RHI MAGNESITA

NFM / FERROALLOYS

Refractories for the Ferroalloy Industry



© RHI Magnesita

There for you, wherever you need us

RHI MAGNESITA

The more closely we work with our customers, the greater the impact we can make for them. So a global network of offices, research centers, and production sites is important to us, and to them. We are continuously extending our global reach to be closer to even more customers.

Being closer to customers doesn't just mean we can be more responsive to their needs. It also helps us to listen better — to understand their concerns, cultures and ways of working. It makes us alert to new ways of thinking and ideas that enable us to deliver even better advice, services, and solutions.

Our exceptional resources and expertise extend far beyond making and selling products. We provide solutions to customers worldwide for cover projects, material specifications, thermal studies, numerical simulations, follow-ups and technical support in application of minerals, and maintenance and electromechanical services for refractory equipment.



35
Main production and raw material sites

70
Sales offices

180
Countries shipped to worldwide

We are RHI Magnesita

Refractory Competence — Ferroalloy Industry

Rotary Kiln Lining

AC Electric Furnace

DC Electric Furnace

Freeze Lining Concept

Insulating Lining Concept

Refining — Converter & Ladle

Metal Stirring — Purging Lances

Launders



We are RHI Magnesita

Refractory Competence — Ferroalloy Industry

RHI Magnesita is the global leader in refractories. We have the largest number of locations around the world and the most innovative, reliable products and services. Our exceptional vertical integration — from mining to full service solutions — ensures our customers the most robust reliability of supply with the best quality.

The RHI Magnesita brand comprises a large number of successfully established trademarks (Radex, Didier, Veitscher, Interstop, Agellis), which combine tradition with innovative technology and highest quality standards.

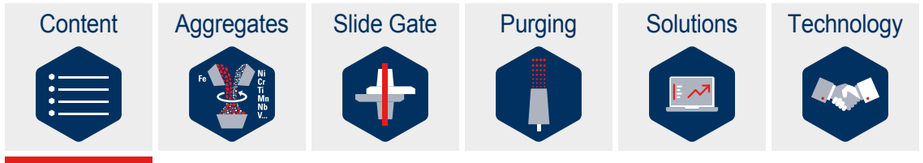
We are a global partner for the nonferrous metal industry. The complete program of products and services ranges from basic and non-basic mixes and bricks to prefabricated products, slide gate plates, isostatically pressed products, special machines and repair systems, and technical equipment used to install refractory products into the various production units of the nonferrous metal industry.

RHI Magnesita stands for optimum refractory solutions for rotary kilns, electric arc furnaces (AC and DC), converters, ladles and launders, among other aggregates typical of the ferroalloy industry. The quality of the products and services offered by RHI Magnesita are based on carefully selected raw materials, state-of-the-art manufacturing plants, continuous and intensive research and development work, and on the competence of all RHI Magnesita employees. Applied to the ferroalloy production process, our products and systems represent a significant contribution to the efficiency and safety of smelting plants. A pre-requisite for optimum application of any refractory product is extensive knowledge of all steps of the metallurgical production process and specific conditions at each of our customers. Our metallurgists and process experts are active around the globe and cooperate with renowned research institutes and universities in Austria and other countries. In addition, the partnership and close cooperation with our customers are fundamental factors that ensure continuous improvement of their processes.

RHI Magnesita is more than just a reliable supplier of high-grade refractory products, we are also a partner for the ferroalloy industry to work on complete integrated solutions:

- Selection of refractory qualities and recommendations to improve total cost of operation
- Calculation of heat transfer and fluid interactions by Computerized Fluid-Dynamic modeling
- Calculation of mechanical stress by Finite Element Analysis
- Thermodynamic calculations of metallurgical processes and interaction with refractory materials
- Lining drawings and guidelines for refractory installation
- Instructions for furnace heat-up or shutdowns
- Instructions for proper storage and handling of refractory materials
- Process and flow control solutions, such as purging plugs, injection lances and slide gate systems
- Installation service through RHI Magnesita-owned company RHI Magnesita Installation Services and installation supervision
- Post-mortem analysis of refractory materials in our own R&D facilities

The headquarters of RHI Magnesita are based in Vienna where all worldwide activities are focused. If you need assistance in finding the responsible RHI Magnesita office in your country, please visit the RHI Magnesita webpage rhimagnesita.com or send an e-mail to our Vienna head office nfm-marketing@rhimagnesita.com



Ferroalloys

Over the last years and decades the production of ferroalloys has increased, mostly because of the increased importance of these products in the production of high-performance steel qualities for the most varied applications. The development of new production routes and the optimization of existing processes and vessels demand continuous improvement in refractory materials and design.

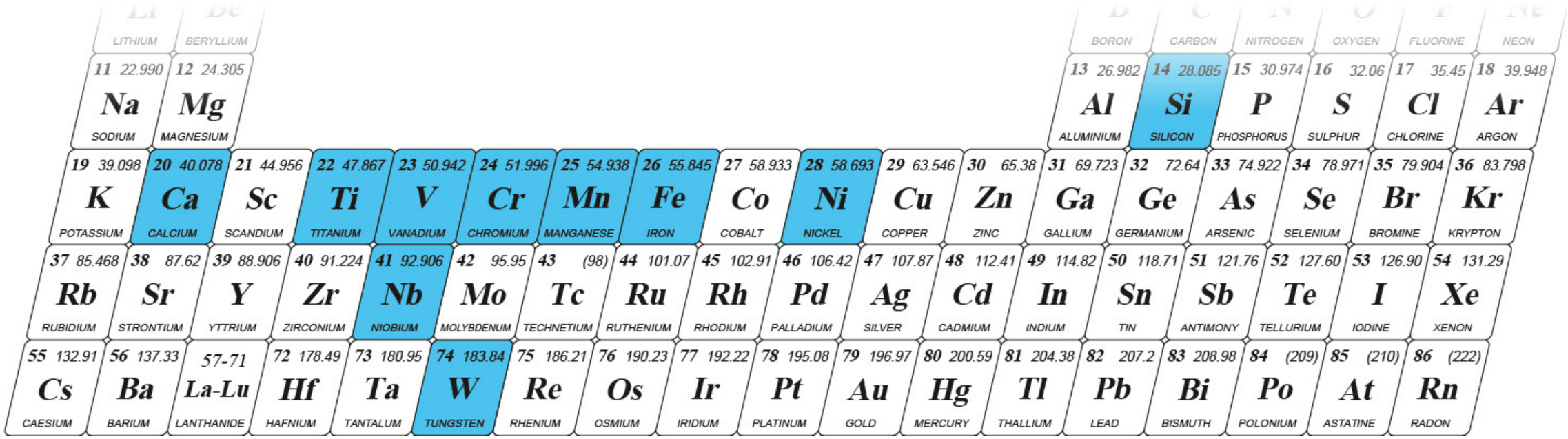
The selection of the proper refractory materials is a decisive factor to guarantee safety in operation and reduce costs caused by poor performance and unplanned repairs. In order to assure the optimal refractory selection for all aggregates and their respective parts, RHI Magnesita adopts an integrated approach specific to the individual needs of our customers: from the proper material selection to the recommendations of the best installation techniques, our solutions are engineered to maximize service life, speed-up installation and improve safety in operation.

The variety of vessels necessary to produce different ferroalloy qualities in the different necessary production steps (ore preparation, reduction, refining, casting) demands a big variety of refractory products, both shaped and unshaped, basic and non-basic. In addition to this complexity of materials necessary, many different application methods are used by the ferroalloy industry, such as brick installation with or without mortar, use of prefabricated components (precast shapes, pre-installed bricks, etc.), vibrated and self-flowing castables, gunning materials, ramming mixes, among others. Carbon linings with very tight tolerances are also used for the production of several ferroalloys, either in an insulating or conductive hearth design.

RHI Magnesita is the largest refractory producer for the ferroalloy industry in the world and supplies all kind of solutions for the most demanding applications. Our technical team understands thoroughly the multiple requirements necessary for the smelting and refining of ferroalloys and can recommend the most suitable refractory solution for each application and the requirements for each individual process step.

Our approach to the selection of the most suitable design for any aggregate follows some basic principles:

- Material selection based on interaction with process phases under given process conditions
- Cost optimization considering material costs as well as process costs (including repair downtimes and resulting production losses)
- Material optimization and zoning to balance the refractory life and achieve a predictable wear rate that allows scheduled maintenance
- Material selection for minimization of heat losses and optimization of energy consumption of furnace
- Material selection for improvement of thermal transfer in cooled structures
- High quality materials and functional products that assure safe performance of high-intensity processes and clean metal production
- Easy installation, maintenance and demolition



Rotary Kiln, Concentrate Containers & Feed Bins

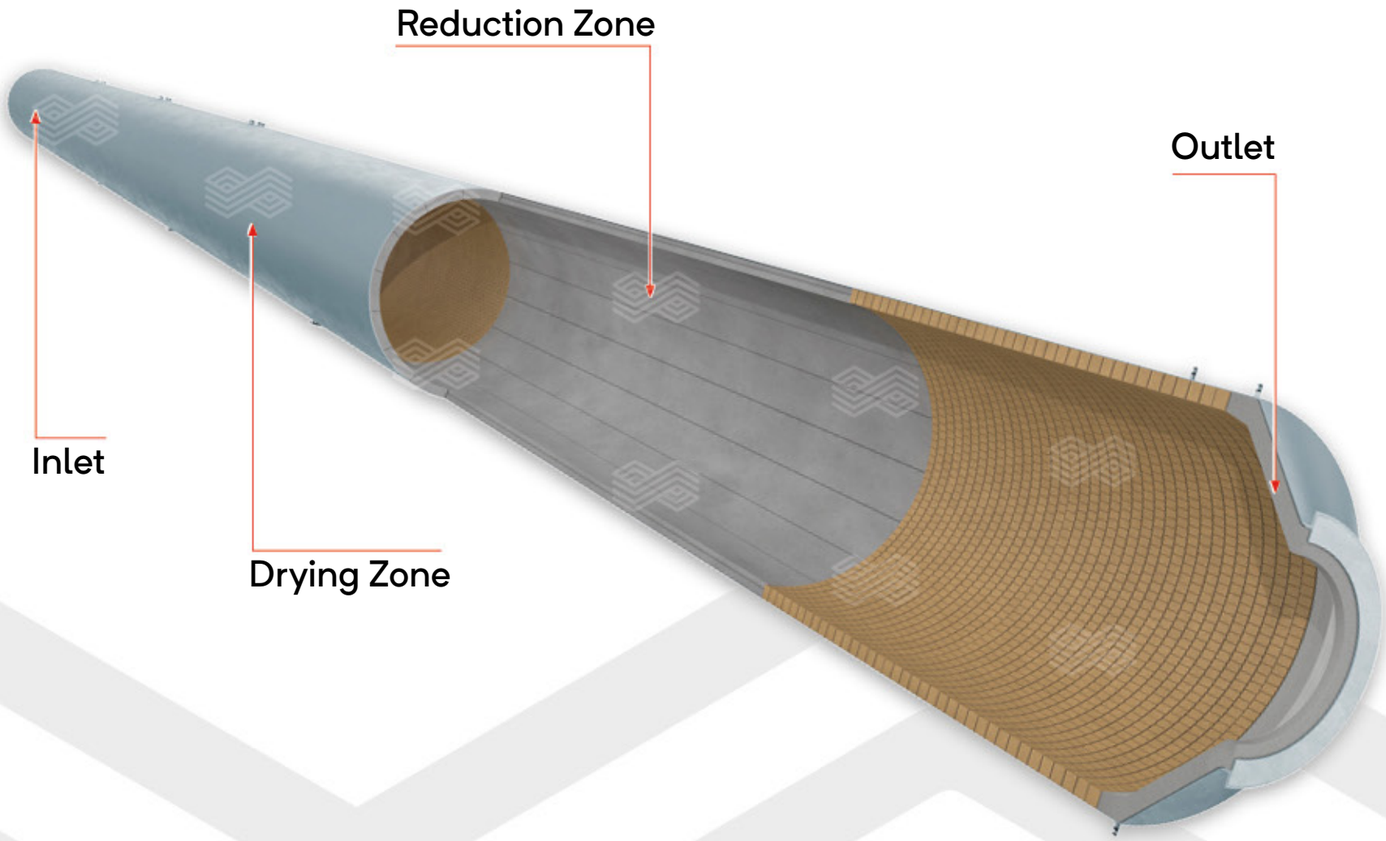
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Rotary kilns are mainly used in the production of FeNi (RKEF route) to achieve de-watering and pre-reduction of the concentrates. Additionally, the kiln rotation leads to agglomeration of the fine concentrate particles and creation of lumpy pieces that are suitable for the downstream treatment in the electric furnace. After the rotary kiln, the still hot calcine is transferred to the electric furnace via concentrate containers and feed bins, which are also lined with refractories to minimize heat losses and maximize energy savings by hot charging into the electric furnace. Besides FeNi production, rotary kilns are also used for example in the production of FeCr and FeV, as well as pretreatment in ilmenite smelting. The lining has to be chosen according to the individual process and the specific kiln area.



