

MILLIPORE

# **Environmental Incubators**

User Guide

- **Portable Single Chamber Incubator**
- **Portable Dual Chamber Incubator**

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# Environmental Incubators

## Introduction

The Millipore incubators are compact, lightweight units used for the incubation of total and fecal coliforms, *E. coli*, *Fecal Streptococci*, and heterotrophic organisms (all analyzed through Millipore membrane filter techniques).

The incubators chambers can hold up to 48 petri dishes, 72 petri slides, 20 (twenty) 55-Plus™ Monitors, or 12 MilliFlex™ cassettes. Each chamber operates at five fixed temperature settings ranging from 30°C ( $\pm 0.5^\circ\text{C}$ ) to 44.5°C ( $\pm 0.2^\circ\text{C}$ ). The exact temperature settings available depends on the type of incubator you use.

## The Purpose of this Manual

This manual describes how to use these types of Millipore incubators:

- Portable Single Chamber Incubator
- Portable Dual Chamber Incubator

**NOTE:** Many of the procedures apply to all of the incubators. However, some sections contain specific information. Refer to the appropriate sections for your type of incubator.

## Portable Single Chamber Incubator Overview

The Portable Single Chamber Incubator enables you to test drinking and waste water. This section lists the contents of your kit. It also includes a diagram of its parts and provides details on the incubator's holding capacity, features, and temperature settings.

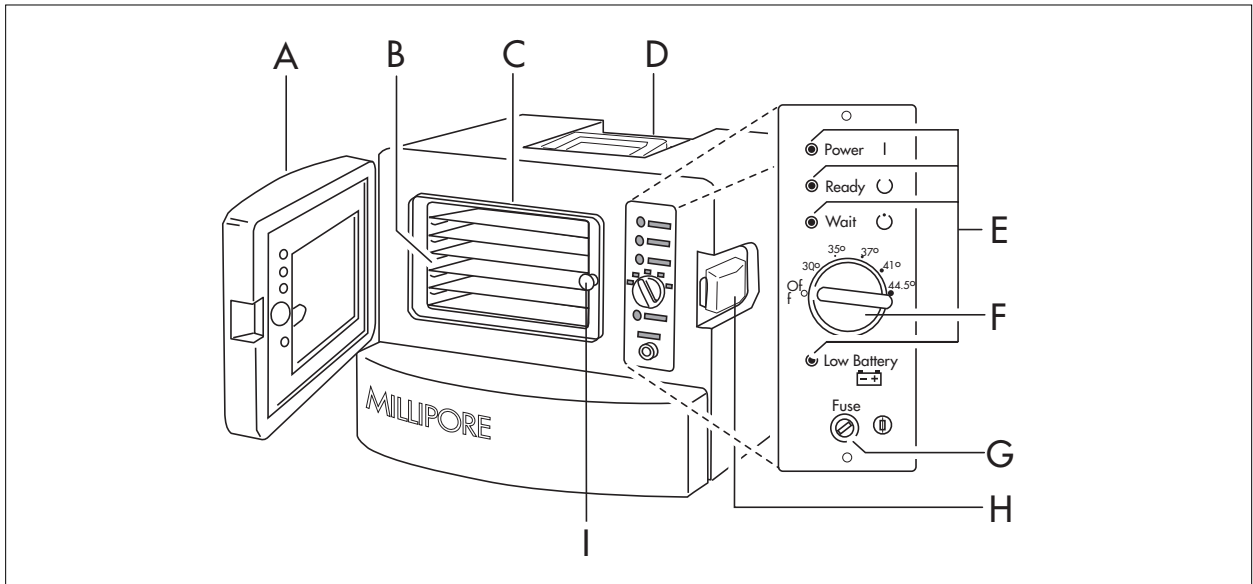
### Portable Single Chamber Incubator Kit Contents

- Portable Single Chamber Incubator (115 volts [V] or 220/240 V), with epoxy-coated removable shelves (6), thermometer with clips, and cables
- AC power supply (115 V or 220/240 V)
- Carrying bag (not included in the Lab kit)
- Rechargeable nickel cadmium battery (not included in the Lab kit)
- Battery charger (115 V or 220/240 V, not included in the Lab kit)

