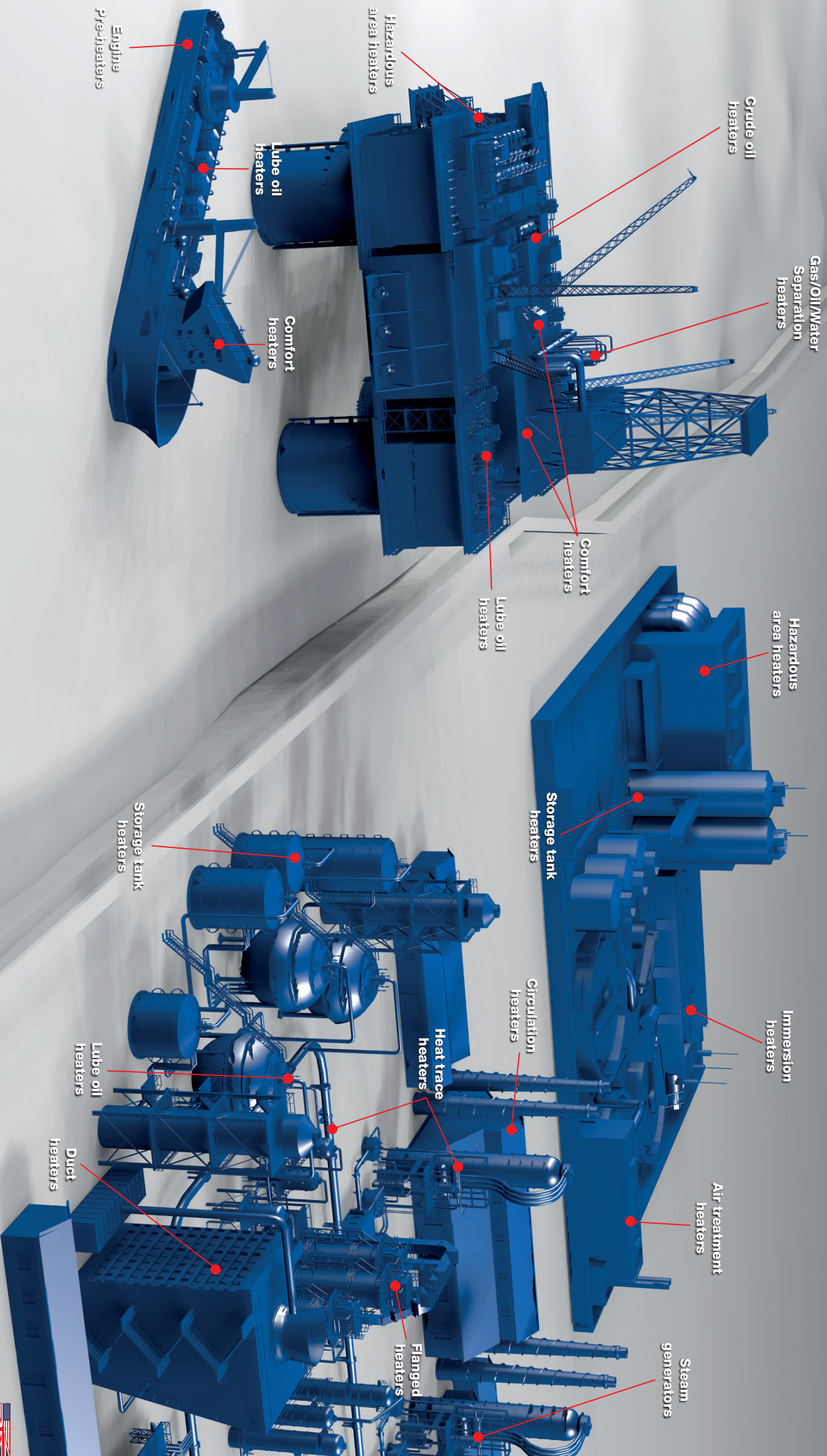




ELECTRICAL HEAT EXCHANGER FOR PROCESS INDUSTRY



PRODUCTS

Zoppas Industries is specialized in the production of sheathed electrical heating elements and in a wide spectrum of electrical heating solution suitable to meet most of the applications in different industrial sectors. All our products are manufactured under the most stringent quality tests according to the main International Standards.

