





Welcome to a world of **thermal solutions** !



WattMobil



ThermalPower



QuickCheck



FlowMaster

Guillaume LEVACHER
President

Who are we ?

Lethiguel is a French company specializing in providing thermal technologies, solutions and services for the global light-metal casting industry. The family business was founded by my living father Michel Levacher in 1976, initially distributing furnaces and machine tools for the French metal casting industries.

Throughout our company's history, we have shown dedication and commitment to our customers, carefully listening to their needs while looking closely at the evolution of the industry. We believe that our capacity to adapt to changes, our long-term approach and our appetite for innovation has enabled us to grow from a local actor to a global group, exporting today 85% of our sales.

Our team is multicultural: we have over 14 nationalities and speak 13 different languages; this great asset allows us to promote a very open-minded approach in driving our globalized business.

With our HQ based in France, and international offices in Germany, Japan and Canada, we serve our customers globally with a strong local presence.





Heating solutions

- 6** Thermal Power ® heater
- 8** L-Type Thermal Power ® heater
- 10** WattMobil ®
- 12** Quickcheck ®
- 13** Air Thermal Power ® heater
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Thermal Power ® heater



Advantages of immersion heater

Heating efficiency >99%

30 to 40 Watts per cm²

Power up to 50kW

Energy savings up to 50% compared to traditional heating methods*

Temperature regulation +/-2°C (+/- 36°F)

Fast and smooth heating

Quick installation, easy maintenance

**Gas burner, SiC heater, heating lid, heating rods*

Powerful Savings. Are you holding molten metal in casthouse, foundry or recycling plants? With TP® heater, be prepared to save energy and time while improving your metal quality and increasing your productivity. The TP® heater is an electrical heating system, specially designed to hold and raise non-ferrous metals. It is intended to be immersed into liquid metal. The thermal power is directly brought to the heart of molten metal through conduction.

Extensions range

Four types of extensions available in our immersion heating product range. Possibility to attach a Quick-Type multipin connector to any cabled extension.

Each type of extension can be elbow shaped, as an option:



Terminal Box Type



Cabled Type



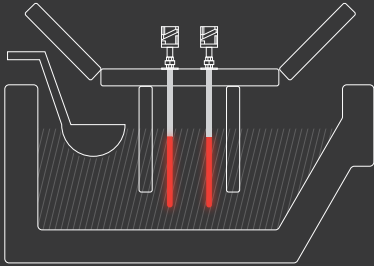
Quick Connector Type



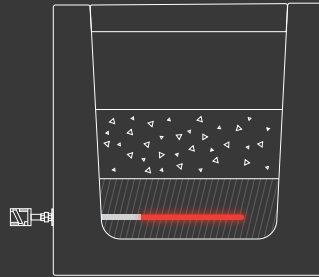
Cabled Type + Elbow option

Main applications

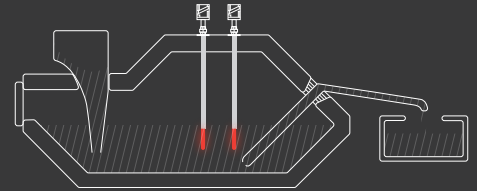
1 Holding furnace



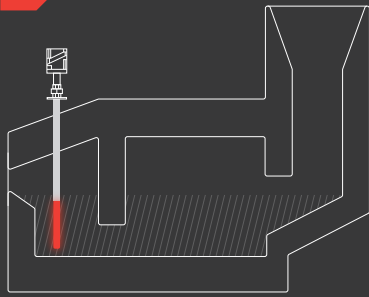
2 Filtering box



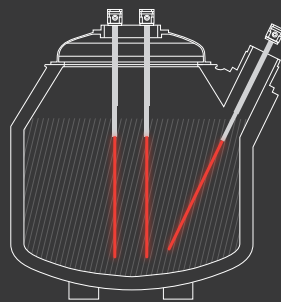
3 Dosing furnace



4 Melting furnace



5 Transport ladle



I-Type 55 in 300kg holding/melting furnace



L-Type Thermal Power® heater



Advantages of L-type immersion heater

Heating efficiency >99%

Suitable for shallow metal levels

Energy savings up to 50% compared to traditional heating methods*

Temperature regulation $\pm 2^{\circ}\text{C}$ ($\pm 36^{\circ}\text{F}$)

Fast and smooth heating

Quick installation, easy maintenance

The L-Type Thermal Power® heater is quick to install, and delivers best metallurgical quality by regulating the flow temperature with a $\pm 2^{\circ}\text{C}$ accuracy. It is specifically designed for shallow bath levels.

Extensions range

Four types of extensions available in our immersion heating product range. Possibility to attach a Quick-Type multipin connector to any cabled extension.

Each type of extension can be elbow shaped, as an option:



