

Melting and Heating Equipment since 1962

MELTING AND HEATING TECHNOLOGY





MELTING TECHNOLOGY

- Channel furnace plants
- Crucible furnace plants
- Compact furnace plants
- Inductors
- IGBT converters
- MARX coil insulation
- Modernisation & conversion
- Service & maintenance

LADLE **TECHNOLOGY**

- Casting, transport and treatment ladles
- MARX gearbox technology
- Mobile gearbox test rigs
- Wire-treatment plants
- Conversion & maintenance
- APR inspections according
- to DIN EN 1247 - Certified welding company (DIN EN ISO 3834-2)



MARX GMBH & CO. KG

Lilienthalstraße 6-13 58638 Iserlohn

MARX ELEKTROWÄRME GMBH

Philipp-Pforr-Straße 6 16761 Hennigsdorf



MARX OFENBAU GMBH

Joseph-Gänsler-Straße 12 86609 Donauwörth



24h availability

We are available by phone to our customers 24 hours a day in the event of emergencies.

24h-emergency call

Phone +49 1722799564

MARX - TECHNOLOGY

Since more than 60 years MARX is known as a reliable manufacturer and service partner in the field of melting and heating technology for the foundry and extrusion industry.

Almost every induction-furnace brand has been serviced, repaired, technically upgraded or newly built in our company. With this experience, we are able to offer holistic solutions for our customers - starting with engineering and new production, through modernization and retrofitting of induction systems to comprehensive service and customer service.

New manufacture, repair and maintenance of all types of ladles, including an own gearbox series as well as wire treatment plants for GG / GGG are also part of our product range.







EXTRUSION TECHNOLOGY

- MARX Smart Container
- HPC High-Power Cartridges
- Control & Software
- Inductive billet heating
- Tool stations and
- Pre-heating stations
- Service & maintenance
- Maintenance & training

In addition, we are one of the leading suppliers of **heating** systems for containers, and along with new installations we also offer our customers individual components, repairs and modifications for extrusion press heating equipment.

The most modern equipment at our manufacturing facilities and an extensive know-how, offer us by the planning, development and production, the ability to work in a manner that our customers worldwide have been used to for more than 60 years:

Reliable - Fast - Competent.

MELTING TECHNOLOGY

70T CHANNEL INDUCTION FURNACE FOR ALUMINIUM





HOLDING, TREATMENT AND CASTING FURNACES WITH CRUCIBLE INDUCTOR



CHANNEL FURNACE PLANTS

The channel furnace technology developed by MARX aims to make the very most of the advantages offered by state-of-the-art channel furnace plants, their particular energy effici**ency** and their varied application and usage possibilities. The flow-oriented MARX channel inductors have been specially developed to meet the high requirements in terms of energy savings, maximum melting performances and service lives.

This type of technology makes it possible to significantly increase service lives while simultaneously reducing energy consumption. For example, channel inductors with a power of 2,400kW were developed and trialled for copper and copper alloys, and with a power of 1,500kW for aluminium.



CHANNEL INDUCTORS FOR ALUMINIUM AND ZINC

Inductor power: 60 to 1,500kW

- Melting furnaces
- Holding/Storage furnaces
- Casting furnaces
- Piece-galvanising furnaces
- Strip-galvanising furnaces
- Zinc-cathode melting furnaces

CHANNEL INDUCTORS FOR COPPER AND COPPER ALLOYS

- Inductor power: 50 to 2,500kW
- Melting furnaces
- Melting furnaces for brass turnings - Holding furnaces

- Furnaces for alloying and
- homogenising

- Combined melting and casting furnaces

- continuous casting
- Holding furnaces for horizontal
 - continuous casting - Dosing furnaces for sand moulding
 - lines with stopper rod device

CRUCIBLE FURNACE PLANTS

Our crucible furnaces are designed, constructed and installed in close collaboration with customers to develop optimum solutions for their applications. The use of the very latest IGBT converter technology ensures practically maintenance-free operation of the power unit.

Power is regulated continually and adjusted to the melting process. Depending on their intended purpose, the IGBT converters are designed for mains and medium frequency applications as well as the low frequency range (<50Hz).

Supplying power in the low frequency range offers particular advantages when melting swarf. The chips are immediately stirred into the melt by intensive agitation of the bath, thus significantly reducing melting time, energy consumption and losses due to burn-off.