Our main products are:

- Screw Plug Heaters
- Flanged Immersion Heater
- Circulation Heaters
- Suction Heater
- Process Heating system
- Electric steam generator
- Engine Pre Heater
- Strip Heaters
- Etched Foil Heaters
- Control Panels
- Heating Elements

INDUSTRIES SERVED

Zoppas Industries offers several products for many industrial sectors:

- Oil & Gas
- Petrochemical
- Power generation
- Industrial gas production
- Chemical
- Marine
- Water treatment
- Energy
- Food processing
- Pharmaceutical
- Processing Plant

ENGINEERING PROJECT

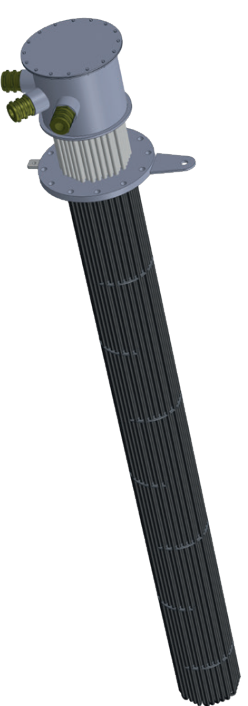
We design and manufacture electrical process heating exchangers, duct heaters and temperature control solutions to meet any specified technical customer requirement and international standards. We support our partners from conceptual design and feasibility study throughout the life cycle of the supplied products.

Our design skills include:

- Process heater design
- Thermal design
- Electrical design
- Mechanical design
- Temperature control design
- Hazardous area certification



Typical Circulation heater for hazardous area



Typical Immersion heater

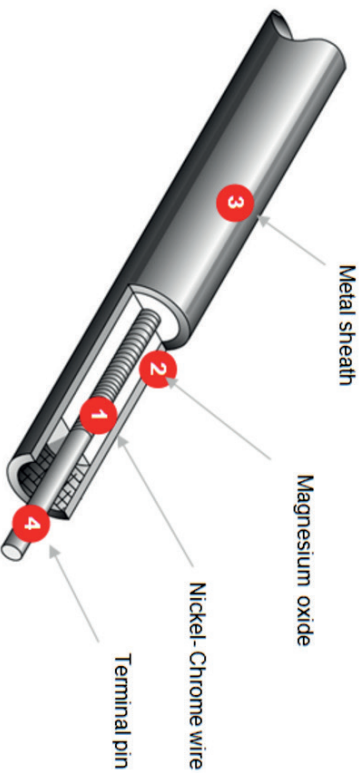


TYPICAL APPLICATION

- Fuel oil forwarding
- Lube oil preheating
- LNG heating and vaporizing
- Air separation
- KO drum
- Industrial gases (O₂, N₂, H₂, CO₂)
- Heat transfer fluids
- Fuel gas conditioning
- Water treatment
- Bilge water
- TEG reboilers
- Water heaters
- Tanks heaters
- Crude oil heaters
- Heat transfer salts
- Catalysts regeneration

HEATING ELEMENTS

We offer Tubular sheathed Heating elements having high quality Ni-Chrome resistance wire with in electric insulation made by compact magnesium oxide covered by metal sheath made of different materials (carbon Steel, SS 304/316/321/321L, Incoloy 800, Incoloy 825, Hastelloy, Inconel etc.) to suit the process condition. Heating elements can be supplied in different diameter (Ø 6.25 ÷ 16 mm) and length.



