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EREDI SCABINI NEWS

# "WELCOME INTO THE FUTURE!"

Eredi Scabini has been on the market since 1945 and specializes in advanced refractory solutions for a number of industrial sectors, in particular where there is contact with molten metal. Our solutions are based on both monolithics and preformed shapes, produced with exclusive formulations. Pioneer producer of monolithic refractories, for over 40 years Eredi Scabini has designed and manufactured preformed shapes up to 15 tons in its factories, specifically designed for this type of production.

Eredi Scabini is recognised as the key to solving problems! We offer customised solutions for specific needs ensuring a 'turnkey' service, from the careful analysis of specific requirements to the design, production and installation of the refractories, backed up by a comprehensive after-sales service including the maintenance of the refractories during the whole lifetime of a furnace. In order to promote our business and stay ahead of our competitors we commit ourselves to invest half of our earnings in research and development. Our R&D laboratory is the heart and soul of our company, and our engineers and researchers have a deep knowledge of ceramics, mineralogy and chemistry. They work in close co-operation with technical universities and other research institutes to develop new products for specific requirements. We

own the intellectual property rights to hundreds of products and are constantly developing new formulations to meet every type of need. Responsive to the evolving market and with a clear orientation towards new technologies, in the last few years Eredi Scabini's research has been mainly focused on nanotechnology and the application of its basic principles in the refractory sector. This year, Eredi Scabini celebrates its 70th anniversary by introducing Nanoplastics, the ultimate generation of refractory materials. What are Nanoplastics?

Since 1945, the refractory specialist at your disposal.

So far, nanotechnology has been used in various applications; in ceramics and in particular for refractory products, binders based on colloidal silica known as "nano bonds" have recently been used. For us, these systems are already outdated! Our Nanoplastics are two-component or ready-to-use products using nanotechnology applied to several binders, an absolute novelty in the refractory market, such as Amorphous Silico-Aluminate, Amorphous Mullite and a Special Amorphous Corundum. Thanks to nanotechnology, binders and additives are so tiny that it is hard to imagine them except with the aid of practical examples: if they were spread across a surface in a compact layer, 1 gram of them would cover an area of up to 800m<sup>2</sup> (the size of 2 standard football pitches); so minute that, with the right carrier substances, they are able to penetrate into the porosity or microcavities of aggregates, generating nano umbilical pathways and

nano porosity that will change some of their chemical and physical characteristics depending on the type of nanostructured matrix designed and thus also the characteristics of the final product. When using this type of nanoplast technology you not only create a metal-proof skin but also metal-proof the internal mass of the refractory. This is a completely different concept

compared to previous products and revolutionises the market. Last, but not least, all Nanoplast products have a plastic phase which can occur in different stages: some products are delivered during their plastic phase, in others the plastic phase is activated during installation.

**CONTINUED ON PAGE 8** 



The company is turning 70, and I've worked here for 50 years. In all this time, which to tell the truth has passed in the twinkling of an eye, three generations have been involved, all different but sharing events and prospects. It's an incredible feeling and hard to describe... "Scabini Refrattari", as the company was called when my father Osvaldo founded it, was a specialist distributor of refractories for household and industrial boilers. Even then the family character was clear: the striving to do get things done, and do them well, was the clearest of expression of our long-established competitive spirit. At that time, while competitors were only selling bricks for that type of application, my father designed and arranged the production of specially shaped pieces that provided a geometrical fit with the inside



profile of the boiler. It was a huge success: installation times and costs were cut and boilers were made more efficient. These special pieces had a higher cost/kg than standard bricks, because they were manufactured by hand-ramming or mechanical pressing, depending on thickness, but the benefits generated by their use immediately won over even the most sceptical: twice the refractory lifetime and fuel savings of 10-15%. The first corner stone had just been laid for a new concept in refractories: the question was no longer "How much does it cost?" but "How efficient is it"? On 18 March 1965, tragedy struck! My father died at just 42 years of age, when I was 17. I loved and respected my father very much and I knew that he felt the same about me, although, as is often the case, because of our characters or because of pride, we had never actually told each other so. **CONTINUED ON PAGE 8** 