Terminal Box Type



Cabled Type



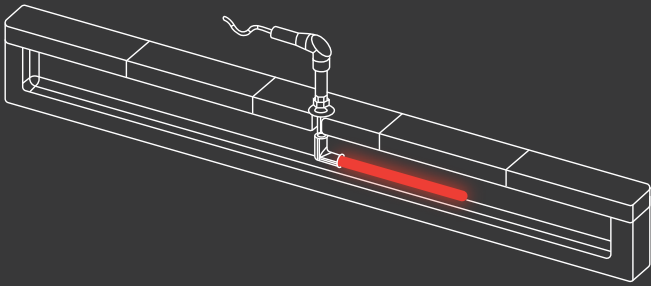
Quick Connector Type



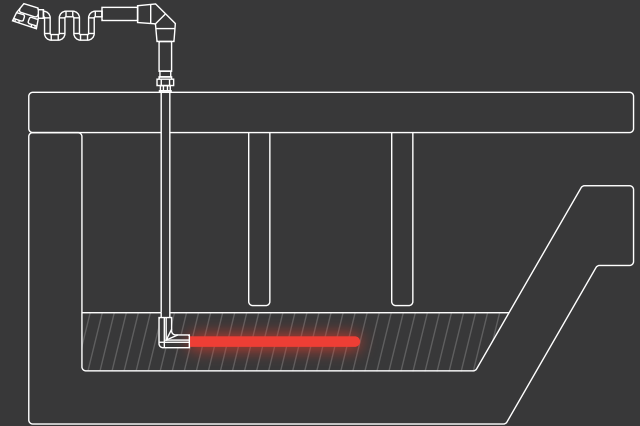
Cabled Type + Elbow option

Main applications

1 L-Type in transfer launder



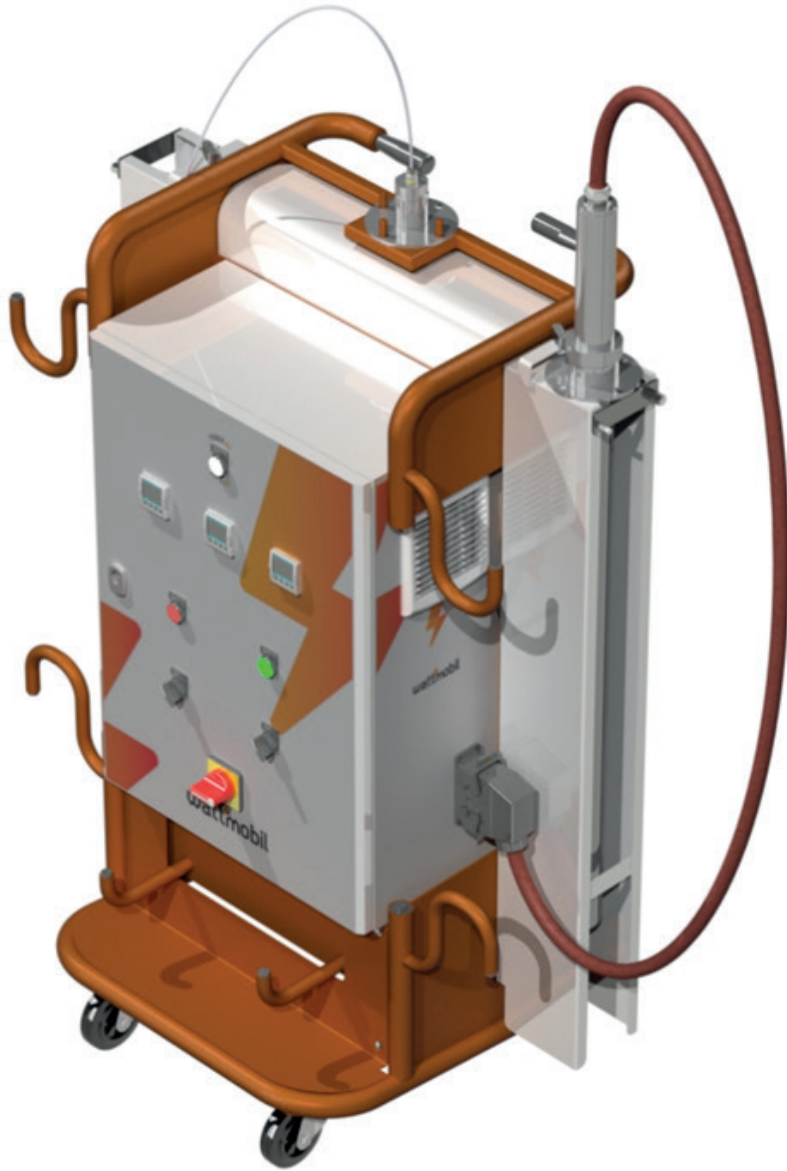
2 L-Type in holding Furnace



Using an immersed heating system is the most efficient way to precisely monitor and manage the aluminium bath temperature, and therefore take control over your metal quality, your productivity, and your energy savings.



WattMobil®



Watt Mobil® is designed to help in the following situations:

- Furnace maintenance
- T° rising and monitoring
- Furnace breakdown
- Degassing time
- Weakened furnace performance

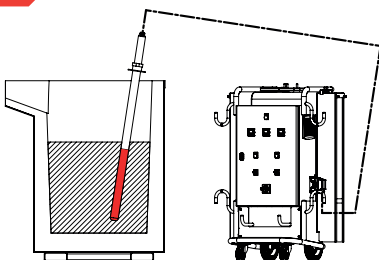
Designed according to foundry required standards, the WattMobil® is the perfect concentrate of an electrical high efficiency heating rod, or immersion heater, and a dolly with an integrated electric control cabinet.

Forwarding the power straight in the heart of molten metal, a WattMobil® ensures both efficient maintaining and rising of the temperature, using 99% of Immersion heater power dissipation.

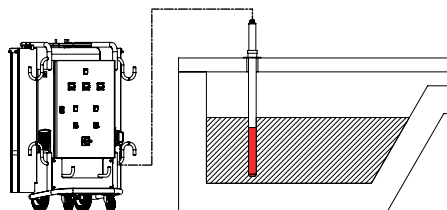
Continuous use allows relief of furnace heating roof, thus helping to notably save energy, reduce oxydation of the bath and eliminate the accumulation of corundum.

Main applications

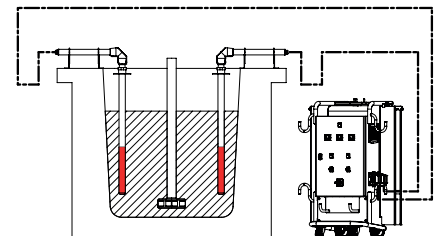
1 Transport Ladle



2 Furnace Maintenance



3 Degassing Time



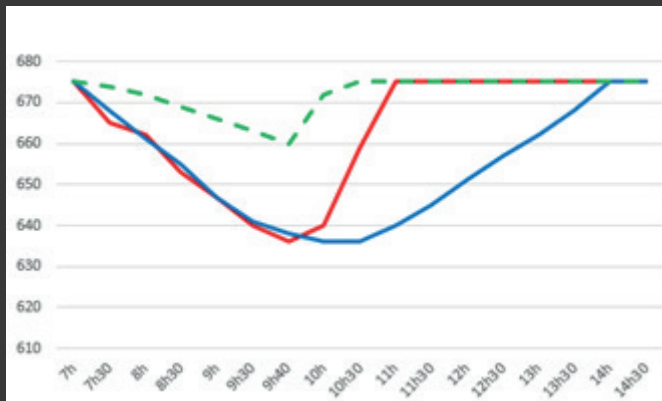
Case study

Current issue:

A furnace maintenance for aluminum in high pressure diecasting foundry. The furnace undergoes on a heating vault's maintenance. Once the maintenance is completed, it takes 4h to heat up to the casting temperature (675°C)

Furnace's info:

- Furnace capacity: 1500kg
- Casting Temperature: 675°C
- Furnace's type: Heating Rods



- With WattMobil, started at 9.40am
- Without WattMobil
- With WattMobil, started from the beginning



The WattMobil is available with I-Type 55, 850 or 1050mm under flange.

Lethiguel Solution:

WattMobil with a Thermal Power Heater of 14kW
The heater was started at 9.40am from 636°C

Results:

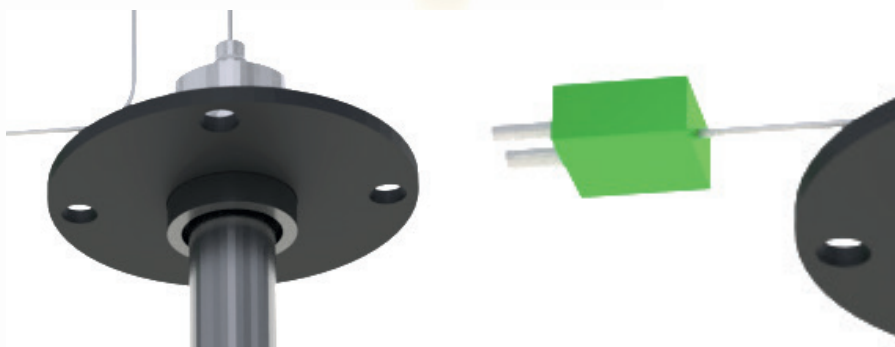
It took 1 hour 20 mins to reach casting temperature and restart production.
Compared to existing solution, the WattMobil reduced the maintenance time by 2 hours and 40 mins

Suggestions:

By using the heater while performing the maintenance, we could reduce the temperature drop and restart the production sooner.



Quickcheck®



Quickcheck® is the perfect add on to Thermal Power® heater applications like Alclean furnaces, Twiga heating stations and WattMobil solutions.

