THORNE & DERRICK INTERNATIONAL
Thorne & Derrick
+44 (0) 191 410 4292
www.heatingandprocess.com

Product Note	THERMOSAFE® CONTROL	TPN3.9/1008

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 for cleaning, and is tolerant of spillage. These features lend themselves to the safe, unattended use of THERMOSAFE even in hazardous areas. In the vast majority of applications, additional control is not required.

When considering temperature control it should be noted that THERMOSAFE is an induction and not a radiant heater. Thus the conventional but inconsistent (and often unreliable) method of control by thermostat sited on the heater surface, is not relevant, and can be dramatically improved upon. THERMOSAFE uses no heating elements and remains cooler than the vessel being heated. When switched off, there is no retained heat in the heater and consequently no temperature over-shoot in the vessel being heated. Simple "on-off" control is all that is required to achieve accurate results.

The choice and benefit of any additional control will depend on the specific application. The time versus temperature profile measured on the drum walls will vary depending on the characteristics of the material inside the drum. With solids, the heating curve flattens off just beyond the melting-point and only starts to rise substantially again after the contents have melted. The specific heat capacity of liquids varies considerably, and so will have significant bearing upon the time taken for all the drum contents to reach a stable temperature.

The whole system is self-limiting by design, the maximum temperature being reached when the energy input equals the heat loss. Electrical Research Association test figures for maximum temperatures with an unlagged drum are as follows:

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

(NB. The maximum hazardous area certified temperature of 170°C is based on 264v. 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. Contact us for further details on appropriate products for your application.

There may be occasions, with certain materials, when it is necessary to ensure that a particular temperature is maintained, or that a specific temperature below THERMOSAFE's maximum limiting temperature is not exceeded. Where potentially explosive gases or dusts are present, operating the heater at reduced supply voltages certifies lower self-limiting drum wall temperatures. These are tabulated in the ATEX certificate Sira08ATEX3101X. For maximum heating rates however, it is preferable to operate from the maximum standard single phase supply available, and limit temperature using the power or temperature control methods described below.

If a specific temperature is required for a material with a previously monitored heating curve, simple time control is usually the most appropriate. An energy controller (or timer with an equivalent facility) will provide similar control to a simple thermostat on a conventional heater. However, as with a thermostat, this will increase the overall heating time.

THORNE & DERRICK INTERNATIONAL
Thorne & Derrick
+44 (0) 191 410 4292
www.heatingandprocess.com

If close temperature control is required, independent of changing ambient conditions, the temperature of the drum or vessel must be monitored directly. This can be achieved using a thermocouple (usually embedded in a magnetic pad on the side of the drum) in conjunction with any style of "on-off" temperature controller.

The following standard devices are supplied, but more complex options can be discussed where appropriate to specific projects:

1. Model BF400 Powerlink energy regulator, uniquely designed for use with the THERMOSAFE heater. Open loop control that is simple to install and use, ideal for most applications where a drum needs to be maintained at an operational temperature for a period of time.

Burst firing controller enabling adjustment of heater output (0-100%). Near zero-crossing switching minimizes supply disturbance. Integrated 25A mcb for circuit protection.

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

2. Comprehensive unit facilitating all likely combinations of temperature and/or time control.

Control panel containing digital on-off temperature controller and timer, solid state relay with heat sink, mains input circuit breaker, control circuit fuse, and 3-position rotary cam switch (to select full control, off, or continuous power).

Heavy duty k-type thermocouple with magnetic base (c/w 2m or 5m stainless steel braided cable)

The panel can also incorporate an intrinsically safe (zener) barrier for the thermocouple input. Whilst the panel must still be situated in a safe area, the use of a zener barrier allows hazardous area operation of the THERMOSAFE heater.

The THERMOSAFE heater can also be used in certain circumstances with non magnetic drums and containers. Temperature control and operation in these situations will necessarily vary from the methods described above. Please refer to our technical team for more information. We are always happy to give advice on particular applications, and support users or electrical contractors in building suitable control or monitoring systems.

The THERMOSAFE Type A Induction Heater is certified for use in potentially explosive atmospheres under Directive 94/9/EC by Sira Certification Ltd. The certification complies with the relevant sections of BS EN 60079-0, BSEN 60079-7, IEC 61241-0 and EN61241-1. Sira Certification Ltd is a “Notified Body”, and part of the IECEx Scheme so has also issued IECEx certificate SIR O8.0037X.

ISO 9001 sira UKAS CE 0518