

Corning® Digital Hot Plates, Stirring Hot Plates, Stirrers, and External Temperature Controller

CORNING

Instruction Manual



Model No.	Description	Catalog Number				
		120V	100V	230V (Non-Europe)	230V (Europe)	230V (China)
PC-400D	Hot Plate	6795-400D	6797-400D	6798-400D	6796-400D	6799-400D
PC-410D	Stirrer	6795-410D	6797-410D	6798-410D	6796-410D	6799-410D
PC-420D	Stirring Hot Plate	6795-420D	6797-420D	6798-420D	6796-420D	6799-420D
PC-600D	Hot Plate	6795-600D	6797-600D	6798-600D	6796-600D	6799-600D
PC-610D	Stirrer	6795-610D	6797-610D	6798-610D	6796-610D	6799-610D
PC-620D	Stirring Hot Plate	6795-620D	6797-620D	6798-620D	6796-620D	6799-620D
	External Temperature Controller	6795PR (all models)				

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1.0 Safety Information

This instruction manual contains important operating and maintenance instructions that must be read, understood, and followed by the product user. Failure to use this product according to this instruction manual may degrade or defeat the protection normally provided by this product. Read this instruction manual prior to product use and keep this instruction manual for future reference.

Product Voltages

Hot plates, stirrers, and stirring hot plates are available in different voltages. Before initial use, check that the unit you received is the correct voltage for your location.

Safety Precautions



Caution - Risk of Danger: Cautions there is material in the instruction manual which must be read, understood, and followed in order to preserve product safety features.



Caution – Hot Surface: Cautions that the top plate is too hot to touch



Indicates that the unit is plugged into power supply.



Indicates that the accessory external temperature controller is properly plugged into the unit.

Warnings

Personal Injury

- ▶ If the equipment is used in a manner not specified by this manual, the equipment may become unsafe to operate, could harm the user or the device, and may void the warranty. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- ▶ This product is designed for use in laboratory environments by persons knowledgeable in safe laboratory practices.
- ▶ Always wear safety glasses and other appropriate protective equipment when operating this product.

Electric Shock

- ▶ This product must be connected to a grounded power outlet for safe functioning.
- ▶ Use only the power cord supplied with the product.
- ▶ Position the product for use so the power cord can be easily disconnected without having to move the product.
- ▶ Disconnect the power cord before moving or cleaning the unit.

Product Damage

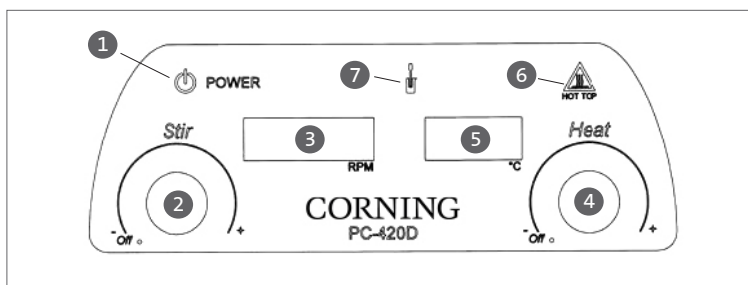
- ▶ Keep the product dry and clean.
- ▶ Do not immerse the product for cleaning.
- ▶ The ceramic top may break if impacted.
- ▶ The maximum gross weight placed on the top surface must not exceed 25 lbs. (11 kg).
- ▶ These units are not explosion- or spark-proof.
- ▶ Do not heat or stir volatile or flammable materials.
- ▶ Do not operate this product near volatile or flammable materials.
- ▶ Do not use this product with a metal vessel.
- ▶ The temperature probe must always be inside the media to close the heating control loop and should not be operated unattended.
- ▶ Corning strongly recommends to not leave the product unattended while operating.
- ▶ Corning recommends to disconnect the unit when not in use.

2.0 Operating Conditions

Corning® hot plates, stirrers, and stirring hot plates, are designed to be safe when used under the following conditions:

- ▶ Indoor use.
- ▶ Altitude up to 6,500 feet (2,000 meters).
- ▶ Ambient temperatures of 5°C to 40°C.
- ▶ Product should be placed on a flat surface at least 12 in. (30.5 cm) from walls, 48 in. (122 cm) from ceilings, and 12 in. (30.5 cm) from other stirrers if using multiple units.
- ▶ Maximum relative humidity of 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
- ▶ Installation Category II: Product is designed for connection to an electrical branch circuit inside a building with main supply voltage fluctuations not exceeding $\pm 10\%$ of the nominal voltage.
- ▶ Pollution Degree 2: Any foreign matter that may accumulate on or within the product during normal use is not electrically conductive.