Product advantages :

Instant T° measuring response. Even at start-up

Internal K-Type Thermocouple removable

One or two measuring points in one device

Long-life thermocouple: we guarantee the sheath for 12 months (observed lifetime of over 2.5 years)

Length under flange available from 650mm to 1300mm

Non wetting SN sheath

Long life thermocouple with instant response

Extremely high temperature is required to be maintained for the melting, refining and alloying of aluminum, so it requires the application of Quickcheck technology. Accurate and instant measurement of temperature in furnaces are needed for process control to improve product quality and production efficiency. Thermocouples are required for use in molten aluminum baths, especially where there are rapid temperature fluctuations. A quick check thermocouple prevents from temperature drop in the molten aluminum bath and greatly contributes to energy savings.

Air Thermal Power ® heater



Product advantages :

Wide range of power: 2-20 kW

High maximum temperature:
950°C

Smooth and fast pre-heating:
no overheating

Suitable for any extensions

Available in any power supply
specifications

Compatibility with AI Clean range,
Twiga and WattMobil

Air Thermal Power heaters are Lethiguel's solution ladle for furnace pre-heating. Based on years of experience in conductive electrical heating elements for the aluminum industry, we designed this powerful air heater for a quick pre-heating of all containers.



Make sure your transport ladles and holding furnaces are ready for action in no time with the Air Thermal Power heater!



CERAL[®]

Silicon Nitride Products for demanding operating conditions

MELT HIGH METALLURGICAL QUALITY PARTS

Silicon nitride ceramic will help you cast higher quality parts.

SAVE MONEY AND TIME

No need to adapt Silicon Nitride equipment to alloy thanks to SN's inertness property.

REDUCE HANDLING WEIGHT

SN ceramic tubes are lighter than iron tubes, making handling easier and safer for operators.



Ceral

High standard SN products around the Globe with following characteristics

Item	Material	Unit	Silicon Nitride	Silicon Nitride
CERAL			<i>Ceral-N</i>	<i>Ceral-S</i>
<i>Bulk density</i>		<i>g/cm³</i>	<i>3.2</i>	<i>3.2</i>
<i>Water absorption</i>		<i>%</i>	<i>0</i>	<i>0</i>
<i>Flexural strength</i>		<i>MPa</i>	<i>750</i>	<i>1050</i>
<i>Young modulus</i>		<i>Gpa</i>	<i>280</i>	<i>290</i>
<i>Fracture toughness</i>		<i>MPa - m^{1/2}</i>	<i>6.5</i>	<i>7</i>
<i>Poisson's ratio</i>		<i>-</i>	<i>0.28</i>	<i>0.28</i>
<i>Vickers hardness</i>		<i>Gpa</i>	<i>15</i>	<i>15</i>
<i>Coefficient of linear expansion</i>		<i>x10⁻⁶°C</i>	<i>3.4</i>	<i>3.5</i>
<i>Thermal conductivity</i>		<i>W/(m - k)</i>	<i>28</i>	<i>32</i>
<i>Specific heat</i>		<i>J/(g - k)</i>	<i>0.65</i>	<i>0.65</i>
<i>Volume resistivity</i>		<i>Ω - cm</i>	<i>>10¹⁴</i>	<i>>10¹⁴</i>
<i>Thermal shock resistance Δ*</i>		<i>°C</i>	<i>800</i>	<i>900</i>
<i>Maximum operation temperature</i>		<i>°C</i>	<i>1150</i>	<i>1150</i>

Proper use instructions

Store in dry atmosphere before use.

Preheat before heating the cold furnace.

Gradually heat up/ cool down material - avoid abrupt cooling and heating.

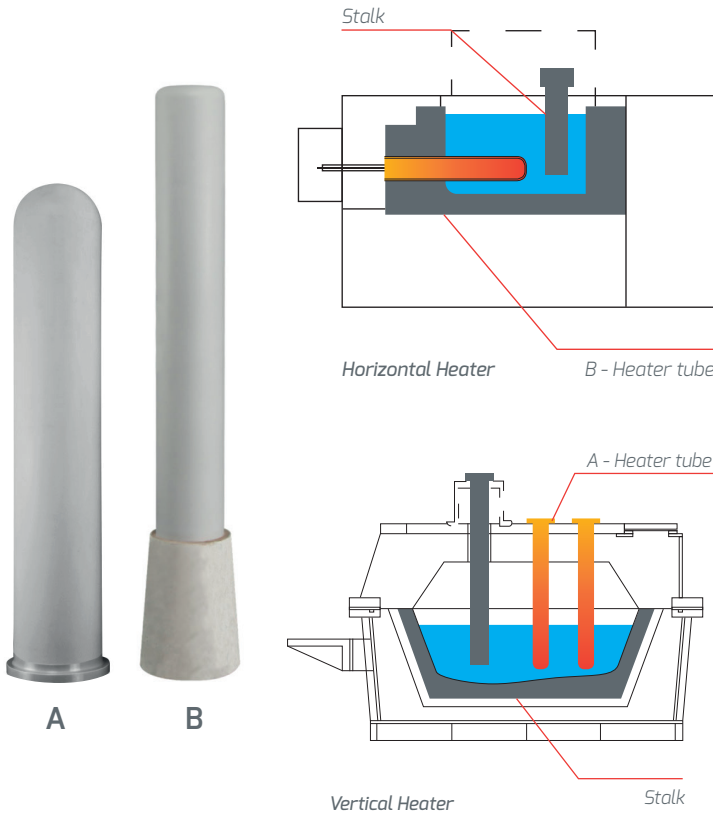
Handle with care.

Keep under regular maintenance in order to enhance lifetime.

CERAL offers a whole range of technologies & designs upon specific demand, and provides relevant usage instructions.

