

Interpower **INDUCTION**



**WORLD CLASS
INDUCTION HEATING**



VESSEL AND INLINE HEATERS

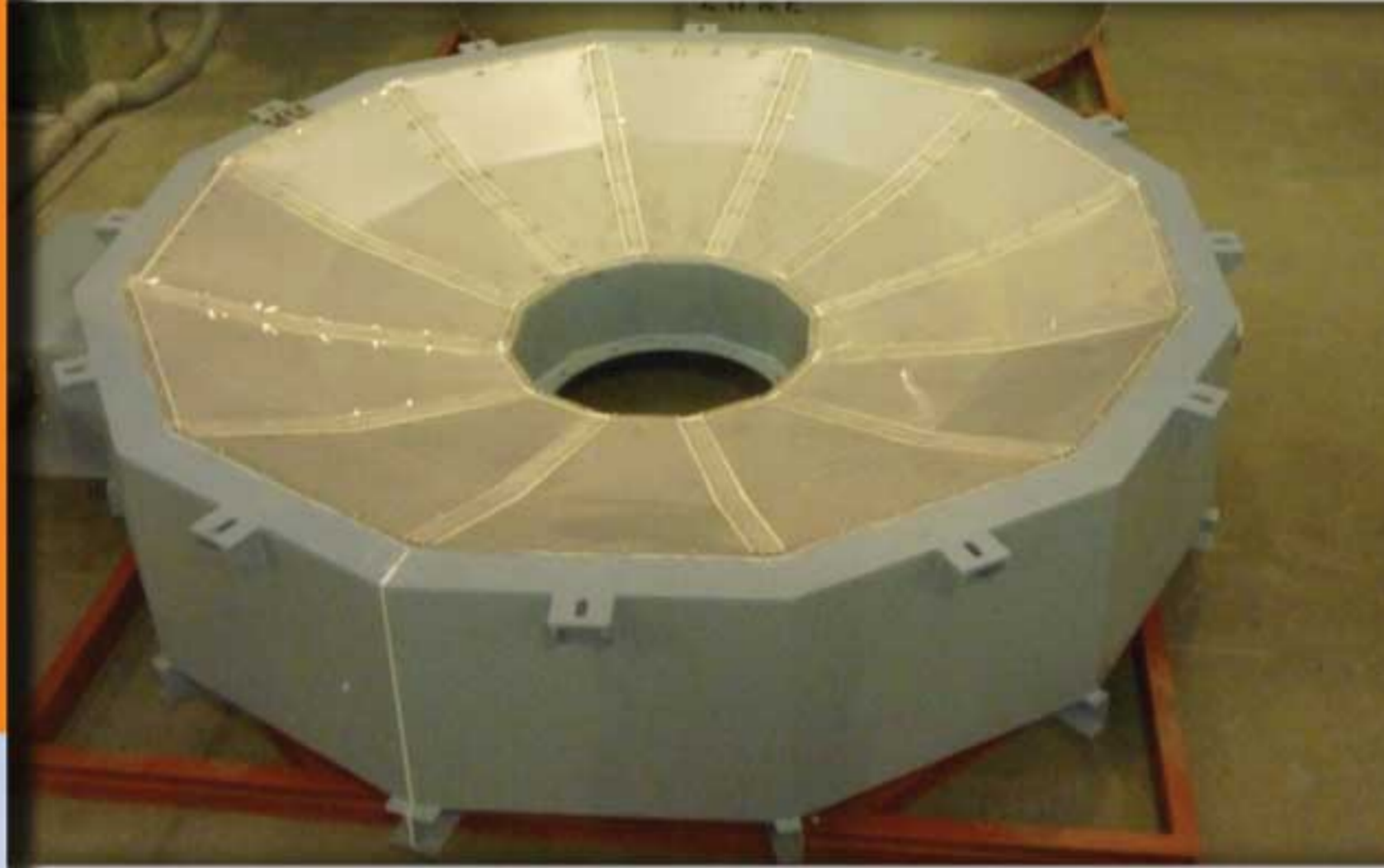
INTERPOWER HAVE DESIGNED, DEVELOPED, MANUFACTURED AND COMMISSIONED INDUCTION HEATING FOR PROCESS VESSELS FOR OVER THE PAST 20 YEARS

Electric mains frequency induction is the most advanced precision heating method available. The system is simple and flexible to operate and offers:

