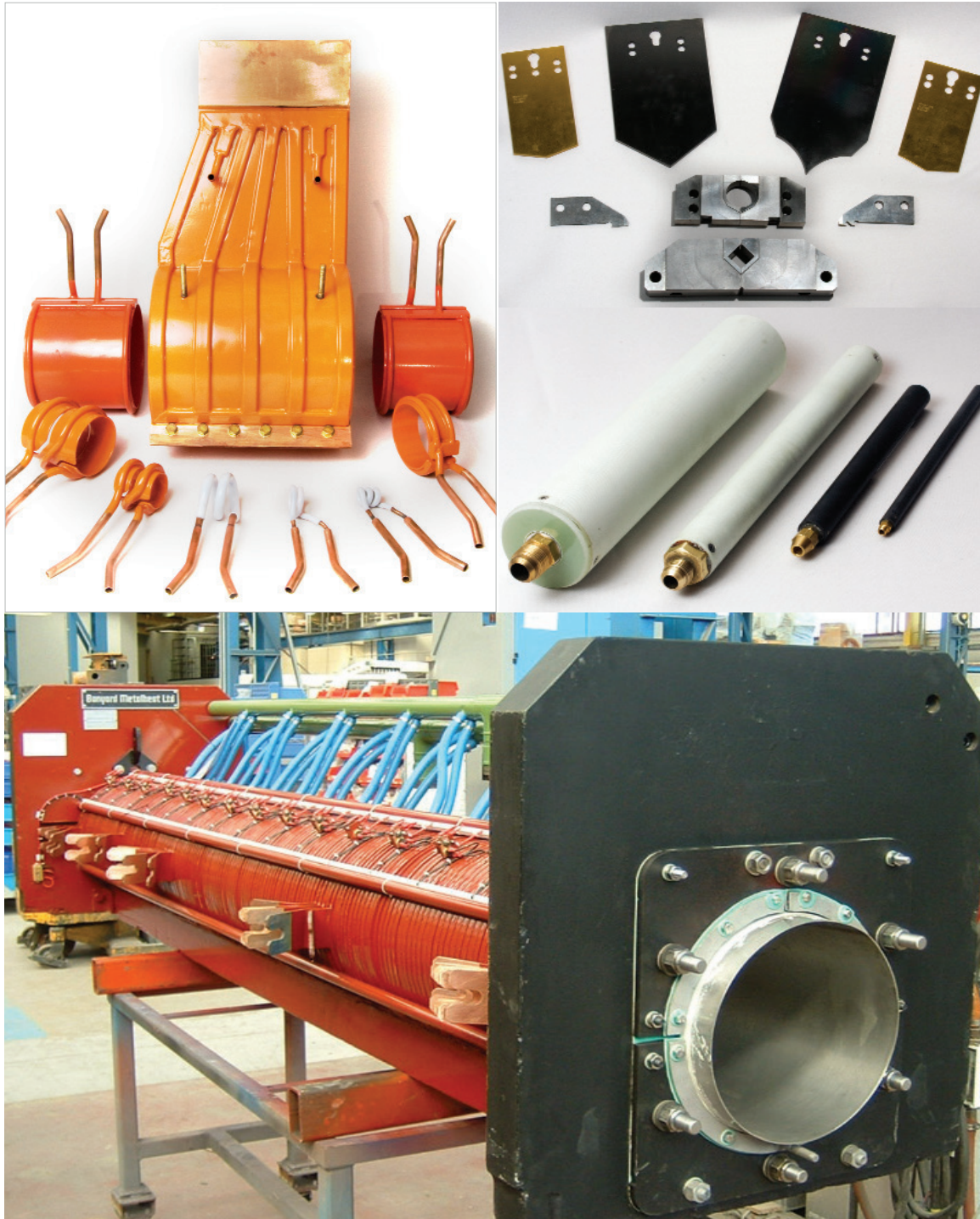


Tube Welding and Cutting Consumables & Induction Heating Coil Refurbishment





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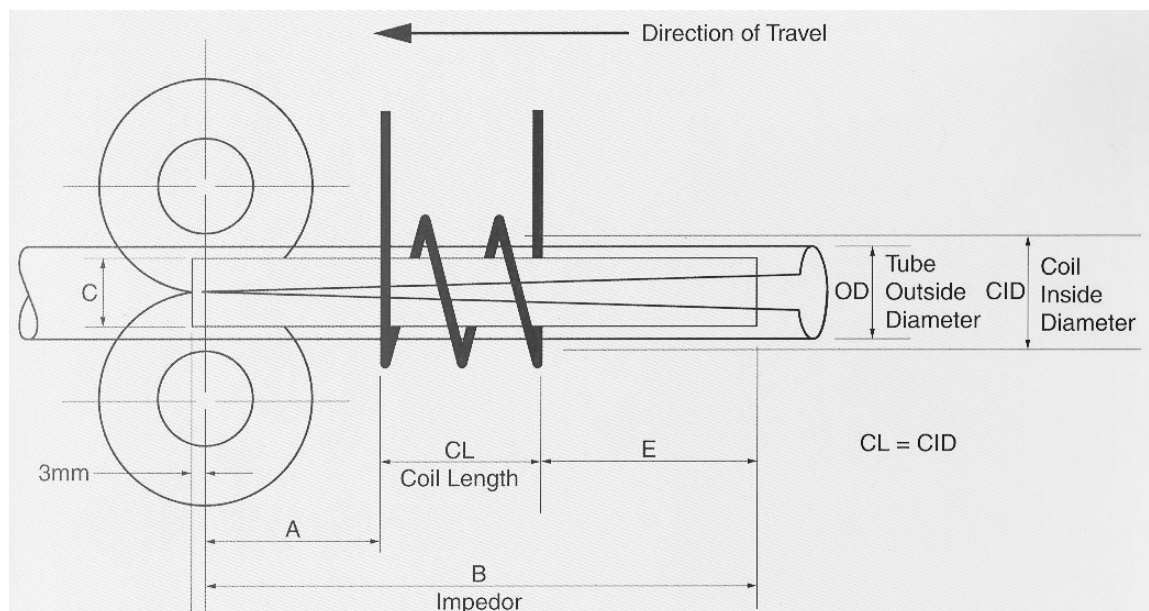
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Achieving the Best from your Thermatool HF Welder

The correct choice of induction coil and impedor will play a major part in optimising the performance and overall operating efficiency of a welder, provided they are both correctly positioned on the mill.

Thermatool offers many different types of impedor, available in a wide variety of lengths and diameters to suit most tube and pipe welding applications including Carbon or Stainless Steel, Copper, Aluminium and Brass.



The above diagram illustrates the correct size (diameter, length) and position of both the induction coil and ferrite material (within the impedor) which is necessary to achieve efficient welder performance. In general, the larger the diameter (mass) of the ferrite material, the faster the welding speed.

Impedor length is also dependent upon specific mill characteristics such as the seam guide and support structure.

Referring to the above diagram, dimension A will depend upon the design of the mill and the weld roll diameter and should be kept to a minimum, preferably not exceeding the tube diameter (OD).

Similarly, the impedor diameter (dimension C) should be as large as practically possible, however, in reality this will be limited to around 80% of the inside diameter of the tube. Another parameter, often over-looked, is the length of the impedor. This should ideally be around 3.5 to 4 x the length of the induction coil (CL).

Call Inductotherm today on +44 (0)1256 335533 with your requirements for tube welding consumables. There are hundreds of popular items in stock for immediate delivery.

For special applications Inductotherm offers tube and pipe producers a fast-track design and custom build programme. With over 2500 Thermatool solid-state HF welders in service throughout the world, Inductotherm engineers have considerable applications experience to draw from.

Induction Coils

Inductotherm offers a comprehensive range of induction coils, designed specifically for use with Thermatool CFI and HCT series solid-state HF induction welders. Manufactured from high conductivity Copper, quality inspected and painted for clear identification, there are numerous types and sizes available to satisfy every application. Many of these models are available for immediate delivery from stock.

