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Installation, Operation & Maintenance Instructions



THERMOSAFE[®] Induction Heater Type A (711mm High)

CD016-4 07/09/2010



Certification Nos. SIRA08ATEX3101X IECEx SIR08.0037X II 2GD Exe II 170°C (T3) Ex tD II A21 T 170°C.
Certified to IEC Standards 60079-0, 60079-7, 61241-0, 61241-1. For use in Zones 1 and 2.
Patent Nos. GB2425447 International Patents Pending
THERMOSAFE[®] is a Registered Trade Mark of LMK Thermosafe Ltd



Certification

The Thermosafe Induction Drum Heater Type A is certified for use in the following situations:

A

45g Imp/ 55g US/210litre magnetic steel drums at voltages up to and including 240volts

- **Certified temperature/T class depends on voltage – see voltage tables at rear of booklet.**

The Certification allows for the use of supplies at varying voltages and varying T class ratings. The maximum temperature in the heater/drum system in steady state conditions at 240 volts and 20°C ambient is 123°C on the steel drum. The certified temperature at 240 volts is 170°C (T3) T170°C, which is based on 10% over voltage, ie.264 volts, and 40°C ambient.

B

Smaller magnetic steel drums than the above, one or more at a time, at voltages up to and including 240volts

- **Certified temperature 170°C (T3) T170°C, regardless of voltage.**

C

Drums and containers of whatever material, one or more at a time, at nominal voltages up to and including 127volts

- **Certified temperature 170°C (T3) T170°C, regardless of voltage**

NB. The induction heater is relatively inefficient with non-magnetic materials and acts simply as a resistance heater. The heating effects reduce with voltage.

The Thermosafe Type A may be used with additional heating equipment. This includes the Faratherm Induction Base Heater and the Thermosafe Top Hat. See additional equipment's operating instructions as to how this may affect the overall T rating.

Supply

Single phase 240volts maximum, 50 / 60Hz.A.C. Current/ power consumption at 240volt switch-on with 210 litre magnetic steel drums approximately 21amps/ 2750watts, falling within minutes to approximately 18amps/ 2250watts. It is not practical to estimate the current/power consumption with other vessels, and this should be established by actual measurement.

In general the more the magnetic material within the heater, the lower the current that will be drawn.

This is a Class II Appliance ie."double-insulated", and no earth is required. However, in order to provide adequate protection of the flexible cable normally supplied with the heater, that cable's outer metallic sheath must be earthed by either conduit or metal braiding. If cable other than the GSWB flexible cable normally supplied with the heater is used, the following points should be noted:

1. The heater's supply cable must always be appropriate for the current and the mechanical and chemical environment in which it is used.
2. The method of cable entry must provide ingress protection to IP66 as a minimum.



Operation

The drum(s) to be heated should be positioned within the heater before the supply is switched-on. If there is no magnetic metal within the heater, the current will be approximately 41amps at 240volts, therefore close excess current protection must be provided eg.mcb, to ensure interruption of the supply if this fault condition occurs.

The maximum temperature at any particular voltage is self-limiting, without dependence on additional temperature control. Some form of specific temperature control may be required below this level. For “safe” area applications THERMOSAFE can be used as a practical basis for drum heated/stirred reactor systems, with reactor vessels being specially constructed for the particular application from either mild or ferritic stainless steel. Please contact our Technical Department if in any doubt regarding the hazardous area certification coverage, for interpolation between the specific voltages shown in the voltage tables at the rear of this booklet, and for advice regarding non-standard applications, including gas bottles.

Whilst the heater only weighs approximately 48kg and can be lifted manually by two persons, holes have been provided in the top flange to assist in lifting where this is appropriate. There are no electrics in either top or bottom flanges which can be drilled to suit alternative lifting arrangements. NB. The flanges must not be used to lift more than the heater itself eg. the drum to be heated. Either the drum can be lowered into the heater, or the heater lowered over the drum, the latter method being preferred.

An unusual feature of this induction heater is that in normal operation with 210litre magnetic steel drums it's exterior surface will reach a much lower temperature than the drum being heated. This is due to the absence of heating elements, the energy input into the drum walls being via. an electro-magnetic field. However, at 240 volts with an ambient temperature of 40°C the heater exterior could theoretically reach approximately 80°C after prolonged heating, and care should be taken in handling both the drum and the heater after heating.

Heating rates will be reduced if drums are stood on relatively high conductivity materials eg. concrete and stone.

Ventilation at the base of the heater (eg. standing on open-slat pallets) should also be avoided.