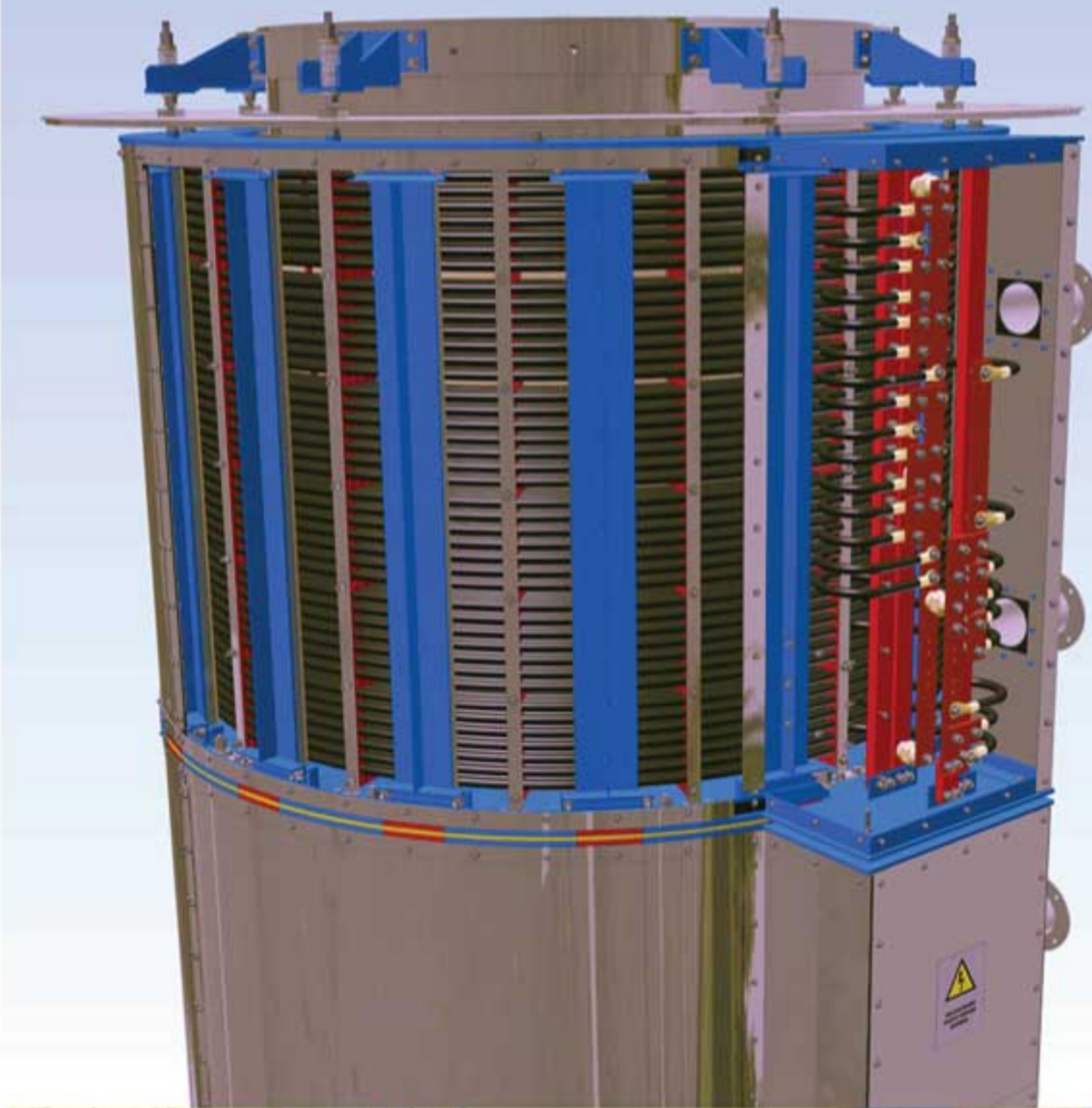
- No physical contact between induction coil and heated vessel wall
- Instant start-up and shut down
- No thermal inertia
- Low heat loss
- Precision product and vessel wall temperature control without overshoot
- High energy input
- Safe hazard area or standard industrial operation at line voltage
- Pollution free uniform heating at high efficiency
- Low running costs
- Low or high temperature working
- Minimum maintenance
- Inline heaters can be of standalone design
- Vessel Continuous and Batch Process Heaters can be self contained and are mounted directly onto a vessel generating minimum floor space requirements

OPERATING PRINCIPLE

Induction heating works on the simple well understood transformer principle. When a coil wrapped around the outside of a metallic vessel is energised with an A.C. potential it induces a high current, low voltage circulation within the wall of the vessel, which acts as a short circuited single second turn. The current flow causes instantaneous heating in the wall and this rapidly transfers to the vessel contents by conduction, which may be assisted by mechanical agitation.



Any required temperature can be achieved and accurately held by Induction Heating. There is no physical contact between the induction coil and the vessel wall as it heats. Thermal insulation is incorporated between the two as an integral part of the heater construction. This keeps the vessel hot and the coil relatively cool since very little heat is generated in the copper induction winding itself compared with the total heater rating. Because of this the heating system has virtually no thermal inertia giving the closest possible control response and temperature accuracy. Heating is also uniform, there is no spot heating as with some flame/element systems and no heating gradients as with heat transfer fluids. With induction, heat is instantaneous and ceases immediately with the switching on and off of the mains supply.