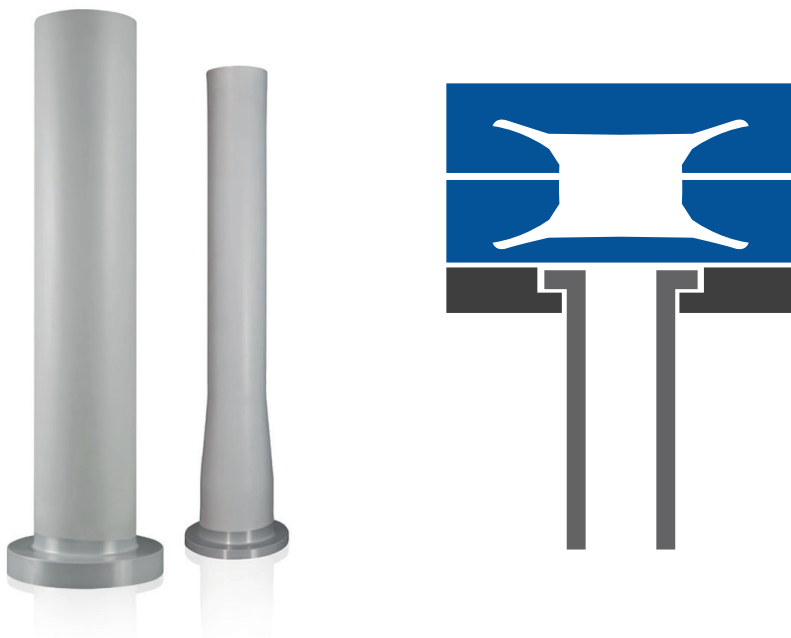
Ceral

Protection tube



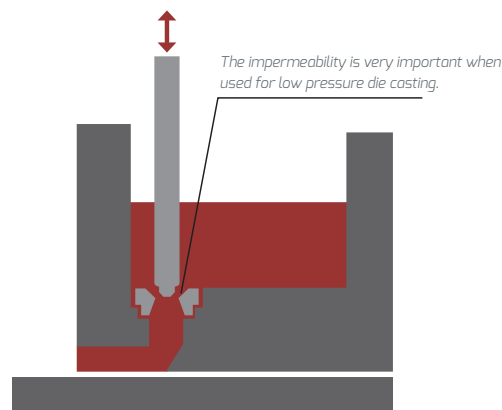
CERAL silicon nitride ceramic has the best thermal conductivity when used for aluminium melting applications. Even though there can be a temperature difference between the tube and the aluminium solution in some harsh environments, the heater protection tube will work stably. Regarding its lifetime, it can be used for many years with correct operation environment and regular maintenance.

Stalk for low pressure die casting



CERAL silicon nitride ceramic stalk has an excellent corrosion resistance for LPDC applications. It has remarkable heat-retaining properties, so that the heat loss is reduced to a minimum. The stalk can be used for many years if kept under regular maintenance. CERAL offers a whole range of technologies & designs upon specific demand, and provides relevant usage instructions.

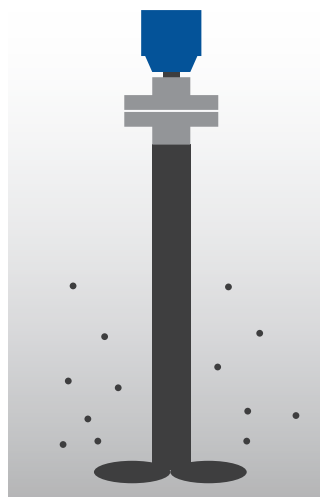
Stopper pipe



CERAL silicon nitride ceramic has high density and abrasion resistance; it is the most suitable material for low-pressure die-casting. The stopper pipe has the most favorable properties: toughness, non-wetting with excellent design precision. The stopper pipe can be used for many years if kept under regular maintenance.

Non-wetting property is very important when used in low-pressure die casting applications.

Degassing pipe and rotor



CERAL silicon nitride ceramic has high density and abrasion resistance, it is the most suitable material used for degassing pipe and rotor shaft.

CERAL silicon nitride rotor shaft shows an exceptional corrosion and oxidation resistance compared with other products. It ensures high hydrogen removal efficiency. The rotor shaft can be used for many years if kept under regular maintenance.

The efficiency of degassing varies according to the rotor shape and other conditions. We sell the most suitable rotor according to one's environment.

Al Clean



On demand
and 100% customizable



Product advantages :

3 furnace sizes Al Clean 6500,
Al Clean 3500 and
Al Clean 1500

Low energy consumption,
High heating speed

High aluminium quality

Integrated degassing

Advanced monitoring for
preventive maintenance

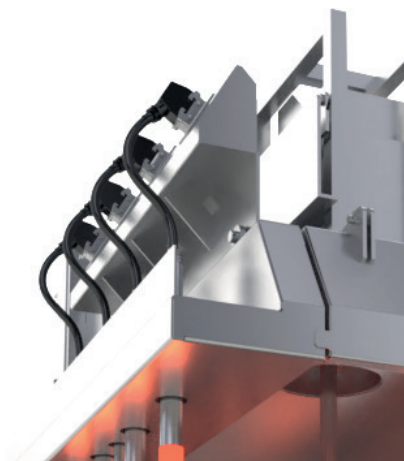
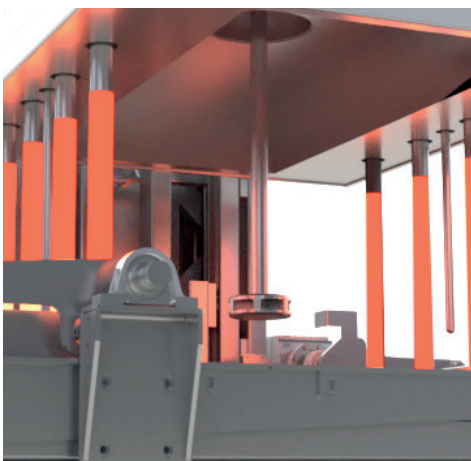
Easy maintenance

Al Clean is Lethiguel aluminium holding furnace line. Designed to optimize aluminium quality and energy consumption, Al Clean uses the most efficient heating system on the market to combine a very low average energy consumption and a high heating speed. Mounted with Lethiguel ThermalPower® immersion heaters, Al Clean optimizes aluminum quality.

As a result of years of field experience, Al Clean's design reduces operation time and allows a very efficient preventive maintenance.

Al Clean is the asset for holding aluminum in HPDC or gravity die casting. It combines energy saving and high heating power.

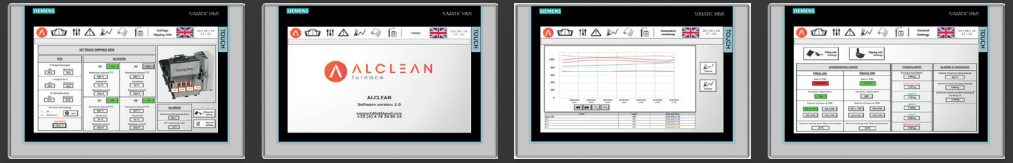
Increase quality and efficiency with Al Clean!





