# Bead Bath

## 100 – 120 Voltage


# CS-BB20

# Installation - Operation Manual

**These bead baths require the use of Lab Armor beads to function.** The units are not watertight and cannot be used as water or oil baths.

**Warning:** This product contains chemicals, including triglycidyl isocyanurate, known to the State of California to cause cancer as well as birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

**¡Advertencia!** Este producto contiene sustancias químicas, incluido el triglicidil isocianurato, que el Estado de California sabe que causa cáncer, así como defectos de nacimiento u otros daños reproductivos. Para obtener más información, visite www.P65Warnings.ca.gov**.**

**Avertissement!** Ce produit peut vous exposer à des produits chimiques, dont l'isocyanurate de triglycidyle, reconnu par l'État de Californie pour provoquer le cancer, des anomalies congénitales ou d'autres problèmes de reproduction. Pour plus d'informations, visitez le site www.P65Warnings.ca.gov.

# CS-BB20 Bead Bath

## 100 – 120 Voltage

### Installation and Operation Manual

### Part Number (Manual): 4861834

### Revision: October 23, 2019

# TABLE OF CONTENTS

# CERTIFICATIONS

**This certificate satisfies NRTL safety requirements**

## TÜV SÜD CUE

**Certificate Number**: U8 14 01 64872 030

These units are CUE listed by TÜV SÜD as bead baths for appropriate professional, industrial, or educational use. TÜV SÜD America Inc. is an OSHA recognized NRTL and a Standards Council of Canada accredited certification body.

The units have been tested to the following requirements:

CAN/CSA C22.2 No. 61010-1:2012
CAN/CSA C22.2 No. 61010-2-010 / R:2009
UL 61010-1:2012
UL 61010A-2-010:2002
EN 61010-1:2010
EN 61010-2-010:2003

This unit CUE certified under the model name 74300-720

# CERTIFICATIONS

# UNIT SPECIFICATIONS

These bead baths are 100 – 120 volt units. Please refer to the unit data plate for individual electrical specifications.

Technical data specified applies to units with standard equipment at an ambient temperature of 25°C and at nominal voltage. The temperatures specified are determined in accordance with factory standard following DIN 12880 respecting the recommended wall clearances of 10% of the height, width, and depth of the inner chamber. All indications are average values, typical for units produced in the series. We reserve the right to alter technical specifications at all times.

## *Temperature Performance*

| Range | Uniformity | Stability |
|---|---|---|
| Ambient +5°C to 80°C | ±1.0°C @ 37°C | ±0.1°C @ 37°C |

**Heat Up Times from Ambient (25°C)**

| To 80°C |
|---|
| 169 Minutes |

## *Power*

| AC Voltage | Amperage | Frequency | Phase |
|---|---|---|---|
| 100 – 120 | 6.0 | 50/60 Hz | 1 |

# UNIT SPECIFICATIONS

## *WEIGHT*

| Shipping | Unit Weight Empty | Unit Weight with Beads |
|---|---|---|
| 104 lb / 47 kg* | 22.0 lb / 10.0 kg | 88.0 lb / 39.9 kg |

*Shipping weight includes 15 liters of beads.

## *DIMENSIONS*

**By Inches**

| Exterior W × D × H | Interior W × D × H |
|---|---|
| 15.9 x 23.4 x 8.5 in | 12.0 x 17.1 x 6.0 in |

**By Millimeters**

| Exterior W × D × H | Interior W × D × H |
|---|---|
| 404 x 594 x 216 mm | 305 x 434 x 152 mm |

## *CAPACITY*

**Volume**

| Cubic Feet | Liters |
|---|---|
| 0.71 | 20.0 |

*See page 10 for recommended volume of beads.

# INTRODUCTION

## READ THIS MANUAL

Failure to follow the guidelines and instructions in this user manual may create a protection impairment by disabling or interfering with the unit safety features. This can result in injury or death.

Before using the unit, read the manual in its entirety to understand how to install, operate, and maintain the unit in a safe manner. Ensure all operators are given appropriate training before the unit begins service.

Keep this manual available for use by all operators.

**Intended Applications and Locations**

CS-BB20 bead baths are engineered for constant temperature, general purpose warming applications in professional, industrial, and educational environments. The baths are not intended for use at hazardous or household locations.

## CONTACTING ASSISTANCE

Please have the following information ready when calling or emailing Technical Support: the **model number** and **serial number** (see page 14).

Phone: 503 847-9047

Cascade Sciences
6725 NE Evergreen Pkwy
Ste 106
Hillsboro OR, 97124

## ENGINEERING IMPROVEMENTS

Cascade Sciences continually improves all of its products. As a result, engineering changes and improvements are made from time to time. Therefore, some changes, modifications, and improvements may not be covered in this manual. If your unit's operating characteristics or appearance differs from those described in this manual, please contact your Cascade Sciences dealer or customer service representative for assistance.

## *LAB ARMOR BEADS REQUIRED*

CS-BB20 bead baths come packaged with **15 liters** of aluminum-coated thermal beads. The manufacturer recommends using this full volume of beads to fill the tank to **1" (25 mm)** below the top of the bath. This level helps hold product containers in place.

**Never fill the unit with water or oil.** The bath tank is not watertight and filling the tank with liquid will damage the heating elements and other electrical components, and voids the manufacturing defect warranty

The beads are designed to maximize thermal conductivity while still allowing ease of placement for product. When operating at your setpoint, the beads are highly resistant to temperature fluctuations, providing optimal temperature stability and uniformity.

Bead baths and traditional water baths have slight operational differences. See page 33 for a more detailed explanation.

# RECEIVING YOUR UNIT

## *INSPECT THE SHIPMENT*

- When a unit leaves the factory, safe delivery becomes the responsibility of the carrier.
- **Damage sustained during transit is not covered by the manufacturing defect warranty.**
- Save the shipping carton until you are certain that the unit and its accessories function properly.

When you receive your unit, inspect it for concealed loss or damage to its interior and exterior. If you find any damage to the unit, **follow the carrier's procedure for claiming damage or loss**.

1. Carefully inspect the shipping carton for damage.
2. Report any damage to the carrier service that delivered the unit.
3. If the carton is not damaged, open the carton and remove the contents.
4. Inspect the unit for signs of damage. See the orientation depictions on the next pages as a reference.
5. The unit should come with an Installation and Operation Manual.
6. Verify that the correct number of accessory items has been included.
7. Carefully check all packaging for loose accessory items before discarding.

