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## INTRODUCTION

Thank you for purchasing a BriskHeat<sup>®</sup> Laboratory Heating Mantle. Your heater is designed to provide a long and efficient service life with function, reliability, and safety in mind. For additional information concerning this product, or other BriskHeat<sup>®</sup> products, please contact your local BriskHeat<sup>®</sup> distributor or contact us toll free at 1-800-848-7673 (U.S. / Canada) or 614-294-3376 (Worldwide).

BriskHeat heating mantles are fiberglass insulated heaters for laboratory and pilot laboratory applications. They are used to heat a variety of round bottom shaped vessels, to either increase temperature or keep media at a constant process temperature. All heating mantles are manufactured to high quality standards of craftsmanship.

# Laboratory Heating Mantles

## Instruction Manual

	<p>Read and understand this manual before installing, operating, or servicing this product. Failure to understand these instructions could result in an accident causing serious injury or death. Only qualified personnel should install, operate, or service this product.</p>
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**SAVE THESE INSTRUCTIONS!**  
 Additional copies of this manual are available upon request.

**IMPORTANT SAFETY INSTRUCTIONS**



**SAFETY ALERT SYMBOL**

The symbol above is used to call your attention to instructions concerning your personal safety. It points out important safety precautions. It means “**ATTENTION! Become Alert! Your Personal Safety is involved!**” Read the message that follows and be alert to the possibility of personal injury or death.



A person who has not read and understood all operating Instructions is not qualified to operate this product.



- Do not immerse or spray any component of the system with liquid.
- Keep volatile or combustible material away from heater when in use.
- Use heater only in approved locations.
- Keep sharp metal objects away from heater.

Failure to observe these warnings may result in electric shock, risk of fire, and personal injury.



**End-User Must Comply to the Following:**

- Only qualified personnel are allowed to connect electrical wiring.
- Disconnect all supply power at the source before making any power connections.
- All electrical wiring must follow local electrical codes and highly recommend following NEC Article 427.
- The person who performs the final installation / wiring must be qualified for this work.
- The end-user is responsible for providing a suitable disconnecting device.
- The end-user is responsible for providing suitable electrical protection device. It is highly recommended that a ground fault circuit breaker be used.

Failure to observe these warnings may result in personal injury or damage to the heater.



Immediate hazards which **WILL** result in severe personal injury or death.



Hazards or unsafe practices that **COULD** result in severe personal injury or death.



Hazards or unsafe practices that **COULD** result in minor personal injury or property damage.

**Agency Approvals**



**Approvals valid only when** installed in accordance with all applicable instructions, codes, and regulations.



- Never handle the heating element while it is in operation; always disconnect the heater from the power source and allow to cool prior to handling.
- Inspect heater before use.
- Never operate heater without a temperature control device.
- If spillage of foreign matter onto heater occurs, disconnect from power source and clean after heater is allowed to cool.
- Never operate a heater without an appropriate heat sink (device being heated is considered a heat sink).
- Do not operate heater above rated temperature value.
- Do not repair damaged or faulty heaters.
- Do not crush or apply severe physical stress on heater or cord assembly.
- Disconnect heater when not in use.

Failure to observe these warnings may result in personal injury or damage to the heater.

HM heating mantles, hereinafter also referred to as heating mantles, have been constructed in accordance with the state-of-the-art and recognized safety rules.

Nevertheless, dangers for the user or a third party may arise during their use, or damage to the heating mantles and other material assets may occur, if

- they are operated by uninstructed personnel,
- they are not used for the intended purpose,
- they are inappropriately serviced or maintained.

**Use in accordance with the intended purpose**

The heating mantles' intended use is the heating of non-combustible and non-explosive media in glass flasks in laboratory and pilot laboratory applications. The size of the heating mantles has to correspond to the size of the glass flasks.

Any other use or use beyond the one mentioned is considered as not in accordance with the intended use. Use in accordance with the intended purpose also includes compliance with the safety, operating, servicing and maintenance information described in these operating instructions.

Understand the respectively mentioned safety information and act with particular care in these cases. Please also pass on all safety information to other users.

In addition to the information contained in these operating instructions, the general safety and accident prevention regulations also must be complied with.

*Note: This points out special circumstances the consideration of which will ensure a safe, appropriate and efficient handling of the heating mantles. For the benefit of using the heating mantles in accordance with their intended purpose, all instructions are to be complied with. Please pass on all instructions to other users.*

**Residual risk**

Even if all safety regulations are observed, a residual risk remains during operation of the heating mantles.