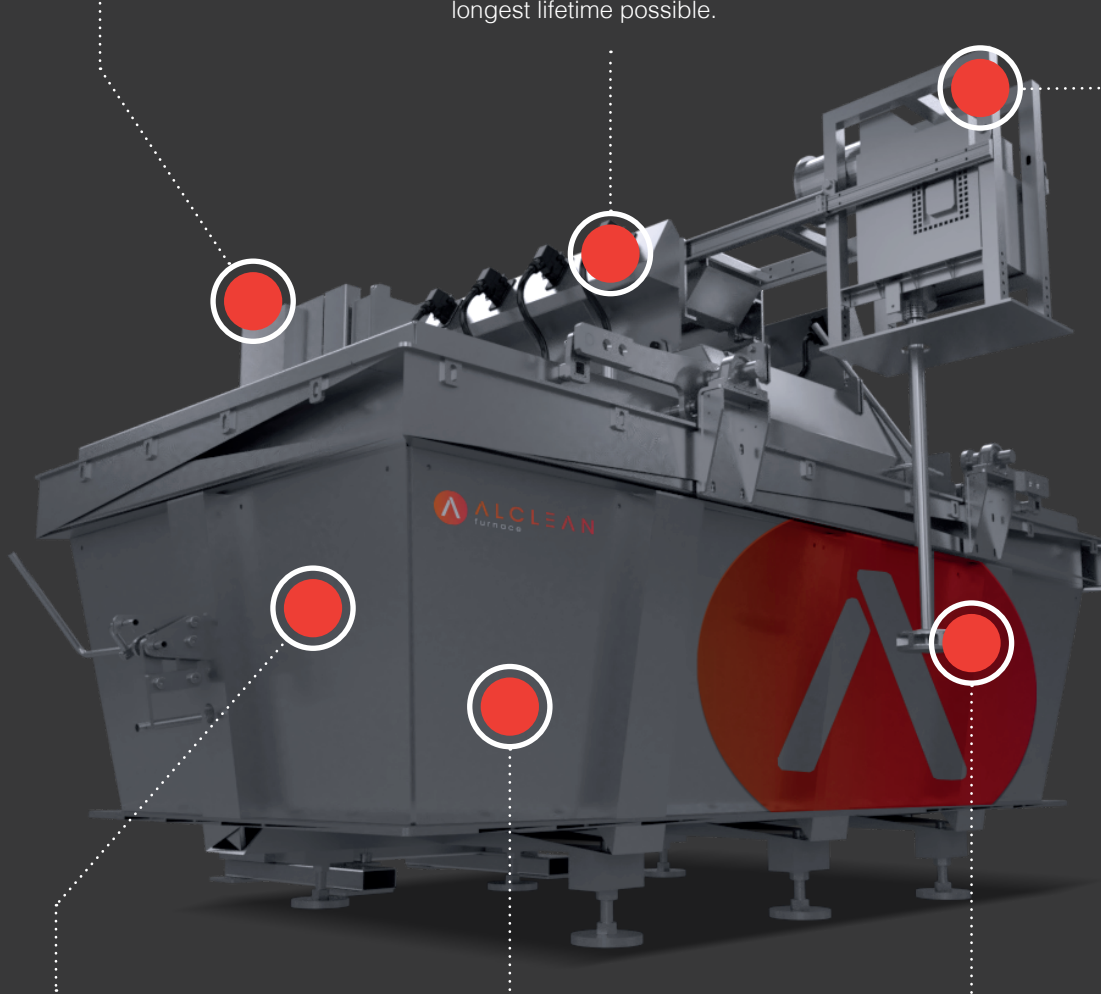
Al Clean

Smart regulation, deep monitoring, easy handle and intuitive usability with Siemens Comfort TP1200. Monitored data exportable on USB flash drive.



Customized Thermal Power Heaters ® based on power needs, metal temperature and power supply to ensure maximum heating power and longest lifetime possible.

Easy maintenance with a user friendly position for rotor changes and repairs. Safety and ergonomic position for a quick maintenance.

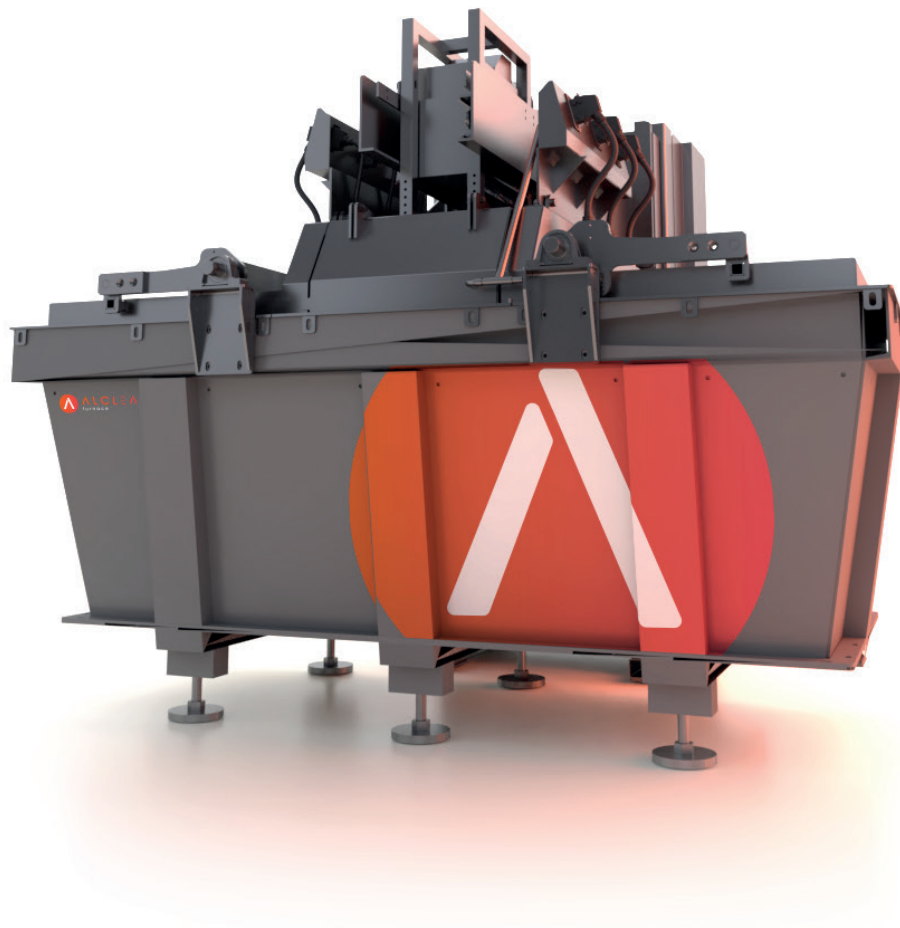


Ergonomic design for operation, cleaning, and sampling with a user dedicated side giving easy access to heaters, thermocouples, and all aluminum baths.

High quality refractory and insulation material for a low wall temperature (<math><55^{\circ}\text{C}</math>) and low convection power loss.

Integrated degassing: All in one solution for an optimized casting process.

Model	6500	3500	1500
Industry	Gravity die casting	Gravity die casting and HPDC	HPDC
Metal	Non ferrous (Aluminum, Zinc, ...)		
Weight	6500kg	3500kg	1500kg
Power supply	60V to 600V - Mono / Tri		
Heating power	Up to 145 kW	Up to 95 kW	Up to 60kW
Metal temperature	Up to 780°C		
Monitoring	Furnace temperature / Heater temperature / Heater lifetime / Heating cycles / Energy consumption		
Usability	Siemens PLC / TP 1200 Comfort HMI		
Degassing (Option)	Rotor / Nitrogen	Rotor / Nitrogen	NA
Availability	Available	Available	On demand



Customized furnaces

Technical specifications :