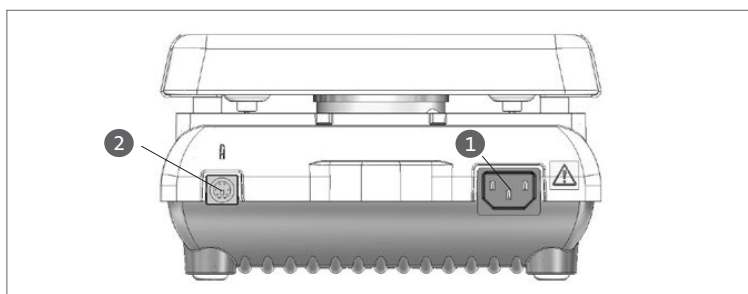
3.0 Product Controls and Indicators



1. Power Indicator: Illuminates at all times when the product is properly connected to input power.
2. Stir Control Knob: Turn the knob all the way counterclockwise to turn off stirring function. Turn the knob clockwise to set desired stirring speed.
3. Stirring Speed Display: Shows the speed set for stirring.
4. Heat Control Knob: Turn the knob all the way counterclockwise to turn off heating function. Turn the knob clockwise to set the desired heating temperature.
5. Heating Temperature Display: Shows the temperature set for heating.
6. Hot Top Indicator: Illuminates when the temperature of the top is too hot to touch (greater than approx. 60°C).
7. Temperature Probe In-Use Indicator: Illuminates when the external temperature probe is connected to the unit.

4.0 Product Connections

1. Power Cord Input: Connect the supplied power cord into this connector.
2. External Temperature Controller Input: Connect the optional External Temperature Controller (Cat. No. 6795PR) into this connector.



To Connect/Disconnect the External Temperature Controller

1. Turn the Stir Control Knob and Heat Control Knob to the **OFF** position.
2. Disconnect power cord.
3. Insert/remove external temperature controller connector into/from the input connector.
4. Reconnect power cord.
5. Product is now ready for use.

5.0 Stirring Instructions

For Models: PC-410D, PC-420D, PC-610D, PC-620D

1. Fill the vessel with solution to be stirred.
2. Place the stir bar into the vessel.
3. Place the vessel in the center of the top surface.
4. Turn Stir Control Knob until the Stirring Speed Display shows the desired speed. The speed setting can be adjusted according to the table below.

Operating Range (rpm)	Adjustable Increment (rpm)
60 - 100	5
100 - 200	10
200 - 400	20
400 - 1,150	50

- ▶ Flashing Display: The number will **FLASH** when the actual stirring speed is not at set speed.
 - ▶ Constant Display: The number will not flash when the actual stirring speed is at the set speed. The number will remain constantly **ON** when the actual stirring speed is at the set speed.
5. When desired stirring is complete, turn the Stir Control Knob to the **OFF** position. Allow stir bar to cease rotation before removing the vessel from the unit.
 6. Heating and stirring can be performed simultaneously with the PC-420D and PC-620D models, which offer both heating and stirring functions.

NOTE: The viscosity of the stirred material will affect the ability of the stir bar to remain coupled to the rotating ring magnet. Materials of high viscosity must be stirred at slower speed settings.

6.0 Heating Instructions

Without the External Temperature Controller for Models: PC-400D, PC-420D, PC-600D, and PC-620D

1. Fill the vessel with solution to be heated.
2. If using a PC-420D or PC-620D model and the stirring function, place the stir bar into the vessel.
3. Place vessel in the center of the top surface.
4. Turn Heat Control Knob until the Heating Temperature Display shows the desired temperature. The temperature setting can be adjusted in 5°C increments.
 - ▶ Flashing Display: The number shown on the Heating Temperature Display will **FLASH** when the actual heating temperature is not at the set temperature.
 - ▶ Constant Display: The number shown on the Heating Temperature Display will remain constantly **ON** when the actual heating temperature is at the set temperature.

- ▶ Hot Top Indicator: The Hot Top Indicator will be **ON** at all times when the temperature of the top surface is too hot to touch (greater than approx. 60°C).
- ▶ The Hot Top Indicator will **FLASH** when the Heat Control Knob is turned **OFF** but the top surface is still too hot to touch.
- ▶ The Hot Top Indicator will be **OFF** when the temperature of the top is less than approx. 60°C.