All persons working with the heating mantles have to be aware of these residual risks. They have to comply with the instructions preventing these residual risks from leading to accidents or damage.

**⚠ DANGER**

Hot surface at the top rim of the heating mantle may cause severe burns even after device has been switched off.

Do not touch heating mantles when they are switched on.

Before handling the heating mantle, switch it off, disconnect all supply power at the source, and allow for a sufficient cool-down period.

**GENERAL**

These operating instructions provide essential assistance for the successful and safe operation of heating mantles series HM-MC, HM-MH.

The operating instructions contain important information to operate the heating mantles safely, appropriately and economically. Following these instructions helps to avoid dangers and to increase the heating mantles reliability and service life. The operating instructions must be available at all time and must be read and applied by every person performing work with a heating mantle.

**Notes regarding copyrights and property rights**

These operating instructions have to be treated as confidential. They ought only be made accessible to authorized persons. They may only be yielded to third parties with the written approval of the manufacturer. All documentation is protected in terms of the Copyright Act. The dissemination and duplication of documents, also of excerpts, as well as the exploitation and communication of their contents is not permitted, unless this has expressly been granted in writing.

**Notes for the operator**

The operating instructions form an integral part of the heating mantles. The operator has to ensure that the operating personnel takes notes of these operating instructions and observes the specifications provided therein.

All heating mantles have had controlled heat-up applied ahead of shipment. Discoloration of the glass fiber braiding is not deterioration of quality. During initial start-up there may be a small amount of smoke. The smoke (fume) drift does not continue long.

*Note: Before putting a heating mantle into service, it is essential to read and observe the operating instructions.*

**⚠ DANGER**

- Penetration of moisture due to water or chemical liquids may cause dangerous to life-threatening electric shocks. Do not touch the heating mantles if a vessel breaks or liquids are spilled. Immediately disconnect the heating mantles from the main power supply. Wet or humid heating mantles have to be dried inside a drying cabinet at maximum 60°C for at least 3 hours before they may be put into operation again. Only put completely dry heating mantles into operation.
- Explosive media, explosive gas-air-mixtures or combustible liquids may explode due to heat processes or cause fires due to vessel breakage or spilling. Heating mantles are not explosion-proof. Do not use to heat explosive media or media which may generate an explosive gas-air mixture when they are heated. Do not use to heat combustible liquids. Observe safety data sheets for media prior to heating.
- Do not pierce the heating mantle with needles or similar objects.
- There is a risk of shock occurring. Persons carrying out work on or with the heating mantle have to proceed with caution.

**⚠ WARNING**

- Hot surfaces such as the top rim of the heating mantle and hot liquids are not always perceptible. Hot surfaces should be identified if their temperature may exceed 45°C (coagulation of protein) as they are then able to cause burns to human beings.
- Do not touch hot surfaces without protective gloves.
- Read and observe operating instructions
- The heating mantles may only be used with the knowledge gained from the operating instructions (manufacturer's instructions for use).
- From the operating instructions, it is for instance possible to gather details:
  - on the dangers involved,
  - on the operating environment,
  - on the customary fields of application (general applications),
  - in respect to connection and use (all operating modes, settings, displays, handling) and about possible application errors as well as error conditions and their easy correction (otherwise one of the service points has to be referred to).
- Before the heating mantles are put into operation, the user (operator) must have read and understood the operating instructions (manufacturer's instructions for use).

**SPECIFICATIONS**

**General**

Heating mantles are fiberglass insulated heaters for laboratory and pilot laboratory heating applications. They are used to heat round-bottom flasks to either keep media at a constant process temperature or to increase temperature to a desired point.

**Structure**

The exterior of the mantle is a plastic-coated metal casing, with a pre-molded fiberglass liner to hold the round-bottom flasks. The heating element consists of a chrome-nickel alloy resistance wire which is electrically insulated using a crocheted high-temperature yarn. The adapted shape ensures an even heat transition to the glass flask, and a layer of fiberglass insulation under the heating element reduces heat dissipation to increase efficiency.