CRUCIBLE FURNACE PLANTS

- Alloy: Iron and non-ferrous metals - Power unit: NF / MF (transistor
- technology) - Power can be distributed to one
- or more furnaces



COMPACT FURNACE PLANTS

- Alloy: Iron and non-ferrous metals
- more furnaces





- Forehearth casting furnaces for vertical



CHANNEL INDUCTORS FOR **IRON AND IRON ALLOYS**

- Inductor power: I 25 to 2,000kW
- Holding furnaces
- Dosing furnaces with forehearth and stopper rod device

- Power unit: MF (transistor technology) - Power can be distributed to one or



CRUCIBLE INDUCTORS

Rated power: 100 to 1,000 kW - Alloy: Non-ferrous metals (Al / Cu) - Power unit: NF / MF (transistor technology)

MELTING TECHNOLOGY



OVERVIEW OLD MELTING FURNACE





OVERVIEW MODERNISED MELTING FURNACE

MARX SMART INDUCTION SOLUTIONS

Modernisation of induction-furnace plants

Old melting plants have great **potential for** performance improvements. A wide range of reusable plant parts and technologies can easily be utilised in order to exploit this potential. Performance improvements can be achieved for a large number of old plants by measures such as the following:

- State-of-the-art coil design technologies
- Effective insulation technologies
- Redesign of furnace vessels
- Remodelling of the ceramic furnace parts
- Ramming the inner crucibles
- Use of IGBT converters
- Replacement of furnace controls

It is also usually possible to increase the capacity.

MARX SMART INSULATION

High-quality crucible furnace insulation

- triple synthetic coating of the copper profile with heat-resistant special coating with perma-

- Copper profile partly or fully bonded with

- externally sheathed with Isoplan or silicate-felt

- intermediate insulation technologies are doubly

applied, overlapping and consolidated with

The **full-insulation technology** corresponding to the **MARX** standard insulation technology

offers customers the highest possible levels of

coil protection against moisture, dirt and

- intermediate insulation of special mikanit or GHG

technology for more safety

nently elastic properties - Heat resistant up to 200°C

lacquer glass-fibre tape

fibre

saturation

mechanical stresses.

COIL PRODUCTION AND REPAIR

- Manufacturing of new coils
- Coil repair for all brands
- Restoral of nominal diameter
- Power increase



PREPARATION FOR NEW **COIL INSULATION**

- Removal of old insulation in pyrolysis furnace

water-flow check

- Volume increase
- Coil optimisation
- TIG welding method

INSERTS

coil unit

MARX FULL-INSULATION TECHNOLOGY

- Synthetic coating insulation (grey-green-grey)
- Intermediate insulation of
- special mikanit or GHG
- Intermediate insulation technologies are doubly applied, overlapping,
- and consolidated with saturation - Outer layer sheathed with highly
- heat-resistant ceramic plates, silicate felt or glass fabric







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TRIPLE SYNTHETIC COATING





- Cleaning the coil using a special sand blasting method (metallically pure) - Leak-tightness test via water-pressure check or helium leakage rate check - Flushing of the cooling channel and



DIAMETER CORRECTION

- Optimum efficiency
- Restoration of the original nominal power
- Reduction of melting times
- High energy cost savings

DRYING FURNACE FOR DRYING COILS AND CRUCIBLE FURNACE

- Drying and hardening the impregnation varnishes to solidify the entire

- Removal of residual moisture in permanent concrete and coil grout - Pre-drying of magnet yokes for treating with 2-component resin



OUALITY ASSURANCE AND TESTING METHODS

- Helium leakage rate check
- Water-flow check
- Water-pressure check
- Endoscopy examination
- Insulation measurement
- Electrical tests as perVDE

LADLE **TECHNOLOGY**



CASTING, TRANSPORT AND TREATMENT LADLES

Our product portfolio includes casting, transport and treatment ladles with dimensions to suit the particular requirements of our customers. Gearboxes MX-1 up to MX-5 from our MARX gearbox series are available in different dimensions which match the respective ladle sizes.

The current regulations of **DIN EN 1247** and the DGUV (German Social Accident Insurance) are an integral part of the design, manufacture and inspection of casting, transport and treatment ladles.

As your partner in security issues, we conduct annual inspections in your premises. The main inspections are carried out according to the customer's wish, either at our factory or on site by one of our specialists.



CRANE CASTING LADLES

Available in all sizes and designs. Our scope of supply includes both standard ladles and foundry ladles, which can be individually produced based on customer requirements.

TREATMENT LADLES

- Tundish-cover ladles
- Ladles for the overpour or sandwich processes
- Ladles for wire-treatment processes



MX-1 60V



MX-2 80V







MX-4 140V



MX-5 180V

MX GEARBOX SERIES

Our gearboxes of the MX series are characterised by their particularly sturdy design. Certified by Germanischer Lloyd, they offer maximum safety.