CAUTION: The Hot Top Indicator will turn **OFF** when the power cord is disconnected from the product even if the temperature of the top surface is still too hot to touch.

With the External Temperature Controller (Corning 6795PR) for Models: PC-400D, PC-420D, PC-600D, PC-620D, and 6795PR

1. Connect the External Temperature Controller to the connector on the back of the unit.
 - ▶ Temperature Probe in Use Indicator: This will illuminate when the External Temperature Controller is properly connected.
2. Fill the vessel with solution to be heated.
3. If using a PC-420D or PC-620D model and the stirring function, place the stir bar into the vessel.
4. Place the vessel in the center of the top surface.
5. Insert the tip of the External Temperature Probe into the solution (see section 10.0 diagram for proper usage).
 - ▶ The tip should be located in the center of the vessel and at approximately one-half of the depth of the solution.
6. Secure the position of the External Temperature Controller by using a ring stand/support rod and clamp.
 - ▶ Ensure the cable of the External Temperature Controller does not come into contact with the heating surface.
7. Turn the Heat Control Knob until the Heating Temperature Display shows the desired heating temperature.
 - ▶ Flashing Display: The number shown on the Heating Temperature Display will **FLASH** when the actual heating temperature is not at the set temperature.
 - ▶ Constant Display: The number shown on the Heating Temperature Display will remain constantly **ON** when the actual heating temperature is at the set temperature.
 - ▶ Hot Top Indicator: The Hot Top Indicator will be **ON** at all times when the temperature of the top surface is too hot to touch (greater than approx. 60°C).
 - ▶ The Hot Top Indicator will **FLASH** when the Heat Control Knob is turned **OFF** but the top surface is still too hot to touch.
 - ▶ The Hot Top Indicator will be **OFF** when the temperature of the top is less than approx. 60°C.



CAUTION: The Hot Top Indicator will turn **OFF** when the power cord is disconnected from the product even if the temperature of the top surface is still too hot to touch.

7.0 Heating Operation

7.1 Principles

The heating element and a temperature sensor are located just beneath the ceramic top surface of the product. The microprocessor-controlled heat, generated by the heating element, is based upon the sensor temperature and the value set on the Heating Temperature Display. When the sensor temperature is not within range of the value set on the display, the display will **FLASH**. When the sensor temperature is within range, the value displayed will remain constantly **ON**.

The Heating Temperature Display does not indicate the actual temperature of materials placed on top of the product or the actual temperature of the ceramic top surface.

The following table shows a typical difference between the temperature set on the Heating Temperature Display and the actual temperature measurement of the ceramic top surface.

Temp. Set on Display (°C)	Actual Top Surface Temp. (°C)	Temp. Set on Display (°C)	Actual Top Surface Temp. (°C)
50	45	350	285
100	85	400	325
150	125	450	365
200	165	500	405
250	205	550	440
300	245		

(This information was taken using a 6795-420D with no top load in 20°C ambient conditions).

Using the External Temperature Controller (Cat. No. 6795PR) enables precision temperature control of materials placed in vessels on top of the product.

When the External Temperature Controller is connected to the product, the closed loop control process is extended to include temperature input from the External Temperature Controller. The microprocessor-controlled heat, generated by the heating element, is based upon the sensor temperature located in the tip of the External Temperature Controller and the value set on the Heating Temperature Display. When the sensor temperature is not within range of the value set on the display, the display will **FLASH**. When the sensor temperature is within range, the value displayed will remain constantly **ON**.

To directly control the temperature of liquid in a vessel on the top surface, place the External Temperature Controller into the liquid and connect the Controller to the product. The Heating Temperature Display shows the temperature of the liquid and can be used to adjust the temperature of the liquid. See Section 10.0 for ordering information.



CAUTION: The top surface and the vessel used may be at substantially higher temperatures than indicated by the setting on the Heating Temperature Display as the controller regulates the liquid temperature inside the vessel.

7.2 Safety

The microprocessor-controlled system has built-in error routines to detect product operation in some unfavorable conditions. The type of error routines which may be active in a product varies depending upon the functionality of the model and the operating software version.

If an error routine is engaged, the product will typically shut down. Some error routines will display an error code number in the left digital location of the Heating Temperature Display when the product is shut down. For more information on error codes, contact Corning Scientific Support at 978.442.2200.