The degree of enclosure protection is IP 66 ie. complete protection from the ingress of dust, and protection against powerful jets of water.



Drum bungs should be removed before heating to prevent pressure build up. Any release of gas during heating must be handled by appropriate ventilation.

Safety

The THERMOSAFE induction heater belongs to a broad category of equipment that includes transformers, and electric motors and generators. Guidelines to protect people from the effects of electric and magnetic fields have been developed by the National Radiological Protection Board (NRPB). Testing has established that THERMOSAFE emissions are significantly below both NRPB guidelines, and the EMC emission limits laid down in relevant standards, the maximum field being experienced inside the steel drum. Notwithstanding, THERMOSAFE's low impedance emissions may cause slightly disturbed screen images to nearby VDUs using cathode ray tubes, although liquid crystal screens are not affected. Users of mechanical watches should also be aware that close proximity to the heater may cause the hands to move, but no permanent damage should result.

Maintenance

The ribs on the inside of the heater have been provided to take the wear from abrasion during loading/unloading. Periodic examination of the ribs will show the extent of wear: a black-coloured resin has been used to bond the ribs to the main shell, and when the wear has been so considerable that this black layer is exposed, the heater should be returned for rib-replacement, before any wear can occur to the main shell.

Under normal use, the heater should not need any maintenance, however we would suggest an annual routine check of the overall fabric of the heater, with particular attention to the rubbing strips, the connection box exterior including cover, and the supply cable. After switching off the supply the connection box cover should be removed, allowing the gasket and the terminal connections inside the box to be checked.



Voltage Tables

Certified temperature T classes when using a 45g Imp/ 55g US/210litre magnetic steel drum

Nominal Supply Voltage 50/60Hz single phase (Volts)	Nominal Drum Wall Temperature at 20°C ambient	Temperature Classification	
		(Gases, Vapours and Mists)	(Dusts)
240	123	T3 (170°C)	T170°C
230	119	T3 (165°C)	T165°C
220	112	T3 (155°C)	T155°C
207	104	T3 (145°C)	T145°C
146	72	T4 (105°C)	T105°C
127	61	T5 (95°C)	T95°C
121	57	T5 (90°C)	T90°C
120	56	T5 (90°C)	T90°C
115	52	T5 (90°C)	T90°C
110	48	T6	T85°C
100	39	T6 (75°C)	T75°C



The table above may be redrawn to give the particular voltage for a given temperature class or maximum drum wall temperature

Nominal Drum Wall Temperature at 20°C ambient	Nominal Supply Voltage 50/60Hz single phase (Volts)	Temperature Classification	
		(Gases, Vapours and Mists)	(Dusts)
123	240	T3 (170°C)	T170°C
120	231	T3 (165°C)	T165°C
115	223	T3 (160°C)	T160°C
110	216	T3 (150°C)	T150°C
105	208	T3 (145°C)	T145°C
100	199	T3 (140°C)	T140°C
95	190	T4	T135°C
90	180	T4 (125°C)	T125°C
85	170	T4 (120°C)	T120°C
80	161	T4 (115°C)	T115°C
70	142	T4 (105°C)	T105°C
60	126	T5 (95°C)	T95°C
55	119	T5 (90°C)	T90°C
50	113	T6	T85°C
40	102	T6 (75°C)	T75°C

Contact manufacturer for other voltages and temperatures.



1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 08ATEX3101X** Issue: **1**

4 Equipment: **Thermosafe Type A & Type B Drum Heaters
plus optional 'Top Hat' Cover Accessory**

5 Applicant: **LMK Thermosafe Limited**

6 Address: 9-10 Moonhall Business Park
Hellions Bumpstead Road
Haverhill
Suffolk
CB9 7AA
UK

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2004 EN 60079-7:2003 EN 61241-0:2006 EN 61241-1:2004

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:



II 2 GD
Ex e II T*
Ex tD A21 T***C IP66

* The dust temperature marking and temperature class are subject to configuration of equipment and input voltages. (See description)

Project Number 20675
C. Index 06

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D R Stubbings BA MIET
Certification Manager

Form 9400 Issue 1

Page 1 of 5

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EC TYPE-EXAMINATION CERTIFICATE

Sira 08ATEX3101X

Issue 1

13 DESCRIPTION OF EQUIPMENT

The Thermosafe Induction Heater Type A is intended for heating the contents of a steel drum by induction. The heater has a maximum rating of 240 V a.c. rms, 50/60 Hz, 21 Amps, and 2750 Watts and may be used to heat a drum of capacity 210 litres/45 gallons (55 US gallons).