**NOTE:** To order parts or accessories, see "Ordering Information" further in this document.

## Portable Single Chamber Incubator Diagram and Parts

Your incubator looks like this:



Letter	Part
A	Exterior door
B	Chamber with shelves
C	Heated interior door
D	Carrying handle
E	Indicator light emitting diodes (LEDs)
F	Temperature selector
G	Fuse
H	Exterior door latch
I	Interior door knob

## Description of the Portable Single Chamber Incubator

<b>Category</b>	<b>Description</b>
Holding capacity	<ul style="list-style-type: none"> <li>■ 48 petri dishes</li> <li>■ 72 petri slides</li> <li>■ 20 (twenty) 55-Plus Monitors</li> <li>■ 12 MilliFlex cassettes</li> </ul>
Features	<ul style="list-style-type: none"> <li>■ Shock- and water-resistant case</li> <li>■ Gaskets on the door and battery compartment</li> <li>■ Epoxy-coated chamber that resists chemical attack and cleans easily</li> <li>■ One Teflon™-coated thermometer to clip onto the inner chamber shelves</li> <li>■ One nylon carrying bag with high-density foam padding (included only with field kits)</li> </ul>
Fixed temperature settings of chamber	<ul style="list-style-type: none"> <li>■ 30°C (± 0.5°C)</li> <li>■ 35°C (± 0.5°C)</li> <li>■ 37°C (± 0.5°C)</li> <li>■ 41°C (± 0.5°C)</li> <li>■ 44.5°C (± 0.2°C)</li> </ul>

See the “Portable Single Chamber Incubator Specifications” section near the end of this document for more details.

## Portable Dual Chamber Incubator Overview

The Portable Dual Chamber Incubator has two incubation chambers that have their own temperature control. You can independently set each control. This enables you to split the samples and simultaneously recover different organisms in one incubator.

This section lists the contents of your kit. It also includes a diagram of its parts and provides details on the incubator's holding capacity, features, and temperature settings.

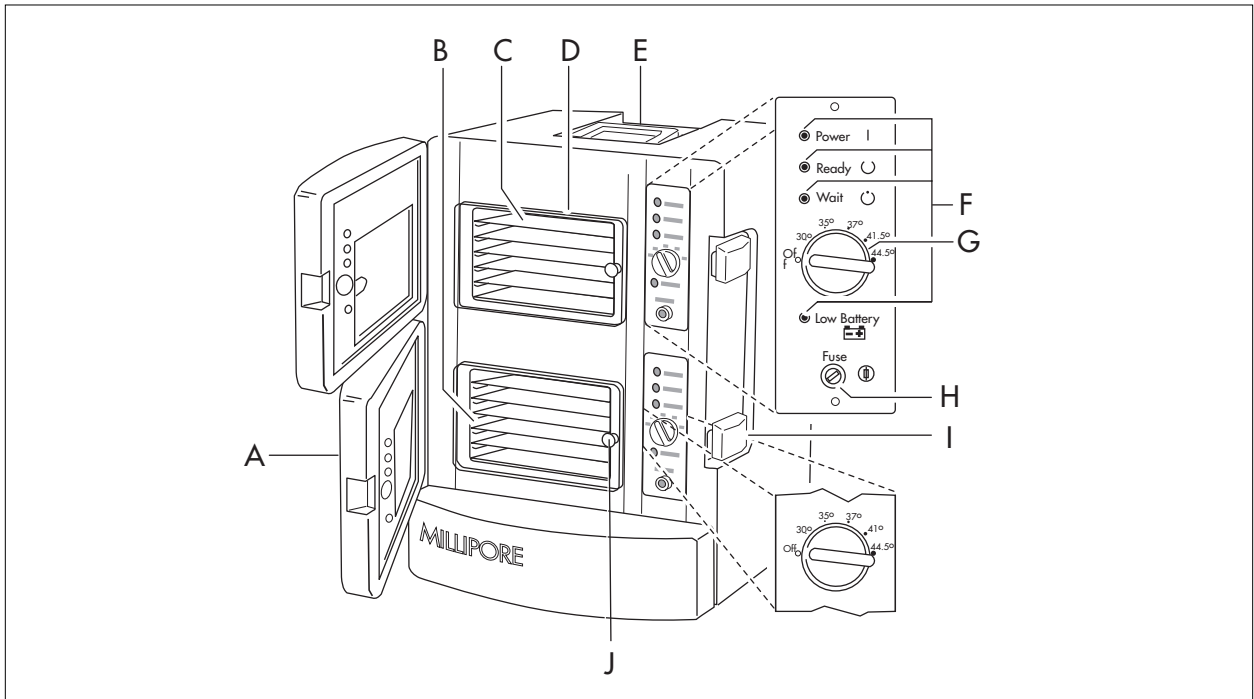
### Portable Dual Chamber Incubator Kit Contents