All gearboxes are fitted with a brake that operates automatically in both tilting directions and that holds the ladle at any desired tilt angle, thereby ensuring the necessary self-locking effect.

During the development of the specially fitted gearboxes, particular importance was given to components and services from regional suppliers, such as the cast parts of the gearboxes or the machining operations.





MX GEARBOX SERIES

The gearbox series includes models MX-1 to MX-5.

Our MX-1 to MX-4 gearbox models are used for the most standard foundry ladle sizes with a capacity of up to 25 tons.

The MX-5 is suitable for the operation of foundry ladles with a capacity of up to 50 tons without the need for an offset gearbox.

SPECIAL DRIVES

- Battery drive for ladle gearbox
- Electric drives for ladle gearbox
- Electric gear motors - Offset gearboxes







SPECIAL FOUNDRY LADLES

- C-suspensions
- Bottom-pouring ladles
- Drum ladles
- Siphon ladles
- Steel foundry ladles
- Foundry ladles with changeable suspension
- Manual foundry ladles up to approx. 150kg capacity



GEARBOX TEST RIGS

With our specially developed gearbox test rigs, we are able to measure and document the exact output and braking torgues in accordance with DIN EN 1247.

The mobile design of the test rigs allows us to perform these measurements both at the MARX premises or on-site at your location.

LADLE TECHNOLOGY



MODERNISATION, **CONVERSION AND SERVICE**

When you need quick and reliable repairs or servicing of your foundry ladles and gearboxes, then MARX is the right partner for you.

Thanks to the in-house manufacturing capabilities at all of our German sites, we are able to provide quick and **flexible solutions** to make your range of ladles available for production again as quickly as possible.

STEEL CONSTRUCTION AND WELDED CONSTRUCTIONS AS PER DIN EN ISO 3834-2

In our Iserlohn and Hennigsdorf sites, we have the option of manufacturing the steel-construction components for our projects ourselves in accordance with DIN EN ISO 3834-2, and our machinery pool allows us to perform an extremely wide range of manufacturing tasks. We are therefore able to respond to your requirements in an independent and flexible manner.

In addition to a range of small and medium-sized machine tools, the existing machinery pool also allows for tasks including, in particular, the following:

- Point turning (max. length 5,000mm, max. diameter 1,400mm)
- Boring work
- Horizontal and vertical milling
- Round milling of sheet metal up to 20mm thickness and a width of up to 2,100mm
- CNC flame-cutting work (also plasma cutting of high-alloy steels)



GEARBOX CONVERSION

LADLE MODIFICATIONS

- Worm gear transmission to planetary oil bath gearbox
- Conversion to pneumatic drive
- Conversion to electric drive
- Conversion to battery drive
- Conversion from keyway connection to splined shaft



- Volume increase

- Plug lifting devices



ZERTIFIKAT

CERTIFIED WELDING COMPANY ACCORDING TO DIN EN ISO 3834-2

- Certified welders - Crucible-push-out stations - Furnace platforms
 - Certified welding equipment
 - Welding supervisors
 - dye penetrant testing
 - Ultrasound tests
 - X-ray tests
- foundry ladles - Accommodation frames for
- pecial foundry ladles

SPECIAL-DESIGN STEEL

CONSTRUCTIONS

- Inductor housings

- Capacitor frames

- Crucible furnace frames

- Transportation systems for

- Tilting frames

- Welded constructions based on customer requirements







- Modification of the crane adapter - Sealed ladle gate technology





VISUAL INSPECTIONS AND MAIN TESTS AS PER ACCIDENT PREVENTION REGULATIONS

We will test and maintain your foundry ladles in accordance with the current regulations of DIN EN 1247 and the DGUV (Deutsche Gesetzliche Unfallversicherung - German Social Accident Insurance). Depending on customer requirements, the main tests are carried out at our production plant or directly on-site by one of our specialists.



WIRE-TREATMENT PLANTS (DIM)

The Marx DIM plants are specially designed for the treatment and inoculation of grey cast iron. The treatment process is precisely attuned to the individual melting treatments, and can be initiated fully automatically.

The treatment cabins can be fitted with special, designated treatment ladles and can also be adapted to the customer's existing ladles.

EXTRUSION TECHNOLOGY



SMART CONTAINER®





SMART CONTAINER

The current state of development of the process-controlled "Smart Containers" means that they can be heated up and regulated at weights of between 500kg and over 100 tons in segmented heating zones.

The high-power heating cartridges can be produced with up to three heating zones and achieve a proven service life of up to 5 years and above depending on their intended purpose.

