



HT9 SERIES HEATING TAPES

INSTRUCTION BOOK

Please take your time to read this Instructions book in order to understand the safe and correct use of your new Bibby Scientific product.

It is recommended the responsible Body for the use of this equipment reads this instruction book and ensures the user(s) are suitably trained in its operation.

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This product is manufactured in Great Britain by Electrothermal, part of the Bibby Scientific Group of companies.

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1. INTRODUCTION.

The HT 9 Series of heating Tapes are a range of flexible resistance heater elements for use in a wide range of commercial/industrial surface heating applications which include flexible heaters ideal for heating columns, pipes, valves and transfer lines.

The tape has an element covered in glass fibre and a braided earth (ground) wire which is enclosed in a glass sleeve. Linear loading of 50W/ft (164W/M). Voltage 115V and 230V. Temperatures up to 450°C. Lengths range from 2ft. (0.61M) to 32ft. (9.76M). For use in dry conditions only - not water resistant.

2. SYMBOLS AND USING THIS INSTRUCTION BOOK.

2.1. Throughout this Instruction book the following symbols are shown to identify conditions which pose a hazard to the user, or to identify actions that should be observed. These symbols are also shown on the product, or its packaging. When a symbol is shown next to a paragraph or statement it is recommended the user takes particular note of that instruction in order to prevent damage to the equipment or to prevent injury to one's self or other people.

The Responsible Body and the Operator should read and be familiar with this Instruction book in order to preserve the protection afforded by the equipment.

To prevent injury or equipment damage it is the manufacturer's recommendation that all persons using this equipment are suitably trained before use.



Caution, risk of danger. See note or adjacent symbol.



Protective conductor terminal to be earthed.
(Do not loosen or disconnect).



Caution / risk of electric shock.



Recyclable Packing Material.



Do not dispose of product in normal domestic waste.



Caution. Hot surface.



Refer to instructions book.

3. SAFETY INFORMATION.

This product has been designed for safe operation when used as detailed in accordance with the manufactures instructions.

NOTE: Failure to use this equipment in accordance with the manufactures operating instructions may compromise your basic safety protection afforded by the equipment and may invalidate the warranty / guarantee. The warranty / guarantee does not cover damaged caused by faulty installation or misuse of the equipment.

3.1. Prevention of Fire and Electric shock.



To prevent damage to the heating tape when unpacking, the coil must be carefully unwound and not pulled straight without first de-looping.



Do not touch the heating element or associated structure when in use.



Always install mechanical guards and thermal insulation to protect operatives and adjacent equipment.



Once the heating element has been installed and energised, the element will set to the form of the enveloped surface. Any attempt to remove the unit after energising will damage the heating element and make it unsafe to use.



Only use with protective earth (ground) bonded installation when applied to electrically conductive vessels.



Do not Cut or attempt to shorten the heating tape.

3.2. General safe Operating Practice.



Always follow good laboratory practice when using this equipment. Give due recognition to your company's safety and legislative health & safety procedures and all associated legislation applicable to your areas of operation. Check laboratory procedures for substances being heated and ensure all hazards (e.g. explosion, implosion or the release of toxic or flammable gases) that might arise have been suitably addressed before proceeding. When heating certain substances the liberation of hazardous gases may require the use of a fume cupboard or other means of extraction.



Ensure HT heating elements are used on a clean, dry, non-combustible, solid work surface with at least 300mm suitable clearance all around from other equipment.



Do not position the HT heating elements or MC Controller so that it is difficult to disconnect from the mains supply.



Do not immerse HT heating element or MC controller in water or fluids.



Do not spill substances onto HT heating elements or MC Controller. If spillage does occur, disconnect unit from mains supply and follow instructions as detailed in Section 'Maintenance'.



To prevent electronic overheat and potential fire **Do not** cover this product when connected to the mains power supply.



It is **not** recommended to leave any heating apparatus unattended during operation.



Only use Original Equipment manufacture's spares and accessories. Ref Section 10.



The equipment is not spark, flame or explosion proof and has not been designed for use in hazardous areas in terms of BSEN 60079-14:1997. Keep flammable, low flash point substances away from heating apparatus.



Do not operate or handle any part of your HT heating elements or MC Controller with wet hands.



Keep the Mains Plug and Lead set cable away from the heating apparatus being controlled.



Refer to Instructions book / product data label for the resistive load of equipment to ensure controller is suitable for application.



