Melting

PILLAR INDUCTION

Pillar is **your** partner for induction melting solutions

"Do more with less" — this is the challenge you face every day. Make the most of your existing resources. Maximize your return on new technology. And do it all while keeping your line up, running and profitable. Achieving this balance is difficult. When rising to the challenge, it helps to have a partner — both a technology provider and an expert on how to implement it. When the right technology for ferrous and nonferrous melting is induction, the right partner is Pillar.

A Heritage of Excellence

Pillar Induction is a leading supplier of induction heating and melting equipment. Reflecting the proud heritage of our group companies, Pillar, Westinghouse and Cycle-Dyne, our personnel and innovative traditions remain central to our strategy and future. Our high-quality standards match our reputation, as does our expertise in process engineering and modernization — all resulting in stable, long-term solutions that can last for decades.

Continuous Innovation

Not only are we one of the largest induction suppliers, we are one of the most progressive, not to mention a market leader in developing customer-valued new technology. 3D CAD simulations, state-of-the-art manufacturing capabilities, application laboratories, and on-staff metallurgists guarantee that our customers always stay ahead of the industry.

Your Process Partner

Through close collaboration and personal attention, Pillar is dedicated to sharing our customers' passion and focus on their business goals. Pillar doesn't just sell equipment, we provide the right solution. We optimize your floor plan. We streamline your energy consumption. By applying our years of experience and knowledge of best practices, our customers are empowered to compete more effectively.

Customer Service and Support

Before the contract is signed and for years beyond start-up, customers can count on Pillar. Whether creating a turnkey solution from scratch, retrofitting and updating your existing lines, or evaluating future possibilities, the level of service is the same. Our maintenance specialists are available 24 / 7 and customers can enroll in preventive maintenance contracts to keep their lines up and running. All day. Every day.

Pillar Support Network

Along with personalized service, Pillar customers can benefit from the resources of a global corporation. We provide global assistance through our network of regional service engineers in China, England, Germany, Japan, Korea, Mexico and Thailand. Wherever you are, we can help.

Solutions Designed for You

When you have unique requirements, Pillar can tailor a solution based on our extensive application experience. Through a combination of standard products and innovative engineering, Pillar can meet your most demanding production and quality needs. With a wide range of field-proven solutions, our engineering team can provide the experience and expertise to optimize your process.

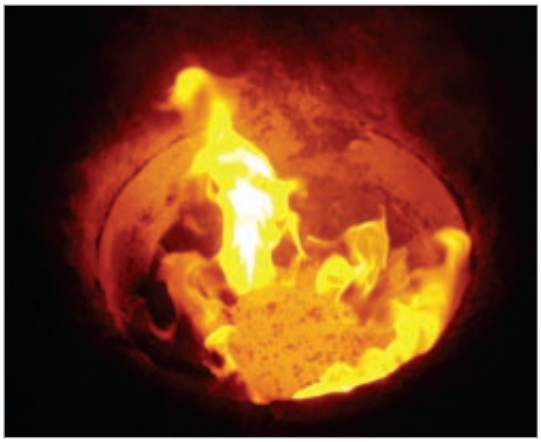
PILLAR INDUCTION

Melting Applications

Pillar's Induction Melting Division has a long history of supplying induction melting systems for a variety of applications throughout the foundry industry. We pride ourselves on supplying the most reliable, durable and efficient equipment available to the industry today. Our line of induction melting furnaces range in capacity from 1 pound to 20 Tons. Pillar offers coreless induction systems for the following applications: **Small Ferrous Systems, Large Ferrous Systems, and Nonferrous Systems**

System offerings and capabilities include:

- Dual output power supplies
- Lift/Swing and crucible melting furnaces for non-ferrous melting
- Shunted steel frame furnaces
- Medium and large capacity steel shell furnaces
- Investment casting systems
- Precious metal melting systems
- Vacuum melting power supplies and furnaces
- Graphite susceptor heating systems
- Water cooling system
- Turn-key melting systems
- Furnace, coil and water-cooled lead repair



Nonferrous Melting

Pillar offers a variety of Furnaces for the Nonferrous metal industry, each designed to meet a specific need. Our product offering includes small systems, designed to melt and pour multiple alloys and high powered systems developed for large scale melting processing.