Whether you are producing Carbon Steel, Stainless Steel, Copper, Brass, Aluminium or Galvanised tubing, Inductotherm has the induction coil to meet your specific needs. Its comprehensive range of induction coils fully supports the entire range of Thermatool welders with power ratings from 50kW to 2MW and operating frequencies ranging from 100kHz to 800kHz and variable frequency.

For special coil requirements, Inductotherm engineers are pleased to review the possibility of custom coil design/build.



Tubular Induction Coils

Thermatool tubular coils are made from high conductivity Copper and they are insulated with PTFE (Teflon) tubing. They are designed to match the impedance of Thermatool CFI and HCT series welders in order to maximise output weld power into the tube.

Typically used for tube diameters from 10mm to 32mm.



Universal Banded Induction Coils

Designed for ease of installation. Called "Universal" as you only need to stock one universal coil to accommodate either Left-Handed or Right-Handed mill orientations. Like other Thermatool banded coils, they are constructed from Copper bands with brazed on cooling tubes. Their design also ensures correct impedance matching and a stable, consistent weld frequency.

Typically used for tube diameters from 33mm to 78mm.



Single-Turn Banded Induction Coils

Thermatool single-turn banded coils are constructed from Copper bands with brazed on cooling tubes. Their design also ensures correct impedance matching and a stable, consistent weld frequency.

Typically used for tube diameters from 79mm to 190mm.



Split Type Single-Turn Induction Coils

Thermatool split type coils are constructed from durable Copper sheet and can be supplied with brazed on cooling tubes or without, if a constant spray cooling is used.

A major benefit of this type of coil is that it can be quickly removed from the mill without having to cut a section of welded pipe, thus avoiding unwanted, scrap tube.

Typically available for installation on CFI and HCT series welders 400kW and higher that use pneumatic clamping.

Typically used for tube diameters from 60mm to 530mm (or larger).

Impedors

Inductotherm offers an extensive range of impedors to satisfy a very diverse range of tube and pipe welding applications. Whether your mill produces small diameter/thin wall tubing or large diameter/heavy wall API line pipe, Inductotherm has a wide selection of impedors for you. The proper choice of impedor, correctly installed, will play a major part in achieving maximum welding efficiency.

It should also be noted that as the performance of all ferromagnetic materials is a function of temperature, it is critically important that the ferrite core is kept as cool as possible during the tube welding process. Ideally, the temperature of the coolant flowing through an impedor should not exceed 25 deg C.

Standard Through-Flow Impedors

These are the most widely used of all types of impedor, designed to use solid, fluted ferrite rods in order to ensure sufficient cooling. They consist of one or more ferrite cores inside a casing of either ferroglass or silglass.

For correct operation a minimum pressure of 2.75 bar (40 psi) should be maintained to ensure sufficient flow of coolant through the impedor under all but the most extreme welding conditions.

Standard models are available with diameters ranging from 6.5 mm up to 114 mm in lengths of 230, 330 and 432 mm and above.

Return Flow Impedors

These impedors are recommended for welding applications where it is necessary to keep the inside of the tube dry. Coolant enters and exits the impedor through a special coupling and is discharged outside of the tube. Fitted with end plugs approximately 12 mm thick, it is important to position the end of the impedor around 15 mm past the weld point for the highest efficiency.

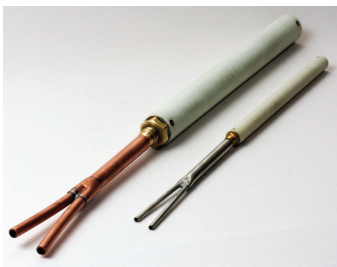
Standard models are available with diameters ranging from 10 mm up to 76 mm in lengths of 230, 330 and 432 mm and above.