**Designs and technical specifications**

**Series HM-MH**

Nominal voltage	Available 120 VAC
Nominal output	See chart below
Heating zones	See chart below
Protection class	I
Type of protection	Heating element: IP 00
Heating conductor temperature	Max. 842°F (450°C)
Main connection cable	5ft (1.5m) with plug with grounded contact

*Note: Available with other specifications*

Volume (ml)	Glass Flask Diameter (ml)	Output (Watts)	Heating Zones	Part Number
50	51	60	1	HM0050MH1
100	64	110	1	HM0100MH1
250	85	165	2	HM0250MH1
500	105	220	2	HM0500MH1
1000	131	325	2	HM1000MH1
2000	166	545	2	HM2000MH1
3000	185	650	2	HM3000MH1
4000	207	815	2	HM4000MH1
5000	223	935	2	HM5000MH1
6000	236	1090	2	HM6000MH1

**Series HM-MC with built-in Power Control**

Nominal voltage	Available 120 VAC
Nominal output	See chart below
Heating zones	See chart below
Protection class	I
Type of protection	Heating element: IP 00
Heating conductor temperature	Max. 842°F (450°C)
Main connection cable	5ft (1.5m) with plug with grounded contact

*Note: Available with other specifications*

Volume (ml)	Glass Flask Diameter (ml)	Output (Watts)	Heating Zones	Part Number
50	51	60	1	HM0050MC1
100	64	110	1	HM0100MC1
250	85	165	2	HM0250MC1
500	105	220	2	HM0500MC1
1000	131	325	2	HM1000MC1
2000	166	545	2	HM2000MC1
3000	185	650	2	HM3000MC1
4000	207	815	2	HM4000MC1
5000	223	935	2	HM5000MC1
6000	236	1090	2	HM6000MC1

**Safety equipment**

The building or facility's circuit breaker can be used as short-circuit protection. The use of a GFCI Ground Fault Interrupting Device is recommended.

The heating mantles may only be operated with an (RCD) personal protection adapter. (Not included)

Due to the high temperature range, the heating mantles are not protected against moisture and the heater core is not equipped with sufficient protection against dangerous currents.

*Note: The heating mantles may be exclusively operated with an personal protection adapter (RCD 30mA) connected ahead of it.*

## OPERATION

### General

*Note: Before putting the heating mantles into operation, they have to be checked to determine whether the voltage complies with the nominal voltage specified on the product label.*

#### **DANGER**

- Putting a defective heating mantle into operation may lead to dangerous or life-threatening electric shocks.
- A heating mantle may not be connected and put into operation, if it exhibits visible damage such as embrittlement of the fabric or exposed heating conductors, it no longer functions properly according to the specifications of these operating instructions, testing of the personal protection adapter fails several times prior to putting the heating mantle into operation, the personal protection adapter cuts out during operation, or the heating mantle is moist or wet.

#### **CAUTION**

- Overheating of the heating mantle may possibly lead to overheating of the glass flask and its contents and to embrittlement of the heating mantle's fiberglass fabric.
- Only operate the heating mantles under supervision. Do not exceed the specified maximum heating element temperature.
- Avoid overheating by means of: switching off of individual heating zones, external power controllers or temperature controller and/or temperature limiter.
- Do not operate heating mantles with empty glass flask or without a glass flask. In case of the liquid level dropping, switch off heating zones located above current level.

*Note:*

- *The use of temperature controllers is recommended for delicate materials or in case of heating processes during which working temperatures have to be accurately adhered to.*
- *A support clamp (part#HCLAMP) is used to facilitate the integration of metal-cased heating mantles with support scaffolding and allows support rods with diameter up to 13 mm to be attached to the metal-cased heating mantles. (Not included)*
- *All heating mantles have had a controlled heat-up applied ahead of shipment. Discoloration of the glass fiber braiding is not deterioration of quality.*
- *During initial start-up there may be a small amount of smoke. The smoke (fume) drift does not continue long.*

## Heating mantle operation

#### **DANGER**

- Hot surface at the top rim of the heating mantle may cause severe burns even after device has been switched off. Do not touch heating mantles when they are switched on. Before touching the heating mantle, switch it off, disconnect all supply power at the source, and allow for a sufficient cool-down period.
- Penetration of moisture due to water or chemical liquids may cause dangerous to life-threatening electric shocks. Do not touch the heating mantles if a vessel breaks or liquids are spilled. Immediately disconnect the heating mantles from the main power supply by pulling the power plug.
- Wet or humid heating mantles have to be dried inside a drying cabinet at maximum 60°C for at least 3 hours before they may be put into operation again. Only put completely dry heating mantles into operation. Immediately disconnect heating mantles that have become wet or humid from the main power supply and do not put into operation again. Completely dry heating mantles inside a drying cabinet at maximum 60°C for at least 3 hours and only then put into operation again. Only put completely dry heating mantles into operation.
- Explosive media, explosive gas-air-mixtures or combustible liquids may explode due to heat processes or cause fires due to vessel breakage or spilling. Heating mantles are not explosion-proof. Do not use to heat explosive media or media which may generate an explosive gas-air mixture when they are heated. Do not use to heat combustible liquids. Observe safety data sheets.

