



EREDI SCABINI NEWS

Since 1945, the refractory specialist at your disposal.

Advanced refractory solutions from Eredi Scabini.

Eredi Scabini, was one of the first companies to introduce unshaped (monolithic) refractories as an alternative to conventional bricks. Today, the company specialises in the design and production of monolithics, preformed shapes and composites based on its own exclusive formulations. More than 30 percent of the material produced is transformed into preformed products for the lining of furnaces and containers for molten metal - in a broad range of shapes up to 15 tonnes each.

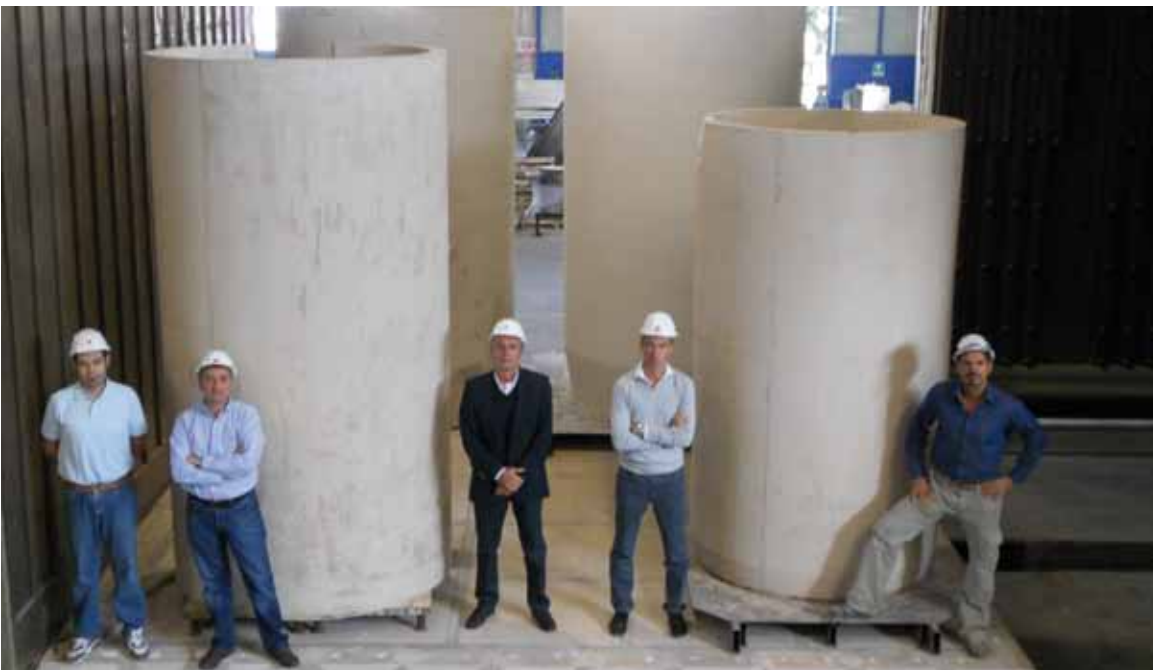
Preformed shapes offer a number of advantages, and the growing demand for high-quality, ever larger shapes confirms that Eredi Scabini's approach is the right one. The aim is to replace bricks with larger-sized pieces to reduce the number of joints and construction time, thus increasing furnace life and productivity on the one hand, and reducing the resultant costs on the other.

The company is market leader in this segment and points to a customer reference list that includes well-known companies such as ALCOA, ALERIS, AURUBIS, COMPONENTA, CONSTELLIUM, DUBAL, FONDERIE TACCONI, FORGIATURA VIENNA, HAYES LEMMERZ, KME, MAHLE, NOVELIS, TENARIS, THYSSENKRUPP, TRIMET, WIELAND-WERKE, ZANARDI FONDERIE.

Thanks to its technology, product range and know-how coupled with a reputation for listening and responding to customers' needs, Eredi Scabini can offer products and solutions tailored to any plant. This includes a complete 'turnkey' service, from the careful analysis of the specific requirements through to the design, production and installation of the refractories, which is backed up by a comprehensive after-sales service. Eredi Scabini's refractory solutions are developed entirely in-house. The design is executed with the aid of sophisticated 2D and 3D CAD and FEA systems. All the monolithics, including those used for the production of preformed shapes, are produced in the company's own plants and are based on exclusive formulations. The company owns the intellectual property rights to hundreds of products, and is constantly developing new formulations to fully meet every type of requirement. Installation and commissioning are carried out by specialist engineers with the aid of equipment designed by the company itself.

