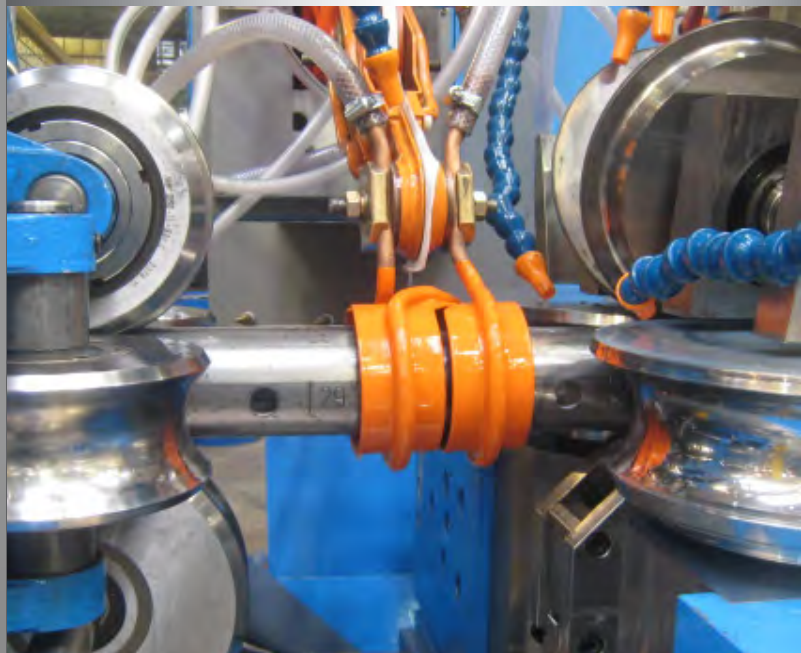




**THERMATOOL**

*An Inductotherm Group Company*

# Tube & Pipe Welding Systems



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# Performance is paramount

Performance is a key issue in the tube and pipe industry. With the requirement to produce a wide range of tube and pipe diameters, if each new job demanded a lengthy reconfiguration of your welder, your productivity - and profitability - would soon suffer.

So naturally, performance is foremost in the minds of our designers and engineers. Our solution is to design and build welders with the capability to meet even the most diverse demands. The wide range of welding frequencies at which they can operate means they - and you - can meet the day-today changing needs of a busy mill with speed, efficiency and economy.

## Down time is dead time

Reliability is another great concern. It is an issue raised repeatedly and one that we have addressed aggressively.

Reliability is fundamental in the design of our welders, which are designed to be robust under all conditions.

We then ensure the design theory is put into practice by constructing from the very highest quality materials, while using carefully selected components from the best suppliers available. We also use electronic components with no

finite life. This combination results in less downtime for your welder and lower maintenance costs for you.

However, if your Thermatool welder ever does require repair or maintenance, the modular construction techniques that we employ ensure remedial work can be carried out quickly and easily, with minimum disruption to your productivity. So our approach in design and construction helps you to keep your costs lower in the long term.

## No room for waste

Wasted energy, wasted money, wasted production: you are concerned about them, so are we. Accordingly, we ensure our welders provide the utmost in energy and production cost-efficiency.

For example, they use less power because of their patented AutoMatch™ feature, which continually matches coil impedance to maximise output power while maintaining output frequency at the selected nominal value. They produce less scrap because automatic synchronisation of weld power to weld speed reduces the amount of unwelded tube at start-up and shut-down. And they use less water because of their highly efficient design which produces less heat to dissipate.

**Choose the welder that suits your needs...**

**Choose Thermatool.**

## The only global specialist

No other global welder manufacturer specialises in the tube and pipe industry. Because it's what we do, and nothing else, it makes welders as vital to us as they are to you.

So we put all of our resources into building the best tube and pipe welders money can buy. And after you have invested in a Thermatool welder, you will find that we are still there when you need us.

With the only truly comprehensive, round the clock, round the world service support operation for welding equipment, you can rely on us like you rely on our welders: totally.



# Selecting your welder

As the only global manufacturer specialising in tube and pipe welders, Thermatool provides a wider range of welders than any other manufacturer.

All our welders are based on the HF welding process that we developed fifty years ago and have led the way with ever since. With its Current-Fed Inverter (CFI) design, our welding equipment range gives you the capability to weld almost any metal you want to: efficiently and economically.