If you are looking for innovative solutions to match your production needs, look no further than Pillar Induction. Our experienced staff will work with you to provide the most cost effective and productive Induction melting system available.

Smaller Systems

Nonferrous Systems Lift/Swing Furnaces are available with hoist and hydraulic designs for crucible sizes ranging from #40 to #225. Important characteristics include:

- Rapid Alloy Changeover without Contamination
- Reduced Pouring Temperatures
- Utilization Rates near 100%
- Optional Fume Collection Ring Available

Larger Systems

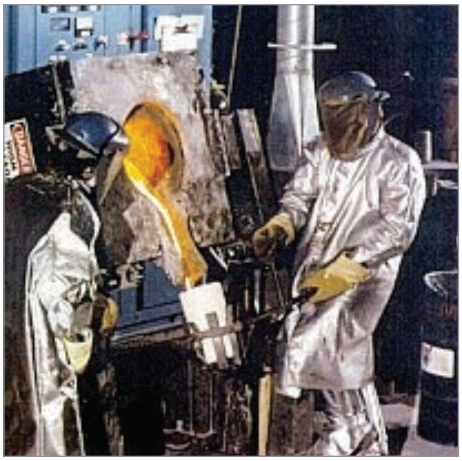
Aluminum Box, Steel Frame and Steel Shell Furnaces are available in capacities from 50 to 20,000 pounds. Operational frequencies are selected to match each application and vary between 200 and 3000 Hz. Use with a rammed type lining or crucible is possible. Optional fume collection is available.

Ferrous Melting

Pillar offers a variety of furnaces for ferrous melting applications. Our product offering includes box and steel frame furnaces for smaller applications, and steel shell furnaces for the larger foundry applications. All Pillar furnaces are designed to handle the toughest of foundry environments.

Optional items available include:

- Closed Capture Hoods or Fume Collection Rings
- Lining Pushout Devices
- Furnace Weighing Systems



Precious Metal Melting

Pillar offers cost effective and efficient systems for melting, recycling, refining, and casting precious metals such as Gold, Silver, and Platinum Group Metals (PMG).

Special Melting

As an innovator in the development of induction technology, Pillar offers a wide array of unique solutions designed to meet the specific needs of your application including:

- Glass
- Silicon
- Graphitization
- Refining
- Vacuum or Atmosphere Melting

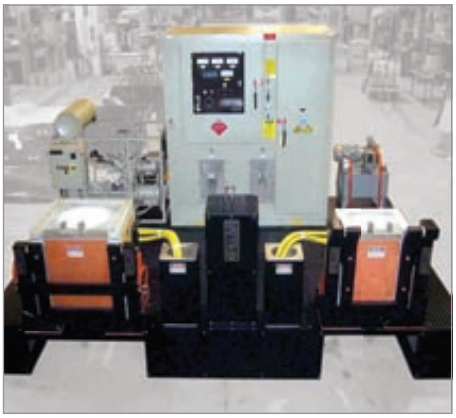
PILLAR INDUCTION

Furnace Technology

Lift/Swing Furnace

Capacity: 40 lbs – 225 lbs

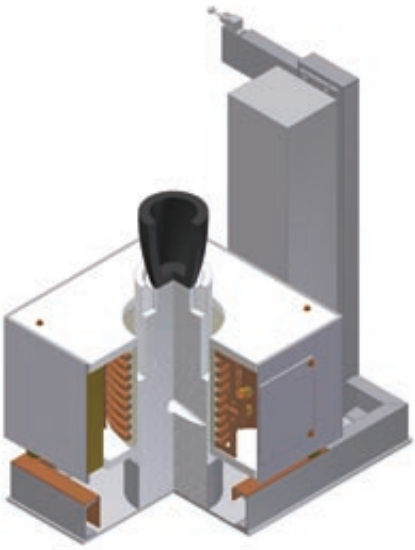
The Lift/Swing furnace is an original Pillar design. Used specifically in non-ferrous applications, the two crucible design yields close to 100 percent utilization. The Lift/Swing is free standing. They key difference between a push out furnace and the Lift/Swing is that the coil moves instead of the molten metal. Its close coupled design permits the fastest melt rate possible and rapid alloy changeover without fear of contamination.



