www.lmkthermosafe.co.uk
www.inteliheat.com

THERMOSAFE LTD

Industrial Heating Technology
for drums IBCs totes & containers

Tel: +44 (0)1440 707141
sales@drumheating.com

9/10 Moonhall Business Park
Haverhill, Suffolk CB9 7AA England

Temperature Control
For Ex Hazardous Areas

Accurate temperature control can be very important for industrial heating processes. This can include gently warming pressurised gas cylinders to counter surface frosting, maintaining constant flow rates, delivering consistent material properties in waxes and resins, heating viscous liquids in food, pharmaceutical and petrochemical manufacturing plants, or achieving a reliable finish when curing composites.

Some of our products come with adjustable temperature control as standard, whilst others are self-limiting in their design. Our legendary Thermosafe® induction drum heater and our ATEX/IECEx/C1Z1/CCC/JpEX rated Inteliheat Flexiplus heating jackets are examples designed to be inherently self-limiting so that additional temperature control is usually not needed. Where it is required we can offer various solutions for both safe and hazardous area use. For the former, please refer to our separate product note – "Temperature Control for Drum & Container Heaters".

Inteliheat Flexiplus heating jackets

All of our standard T4 and T3 Inteliheat Flexiplus heating jackets are self-limiting in their design. At a defined temperature above ambient, the power delivered into the system equals all other energy loss. Our higher-powered T3 heating jackets are delivered as standard with a fixed temperature ATEX certified thermostat (which can be adjusted in a safe area) as shown on the right. Optionally this can also be added during manufacturing to all of our lower powered T4 heating jackets.

All of our standard T4 and T3 heating jackets can be optionally fitted with our patented ProxATEX controller for precise control and increased usability, as supplied with all custom designs.

Thermosafe induction drum heater and Faratherm induction base heater

The Thermosafe and Faratherm both use induction coils rather than traditional radiant heating elements. The maximum surface temperatures on the drum wall are self-limiting, and depend only on the a.c. voltage supplied and ambient temperature. The Thermosafe itself always remains cooler than the drum being heated. When switched off, there is no retained element heat and no temperature over-shoot. In the vast majority of applications additional control is not required as time to reach operating conditions is the defining factor. Where temperature control is essential, a number of options are available.

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BF400 Power Controller – Low cost solution for most installations

Uniquely designed for use with the Thermosafe and Faratherm heaters. Open loop power control that is simple to install and use, ideal for most applications where a drum needs to be maintained in a broad operational temperature range and time is not critical.

Burst firing electronic control enables adjustment of heater output (0-100%). Selecting 50% will deliver power for 50% of the time (e.g. on for 30 seconds & off for 30 seconds), therefore reducing the maximum drum temperature. Integrated with a 25A MCB for circuit protection.

Whilst the BF400 must be situated in a safe area, (usually in the room where switchgear is located) the Thermosafe heater itself can still be operated in a hazardous area. The standard heater supply cable length is 5m, but a longer cable can be fitted on request if the safe area is further away.

"ProxATEX" ATEX/IECEx/ETL Temperature Controller – Patented control for demanding applications

Certified for ATEX/IECEx/C1D2 environments with IP66 ingress protection, this next-generation temperature controller combines feature-rich accurate control with simplicity and secure NFC access.

The controller can be operated at 110/120v or 220/240v and is supplied with pre-programmed access cards set to the customer's requirements.

Features include adjustable timers for delayed start and soak period, set-point offset and adjustable hysteresis, 0-100% power control and lock-out functionality which can be set manually or using the supplied NFC cards to protect against unauthorised adjustment. Parameters can be manually set within the hazardous area whilst the controller is operating by using the keypad, or simply tapping the card against the device.

100-240v, 50/60Hz | IP66 | Ambient: -20°C to +40°C
25A (for use with Thermosafe): II 2 (1) GD Ex mb [ia] IIC T3 Gb Ex mb [ia] IIIC T155°C Db (Zones 1, 2, 21 & 22)
15A (for use with Inteliheat Flexiplus): II 2 (1) GD Ex mb [ia] IIC T4 Gb Ex mb [ia] IIIC T135°C Db (Zones 1, 2, 21 & 22)

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Do I need temperature control with a Thermosafe?

The Thermosafe's lack of heating elements and total encapsulation of all electrical components has resulted in a heater which not only remains much cooler than the vessel it heats, but can be hosed down and is tolerant of spillage. These features lend themselves to the safe, unattended use of a Thermosafe even in hazardous areas. Additional control is often not required.

The self-limiting maximum temperature of the Thermosafe has been demonstrated by the Electrical Research Association. Test figures with an unlagged drum are as follows:

50Hz AC at 240v. 20°C(68°F) ambient temperature	THERMOSAFE outside wall	58°C
	THERMOSAFE inside wall	86°C
	Drum surface (max. system temperature)	123°C

NB. The maximum hazardous area certified temperature of 170°C for auto-ignition calculations is based on 10% over-voltage (264v) and 40°C(104°F) ambient.

Our range of base heaters and insulated lids can be used to speed the heating rate, and/or to elevate the drum surface temperature. Conversely operating the heater at a reduced supply voltage will lower the self-limiting temperatures (see ATEX certificate Sira08ATEX3101) and reduce the heating rate. For maximum heating rates, it is preferable to operate from the maximum standard single-phase supply available, and limit temperature using a controller.

Which controller is best for my application?

If a specific temperature is required for a material with a previously monitored heating curve, simple time control can be used to turn the heater off after a specified time.

A power controller (**BF400 Power Controller**) will limit the proportion of time that the heater is on, therefore reducing the maximum drum wall temperature. Variations in the ambient temperature will cause the drum wall temperature to vary. Many animal fats, liquid sugars and foodstuffs must not be heated above a critical temperature to avoid spoiling. In these circumstances our power controllers are usually the best value and simplest solution, enabling easy heating rate optimisation.

If close temperature control is required, the drum or vessel must be monitored directly. This can be achieved with our patented **ProxATEX Controller**. A magnetic sensor is placed directly on the drum wall or optionally a probe can be inserted into the drum where thermal flows may cause significant variations.

The choice and benefit of any additional control will depend on the specific application. The temperature profile measured on the container wall will vary depending on the characteristics of the material inside. Melting solids takes time and creates greater temperature variations in the process. The specific heat capacity of a liquid will have a bearing upon the time taken for the entire drum contents to reach a stable temperature. In some circumstances, the addition of a Faratherm Induction Base Heater will be a much better solution than a controller.

Please refer to our technical team for more information. We are always happy to give advice on particular applications, and support users in building suitable control or monitoring systems.

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