Content | Aggregates | Slide Gate | Purging | Solutions | Technology

Rotary Kiln Lining





AC Electric Furnace Process

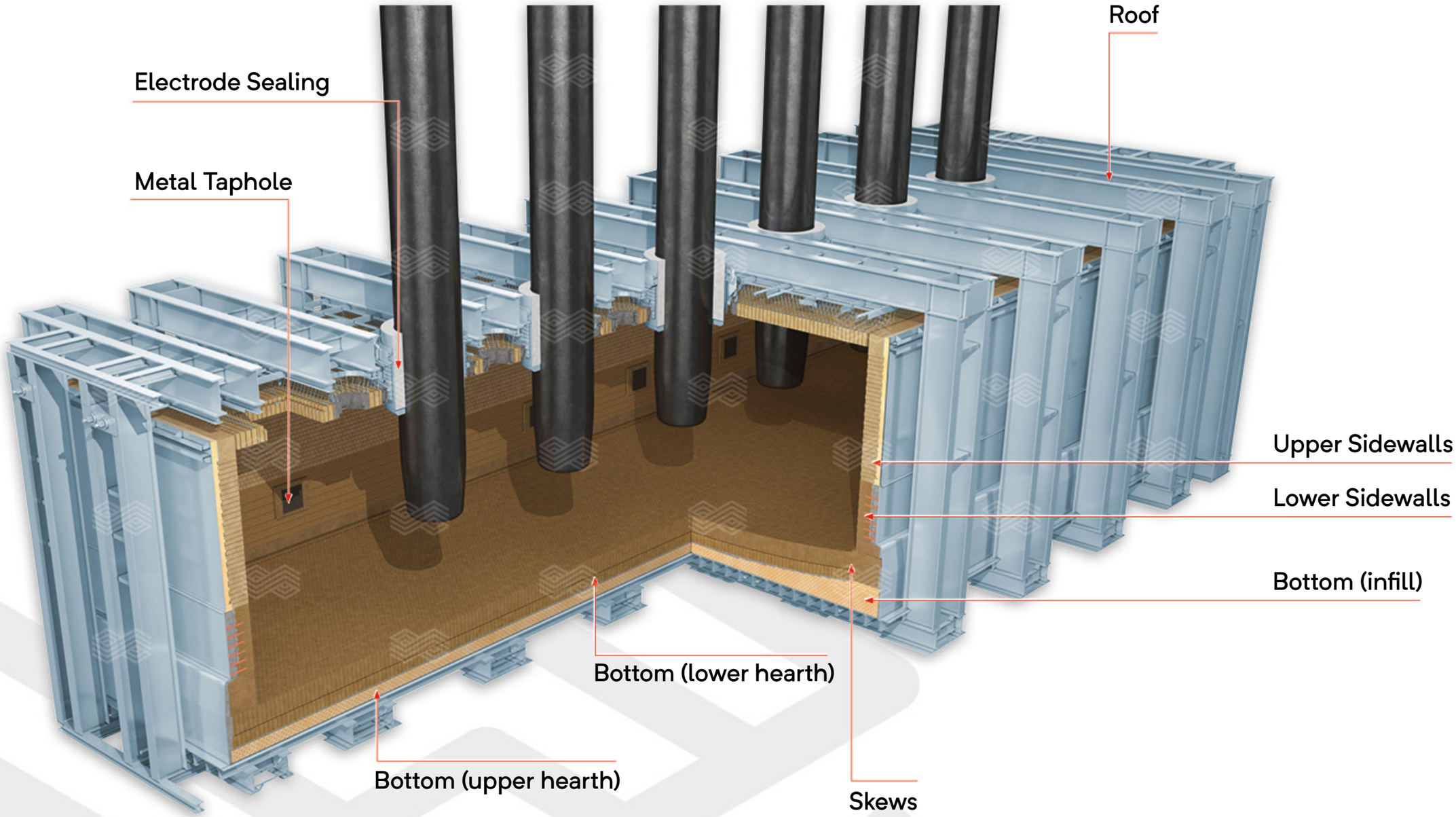


In the ferroalloy production, reduction of concentrates or calcines to recover different metals from their oxides is a highly endothermic process. The most common sources of energy in this process are carbon sources, such as anthracite, coke, coal, among others and electric energy. The electric arc furnace in its different forms (AC or DC, round or rectangular) is the dominant smelting aggregate in the industry. The last decades have seen the use of lower quality ores due to depletion of high-grade ore bodies, which poses great challenges to the metal producer to keep a stable process, and to the refractory lining. The refractory design in the electric arc furnaces must cope with more often alterations in metal and slag chemistry and temperature, very different slag systems and newly designed large furnaces with very high power input and productivity. In addition to that, new efficient cooling systems and tight environmental legislation require refractory designs that improve the energy efficiency and reduce emissions.

RHI Magnesita provides solutions both in fired oxide bricks and carbon linings. Our experienced engineering department has successfully developed design solutions for the largest and most demanding existing furnaces. We work together with the largest OEMs from the feasibility studies to the realization of the project. Our supervision and installation services assure that the high-quality refractory materials are also installed by state-of-the-art techniques, thus assuring that the supplied materials will achieve their full potential over the furnace life.

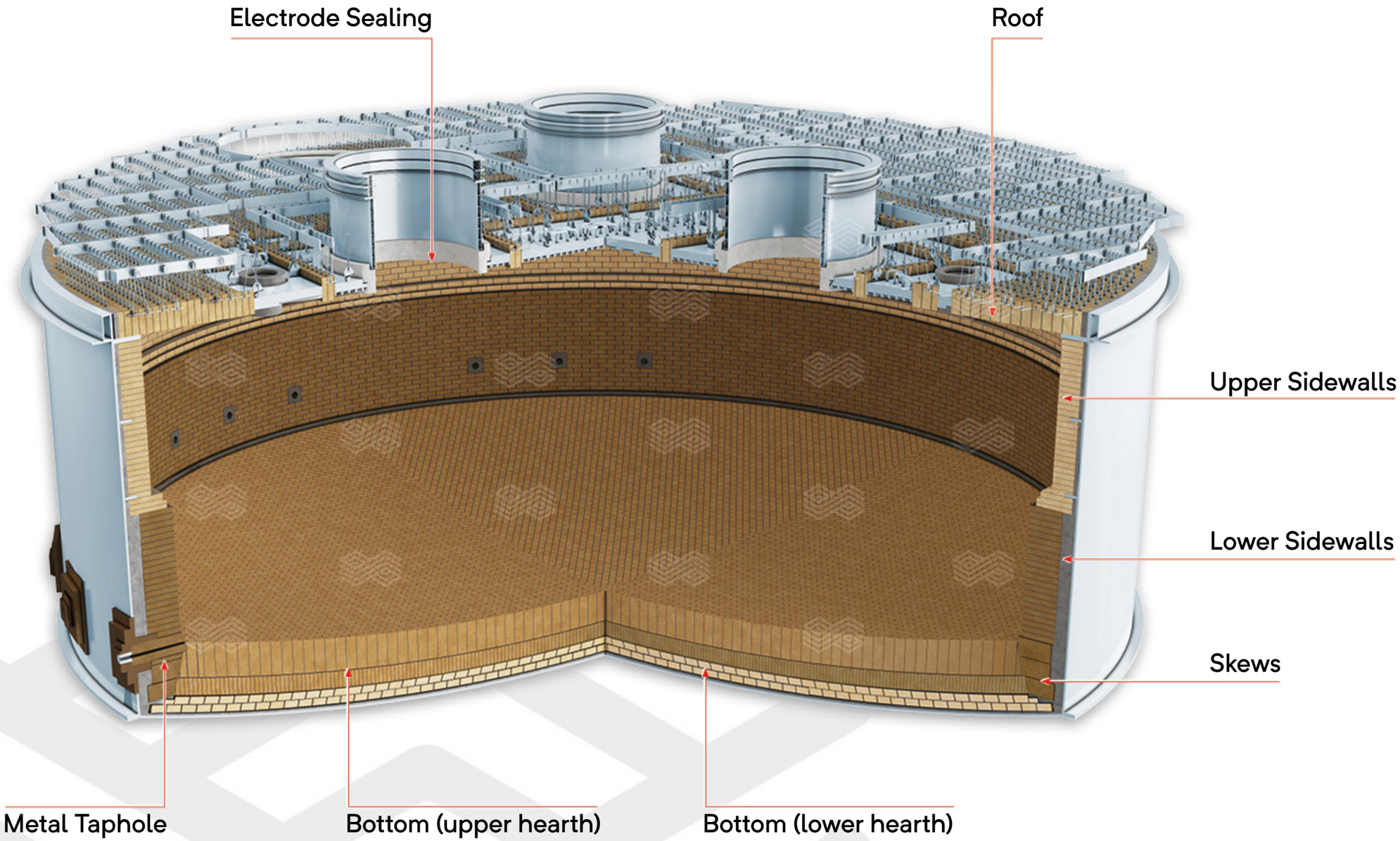
AC Electric Furnace (rectangular)

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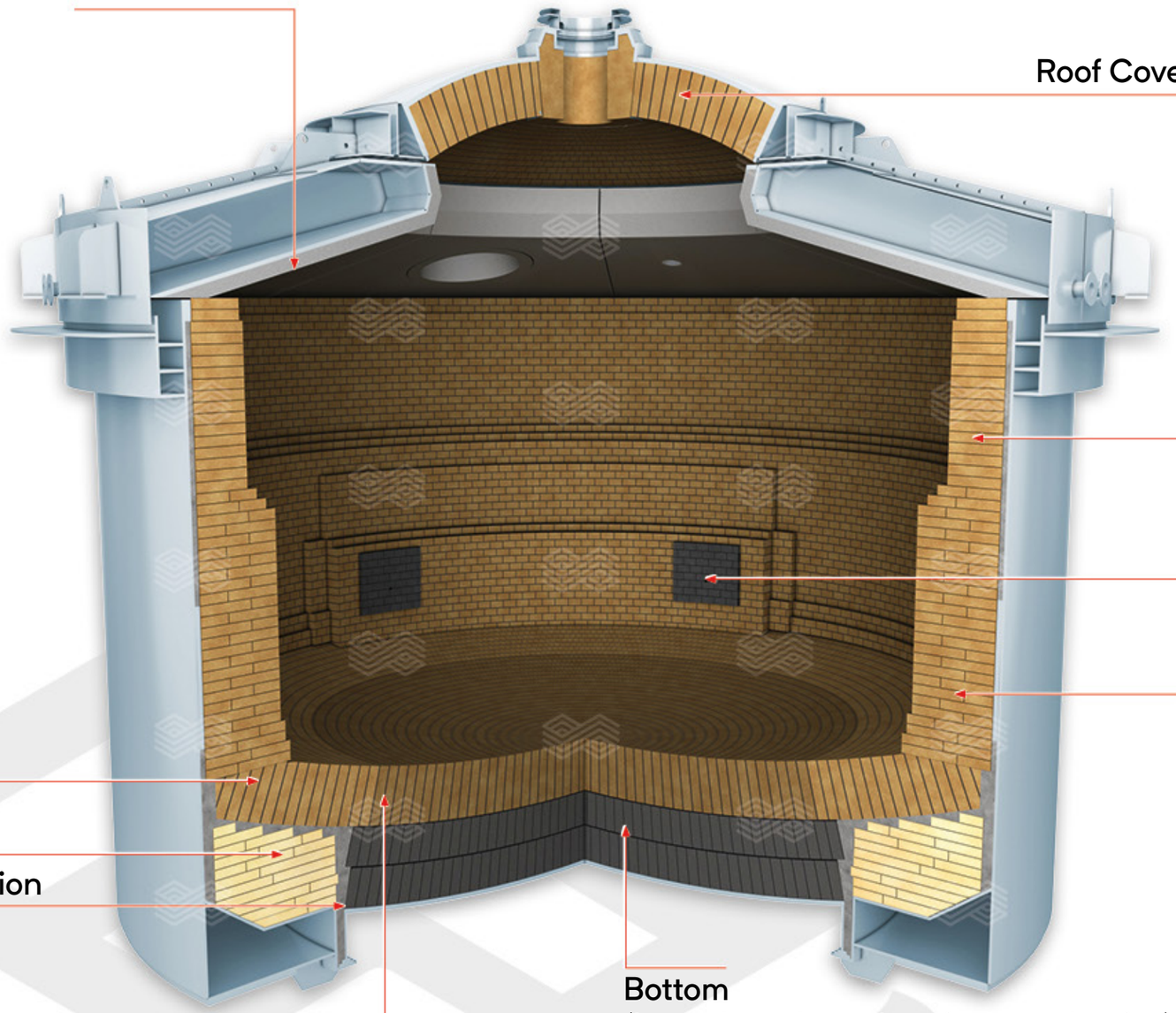
AC Electric Furnace