Box Furnace

Capacity: 50 lbs – 2,000 lbs

The flexible design include easily removable side panels and through bolt connections for easy coil access. The design also incorporates a one-piece precast top and full top frame for superior torsional integrity. The hydraulic tilting assembly uses high quality cylinders, industrial tilt control valves and flow valves that ensure a controlled descent rate even in the event of hydraulic failure. The tilt angle is a full 105° for easy removal of all molten metal. The Box Furnace is available in either standard or nose tilt designs.



Hand Furnace

Capacity: 3 lbs – 50 lbs

Hand Furnace complete with refractory fiber reinforced shell, top and bottom, shank plates and induction coil with terminations for use with water cooled leads.

Drop Coil Furnace

Capacity: 9 lbs – 90 lbs

The Drop Coil Furnace is designed for use with free standing crucible melting of non-ferrous metals in conductive crucibles. Features include a high efficiency coil, free standing fabricated steel furnace base, confinement area, refractory pedestal for crucible support, single hand operated lever, pneumatic cylinder and flow control valves.

Steel Frame Furnace

Capacity: 100 lbs – 3,000 lbs

The heavy-duty, welded Steel Frame furnace is rugged and durable, but above all, practical. The coil is fully supported in the steel frame and surrounded by magnetic shunts. This structure ensures that the lining is not mechanically stressed when tilting the furnace. Field experience has shown a better than 35 percent improvement in lining life when compared with a conventional box furnace. Similarly, the castable in the top and bottom of the furnace is fully supported, has a refractory function only, and plays no part in the tensile strength of the furnace. The refractory lined lid ensures maximum efficiency, especially with higher temperature metals. A fume ring is optional.

Steel Shell Furnace

Capacity: 2,000 lbs – 44,000 lbs

The Steel Shell furnace is designed to handle the toughest of foundry environments. With its rolled steel shell, heavy-duty shunts and machined termination blocks, the Pillar Steel Shell furnace ranges from 2 to 20 tons and can withstand many years of punishment. The construction of the Steel Shell furnace addresses all safety concerns and provides total mainenance accessibility.

PILLAR INDUCTION

Power Supplies & Controls

As the originator of the solid state power supply, Pillar Induction provides solid reliability, quality and efficiency in our market-leading product line. Pillar offers a wide range of IGBT and SCR power supplies with output frequencies of 120 Hz through 450 kHz, and power output up to 10 megawatts. The MK-Series power supply provides the consistent and reliable power which is necessary for critical melting applications. In conjunction with real time process feedback including temperature monitoring the MK-Series power supply offers simple operation and maintenance. With thousands of MK-Series power supplies utilized around the world, Pillar offers a proven solution for the most demanding production needs.

MK8

MK8 – SCR Power Supply

Power Range: 50kW – 750kW
Frequency: 200Hz – 3,000Hz

The MK8 is a voltage source inverter with a parallel tuned circuit. This range of power supply is designed as an economic and reliable solution for applications up to 750kW. The parallel tuned circuit keeps the high currents away from the inverter thyristors (SCR). The lower currents flowing into the SCR's results in low power loss and high efficiency.

Control is by a combination of rectifier voltage control at lower power levels and inverter swept frequency control at higher power levels. This provides very controllable starting and excellent fault protection, along with constant output power over the entire heating cycle. Accurate and reliable control is achieved in extreme ambient conditions without the need for additional cooling.

Current leakage detector with meter and ground fault interrupter to sense and interrupt the flow of electrical current to ground in the event that molten metal would work its way to the coil.

Furnace Selector Switches

The knife blade switches are standard options in MK-8 to allow alternate selection of furnaces. The cast aluminum handles are located in front of the power supply to permit easy access.

MK11

MK11 – IGBT Power Supply

Power Range: 100kW – 600kW
Frequency: 1kHz – 50kHz

The MK11 is an energy efficient, voltage source inverter with a parallel-tuned technology. This IGBT power supply offers a wide tuning range and is available in both local and remote heat station configurations which simplifies integration into new installations or retrofitting existing systems with energy-efficient.