- Portable Dual Chamber Incubator (115 V or 220/240 V), with epoxy-coated removable shelves (12), thermometer with clips (2), and cables
- AC power supply (115 V or 220/240 V)
- Rechargeable nickel cadmium battery (not included in Lab kit)
- Battery charger (115 V or 220/240 V, not included in Lab kit)
- Carrying bag (not included in Lab kit)

**NOTE:** To order parts or accessories, see “Ordering Information” further in this document.

## Portable Dual Chamber Incubator Diagram and Parts

Your incubator looks like this:



Letter	Part
A	Exterior door
B	Bottom chamber with shelves
C	Top chamber with shelves
D	Heated interior door
E	Carrying handle
F	Indicator LEDs
G	Temperature selectors
H	Fuse
I	Exterior door latch
J	Interior door knob

## Description of the Portable Dual Chamber Incubator

<b>Category</b>	<b>Description</b>
Holding capacity	<ul style="list-style-type: none"><li>■ 48 petri dishes</li><li>■ 72 Petri slides</li><li>■ 20 (twenty) 55-Plus Monitors</li><li>■ 12 MilliFlex cassettes</li></ul>
Features	<ul style="list-style-type: none"><li>■ Shock- and water-resistant case</li><li>■ Gaskets on the door compartment</li><li>■ Epoxy-coated chamber that resists chemical attack and cleans easily</li><li>■ Two Teflon-coated thermometers to clip onto the inner chamber shelves</li><li>■ One nylon carrying bag with high-density foam padding (included only with field kits)</li></ul>
Fixed temperature settings of chambers	<ul style="list-style-type: none"><li>■ 30°C (<math>\pm 0.5^\circ\text{C}</math>)</li><li>■ 35°C (<math>\pm 0.5^\circ\text{C}</math>)</li><li>■ 37°C (<math>\pm 0.5^\circ\text{C}</math>)</li><li>■ 41°C (<math>\pm 0.5^\circ\text{C}</math>) (bottom chamber only)</li><li>■ 41.5°C (<math>\pm 0.5^\circ\text{C}</math>) (top chamber only)</li><li>■ 44.5°C (<math>\pm 0.2^\circ\text{C}</math>)</li></ul>

See the "Portable Dual Chamber Incubator Specifications" near the end of this document for more details.

## Overview on How to Use the Incubator

To properly incubate your samples using either of these portable incubators, you need to perform the following procedure:

1. Connect the power supply.
2. Warm up the incubator.
3. Incubate the samples.
4. Analyze results.
5. Maintain and troubleshoot the incubator.

## How to Connect the Incubator to a Power Supply or Battery

This section describes how to connect the Portable Single Chamber and the Portable Dual Chamber Incubator using an AC power supply. It also contains steps to connect the Portable Single Chamber and the Portable Dual Chamber Incubator to a vehicle battery, an external 12 V DC, and a rechargeable nickel cadmium battery. (See "Ordering Information" further in this document if you need to order parts.) The appropriate power supply depends on where you use the incubator. (For example, if you use the incubator in the field, you can use the rechargeable nickel cadmium battery as a power supply.)