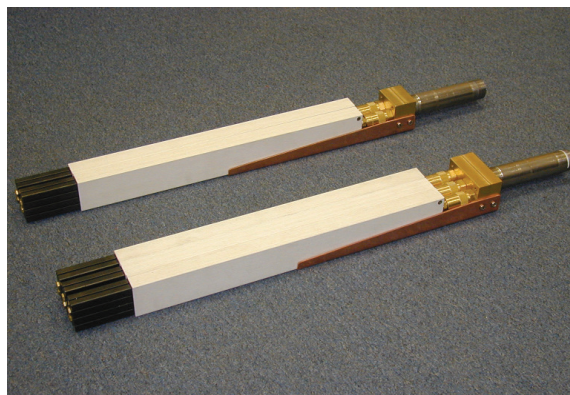
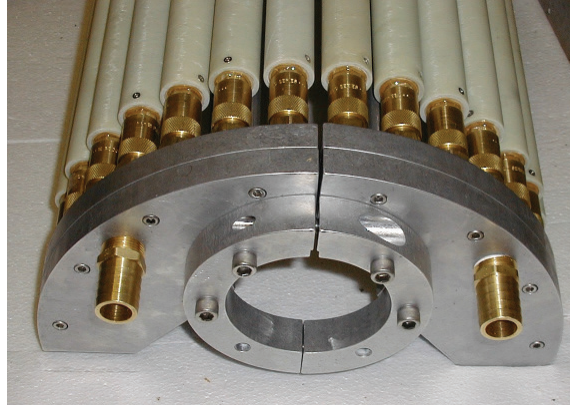
Exposed Ferrite Impedors

These impedors offer an efficient alternative for smaller diameter tubes as they allow positioning of the ferrite in the welding zone without fear of the casing burning away.

Exposed ferrite impedors are ideally suited for welding hot rolled strip, aluminised or pre-galvanised strip, stainless steel and other difficult materials. They are also the best choice for air or inert gas cooled applications.

Standard models are available with diameters ranging from 8 mm up to 25 mm with a length of 230 mm.





Integral Mandrel Impedors

These impedors are designed for applications where there is a requirement for ID bead removal (scarfing) or bead rolling in smaller diameter tubes (up to approximately 90 mm diameter). They are constructed with a non-magnetic steel bar through the centre in order to support the loads generated during the ID scarfing process.

These impedors are available with diameters from 13 mm up to 76 mm in standard lengths of 267 mm and 370mm.

Over Mandrel Impedor

These impedors are designed for applications where more rigidity is required during the internal scarfing, provided there is adequate space available.

These impedors are available with diameters from 76 mm to 152 mm in standard lengths of 430 mm and 635 mm.

Impedor Cluster Assemblies

Cluster Impedors are recommended for larger tubes and pipes with diameters greater than 102 mm. They are an assembly of standard impedors connected to a manifold through which the coolant enters. The cluster manifold is supported by the mandrel and fixed into position using a clamp manufactured to suit the customer's mandrel diameter.

The impedor cluster gives the possibility of economically positioning the ferrite in large tubes without resorting to costly, oversized, single pieces of ferrite. The use of individual standard impedors also enables fast and economical replacement of any damaged parts, as and when required.

On pipe sizes > 200 mm it is not usually necessary for the impedor to completely cover the inside surface of the pipe. Positioned where ferrite is needed, cluster assemblies normally span around 180° of the inside surface of the pipe being induction welded.

Ferrites

Tube and pipe producers worldwide recognise the production benefits and cost savings that can be achieved from the use of correctly designed impedors that take full advantage of the very latest developments in ferrite material technology.

Modern tube mills that operate at higher line speeds have created demand for impedors that deliver superior performance. Such enhanced performance can only be achieved by using the very best ferrites available.

Inductotherm in recognition of the above, has developed ferrite material that possesses higher magnetic permeability whilst offering the highest Curie temperature (330°C), minimal core loss and high saturation flux density over a wide operating temperature range. These are just some of the reasons why a growing number of tube and pipe producers worldwide choose Thermatool ferrites in order to optimise the performance of their mills. Thermatool offers four different types of ferrites which can be cut to length, if required.