RHI MAGNESITA



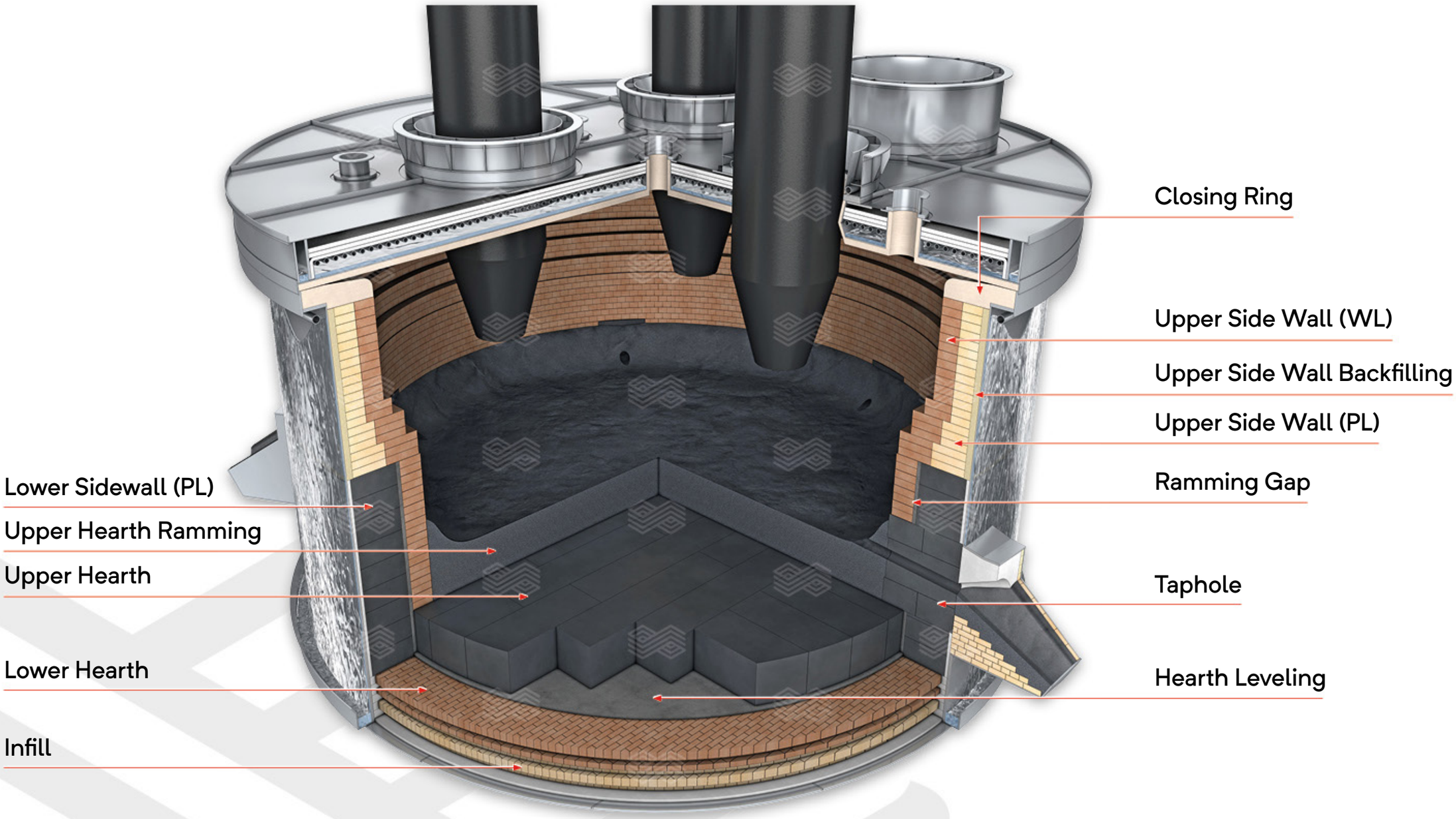
DC Electric Furnace

RHI MAGNESITA



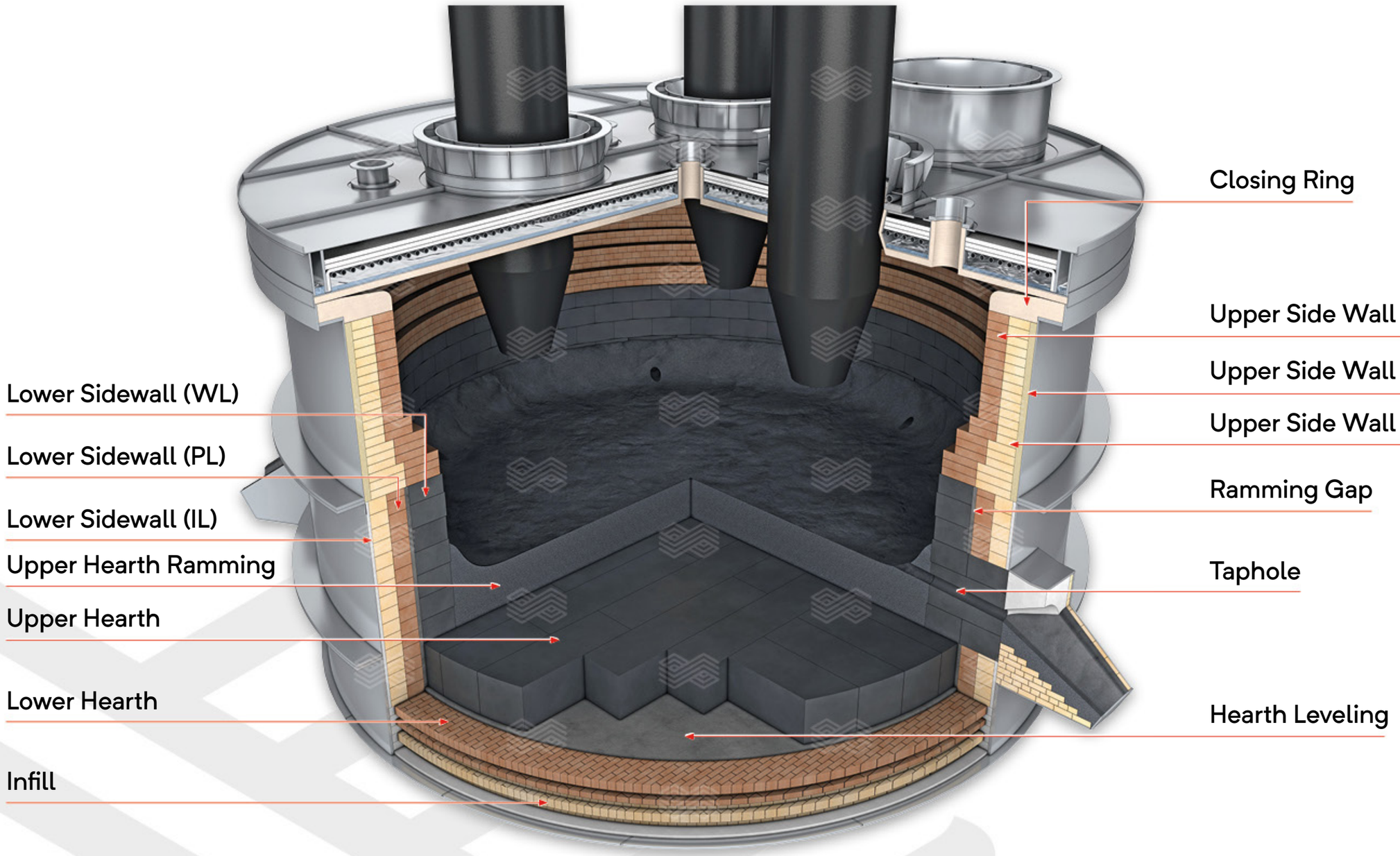
Freeze Lining Concept

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Insulating Lining Concept

RHI MAGNESITA

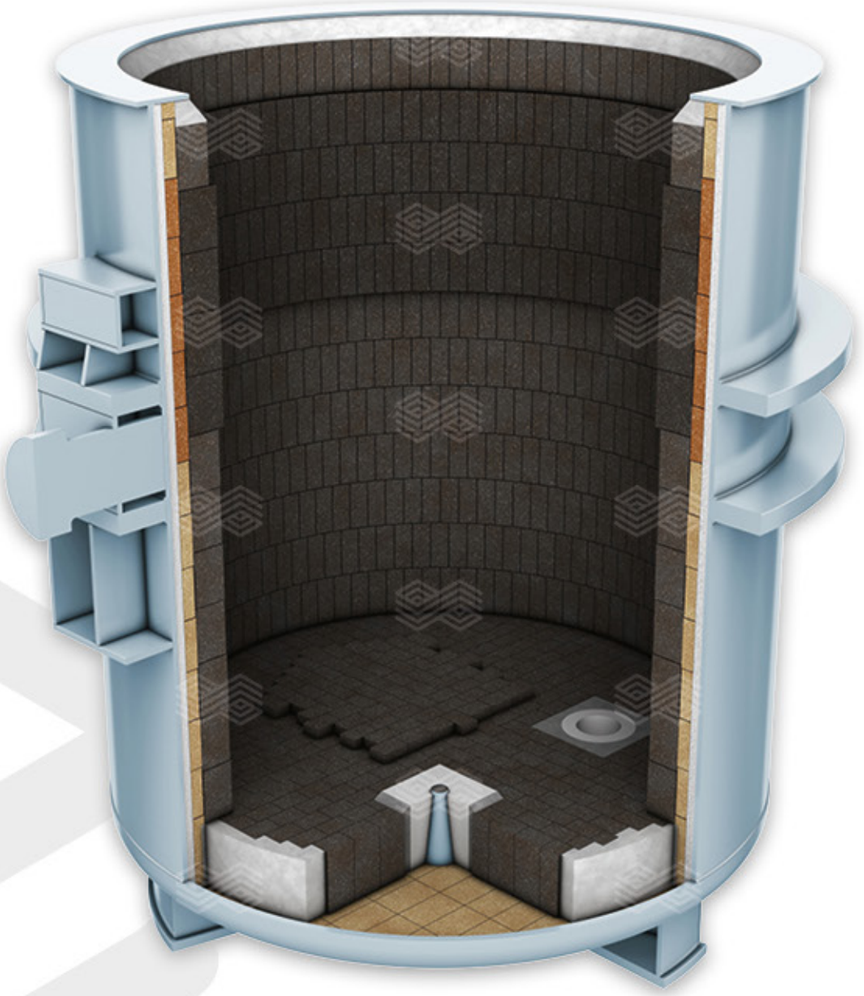


Refining — Converter & Ladle

Refining is carried out in a converter or a teeming ladle and is necessary to reduce the level of impurities in the metal. This process is generally carried out by blowing gases in the metal through purging plugs or lances, and by conditioning the slag to absorb the formed impurities. For some alloys, injection of metallic powder is necessary to de-oxidize or de-sulfurate the bath. Aluminothermy can also be used to reduce oxides with high affinity to carbon, such as niobium and tantalum. Moreover, ladles can also be used exclusively for the transport of metal and slag between different process stages, as for example, from furnace to granulation.

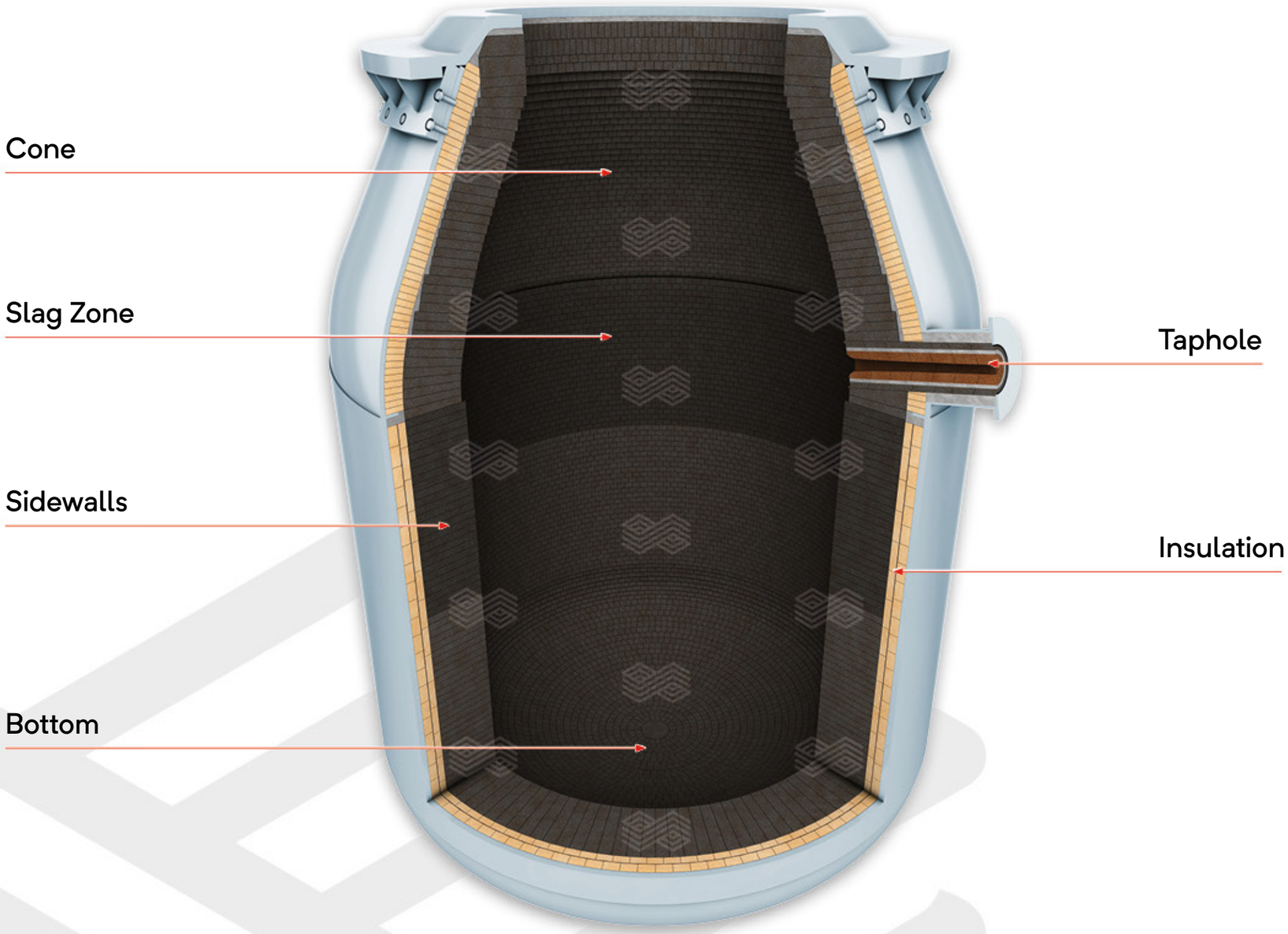
This broad range of operational conditions result in specific refractory solutions for each customer. RHI Magnesita supplies converters and refining ladles mostly in two different concepts: Magnesia-carbon or fired magnesia-chromite. Transport ladles or some special purpose vessels can be lined with bricks (basic or non-basic) or even monolithic materials. Purging plug and slide gate systems increase equipment availability and safety, and are produced by our wholly owned subsidiary INTERSTOP®.