*Note:*

- *If the personal protection adapter's protective function repeatedly triggers during operation of one of the heating mantles, the connected heating mantle has to be put out of operation and handed over to the manufacturer for inspection.*
- *If the personal protection adapter switches off due to moisture inside the heating mantle, the heating mantle must be immediately put out of operation and first be dried inside a drying cabinet.*
- *Only reconnect the heating mantle and put it into operation again as described in "Heating Mantle Operation" after it has completely dried.*
- *If the personal protection adapter's protective function still triggers after drying, the connected heating mantle must be put out of operation and handed over to the manufacturer for inspection.*

**PRIOR TO INSTALLATION**

1. Check for suspected damage to the heater like rips, punctures, etc.
2. Confirm voltage / wattage rating of heater is appropriate for power supply device or temperature controller. The heater is designed to work at a specific voltage to heat properly. Failure to operate the heater at the specified rating could result in overheating of the heating element, the surface being over-heated, or personal injury. Also note lower-than-rated voltage will result in under-heating.

**To Avoid Electrical Shock, Always:**

- Use an electrical outlet that operates with a fuse or a circuit breaker and a ground fault circuit interrupt (GFCI).
- Disconnect the mantle from the power supply prior to maintenance and servicing.

**To Avoid Personal Injury:**

- Do not use in the presence of flammable or combustible materials. Fire or explosion may result. This device contains components which may ignite such materials.
- Do not operate in damp or wet locations.
- Refer servicing to qualified personnel only.
- Flasks and vessels should be handled with care. Appropriate safety clothing, glasses, gloves, and coats should be worn when operating all heating mantles.

**To Avoid Damage:**

- Never plug HM-MH models directly into a power source. Your heating mantle **MUST** be operated with a temperature controller and with an appropriate size flask, filled with fluid.
- Never operate heating mantle without fluid within the flask.
- Fluid should not be allowed to come in contact with the cavity of the heating mantle.
- Never operate the mantle at temperatures above maximum exposure temperature .

**INSTALLATION****Series HM-MH**

Your heating mantle is a fiberglass-insulated heater designed for heating laboratory vessels. The mantles are specifically designed for glass flasks, however, with appropriate temperature control and product type, metal or plastic flasks can be used. Only use round bottom flasks of the size corresponding to the mantle size.

1. Install heater around properly sized flasks.
2. For proper temperature control, secure the thermocouple, RTD, or other sensing device vertically along the lead wire seam of the blanket with one strip of adhesive tape so that it is sandwiched firmly in-between the heater and glass flask.
  - Sensor must be in close proximity to the heater to prevent overheating.
  - Sensor should be connected in accordance with instructions provided with temperature controller.
3. Ensure heater is in contact with the surface to be heated. The heater must fit tightly around the glass flask. Minimal air gaps between the heater and the flask provide the best thermal transfer of heat to the flask and extend heater life.
4. Once the mantle has been properly installed:
  - 120VAC: Plug the heater into an acceptable temperature controller. Use a variable transformer, manual control, or automatic controller to prevent overheating.







*All electrical connections must be made by qualified personnel and in accordance with all applicable codes and regulations.*

**Series HM-MH**

*Note:* Due to their overall size, the heating mantle sizes 50ml and 100ml are only designed with one heating zone. They are put into operation by means of an MIN/MAX switch to half the power.

Maximum heating element temperature for series HM-MH: 842°F (450°C).

1. Connect the heater to an appropriate power supply.
2. Heating Mantle can be switched on and off by using the green ON/OFF switch.
3. With the MIN/MAX switch the heating zones can be switched (See Figure 1)
4. In case of the liquid level dropping during operation, adjust/switch heating zones accordingly.

	Min	Max
1 heating zone power	 50%	 100%
2 heating zones power	 100%	 100%





**Figure 1: Switch positions series HM-MH**

**Series HM-MC**

*Note:* Due to their overall size, the heating mantle sizes 50ml and 100ml are only designed with one heating zone. They are put into operation by means of an MIN/MAX switch.