FLANGED HEATERS



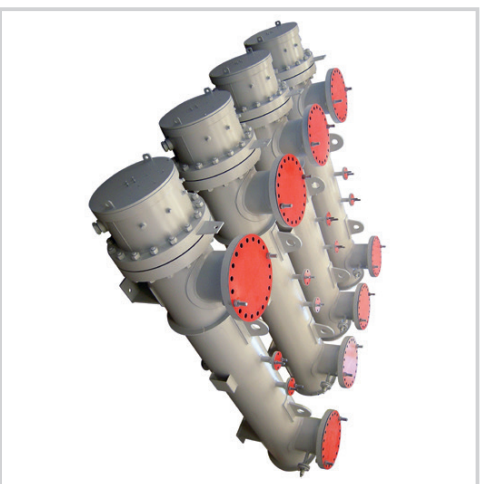
Flanged Immersion Heaters are most commonly used electric heaters in industrial market to heat gas or fluids in horizontal or vertical position. Flanged heaters are constructed with U shaped tubular heating elements, brazed, welded or connected using mechanical coupling to the flange. The watt densities and the metallurgy of the heating elements are selected on the basis of each application, specific power requirement and the customer specifications. Flanged heaters can be offered in fixed type or withdrawable type configuration (the heater can be removed without draining the product from the tank).

Technical Data Sheet & construction details

| | |
|-------------------------|------------------------------------------------------------|
| KW Rating | Up to 4000 KW |
| Elements Metallurgy | Copper, Carbon Steel, SS304/316, Incoloy/Inconel |
| Elements Dia (mm) | 10, 12.5, 16 mm |
| Watt Density | up to 85 watts/sq inch depending on the application |
| Flange Class | 150, 300 or more as required |
| Flange Metallurgy | Carbon Steel, SS 304/316/321 or as per process requirement |
| Terminal Box Metallurgy | Carbon Steel, Cast Aluminium, SS |
| Area of application | Available for both Hazardous & safe areas application |
| No & size of entries | 2 & more |
| Temperature Control | Thermostat/RTD/Thermocouple |
| Voltages | 240, 480-690 VAC, single & 3 phase |
| Approvals | ATEX - IECEx (Exd - Exe) |



CIRCULATION HEATERS



Circulation heaters are meant for heating flowing liquids or gases using in-line piping configuration. These heaters are comprised of a heater bundle fitted in vessel/pipe (Heating Chamber), temperature controller(s), insulation along with the insulation jacketing of the heating chamber.

These heaters typically used for in-line heating of all the type of fluids where the heating requirement is not fluctuating and the heating is done in a closed loop. The metallurgies of heating elements, vessels, flanges depend on the application and/or specifications. These heaters are available for safe & hazardous areas applications and can be supplied with integral control panel or remote mounted contactor or control panel.

Technical Data Sheet & construction details

| | |
|-------------------------|------------------------------------------------------------|
| KW rating | up to 4000 KW |
| Elements Metallurgy | Copper, Carbon Steel, SS304/316, Incoloy/Inconel |
| Vessel Metallurgy | Carbon Steel or as per process application |
| Elements Dia (mm) | 10, 12.5, 16 mm |
| Watt Density | up to 85 watts/sq inch depending on the application |
| Flange Class | 150, 300 or more as required |
| Flange Metallurgy | carbon steel, SS 304/316/321 or as per process requirement |
| Terminal Box Metallurgy | Carbon Steel, Cast Aluminium, SS |
| Area of application | Available for both Hazardous & safe areas application |
| No & size of entries | 2 & more |
| Temperature Control | Thermostat/RTD/Thermocouple |
| Voltages | 240, 480-690 VAC, single & 3 phase |
| Approvals | ATEX - IECEx (Exd - Exe) |

PROCESS HEATING SYSTEM



Process heaters are used for heating flowing gases or liquids using in-line piping/vessel configuration. These heaters are normally used for large capacities and plays critical part in a process in Process Industry like oil refineries, petro chemical plants & so on. These heaters are comprised of a heater bundle (as shown in the above picture) fitted in a pressure vessel/pipe, installed with temperature controllers (however it can be changed depending on the requirement) and connected with terminal enclosure for power connections.

These heaters are customized for each application based on parameters/data sheet provided and supplied with remote mounted SCR control Panel.