Eredi Scabini offers innovative, high-performance solutions for many applications in a several industries. The solutions are 'kits' for the modular refractory lining of furnaces or specific plants. They are created and controlled in the company's plants and then transported to customers' sites and assembled. A kit comprises several products, both monolithics and preformed shapes. The quicker and easier is to assemble a kit, the greater is the benefit for the customer.

To have a broader picture of Eredi Scabini's cutting-edge solutions, you can read some of our most significant case histories in the following pages.

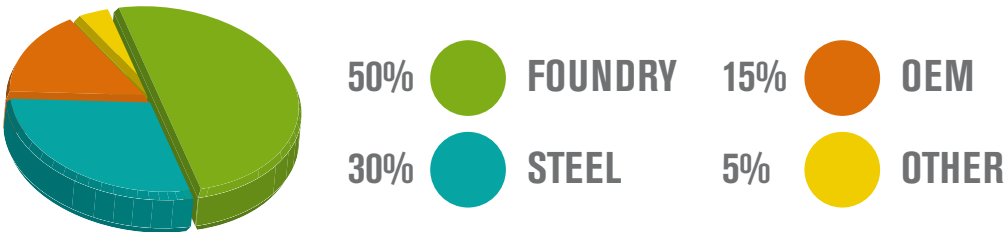


Dense preformed shapes for applications requiring high analytical purity, excellent resistance to abrasion and outstanding non-wetting properties.



Advanced Block Technology: modular preformed and prefired solution for reverberatory furnace linings.

90% OF OUR BUSINESS IS IN MOLTEN METAL APPLICATIONS.



Our mission:
“Everything that is worth doing at all, is worth doing well.” (P. Stanhope, 1694-1773)

Eredi Scabini R&D Lab: an inexhaustible workshop for new ideas.

Our company has always implemented a policy strongly oriented towards quality and the continual innovation of its offering. In the Research and Development laboratory, the heart and soul of the company, engineers and researchers, with in-depth knowledge of ceramics, mineralogy and chemistry, work constantly in close contact with the very best international universities and external research laboratories to identify new products for specific requirements. The sophisticated equipment, the development of new installation techniques and access to a vast range of high quality raw materials guarantee Eredi Scabini unrivalled flexibility in the development of more and more complex materials, constantly at the state of the art. Responsive to the evolving market and with a clear orientation towards new technologies, during the last few years Eredi Scabini's research work has focused above all on the development of nanotechnology and the application of its basic principles in the refractory sector. This has been a project on a vast scale, in which the company has invested and is continuing to invest im-

WE VIEW NANOTECHNOLOGY AS SIMPLY A MEANS TO THE DEVELOPMENT OF A NEW PRODUCT CONCEPT WITH FEATURES THAT WRITE NEW CHAPTERS IN THE HISTORY OF REFRACTORY MATERIALS.

mense human and financial resources and which is already yielding amazing results. Today nanotechnology itself is no longer new, and plenty of companies have already used and sold it in their products. We are not content with this, we are doing much more. We view nanotechnology as simply a means to the development of a new product concept with features that write new chapters in the history of refractory materials. A product, or rather an extended family of products with such revolutionary characteristics that we feel it is reductive to describe them as just "nanostructured castables".

Eredi Scabini owns hundreds of exclusive proprietary products. The nanoplastic products further extend its offering, giving its customers a vast range of options for dealing with every requirement in the best possible way, in terms of both performance and cost.

We will be coming back to this topic with further information very soon...

highlights

- Advanced refractory solutions from Eredi Scabini. PAGE 1
- Eredi Scabini R&D Lab: an inexhaustible workshop for new ideas.

case histories

- Our Resistone™ line leave other flooring products far behind!** PAGE 2/3
- Eredi Scabini excels itself with Alfablast™ nanoplastic monolithics.**
- With Flustone, linings are easier to apply and tougher.**
- Eredi Scabini Solution for Aluminium melting furnace lining.**
- With Eredi Scabini's modular preformed and prefired solutions ABT you can forget about your furnace lining!**
- New 2lite® insulating foam Effective, safe innovation.**
- Better performances with Ultrablock® preformed shape for casting launder system.**
- Flexstrong®: durability guaranteed.**
- CPS (Crucible Preformed System): an innovative solution for coreless induction furnaces lining with no rivals on the market.**

- The company that gives you a hand!** PAGE 4
- Eredi Scabini sees to everything!**
- Looking for an advanced level solution? We have it.**
- Big investments for the production of even bigger pre-formed shapes.**
- A success story.**

Our **Resistone™** line leave other flooring products far behind!