2015

EREDI SCABINI

## for preformed solutions!

New and even bigger milestones

Drawing on its forty years' experience in the design and construction of preformed refractory linings, the company is always ready to accept new challenges. Now, in addition to its successful CPS<sup>™</sup> solution for coreless induction furnaces, the ABT<sup>™</sup> range for reverberatory furnaces and shafts and upper cases of channel induction furnaces, Eredi Scabini is proud to present the new IPS™

## Inductor Preformed System

an innovative solution for inductors of channel induction furnaces

The project comprises a preformed, pre-sintered wear lining to be sealed to the metal structure of the inductor by means of a monolithic safety lining. This concept allows the use of products with chemical and physical properties (e.g. abrasion and corrosion resistance) far superior than those of conventional refractories, and eliminates the most critical procedures related to the in situ installation of dry and wet ramming mixes and concretes; mixing, vibration and/or ramming, drying and sintering. What's more, with the IPS<sup>™</sup> the use of disposable or reusable formworks for construction of the loop channel is no longer necessary.

Design of ISP<sup>™</sup> systems is highly customised and they are manufactured in our production departments, which reproduce the optimal conditions of a laboratory on an industrial scale to guarantee guality and repeatability. In view of the unusual shape and position of the loop channels, additional procedures have been adopted for the verification and validation of each system. IPS<sup>™</sup> is therefore more reliable and quicker to apply than other conventional systems.



Photo 1 - Pre-formed pre-fired working lining

Daniele Scabini, President

#### Contents

Welcome into the future!	PAGET
Yesterday, today and tomorrow: opportunities, never just products.	
New and even bigger milestones for preformed solutions!	
case histories	
Flextrong® HT: durability guaranteed in ladle lip ring.	PAGE 2
Engineering & Flextrong <sup>®</sup> HT: a winning combination for a long-lasting solution for tundish cover.	
Eredi Scabini excels itself with Alfablock <sup>®</sup> in EAF delta section.	
Alfaplast®, the perfect product for furnace maintenance.	PAGE 3
Alfaplast® for ductile iron ladles: only Eredi Scabini can beat Eredi Scabini.	
With Flustone® HT, coreless furnace top cap linings are easier to apply and tougher.	
Resistone®: the ideal product for industrial floorings with unbeatable strength.	PAGE 4
Big blocks for bigger goals in shaft melting furnaces.	
With Eredi Scabini's ABT system you can forget about your furnace lining!	
No more Corundum in Aluminium melting furnaces with Sigmaplast®.	PAGE 5
ABT: the right solution for reverberatory furnace lining.	
Flextrong® HT: the Eredi Scabini answer to sill problems!	
Better performances with Ultrablock $^{ extsf{w}}$ for casting launders.	PAGE 6
More insulation and greater safety for launders with 2lite.	
Thanks to Flextrong <sup>®</sup> , skimming and stirring tool performances are greatly multiplied.	
CPS® the exclusive solution for lining coreless induction furnaces with no rivals on the market.	PAGE 7
ABT increases output and reduces problems for channel induction furnaces.	
Tilting rotary furnace lining lifespan has increased by +35% with Flustone $^{\circ}$ .	
High temperatures and oxidizing atmospheres are no longer a	PAGE 8
problem for tilting rotary furnace lip ring with Flextrong® HT.	



Photo 1 - Steel lip ring



Photo 2 - Flextrong pouring area after 6 months



Photo 3 - Complete Flextrong® lip ring

## **Fle)(trong**<sup>®</sup> HT: durability guaranteed in ladle lip ring.



The customer is an electric steel mill which produces about 100.000 tons a year of ingots, forged and machined in-house, for the petrochemical and energy market.

Flextrong<sup>®</sup> is a preformed ceramic matrix composite reinforced with heat resistant steel. The product has excellent resistance to thermal shock, impact, fracture and oxidation as well as to contact with molten metals.

Flextrong<sup>®</sup> is designed for the installation via bolts and/or welding brackets provided. Flextrong<sup>®</sup> HT has been specifically developed for applications at high temperatures and in the presence of oxidizing atmospheres.

The steel mill is equipped with a 40 tons Electric Arc Furnace, a VD/VOD station and a L.F. for 40 tons 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<sup>®</sup> 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<sup>®</sup> HT again to cover the entire lip ring, consisting of a total of 6 pieces (Photo 3). The Flextrong<sup>®</sup> HT preforms subjected to the least stress achieved a working life of 10 months.