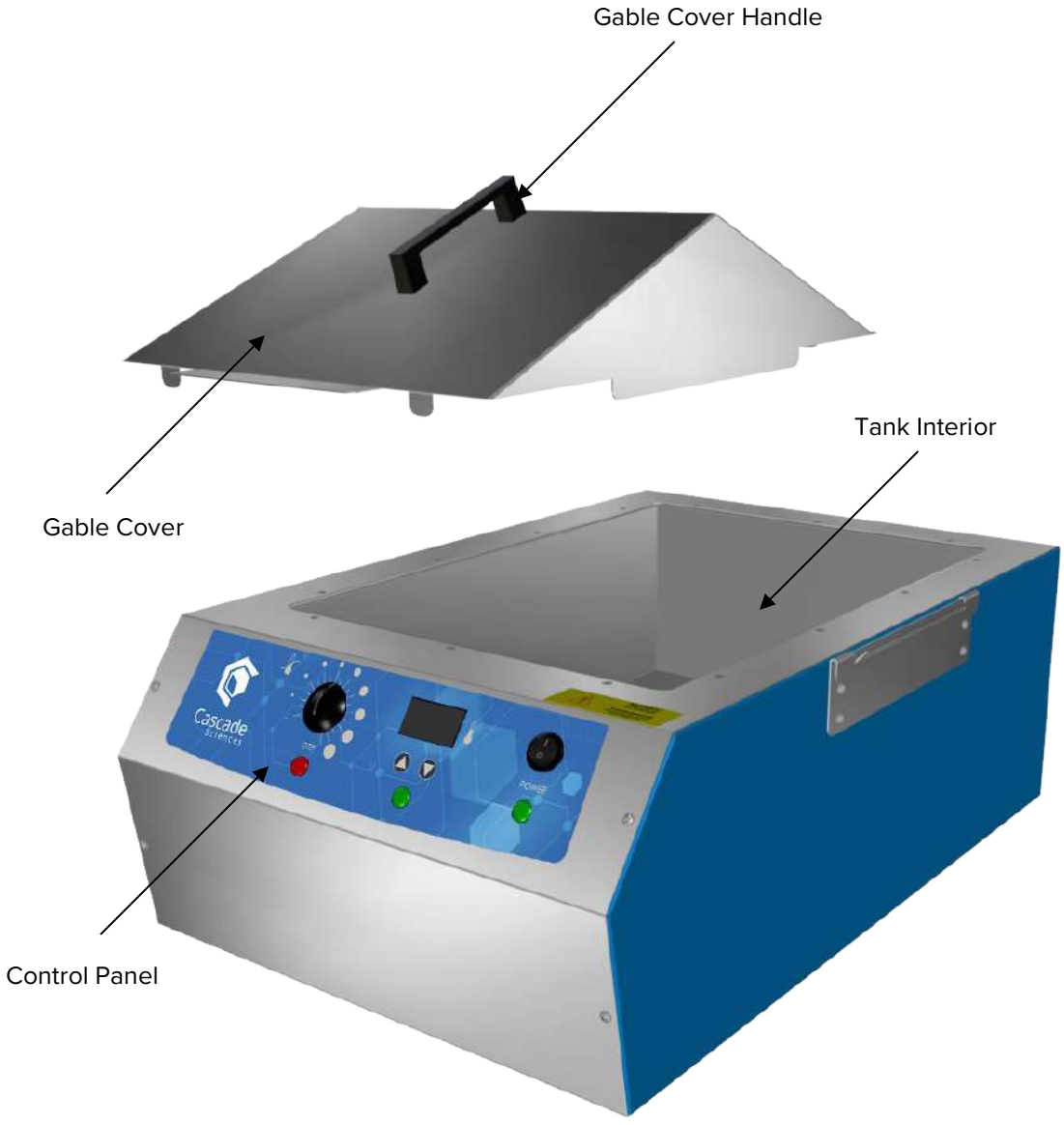
**Included Accessory Items:**

| Gable Cover | Power Cord | Lab Armor Beads, 5L Bag |
|---|---|---|
| 1 | 1 | 3 |