As well as formulating refractory castables and preformed shapes, the company has a full range of products specifically developed for industrial floors exposed to heavy mechanical and chemical stresses in the presence of heat: the Resistone™ line. Resistone™ line castables are installed with procedures similar to those used for construction concretes, but they develop extremely high mechanical resistance within just a few hours and can be used at a temperature of 1,400°C even in contact with metal and slag splashes. Resistone's quick setting and ease of use also make it an excellent product for maintenance. The customer is Turkey's largest producer of aluminium castings, with a melting capacity of 7.5 tonnes/hour, and built a new foundry near Istanbul in 2012. The foundry is divided into two zones: the "melting centre", with four tower melting furnaces, and the "die-casting" area, with a number of presses of various sizes equipped with electric bale-out and dosing furnaces. Our Resistone™ ST MF was installed in the "melting centre", around the zones with a high risk of molten metal spills, while the customer decided to use ordinary construction concrete in the forklift operating areas only. About a year and a half after the melting centre went into operation, the zone protected by Resistone™ ST MF is still in excellent condition, while the construction concrete zone is showing clear signs of damage, with numerous cracks (see photos), even though it is not in contact with the molten metal.

REF. M.1



Installation of RESISTONE™ ST MF – Dec 2012



Eredi Scabini RESISTONE™ ST MF compared to ordinary concrete - May 2014

Eredi Scabini excels itself with **Alfaplast™** nanoplastic monolithics.

The customer is an iron foundry producing about 12,000 tonnes of castings a year for the energy market. Output comprises 55% grey iron and 45% ductile iron. The foundry contains 4 coreless induction furnaces (from 28 to 7 tonnes) and 7 ladles (from 20 to 1 tonne), each used to transport grey or ductile iron. Historically, the ladles were lined with Ultra Low Cement castable, with variable lifetimes of 10/11 months for the ladles used for grey iron and 9/10 months for those transporting ductile iron (Photo 1). The main problem was the build-up of slag on the sides of the ladles, workers were forced to remove this with demolition hammers, damaging the lining which therefore required constant repair with trowellable castables. In 2010, Eredi Scabini lined the ladles with Flustone® castable, extending ladle lifetime to 12/14 months for grey iron and 10/12 months for ductile iron and also reducing the amount of maintenance required during the lifetime (Photo 2). In November 2013 a 7.5 tonne grey iron ladle was lined with a new-concept product, the latest addition to the Scabini range: Alfaplast™. Alfaplast™ is a family of quick-setting, fast-heating cement-free dual component (with amorphous silica-alumina binder) nanoplastic monolithics. Alfaplast™ bond strongly to existing linings and have excellent thermal shock resistance. The customer immediately noticed that the sides remained amazing clean (Photo 3 - Photo 4): the surface was smooth with just a thin coating. This had never been seen before. The ladle with Alfaplast™ lining is still in service, without any repairs. In June 2014, Alfaplast™ was used for the lining of an 8.6 tonne ladle for ductile iron.

REF. N.2



Dry ramming mix top cap - Photo 1



Overview of damage to dry ramming mix top cap - Photo 2



Installation of Flustone® HT top cap - Photo 3

With **Flustone®**, linings are easier to apply and tougher.

Flustone® is a line of microionic dense castables with excellent flow ability allowing application by self-distribution. They are used mainly for working linings requiring high resistance to abrasion and/or saturation by metals and/or slags. They are self-bonding, allowing linings to be repaired by applying the same product to the worn surface without changing the whole lining.