## Engineering & Fle (trong® HT: a winning combination for a long-lasting solution for tundish cover.



The customer is an European electric steel mill which produces about 900.000 tons per year of carbon steel using a 100 tons E.A.F., a L.F. and two continuous casting (CC) machines, with a capacity of 15 and 25 tons respectively.

Flextrong<sup>®</sup> is a preformed ceramic matrix composite reinforced with heat resistant steel. The product has excellent resistance to thermal shock, impact, fracture and oxidation as well as to contact with molten metals. The product is used to replace both refractory linings or metal castings.

The customer had serious problems on tundish cover consisting of 2 cast-iron sections. Most critical areas were the joint between sections (photo 1) and pre-heating burner holes where high temperature, thermal shocks and oxidation deformed the cover forcing the customer in replacing both sections after just 20 heating cycles. Eredi Scabini designed and produced a new tundish cover, consisting of 3 parts: the middle section in Flextrong<sup>®</sup> HT (Photo 2) and the two side sections in cast iron.

The test performed with the new design gave very encouraging results: 130 heating cycles (Photo 3) compared to the 20 achieved previously. On the basis of these results, the customer decided first and foremost to use the Flextrong<sup>®</sup> HT solution for the entire CC2 tundish cover (Photo 4) and then to do the same for the CC1. The new lids in Eredi Scabini Flextrong<sup>®</sup> HT are still in use, in both continuous casting machines.

**REF. N.16** 



Photo 2 - Middle cover section in Flextrong<sup>®</sup> HT

Photo 1 - Cast iron cover sections



Photo 3 - Middle cover section in Flextrong® HT after 100 cycles



## Eredi Scabini excels itself with RIFablock® in EAF delta section.





The customer is an European electric steel mill which produces about 250,000 tons a year of billets and ingots, partly forged and machined



in-house and also sold on the export market. Its output is intended for the petrochemical and energy market.

Alfablock<sup>®</sup> is the Eredi Scabini nanoplastic preformed shape with amorphous Silico-Aluminate binder which features an exceptional resistance to corrosion and thermal shocks.

The steelworks contains an 80 tons EAF (Electric Arc Furnace) with, a VD (Vacuum Degassing) unit and a LF (Ladle Furnace) for 80 tons ladles. The customer's biggest headache has always been the lifetime of the E.A.F. delta section. Traditionally, the EAF delta was lined with bricks (photo 1), which however became worn very quickly, forcing the customer to change the lining too often - after just 180 heats. Eredi Scabini's first step towards solving the problem was to design and deliver a new preformed delta, produced using its exclusive Megablock<sup>®</sup> large aggregate product (Photo 2). The results were immediately encouraging: the delta lifespan was extended by almost 100%! (350 heats compared to 180 heats) (Photo 3). Delighted with the performance achieved, the customer decided to carry out a further upgrade by testing a new preformed delta, this time produced using Eredi Scabini's new Nanoplastic product "Alfablock<sup>®</sup>" (Photo 4). With its key characteristics of excellent resistance to thermal shock and chemical attack, the Alfablock<sup>®</sup> solution proved to be absolutely the right choice. The customer immediately found that the inner surface stayed cleaner and showed less wear, as well as remaining more uniform across the entire surface. Alfablock<sup>®</sup> delivered a performance of 400 heats (Photo 5).

Photo 1 - Bricks and castable solution



Photo 2 - Megablock® solution





Photo 4 - Alfablock® solution



Photo 5 - Alfablock® in service

ADVANCED REFRACTORY SOLUTIONS

#### **Alfaplast**<sup>®</sup>, the perfect product for furnace maintenance.



The customer is a steel mill which produces about 100.000 tons a year of ingots, forged in-house, for petrochemical and energy applications.

Alfaplast<sup>®</sup> is an amorphous Silica-Aluminate bonded refractory product. Cement free, supplied in two components unit, the product has excellent bonding properties, fast setting and does not require an accurate and long heat-up schedule.