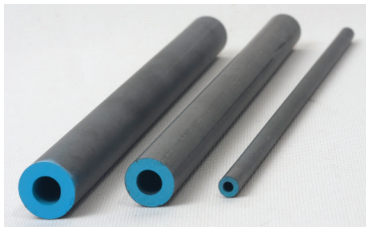
Fluted Ferrite (FF)

The best all round ferrite offering a large mass of material with maximum cooling capacity due to its “fluted” design. This type is ideal for use with through flow impedors.



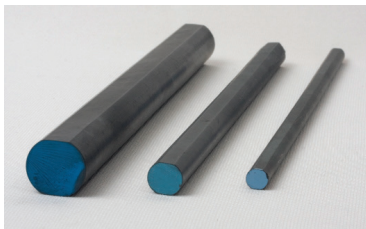
Fluted Hollow Ferrite (FHF)

The hollow centre permits this type of ferrite to be utilised where a mandrel is used or for return flow impedor applications. This type is ideal for use with return flow impedors.



Hollow Ferrite (HF)

This type of ferrite can be utilised where high numbers of ferrite rods are required, particularly where extra cooling capacity is needed.

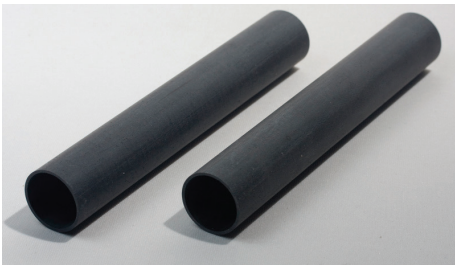


Flat Sided Ferrite (FSF)

Commonly used in larger impedors where high numbers of ferrite rods are required, thus reducing overall cost, however, cooling is not as efficient as that which can be achieved using fluted ferrites.

Impedor Casings

Thermatool offers a wide range of impedor casings in many standard diameters (and lengths upon request), available in three different materials as follows:-



Ferroglass

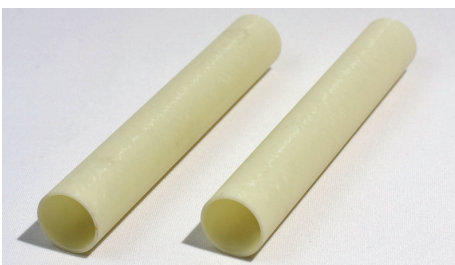
Ferroglass is a ferrite powder impregnated epoxy glass possessing characteristics that can substantially increase production speeds when welding small diameter tubing (< 30mm).

For impedors larger than 30mm in diameter, the percentage of total ferrite contributed by the Ferroglass becomes less with increase in diameter.



Silglass

Silglass is a very high temperature Silicone based material that is ideal for return flow impedors and other types where long life is required. The material is relatively soft compared to epoxy glass and needs to be well supported to avoid wearing out and damage caused by friction.



Epoxy (Fibreglass)

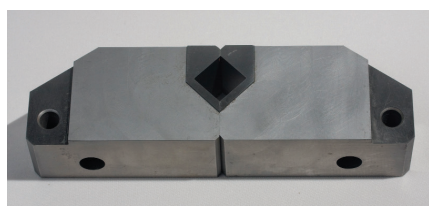
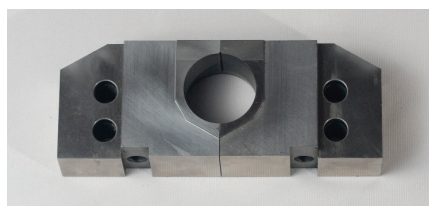
The least expensive option for use as an impedor casing, providing a good compromise between both performance and cost. Epoxy casings are also the most abrasion resistant, however, they do not provide the electrical benefit of Ferroglass or the heat resistance that Silglass offers.

Tube Cutting Consumables / Tooling

Inductotherm offers a comprehensive range of tube cutting consumables, designed specifically for use with its range of Thermatool Alpha high speed flying shears. The Alpha range is available in four models, namely 2", 3", 4" and 5" machines.