In addition to carbon and stainless steel, brass, copper and aluminium, we can also supply the equipment you need for welding even exotic alloys, such as boron steel.

Thermatool welders have power levels from 50kw and above with the availability of the widest range of frequencies in the industry. Once you have decided on a Thermatool, we'll discuss your welding requirements to make sure you get the model that matches your welding needs.

## **What makes a Thermatool welder?**

Choose a Thermatool welder and you can expect the most intelligent design, highest quality materials and exceptional standards of construction. But there is even more that you can depend on.

### ***Reliability, day in, day out.***

We have many machines still working



at full capacity, 45 years after installation, including a Thermatool welder we commissioned in New Jersey, USA in 1955. It is still in operation today!

### ***Quick and easy maintenance.***

We build to a modular design which means failed parts can be switched for new in hours, rather than days.

### ***Energy saving and cost reduction.***

Our welders feature innovative technology to minimise power loss, maximise efficiency, cut down water requirements and reduce scrap.

### ***Safer operating conditions.***

CFI technology is inherently safer

because it requires lower voltages. It is also short-circuit proof, so no damage will occur when coil and tube touch or create an arc.

### ***24/7 Service support, worldwide***

Our engineers are always available to answer the phone. Due to their expertise, and serviceability we build into every Thermatool welder, 80% of customer service issues are solved quickly by phone. If closer assistance is required however, we will have an engineer in your plant at the soonest opportunity, to keep your welding operation working at peak efficiency.

**50 years' experience and over 3000 proven installations.**

Thermatool has spent 50 years developing and improving welding technology. Thermatool have more HF welders installed than all other HF welder manufacturers combined. Having positioned ourselves at the forefront of the development of solid-state welding, we have now sold over 950 solid-state welders worldwide. Our objective at all times is to satisfy customers who see the advantage of not just buying a welder, but choosing the best welder they could buy.

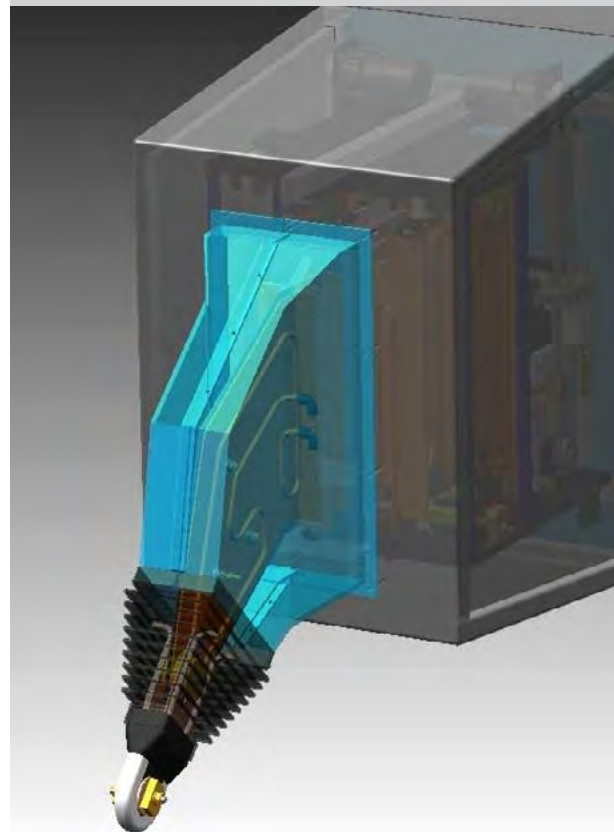
**The next 50 years.**

Over the next 50 years we intend to carry on doing what we do best, better in fact than anyone else in the tube and pipe industry. That is, the continued

development, in a controlled and considered manner, of our welders. We are here for the long-run and so can talk with conviction of the customer support and component availability we will continue to provide over the forthcoming years. We recognise our responsibility in being the world's leading welder manufacturer.

**Exceptional engineering expertise.**

Our sales team, many of whom are highly qualified engineers, will work closely with you to ensure the welder you get is the welder you need. Whether it's carbon steel, fin tube or copper refrigeration tubing you are welding, we will supply you with the right welder for the task, configured precisely to the correct power rating and set-up specifications.