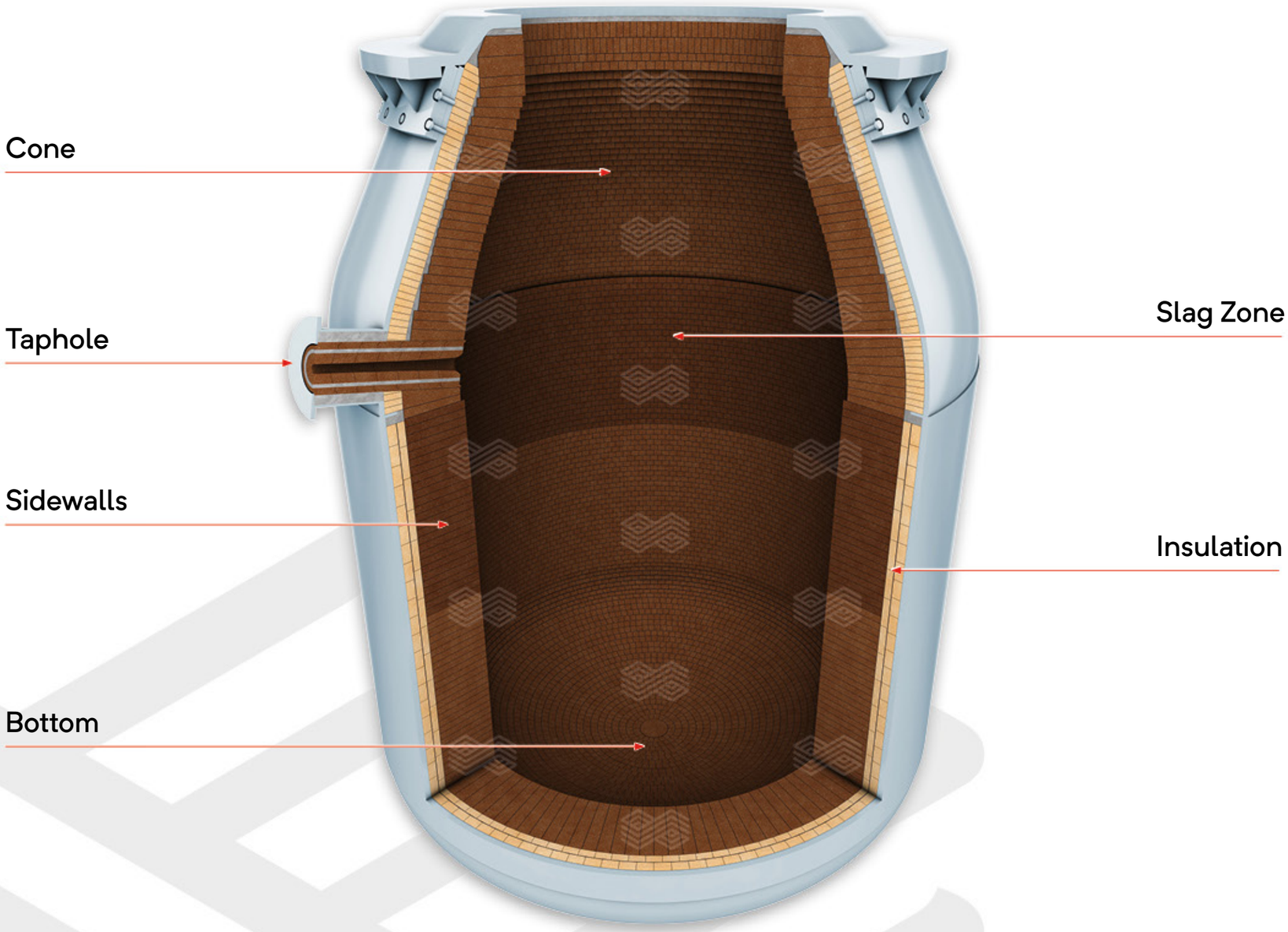
Refining — Converter

RHI MAGNESITA



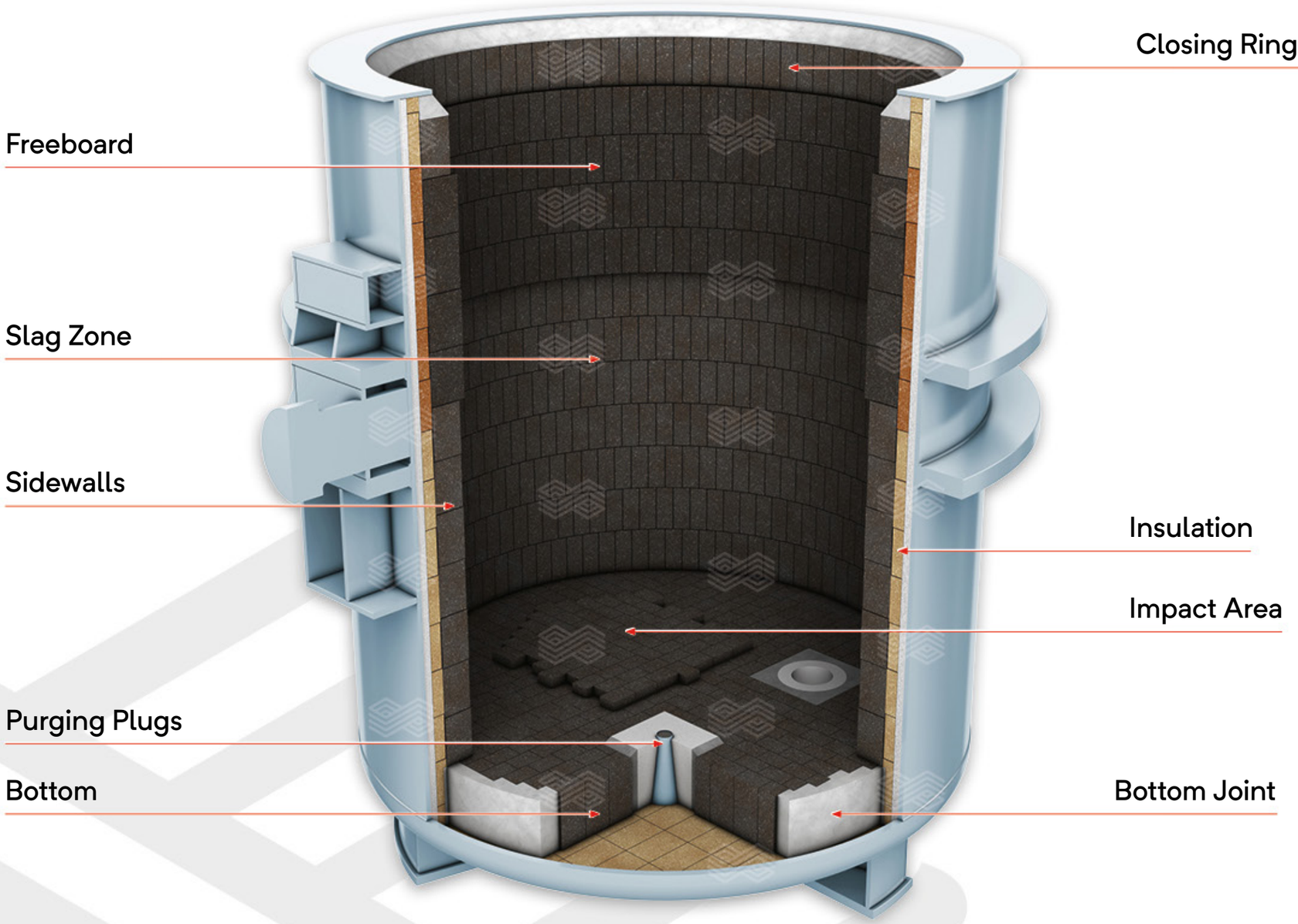
Refining — Converter

Magnesia-chromite (MCr) concept

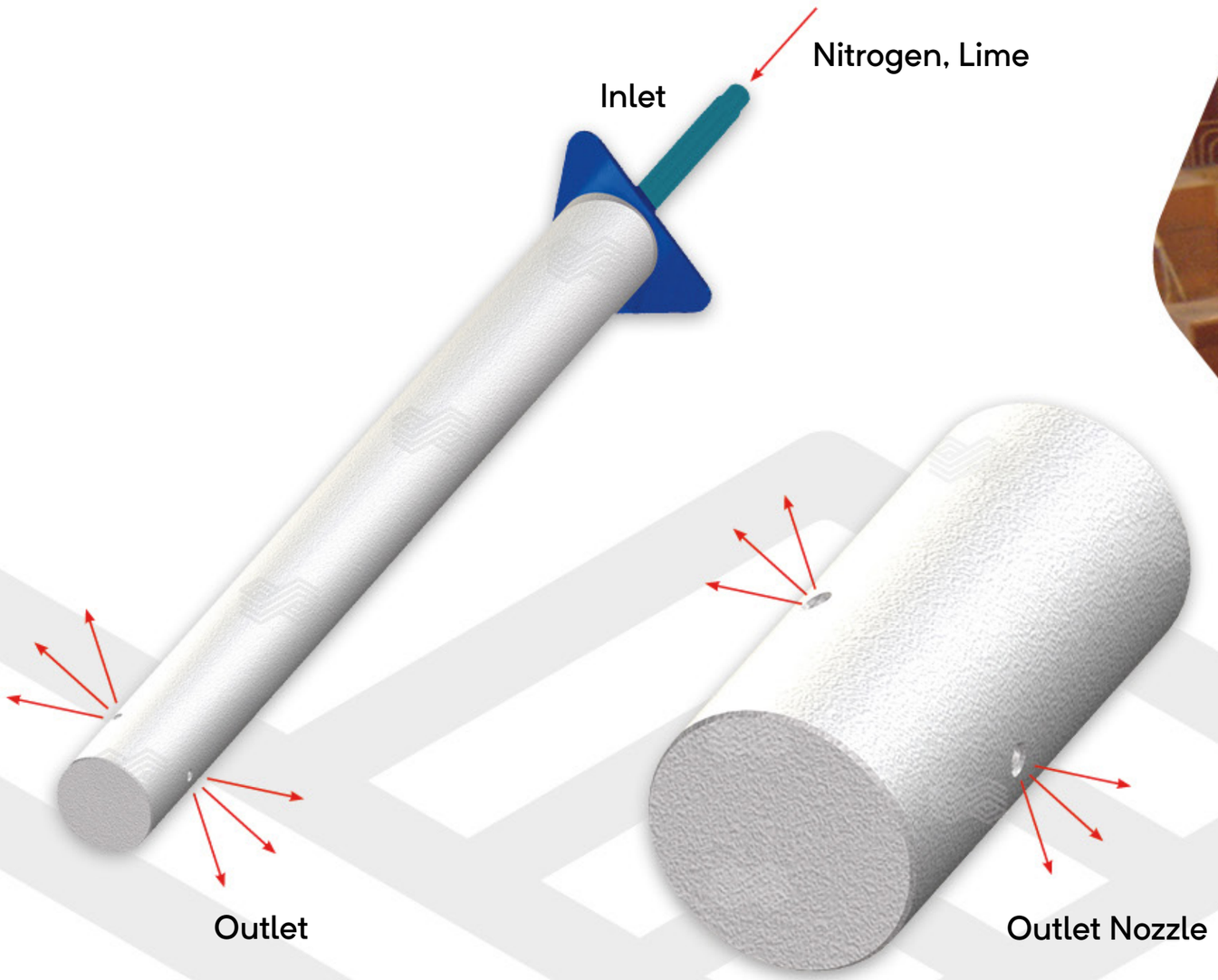


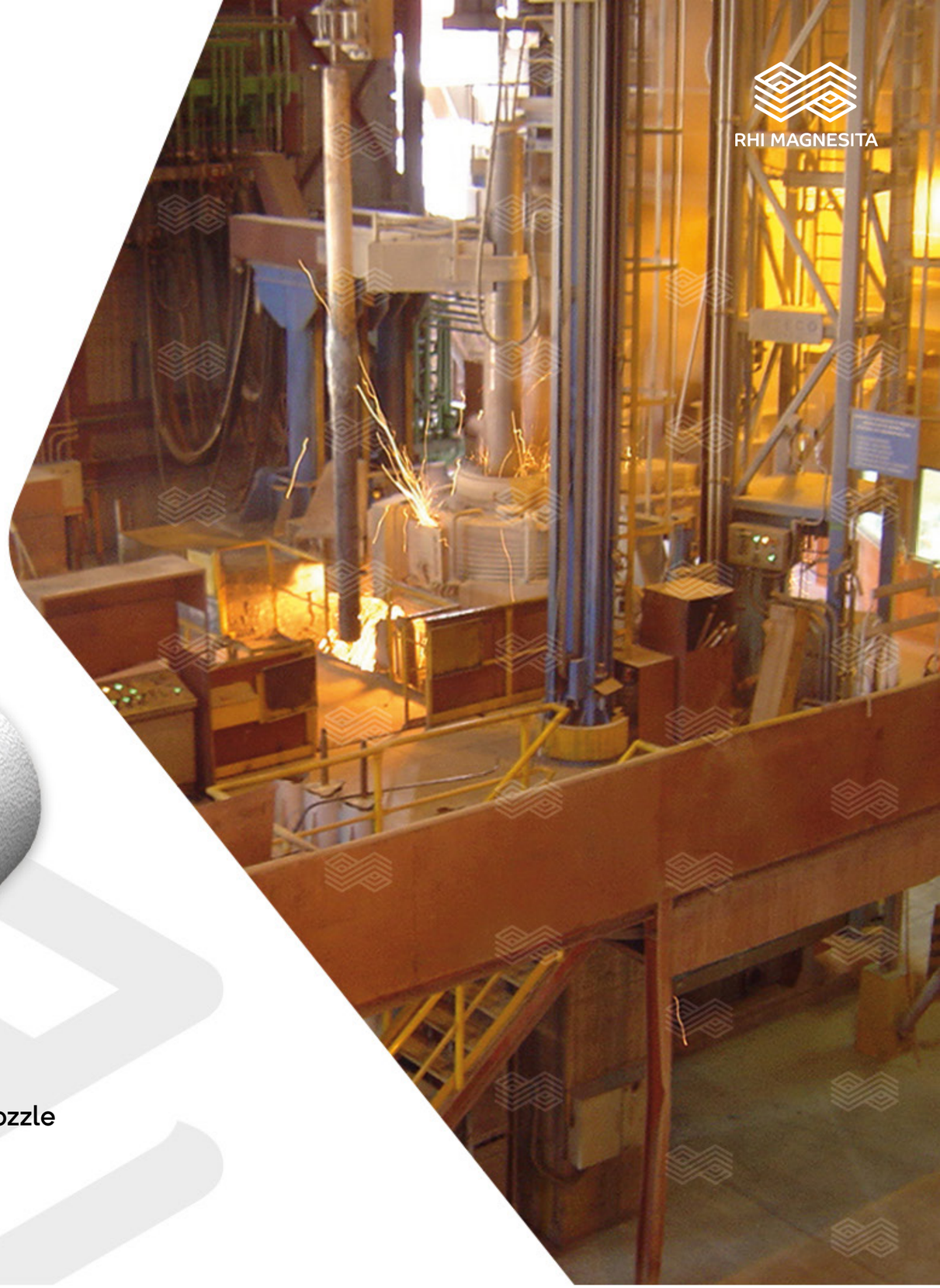
Refining — Ladle

Concept for refining ladle



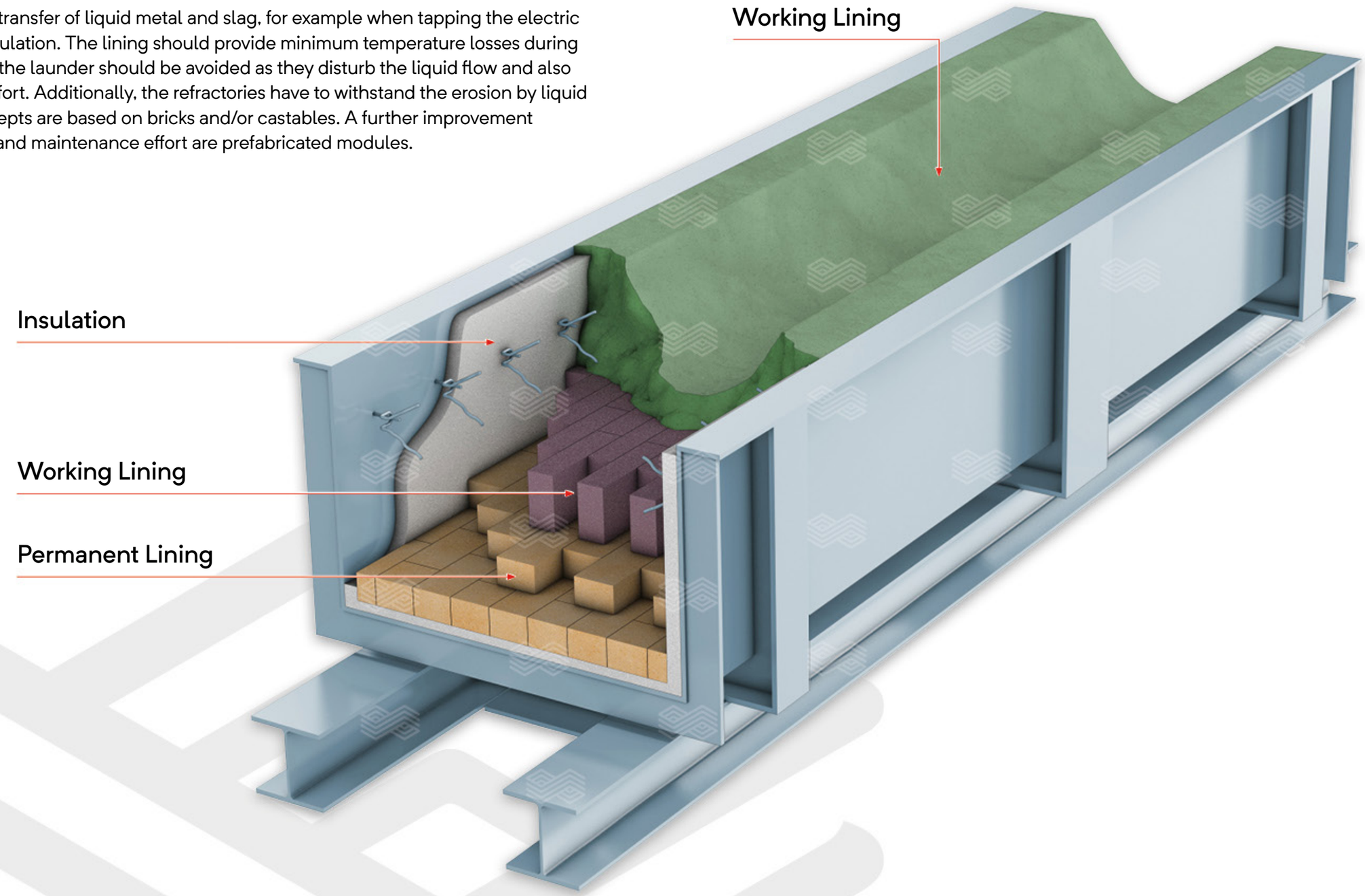
Metal Stirring — Purging Lances





Launders

Launders are used for transfer of liquid metal and slag, for example when tapping the electric furnace or before granulation. The lining should provide minimum temperature losses during transfer. Accretions in the launder should be avoided as they disturb the liquid flow and also cause maintenance effort. Additionally, the refractories have to withstand the erosion by liquid phases. Launder concepts are based on bricks and/or castables. A further improvement regarding installation and maintenance effort are prefabricated modules.



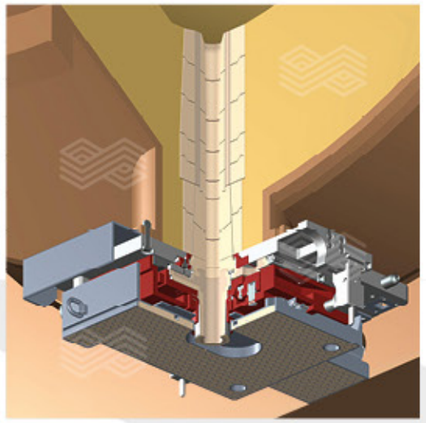
INTERSTOP® — Flow Control Technology from Converter to Mold