### Connecting the Incubator Using a Alternate Current (AC) Power Supply

You can connect the incubator to an AC 115 V AC or 220/240 V AC power supply that comes with your kit. It is also available as an accessory. (See "Ordering Information" further in this document if you need to order parts.)

**NOTE:** You prolong the battery life if you use AC power to warm-up the incubator.

1. Plug the AC power supply cord into the incubator; the plug is located at the rear of the incubator.
2. Plug the prong-end of the cord into a grounded, AC outlet.
3. Turn the temperature selector knob to the temperature setting you want.
4. Continue to "Warming Up the Incubator."

## **Connecting the Portable Single Chamber or the Portable Dual Chamber Incubator to a Vehicle Battery**

You can operate the incubator in a laboratory or other locations using the 12 V DC cigarette lighter power supply that comes with your kit.

1. Loosen the thumbscrews on the back plate of the incubator by turning them to the left. Then remove the screws and plate and set them aside.
2. Connect the power jack end of the cigarette lighter power supply to the incubator power plug. Then plug the other end of the cable to the vehicle's cigarette lighter.
3. Turn the temperature selector knob to the temperature setting you want.
4. Continue to "Warming Up the Incubator."

## **Connecting the Portable Single Chamber or the Portable Dual Chamber Incubator to an External Battery**

You can use an external 12 V DC battery to supply power to the incubator. To connect the incubator to the external battery:

1. Loosen and remove the captive thumbscrews on the back plate by turning them to the left. Then remove the screws and plate.
2. Insert the power jack end of the battery cable to the incubator power plug.
3. Connect the clamp on the black cable to the negative (-) battery terminal of the battery. Then connect the clamp on the red cable to the positive (+) battery terminal of the battery.
4. Turn the temperature selector knob to the temperature setting you want.
5. Continue to "Warming Up the Incubator."

## Recharging and Installing the Nickel Cadmium Battery in the Portable Single Chamber or the Portable Dual Chamber Incubator

The rechargeable nickel cadmium battery installs directly inside the Portable Single Chamber or the Portable Dual Chamber Incubator for convenient field use. While operating at 44.5°C, the battery provides approximately 12 hours of service at an ambient temperature of 25°C, or approximately six hours at 5°C. This only occurs if the incubator has been warmed up using an alternate power supply and the doors are opened infrequently. (See "Ordering Information" further in this document if you need to order parts.)

To recharge the battery before you install it, see step 1. Otherwise, skip to step 3.

1. Connect the charger power plug to the battery power jack. Leave it connected for 14 to 16 hours (or overnight) to completely recharge the battery.
2. Disconnect the battery and continue to the next step to install the battery into the incubator after it is fully recharged.
3. Loosen the thumbscrews on the back plate of the incubator by turning them to the left. Then remove the screws and plate.
4. Hold the battery so that the Velcro® is facing you and the power jack on the left.  
**NOTE:** The Velcro strips prevent the battery from moving around inside of the incubator. They also make it easier to remove the battery from the compartment.
5. Insert the battery power jack into the incubator power plug. Then slide the battery in all the way.
6. Replace the back plate and finger-tighten the screws onto it.
7. Continue to "Warming Up the Incubator."

## Warming Up the Incubator

This section contains steps to warm up the Portable Single Chamber or Portable Dual Chamber Incubator.

**NOTE:** If you turn the incubator off from a temperature setting then immediately set it again, the low battery indicator lights. This occurs because the low battery indicator is designed to light when the supply voltage drops below 10 V. To reset the incubator, turn the temperature selector knob to the off position, wait five seconds, then turn to the desired setting. If the low battery indicator lights when you first set the temperature, you have to either recharge your battery or use another power supply.

### Warming Up the Portable Single Chamber or Portable Dual Chamber Incubator

For best results, you need to pre-heat either incubator prior to sample preparation. Both incubators heat at a rate of 8°C per hour at room temperature. Once you connect the incubator to a power supply, follow these steps to warm up it up:

1. Locate the thermometer with clips that came with the kit. Open the exterior and interior doors.
2. Clip the thermometer onto one of the chamber shelves. Make sure you position the thermometer so you can see it through the heated interior door. Then securely close the interior and exterior doors.
3. Turn the temperature selector knob to the desired incubation temperature. The green Power and yellow Wait LEDs light. When the inside chamber reaches the set temperature, the Wait LED goes out and the green Ready LED lights.
4. Verify the temperature in the chamber by looking through the inner chamber doors at the thermometer.