# Made better to work better

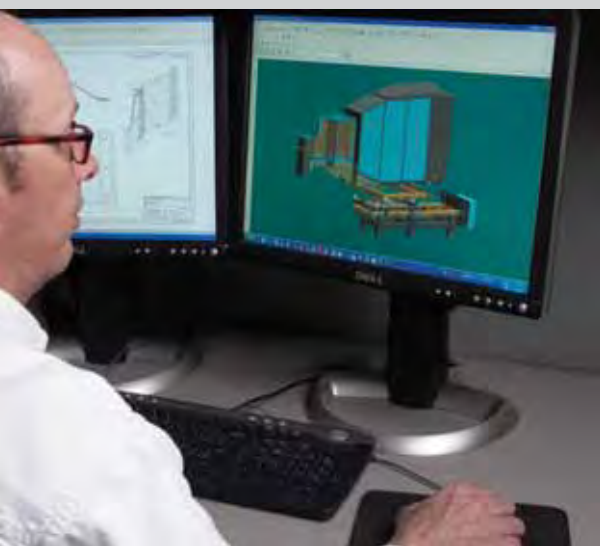
Engineering quality is a concern for you. So naturally you demand the highest quality of design and construction in the welder you choose.

Choose a Thermatool welder and the quality is something you can depend on. Our standards are as high as your own, and we consciously strive at every stage of the design and construction process to create a superior product.

We know you will be the first to appreciate what has gone into it, and what you can get out of it.

## **Virtual reality for the real world**

Thermatool uses 3D modelling as part of the standard design process, which can extend to modelling the entire weld area and welding process.



This unique facility means we can see any problems before they arise, any improvements we can make before we build, and any special configurations we can apply to make your welder work harder for you.

## **Learning through experience**

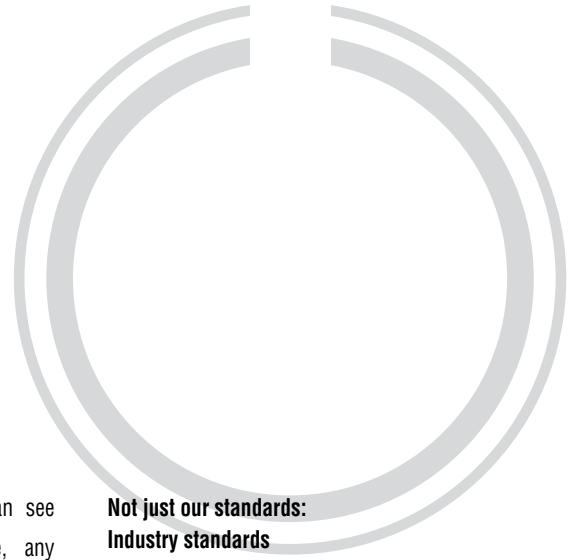
Thermatool has more specific tube and pipe welding experience than any other welder manufacturer. So naturally, we've learned more along the way. We also learn through the service support we offer.

Because we maintain and repair our machines in the field, we see how they function and where we can possibly improve performance and efficiency. Then we pass this knowledge back to our design engineers, so that our products are constantly evolving and improving.

Our engineers, too, are highly qualified and experienced, many with a lifetime in the tube and pipe welding industry.

## **Quality in, quality out**

Building the very highest quality welders demands the very highest quality suppliers. Amongst the leading names who supply our components are Siemens, ABB, Alan Bradley, Telemecanique and Merlin Gerin.



## **Not just our standards: Industry standards**

Our manufacturing facilities are certified to ISO-9001, and all our welders comply with all relevant CE manufacturing standards in Europe NEC and IEC manufacturing standards in the USA.

We also work very closely with our customers, to ensure our welders will produce the end product, which satisfies the most rigorous tube and pipe industry standards, such as API, ASTM, ANSI, BS, DIN and TUV.

Our high standards are not just promised, they're certified by the industry itself.

## **World class, worldwide**

With state-of-the-art design and manufacturing facilities in Europe, USA, South America and Asia, we are perfectly placed to serve our customers throughout the world.

We are also able - via a dedicated Internet link - to combine engineering skills available at our two main locations, multiplying the knowledge and experience we can bring to bear on any particular problem or project.

