as a baseline for comparison.

Fig 1: Measurement Wavelength
At the CO₂ absorption wavelength, light is absorbed by the carbon dioxide present in the gas. The FPI tunes out all other wavelengths, so the intensity of light reaching the IR Detector varies as a function of the amount of CO₂ within the sensor.

Fig 2: Reference Wavelength
Here the FPI is tuned to a nearby non-absorbing reference wavelength, where the IR Detector measures the full intensity of light, creating a baseline for comparison. Any changes in the performance of the light source, FPI or IR Detector effect both measurements equally, preserving the difference between both measurements and therefore the calibration of the sensor.

Operating Conditions:
%CO₂ detection range: 0 to 20% CO₂ Concentration
%RH operating range: Not affected by Humidity
Temperature range: -20°C to +60°C

TC CO₂ Sensor
Esco TC CO₂ sensor’s operating principle relies on a resistor as a heater and two thermocouples as a sensing element for the CO₂ gas. Accurate sensing is made possible by the porous cap on the eye of the sensor probe.

One of the thermocouple functions as a reference signal, while the other functions as the sensing signal. An amplifier will feed the data variance between the two thermocouples to an electronic control system.

Operating Conditions:
%CO₂ detection range: 0 to 20% CO₂ Concentration
%RH operating range: 40% to 98% Relative Humidity
Temperature range: +25°C to +100°C
Options and Accessories

**COA-1001-F Humidity Display**
This option allows the Incubator to monitor the relative humidity inside the chamber.

**COA-1002-F CO₂ Backup**
This option allows two tanks of CO₂ to be connected to the Incubator. It will automatically switch from the primary tank to the secondary tank when low gas pressure is detected on the primary tank.

**COA-1006 Sealed Inner Door Kit**
Celculture CO₂ Incubator can be equipped with 4 glass doors, which allows access to defined sections of the incubator without disturbing the inner atmosphere. This minimizes recovery times and contaminated risks. The Sealed Inner Door is available as a factory installed option or field installed retrofit kit.

**COA-2001-F Roller Base**
Roller base are available with castors for mobility of your incubators and to provide against floor contamination.

**COA-2002-F Floor Stand 200 mm (8.0") With Adjustable Feet**
Floor stands are available with adjustable feet, nominal range 180 mm to 250 mm (7.1" to 9.8") for comfortable access to the incubator and to avoid floor contamination.

**COA-2003-F Floor Stand 700 mm (27.6") With Casters**
This support stand raised the incubator to a height of 700 mm (27.6") above the floor for comfortable access. It comes with castors for mobility of your incubators.

**COA-2005-F 2-Stage Gas Regulator for CO₂/N₂**
CO₂ and N₂ gas input regulators reduce pressure from the tank to the incubator. It has dual pressure gauges, barbed line connection and shut-off valve. It prevents over-pressure of the gas supply into the incubator and thereby causing tubing to burst.
- CGA 320 connector (U.S. Standard)
- BP-BS341-#8-NT4 connector (British Standard)
  *Note: Compatible with European DIN477, French NFE29-650 and Australia AS2473*
- G5/8-RH connector (China Standard)
COA-2007-F Extra Shelf, With 2 Support Rails
Each Celculture CO₂ Incubator comes standard with 4 shelves and it can accommodate up to a maximum of 7 shelves. Extra shelves are available and each shelf comes with 2 support rails.

COA-2008-F Stacking Kit
Stacking kit is a provision to stack one incubator on top of another incubator. Four stacking brackets are included as standard inside the Accessories Kit Box with each incubator.

COA-2010-F Electronic CO₂ Analyzer, For CO₂/Temp Measurement
The Electronic CO₂ Analyzer allows the measurement of CO₂ concentration and temperature (with optional temperature probe).

COA-2012-F 6" Chart Recorder, Temp, 115/230VAC 50/60HZ
The chart recorder provides an easy to read graph of data vs time. It is a reliable, accurate, and stable instrument, for on the spot written documentation of environmental condition. This model offers 6" chart of temperature data.

COA-2013-F 8" Chart Recorder, Temp/Temp, 115/230VAC 50/60HZ
The chart recorder provides an easy to read graph of data vs time. It is a reliable, accurate, and stable instrument, for on the spot written documentation of environmental condition. This model offers 8" chart of temperature data and comes with 2 remote probes for dual temperature monitoring.

COA-2014-F 6" Chart Recorder, Temp/RH, 115/230VAC 50/60HZ
The chart recorder provides an easy to read graph of data vs time. It is a reliable, accurate, and stable instrument, for on the spot written documentation of environmental condition. This model offers 6" chart of temperature and humidity data.

COA-2015-F Inner Door Shelving Kit (4 Sets With Total 12 Mini Shelves For One Incubator)
These mini shelves are to be used with the Sealed Inner Door Kit installed. There are 4 sets with a total of 12 mini shelves on each incubator.