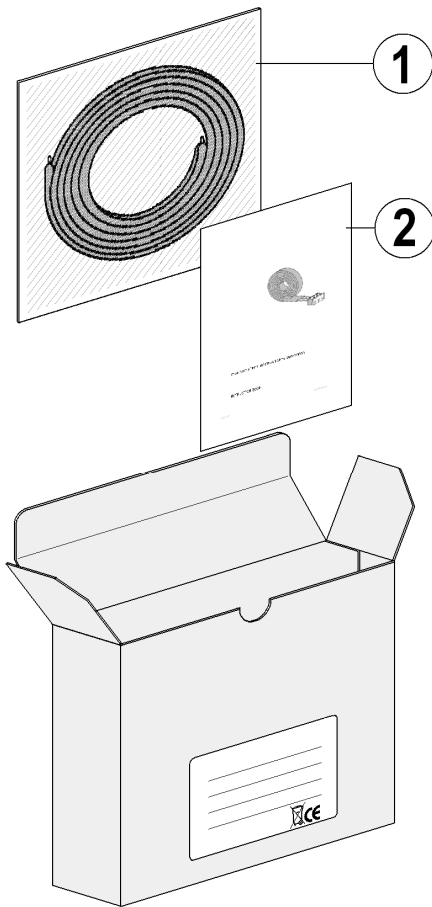
It is **not** recommended the HT heating elements are used on plastic pipes. If used on plastic pipes the heating elements must be controlled such that the element temperature never exceeds the softening temperature of the plastic.



Use only in conjunction with Electrothermal MC range of controllers.

NOTE: *if this product is not used in accordance with the Manufacturers Instructions then the basic safety protection afforded by the equipment may not be preserved and the guarantee invalidated.*

4. UNPACKING AND CONTENTS.



Item	Description	Qty
1	Heating Tape	1
2	Instruction Book M6884	1


<p>For future reference please record your products Serial and Model Numbers.</p>	<i>Serial Number</i>	<i>Model Number</i>

5. INSTALLATION.

5.1. Electrical safety and installation.

5.1.1. This equipment is designed for safe operation under the following conditions:-

- Indoor use.
- Altitude up to 2000 meters.
- Temperatures between 5°C and 40°C.
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
- Mains supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage.
- Transient overvoltages typically present on the mains supply.
- Applicable rated pollution degree 2.

5.1.2.  This equipment must be earthed / grounded to a fixed earth / grounded mains socket outlet. The mains supply is to be earthed / grounded in accordance with current legislation.

5.1.3. Ensure only the correct rated mains input fuses are fitted. (Where applicable ensure the correct mains cable fuse if fitted). See Technical Information Section 8 of this Instruction book.

5.1.4. Check the voltage on the product data label of this unit. Ensure the rating conforms to your local supply.

5.1.5. It is recommended this unit be connected to a mains supply source which incorporates an RCD or GFCI device.

5.1.6. (Optional) The MC controller is supplied with a moulded mains cord and plug set wired as follows:-



Green / Yellow or **Green** = **Earth / Ground**

Blue or **White** = **Neutral**

Brown or **Black** = **Live / line hot.**

5.1.7. Ensure equipment is used on a clean, dry, non-combustible, solid work surface with at least 300mm suitable clearance all around from other equipment.

5.1.8. Ensure the heating tape selected is of a suitable length and power fit the application. The heater must physically fit the pipe or vessel, be in good contact and never overlap.

5.1.9.  Never attempt to shorten the heaters by cutting the tape.

Note: For selection see Section 8 Technical Specifications.

- 5.2. **Installation. Do Not Unpack the Heating Tape yet.** All vessels and pipes must be checked for sharp edges and burs and clean prior to installation of the heater. Any valves, unions, sharp edges or other fittings that will create air spaces and prevent good physical contact of the heater should be rounded off by means of foam pads of compressed aluminium foil to soften the edges and fill the gaps. If possible, temperature control or readout sensors should be fixed in place prior to fixing the heater. Glass fabric adhesive tape can be used to secure and pad the sensor.
- 5.3. **Handling and Tracing** Heating tapes are manufactured from glass, ceramic and quartz fibres, and are easily damaged by poor handling during installation. Care must be taken to ensure that no twisting or kinking of the loose length of tape during tracing into place. Any tight bend or twist in the heater may result in rupture or separation of the outer layers of glass yarns and a live element wire may protrude. Most Installations are better if two persons are involved in the handling.
- 5.4. **Tracing Methods** Low powers and temperatures can be met by simple straight tracing, taping the heater along the underside of a pipe, fixing at 15cm (6ins) intervals. Increased installed power can be achieved by spiralling the heater around the pipe or vessel, at any spiral rate from very open , to close coiling turn against turn, (never overlapping) fix with glass fabric adhesive tape at 15cm (6ins) intervals for open spiralling, increasing to 25cm (10ins) intervals for close coiling.
NOTE Do not fix tape, other than at start and finish, until the spiral winding is even, in proper contact and disposed over the whole heated length.