In addition we have sales and service facilities strategically located globally to ensure Thermatool customers maximise the enhanced productivity of their welder.

# Features and Benefits

The unique benefits of Thermatool innovation.

## Reduced operating costs

**Maximised efficiency** - Thermatool's patented AutoMatch™ feature provides automatic load impedance matching that ensures full power availability throughout the product range without operator involvement. This means full, continuous power is delivered to the load at the selected nominal frequency of the welder, minimising power loss while maximising efficiency - all without an RF output transformer.

**Reduced water usage** - Thermatool's plate-type heat exchanger features an automatic control temperature valve which helps to minimise water usage. Total water consumption can be significantly reduced compared to other tube welders.

**Reduced scrap** - Thermatool's automatic Speed / Power Control System synchronises weld power to weld speed, reducing the amount of unwelded tube produced when the mill is started and stopped.

**Superior weld quality** - Thermatool's advanced low ripple output provides maximum product quality while minimising I.D. trimming costs.

## Greater productivity with greater ease of use

Weld at the frequency of your choice - CFI (Current-Fed Inverter) technology removes the higher limits inherent in voltage-fed solid-state machines. CFI offers the traditional frequencies of 200, 300 and 400kHz for high and low tensile steel and aluminium products and higher frequencies for applications for applications such as small diameter, thin-wall copper, aluminium and brass tube.

Adjust the coil / contact position quickly and easily - A Work Coil Positioning Table provides motorised adjustment of the work coil position as part of the mill set-up. The number of adjustable axes required depends on the tube or pipe production range and the mill configuration. Thermatool will gladly review your production requirements and recommend the best table suited to the application.

Take full control from the operator's multi-language, alpha-numeric display - Provides step-by-step guidance through welder set-up, and

then displays a complete set of real-time operating parameters to help maintain peak productivity.

Work safely - CFI technology involves up to 50% lower voltages than vacuum tube and voltage-fed inverters, thus reducing hazardous exposure. Low-water flow, over-temperature, over-voltage and safe circuit protection provides for the safety of plant personnel and system components.

## Time and money saved on maintenance and repair

Speed up troubleshooting – Welder fault diagnostics help operators isolate and diagnose faults, resulting in faster repairs and greater productivity.

Reduce your parts inventory – Thermatool solid state welding modules are more durable than thermionic devices.

Eliminate the expense of vacuum tubes – No more costly vacuum tubes to replace. Ever.

Avoid damage when there's a short circuit – CFI design is "short circuit proof", meaning no damage will occur when coil and tube touch or create an arc.

Enjoy easy access – RF inverter and power supply cabinet doors are fitted with lift-off hinges for easy access in tight spaces.

## HF Inverter

Short-circuit, damage proof technology ensures reliable operation through coil arc-overs, minimises trip-outs and is not damaged by short-circuits.

AutoMatch™ Automatic Load Match System ensures maximum welder efficiency and consistent weld frequency for low-cost operation and repeatable tube and pipe quality without operator adjustment.

High-frequency, high-power capacitor bank delivers high power with low voltage to minimise arc-overs and enhance reliability.

Water-cooled, high frequency module pairs minimise total power loss in case of module fault and reduce time required for maintenance.



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High-current, low-voltage CFI technology achieves frequencies to 400kHz and above, the industry's broadest range.

Encapsulated coil holder and shrouded output minimises downtime by protecting against mill contaminants. Reduces weld area maintenance.

### DC Power Supply

Compact, sealed power supply cabinet may be located separately from the HF inverter to conserve space, without power loss even over large distances. Removable doors and internal lighting enhance ease of maintenance.