**CAUTION:** Do not open the inner chamber door to read the thermometer; heat is released quickly, causing the thermometer to give an inaccurate reading.

## How to Incubate the Samples

This section describes how to incubate samples using any of the incubators described in this document. Both incubators can hold up to 48 petri dishes, 72 petri slides, 20 (twenty) 55-plus monitors, or 12 MilliFlex cassettes. For the specific procedures required to perform fecal coliform, total coliform, and other microbiological tests, refer to Water Microbiology, Laboratory and Field Procedures (Millipore literature number AD323). See "Ordering Information" further in this document for information about contacting Millipore.

To incubate your samples:

1. Check that the ambient temperature is at least 3°C lower than the incubation temperature. For example, if the incubation temperature is 35°C, the ambient temperature should be less than 32°C. To operate at warmer temperatures, place the incubator in a refrigerator or cool box, or incubate the samples during cooler night temperatures.
2. Open the exterior door of the preheated incubator. Then pull the interior door knob out and open the interior door.
3. Slide the shelves out. Then place the prepared containers you want to incubate on them.
4. Slide the shelves back into the incubator chamber.
5. Grasp the interior door knob with your fingers, while resting your fingertips on the interior door. Then pull the knob away from the door using the pressure from your fingers. Guide the knob back into the hole on the unit and snap it into place.
6. Close and latch the exterior door. You can reset the temperature selector for use at another temperature once you finish incubating your samples.
7. Examine the results of your samples using appropriate laboratory methods when the incubation period ends.

## How to Maintain and Troubleshoot the Incubator

The following sections provide steps to clean the incubator and replace the fuses. It also contains a section on interpreting errors.

### Cleaning the Incubator

Clean the exterior case and interior incubation chamber with a damp cloth and warm water (or mild detergent).

### Replacing a Fuse in the Incubator

If the Power LED does not light when you turn on the incubator, the fuse may be blown.

The fuse is located on the front panel of the incubator. (See the specifications for your type of incubator for the fuse rating.) To replace the fuse:

1. Loosen the fuse holder by turning it to the left with a flathead screwdriver (not provided). Then pull it straight out to remove it.
2. Pull the old fuse from the holder. Then place a new fuse in the holder.
3. Push the fuse holder back into its compartment. Then secure it with the flathead screwdriver.

### Calibrating the Incubator

Millipore recommends that you have the incubator calibrated periodically, the frequency depending on usage. Prior to service, remove all shelving, thermometers, and power cords. Wipe the inside surfaces with a 10% bleach solution. Call Millipore Technical Service to arrange service. See the “Technical Assistance” section for information about contacting Millipore.

## Troubleshooting the Incubator

<b>Problem</b>	<b>Possible Cause</b>	<b>Solutions</b>
Power LED does not light	Faulty power supply connection	Disconnect the power supply from the incubator. Clean the incubator, then re-connect it to the power supply.
	Fuse blown	Replace fuse.
	Faulty power	Try alternate power supply.
Thermometer does not read the temperature setting of incubator	Mercury in the thermometer has separated	Place the thermometer in a freezer for two hours to overnight to rejoin the mercury.
	Open interior door is allowing heat to escape before thermometer can accurately measure the temperature	Close interior door.
Wait LED lights, heat is uneven, or there is no heat	Door(s) not closed properly	Make sure all doors are all securely closed.
	Door gaskets damaged	Contact Millipore Technical Service. (See "Technical Assistance" for the phone number of the office nearest you.)
	Interior door not closed securely	Push door knob into place.
Exterior door does not close tightly	Latch is loose	Tighten knurled nut on underside of door latch.
Dirty incubator	Sample spilled or counter dirty	Clean chamber shelves and counter.
Low battery indicator lights	Incubator has been turned off from a temperature setting then immediately set again	Turn the temperature selector knob to the off position, wait five seconds, then turn to the desired setting.
	Battery low	Recharge the battery or use another power supply.