A product shut down by an error routine must be disconnected and reconnected to mains input before it can be used again. Please contact Corning Life Sciences or a Corning authorized repair facility (visit www.corning.com/lifesciences) if a product does not reset from the error routine shut down or if it continues to shut down after resetting.



CAUTION: Error routines built into these products do not substitute the need to use these products per the specified operating conditions and according to safe laboratory practices. There are potential failure modes in product functionality or in the process of use that could result in uncontrolled or unexpected heating of the top surface. Reaction plans should be developed and safety precautions put in place based on the worst case scenario that any materials placed on the top surface could be subjected to a continuous supply of heat, raising the material temperature to levels in excess of 550°C.

8.0 Repair

There are no direct user serviceable components inside this series of products.

Please contact Corning or a Corning authorized repair facility for repair or maintenance issues.

9.0 Maintenance

Power



CAUTION: Disconnect power to the product by unplugging the power cord before performing any maintenance or inspection procedures.

- ▶ Inspect the power cord regularly and replace if damaged. Use only replacement power cords available from Corning or Corning authorized product distributors.

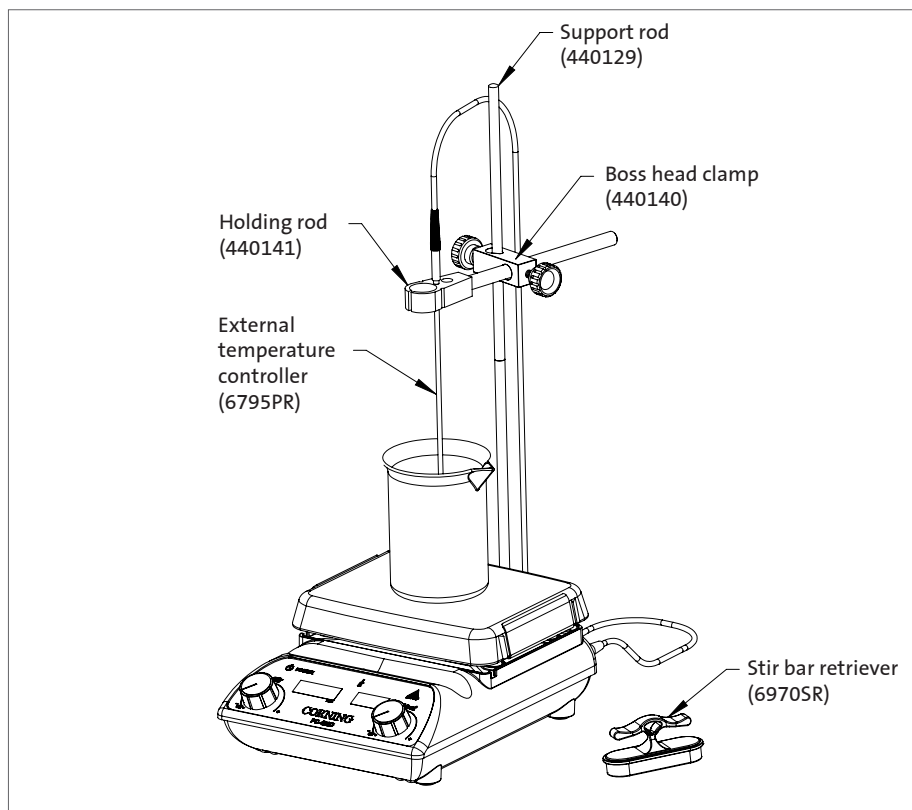
Ceramic Top Plate

- ▶ These products are supplied with a Pyroceram® top that is easy to clean and highly resistant to scratches, corrosion, and chemical attack.
- ▶ The ceramic top may break during use if not properly maintained.
- ▶ Keep the ceramic top clean. A nonabrasive cleaner may be used to clean the ceramic top.
- ▶ Inspect the ceramic top for damage during cleaning.
- ▶ Discontinue product use if the ceramic top is chipped, etched, or shows excessive scratching.
- ▶ Contact Corning or a Corning authorized repair facility for a top replacement.

General

- ▶ It is important to keep this product dry and clean.
- ▶ Remove minor exterior liquid spills promptly.
- ▶ Clean exterior surfaces with a nonabrasive cleaner. Do not reconnect product to power input until all cleaned surfaces have dried.
- ▶ If liquid or wet solid material gets inside the product, immediately disconnect the power to the product and discontinue use. Contact Corning for additional instructions regarding interior spills.