High quality tube shearing relies upon good installation and set-up procedures. To achieve this, it is essential that all cutting consumables such as blades and jaw sets are of the very highest quality. Blade tolerances after hardening are typically within $\pm 0.001"$ (0.025mm) on width and thickness, and less than $\pm 0.002"$ (0.05mm) on flatness. Blades typically undergo special surface coating and custom heat treatment in order to arrive at the ideal specifications for high speed cutting of exotic materials.

There are many different styles and shapes of blade, the selection of which depends primarily on whether rounds, squares, rectangles or irregular profiles are being precision cut. Thermatool's unique material delivers increased cutting life on carbon steels and offers exceptional performance when cutting high tensile and stainless steels.



ALPHA Shear Jaw Sets

Alpha jaw sets are available for the cutting of tube with diameters ranging from 10mm to 127mm. They are precision manufactured from highest quality tool steel. Their function is to accurately clamp the tube in the dieset during the high speed cutting process. In addition to providing 50% of the effective cutting surface, they also ensure that correct clearance is maintained between the jaws and the vertical blade, thus enabling the optimum cut (shear) quality to be achieved.

Alpha jaws undergo complex heat treatment to ensure high wear resistance.

Jaw sets can be produced to enable precision cutting of round, square and rectangular tube.

ALPHA Shear Blades

Inductotherm can supply both Vertical and Horizontal blades to precision cut tube of varying diameter, wall thickness, material composition and Rockwell hardness.

Engineers at Inductotherm utilise the latest solid edge modeling techniques to generate blade profiles which have the optimum blade geometry designed into them for a specific cutting application. Blade life and cut quality can also be optimised where blades undergo special heat treatment and/or surface coating. Please contact us for assistance on specific tube cutting requirements.

Induction Coil Refurbishment

Inductotherm offers a complete refurbishment service for the many types of induction coil which are in operation with Inductotherm induction heating power supplies from the Banyard, Radyne and Newelco brands.

Today's market conditions will often determine that it can make good economic sense to have an existing, well used and even partly damaged induction coil completely refurbished - rather than have it discarded and replaced by a brand new one.

Prior to returning units for total refurbishment, Inductotherm recommends that digital photos of the subject coil(s) are forwarded to the spares department for an initial assessment. An on-site inspection can also be carried out by an Inductotherm engineer at minimal expense to the customer if required.

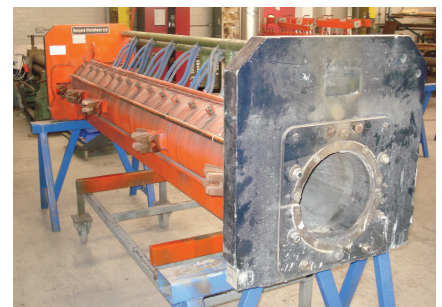
During the annual shutdown period it is becoming increasingly popular for customers of Inductotherm to take a coil out of service and replace it with a spare unit from their stock. A coil change-out programme such as this will enable the customer to carry out a planned refurbishment with no costly production downtime.

Non-Ferrous Extrusion Coil Refurbishment

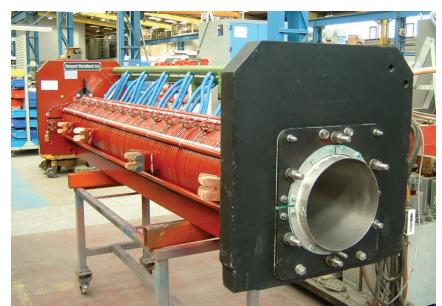
A full coil refurbishment will involve many, if not all of the following activities:-

- Replace coil liner and insulation
- Chemically clean the coil's water system
- Check for any signs of water leakage
- Replace all hoses and retaining clips
- Replace the coil skid plate
- Replace the tie-rod insulation and re-torque
- Re-align the coil, as necessary
- Pressure test the coil
- Check and/or replace temperature probes
- Carry out a full Megger insulation test
- Carry out complete respray
- Vacuum packed for storage

Before



After



Billet and Bar Heater Coil Refurbishment

A full coil refurbishment will involve many, if not all of the following activities:-