## Incubator Specifications

The following sections provide details on the specifications for all the incubators described in this document. Refer to the sections you need.

### Portable Single Chamber Incubator Specifications

Exterior dimensions	32.7 cm H × 37.1 cm W × 29.6 cm D
Chamber interior dimensions	10.5 cm H × 17.2 cm W × 16 cm D
Chamber capacity	Six removable shelves with total capacity for: <ul style="list-style-type: none"><li>■ 48 Petri dishes</li><li>■ 72 Petri slides</li><li>■ 20 (twenty) 55-Plus Monitors</li><li>■ 12 MilliFlex Cassettes</li></ul>
Weight	Without battery    Approximately 14.2 lb (6.4 kg) With battery        Approximately 17.7 lb (8 kg)
Operating temperatures	<ul style="list-style-type: none"><li>■ 30°C (± 0.5°C)</li><li>■ 35°C (± 0.5°C)</li><li>■ 37°C (± 0.5°C)</li><li>■ 41°C (± 0.5°C)</li><li>■ 44.5°C (± 0.2°C)</li></ul>
Fuse	0.8 amp, 5 mm × 20 mm fast blow
Power supply	115 V AC ± 10% or 220/240 V AC ± 10% 12 V DC operates at approximately .5 amp per chamber 12 V DC supplied by a(n) <ul style="list-style-type: none"><li>■ rechargeable nickel cadmium battery</li><li>■ vehicle battery</li><li>■ external battery</li></ul>

## Portable Dual Chamber Incubator Specifications

Exterior dimensions	54 cm H × 37 cm W × 29 cm D
Chamber interior dimensions	10.5 cm H × 17.2 cm W × 16 cm D
Chamber capacity (each chamber)	Six removable shelves with total capacity for: <ul style="list-style-type: none"><li>■ 48 petri dishes</li><li>■ 72 Petri slides</li><li>■ 20 (twenty) 55-Plus Monitors</li><li>■ 12 MilliFlex cassettes</li></ul>
Weight	
Without battery	Approximately 24.5 lb (11.1 kg)
With battery	Approximately 28 lb (12.7 kg )
Operating temperatures	<ul style="list-style-type: none"><li>■ 30°C (± 0.5°C)</li><li>■ 35°C (± 0.5°C)</li><li>■ 37°C (± 0.5°C)</li><li>■ 41°C (± 0.5°C) (bottom chamber only)</li><li>■ 41.5°C (± 0.5°C) (top chamber only)</li><li>■ 44.5°C (± 0.2°C)</li></ul>
Fuse 0.8 amp, 5 mm x 20 mm fast blow	
Power supply	115 V AC ± 10% or 220/240 V AC ± 10% 12 V DC operates at approximately .5 amp per chamber 12 V DC supplied by a(n) <ul style="list-style-type: none"><li>■ rechargeable nickel cadmium battery</li><li>■ vehicle battery</li><li>■ external battery</li></ul>

## Ordering Information

This section lists the catalogue numbers for Environmental Incubators. See the Technical Assistance section for information about contacting Millipore. You can also buy Millipore products on-line at [www.millipore.com/purecommerce](http://www.millipore.com/purecommerce).

### Portable Single Chamber Incubator Kit and Lab Kit Catalogue Numbers

<b>Part</b>	<b>Catalogue Number</b>
Portable Single Chamber Incubator Field Kit includes:	XX63 1K1 15 (115 V) XX63 1K2 30 (220/240 V)
■ Portable Single Chamber Incubator, with epoxy-coated removable shelves (6), and thermometer with clips	
■ Cigarette lighter power supply (12 V DC)	
■ Battery cables (12 V DC)	
■ Rechargeable nickel cadmium battery	
■ Battery charger (115 V or 220/240 V)	
■ AC power supply (115 V or 220/240 V)	
■ Carrying bag	
Portable Single Chamber Incubator Lab Kit includes:	XX63 1K0 00 (115V) XX63 1K0 05 (220/240V)
■ Portable Single Chamber Incubator, with epoxy-coated removable shelves (6), and thermometer with clips	
■ AC power supply (115 V or 220/240 V)	