10.0 Accessories



Accessories (Shown with Cat. No. 6795-420D)

Cat. No.	Description
6795PR	External temperature controller for digital display hot plates and stirring hot plates. Use with all PC-400D, 420D, 600D, and 620D models.
440129	Vertical support rod. Supplied as two 9 in. (22.86 cm) rods which can be screwed together. Use with all PC-400D, PC-410D, PC-420D, PC-600D, PC-610D, PC-620D series products. Stainless steel.
400430	PTFE-coated magnetic stir bar, 39 x 2 in. (1 x 5.1 cm) – recommended size for all PC-610D and 620D models
401435	PTFE-coated magnetic stir bar, 39 x 1 in. (1 x 2.5 cm) – recommended size for all PC-410D and 420D models
6970SR	Stir bar retriever, polypropylene

Cat. No.	Description
6795KIT	Corning® Digital Display Hot Plate and Stirring Hot Plate Accessory Kit This accessory kit is designed for all Corning digital display hot plates and stirring hot plates (Models PC-400D, PC-420D, PC-600D, PC-620D). This kit includes: external temperature controller (Cat. No. 6795PR), vertical support rod (Cat. No 440129), Supplied as two 9 inch (22.9 cm) support rods that can be screwed together (18 inches), stir bar retriever (Cat. No. 6970SR).
6795-420KIT	Corning 5 x 7 Inch Top PC-420D Stirring Hot Plate Kit with Digital Displays, 120V/60Hz This kit includes: One stirring hot plate (Cat. No. 6795-420D), external temperature controller Cat. No. 6795PR, vertical support rod (Cat. No 440129). Supplied as two 9 inch (22.9 cm) support rods that can be screwed together (18 inches), stir bar retriever (Cat. No. 6970SR).
6795-620KIT	6795-620KIT Corning 10 x 10 Inch Top PC-620D Stirring Hot Plate Kit with Digital Displays, 120V/60Hz This kit includes: One stirring hot plate (Cat. No. 6795-620D), external temperature controller (Cat. No. 6795PR), vertical support rod (Cat. No 440129). Supplied as two 9 inch (22.9 cm) support rods that can be screwed together (18 inches), stir bar retriever (Cat. No. 6970SR).
Available for purchase separately and not included in the kits	
440140	Boss head clamp. Use for connecting the holding rod (Cat. No. 440141) at a 90° angle to the support rod (Cat. No. 440129). Aluminum.
440141	Holding rod. Use for holding the external temperature controller (Cat. No. 6795PR) in position. Aluminum.

11.0 Technical Specifications

Model No.	Power				Temp. Range ²	Stir Range (rpm)	Weight
	120V/60Hz (6795 Cat. Nos.)	100V/60Hz (6797 Cat. Nos.)	230V/50Hz (6796 Cat. Nos.)	230V/50Hz (6798 Cat. Nos.) ¹			
PC-400D	628W/5.3A	548W/5.5A	628W/2.7A	628W/2.7A	5°C-550°C (41°F-1,022°F)	—	6.0 lbs. (2.7 kg)
PC-410D	73W/0.7A	78W/0.8A	73W/0.3A	73W/0.3A	—	60-1,150	7.0 lbs. (3.2 kg)
PC-420D	698W/5.9A	623W/6.3A	698W/0.3A	698W/0.3A	5°C-550°C (41°F-1,022°F)	60-1,150	7.0 lbs. (3.2 kg)
PC-600D	1043W/8.7A	1043W/10.5A	1043W/4.5A	1043W/4.5A	5°C-550°C (41°F-1,022°F)	—	10.0 lbs. (4.5 kg)
PC-610D	73W/0.7A	78W/0.8A	73W/0.3A	73W/0.3A	—	60-1,150	11.5 lbs. (5.2 kg)
PC-620D	1113W/9.3A	1113W/11.2A	1113W/4.8A	1113W/4.8A	5°C-550°C (41°F-1,022°F)	60-1,150	11.5 lbs. (5.2 kg)

¹Cat. Nos. beginning with 6798 in 230V are non-European configuration models.

²The Temperature Range using the External Temperature Controller is 5°C to 200°C (41°F to 392°F).