Insulation Most heating systems will benefit from thermal insulation, which should be selected to suit the temperatures required. Various materials can be used and can be classified as follows:

Up to 80°C	- use PVC/Nitrile rubber foam.
100 to 180°C	- use Silicon Rubber insulation foam
180 to 400°C	- use Rockwool or Glassfibre.
400 to 750°C	- use Ceramic fibre blanket.

Well fitted insulation decreases heat loss and cover and supports the heater over the whole area of the insulation. Fibrous insulation, such as wool and ceramic fibre can be cut to size, enveloped in aluminium foil and the taped into place. In general terms, the thicker the insulation layer, the more efficient the heater will be.

Up to 80 °C	- at least 10mm (0.4ins)thickness.
100 to 180 °C	- at least 25mm (1.0ins) thickness.
180 to 400 °C	- at least 50mm (2.0 ins) thickness.
400 to 600 °C	- at least 75mm (3.0ins) thickness.

General Most of the heaters and insulation's are fibrous in nature, and will absorb moisture if left cold. If residual current circuit breakers are fitted to the power supply, larger insulation's may absorb enough moisture to trip circuit breakers.

Upon receipt of the Tape proceed consecutively as follows:-

- 5.5. **Power Supply** The heating system will only be as good and reliable as the control system permits. Various types are listed below, with their limitations.
- 5.6. **Energy Control** (Bibby Scientific MC227 and MC228) Usually based upon thermal simmerstats, or a variety of solid state power control devices. Adjustable rate of energy flow based upon knob and pointer on arbitrary scale. This is the very lowest

level of control that should be used and then only under constant supervision and never under any circumstances where excess temperature could create an unsafe or hazardous situation. Monitoring of temperature is essential, adjustment may be frequent, or temperatures will drift.

- 5.7. **Thermostats** Bi metal contact switches and capillary and bulb mechanical thermostats, although often difficult to fit, can be used. Accuracy is likely to be only +/- 5 percent.

Electronic thermostats can be used to give considerable accuracy, usually +/- 1 deg C and use a sensor mounted on the pipe or in the vessel.

- 5.8. **Digital Display Controller** (Electrothermal MC810B). This controller with digital display and the capacity to pre-programme setting and display range is the best solution to simple and accurate temperature control for non volatile and non hazardous applications. It can also be used as a 'Policeman' overtemperature device, as part of a more sophisticated control system when heating delicate, volatile or more hazardous substances.

- 5.9. **Proportional and PID Control Systems** Delicate and difficult materials and materials that require heat input whilst flowing through the system will require more sophisticated control systems. Contact Electrothermal Technical Sales for more information and advice.

- 5.10. **Sensors** Thermocouples or resistance sensors should be selected to suit the maximum temperatures involved, should be as small as possible, to give fast response to changes, should be electrically and physically isolated from the heater and firmly fixed to the surface of the pipe or vessel if temperature maintenance is required or inserted into the fluid or solid matter if the process heat is required.

- 5.11. **Electrical Installation** This should be done by a competent electrician under the direction of the Responsible Body, so that a full knowledge of operational and safety requirements is understood. Installation should be in compliance with all current mandatory regulations.

- 5.12. **Mains Connection** All metal parts should be properly Protective Earthed (Grounded) to an approved and tested bonding point.

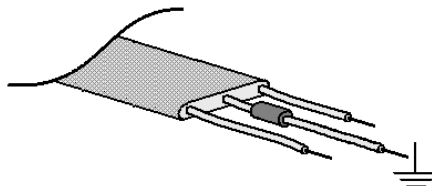
- 5.13. Each heater in a system must be fused or protected by overcurrent circuit breakers of appropriate rating.

- 5.14. All connecting cables to be selected to ensure their current and operating temperature limits meet the requirements of the application.

- 5.15. Provision should be made to switch off and isolate heating and control circuits in the immediate vicinity of the process.

- 5.16. If practical, provision for additional safety in the form of a residual current device fitted to the incoming supply, should be considered.

- 5.17. The center wire is the Earth wire.



6. ENVIRONMENTAL PROTECTION.

- 6.1. Bibby Scientific has given due consideration to environmental issues within the design and manufacturing process without compromising end product performance and value.



- 6.2. Packaging materials have been selected such that they may be sorted for recycling.



- 6.3. At the end of your product and accessories life, it must **not be** discarded as domestic waste. Ref: EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment Directive (WEEE). Please contact your distributor / supplier for further information. For end users outside of the EU consult applicable regulations.

- 6.4. This product should only be dismantled for recycling by an authorised recycling company.



This product and accessories must be accompanied by a completed Decontamination Certificate prior to any disposal. Copies of the Certificate are available from your distributor of Bibby Scientific products, or you may copy and enlarge from 'Appendix A' of this instruction book.