## Portable Dual Chamber Incubator Kit and Lab Kit Catalogue Numbers

Part	Catalogue Number
Portable Dual Chamber Incubator Field Kit includes:	XX63 2K1 15 (115 V) XX63 2K2 30 (220/240 V)
<ul style="list-style-type: none"> <li>■ Portable Dual Chamber Incubator, with epoxy-coated removable shelves (12), cables, thermometer, and thermometer with clips</li> <li>■ Cigarette lighter power supply (12 V DC)</li> <li>■ Battery cables (12 V DC)</li> <li>■ Rechargeable nickel cadmium battery</li> <li>■ Battery charger (115 V or 220/240 V)</li> <li>■ AC power supply (115 V or 220/240 V)</li> <li>■ Carrying bag</li> </ul>	
Portable Dual Chamber Incubator Lab Kit Unit includes:	XX63 LK1 15 (115V) XX63 LK2 30 (220/240V)
<ul style="list-style-type: none"> <li>■ Portable Dual Chamber Incubator, with epoxy-coated removable shelves (12), and thermometer with clips</li> <li>■ AC power supply (115 V or 220/240 V)</li> </ul>	

## Incubator Accessories and Catalogue Numbers

Part	Catalogue Number
Rechargeable nickel cadmium battery	XX63 200 01
Battery charger 115 V AC, 50/60 Hz	XX63 200 02
Battery charger 220/240 V AC, 50/60 Hz	XX63 200 22
Carrying bags; zippered, heavyweight nylon, with high-density foam padding	XX63 100 03 (single chamber) XX63 200 03 (dual chamber)
Thermometer with clips	XX63 200 04
AC power supply, 115 V AC $\pm$ 10%, 50/60 Hz	XX63 201 15
AC power supply, 220/240 V AC $\pm$ 10%, 50/60 Hz	XX63 202 30
Epoxy-coated shelves, six	P34807
Fast blow fuse, 0.8 amp, 5/pk	P34806
Incubator internal doors:	
Incubator doors, 2/pk	P34809
Inner door knob 2/pk	P34810

## Technical Assistance

For more information, contact the Millipore office nearest you. In the U.S., call **1-800-MILLIPORE** (1-800-645-5476). Outside the U.S., see your Millipore laboratory catalogue for the phone number of the office nearest you. You can reach us by e-mail at [tech\\_service@millipore.com](mailto:tech_service@millipore.com) or visit our web site ([www.millipore.com](http://www.millipore.com)).

Millipore Corporation is pleased to provide internet access to Material Safety Data Sheets (MSDS) for its products that contain hazardous materials. To obtain any MSDS documents that may be associated with this product, go to the MSDS page of our website ([www.millipore.com/msds.nsf/home](http://www.millipore.com/msds.nsf/home)).

## Standard Warranty

**Millipore Corporation (“Millipore”)** warrants its products will meet their applicable published specifications when used in accordance with their applicable instructions for a period of one year from shipment of the products. **MILLIPORE MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED. THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** The warranty provided herein and the data, specifications and descriptions of Millipore products appearing in Millipore's published catalogues and product literature may not be altered except by express written agreement signed by an officer of Millipore. Representations, oral or written, which are inconsistent with this warranty or such publications are not authorized and if given, should not be relied upon.

In the event of a breach of the foregoing warranty, Millipore's sole obligation shall be to repair or replace, at its option, the applicable product or part thereof, provided the customer notifies Millipore promptly of any such breach. If after exercising reasonable efforts, Millipore is unable to repair or replace the product or part, then Millipore shall refund to the customer all monies paid for such applicable product or part. **MILLIPORE SHALL NOT BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, SPECIAL OR ANY OTHER INDIRECT DAMAGES RESULTING FROM ECONOMIC LOSS OR PROPERTY DAMAGE SUSTAINED BY ANY CUSTOMER FROM THE USE OF ITS PRODUCTS.**

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