INTERSTOP® is the globally leading brand in flow control technology and sets standards to control the flow of metallurgical melts in the steel and nonferrous industries. Slide gate and stopper systems are applied from the melting vessel to the mold. They enable a safe casting process and support the requirements for clean steel production. The company's R&D and the close cooperation with customers result in continuous innovation to meet the increasing requirements in the areas of safety, process reliability and quality. Most recently RHI Magnesita has been supplying innovative gas purging systems for BOF, EAF, ladle and CCM applications under the brand name INTERSTOP®.

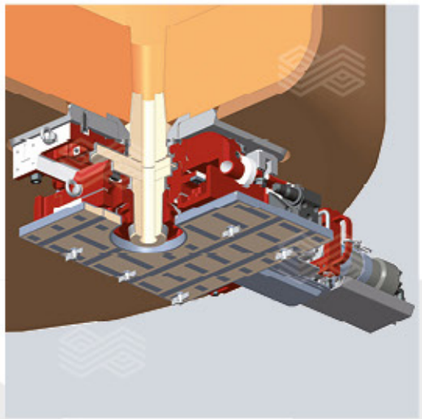
The INTERSTOP® flow control technology is in operation on all continents. The global presence of our service network offers all customers worldwide the best possible support.

Process control technology

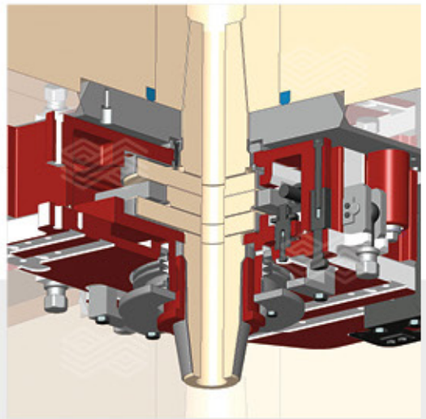
- Automatic mold level control
- Automatic tundish bath level control
- Visualization of casting process
- Connection to LAN
- Slag detection
- Gas purging control systems



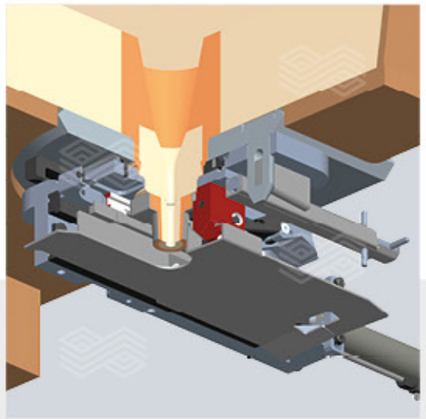
Converter gate systems



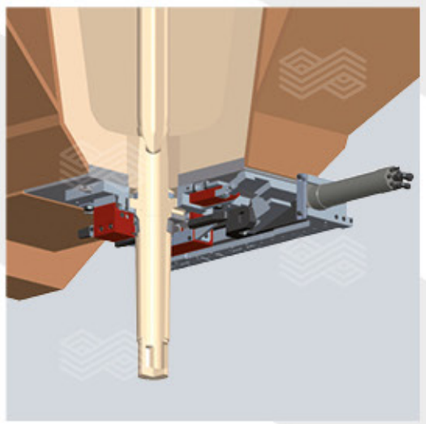
Ladle gate systems



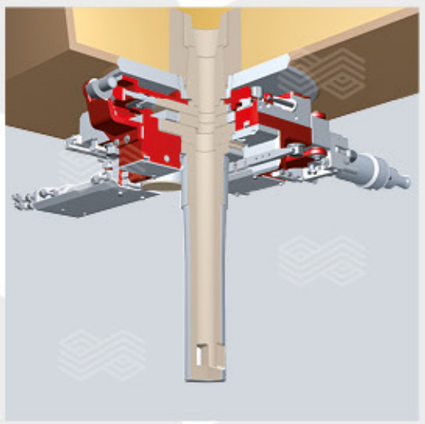
Tundish gate for billets, blooms and slabs