The forge department contains a number of bogie hearth furnaces used for re-heating and heat treating ingots, with capacities ranging from 60 to 400 tons. Both types of furnaces require frequent maintenance to both the hearth and the perimeter of the car, due to the mechanical stresses and the abrasion caused by the tools used to remove the scale. Repairs were performed by demolishing the damaged areas and reconstructing them with dense refractory castable (Photo 1). This procedure involved lengthy stoppages and the repairs were fairly short-lived (Photo2). With the advent of the new Nanoplastic products Eredi Scabini decided that its Alfaplast<sup>®</sup> was the ideal solution for this type of problem and recommended it to the customer, which used it both for complete reconstructions and for surface repairs (Photo 3). With Alfaplast<sup>®</sup> it was possible to perform repairs without any demolition, merely cleaning the surface of the damaged areas to remove the scale. What's more, thanks to Alfaplast<sup>®</sup> the installation could be carried out in very short times, as the product ensured very rapid drying. To conclude, the results of the repairs were extremely satisfactory, setting the absolute record of 10 months' service (Photo 4). This persuaded the customer to decide to approve the use of Alfaplast<sup>®</sup> for the complete and partial repair of all the furnaces in the department.



Photo 1 – demolition with conventional solution



Photo 3 – Alfaplast® in service





Photo 4 – Alfaplast<sup>®</sup> after 5 months in service

### **Alfaplast**<sup>®</sup> for ductile iron ladles: only Eredi Scabini can beat Eredi Scabini.



Over time, Eredi Scabini has won the confidence of this customer, which has found the company to be a reliable partner, capable of delivering prompt solutions to requirements of all kinds. Well aware of the market's latest developments, with the advent of the new Nanoplastic products the customer was one of the first to decide to test the new Alfaplast<sup>®</sup>, even though it was already satisfied with the Eredi Scabini products in use up to this time

The customer is an iron foundry which produces about 60.000 tons a year of ductile iron and austempered ductile iron. The foundry has three 28-tons coreless induction furnaces, 6 treatment ladles with different capacities and 2 pressure pour ladles. The treatment ladles are lined with our Flustone<sup>®</sup> castable, with average lifetime of about 8 months, considered very satisfactory by the customer (Photo 1). Only light repairs are carried out during the lining's lifetime, bringing it to the end of its cycle without any particular problems. With the arrival of the new Eredi Scabini nanoplastic products, the customer decided to construct the first ladle lining using Alfaplast<sup>®</sup>, which requires much shorter installation and drying times than the previous lining (Photo 2). Once in operation, the customer immediately noticed that the sidewalls of the ladle were cleaner than ever before (Photo 3). Currently, 5 months later, the Alfaplast<sup>®</sup> ladle is still in service without having undergone any repairs.







2015

#### Photo 2 - Alfaplast® installation

With **Flustone**<sup>®</sup> HT, coreless furnace top cap linings are easier to apply and tougher.



The customer is a leading international corporation with iron foundries in the Middle East and Europe. In its Middle Eastern plant it produces about 170,000 tons of grey and ductile iron castings per year.

Flustone<sup>®</sup> is a line of microionic dense castables with excellent flow ability allowing application by selfdistribution. 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 melting department consists of several coreless induction furnaces with capacities from 8 to 28 tons 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 (Photo 1 and 2). In 2012 we suggested the use of our Flustone<sup>®</sup> HT for construction of the top cap (Photo 3). 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 4).



Photo 1 - Dry ramming mix top cap



Photo 3 - Installation of Flustone® HT top cap



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



Photo 4 - Flustone® HT top cap in service

**REF. N.18** 

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### **Resistone:** the ideal product for industrial floorings with unbeatable strength.

The customer is a multinational company, which produces castings in both aluminium and cast iron for the automotive industry.

2015

Resistone is a line of castables specifically developed for industrial floorings. They 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 up to a temperature of 1.400°C even in contact with metal and slag splashes. Resistone's quick setting and ease of use make it an excellent product for maintenance too.

Eredi Scabini has been supplying the group companies with refractory solutions since 2001 and in 2008 Resistone ST was used in one of the Italian Iron foundry for the flooring around the melting furnaces. Thanks to its distinctive qualities, Resistone quickly became one of the group's benchmark products, with a succession of further orders, such as in 2012 when a new aluminium foundry was opened. In this case, Resistone ST was used for the flooring of the area next to the melting furnaces, where the transfer ladles are filled.

The floor was laid using 20 tons of Resistone ST with the aid of a cement mixer truck, manual tools and a power trowel.

## Big blocks for bigger goals in shaft melting furnaces.



The customer is a multinational company market leader in copper products.

By combining its products and knowhow, Eredi Scabini offers innovative, high-performance solutions for the refractory lining of specific plants. Our knowledge of plants and ability to listen to and interpret the customer's needs enable us to offer the most

suitable solutions. These may be chosen from our many consolidated products, or may be custom-developed, as in this case.