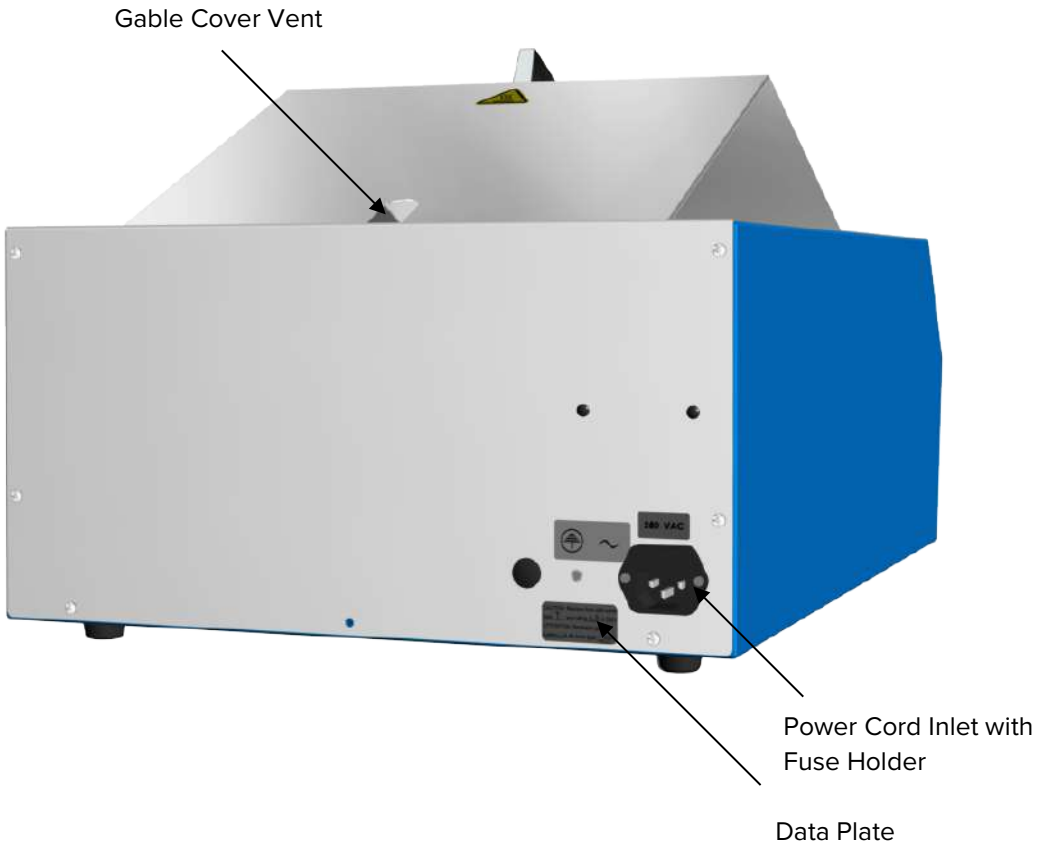


## *ORIENTATION IMAGES*

### CS-BB20 Bead Bath



**Back of Unit**


Gable Cover Vent
Power Cord Inlet with
Fuse Holder
Data Plate

## *RECORDING DATA PLATE INFORMATION*

Record the unit **serial number** and **model number** below for future reference. Tech Support needs this information to provide accurate help during support calls and emails.

- The data plate is located on the back of the unit, next to the power cord inlet.

**Date Plate Information**

| | |
|---|---|
| MODEL NO: | |
| SERIAL NO: | |

## *INSTALLATION PROCEDURE CHECKLIST*

For installing the unit in a new workspace location.

**Pre-Installation**

- ✓ Check that the required ambient conditions for the unit are met, page 16.
- ✓ Check that the spacing clearance requirements are met, page 16.
    - Unit dimensions may be found on page 7.
- ✓ Check that a suitable electrical outlet and power supply is present, page 17.

**Install the bead bath in a suitable workspace location**

- ✓ Review the lifting and handling instructions, page 18.
- ✓ Verify that the unit is level, page 19.
- ✓ Install the unit in its workspace location, page 19.

**Set up the bead bath for use**

- ✓ Clean and disinfect the unit and beads (recommended), page 20.
- ✓ Assemble the bead bath cover, page 21.

## *Required Ambient Conditions*

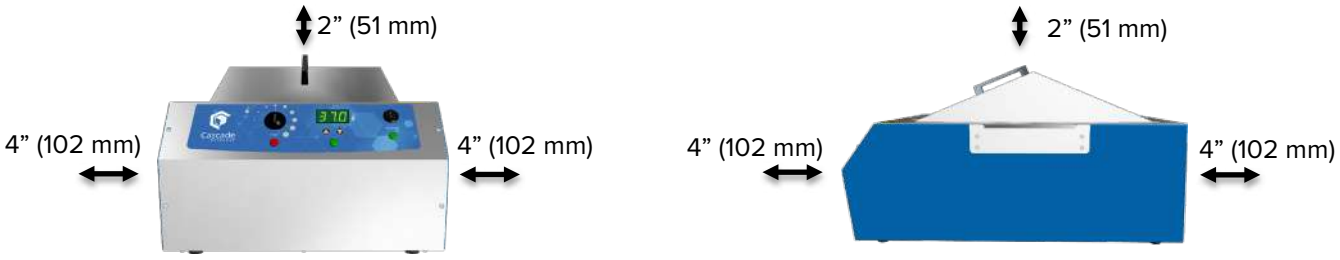
These units are built for use indoors at room temperatures between **15°C and 30°C (59°F and 86°F)** at no greater than **80% Relative Humidity** (at 25°C / 77°F). Operating outside these conditions may adversely affect the unit temperature performance.

When selecting a location to install the unit, consider all environmental conditions that can adversely impact its temperature performance. These include:

- Proximity to ovens, autoclaves, or any other device producing significant radiant heat
- Heating and cooling vents or other sources of fast-moving air currents
- High-traffic areas
- Direct sunlight

## *Required Clearances*

These clearances are required to provide air flows for ventilation and cooling.




**4 inches (102 mm)** of clearance is required on the sides and back.

**2 inches (51 mm)** of headspace clearance is required between the top of the unit and any overhead partitions.

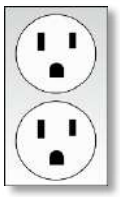
Ensure that there is sufficient overhead clearance for operators to remove the cover.

## *POWER SOURCE REQUIREMENTS*

When selecting a location for the unit, verify each of the following requirements is satisfied:

### Power Source

The power source must match the power requirements listed on the unit data plate (located on the back of the unit, next to the power cord inlet).



Standard NEMA 5-15R wall socket

- The bead bath is intended for **100 – 120 volt 50/60 Hz** applications at **6 amps.**
- The wall power source must be **single-phase (1)** and **protective earth grounded**.
- **The unit may be damaged if the supplied voltage varies by more than 10% from the data plate rating.**
- Use a separate circuit to prevent loss of the unit due to overloading or circuit failure.
- **The recommended wall circuit breaker for this unit is 15 amps.**
- The wall power source must conform to all national and local electrical codes.

### Power Cord

The unit must be positioned so that all operators can quickly unplug the power cord in the event of an emergency.

- The unit is provided with a **125V, 15A, 9ft 5in (2.86m), NEMA 5-15P** power cord.
- Always use this cord or an identical replacement.

### Fuses

The unit ships with a fuse installed in the power cord inlet.

- The fuse must be installed and intact for the unit to operate.
- Always find and fix the cause of a blown fuse prior to putting the unit back into operation.
- Fuse type:
    - 250V T6.3A, 5x20mm

## GENERAL POWER SAFETY

Your unit and its recommended accessories are designed and tested to meet strict safety requirements. It is designed to connect to a power source using the specific power cord type shipped with the unit.

For continued safe operation of your unit, always follow basic safety precautions including:

- Always plug the unit power cord into a protective earth grounded electrical outlet that conforms to national and local electrical codes. If the unit is not grounded properly, parts such as knobs and controls can conduct electricity and cause serious injury.
- Do not bend the power cord excessively, step on it, or place heavy objects on it.
- A damaged cord can be a shock or fire hazard. Never use a power cord if it is damaged or altered in any way.

## LIFTING AND HANDLING

The unit is heavy. Use appropriate lifting devices sufficiently rated for these loads. Follow these guidelines when lifting the unit:

- Lift the unit from its bottom surface or with the side mounted handles.
- Handles and knobs are not adequate for lifting or stabilization.
- Restrain the unit completely while lifting or transporting so it cannot tip.
- Remove all moving parts, such as the cover and beads, during transfers to prevent shifting and damage.