The zone arrangement is designed individually depending on the particular application, which include special solutions such as containers with oval inner liner, large external diameters or long containers. The process is controlled based on the specific requirements, and is supported by segmented cooling zones as required.

TOOL STATIONS AND PRE-HEATING STATIONS

In order to meet today's modern demands, special tool stations have been developed at MARX, to heat up the extrusion press tools to an optimal process temperature.

The **container pre-heating stations** are either fitted with independent heating systems, or can be operated via the resistance heating system integrated in the container. In this case, the power is supplied automatically via a pneumatic contact unit. The heating process is precisely controlled via integrated controllers.



CONTAINER HEATING FOR LIGHT METAL (RESISTANCE HEATING)

- New production and repair for all press sizes
- Container weights of up to 100 tons and above
- Individual heating zone arrangement Conversion of existing presses to modern, multi-zone heating systems



CONTAINER HEATING FOR **HEAVY METAL (RESISTANCE** HEATING)

- New production and repair for all press sizes
- Container weights of up to 100 tons and above
- Individually controlled cooling
 - Conversion of existing presses to modern, multi-zone heating systems



INTEGRATED HEATING SYSTEMS FOR BOLSTERS, TOOLS AND DIE SLIDES

- to compensate heat losses at:
- die slides
- bolsters and
- extrusion press tools
- Up to 2 heating zones with individual temperature measurement
- Automatic contacting with die slides
- (depending on plant concept)
- Connection components



MARX HPC HIGH-POWER HEATING CARTRIDGES, CONTROL COMPONENTS AND ACCESSORIES

- Heating cartridges with up to 3 heating zones; service life based on inten-
- Control units for heating systems
- Control units for regulated cooling systems - Special thermocouples with simul-
- taneous detection at up to 3 different measurement points - Insulation components



- Individual heating zone arrangement



INDUCTION HEATING SYS-TEMS AND ACCESSORIES FOR CONTAINERS

- New production and repair for all press sizes
- Connection components and special high-current cables for supplying power to the induction heating systems - Transformers for the heating supply



ded purpose up to 5 years and above - Special components for connection



INDUCTIVE BILLET HEATERS

- The converter, induction coil, power unit, recooling system, control and operator cabinet with operator panel are combined within a frame to form a single unit
- Compact dimensions

Example:

- approx. 900x700x2,100mm (WxDxH)
- With billet data: Length 200mm, Ø up to 60mm
- Temperatures up to 560°C







SERVICE AND MAINTENANCE

Customer service is of top priority for us. In the casting sector in particular, fast response times and flexibility are of crucial importance. That's why we make it possible for you to contact us at any time on our 24h emergency number.

With a total of three production and service sites in Germany, we are able to reach and support our customers all over Europe as quickly as possible.

Our assembly personnel also have years of experience, enabling them to provide solutions competently, reliably and guickly.

TRAINING SESSIONS

The provision of training for our customers is part of our daily business activities. Our service and sales employees are available to provide you with **on-site** support at any time.

We also provide regular training sessions on the safe handling, servicing and maintenance about our product range.

On customer request, we can also create individual training plans that are specially tailored to the customer's specific situation and requirements. The training sessions can be held either at your premises or in our training rooms.

Just get in touch with us!



24H AVAILABILITY

We are available by phone to our customers 24 hours a day in the event of emergencies.

24h emergency call Phone +49 1722799564



ASSEMBLY PERSONNEL

- Commissioning

- Modernisations

- - Assembly work
 - Maintenance
 - Inspections



TECHNOLOGY

INDUCTION FURNACE TECHNOLOGY

- Furnace inspection and maintenance
- Spare parts service
- Coil repairs for all brands
- Helium leakage check
- NDT testing for welded seams - Coil storage
- On-site coil change for all brands

Rheinland) - Strength verification and FEM calculation of foundry ladles

SERVICE | TRAINING MAINTENANCE



TRAINING SESSIONS

- Maintenance workshops for furnace plants
- Foundry ladle workshops
- Safety workshops for:
- Induction furnaces
- Foundry ladles
- Heating systems for Extrusion presses
- On-site consultancy



FOUNDRY LADLE

- Visual inspections and main tests as per accident prevention regulations - Gearbox test rigs (mobile) - Groove miller (mobile)
- Training sessions (ladle workshops under the command of TÜV

EXTRUSION TECHNOLOGY

Modernisation of heating systems

- Conversions from induction heating to resistance heating
- Conversions from external heating (holder) to internal resistance heating - Conversions to
- "SMART CONTAINER" SYSTEM

Repair service

- Container heating systems (resistance heating, induction heating)
- Billet heating systems
- Tool stations and Pre-heating stations Spare parts service