Bibby Scientific's Electrothermal branded product range is registered with the Environment Agency under the name of as Electrothermal Engineering Limited as being a producer of WEEE (Waste Electronic and Electrical Equipment) through b2b Compliance, an authorised waste collection compliance scheme.

7. PRODUCT OPERATION.

Once the Heating Tape has been installed around the item to be kept at an elevated temperature it is recommended it be coupled to an MC control manufactured by Bibby Scientific. Recommended controller models are MC242 or MC227 single output controllers. Digital display Controller MC810B may also be used.

Operate the Controller as per the Instruction Book of the controller model.

It is recommended that once installation is complete and approved for use by the Responsible Body, written operating instruction for use be produced as part of the system operational procedure documentation for the given process.

8. TECHNICAL SPECIFICATION.

8.1. HT9 Series.

Voltage	115V and 230V. (24ft and 32ft lengths 230V~AC @ 50/60Hz)
Operational Temperature	Up to 450°C
Linear Loading	50Watts/ft (164Watts/Meter).
Surface Loading	4Watts/in ² (0.62 Watts/cm ²)
Elements are braided with an Earth (Ground) wire.	
Mains Connection:	At one end. Lead length 3.5in (9cm).
Application	Dry Metal or Glassware

<u>Cat no.</u>	<u>Length</u>	<u>Width</u>	<u>Watts</u>
HT95502	2ft (0.61M)	1in (25.4mm)	100
HT95503	3ft (0.91M)	1in (25.4mm)	150
HT95504	4ft (1.22M)	1in (25.4mm)	200
HT95506	6ft (1.83M)	1in (25.4mm)	300
HT95508	8ft (2.44M)	1in (25.4mm)	400
HT95512	12ft (3.66M)	1in (25.4mm)	600
HT95516	16ft (4.88M)	1in (25.4mm)	800
HT95524	24ft (7.32M)	1in (25.4mm)	1200
HT95532	32ft (9.76M)	1in (25.4mm)	1600



The Ingress protection rating for this heating tape is classified as IPX0.

9. MAINTENANCE.

Heating systems can degrade with use. It is essential that regular inspection is carried out and maintenance or replacement of system parts is done as soon as required.

Note: Once the heating element has been installed and energised, the element will set to the form of the envelope surface. Any attempt to remove the tape after energising will damage the heating element making it unsafe to use.

With proper care and operation the equipment should give reliable service. Contamination or general misuse will however reduce the effective life of the product and may cause a hazard.

9.1.   Unplug the Power Supply from the mains voltage and allow it to cool before undertaking any maintenance tasks.

9.1.1. Routine maintenance should include inspection of the Power Supply Unit and Mains supply power cord set.

9.1.2. Responsible body should confirm with manufacturer that any intended method of decontamination will not damage the equipment

9.1.3. Maintenance for the equipment should include periodic electrical safety testing (an annual test is recommended as a minimum requirement).

9.1.4. Preventative maintenance for the equipment should include keeping the product clean and protecting it from spillage, contamination or corrosive environments.

DO NOT USE SOLVENTS FOR CLEANING ANY PART OF THIS EQUIPMENT.

9.2. Servicing.

For Technical Assistance contact Customer Support. See section 10.

Heating tapes cannot be repaired.

10. CUSTOMER SUPPORT.

For help and support in using this product, please contact Customer Services at the following address.

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For the America's and Canada, contact:

Techne Incorporated, 3 Terri Lane,
Suite 10 Burlington, NJ 08016 USA.

Toll free:800-225-9243Tel: 609-589-2560
Fax: 609-589-2571
Email: labproducts@techneusa.com
Http www.techneusa.com

- General enquiries :
info@bibby-scientific.com
- Order enquiries :
sales@bibby-scientific.com
- Technical support :
electrothermalhelp@bibby-scientific.com
- www.electrothermal.com

11. SPARES AND ACCESSORIES.

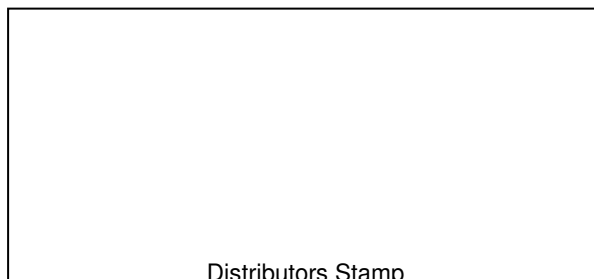
There are currently no spares or accessories available for Heating Tapes.

12. EC DECLARATION OF CONFORMITY.

CE marked products and associated accessories covered by this Instruction book conform to the essential requirements of the following directives:

EMC Directive.
Low Voltage Directive.

A full copy of the EC Declaration / Conformity document can be obtained from the manufacture at the email address : info@bibby-scientific.com



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