Technical Data Sheet & construction details

| | |
|-------------------------|------------------------------------------------------------|
| KW Rating | up to 4000 KW |
| Elements Metallurgy | Copper, Carbon Steel, SS304/316, Incoloy/Inconel |
| Vessel Metallurgy | Carbon Steel or as per the process requirement |
| Vessel Design Code | ASME VIII Div 1/1U Stamped/EN13455 |
| Elements Dia (mm) | 10, 12.5, 16 mm |
| Watt Density | up to 85 watts/sq inch depending on the application |
| Flange Class | 150, 300 or more as required |
| Flange Metallurgy | Carbon Steel, SS 304/316/321 or as per process requirement |
| Terminal Box Metallurgy | Carbon Steel, Cast Aluminium, SS |
| Area of application | Available for both Hazardous & safe areas application |
| No & size of entries | 2 & more |
| Temperature Control | Thermostat/RTD/Thermocouple |
| Voltages | 240, 480-690 VAC, single & 3 phase |
| Approvals | ATEX - IECEx (Exd - Exe) |



ENGINE PREHEATER



These are plug-in compact electric heating systems mainly to heat fluids like water or oil. These heaters comprise of screw plug/flanged immersion heater fitted in a pressure vessel equipped with the required temperature controller(s), instrumentation along with a integral contactor or SCR control Panel. Typical applications for these systems are for Gensets, Power Plants, Marine, Railway, etc. like Pre Heating of jacket water cooling systems, pre heating of jacket water cooling systems, pre heating lube oil system, combined pre heating of jacket water & lube system etc.

Technical Data Sheet & construction details

| | |
|-------------------------|-------------------------------------------------------------------------|
| KW Rating | up to 4000 KW |
| Elements Metallurgy | Copper, Carbon Steel, SS304/316 |
| Elements Dia (mm) | 10, 12.5, 16 mm |
| Watt Density | up to 85 watts/sq inch depending on the application |
| Flange Class | 150, 300 or more as required |
| Flange Metallurgy | carbon steel, SS 304/316/321 |
| Terminal Box Metallurgy | Carbon Steel, Cast Aluminium, SS |
| Area of application | Available for safe areas application |
| No & size of entries | 2 & more |
| Temperature Control | Thermostat/RTD/Thermocouple |
| Voltagess | 240, 480-690 VAC, single & 3 phase |
| Approvals | ATEX (COOE or any other approval can be obtained on case to case basis) |

DUCT HEATERS



Installed directly inside the fluid main (duct) or mounted on the flange for large diameter pipes. Suitable for very high flow rates and low pressure drops. Available with smooth or finned elements for increased heat exchange rate. APPLICATIONS: Air units/Drying ovens/Process fluids.

Technical Data Sheet & construction details

| | |
|---------------------|-------------------------------------------------|
| KW Rating | Up to 2000 KW |
| Elements Metallurgy | SS304/316/Incoloy |
| Elements Dia (mm) | 8.5/10/12.5/16 |
| Watt Density | up to 85 watts/sq inch depending on application |
| Flange Metallurgy | Galvanized Carbon Steel/SS 304/SS316 |
| Frame | Galvanized Carbon Steel/SS 304/SS316 |
| Area of application | Safe Area |
| Temperature Control | Thermostat/RTD/Thermocouple |
| IP rate | 55/65 |
| Voltagess | 220/690 VAC |



SCREW PLUG IMMERSION HEATERS



Screw Plug Heaters are constructed with U shaped tubular heating elements brazed or welded to the screw plug.
Screw plug heaters are used mainly for heating liquids like chlorinated water, demineralized water, lube oil, fuel oil, mineral oil, edible oil, and so on. These heaters can be provided with a temperature controller. Screw Plug heaters can be offered in fixed type or withdrawable type configuration (the heater can be removed without draining the product from the tank).

Technical Data Sheet & construction details

| | |
|-------------------------|-------------------------------------------------------|
| KW Rating | up to 24 KW |
| Elements Metallurgy | Copper, Carbon Steel, SS304/316, Incoloy/Inconel |
| Elements Dia (mm) | 8.5, 10, 12.5 mm |
| Number of elements | 1 - 3 |
| Watt Density | up to 85 watts/sq inch depending on the application |
| Screw Plug Size | 1 - 2.5 inch |
| Plug Metallurgy | Brass / SS 304/316/321 |
| Terminal Box Metallurgy | Carbon Steel, Cast Aluminium, SS |
| Area of application | Available for both Hazardous & safe areas application |
| No & size of entries | 2 Nos - 3/4" |
| Temperature Control | Thermostat, RTD, thermocouple |
| Voltages | 120, 240-480 VAC, single & 3 phase |
| Approvals | ATEX - Exd |

CONTROL PANELS



Control Panels are very important & crucial for any electric heater performance and satisfactory & safe operation of the connected equipment.
We offer Thyristor as well as contactor panels based on the application requirement.
These control panels can be supplied both safe & hazardous area applications.
Typically there are two types of control panels for most of the applications electrical heaters are used, though for some applications more complex control system may be required.