Capacity: 6500Kg

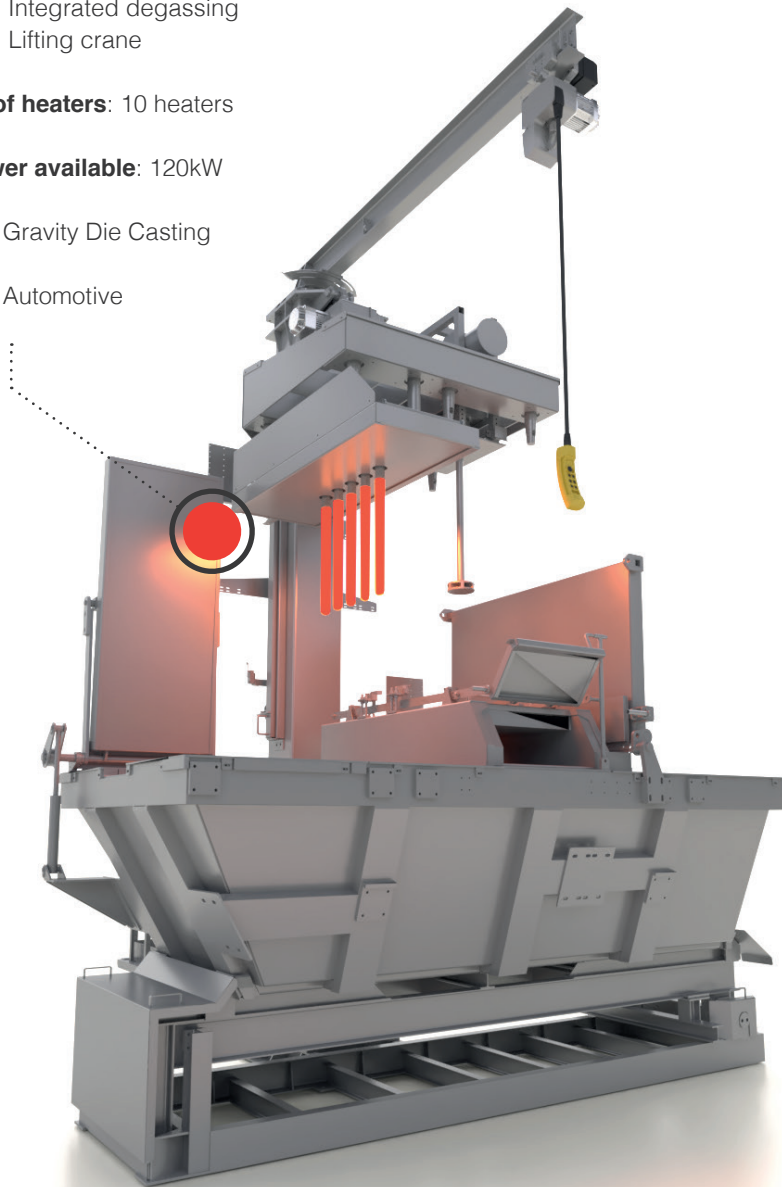
Features: Integrated degassing
Lifting crane

Number of heaters: 10 heaters

Total power available: 120kW

Casting : Gravity Die Casting

Industry: Automotive



For :

High pressure die casting,

Low pressure die casting,

Gravity die casting

Quality, efficiency, precision

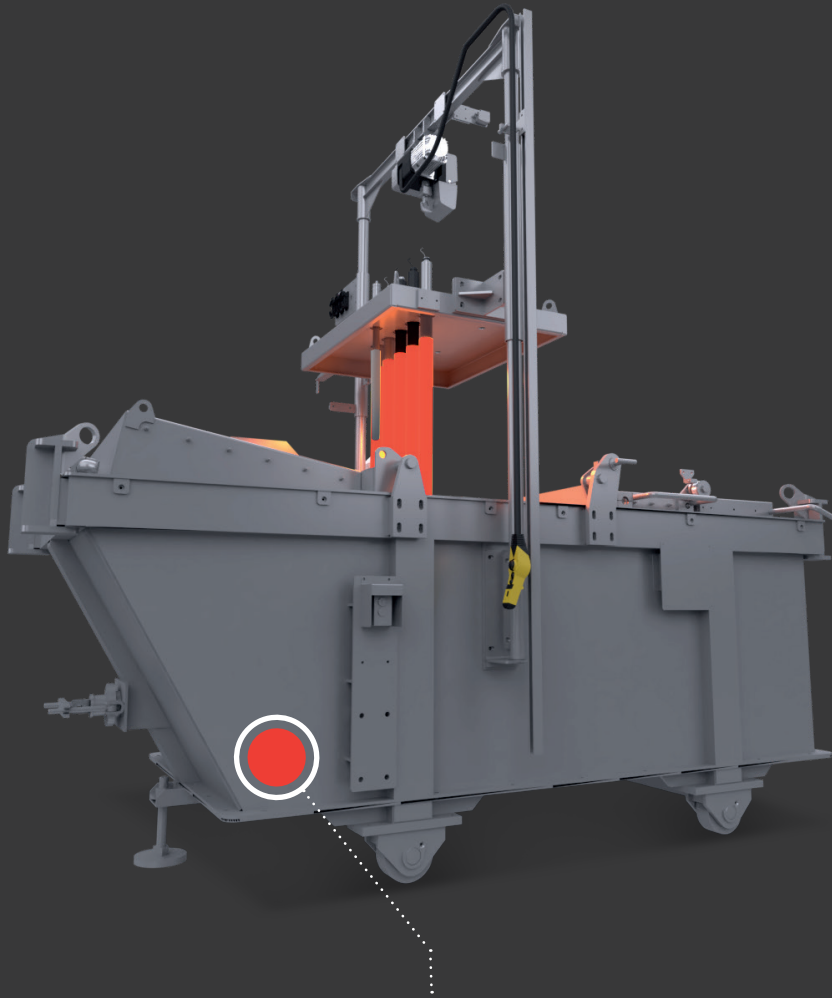
Lethiguel designs and sells fully-customized furnaces, built around immersion heating technology, with or without an embedded degassing system. The useful capacity, thermal performances and immersion heater positioning are specifically designed for each customer.

Thanks to Lethiguel's savoir-faire, our immersion heating furnaces help reduce energy consumption and improve metal quality. Using heaters in a furnace boosts temperature rising while avoiding oxides. When used with a degassing system, immersion heaters ensure an optimum metal quality and density.



Lethiguel delivers not only a furnace, but a turnkey solution that can be instantly integrated in your casting process.

Field illustrations:



Technical specifications :

Capacity: 3800Kg

Features: Lifting hoist

Number of heaters: 5 heaters

Total power available: 75kW

Casting : High Pressure Die Casting

Industry: Automotive

In the past few years, more and more customers have been seduced by our core heating system, the Thermal Power Heater ®. Working together with our clients we co-designed customized furnaces in order to meet very specific technical specifications from industries that require increased quality and low energy consumption.

Our engineering team is always available to design the best solution based on your unique technical specifications.

**Our team
is yours,
challenge us!**

Twiga



Product advantages :

- Ladle size from 300kg up to 5T
- 2kW to 60kW heating power
- Degassing available
- Advanced monitoring available
- Compact design: only 1,80m in low position

Twiga is the newest Lethiguel aluminium heating station. Designed to optimize the working space and energy consumption, Twiga can be adapted to any kind of transport ladle and can be offered with degassing system thanks to an adaptive cover holder. Mounted with Lethiguel ThermalPower® immersion heaters, Twiga allows a high heating speed and low heat loss.



Twiga is the answer to process optimization using heating station. It combines energy saving and high heating power.

Save time, space and energy with Twiga!





Key Benefits

Save space and energy

Based on years of field experience, it is designed to optimize the working space, thanks to a compact geometry (only 1,80m in heating position), and energy consumption, with a smart regulation system providing just the necessary power.

Boost your Twiga using Thermal Power heaters ®

Mounted with Lethiguel Thermal Power® immersion heaters, Twiga allows a high heating speed and low heat loss with a temperature raise based on your process needs (up to 150°C/hour). The smart regulation system is specifically designed to use 100% of Thermal Power Heaters ® potential, while providing them with a controlled environment for long lifetime.