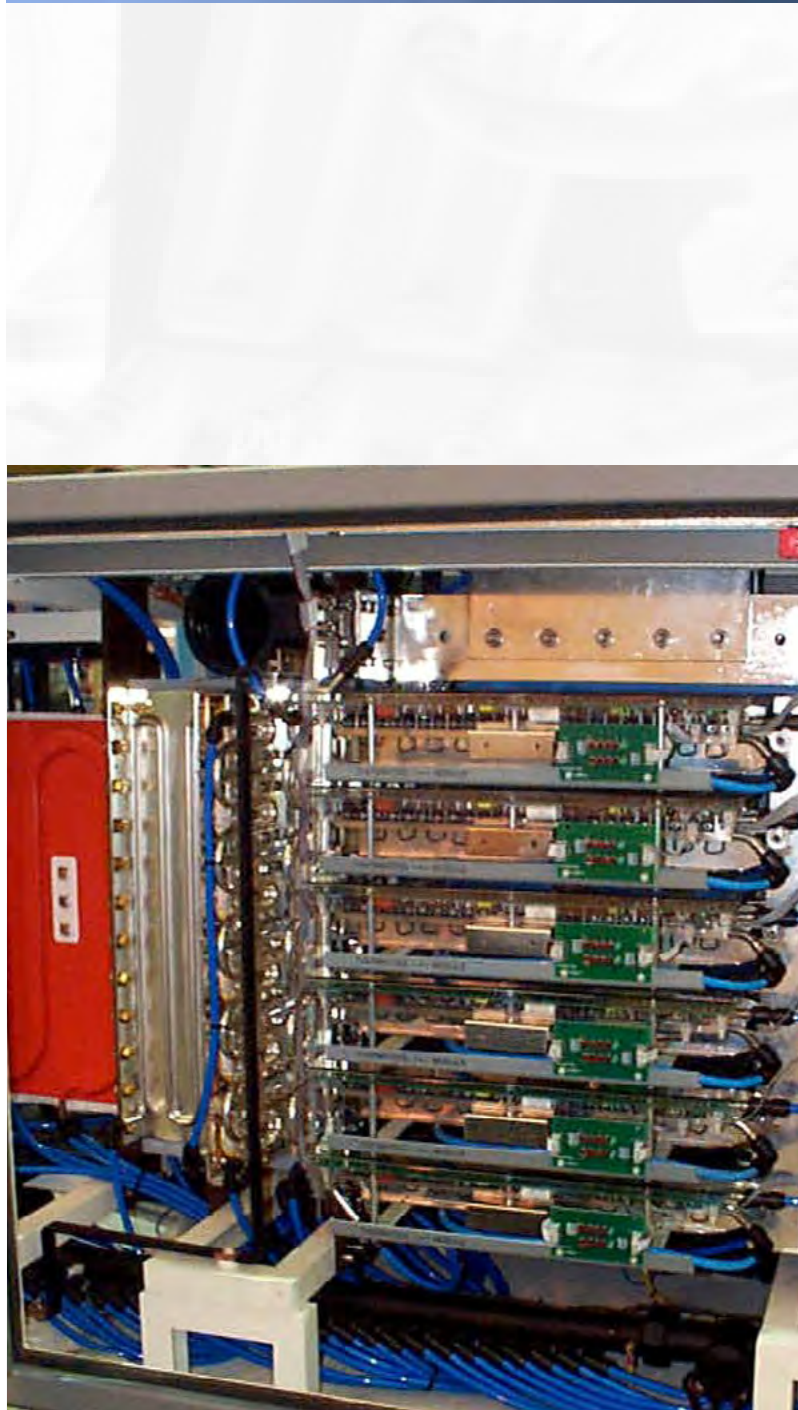
Automatic speed/power control system adjusts weld power for mill speed changes and minimises unwelded tube when mill is started and stopped.

Programmable Logic Controller (PLC) provides flexible interfaces of customer signals and fault diagnostics for rapid repair, minimising downtime.

Thyristor (SCR) power control / stabiliser provides constant output power for consistent weld quality.

Low-ripple filter network minimises AC line harmonics to less than 1%, standard, to eliminate 'stitched' welds. Optional filters reduce ripple to less than 0.2% for welding stainless and non-ferrous metal.

Heavy-duty main power transformer provides reliable power output and long life.