The customer is a leading international corporation with production plants in the Middle East and Europe. In its Middle Eastern plant alone it produces about 170,000 tonnes of grey and ductile iron castings per year. The melting department consists of several coreless induction furnaces with capacities from 8 to 28 tonnes and two electric arc furnaces. The coreless induction furnaces working lining is a silica-based dry ramming mix with a lifetime of 80 heats over about 3 weeks. During the campaign, due to the mechanical stresses of the charging process, the lining of the top cap, also in silica, had to be repaired on a weekly basis. In 2012 we suggested the use of our Flustone® HT for construction of the top cap. With this solution, the customer has extended the lifetime of the entire lining up to 120 charges (about 4 weeks), and above all it no longer has to perform any repairs on the top cap at any time during the lining's life (photo 3).

REF. N.3



Flustone® HT top cap in service - Photo 2



Original solution - Photo 1



Eredi Scabini solution with Flustone® - Photo 2



Alfaplast™ lining after 6 months - Photo 3



Alfaplast™ lining - Photo 4

Eredi Scabini Solution for Aluminium melting furnace lining.

The client is a marked leader in rolled aluminum products and beverage can recycler. In November 2011 a melting furnace was stopped for maintenance and Eredi Scabini supplied the refractory lining, the installation and the dry-out service. The furnace is a 23 ton/hour batch melter equipped with 4 regenerative burners. The lining was designed to increase the furnace capacity to 72 tons using big preformed shapes. Megablock®, large aggregate big-blocks, was installed in the furnace bottom. The combination of product with the grain size up to 150mm, and the unique ceramic matrix guarantees excellent impact and thermal shock resistance as well as unique non-wetting properties. The prove is the result: after almost three years of service and around 300.000 tons, the bottom lining is still in excellent conditions without the need of maintenance.

REF. N.4



Photo 1



Photo 2



Photo 3



Photo 4



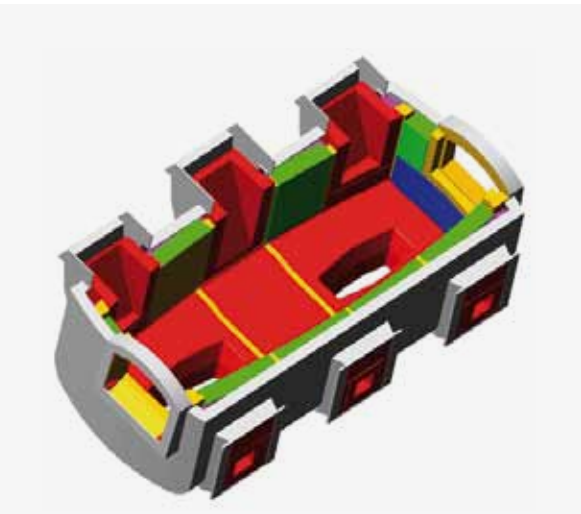
Photo 5



Photo 6

Job reportage:

- Foto 1: Furnace view in hot conditions before relining
- Foto 2: Complete hearth - Ramp&Sill demolitions
- Foto 3: Hearth block installations with Large aggregate preformed blocks made with Megablock® 245
- Foto 4: Hearth block sealing made with Flustone® 80 AL
- Foto 5: Eredi Scabini lining after dry-out
- Foto 6: Hearth block (Megablock® 245) after 18 months from start-up, with an average production of 175 ton per day



With Eredi Scabini's modular preformed and prefired solutions **ABT** you can forget about your furnace lining!

Eredi Scabini has always believed in the development of preformed shapes and its capability for producing preformed shapes up to 15 tonnes in weight places Eredi Scabini amongst the undisputed world leaders in this market sector. Eredi Scabini's ABT - Advanced Block Technology- solutions are preformed and customized kits for furnace linings. The kit developed for this customer included several products, among which Ultrablock®, dense pre-formed shapes featuring excellent "non-wetting" properties. The low porosity, the controlled pore size and the unique bonding system result in a winning combination against abrasion and chemical attach.

The customer is Europe's largest producer of brass rods, with a melting capacity of 700,000 tonnes/year. The melting centre comprises 3 foundries. The largest is equipped with two coreless induction melting furnaces of 75 and 32 tonnes, two channel induction melting furnaces of 120 tonnes and a 200 tonne channel induction holding furnace, all supplying a vertical continuous casting plant. In 2006, after successfully building the two channel melting furnaces using its ABT -Advance Block Technology- system, Eredi Scabini designed and installed the lining of the holding furnace using the same system, replacing the old brick lining. The results obtained were undoubtedly amazing, starting from the installation itself, which with our solution took just 5 days compared to the 30 required for the previous lining. But that is not all. While in service, the brickwork lining underwent maintenance on many occasions, until it was eventually completely replaced after just 6 years; the Eredi Scabini ABT -Advanced Block Technology solution is still in operation, 8 years after its installation!