Maximum heating element temperature for series HM-MC: 842°F (450°C).

1. Connect the heater to an appropriate power supply.
2. Heating Mantle can be switched on and off by using the green ON/OFF switch.
3. With the MIN/MAX switch the heating zones can be switched (See Figure 2)
4. The built-in power controller is used for the continuous adjustment of the power input.
5. The yellow indicator light indicates the heating power is on.
6. In case of the liquid level dropping during operation, adjust/switch heating zones accordingly.

	Min	Max	Rotary Knob Position	Output Heating Mantle
1 heating zone power	 50%	 100%	0	0%
2 heating zones power	 100%	 100%	1 to 9	10% to 90%
			10	100%

**Figure 2: Switch positions series HM-MC**

**BAKE-OUT PROCEDURE FOR NEW HEATING MANTLES**

On the initial heat-up of the mantles, a slight odor may be detected and some discoloration will occur in the cavity area. The discoloration of the cavity area has no effect on the operation of the mantle. If the heated vessel becomes discolored, it can be cleaned with water. To bake-out your mantle prior to use, connect the mantle to your temperature controller and fill a flask corresponding to the size of the mantle half full of water. Place the flask in the mantle cavity and allow the water to come to a boil and continue boiling for approximately 15 minutes. The mantle can be operated at full rated voltage during bake-out.

**MAINTENANCE AND SERVICING**

Your Heating Mantle is designed to provide a long service life. Overheating, contamination, and misuse will greatly reduce the life of the heating mantle.

If the flask or vessel breaks or fluid spills into the cavity, immediately disconnect the mantle from the power source. Allow the unit to dry completely before attempting to re-energize the mantle. Liquid spilled into the cavity may burn-out the heating element.

**General**



*Repairs to the heating mantles may cause severe injuries or death by electrocution.*

*Repairs may only be carried out by the manufacturer or specialist firms authorized by manufacturer.*

*Note: Maintenance work may only be carried out by qualified employees. Repairs in particular replacing the connection cable and connection components may only be carried out at the manufacturing plant.*

At regular intervals the operator has to inspect the BriskHeat heating mantles according to valid regulations for their safety and perfect functioning.

**DISPOSAL**

The heating mantles as well as the enclosed accessories have to be disposed of via accordance with the Electrical and Electronic Equipment Act (Act Governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment) via the local collection points.

**EC DECLARATION OF CONFORMITY**

**Laboratory devices for the heating of materials**

Design: Metal-cased heating mantles.  
 Series: HM-MH and HM-MC are developed, designed and manufactured in compliance with the EC directives.

**2006/95/EC Low Voltage**

**2004/108EC Electromagnetic Compatibility.**

The following harmonized standards are applied: **DIN EN 61010-1** Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements.

**DIN EN 61010-2-010** Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-010: Particular requirements for laboratory equipment for the heating of materials.

**DIN EN 6100-3-2-EMV**

**DIN EN 6100-3-3-EMV**

**DIN EN 61326-1-EMV**

Date: November 2013

**TROUBLESHOOTING GUIDE**

Please read this guide prior to contacting BriskHeat<sup>®</sup>. This guide is designed to answer the most commonly asked questions. If you are unable to identify the problem or need additional assistance, please contact your local distributor/representative or BriskHeat at **1-800-848-7673, 614-294-3376, or bhtsales1@briskheat.com.**

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Heating Mantle does not heat	Not connected to power supply	Check Mantle connection.
	No Power in circuit	Check power supply circuit.
	Defective Control	Repair or replace Control.
	Element burned out	Replace Mantle.
Heating Mantle outgasses	Has not been baked-out	Refer to Bake-Out Procedure for new mantles.
	Spillage of fluid	Disconnect from power supply and allow mantle to dry out completely before use.

**WARRANTY INFORMATION**

BriskHeat warrants to the original purchaser of this product for the period of eighteen (18) months from date of shipment or twelve (12) months from date of installation, whichever comes first. BriskHeat's obligation and the exclusive remedy under this warranty shall be limited to the repair or replacement, at BriskHeat's option, of any parts of the product which may prove defective under prescribed use and service following BriskHeat's examination, is determined by BriskHeat to be defective. The complete details of the warranty can be found online at [www.briskheat.com](http://www.briskheat.com) or by contacting us at 1-800-848-7673 (toll free, U.S. / Canada) or 1-614-294-3376 (Worldwide).



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