Metering nozzle changer



Monotube changer



Tundish gate with monotube changer



Gas purging systems



Process control

INTERSTOP® — Flow Control Technology from Converter to Mold

RHI MAGNESITA

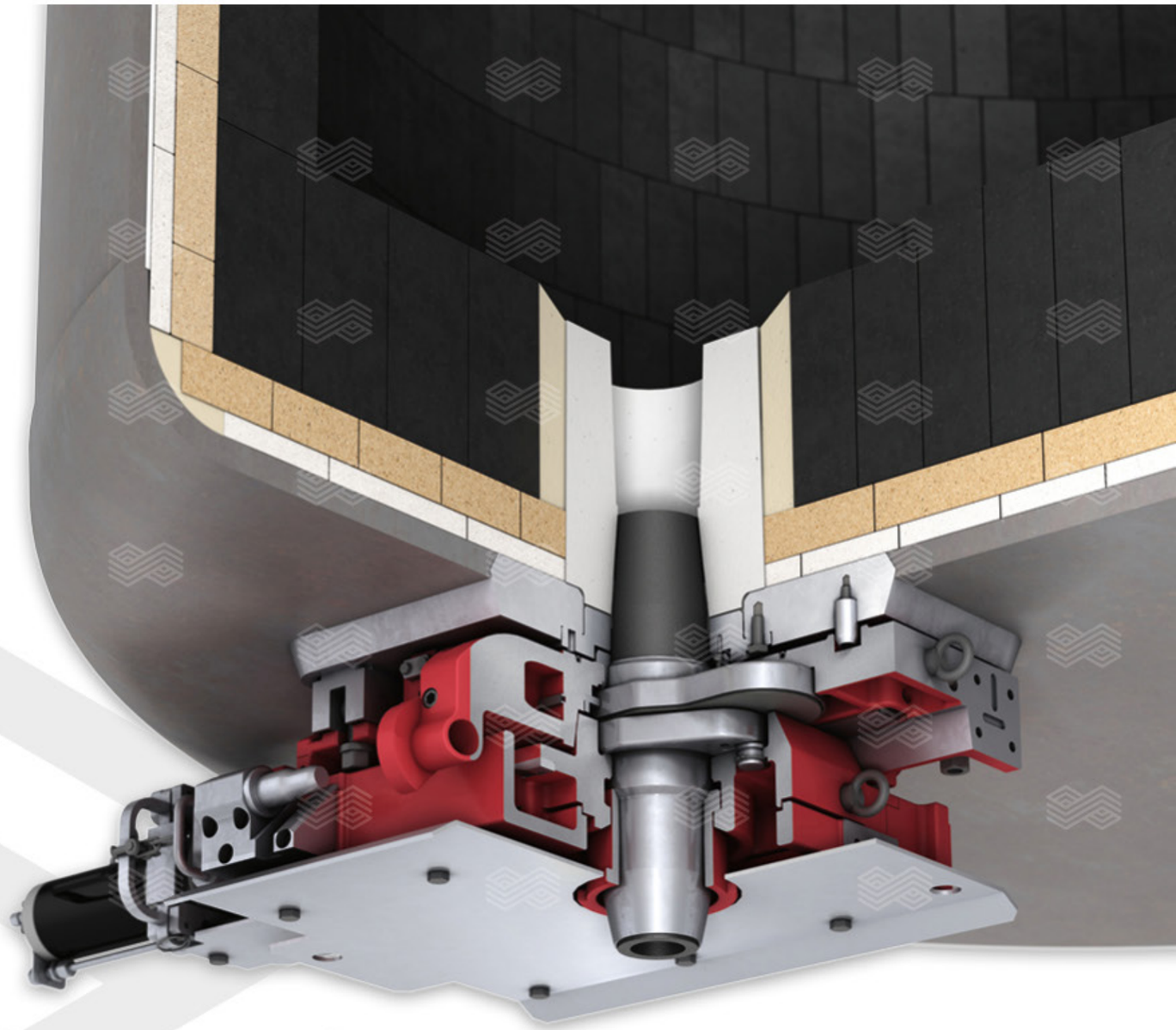
Drive and inert gas technology
- Hydraulic systems incl. cylinder drives
- Electric drives
- Inert gas purging and shielding systems

Additional services
- Project engineering
- Consulting
- Commissioning
- Training
- After-sales service

RHI Magnesita and INTERSTOP® — One Step System Solution

RHI Magnesita offers system solutions for slide gate systems from a single source. The development of refractory components is carried out at RHI Magnesita under the brand name INTERSTOP®. The objective is to provide customer-oriented solutions for
- Converter slide gates
- Ladle slide gates
- Tundish slide gates
- Stopper control systems
- Gas purging systems

More than 45 years of experience with slide gate systems are the base for:
- Highest possible quality
- Superb service
- Maximum operational safety



INTERSTOP Ladle Gate S

Ladle Gate

INTERSTOP® offers ladle slide gate systems having a high-end technical standard.
Depending on the application area, two different system types are offered:

- INTERSTOP S System for continuous casting
- INTERSTOP SLG System for ingot casting

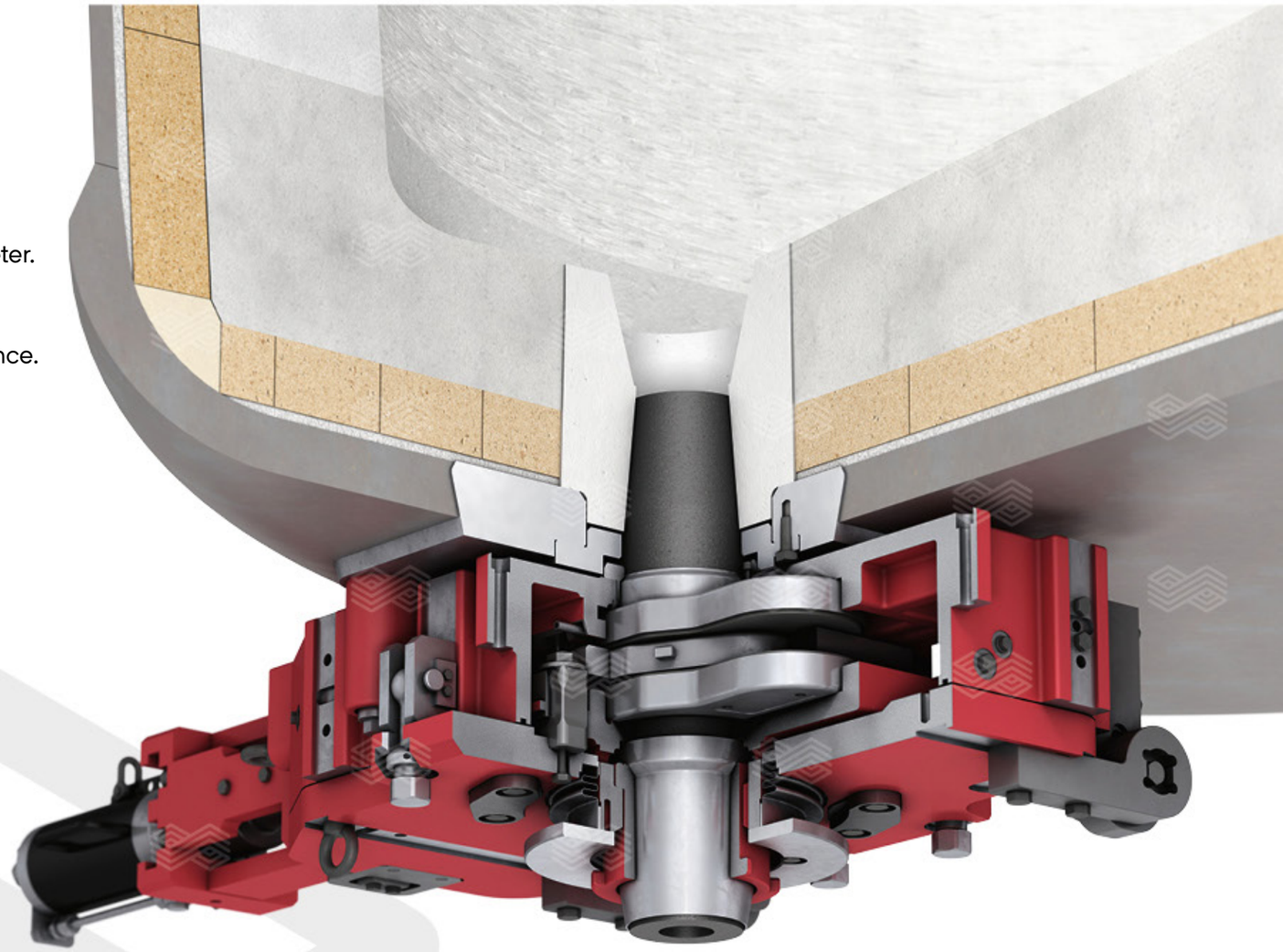
Different sizes of the INTERSTOP S and SLG systems cover any application case.

The selection of the slide gate system is primarily dependent on the optimal casting diameter.
The ideal casting diameter is clearly determined by the following factors:

- Maximum throughput with full ladle for an optimal quick start of casting.
- Optimal throughput with almost empty ladle to maintain the required casting performance.
- Furthermore, metallurgical periphery conditions may have an influence on the selected casting diameter.

Further criteria include:

- Ladle size
- Mounting situation



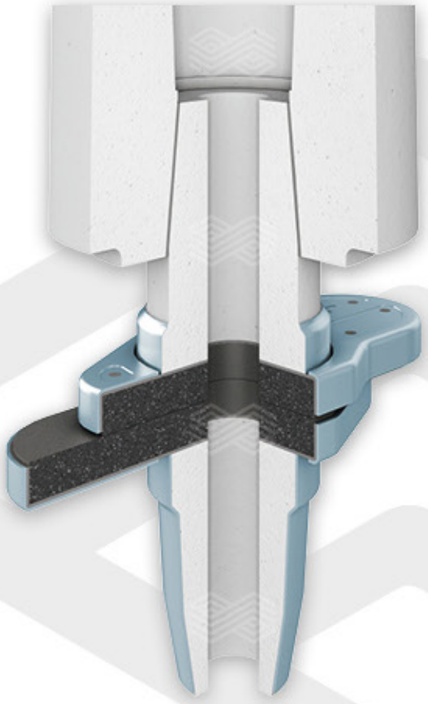
INTERSTOP Ladle Gate SLG

Wear Criteria for Slide Gate Ceramics

The service life of slide gate ceramics in a steel mill is dependent on various thermal and physical-chemical factors.

The following factors have an influence on the performance of slide gate ceramics:

- Steel grade
- Grade selection
- Casting time
- Throttle degree of slide gate plates
- Thermal stress
- Slag carryover
- Ladle cycle time
- Clamping method used for the plates (dependent on slide gate system)
- Slide gate control
- Careful installation of slide gate ceramics/refractories
- External forces on slide gate ceramics/refractories
- Maintenance of slide gate mechanics





Metal Stirring — Purging Plugs

In the ladle refining step different fluxes and reductants are added to remove impurities and to form a slag phase during the treatment. For an optimal distribution of the added materials nitrogen stirring is applied to the melt by bottom purging plugs or top submerged lances.

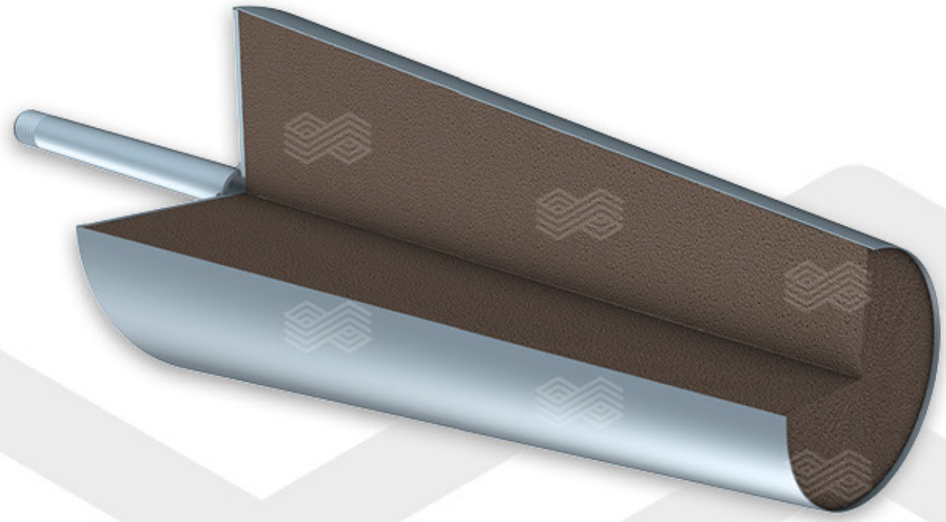
RHI Magnesita offers a complete system solution for ladle purging including the nitrogen and lime injection lances, purging plugs, well blocks and gas control station. Additionally, RHI Magnesita supplies different purging plug types to ensure the best metal stirring and a final homogeneous chemical distribution of the melt.