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## THERMATOOL SOLID-STATE WELDERS WITH CFI TECHNOLOGY

Model #	RF Inverter			DC Power Supply			Cooling System		
	Rating (kW)	Nominal Frequency (kHz)	RF Enclosure	DC Power Supply Enclosure			Raw Water Flow @ 28°C (l/min)	Cooling System Enclosure	
CFI 50	50	400	RF 12	PS 1			56	HE 1	
CFI 80/8	80	800	RF 12	PS 1			110	HE 1	
CFI 100	100	400	RF 12	PS 1			110	HE 1	
CFI 100/6	100	600	RF 12	PS 1			110	HE 1	
CFI150	150	400	RF 12	PS 1			146	HE 1	
CFI150/6	150	600	RF 12	PS 1			146	HE 1	
CFI 200	200	400	RF 12	PS 2			203	HE 1	
CFI 250	250	400	RF 12	PS 2			240	HE 1	
CFI 300	300	400	RF 12	PS 2			312	HE 1	
CFI 350	350	300	RF 12	PS 2			330	HE 1	
CFI 400	400	300	RF 24	2 x PS 3			377	HE 1	
CFI 500	500	300	RF 24	2 x PS 3			468	HE 1	
CFI 600	600	300	RF 24	2 x PS 3			576	HE 1	
CFI 800	800	200	RF 32	PS 4 + PS 5			720	HE 2	
CFI 1000	1000	200	RF 32	PS 4 + PS 5			900	HE 2	
CFI 1200	1200	200	RF 36	PS 4 + PS 5			1040	HE 2	
Enclosure	Width (mm)	Depth (without output bus) (mm)	Height (mm)	Width (mm)	Depth (mm)	Height (mm)	Width (mm)	Depth (mm)	Height (mm)
RF 12	665	2250	1270	-	-	-	-	-	-
RF 12	700	2265	1870	-	-	-	-	-	-
RF 12	800	2900	2100	-	-	-	-	-	-
RF 12	800	2900	2190	-	-	-	-	-	-
PS 1	-	-	-	1795	880	2065	-	-	-
PS 2	-	-	-	2275	880	2065	-	-	-
PS 3	-	-	-	2400	880	2065	-	-	-
PS 4	-	-	-	2500	1000	2065	-	-	-
PS 5	-	-	-	2500	1250	2065	-	-	-
HE 1	-	-	-	-	-	-	876	760	-
HE 2	-	-	-	-	-	-	1680	1280	-

Standard Information  
 Output Power Rating into a Calorimetric Load  
 Ripple Less Than 1%  
 PLC Allen-Bradley, Siemens  
 Standard Input Voltages: 3 Phase - 380, 400, 420, 460, 575V (50/60 Hz)  
**VARIABLE FREQUENCY OPTIONS AVAILABLE**



Thermatool weld-area hardware for specific needs

Thermatool offers a wide range of options and accessories to help you accommodate application requirements and achieve the highest level of performance with your Thermatool solid-state welder.

## Induction coils

Thermatool offers four standard coil designs that provide correct nominal values:

Tubular coils for tube OD's from 0.5" to 1.2"  
(12.7mm to 31.7mm)  
Constructed from 0.250" or 0.375"  
(6.3mm or 9.5mm) copper tubing.  
Insulated with Teflon™ tubing

Banded tube coils for tube OD's from 1.315" to 2.25"  
(33.4mm to 57.1mm)  
Constructed from 0.375" (9.5mm) copper tubing  
with brazed band  
Insulated with epoxy paint.

Single-turn banded coils for tube OD's from 2.375" to 6.625"  
(60.3mm to 168.3mm)  
Constructed from 0.375" (9.5mm) tube to mount  
to coil holder.  
Insulated with epoxy paint

Split-type single-turn coils for tube OD's from 2.375"  
(60.3mm) upwards  
Constructed from durable copper sheet with  
brazed cooling pipes.  
Suitable for use with old solid-state welders of  
400kW and above, that utilise pneumatic coil  
clamping systems



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## Impeders

Variables such as tube and pipe size, material and welding speed place specific demands on the weld area, where the impeder plays a critical role in directing the flow of electrical current. Standard Thermatool impeder designs include:

### Through-flow impeders –

Constructed of epoxy glass, silglass or ferroglass, offering good, better and best performance at associated costs.

### Exposed ferrite flow-through impeders –

Exposed and prevents case burnout from weld heat and spume.

### Return flow-through impeders –

Recommended for jobs where inside of welded tube must be kept dry.

### Integral mandrel impeders –

Well suited for small diameter tubes where space is not available for a solid mandrel.

### Over mandrel impeders –

For use where more rigidity is required for internal scarfing and where adequate space is available.

### Impeder cluster assemblies –

For large diameter pipe; cost-effective means of placing necessary ferrite in large tubes without having to use expensive oversize pieces of ferrite.