1. ON/OFF CONTROL

This type of control relies upon mechanical contactors and switches the load on or off from a demand signal received from the sensors mounted on the heater. It should be noted that this type of control system is best suited to static applications such as heaters for tanks/vessels as the degree of accuracy which can be applied is limited by the reaction time of the contactor and the number of stages available. Slightly more sophisticated systems incorporate multiple stages to allow a degree of flexibility.

2. THYRISTOR CONTROL

This type of control is the most common system used in flowing systems as the infinitely variable thyristor (SSR) switching device can very quickly adjust the heater power to match exactly the demand signal sensing the process fluid or gas temperature.

3. BASIC COMPONENTS FOR A HEATER CONTROL PANEL

- Enclosure typically IP44 mild steel for indoor mounting
- Main isolator
- On/off switch
- Warning lamps
- Low voltage control circuit
- Over temp controller (s)
- Process temperature controller
- Circuit protection fuses or MCCB
- Power switching device (s) either contactor or thyristor
- Trip device



ETCHED FOIL HEATER



Etched foil elements are used for heating surfaces and fluids through excellent heat exchange and thermal uniformity, generally with lower temperatures than those on other heaters. Etched foil heating elements come from printed circuit technology.

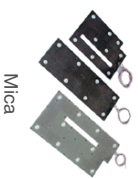
These heaters comprise a slim metal heating track (in aluminium, steel, nickel-chrome non-magnetic alloys, copper, constantan, etc.) between two insulating sheets of silicone, polyester, polyimide or mica and supplied complete with:

- Wires with PVC, silicone, polyimide, teflon, etc. protection
- Connectors
- Controls such as thermostats and thermal fuses
- Sensors: thermocouples, PT100, PT1000, NTC, SMD components
- ZIF connections

Flat heating elements offer a series of advantages that make them one of the most effective solutions for many applications:

- Possibility to differentiate power distribution locally to offset possible lack of thermal consistency
- Minimum heat dispersion for applications on external surfaces to be heated
- Possibility to provide shapes and extremely versatile contours in terms of extension and complexity
- Flexible and easy to fit
- Minimum weight and thickness
- Overall savings on many applications

Flat heating elements are UL and VDE certified and have protection of rating IP67. The heating element is available in following types:



Mica



Silicon



Polyimide



Polyester

Worldwide Local Supplier



50 Years of experience in design and production of heating elements and systems



ZOPPAS INDUSTRIES Partner

- Experience Zoppas Industries increasing efficiency using lean enterprise across all facilities and departments.
- Access our state-of-the-art laboratory facilities with over 30 years' design experience.
- Benefit from Zoppas Industries manufacturing and design facilities which maintain Quality Management Systems according to ISO 9001, EN 9100, Environmental Management System according to ISO 14001 and Energy Management System according to ISO 50001.
- Access one of the widest Heating Element Technology product portfolios in the world including completely integrated thermal assemblies with sensors, connectors, enclosures, etc.
- Benefit from Zoppas Industries global presence through design and manufacturing facilities across Europe, North America, South America and Asia - lowering your Total Cost of Ownership (TCO) including reduced logistics, design, communication and support costs.
- Access Zoppas Industries' in-house design, development and R&D capabilities, such as CAD 3D design, FEA, DOE, FMEA.
- Benefit from Zoppas Industries products third-party certification, such as UL and VDE: marking applied on customer's request.

We at ZOPPAS INDUSTRIES put you in the front seat of internationalization - sourcing your local needs globally.



Compliance with the mark of each specific product must be properly reviewed with our Sales Department.



Zippas Industries
Heating Element Technologies

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