A customized standard solution

Twiga can be adapted to any kind of transport ladle and be mounted for degassing thanks to an adaptive cover holder and customized cover to implement customized immersion heaters.

The quickest way to use degassing

Using Twiga mounted with our degassing system and heating solution is the best way to ensure both aluminum quality management and temperature control.

Smart, Accurate, Efficient!

Quick heat raise
Heating power up to 75kW

No metal quality loss
No overheat with Thermal Power Heater ®

>98% heat efficiency
Heating only the aluminum with Thermal Power Heater ®

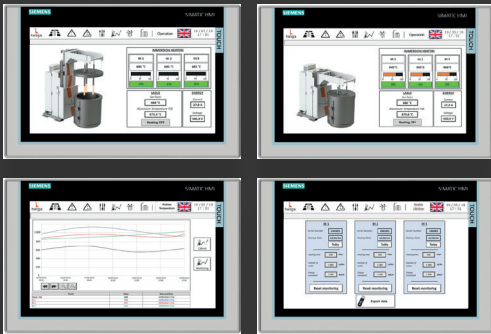
+/- 1°C temperature control
Smart heat regulation

Compact design
Only 1,80m high in heating position

Technical Features

Metal (Aluminum, Zinc, ...)	Non ferrous (Aluminum, Zinc, ...)
Ladle size	Up to Ø 2000mm wide and 2000mm high
Power supply	From 300kg to 5000kg of metal
Heating power	60V to 600V - Mono / Tri
Metal temperature	Up to 75 kW
Configuration	Up to 780°C
Monitoring	1, 2 or 3 Thermal Power Heaters ® Degassing system available (with 2 heaters max)
Usability	Ladle temperature / Heater temperature / Heater lifetime / Heating cycles / Energy consumption
Degassing (Option)	Siemens PLC / TP 1200 Comfort HMI
	Rotor / Nitrogen

Overview



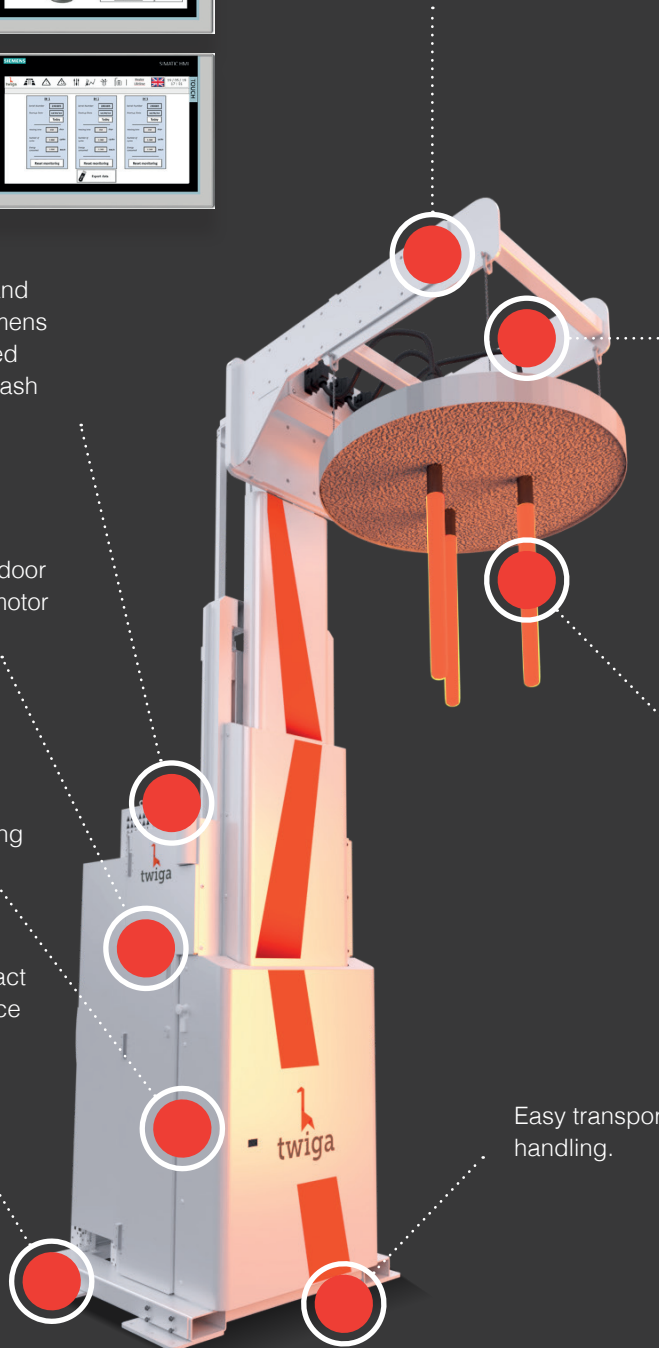
Adjustable cover holder suitable with wide range of ladle (Up to 5000kg). Customized cover fitted to the ladle to ensure thermal sealing and minimum heat loss.

Smart regulation, deep monitoring, easy handle and intuitive usability with Siemens Comfort TP1200. Monitored data exportable on USB flash drive.

Easy maintenance with a door access to lifting system, motor and sensors in the back.

Safety features with ladle detection sensor for heating control.

Easy fit thanks to a compact geometry with a floor space of 1600 x 1200 mm² and minimum height of 1,80m.



Easy access to heaters, thermocouple and electrical connections.

Customized Thermal Power Heaters[®] based on power needs, metal temperature and power supply to ensure maximum heating power and longest lifetime possible.

Easy transport with forklift handling.

Twiga is designed to be optimized by using Lethiguel heating solutions:

- Thermal Power Heaters[®]** for an optimum heating power in metal
- Quickcheck[®] thermocouple** for a reliable measurement and regulation control
- Air Thermal Power Heater[®]** for an efficient ladle pre-heating process in the air

Al Serve



Liquid metal transfer with a sealed ladle offers an important safety during transits (no splashes) and drastically brings down the oxide and dross formation.



Potential metal savings range from 6 to 9 kg per ton (estimation based on field evaluations in European foundries)



Filling of transfer ladle generates an average of 5.2 kg/Ton of oxides with standard pouring system, down to 0.9 kg/Ton with Al Serve vacuuming system.

Vacuum filling and pressure dosing system for molten aluminium

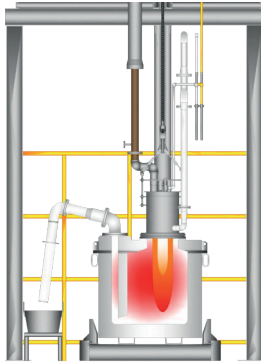
The Al Serve System was developed by HOEI METAL Co., Ltd and is distributed on selected markets by Lethiguel. This system, incorporating a transport ladle, enables in-plant transportation of liquid aluminium and holding furnace refilling operations.

Overview of the pressure dosing system

Molten aluminium is transferred from a melting furnace into a dedicated pressurizing transport ladle and then to any die casting machine without any contact with air.

Pressure dosing system can be embedded on forklift or not, several configurations are available to arrange the right solution in the right place, for the right application.