Cast Coil Type

- Inspect and break out the coil winding
- Sand blast and conduct pressure test
- Re-insulate the coil winding
- Test insulation of the windings
- Replace the end boards
- Replace the rails
- Re-hose using new hose clips/fittings
- Test water flow/conduct leak test
- Carry out a full Megger isolation test
- Replace and test microtherms (if fitted)

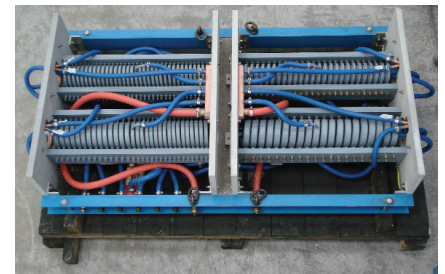
Coil Liner Type

- Inspect and break out the coil winding
- Replace the liner and insulation
- Replace the rails
- Re-hose using new hose clips/fittings
- Test water flow/conduct leak test
- Carry out a full Megger isolation test
- Replace and test microtherms (if fitted)

Before



After



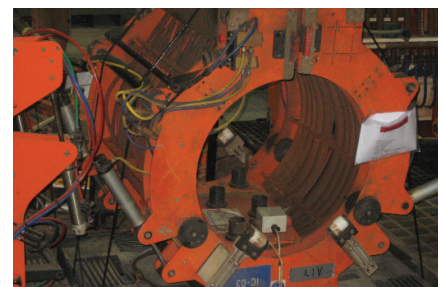
Heating Coil Refurbishment

A full coil refurbishment will involve many, if not all of the following activities:-

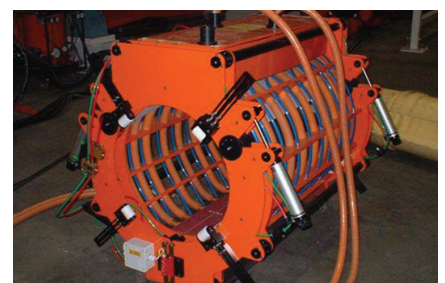
- Full physical inspection of all mechanical and electrical components/systems
- New for old replacement of all critical electrical components
- Full contact replacement
- Full coil wrap replacement
- Re-hose using new hose clips/fittings
- Evaluate and test mechanical components incl. pneumatic cylinders, valves etc.
- Upgrade to meet the latest equipment safety standards, where necessary

Note: After carrying out the refurbishment, offshore heating coils are drained down then winterised by the addition of anti-freeze solution in order to facilitate winter storage (if necessary) prior to redeployment.

Before



After



Customer Service & Technical Support

Inductotherm Heating & Welding Ltd has customer service engineers based strategically throughout the world, knowledgeable on the design and operation of the Thermatool, Radyne, Banyard, iRoss and Newelco range of equipment.

Outside normal office hours, our customer service team is on call to answer the telephone, 24 hours a day, 365 days a year.

Tel: +44 (0)1256 33 55 33

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e-mail: service@inductothermhw.co.uk

Due to the ease of serviceability designed into all Inductotherm induction heating and welding equipment, the majority of customer concerns can be solved quickly and efficiently over the telephone or via e-mail.

In the event where closer assistance is needed, plans will be made for an experienced customer service engineer to travel to site at the soonest available opportunity.

During recent years, in those countries where the volume of Inductotherm customers has increased significantly, the company has made the necessary investment to establish local support whereby equipment service, repair and the supply of common spare parts can be provided locally.

Ordering spare parts

Inductotherm offers a range of spare parts for the Thermatool, Radyne, Banyard, iRoss and Newelco brands. Most common parts are available from stock and if ordered before 15.00 hrs (UK time) will be despatched the same day

Note: Larger items such as mains transformers and DC chokes will not always be available from stock, however, Inductotherm will make every effort to obtain such components from other companies within the Inductotherm Group.

Tel: +44 (0)1256 33 55 33

Fax: +44 (0)1256 33 77 23

e-mail: spares.sales@inductothermhw.co.uk



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