The Thermosafe Induction Heater Type B is a smaller version of the Type A, approximately half the height of a full size drum. It works in an identical manner, heating the contents of a steel drum by induction. It has a maximum rating of 120 V a.c. rms, 50/60 Hz, 24 Amps, and 1500 Watts and a single Type B heater may be used to heat a single drum of capacity 210 litres/45 gallons (55 US gallons), alternatively, two Type B heaters may be stacked one on top of the other in order to heat a drum of capacity 210 litres/45 gallons (55 US gallons).

The construction of both Thermosafe models takes the form of a cylinder which is open at both ends and of such size that it will fit snugly around the diameter of an ISO 15750 drum or equivalent. The cylinder is formed of an inner and outer concentric shell, each manufactured from an impregnated glass fibre mat. The two shells are bonded together with a winding in between.

Connections between the end of the winding and the supply cable are made in one of a number of separately certified increased safety terminal enclosures. The supply cable entry is via a separately certified gland with a minimum ingress protection rating of IP66. The earth terminal in the certified enclosure need not be connected, as this is double insulated equipment.

The Thermosafe 'Top Hat' Drum Heater Cover Accessory consists of an impregnated glass fibre cover, which is designed to sit snugly around the outer diameter and across the upper end of a drum, sitting on top of either Thermosafe drum heater. This accessory is intended to limit heat losses at the upper end of the drum being heated.

The Thermosafe Type A may be used at varying voltages according to the following table where the appropriate temperature class is specified:

Equipment	Nominal Supply Voltage (Volts)	Nominal Drum Wall Temperature at 20°C ambient	Temperature Classification	
			(Gases, Vapours and Mists)	(Dusts)
Type A	240	123	(T3) 170°C	T170°C
Type A	230	119	(T3) 165°C	T165°C
Type A	220	112	(T3) 155°C	T155°C
Type A	207	104	(T3) 145°C	T145°C
Type A	146	72	(T4) 105°C	T105°C
Type A	127	61	(T5) 95°C	T95°C
Type A	121	57	(T5) 90°C	T90°C
Type A	120	56	(T5) 90°C	T90°C
Type A	115	52	(T5) 90°C	T90°C
Type A	110	48	T6	T85°C
Type A	100	39	(T6) 75°C	T75°C
Type A + Top Hat	240	No Information	T3	T200°C
Type A+ Top Hat	150	No Information	T4	T135°C

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Form 9400 Issue1

Page 2 of 5

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EC TYPE-EXAMINATION CERTIFICATE

Sira 08ATEX3101X

Issue 1

The following table indicates the supply voltage for a particular temperature class or maximum required drum wall temperature:

Equipment	Nominal Drum Wall Temperature at 20°C ambient	Nominal Supply Voltage (Volts)	Temperature Classification	
			(Gases, Vapours and Mists)	(Dusts)
Type A	123	240	(T3) 170°C	T170°C
Type A	120	231	(T3) 165°C	T165°C
Type A	115	223	(T3) 160°C	T160°C
Type A	110	216	(T3) 150°C	T150°C
Type A	105	208	(T3) 145°C	T145°C
Type A	100	199	(T3) 140°C	T140°C
Type A	95	190	T4	T135°C
Type A	90	180	(T4) 125°C	T125°C
Type A	85	170	(T4) 120°C	T120°C
Type A	80	161	(T4) 115°C	T115°C
Type A	70	142	(T4) 105°C	T105°C
Type A	60	126	(T5) 95°C	T95°C
Type A	55	119	(T5) 90°C	T90°C
Type A	50	113	T6	T85°C
Type A	40	102	(T6) 75°C	T75°C

The Thermosafe Type B may be used at varying voltages according to the following table where the appropriate temperature class is specified:

Equipment	Nominal Supply Voltage (Volts)	Temperature Classification	
		(Gases, Vapours and Mists)	(Dusts)
Type B	120	(T3) 170°C	T170°C
Type B	109	T4	T135°C
Type B	80	T5	T100°C
Type B	66	T6	T85°C
Type B + Top Hat	120	T3	T200°C
Type B+ Top Hat	95	T4	T135°C
2 x Type B	120	(T3) 170°C	T170°C
2 x Type B	96	T4	T135°C
2 x Type B	67	T5	T100°C
2 x Type B	61	T6	T85°C
2 x Type B + Top Hat	120	T3	T200°C
2 x Type B+ Top Hat	92	T4	T135°C

For both the Thermosafe Type A and the Thermosafe Type B, with the option use of the Top Hat drum heater cover accessory, other voltages may be used when agreed with the manufacturer in order to achieve specific drum heating temperatures, provided that the maximum supply voltage for the appropriate temperature classification given above is not exceeded.