COA-2016-F Temp. Probe (5 mm Tip) for Electronic CO₂ Analyzer
## CelCulture CO₂ Incubators Technical Specifications

### Front view

### Side view

### Rear view

### Ordering Information

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCL-170A-8</td>
<td>CelCulture® Incubator, 170L, TC Sensor, CO₂ Control, ULPA, High Temp Decon, 230VAC, 50/60HZ</td>
</tr>
<tr>
<td>CCL-170B-8</td>
<td>CelCulture® Incubator, 170L, IR Sensor, CO₂ Control, ULPA, High Temp Decon, 230VAC, 50/60HZ</td>
</tr>
<tr>
<td>CCL-170A-9</td>
<td>CelCulture® Incubator, 170L, TC Sensor, CO₂ Control, ULPA, High Temp Decon, 115VAC, 50/60HZ</td>
</tr>
<tr>
<td>CCL-170B-9</td>
<td>CelCulture® Incubator, 170L, IR Sensor, CO₂ Control, ULPA, High Temp Decon, 115VAC, 50/60HZ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COA-1001</td>
<td>Humidity Display, Factory Installed</td>
</tr>
<tr>
<td>COA-1001-F</td>
<td>Humidity Display, Field Install Kit</td>
</tr>
<tr>
<td>COA-1002</td>
<td>CO₂ Backup (Tank Switcher), Factory Installed</td>
</tr>
<tr>
<td>COA-1002-F</td>
<td>CO₂ Backup (Tank Switcher), Field Installed</td>
</tr>
<tr>
<td>COA-1004</td>
<td>Reversed Door Swing, Factory Installed</td>
</tr>
<tr>
<td>COA-1005</td>
<td>Analog Outputs, Factory Installed</td>
</tr>
<tr>
<td>COA-1005-F</td>
<td>Analog Outputs, Field Installed</td>
</tr>
<tr>
<td>COA-1006</td>
<td>Sealed Inner Door Kit (4 Glass Doors With Latches), Factory Installed</td>
</tr>
<tr>
<td>COA-1006-F</td>
<td>Sealed Inner Door Kit (4 Glass Doors With Latches), Field Installed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COA-2001-F</td>
<td>Roller Base</td>
</tr>
<tr>
<td>COA-2002-F</td>
<td>Floor Stand 200 mm (8.0”) With Adjustable Feet</td>
</tr>
<tr>
<td>COA-2003-F</td>
<td>Floor Stand 700 mm (27.6”) With Casters</td>
</tr>
<tr>
<td>COA-2005-F</td>
<td>2-Stage Gas Regulator for CO₂/N₂</td>
</tr>
<tr>
<td>COA-2007-F</td>
<td>Extra Shelf, With 2 Support Rails</td>
</tr>
<tr>
<td>COA-2008-F</td>
<td>Stacking Kit</td>
</tr>
<tr>
<td>COA-2010-F</td>
<td>Electronic CO₂ Analyzer, For CO₂/Temp Measurement (Without Temp. Probe)</td>
</tr>
<tr>
<td>COA-2011-F</td>
<td>IQ/OQ Documentation</td>
</tr>
<tr>
<td>COA-2012-F</td>
<td>6” Chart Recorder, Temp, 115/230VAC 50/60HZ</td>
</tr>
<tr>
<td>COA-2013-F</td>
<td>8” Chart Recorder, Temp/Temp, 115/230VAC 50/60HZ</td>
</tr>
<tr>
<td>COA-2014-F</td>
<td>6” Chart Recorder, Temp/RH, 115/230VAC 50/60HZ</td>
</tr>
<tr>
<td>COA-2015-F</td>
<td>Inner Door Shelving Kit (4 Sets With Total 12 Mini Shelves For One Incubator)</td>
</tr>
<tr>
<td>COA-2016-F</td>
<td>Temp. Probe (5 mm Tip) for Electronic CO₂ Analyzer</td>
</tr>
</tbody>
</table>

### Diagrams

- Front view
- Side view
- Rear view

### Dimensions

- 660 mm (26.0”)
- 505 mm (19.9”)
- 96 mm (3.8”)
- 635 mm (25.0”)
- 660 mm (26.0”)
- 530 mm (20.9”)
- 695 mm (27.3”)
- 505 mm (19.9”)

### Labels

- 1. Control panel
- 2. On/off switch
- 3. Blower
- 4. ULPA filter
- 5. Sensors
- 6. Access port
- 7. Adjustable shelves
- 8. Humidity pan
- 9. N₂ gas supply
- 10. CO₂ gas supply
- 11. Alarm contact
- 12. Analog output
- 13. RS485
- 14. Cooling fan
- 15. Power supply inlet
## Celculture CO₂ Incubator Model CCL-170_-