## LEVELING

The bead bath is equipped with non-adjustable rubber feet to raise it off the counter and prevent sliding. Ensure that the unit is on a flat and level surface prior to placing the unit in operation.

## INSTALL THE BEAD BATH

Install the unit in a workspace location that meets the criteria discussed in the previous entries of the Installation section.

## *Deionized and Distilled Water*

**Do not use deionized water** to clean the unit or cover, even if DI water is readily available in your laboratory.

- Use of deionized water may corrode metal surfaces and **voids the manufacturing warranty.**
- The manufacturer recommends the use of distilled water in the resistance range of 50K Ohm/cm to 1M Ohm/cm, or a conductivity range of 20.0 uS/cm to 1.0 uS/cm, for cleaning applications.

## *Installation Cleaning and Disinfecting*

The manufacturer recommends cleaning and disinfecting the unit and accessories prior to installation.

**Cleaning the Unit**

- The unit was cleaned at the factory but may have been exposed to contaminants during shipping.
- Remove all wrappings and coverings from the gable cover prior to cleaning and assembly.
- Please see the Cleaning and Disinfecting procedure on page 35 in the User Maintenance chapter for information on how to clean and disinfect without damaging the unit.
- **The unit is not watertight**. Do not fill the unit with water for cleaning.

**Cleaning the Beads**

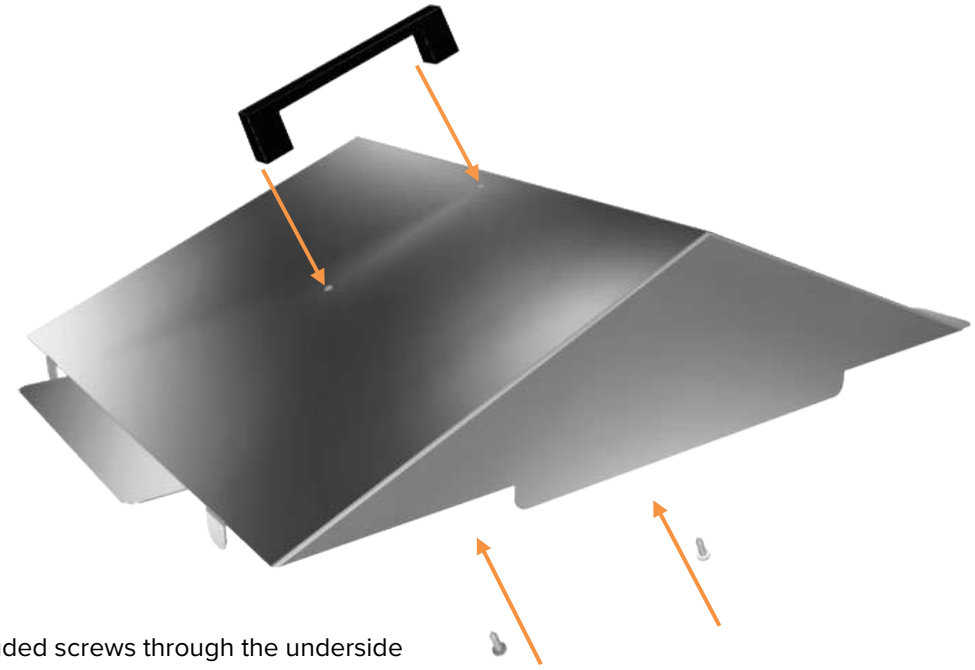
- **Always wear gloves when handling beads to avoid contaminating the beads and bath.**
- Remove all packaging materials from beads prior to cleaning.
- See page 36 in the User Maintenance chapter for information on how to clean and disinfect Lab Armor beads.
- **Do not place beads in the unit at this time.**

## *Assemble the Bead Bath Cover*

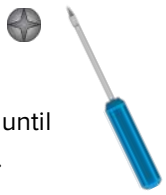
**Note:** The unit ships with the handle installed on the underside of the cover.

**1.** Uninstall the handle from the underside of the cover.

**2.** Align the handle with the screw holes on the cover body.



**3.** Insert the 2 included screws through the underside of the cover body and into the holes on the handle.



**4.** Use a **Phillips screwdriver** to tighten the screws until the handle is securely fastened. Do not overtighten.

**Do not place the cover on the unit at this time.**

End of Procedure


Cascade
Sciences

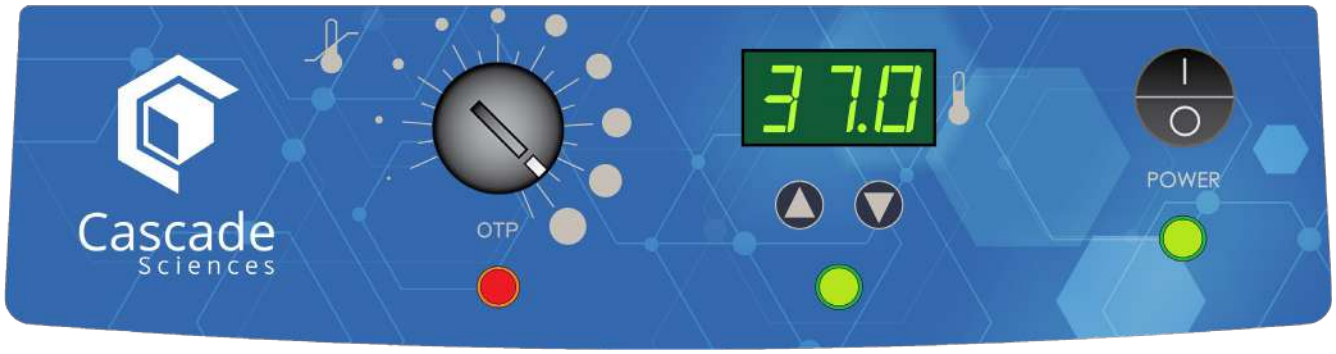
# GRAPHIC SYMBOLS

The unit is provided with graphic symbols on its exterior. These identify hazards and adjustable components as well as important notes in the user manual.

| Symbol | Definition |
|---|---|
|  | Consult the user manual<br>Consulter le manuel d'utilisation |
|  | Temperature display<br>Indique l'affichage de la température |
|  | Over Temperature Limit system<br>Thermostat température limite contrôle haute |
|  | AC Power<br>Repère le courant alternatif |
|  | I/ON O/OFF<br>I indique que l'interrupteur est en position marche.<br>O indique que le commutateur est en position d'arrêt. |
|  | Adjusts UP and DOWN<br>Ajuster le haut et vers le bas |
|  | Potential shock hazard<br>Risque de choc électrique |
|  | Recycle the unit. Do not dispose of in a landfill.<br>Recycler l'unité. Ne jetez pas dans une décharge |
|  | Protective earth ground<br>Terre électrique |
|  | Caution hot surface<br>Attention surface chaude |


Cascade
Sciences

# CONTROL OVERVIEW




**Control Panel**

### Over Temperature Protection Control (OTP)

This graduated dial sets the mechanical heating cutoff for the Over Temperature Protection system (OTP). The OTP helps prevents unchecked heating of the tank in the event of a hardware failure or external heat spike. For more details, please see the **Over Temperature Protection System** description in the Theory of Operations (page 27).