## Welding Contacts

Thermatool offer two types of high-frequency welding contacts:

### Standard tip contacts –

Used in most welding installations

### Extended nose contacts –

For applications where large weld rolls prevent standard contacts from getting in close enough to achieve maximum efficiency.

Materials of contact tip construction include alloys of copper, cadmium, silver, tungsten, molybdenum, and carbide, enabling users to select the optimum tip for the tube or pipe being welded.

Different size tips are available depending on the application and several factors will determine this. For large tubes/pipes, for example, it is often more desirable to use a wider contact surface, to reduce unit pressure and mechanical wear.

## ThermaView graphical diagnostics system

The ThermaView diagnostics system is a microprocessor-based graphics package that gives mill operators a constant display of weld conditions, coupled with easy-to-use troubleshooting indicators. A powerful preventative maintenance tool, ThermaView often provides early warning of conditions which could result in system shut-down if not corrected.

When a welding system fault occurs, the location will typically be displayed on the welder diagnostics screen. The operator can then activate a screen showing real-time PLC analog input and digital input/output values. All equipment have associated help screens which describe the fault, possible causes, and corrective action to aid in troubleshooting.

Comprehensive system monitoring and displays help maintenance personnel isolate and diagnose faults quickly, often without opening cabinet doors, resulting in less downtime.

## ThermaSure™ weld temperature measurement and control system

To help maintain a consistent, high-quality weld Thermatool offers ThermaSure, non-contact weld temperature measurement and control system. ThermaSure monitors and reacts to fluctuations in weld heat in order to maintain a constant, pre-set weld temperature.

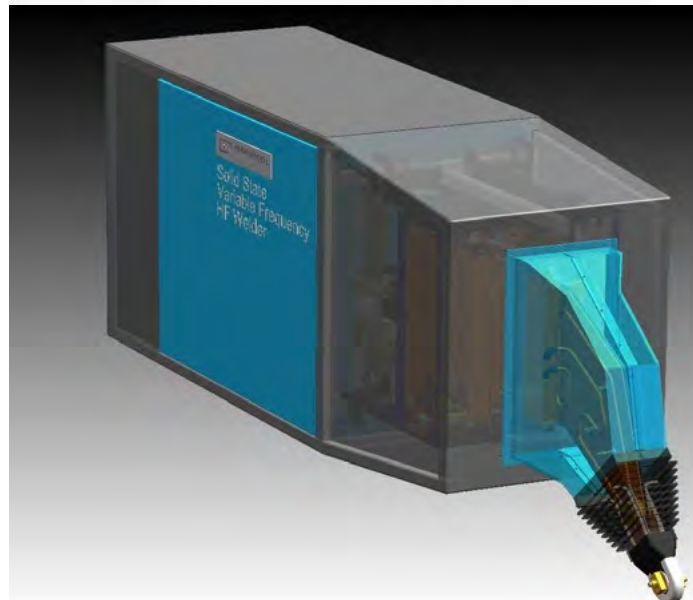
Using a two colour, radiation-type optical pyrometer, the system provides a fast response - within 15 cycles – to normal mill changes, resulting in a deviation of no more than +/- 20 C from the pre-set temperature. ThermaSure also maintains a permanent chart record of weld temperature, including percentage of power delivered to the coil or contacts throughout the production run.

## Selectable stabilised variable frequency

The speed and ease at which you can select a frequency from the operator console, and the ability of that frequency to remain constant throughout operation, ensures that Thermatool's selectable stabilised variable frequency maximises uptime, while enabling a wide range of products to be handled on the same mill.

## Bus lead cover

Manufactured from the highest quality materials, Thermatool bus lead cover all but eliminates the build-up of dirt around the output which causes arc outs. Field retrofitable in minutes, the unit minimises downtime and maintenance costs while reducing exposure to live surfaces.



## PERFORMANCE YOU CAN RELY ON. SERVICE YOU CAN DEPEND ON.

Repair and maintenance are major considerations when investing in a new piece of welding equipment. That's why, at Thermatool, we believe in after-sales service whenever and wherever you need it, for as long as you need it.

We operate the largest service operation in the welding sector, with over 40 direct service engineers strategically located around the world. It's how we provide 24-hour, 7 days a week, 365 days a year support that's unique to the industry.