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Direct heat &amp; air jacket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp. Control Method</td>
<td>Direct heat &amp; air jacket</td>
</tr>
<tr>
<td>Temp. Range, °C</td>
<td>Amb. +3 to 60</td>
</tr>
<tr>
<td>Temp. Uniformity, °C</td>
<td>&lt;± 0.2*</td>
</tr>
<tr>
<td>Temp. Accuracy, °C</td>
<td>&lt;± 0.1</td>
</tr>
<tr>
<td>Recovery Time Without Overshoot** (after 1 min. door opening)</td>
<td>6 mins</td>
</tr>
<tr>
<td>Ambient Temp. Range</td>
<td>18 to 34°C (64 to 93°F)</td>
</tr>
<tr>
<td>CO₂ Control System</td>
<td>Microprocessor PID</td>
</tr>
<tr>
<td>CO₂ Range, % CO₂</td>
<td>0-20</td>
</tr>
<tr>
<td>CO₂ Accuracy, % CO₂</td>
<td>± 0.1</td>
</tr>
<tr>
<td>CO₂ Sensor</td>
<td>IR sensor or TC sensor</td>
</tr>
<tr>
<td>CO₂ Recovery Time Without Overshoot*** (after 1 min. door opening)</td>
<td>4 mins</td>
</tr>
</tbody>
</table>

### Humidity

<table>
<thead>
<tr>
<th>Humidity Method</th>
<th>Humidity pan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity Range, % RH</td>
<td>Up to 97%</td>
</tr>
<tr>
<td>Humidity Recovery (± 5% from initial)</td>
<td>15 mins</td>
</tr>
</tbody>
</table>

### Physical Construction

<table>
<thead>
<tr>
<th>Interior Volume</th>
<th>170 l (5.7 cu.ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Dimensions (W x D x H)</td>
<td>660 x 660 x 900 mm (26.0” x 26.0” x35.4”)</td>
</tr>
<tr>
<td>Internal Dimensions (W x D x H)</td>
<td>505 x 530 x 635 mm (19.9” x 20.9” x 25.0”)</td>
</tr>
<tr>
<td>Shipping Weight</td>
<td>120 kg (264.6 lbs)</td>
</tr>
<tr>
<td>Shipping Dimensions (W x D x H)</td>
<td>850 x 720 x 1150 mm (33.5” x 28.3” x 45.3”)</td>
</tr>
<tr>
<td>Number of Shelves</td>
<td>4</td>
</tr>
<tr>
<td>Maximum No. of Shelves</td>
<td>7</td>
</tr>
<tr>
<td>Shelves Area (W x D)</td>
<td>470 x 470 mm (18.5” x 18.5”)</td>
</tr>
<tr>
<td>Max. Load per Shelf</td>
<td>11 kg/shelf (24.3 lbs/shelf)</td>
</tr>
<tr>
<td>Available Electrical Configuration</td>
<td>230 VAC, 50/60 Hz, 1Ø, 3.4 A</td>
</tr>
<tr>
<td></td>
<td>115 VAC, 50/60 Hz, 1Ø, 7.0 A</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>800 watts</td>
</tr>
<tr>
<td>Effective Watt at 37°C</td>
<td>80 watts</td>
</tr>
</tbody>
</table>

### Contamination Control

<table>
<thead>
<tr>
<th>Interior Material</th>
<th>Stainless steel, type 304</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contamination Control Methods</td>
<td>1) Main body is eletrogalvanized steel with ISOCIDE antimicrobial coating;</td>
</tr>
<tr>
<td></td>
<td>2) ULPA filter;</td>
</tr>
<tr>
<td></td>
<td>3) Moist 90°C overnight decon. cycle;</td>
</tr>
</tbody>
</table>

Since 1978, Esco has emerged as a leader in the development of controlled environment, laboratory and cleanroom equipment solutions. Products sold in more than 100 countries include biological safety cabinets, cleanroom products, compounding pharmacy equipment, CO₂ incubators, containment I pharma products, ductless fume hoods, in vitro fertilization workstations, lab animal research products, laboratory fume hoods, laboratory ovens and incubators, laminar flow clean benches and PCR products and instrumentation. With the most extensive product line in the industry, Esco has passed more tests, in more languages, for more certifications, throughout more countries than any biosafety cabinet manufacturer in the world. Esco remains dedicated to delivering innovative solutions for the clinical, life science, research and industrial laboratory community. www.escoglobal.com.

Biological Safety Cabinets and Laminar Flow • Laboratory Fume Hoods • Laboratory Ovens Laboratory Incubators • PCR Thermal Cylers • Microplate Shaker/Incubators • Ultralow Freezers

**Data recorded under optimum factory testing conditions**

**For temperature not exceeding 37.3°C**

***For CO₂ not exceeding 5.2%***