REF. N.5

MAIN FEATURES AND ADVANTAGES OF ABT

- 40% saving on total costs
- 50% increase in refractory lining performance
- 83% downtime reduction
- excellent 'non-wetting' properties and very low thermal losses.

New 2lite® insulating foam. Effective, safe innovation.

2lite® is a product line that represents an absolute novelty on the market for insulation products. Developed to create the back-up of preformed linings in a simple, fast and safe way, 2lite® is an insulating nanostructured mixture that expands in situ generating a foam with very low thermal conductivity, high thermal shock resistance and good mechanical strength. 2lite® guarantees maximum safety thanks to the excellent non wetting properties and stability, enabling it to maintain excellent insulating properties and ensure a stable support for the working lining, even in case of contact with molten metal. Moreover, 2lite® is an ecological product and does not contain ceramic fibres.

The customer whose case history is described here belongs to an international group with 9 production sites in Europe, North America and Asia. It is the world's biggest producer of semi-finished products for the packaging industry (tubes and cans), with output of about 30,000 tonnes/year. The foundry has 2 continuous casting lines. The customer used to insulate and fix its preformed filter boxes and launders with insulating panels clad with adhesive aluminium sheeting and ceramic fibre cements. The customer has now been using our 2lite® insulating foam to insulate and fix its preformed filter boxes and launders since 2013, to its great satisfaction. Apart from the easy installation and effective insulation, the customer is also delighted with the reduction in crack formation in the preformed launders: exceptionally fluid, 2lite® fills in every gap and its volumetric stability guarantees the preformed launder excellent support.

REF. N.6



The product is poured into the gap between the preformed shape and the carpentry or the rest of the insulating lining. The filling is guaranteed by the product fluidity and its 'high' density during the installation. - Photo 1



Expansion of 2lite® - Photo 2

Better performances with Ultrablock® preformed shape for casting launder system.

The customer is a leading Middle Eastern company which produces rolled aluminium products with continuous casting process, with production capacity of about 250,000 tonnes/year in two plants. The holding furnaces are connected to the continuous casting machine by the launders, which convey the molten metal from the furnaces to the degassing unit, the filter box and finally the casting machine itself. In the past, the launders used to be lined with preforms and insulated by means of two sets of insulating panels; the preform was fitted inside them and secured by flanges at the top. The customer started to use Eredi Scabini preforms for its launders in 2011. The launders were constructed using Ultrablock®, which has excellent non-wetting properties and equally outstanding resistance to thermal shock, impact, and in particular the abrasive effects of the liquid metal. Moreover, its low apparent porosity makes the launders easier to clean. Thanks to these characteristics, the launder recorded better-than-standard performance (of 1.5/2 years). In response to these highly satisfactory results, the customer has chosen also to use Ultrablock® preformed linings for the degassing unit and filter box.

REF. N.7



Steel lip ring - Photo 1



Flextrong pouring area after 6 months - Photo 2



Complete Flextrong pouring area Photo 3

flextrong® durability guaranteed.

Flextrong® is a preformed ceramic matrix composite reinforced with heat resistant steel. The metallic fibres which reaches up to 10 times higher density than the market average thanks to the manufacturing process, combined with the ceramic part, finalised to bind and protect the metallic fibres, make up a perfectly balanced product between ductility, hardness and refractoriness. It is just this balance which gives Flextrong® the advantage: the metal ductility combine with the ceramic hardness and refractoriness to provide a more effective material with all of the performance of metals plus that of traditional refractories. The composition of the product, the special manufacturing process and the possibility to orient the metal fibres according to specific applications guarantee surprising and uniquely quality results which set a new standard for excellence.

The customer is an electric steel mill which produces about 100,000 tonnes a year of ingots, forged and machined in-house, for the petrochemical and energy market. The steel mill is equipped with a 40 tonne Electric Arch Furnace, a VD/VOD station plant and a LF for 40 tonnes ladles, which used to suffer from constant issues on the lip rings: every ladle had a metal lip ring subjected to stresses due to heat and chemical attack by the slag and steel. It was the customer's practice to replace the pouring area whenever metal was poured, meaning every day or every week. The complete lip ring was replaced about every 3 months (Photo 1). In 2009, the customer used our Flextrong® HT composite preform for the first time, for the pouring area (Photo 2). The product performed very well with a lifetime of over 6 months, so the customer decided to use Flextrong® again to cover the entire lip ring, consisting of a total of 6 pieces (Photo 3). The Flextrong® preforms subjected to the least stress achieved a working life of 10 months.