Metal Stirring — Purging Plugs

Porous Purging Plug

- Optimum pore distribution
- For stainless metal
- High initial purging rate
- High gas flow
- For low gas flow — good metal cleaning effect
- Low costs

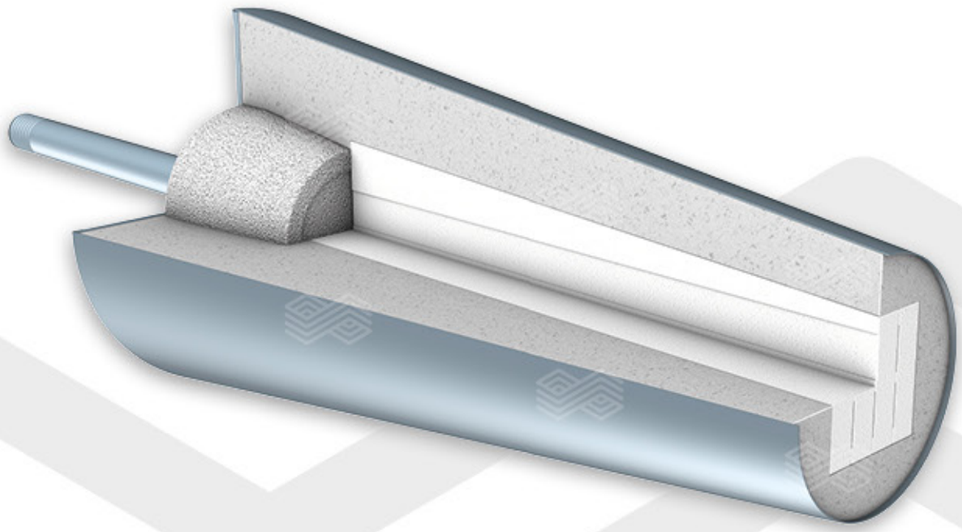




Metal Stirring — Purging Plugs

Segment Purging Plug

- Based on high alumina
- Slot-type gas channels
- High initial purging rate
- Strong bath circulation possible
- Integrated safety features
- Gas flow is easily adjustable

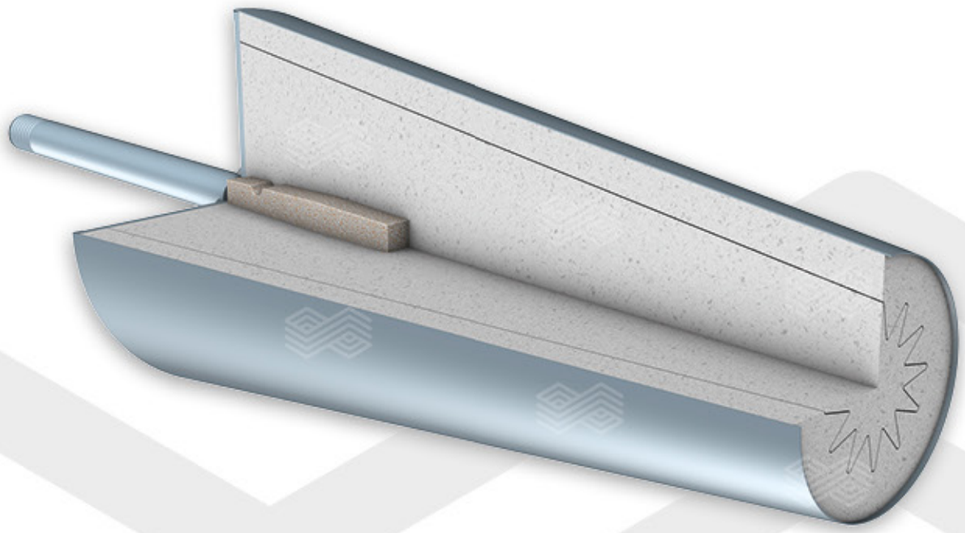




Metal Stirring — Purging Plugs

Starplug

- High-tech variant of slot plug
- Optimized location of gas outlet
- Maximum operational and process safety
- High gas flow
- High initial purging rate
- Integrated safety feature

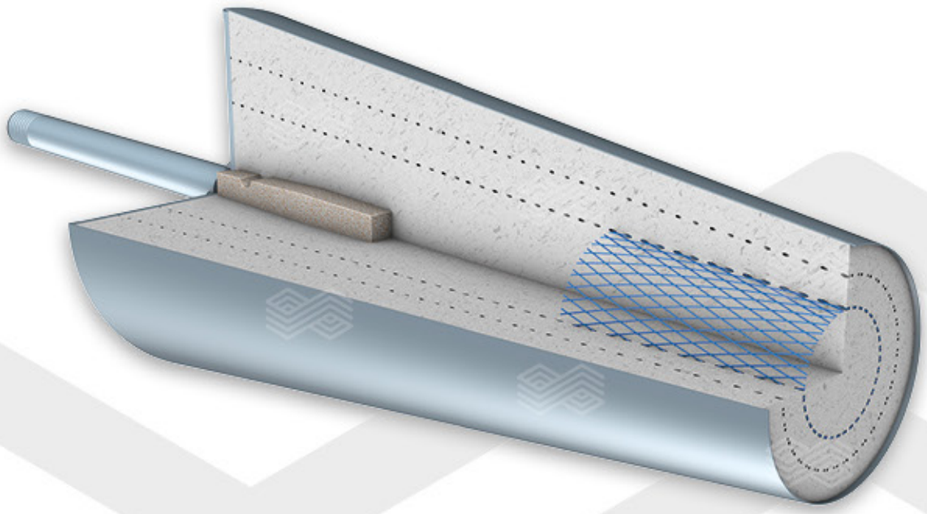




Metal Stirring — Purging Plugs

Labyrinth Purging Plug

- Intricate interconnected gas channels
- High initial purging rate
- Very high durability (high-density material)
- Optimized distribution of bubbles
- Minimized metal infiltration

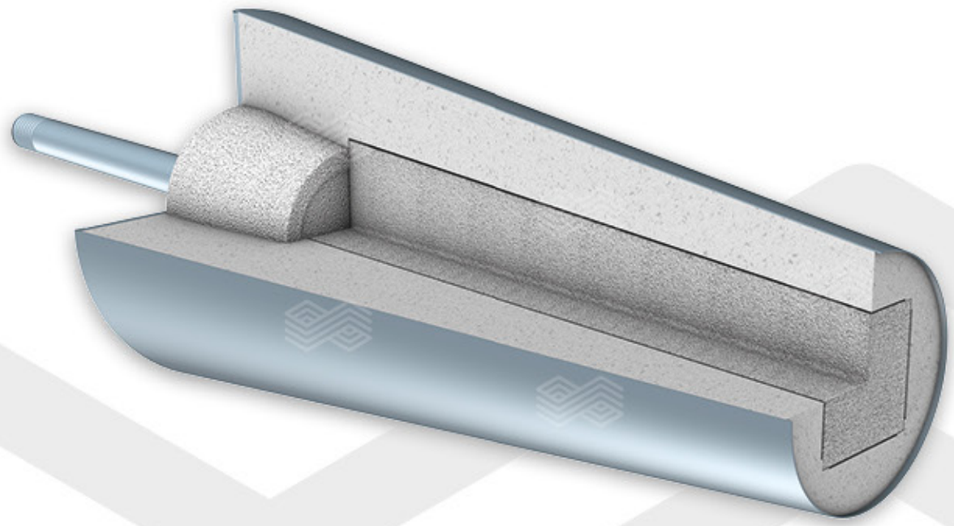




Metal Stirring — Purging Plugs

Hybrid Purging Plug

- Combined porosity
- 100% initial purging rate with insignificant maintenance
- Gas flow is easily adjustable
- Perfect purging performance at low gas pressure
- High/low gas flow is possible
- Integrated safety features





Gas Control Station

Ensuring the constant mass flow of a varying molten metal bath depth is of utmost importance to obtain the desired operational and economic benefits. The gas pressure must be kept constant and therefore it is monitored and adjusted in real time to ensure a continuous stirring.

Technical features

- Standard control system: Siemens SIMATIC S7-300 PLC
- Visualization panel: Siemens TP270
- Minimum inlet gas pressure required: 6 bar.
- Maximum gas flow rate per plug: 300 NLit./min
- Maximum number of gas outlets per station: 12
- Individual adjustment of flow rates for each plug throughout the metallurgical operation
- Reproducible gas flow conditions independent of process conditions
- Individual on/off function for each line
- Automatic blending of the required gas mixtures
- Continuous temperature monitoring of each purging plug
- Integrated wear alarm system
- Emergency bypass in case of power failure
- Bypass function in case of increasing back pressure
- Option for recording and storing gas flow rates [PC required]
- Inert gas purging: nitrogen, argon, and carbon dioxide
- Reactive gas purging: air, hydrogen, and natural gas



Gas control station supplied by INTERSTOP®

Measurement Solutions for Process Optimisation

We have a strong commitment to enhance our customer's productivity, safety and long-term profitability. To achieve this, we developed critical measurement solutions that enables increased automation, improved process efficiency and enhance the safety for personnel within metal production.

Based on our two technology platforms EMLI and VISIR, we developed unique solutions to keep track of your process and ensure the safety of your personnel. We provide process critical solutions from our unique expertise in both electromagnetic and vision technologies, extensive knowledge of industrial processes and close customer cooperation.

Since 2017, AGELLIS® has been a brand of RHI Magnesita's Systems and its Advanced Technologies division. Today, the strategic expansion of RHI Magnesita's product range incorporates more than 30 years of experience in molten metal level measurement, detection and monitoring. Continuous investment in research and development has enabled us to achieve a world leading position within our market niche.

A selection of base metal applications from AGELLIS®:

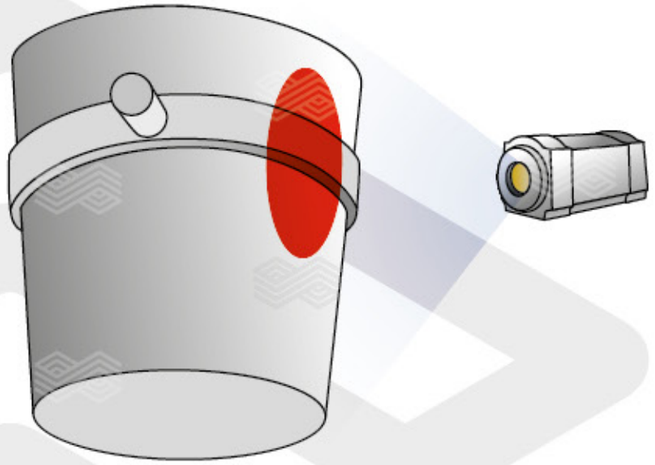
- **EMLI-FurnaceProfile** is a measurement system for recording a complete furnace material profile. It is an automated procedure that only takes seconds to perform and no manual measurements are required, which increases safety for personnel.
- **VISIR-LadleSafe** is an infrared ladle monitoring system, which minimises the risk of liquid breakouts and at the same time allow maximising ladle refractory lifetime.
- **VISIR-LadleDeslag** is a system for real-time ladle skimming monitoring. The system objectively rates slag amount in the ladle and measures metal losses. This helps operators to consistently achieve slag free ladles and increase yield.
- **VISIR-FurnaceSafe** is an infrared furnace monitoring system, which minimises the risk of liquid breakouts and maximises operational furnace availability.

EMLI Our state of the art electromagnetic platform for molten metal measurement systems.

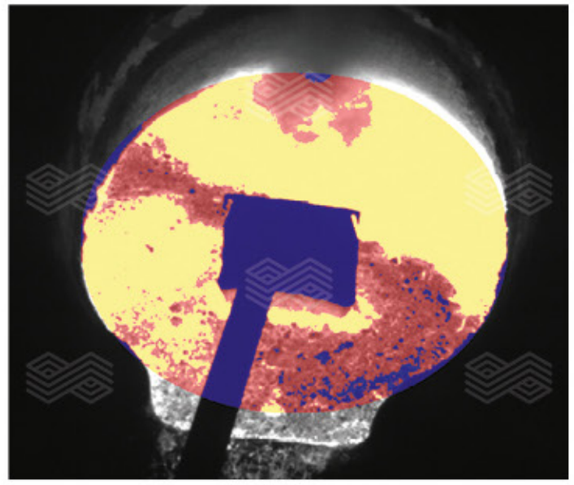
VISIR Our vision and thermographic camera platform for critical process monitoring.



EMLI-FurnaceProfile, mounted on a mechanical delivery system and operator panel with material profile



VISIR-LadleSafe, graphic illustration of principle



VISIR-LadleDeslag, monitoring example of deslagging operations

RHI Magnesita Installation Services — Owned 100% by RHI Magnesita

Founded in the year 1950, MARVO Feuerungs- und Industriebau GmbH now has a total of 145 employees at four locations. In addition to the headquarters in the North Rhine-Westphalian city of Kerpen, the Huebitz subsidiary in Mansfelder Land in Saxony-Anhalt was successfully established in 1994 after Germany's reunification. In 2005 RHI took over 100% of Marvo. In 2011 Marvo established a new operating site in Nuremberg with specialists for the subject area industrial chimney and in 2012 set up a new operating site in Ploiesti/Romania. In 2014 Marvo's company name changed to RHI MARVO. We use our extensive know-how to overcome the toughest challenges encountered during refractory installation. All demands are met and implemented using state-of-the-art machine technology and through the continuous training of permanent staff.

Of utmost importance for RHI Magnesita Installation Services is meeting the demands for quality of our customers while staying within the agreed costs and deadlines throughout the entire installation process. As a supplier with high demands for quality, we perform our tasks according to up-to-date technology and the requirements of the construction contract and local legislation. This provides us with the means to offer our customers the highest degree of flexibility in every phase of the whole construction work, from planning to the implementation of the project.

Controlled responsibilities and quality
Our modern ISO 9001:2008 certified company structure guarantees maximum quality, safety in the workplace and environmental protection. The operational procedures and responsibilities are regulated in our company-specific QM manual with process and working instructions.

Personal and environmental protection
RHI Magnesita Installation Services places the highest priority on personal and environmental protection. We have implemented the SGU management system for safety, health and environment in accordance with legal guidelines to achieve a general reduction of the potential dangers to personnel and the environment. This system conforms to SCCP (Security Certificate Contractors) and BS OHSAS 18001:2007 guidelines. The SGU management system is aimed at practicing and improving the safe, healthy and environmentally friendly operation of companies.

Error prevention instead of error correction
Our philosophy "error prevention not error correction" is based on the knowledge that optimum results can only be achieved where quality is repeatedly checked and evaluated at every stage of the construction process. Error-free completion of our past construction contracts at the agreed deadline serves as an indicator of the effective implementation of our quality policy.