Selectable output regulation modes are voltage, kW, or current, at any rated output.

MK15 – IGBT Power Supply

Power Range: 600kW – 2,000kW
Frequency: 200Hz – 10,000Hz

The MK15 is a voltage source inverter with a series tuned circuit. This IGBT power supply offers low loss, transistorized devices, with an embedded microprocessor control and fiber optic control firing.

MK15

MK17

MK17 – SCR Power Supply

Power Range: 750kW – 6,000kW
Frequency: 200Hz – 3,000Hz

The MK17 is a current source, parallel tuned circuit which allows for relatively low currents through the SCR's without the need for series reactors.

The SCR current is accurately controlled under both normal and fault conditions by using high speed electronic controls together with a large choke. This level of control is essential in the larger power levels to ensure equipment reliability.

The combination of current control, voltage control and electronic sophistication allows the power supply to be turned on and off at any selected power level.

PILLAR INDUCTION

Coils & Accessories

New & Retrofit

The key to every induction melting application is the coil. Whether it is a total rebuild of your induction furnace or the design and manufacture of a precision coil, Pillar's team of highly skilled craftsmen are ready to meet all of your induction coil needs. Pillar utilizes many innovative coil designs and manufacturing techniques to achieve proper melting of your product. Rely on our staff's broad experience. Trust your application to our experts who will provide the most efficient and productive solutions. Coils are designed by our team of engineers and are manufactured in-house, to provide high quality products at a competitive price.

Repair & Rebuild

Pillar has the expertise to rebuild or repair all types of coil designs, including:

- Segmented Coils
- Studded Coils
- Vacuum Coils
- Channel Coils
- Cast Refractory Blocks – Top and Bottom Castables, Pushout Blocks, Crucible Support Pedestals
- Mica Slip Plane Material
- Clay Graphite or Silicon Carbide Crucibles
- Coil Grouting – Straight Wall, Tapered Grout, Colored Grout
- Magnetic Field Containment Shunts/Yokes
- Shunt Insulating Materials

Before

Rebuilt

Bus Bar

Bus Bar

High Conductivity Copper Bus Bar for interconnection between the power supply and the water cooled leads which connect to the furnace. The bus bar will be built to fit your particular installation configuration.

Accessories

Decking

Melt-Deck Package to provide an enclosure for the melt system components and an operating platform for the melt system. Including; rugged steel structural frame, removable steel thread plate decking, high impact steel ventilation plates, and interconnection for water and hydraulics.

DC Emergency Water System

Battery (DC) Powered Emergency Re-circulating System to provide up to 8 hours of furnace water recirculation in case of a power failure.

Furnace Selector Contactors

On larger systems with high furnace currents, the self-cleaning, water-cooled pneumatic contactor switches are used to alternate furnace selections. Furnace Selector Contactors mounted in the bus bar system for trench installation to permit alternate selection of furnaces. Each set is interlocked and controlled by a furnace selector control switch located at the power supply and/or the remote control panel.

Fume Collection Ring

Is a side draft extraction design that encompasses the furnace bath perimeter about the top of the furnace. The outlet is connected to a customer supplied exhaust system at a rotating duct connection located on the tilting axis.

Liner Push-out

Hydraulic actuated, furnace bottom mount Lining Extraction Device (Hydraulic Ram). Actuation and retraction control is provided by the furnace lid control valve in a bypassed mode.

Pump Stations — Single and Dual

Closed Pressurized Pumping Station with to handle the flow requirements of a power supply and up to two furnaces. Designed to be used with an evaporative cooler. This system includes an iron pump with bronze fitted impeller and motor, steel air elimination system, alarm circuit, internal copper piping and wiring and manual disconnect. Also available in dual pump option.