The red light illuminates when the OTP system cuts off heating to the tank by rerouting power away from the heating elements.

### Temperature Control and Display

During normal operations, the display shows the current bead temperature, accurate to 0.1°C. The Up and Down arrow buttons are used to change display modes and input temperature setpoints or calibration adjustments. The display blinks continually while in setpoint or calibration adjustment modes, preceded by an “SP” for Setpoint or “C O” for Calibration Offset.

### Heating Activated

The green light illuminates when the unit is calling for power to the heating elements.

### Power Switch

Power is supplied when the switch is in the ( I ) ON position.

The green Power light illuminates when the unit is turned on.


Cascade
Sciences

## *THEORY OF OPERATION*

### Heating

When powered, the bead bath heats to and then maintains an operator-selected temperature setpoint. The unit temperature controller senses the temperature of the beads via a solid-state probe located in the front, right corner of the tank. When the controller detects that the temperature of the beads has dropped below the target setpoint, it pulses power to the heating elements inside the bead bath walls and floor.

The bead bath uses Proportional – Integral – Derivative (PID) control to avoid significantly overshooting the setpoint. This means the rate of heating slows as the bead temperature approaches the target temperature. If the bead temperature is above the setpoint, the bead bath uses minimum heating to control the rate of cooling and avoid dipping below the setpoint.

Additionally, the PID loops optimize heating rates for the temperature environment around the bead bath. If the bead bath is operating in a cool room, it will increase the length of heating pulses to compensate. Likewise, when operating in a warm room the bead bath uses shorter pulses. If the ambient temperature conditions change significantly, there may be minor over or undershoots as the unit adapts.

The bead baths rely on natural heat radiation for cooling. These units can achieve a low-end temperature just above the ambient room temperature plus the internal waste heat of the bead bath.

### The Over Temperature Protection System

The OTP is an operator-set, mechanical heating cutoff connected to a hydrostatic sensor probe inside the bead bath tank. The system operates independently of the main microprocessor temperature controller and routes power away from the tank heating elements if the bead temperature exceeds the OTP temperature cutoff setting. It will continue doing so as long as the bead temperature remains above the OTP setting. This helps safeguard the unit by preventing runaway heating in the event of electronics failures or a sudden external heat spike.

**The OTP must be set by the operator in order to function**. The manufacturer recommends a setting of approximately 1°C above the highest temperature setpoint of your heating application. A red indicator illuminates when the OTP is rerouting power. Failure to set the OTP system voids the unit manufacturing defect warranty in the event of an over temperature event.

## *Put the Bead Bath into Operation*

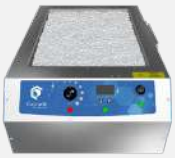
Perform the following steps and procedures to put the unit into operation after installing it in a new workspace environment.

### 1. Plug in the Power Cord

Attach the power cord that came with the unit to the power inlet receptacle on the back of the unit.

Plug the power cord into the workspace electrical supply outlet.

### 2. Fill with Lab Armor Beads



Fill the tank to the appropriate level with beads.

- See page 29.

Place the cover on the bead bath.

### 3. Power the Bead Bath

Place the unit **Power Switch** in the ON ( I ) position.

### 4. Set the Temperature Setpoint


**Set the Temperature Setpoint** to your application temperature.

- See page 30.

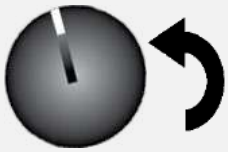
### 5. Allow the Bead Bath to heat for a minimum of 8 hours


Run the unit for at least 8 hours undisturbed (for example, overnight) with the gable cover on prior to:

- Setting the Over Temperature Protection.
- Loading product.

This helps ensure a stable temperature environment.

### 6. Set the Over Temperature Protection



**Set the Over Temperature Protection.** See page 31.

- The bath must be heated **and stable** at your application temperature to perform this procedure.

**The bead bath is now ready for use.**

- You may **Load Product**, page 32.

## *Fill With Lab Armor Beads*

**Warning**: The tank is not watertight. Do not fill the tank with liquid. Use beads only.

**Avertissement**: Le réservoir n'est pas étanche. Ne remplissez pas le réservoir de liquide. Utilisez des perles seulement.

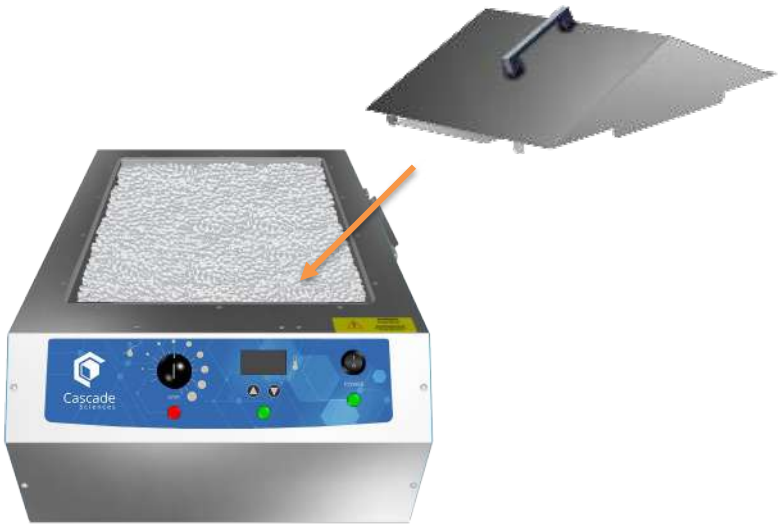
**Reminder**: The beads be should be cleaned and disinfected before filling the tank. See page 36.

- Always wear gloves when handling beads to avoid contamination.