4 STEPS

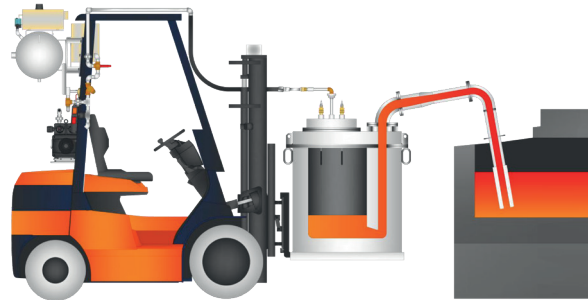


Preheating of ladle

The ladle is pre-heated before use. Caution: in general, when pre-heating is neglected, thermal issues can occur! Lethiguel and Hoei have conducted tests to determine the perfect sintering process for Al Serve.

Filling molten aluminium from a melting furnace to a ladle

Molten aluminium from the melting furnace is drafted through a pipe by decompressing the inside of the transport ladle. This transfer is automatically stopped by detecting the level of molten metal in the transport ladle.



Transfer of molten aluminium from the transport ladle to a die casting machine

By pressurizing the inside of the transport ladle with compressed air, molten aluminium is discharged through a pipe. The applying pressure is controlled depending on the weight of molten metal inside the pot. Again, the low limit of molten metal inside the transport ladle is detected with a measuring device. Alternatively, the process can be automatically stopped with an alarm when the die casting machine reaches full capacity.

Pressure dosing of molten aluminium's assets

- Safer system than a conventional tilted ladle: no lifting up high and no rotation needed.
- Reduced amount of oxide inclusions as the metal's exposition to air is minimized.
- Scrap drastically reduced (5kg/ton)
- Easy operation that does not require skilled labour
- Both filing and dosing operations are processed with one device which improves efficiency and productivity.



Peripherals for heating solutions

Heater Cleaner

The heater cleaner is a cleaning tool for immersion heaters. It is designed to fit the Thermal Power Heater range and assist operators in performing a proper cleaning of the heater. The better the cleaning the longer the life span.

Ref. TOOL-HEATERCL-00



Bath Cleaner

The bath cleaner is a cleaning tool for the aluminum bath. It is designed to help remove dross and oxidation from the surface of your furnace or transport ladle.

Ref. TOOL-BATHCL-00



Wall Cleaner

The wall cleaner is a cleaning tool for the refractory wall of any furnace or transport ladle. Thanks to a handy design it helps removing dross deposit from refractory walls.

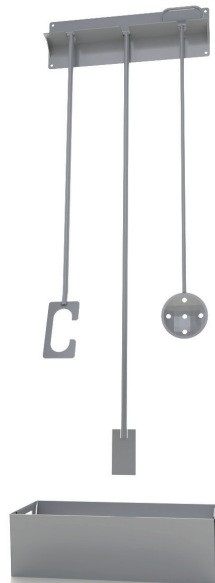
Ref. TOOL-WALLCL-00



Clean Kit

As life span of production tools including immersion heaters and quality directly depend on cleaning, the Clean Kit is a "must have" to make sure you keep getting the best out of your equipment.

ref. TOOL-CLEANKIT-00



Heater Trolley



The Heater Trolley is a furnace peripheral for immersion heaters, thermocouples and air heaters. It is compatible with the Thermal Power Heater range and Quickcheck. Its handy design eases the handling of heaters by helping operators and maintenance workers move new and used heaters all around the foundry.

Ref. DESTP-00

Electrical cabinet



We recommend this type of specific regulation as it optimizes our products' performances with following advantages:

Enhanced lifespan compared to non-specific regulation

UL and/or C€ norm compliance

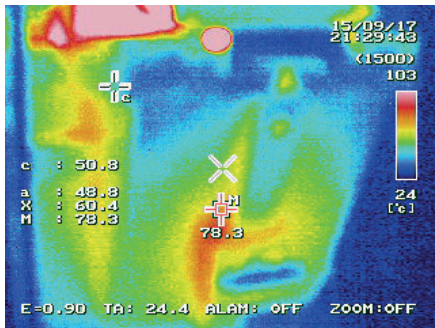
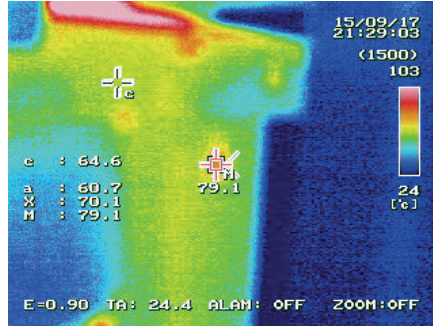
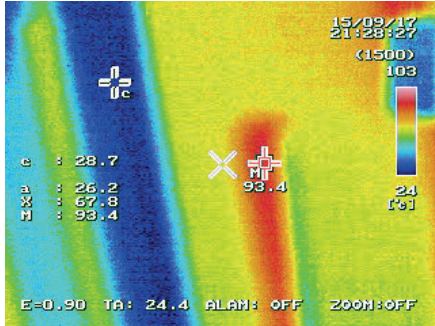
Optimal regulation in scr or ssr type

Tailor-made compact product

Electrical regulation for our immersion heating systems can be bought solo, or part of a global solution. Accuracy of regulation is a critical factor of success for immersion heating technology, and our panels are designed and built specially for our products.



Engineering solutions



Our engineering office works side by side with our customers to develop the best solution for the right application. Every solution offered is based on deep analysis of client's need, and it is carefully optimized to deliver higher value. With Lethiguel, you can save energy and time while improving your metal quality and productivity. We have been offering turnkey solutions that can be instantly integrated in your casting process.

We have done numerous researches like Thermal energy analysis, power need analysis, implementation analysis, IH designer and power.

Is the lid open ? Yes

Heating speed ? °C/hour

Application information

Customer: Date: 12/06/2019

Application: Offer:

Results

Convection power 5.15 kW
 Radiation power 24.26 kW
 Thermal inertia 10.82 kW
 Heating power 40 kW

TOTAL Power: 80.23 kW

Power need configuration



Our team is yours

we work every day
to maintain a high
efficiency in
follow up service

Being able to stay close to our customer and providing high value support has always been our main priority. This is why we have set up several affiliates around the world (United States, Germany, Japan, and China). Each affiliate can count on the full support of experienced technicians and engineers to better guide our customers.

Thanks to years of experience, our after-sales service team is ready to bring support wherever needed and make sure that the solutions we provide are always valued at their highest potential.

Because customer's satisfaction is our first KPI, we work every day to maintain a high efficiency in follow up service.

Every client's needs are carefully analyzed by our sales team on the field and studied by our engineering department so that we are always able to propose the integrated solution that can best meet customer's expectations.



Lethiguel HeadQuarters

14 rue du Parc d'Activités,
ZA du Charpenay
69210 Lentilly,
France
Sales.france@lethiguel.com

Lethiguel Germany

Mainzer Strasse 97,
D-65189 Wiesbaden,
Germany
Sales.germany@lethiguel.com

Lethiguel North-America

Kirkland Court,
L4C 9H4 Richmond Hill, ON,
Canada
Sales.na@lethiguel.com

Lethiguel Japan

203, 3 Chome-17,
Ekakushinmachi
Toyota City, AICHI,
Japan
Sales.japan@lethiguel.com