Customer benefit — receipt of a perfect refractory lining
- Mastery of all conventional and prevalent techniques
- Bricklaying of shaped refractories
- Casting, ramming, pumping and gunning of unshaped refractories
- Installation of industrial chimneys
- Demolishing of refractory linings and industrial chimneys
- Installation of ceramic fiber modules
- Welding, including the stud-welding technique
- Access to a state-of-the-art, company-owned equipment park
- Long-standing experience in all industrial areas
- Company training for new employees and continuous training of permanent employees concerning the latest techniques
- Production of molds for on-site casting of pre-shaped forms
- Fast and flexible emergency service 24 hours a day, 7 days a week



Hydration

RHI Magnesita enjoys a leading position and is on the forefront of technological developments in the global refractory market. After long years of successful research and development efforts, a unique, optimized hydration protection treatment for magnesia and magnesia-chrome fired bricks is offered only by RHI Magnesita. Specified by the suffix “R1” after the brand name, this treatment is a special feature of all basic fired bricks supplied to the ferroalloy industry. This treatment represents a very efficient protection against hydration, hydration being a serious problem for basic refractories, with consequences that range from low performance to furnace run-out. Refractories are exposed to the risk of hydration during most of their life cycle. During transport and storage, by contact with liquid water or vapor; during installation by contact with moisture from atmosphere, mortars and castables; during heat-up by water vapor brought into the furnace by gaseous fuels or evolved from the lining; and during operation, coming from moist raw material or from failures in the cooling system or furnace shell.

The main hydration mechanism is the transformation of the magnesia into brucite (see equation) which is directly related to a volume expansion of 115%.

$$MgO + H_2O <—> Mg(OH)_2$$

The risk of hydration damage can be minimized by using our special brick hydration protection treatment. This treatment is not limited to a simple surface protection, but it goes through the brick structure and is maintained even if there are intensive mechanical operation conditions.

The hydration test is performed in a state-of-the-art steam chest, which operates with saturated steam under ambient pressure. This testing method was established because of its practicability and easy determination of crack formation. The test is conducted in 24-hour intervals up to 96 hours.

The bricks without any impregnation show hydration signs already after 24 hours, while the impregnated version endures 96 hours without any hydration. RHI Magnesita also offers special hydration-resistant brands, indicated with the suffix “HR” after the brand name, tailored for special furnace area application. Please contact your RHI Magnesita sales representative for more information on the “R1” protection treatment and for the “HR” special brands.

Any whitish discoloration of the brick surface is the result of the protection treatment and has no negative effect whatsoever on the brick quality. The brick characteristics, as specified in our data sheets, remain almost unchanged by our treatment.

The long shelf life of magnesite bricks achieved by this special protection system is a further advantage, especially in regions with high humidity even if stored in precipitation-protected areas. Additionally, RHI Magnesita offers special packaging to increase shelf life of basic refractory brands. This special packaging is called ALUVAC. The bricks are sealed in a special wrapping (high strength) under vacuum.



Magnesia brick with “R1“ impregnation after 96 hours



Magnesia brick “R1“ impregnated



Magnesia brick not impregnated after 24 hours

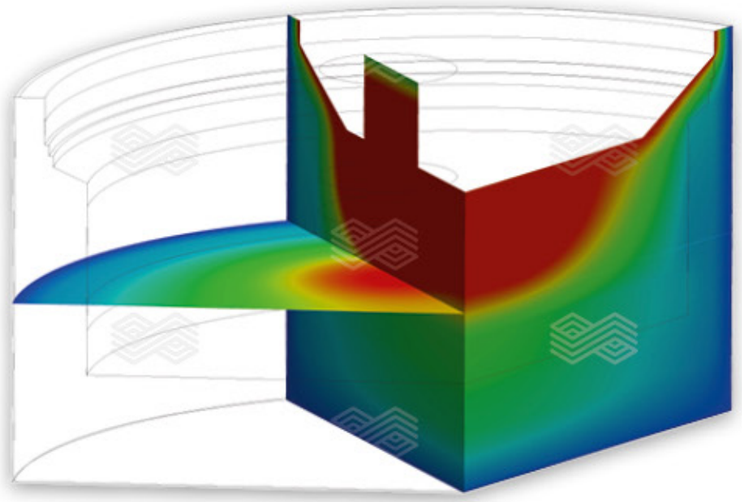


Magnesia brick with “HR” Technology after 600 hours in the steam chamber

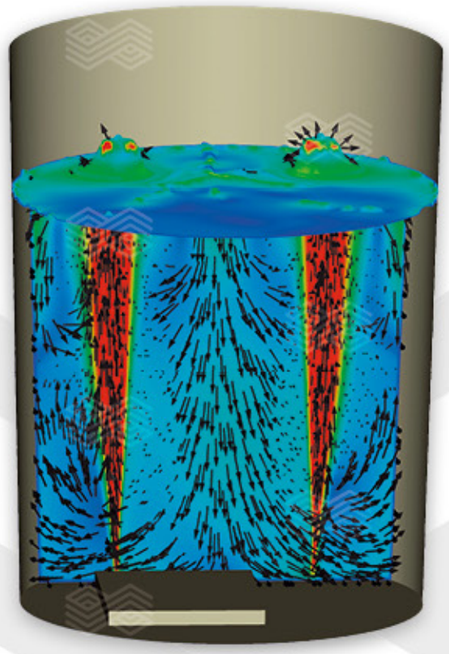
CFD, FEA & FactSage Modelling

RHI MAGNESITA

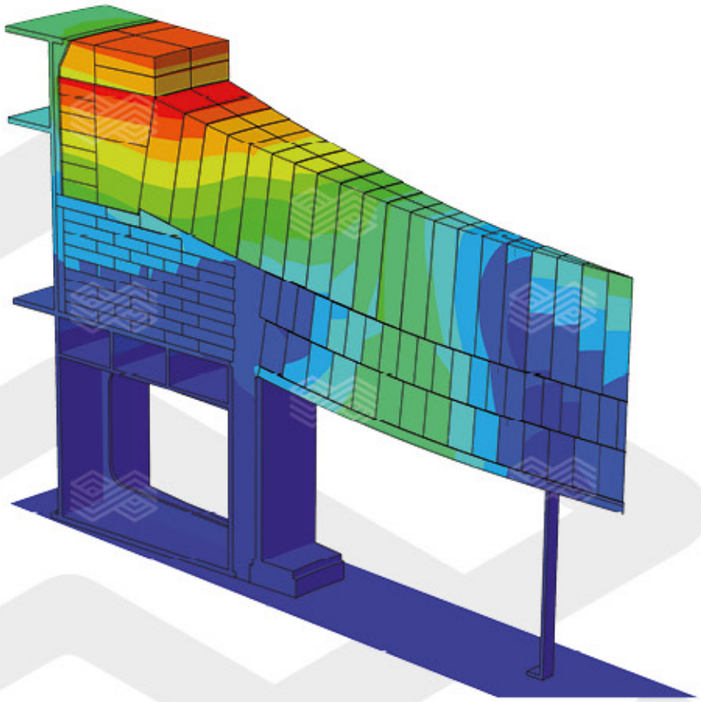
The simulation of complex metallurgical processes, temperature profiles, isothermal calculations, definition of heating procedures, efficiency of cooling systems and their impact on the refractory design, as well as the efficiency of purging system designs by applying computational fluid dynamics (CFD), are very important components of RHI Magnesita's customer-oriented package at the Nonferrous Metals Technology Center. In close cooperation with our customers, both finite element analysis (FEA) and CFD modeling have become essential tools in the achievement of vessel integrity and the development of tailored refractory lining systems as a result of the given operational parameters. Furthermore, RHI Magnesita calculates slag conditioning and models of the refractory corrosion mechanism with the help of FactSage.



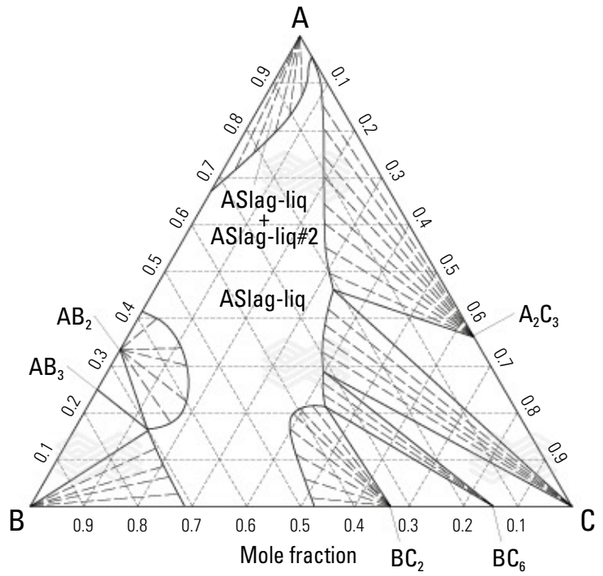
Thermal profile



Ladle purging — flow patterns



Displacement profile



Thermodynamic calculations

Technology Leadership

The objective of research and development (R&D) is to obtain a competitive advantage based on technology leadership for RHI Magnesita and its customers.

The challenge for refractory material manufacturers is to design optimum refractory products from suitable raw materials for each of the customer's production processes. The optimum formula is decisive. RHI Magnesita possesses more than 20,000 formulas allowing them to offer customized products tailored to meet the requirements for the respective application.

RHI Magnesita invests more than 1% of its annual revenue into extending the global technology leadership. This position is based on decades of successful research and development work, which has continuously enhanced refractories knowledge — from raw materials to applications in all relevant industries — and, above all, refractories expertise in the application processes.

Integrated Management System (IMS): Quality
Quality, environmental conservation and work safety are integral parts of the corporate policy of RHI Magnesita. Our company and all its employees are committed to pursuing the principle of contributing to quality, environmental conservation and industrial safety, and thus to increasing the value of the company by their activities.

The quality standard ISO 9001, the environmental standard ISO 14001 and the legal requirements regarding occupational health and safety including legal security have been installed within the RHI Magnesita Group.

The objective of RHI Magnesita is to take maximum advantage of market opportunities by satisfying the customer and thus maintaining and improving the future of the company and welfare of its employees by providing products of constant high-end quality. Personal and plant safety are also central topics of the integrated management system.

Training, apprenticeship programs
Measures for the education and further training of our employees are of great importance to us. Their expert knowledge and abilities are constantly updated and adapted to the technological developments.

In addition, young people who are "especially disadvantaged" are to be integrated, thus giving them a fair chance for a better future.



References in the Ferroalloy Industry

RHI MAGNESITA

Canada
- RIO TINTO FER ET TITANE
- FERROGLOBE - BÉCANCOUR

USA
- ERAMET MARIETTA INC.

Mexico
- COMPAÑIA MINERA AUTLAN S.A.B.

Dominican Republic
- FALCONBRIDGE DOMINICANA

Guatemala
- PRONICO

Venezuela
- MINERA LOMA DE NIQUEL C.A.

Colombia
- CERRO MATOSO S.A.

Paraguay
- ALEACIONES IGUAZÚ

Brazil
- NOVA ERA SILICON
- MINASLIGAS
- GRUPO RIMA
- LIASA
- ANGLO AMERICAN BRASIL LTDA. – BARRO ALTO
  ANGLO AMERICAN DO BRASIL LTDA. – CODEMIN
  VALE S.A. – ONCA PUMA Brazil
- VALE MANGANÊS
- FERBASA
- CBMM - COMPANHIA BRASILEIRA DE METALURGIA E MINERAÇÃO

Island
- ELKEM ICELAND LTD.

United Kingdom
- SPECIAL METALS WIGGIN LTD.

Germany
- ELEKTROWERK WEISWEILER GMBH

France
- ERAMET RESEARCH S.A.S.
- BEFESA VALERA S.A.S.
  VALDI S.A.S.

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Austria
- TREIBACHER INDUSTRIE AG

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- ELKEM BJÖLVEFOSSEN AS

Sweden
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Kazakhstan
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- TAU-KEN TEMIR, TOO

Russia
- SOUTHERN URALS NICKEL PLANT
- LLC VANADYI TULA

Greece
- LARCO - GENERAL MINING & METALLURGICAL COMPANY

Turkey
- ETIKROM YILKROM MADEN VE ENERJI YATIRIM

Egypt
- SINAI MANGANESE COMPANY

Saudi Arabia
- GULF FERRO ALLOYS COMPANY
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Zimbabwe
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South Africa
- MOGALE ALLOYS PTY LTD.
  SAMANCOR CHROME LTD.
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  EXXARO RESOURCES LTD.
- TRONOX MINERAL SANDS PTY. LTD.

China
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  VALE INCO NEW NICKEL MATERIALS
- YUNNAN XINLI NONFERROUS METALS CO. LTD.

Japan
- HYUGA SMELTING CO. LTD.

South Korea
- SNNC POSCO KOREA NICKEL CORPORATION KZ ENGINEERING CO. LTD. SNNC CO. LTD.
- DONGBU METAL CO. LTD.
- POSCO CHEMTECH CO. LTD.

India
- SARADA METALS & ALLOY LTD.

Indonesia
- P.T. ANEKA TAMBANG P.T. VALE INDONESIA

New Caledonia
- KONIAMBO NICKEL S.A.S. SOCIETE LE NICKEL SLN S.A.

FeCr	Феррохром / Ferrochromium	
FeMn	Ферромарганец / Ferromanganese	
FeNi	Ферроникель / Ferronickel	
ILM	Ильменит / Ilmenite	
	Прочее / Others	

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