1. Fill the tank with **15** liters of beads.
   a. Leave approximately **1 inch (25 mm)** of space from the top of the tank.

   **Note:** The bead level will rise when product is loaded.

2. Place the gable cover on the bath.




3. Turn on the unit. **Do not load product at this time.**

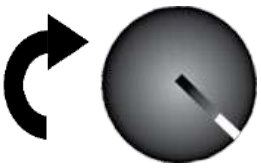
End of Procedure

## *SET THE TEMPERATURE SETPOINT*

Perform the steps below to adjust the setpoint to your process or application temperature.

**1. Set the Over Temperature Protection control to its maximum setting, if not already set to max.**

- This prevents the heating cutoff system from interfering with this procedure.



**2. Navigate to the Temperature Setpoint Adjustment mode**

Briefly push and release either the **Up** or **Down** arrow buttons to activate the temperature setpoint adjustment mode.

- The display will briefly flash the letters “SP”, then show the flashing, adjustable temperature setpoint.


Setpoint Adjustment Mode


Initial Setpoint

**Note:** The display will automatically exit the adjustment mode after 5 seconds of inactivity, with the last shown setpoint value saved.

**3. Set the Temperature Setpoint**

Use the **Up** and **Down** arrow buttons to change the temperature setpoint.


New Setpoint

**4. Wait for 5 seconds after entering the Setpoint**


- The display will stop flashing, and the setpoint is now saved in the controller.
- The tank will now automatically heat or passively cool to match your setpoint.
- The display will revert to showing the current bead temperature.


Heating to New Setpoint

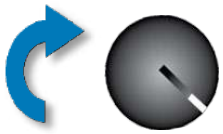
End of Procedure

**Note:** Test the OTP system at least once per year to verify its functionality. **Failure to set the OTP voids the manufacturing defect warranty if over temperature damage occurs.**

## *Set the Over Temperature Protection (OTP)*

This procedure sets the mechanical heating cutoff to approximately 1˚C above the current bead temperature. **Perform this procedure when the unit has been running with no temperature fluctuations at your application temperature for at least 8 hours.**

**1. Set the OTP control dial to its maximum setting,** if not already set to max.



**2. Turn the dial counterclockwise (to the left) until the OTP alarm light illuminates.**

- There is a soft click when the OTP begins rerouting power away from the heating elements.

**3. Slowly turn the dial clockwise (to the right) until the OTP light turns off.**

- The Over Temperature Protection is now set approximately 1˚C above the current bead temperature.

**4. Leave the OTP dial set just above the activation point.**

**Optional:** Turn the dial slightly to the left (counterclockwise).

- This sets the OTP cutoff threshold nearer to the current bead temperature.

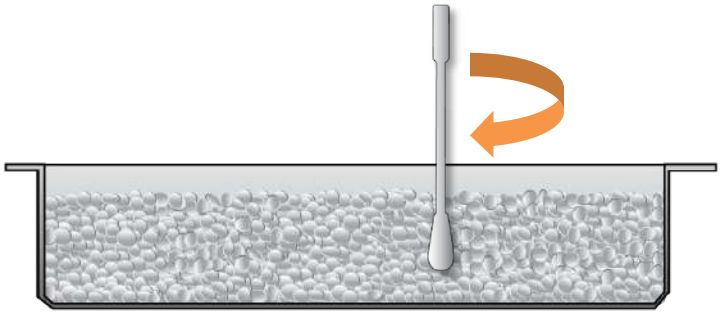
If the Over Temperature Protection sporadically activates after setting the control, turn the dial very slightly to the right (clockwise). If the OTP continues activating, check for ambient sources of heat or cold that may be adversely impacting the unit temperature stability. If you find no sources of external or internal temperature fluctuations, contact Tech Support or your distributor for assistance.

End of Procedure

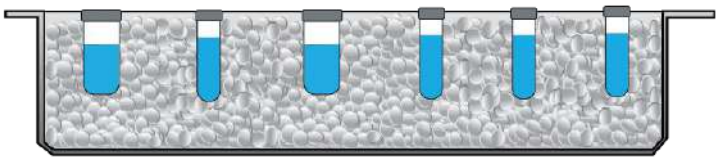
## *Load Product*

Load product after the bead bath must run with beads in the tank for at least **8 hours** prior to loading product.

1. Briefly stir the beads before loading product. This helps ensure temperature uniformity.
    - Always use a stirring rod to avoid contamination. Avoid using a metal rod to prevent scratching the tank and beads.



2. Load product in the tank. Ensure that the combined volume of product and beads does not cause the tank to overfill.
    - Product containers must be completely surrounded by beads without touching the walls and floor of the tank to avoid uneven heating.



3. Place the gable cover on the bead bath.
    - Ensure that the cover sits level.

## *VALIDATING APPLICATION PROTOCOLS*

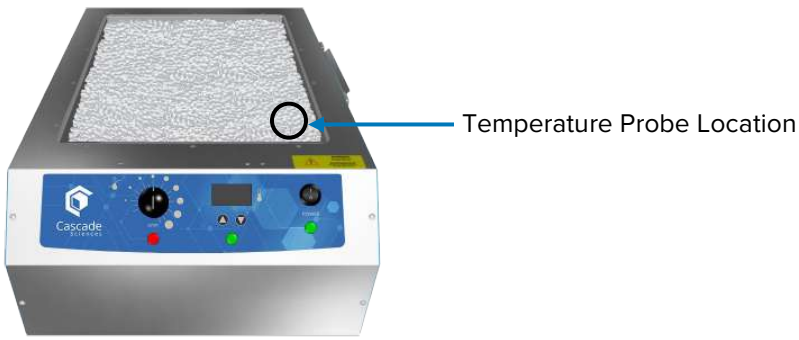
All water bath application protocols should be validated when switching to bead baths. Applications involving large or frozen product containers may take 2 – 3 times longer to achieve the target setpoint than in a traditional water bath due to the high thermal stability of the beads.

Bringing the temperature of frozen product up to 4°C before placing in the bead bath can help optimize heat up times.

### Thawing

When using bead baths for thawing applications, periodically relocate cold product containers within the tank to ensure optimal temperature uniformity.

**Do not place frozen product adjacent to the temperature probe located in the front, right corner of the tank.** This will cause the probe to register the chilled temperature of the beads immediately surrounding the frozen product, potentially causing the bead bath to raise the overall bath temperature.