It's why you can depend on our service as much as you can rely on our machines.

### We're there when you need us, where you need us

Problems don't keep office hours. So neither do we. Because many welding operators work shifts or around the clock, so do we. Also, because we have welding equipment installed all over the world, we're on hand all over the world.

Call our 24-hour hotline and you'll get straight through to a qualified, experienced Thermatool engineer. If you've called before, chances are you'll get through to the same engineer, to ensure continuity of care and service, and in-depth knowledge of your specific equipment and service history.

Most of the time (in approximately 80% of cases) the engineer will diagnose the fault and give guidance to effect the repair immediately, by telephone. That's not only due to our engineers' experience, but also to the innate serviceability of our machines.

However, if a repair requires on-site assistance, we'll have an engineer on a plane to you at a moment's notice. We have service personnel located in North and South America, Europe and Asia, so when you need them you can be sure they will be there within 24 hours, or – usually – less.

To make it less likely that you'll need to call us in an emergency, we offer preventative maintenance visits by our service engineers, to keep your equipment performing at its best.

### Parts while-you-don't-wait

When your welder's not working, it's not a welder; it's a major investment earning no return. So we build our welders to keep working, and – should you ever need an essential replacement part – we ship it to you as fast as possible.

Thermatool offers three levels of delivery depending on the level of urgency:

#### Standard Delivery Service –

For when you need parts but not in a hurry. Standard delivery will have the parts with you within 5 working days. Ideal if you are stocking your inventory or have scheduled maintenance in the near future.

#### Overnight Delivery Service –

For parts required next day, we'll ship them by overnight delivery by courier. If your order is placed before 3pmEST, Monday to Friday, you'll have it by 10:30am the following day.

#### Next Flight Out –

Our next flight out delivery service puts your part on the next available plane to your area – day or night – so you get your part as fast as humanly possible.



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## We never stop learning – or training

With 3% of our annual revenue invested in research and development every year, we are continually learning more about the use and maintenance of existing technology, and constantly developing new methods and new technology.

As part of our service to our customers, we make sure we share everything we learn that could be of use in improving efficiency, productivity and profitability.

Operators of new installations or upgrades receive comprehensive start-up training, as well as safety audits to identify and correct unsafe areas or procedures. We also provide training seminars at our East Haven and Basingstoke facilities, and on-site at customer locations.

## The full story

We provide the most comprehensive welding equipment service support in the industry. We also provide training to help you operate your machines efficiently and maintain them effectively. Because we always go further to satisfy our customers, we even compile and print extensive technical documents for all our machines.

Containing detailed drawings of the equipment – with every component featured – together with important technical information such as electrical ratings, the documents are more than just operators' manuals. They're a valuable resource to help you and your Thermatool welder work in profitable partnership for many years to come.

We also publish the "High Frequency Pipe and Tube Welder Guide", an indispensable handbook for tube and pipe producers, from the industry's most experienced and respected equipment manufacturer, with the most comprehensive database of tube and pipe welding information in the world.

## Thermatool Service Summary

1. World leader in service & support for the welding industry.
2. Unrivalled 24/7/365 worldwide availability of over 40 direct service engineers.
3. Free 24-hour technical service hotline – 80% of all calls successfully resolved on-line.
4. Service facilities in North and South America, Europe and the Far East.
5. Well-equipped service departments with modern test and diagnostics facilities.
6. Preventative maintenance visits to the vendor site by our service engineers.
7. Technical training seminars for customer personnel at Thermatool or customer's factory.
8. Designated service territories so each customer has a personal service engineer who is aware of the customer's equipment, applications and technical history.
9. Extensive customer support base including engineering, design, R&D and marketing departments.
10. World leader ion HF welding equipment for tube and pipe industry, with more years of combined experience in all aspects of tube and pipe manufacturing than any other company.

## 24-Hour Direct Service Hotline

In the Americas, Far East and Australasia:

- (USA) Phone 001 203 468 4252

In Europe, Africa, Near and Middle East:

- (UK) Phone 0044 (0) 1256 335533



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**INDUCTOTHERM  
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Leading Manufacturers of Melting, Thermal Processing and  
Production Systems for the Metals and Materials Industry Worldwide.

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