VESSEL DESIGN REQUIREMENTS

Inductor heater coil designs are available to suit metallic vessels and tanks of most forms and shapes in current use, ranging from a few centimetres to several metres diameter or length. Mild steel, clad mild steel, solid stainless steel or non ferrous vessels can all be successfully heated subject to meeting certain design requirements. Generally a minimum wall thickness of 6mm (1/4") is recommended. It is also possible to heat jacketed or limpet coil clad vessels within certain limitations. These can be advised on request.



INDUCTION HEATER MOUNTING

Little shop floor space needs to be taken up by the induction heater since it is very compact and locates directly around the outside of the vessel. The unit normally attaches direct to the vessel wall, but it can also be free standing to accommodate the vessel if required. The heater is usually fully pre-assembled and is quick to fit. Associated control gear can be wall or floor mounted by the vessel or located in separate switch room as required or available.



HEATING RATING AND POWER DENSITY

Unit ratings range from 1kW to 1500kW. With induction heating there is no limit on power density input. Any limitation that exists is imposed by the maximum heat absorption capacity of the product, process or metallurgical characteristics of the vessel wall materials.

Since heating takes place directly in the vessel wall in contact with the product, external heat losses are extremely low, the system is highly efficient (upto 90%).

PRODUCT AND VESSEL WALL TEMPERATURE CONTROL

In addition to normal product temperature control with induction heating it is also possible and usual to continuously monitor and control the vessel wall temperature under the induction winding and thermal insulation exactly where heat is being generated. This is achieved via a thermocouple attached to the outside wall of the vessel. It ensures that there can never be a temperature run away. It also enables safe pre-heating of an empty vessel whenever required.

HEATER POWER SUPPLY AND CONTROL SYSTEM

The Induction Heater is designed to operate direct from the normal mains supply at line voltage and frequency, so the control equipment is inherently simple. This is usually a circuit breaker protecting the incoming mains supply and low/high switching contactors on each zone operated by the batch wall temperature controllers.

SAFE HAZARD AREA OPERATION

To cater for Flameproof Area requirements or where spillage or corrosive chemicals are present it is usual for the induction heater to be fully mechanically protected and continuously purged. Full safety interlocking is incorporated between the purge system and heating controls to prevent heating without purging.

LOW RUNNING COSTS

The Induction Heating System itself operates at low temperature and is robust, simple and reliable, so very little maintenance is required. A periodic check and inspection of connections, switching contacts, controls and protection devices will confirm this.

Electrical running costs are minimal too. This is because of the high overall heat conversion efficiency of the system and the low thermal losses. Power is only consumed when the product is being heated. No hidden fuel costs are incurred, such as a separate boiler system with high standing loss and no pre-heat or stored heat in the induction unit is to be lost on shut down.



TYPICAL INDUSTRIES USING INDUCTION PROCESS HEATING:

Resin and Paint manufacture. Adhesive and Special Coatings. Chemical gas and Oil. Food Processing. Pharmaceutical. Metallurgical and Metal Finishing.

TYPICAL APPLICATIONS INCLUDE:

REACTORS AND KETTLES

High and Low temperature synthetic resin production combining heating and cooling cycles and working in a Flameproof Area.

PROCESS VESSELS

For sealants, adhesive, varnishes, protective coatings etc. produced on a batch or continuous basis.

STORAGE AND SETTLING TANKS

Heating or holding molten chemicals, oils, greases, acids, sealants, sodium, caustic soda etc.

BATHS, VATS AND STILL POTS

For lead, plating solutions, chemical cleaning, heat treatment, refining etc.

PRESSURE VESSELS, VAPOURISERS, AUTOCLAVES, SUPER HEATERS, HEAT EXCHANGERS ETC.

For oil, gas and chemical industry processes at low or high temperature and pressure, or under vacuum

FOOD PROCESSING VESSELS

For edible oils, fats etc. produced under strict hygiene conditions.

PHARMACEUTICAL PROCESSING VESSELS

For fine chemicals, oils, greases etc. produced in sterile conditions.

MISCELLANEOUS APPLICATIONS

Heating road tankers transporting hot materials. Drying or emptying containers on a continuous basis.

DUAL FUEL HEATED VESSELS

Induction can be combined with steam or other heating systems to give a high temperature capability with close temperature control married to low grade bulk pre-heating from another source.

INDUCTION HEATING CAN BE APPLIED SUCCESSFULLY TO VIRTUALLY ANY VESSEL SYSTEM NEEDING A SOURCE OF HEAT



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