Cascade
Sciences

**Warning**: Disconnect this unit from its power supply prior to performing maintenance or services.

**Avertissement**: Débranchez cet appareil de son alimentation électrique avant d'effectuer la maintenance ou les services.

## *CLEANING AND DISINFECTING*

If a hazardous material or substance has spilled in the tank, immediately initiate your site's Hazardous Material Spill Containment protocol. Contact your local Site Safety Officer and follow instructions per the site policy and procedures.

- The bead bath tank should be cleaned prior to first use.
- Periodic cleaning is required.
- Do not use spray on cleaners or disinfectants. These can leak through openings and coat electrical components.
- Consult with the manufacturer or their agent if you have any doubts about the compatibility of decontamination or cleaning agents with the parts of the equipment or with the material contained in it.
- Do not use cleaners or disinfectants that contain solvents capable of harming paint coatings or stainless steel surfaces. **Do not use chlorine-based bleaches or abrasives; these will damage the tank.**

**Warning**: Exercise caution if cleaning the unit with alcohol or flammable cleaners. Always allow the unit to cool down to room temperature prior to cleaning and make sure all cleaning agents have evaporated or otherwise been completely removed prior to putting the unit back into service.

**Avertissement:** Soyez prudent lorsque vous nettoyez l'appareil avec de l'alcool ou des produits de nettoyage inflammables. Laissez toujours refroidir l'appareil à la température ambiante avant le nettoyage et assurez-vous que tous les produits de nettoyage se sont évaporés ou ont été complètement enlevés avant de remettre l'appareil en service.

### Cleaning the Bath

1. Disconnect the unit from its power supply.
2. Remove beads and any other accessories from the tank.
3. Clean the unit with a mild soap and water solution, including all corners.
    - **Do not use abrasive cleaners**. These will damage metal surfaces.
    - **Do not use deionized water to rinse or clean with.**
    - Take special care when cleaning around the temperature sensor probe in the tank to prevent damage. Do not clean the probe.
4. Clean with a lint-free towel dampened with distilled water and wipe dry with a soft cloth.

### Disinfecting the Bath

When disinfecting the unit, keep the following in mind:

- Always turn off and disconnect the unit to safeguard against electrical hazards.
- For maximum effectiveness, disinfection procedures are typically performed after cleaning.
- Beads must be removed from the tank to successfully disinfect the bath.
- Disinfect the unit using commercially available disinfectants that are non-corrosive, non-abrasive, and suitable for use on stainless steel and glass surfaces. Contact your local Site Safety Officer for detailed information on which disinfectants are compatible with your applications.
- Disinfect all surfaces in the tank, making sure to thoroughly disinfect the corners. Exercise care to avoid damaging the sensor probes.
- Leftover volatile disinfecting agents can contaminate your product. Make sure that disinfecting agents have been rinsed or otherwise removed from the unit surfaces prior to refilling the tank.
- When disinfecting external surfaces, use disinfectants that will not damage painted metal, glass, and plastic.

## *Cleaning and Disinfecting Lab Armor Beads*

Clean and disinfect the beads as often as required by your laboratory protocol. **Always wear gloves when handling beads to avoid contaminating the beads and bath.**

### Cleaning the Beads

1. Remove the beads from the tank.
2. Clean with a mild soap and water solution.
    - **Do not use an abrasive cleaner**. These will damage the surface of the beads.
    - **Do not autoclave the beads.** This will cause pitting on the polished aluminum surfaces.
    - **Do not use deionized water to rinse or clean with.**
3. Rinse with distilled water and disinfect before use.

**Disinfecting the Beads**

1. Remove beads from the tank.
2. Disinfect the beads with a solution of isopropanol (IPA) or 70% ethanol, ensuring that all bead surfaces have been sufficiently coated.
3. The manufacturer recommends allowing the IPA or ethanol solution to air dry. This helps ensure that the beads have had sufficient contact time to be thoroughly disinfected.
4. Ensure that disinfecting agents have fully evaporated and beads are completely dry before returning beads to the tank.

## *Minimizing Contamination Exposure*

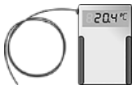
Suggestions for minimizing exposure of the unit to potential contaminants:

- Maintain a high air quality in the laboratory workspaces around the bead bath.
- Avoid placing the bead bath near sources of air movement such as doors, air vents, or high traffic routes in the workspace.
- Minimize the number of times the cover is opened during normal operations.

## *Electrical Components*

Electrical components do not require maintenance. If the unit electrical systems fail to operate as specified, please contact your distributor or Technical Support for assistance.

## *Calibrate the Temperature Display*



**Note:** A calibration reference device must be purchased separately. For best results, use a digital device with thermocouple probes. The device must be accurate to at least 0.1°C and should be regularly calibrated by a third party. **Never use alcohol or mercury-based thermometers.**

**Cascade Sciences bead baths do not normally require calibration. Should your SOP or Quality program require calibrations, follow this guideline.**

Temperature calibrations are performed to match the unit temperature display to the actual temperature of the beads. The actual temperature is supplied by a calibrated reference device. Calibrations compensate for long-term drifts in the microprocessor controller as well as those caused by the natural material evolution of the sensor probe in the tank. Calibrate as often as required by your laboratory or production protocol, or regulatory compliance schedule. Always calibrate to the standards and use the calibration setup required by your industry requirements or laboratory protocol.

**Suggested Calibration Setup**

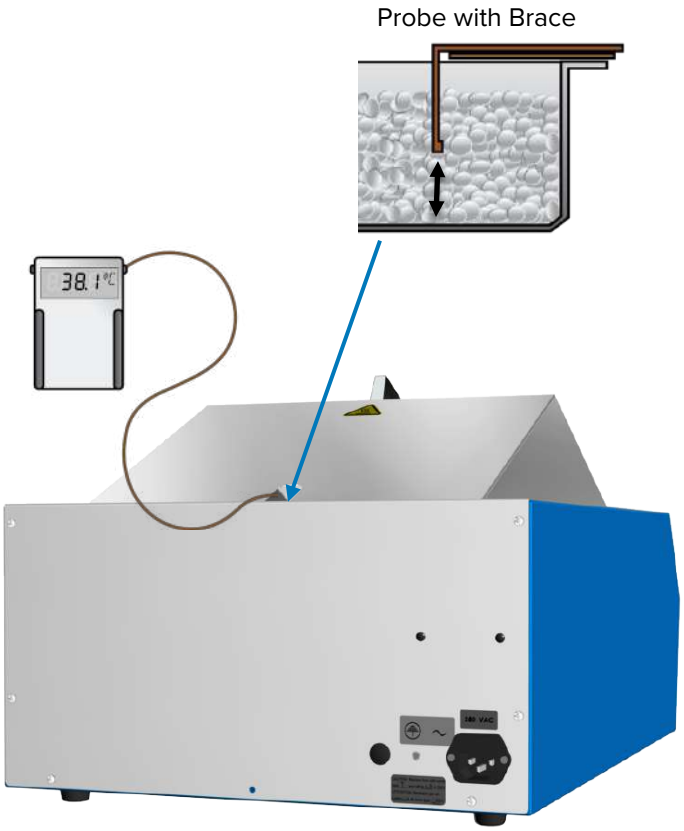
**Heat-resistant, non-stick tape recommended**

**1.** Introduce the reference device thermocouple probe into the tank. Rigid, non-conductive items, such as a wooden tongue depressor, may be used as a brace for the probe.