REF. N.8

CPS (Crucible Preformed System): an innovative solution for coreless induction furnaces lining with no rivals on the market.

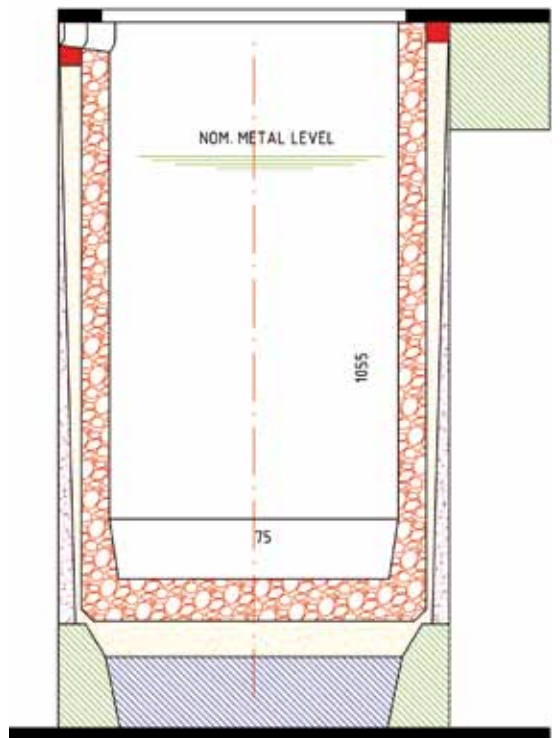
Eredi Scabini is the only company which has introduced and continually implemented the CPS (Crucible Preformed System), an innovative solution for coreless induction furnace linings. Every furnace is a one-off therefore each CPS is customized to meet the specific condition. The first CPS was installed in 2001, and there are now dozens of furnaces in operation with this solution with capacities up to 15 ton. Wherever CPS has been installed, it has increased the lifespan compared to conventional linings.

Here is one example. Our customer Montupet N. Ireland is part of the Montupet group, which has plants in Europe, America and Asia. The Belfast plant produces aluminium engine blocks for automotive manufacturers including BMW, Peugeot, and Ford, with output of more than 2,000 tonnes of molten metal a year.

The foundry is equipped with 2 coreless induction melting furnaces with capacity of 1.5 tonnes. The furnaces initially were lined with dry ramming mix, but this type of lining required a great deal of cleaning and maintenance. In fact, the furnaces had to be cleaned by hand twice a day and the refractory lining had to be repaired at every production stoppage (once a week) due to cracks and "elephant's foot" erosion from the middle to the bottom of the crucible. Due above all to the erosion, the lifetime of a furnace lining was no more than 5 months.

The first project for lining these furnaces using the Eredi Scabini CPS system originated at the end of 2007 and installed in 2009 for the first time. The first liner lasted 30 months and it had one patch low down, caused by the operators using a pneumatic drill to remove a large build-up caused by no cleaning for 4-6 weeks, as CPS only unit working, dry ramming mix lining off for reline.

The result was immediately encouraging; what the customer noticed first was that the lining was very easy to clean and required absolutely no maintenance. The first CPS lasted for 30 months, with no maintenance at all. The two following CPS linings are delivering even better performance:



Drawing of the first CPS

a second CPS has been in service in the furnace in which the first CPS was installed since January 2011, while another CPS has been in operation in the second furnace since October 2011.

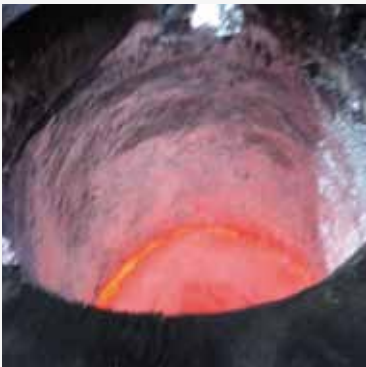
REF. N.9



CPS Installation - Photo 1



Dry ramming mix lining after two weeks in service - Photo 2



CPS after 40 months in service - Photo 3



CPS after 32 months in service - Photo 4

THE MAIN FEATURES AND BENEFITS OF THE CPS:

- Quick and easy installation and furnace start-up so that the furnace can be put back into production in a few hours.
- Higher productivity than conventional linings, along with less build-up, easier cleaning, and no maintenance need.