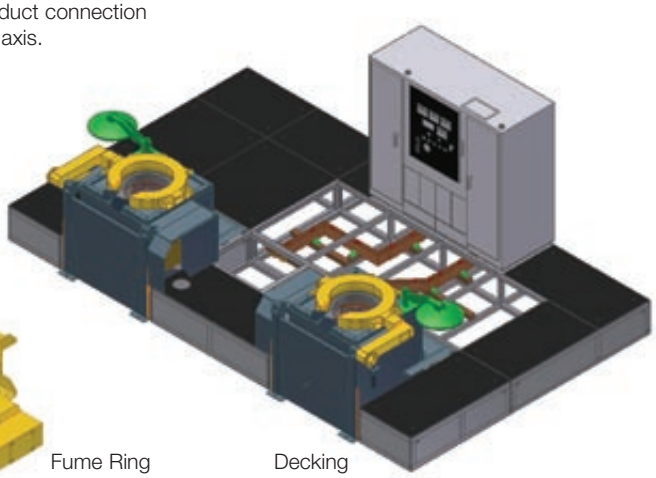
Water Cooled Power Leads

Provide the flexible connection of the furnace power to the furnace as well as provide a path and connection for furnace cooling water.

Water Systems

Pillar offers a range of cooling options for the power supply and furnace coil including evaporative tower systems, dry coolers, and chillers.

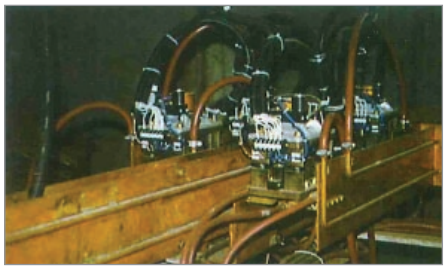
Fume Ring



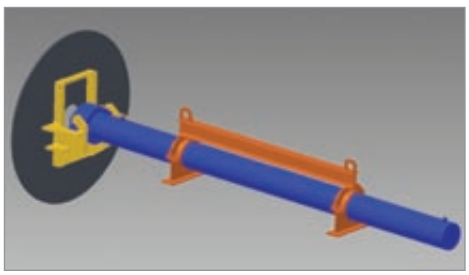
Decking

DC Emergency Water System

Pump Station – Single



Furnace Selector Contactors



Liner Push-out

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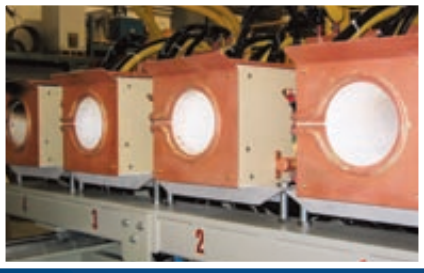
Support



Melting

Materials
- Ferrous
- Non-Ferrous
- Precious Metal Melting

Furnace Styles
- Coreless
- Steel Shell
- Steel Frame
- Box, Lift / Swing
- Lift Coil and Hand Furnaces

Custom Applications
- Vacuum Melting
- Crucible Melters
- Graphite Susceptor Melting

Heating

Tube & Pipe
- Heat Quench & Temper
- Upsetting
- Seam Annealing
- Normalizing
- Coating & Galvanizing
- Stress Relieving

Forging & Forming
- Billet Heating
- Bar End Heating

Heat Treatment
- Horizontal & Vertical Scanners
- Single Shot
- Lift & Rotate
- Automated Pick & Place
- Tooth-by-Tooth Gear Hardening

Specialty Heating
- Wire Heating
- Brazing & Soldering
- Shrink-Fitting
- Crystal Growing

After-Market

Induction Coils
- Repairs
- Rebuilds
- New & Retrofit

Spare & Replacement Parts
- SCR's Diodes, and IGBT's
- Capacitors
- Water Cooled Power Leads
- Bus Bars
- Control Boards

Retrofit & Refurbishments
- Controls Upgrades
- Heat Station Rebuilds
- Equipment Upgrades
- Water System Replacements

Repair Services
- Control Boards
- Water Cooled Power Leads

Field Service
- Preventative Maintenance
- Training
- Documentation
- Thermal Imaging Analysis
- 24-Hour Service Hotline

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Westinghouse Cycle-Dyne
OEM for Westinghouse and Cycle-Dyne induction equipment.

www.pillar.com

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