**2.** Horizontal: Position the sensor probe head as close as possible to the horizontal center point of the tank. Vertical: The probe head must be fully submerged in the beads, halfway between the surface of the beads and the bottom of the tank. This prevents heatsinking from the sides and bottom of the tank.

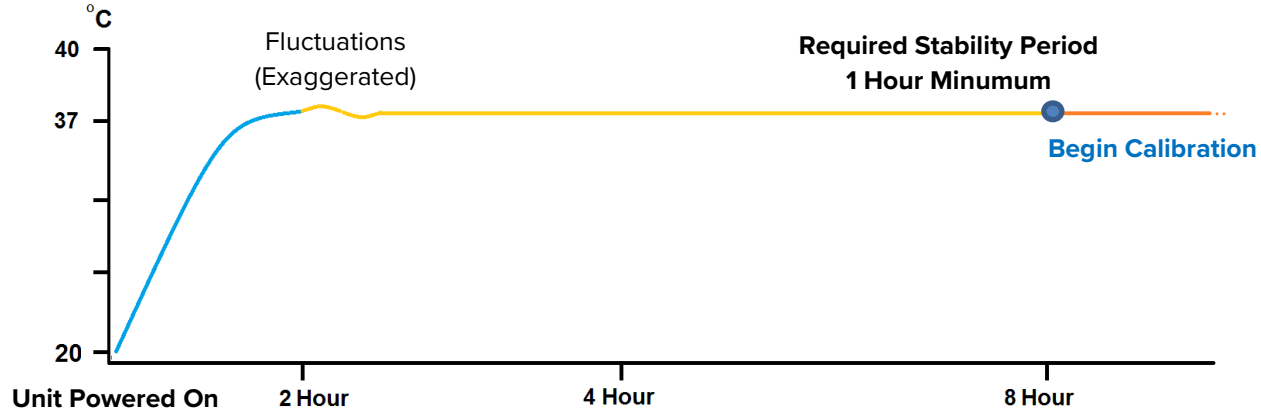
**3.** Secure the probe brace in position using non-stick tape.

**4.** Place the gable cover on the unit. Failure to cover the tank will result in an inaccurate calibration.



**5.** The bead temperature must be stable in order to perform an accurate calibration.

- The bead bath must run loaded with beads for at least 8 hours prior to conducting a calibration.
- The temperature is considered stabilized when the filled bead bath has operated with the cover on at your calibration temperature for at least 1 hour with no fluctuations greater than the specified stability of the unit (see page 7).




## Suggested Temperature Calibration

**1**

Once the bead temperature has stabilized, compare the reference device and unit temperature display readings.

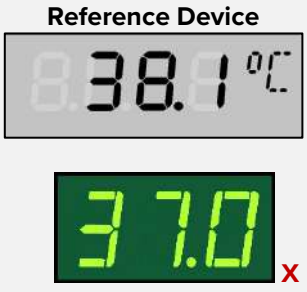
- If the readings are the same, or the difference between the two falls within the acceptable range of your protocol, the display is accurately showing the bead temperature. **The Temperature Calibration procedure is now complete**.

**-OR-**

- If the difference falls outside of your protocol range, advance to Step 2.


**2**

A display calibration adjustment must be entered to match the display to the reference device. See next step.




Continued next page

## Suggested Calibration Continued

**3**

Place the display in temperature calibration mode.

a. Press and hold both the **Up** and **Down** arrow buttons simultaneously for approximately 5 seconds.

b. Release the buttons when the temperature display shows the letters “C O”. The display will begin flashing the **current temperature display value.**


**Note:** The display will automatically exit calibration mode after 5 seconds of inactivity, with the last shown temperature display value saved.

**4**

Push the **Up** and **Down** arrow buttons to adjust the current display temperature value until it matches the reference device temperature reading.

**Reference Device**


**5**


After matching the display to the reference device, wait 5 seconds.

- The temperature display will cease flashing and store the corrected display value.
- The bead bath will now begin heating or passively cooling to reach the setpoint with the corrected display value.


Cooling to Setpoint

**6**


Allow the bead bath to operate for at least 1 hour undisturbed to stabilize **after the unit has achieved the corrected temperature setpoint.**

- Failure to wait until the unit is fully stabilized will result in an inaccurate reading.


Setpoint Achieved

Continued next page

## Suggested Calibration Continued

**7**

Compare the reference device reading with the unit temperature display again.

- If the reference device and the unit temperature display readings are the same, or the difference falls within the range of your protocol, **the unit is now calibrated for temperature.**

**-OR-**

- See the next step if the readings fail to match or fall outside of your protocol range.

**Reference Device**


✓

**8**

If the two readings are not the same, and the difference still falls outside the acceptable range of your protocol, repeat steps 3 – 7 up to two more times.

- Three calibration attempts may be required to successfully calibrate units that are more than ±2°C out of calibration.

**Reference Device**


X

**9**

If the temperature readings of the unit temperature display and the reference device still fall outside your protocol after three calibration attempts, contact your distributor or **Technical Support** for assistance.

End of Procedure


Cascade
Sciences

# PARTS LIST

| Description | Parts Number | Description | Parts Number |
|---|---|---|---|
| Fuse, 6.3 amp 250V |  **3300515** | Gable Cover |  **9751202** |
| Power Cord, 125 volt, 15Amp, 9 ft 5 in (2.86m), NEMA 5-15P |  **1800510** | Lab Armor Beads, 5 Liters |  **42370-005** |


Cascade
Sciences