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Form 9400 Issue1

Page 3 of 5

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EC TYPE-EXAMINATION CERTIFICATE

Sira 08ATEX3101X
Issue 1

Variation 1 - This variation introduced the following change:

- i. A change in the applicants address from Falconer Road Haverhill to Helions Bumpstead Road Haverhill.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	20 May 2008	R52L18156A	The release of the prime certificate.
1	6 October 2009	R20675A	The introduction of Variation 1.

15 SPECIAL CONDITIONS FOR SAFE USE (denoted by X after the certificate number)

- 15.1 The equipment shall be fed from a supply having close excess current protection.
- 15.2 The equipment is certified for the purpose of heating magnetic steel drums of capacity 45 gallons/55 US gallons/210 litres with the temperature class dependant on the voltage as shown in the tables above. The equipment is not intended for use with any other ferromagnetic substance.
- 15.3 The equipment may be used for heating smaller magnetic steel drums of capacity up to 45 gallons/55 US gallons / 210 litres. In this arrangement, the Type A Thermosafe may be used at voltages up to 240 Volts and the Type B at up to 120 Volts. If the 'Top Hat' Drum Heater Cover is not used, then the temperature classification in all cases is (T3) 170°C T170°C, if the 'Top Hat' Drum Heater Cover is used, then the temperature classification is T3 T200°C in all cases.
- 15.4 Plastic or non-magnetic metallic drums or containers may be used; in this arrangement the unit acts simply as a resistance heater. With these drums, the Type A Thermosafe Drum Heater may be used at voltages up to 127 Volts. The Type B Thermosafe Drum Heater may be used with these drums at voltages up to 59 Volts. If the 'Top Hat' Drum Heater Cover is not used, then the temperature classification in both cases is (T3) 170°C T170°C, if the 'Top Hat' drum heater cover is used, then the temperature classification is T3 T200°C in both cases.
- 15.5 The equipment shall only be switched on when a drum is fitted.
- 15.6 The supply cable shall be appropriate for the current and the mechanical and chemical environment in which it is used.
- 15.7 Precautions shall be taken to ensure that the drums do not become pressurised during heating.
- 15.8 Any release of gas during heating shall be handled by appropriate ventilation.
- 15.9 The user/installer shall take precautions to prevent unwanted re-heating after a power failure.

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Form 9400 Issue1

Page 4 of 5

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Sira 08ATEX3101X

Issue 1

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)**

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 **CONDITIONS OF CERTIFICATION**

- 17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.
- 17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.
- 17.3 An electrical strength test of 1500 V rms shall be applied for at least 60 s as required by clause 6.1 of EN 60079-7:2003.

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Form 9400 Issue1

Page 5 of 5

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EC Declaration of conformity

CD020-2 06/07/10

LMK Thermosafe Ltd declares that the following products are in compliance with the EC directives listed below:

Products:

Thermosafe Induction Heater Type A
Thermosafe Induction Heater Type B
Rigid Thermosafe Top Hat Accessory

EC Directives:

Equipment for use in Potentially Explosive Atmospheres 94/9/EC

Standards: EN 60079-0:2004, EN 60079-7:2003, IEC 61241-0:2006, EN 61241-1:2004

EC-Type Examination Certificate Number: SIRA08ATEX3101X

Certifications and QA Notifications held by Sira Certification Ltd, Chester, CH4 9JN

Ex Notified Body Number: 1180

Electromagnetic Compatibility (EMC) 89/336/EEC

THERMOSAFE is a benign (passive) piece of apparatus, operating at 50Hz 240volts, and of inherent qualities not likely to cause EMC disturbance

Tested by the Scientific and Technical Branch of the Department for Health and Social Security for effect on Cardiac Pacemakers.

Low Voltage 73/23/EEC

ANNEX II states that electrical equipment for use in explosive atmospheres is outside the scope of the directive.

The Products listed above have also been tested and issued with an IECEX Certificate of Conformity.

Issued by Sira Certification Ltd. IECEX SIR 08.0037X

This certificate may be viewed on the Official IECEX Website – WWW.IECEX.COM



Mark Newton
General Manager / Director

Reg. Office: Mazars, The Atrium, Park Street West, Luton, Beds, LU1 3BE
V.A.T. No. GB 759 6388 64. Registered in England No. 3959310

Additional related equipment available

Thermosafe Induction Heater Type B



Thermosafe Top Hat





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Thermosafe Lifting Frame



Faratherm Induction Base Heater