- Longer lifetime than conventional linings.
- Cleaner metal compared to dry ramming mix.
- Quicker turn-rounds between metal grade changes.

Eredi Scabini sees to everything!

those used for the production of pre-formed shapes, are produced in our own plants, to exclusive formulae created by Eredi

A single contact, countless benefits for the customer: Expertise-Innovation-Quality-Fast delivery-Excellent service which, backed up by impressive flexibility and absolute confidentiality, make Eredi Scabini the ideal partner, able to provide a turnkey service of genuine value.

ISO 9001
BUREAU VERITAS
Certification



Exiros Suppliers Award

Exiros, service company that centralises procurement and purchase operations of the group, operates in 14 countries for a total of \$ 7.5 billion.

Eredi Scabini was listed amongst the best suppliers of the Tenaris group, those which distinguish themselves for the quality of their work. The criteria for identifying the best suppliers are based on key performance indicators of Exiros and Tenaris Dalmine, including: safety, timeliness of delivery, quality, level of service, nonconformities and distinctive capabilities of the supplier in general.

For these reasons, over the years Eredi Scabini has become a leading player on the molten metal industry.

This is the slogan of the campaign featured in the industry's main international publications. Eredi Scabini is well aware of the huge potential of its solutions and is therefore keen to publicise them more widely. The campaign's aim is to spread the culture of preformed products and to promote the innovation - or even outright revolution - brought about by the solutions in which Eredi Scabini specialises.

The campaign takes a simple, informal approach, using cross-words to explain how Eredi Scabini makes everything easier for its customers. And it is in completing this famous game that we find the keywords containing the essence of the only possible solution for those seeking the answer to their needs. This multi-subject campaign focuses on presenting some of the most innovative solutions for several industries.

Eredi Scabini believes in pre-formed shapes, designing and realizing in its own plants pre-formed shapes with a weight up to 15 ton. There are many advantages (among other: performance increase, reduction of maintenance and downtime) and the market is more and more confirming the intuition of the company increasing the enquiry of high quality and larger pre-formed shapes. To welcome and satisfy this trend, the company has recently invested considerable resources in designing and installing a new furnace with a capacity of 160 cubic meters that can assure accurate thermal treatment even for most complex geometries. Once again Eredi Scabini re-confirms its mission "Everything that is worth doing at all, is worth doing well" and achieves the leadership position in this market share.



outset with high technological content refractory products. Mr. Scabini's son, Daniele joined the Company in 1965 and this addition reconfirmed the company's mission for quality and innovation. The list of records grew longer and more significant. For example: Eredi Scabini was the first company to introduce monolithic refractories in Italy as an alternative to the standard bricks combining these with the direct production of pre-cast materials and the lining service for complete furnaces, using the customer's shell or structural metalwork produced directly. Reassured by its direct experience, in 1993 Eredi Scabini addressed the market in its new capacity as a producer of monolithic refractories. The new acknowledgements were not long in arriving and the company was forced to reorganise the productive structure after only a few years: firstly, the company's plant was extended, a new plant was purchased later to cater for the continued market demands. The Scabini family, now in its third generation with Mr. Scabini's sons Corrado and Massimiliano, still controls and manages the company in accordance with the same principles which determined its success. Today Eredi Scabini is an integrated Company that produces quality monolithics, preformed shapes and composites with control of the entire production process, from design to after-sales. The company operates from a site of more than 20,000 m² in the Milan hinterland and has a specialised staff of more than 60, enabling it to operate easily on both the domestic and the international markets.

Eredi Scabini's history is paved with innovative products which have contributed to the evolution of refractory materials

Year	Type	Brand
1970	Conventional castables	Thermojet
1980	Low cement castables	Al Vibe
1985	Ultra-low cement castables	Al Vibe S
2000	Self-distributing castables	Flustone
2005	Large Aggregate Castables	Dystone
2010	No cement castables	Histone
2014	Nanoplastic products	Alfaplast-Zetapast-Sigmaplast