12.0 Size and Dimensions

Model No.	Top Plate Size	Dimensions
PC-400D/410D/420D	5 x 7 in. (12.7 x 17.8 cm)	4.25 x 7.75 x 11 in. (10.8 x 19.7 x 28 cm)
PC-600D/610D/620D	10 x 10 in. (25.4 x 25.4 cm)	4.625 x 11 x 15.375 in. (11.75 x 19.7 x 39.05 cm)

13.0 Frequently Asked Questions

- ▶ **I have a beaker of water on my hot plate and the temperature is set for 550°C. Why does the display setting blink and not remain constant?**

The display will blink at any time when the temperature sensor is not within range of the set temperature value. The temperature measured by the sensor is a composite of the temperature of the heating element located beneath the sensor, the ceramic top above the sensor, and the very small air space around the sensor. Water requires a substantial amount of heat in order to boil yet remains at a constant temperature of 100°C for the duration of the boiling process. Although the heating element is producing maximum heat at the 550°C setting, the water consumes this heat so quickly during the boiling process that the heat is unable to raise the temperature measured by the sensor to within the range of the 550°C set value.

- ▶ **How long does it take to bring a beaker of water to a boil?**

Using a 600 mL PYREX® beaker with 400 mL of water at 25°C, it takes approximately 15 minutes to bring the water to a full, rolling boil.

- ▶ **Can I use a metal tray on top of my Corning® hot plate?**

No. The metal will act as a heat sink, and have a high probability of creating an abnormal heating condition. If an abnormal condition is detected, the product will shut down. A metal vessel will also scratch the ceramic top plate.

- ▶ **The stir bar keeps decoupling. Why and what can I do to stop this?**

These units are programmed to minimize decoupling. However, liquid viscosity, stir bar magnetic strength, vessel used, and speed changes can cause decoupling. High viscosity liquids must be stirred at slower speed settings. The magnetic strength of stir bars can weaken over time and may need to be replaced. The vessels used need to have thin, flat bottoms to insure optimal performance. Rapid decreases in stir speed can cause decoupling as the magnet slows down quicker than the stir bar and the liquid.

- ▶ **What size vessel should I use?**

The vessels used on the top of a hot plate must not be larger than the top plate.

14.0 Limited Warranty

Corning Incorporated (Corning) warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of purchase. CORNING DISCLAIMS ALL OTHER WARRANTIES WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. Corning's sole obligation shall be to repair or replace, at its option, any product or part thereof that proves defective in material or workmanship within the warranty period, provided the purchaser notifies Corning of any such defect. Corning is not liable for any incidental or consequential damages, commercial loss, or any other damages from the use of this product.

This warranty is valid only if the product is used for its intended purpose and within the guidelines specified in the supplied instruction manual. This warranty does not cover damage caused by accident, neglect, misuse, improper service, natural forces, or other causes not arising from defects in original material or workmanship. This warranty does not cover motor brushes, fuses, light bulbs, batteries, or damage to paint or finish. Claims for transit damage should be filed with the transportation carrier.

In the event this product fails within the specified period of time because of a defect in material or workmanship, contact Corning Customer Service at: USA/Canada 1.800.492.1110, outside the U.S. +1.978.442.2200, visit www.corning.com/lifesciences, or contact your local support office.

Corning Customer Service will help arrange local service where available or coordinate a return authorization number and shipping instructions. Products received without proper authorization will be returned. All items returned for service should be sent postage prepaid in the original packaging or other suitable carton, padded to avoid damage. Corning will not be responsible for damage incurred by improper packaging. Corning may elect for onsite service for larger equipment.

Some states do not allow limitation on the length of implied warranties or the exclusion or limitation of incidental or consequential damages. This warranty gives you specific legal rights. You may have other rights which vary from state to state.

No individual may accept for, or on behalf of Corning, any other obligation of liability, or extend the period of this warranty.

For your reference, make a note of the model number, serial number, date of purchase, and supplier here.

Model No. _____ Date Purchased _____
Serial No. _____ Supplier _____

15.0 Equipment Disposal



According to Directive 2012/19/EU of the European Parliament and Council of 4th July 2012 on waste and electronic equipment (WEEE) as amended, the Corning® Digital Hot Plates, Stirring Hot Plates, and Stirrers are marked with the crossed-out wheeled bin and must not be disposed of with domestic waste.

Consequently, the buyer shall follow the instructions for reuse and recycling of waste electronic and electrical equipment (WEEE) provided with the products and available at the following link: www.corning.com/weee.

Register your product warranty online at
www.corning.com/lifesciences/warranty.

For more specific information on claims, visit www.corning.com/certificates.

Warranty/Disclaimer: Unless otherwise specified, all products are for research use or general laboratory use only. Not intended for use in diagnostic or therapeutic procedures. Corning Life Sciences makes no claims regarding the performance of these products for clinical or diagnostic applications.

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