This plant produces about 130.000 tons of copper billets a year using 1 shaft melting furnace with a capacity of 30 tons/h combined with 1 channel induction holding furnace. The shaft furnace used to be lined with bricks. In 2005 Eredi Scabini designed and supplied a new solution using large preformed shapes for the working lining and a monolithic

Installation, by casting, took about 4 hours' work; the floor could be walked over after just 48 hours. 6 months later the customer purchased another 19 tons of Resistone ST for the flooring of another part of the foundry. Almost 3 years since the latest installation, the floor is still in excellent condition.

**REF. N.20** 



Photo 3 - Installation of Resistone ST





Photo 1 - Installing the wire mesh



Photo 4 - Smoothing with a power trowe

Photo 2 - Cement mixer truck





Photo 5 - Installation completed

safety lining. The aim of the solution was:

- Reduce the downtime required for reconstruction
- Increase the lifespan of the refractory lining
- Reduce maintenance costs

#### **1**<sup>st</sup> INSTALLATION

The use of the Eredi Scabini solution achieved all the set aims:

- The complete reconstruction was finished in 8 days wor king 2 shifts a day, instead of 21 days working 3 shifts;
- No maintenance work was required on the preheating zone until the subsequent reconstruction, in 2011;
- The maintenance requirements of the charging zone and melting chamber were low;
- The temperature on the furnace's steel shell was lower than the previous solution.

#### 2<sup>nd</sup> INSTALLATION

From the first installation, the customer was very pleased with the Eredi Scabini solution, which generated impressive savings in time and resources. The only area where improvement was requested was the charging area. The level of wear in this area increased over years due to a sharp increase of scraps (up to 90% of the charge).

In the meantime Eredi Scabini had already developed a new solution to increase the mechanical strength of the lining in that particular area. The intention was to replace Megablock<sup>®</sup> with Flextrong<sup>®</sup> HT: a new ceramic matrix composite with much higher impact and thermal shock resistance. At the same time, it also was decided to use a monolithic composite behind the steel protection plates: Flustone<sup>®</sup> W. The furnace has been in operation since August 2011 without replacement of a single block, in either the charging or the preheating zone. The only maintenance work done has been in the melting chamber, where, thanks to the products' quality and the special solution used for the individual burner blocks, the quantities of product needed for maintenance in this area were also reduced. REF. N.21





Photo 2 - First installation, 2005 - Pre-heating area



Photo 1 - First installation, 2005 - Melting area

Photo 3 - Second installation, 2011 area after 36 maintenance-free months



Photo 1 - Installing big blocks



## With Eredi Scabini's **ABT** system you can forget about your furnace lining!



The customer is Europe's largest producer of brass rods, with a melting capacity of 700.000 tons/year. 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<sup>®</sup>, 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.

REF. N.5

In this plant the melting center comprises 3 foundries. The largest is equipped with two coreless induction melting furnaces of 75 and 32 tons, two channel induction melting furnaces of 120 tons and a 200 tons 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, 9 years after its installation!

## No more Corundum in Aluminium melting furnaces with **Sigmaplast**<sup>®</sup>.



2015

The customer is an aluminium castings foundry for the automotive industry, producing 46100, 47100 and 44300 alloys.

Sigmaplast<sup>®</sup> is a new generation nanoplastic amorphous mullite-bonded refractory product. Cement-free, Silica-free, fast-firing two components products with exceptional thermal shock resistance, excellent bonding properties, and corrosion resistance. A large number of industrial tests on customers' premises have clearly demonstrated that the product is far superior to conventional alternatives (LCC or ULCC), as well as to other, competitor nanobonded products. Little more than a year after its launch, Sigmaplast<sup>®</sup>, a part of the much wider Eredi Scabini Nanoplast<sup>M</sup> project, has already collected a large number of successful case histories, such as the one recounted below.

The foundry is equipped with 10 melting and holding furnaces of different capacities. The customer's standard practice was to purchase new furnace from the OEM complete with refractory lining; not long after commissioning, huge amounts of corundum were already forming on the walls around the bath, blocking off the melting chamber (Photo 1). The customer cleaned on the furnace regularly, but as the amount of corundum on the walls increased it became impossible to remove it. The lining lifetime before complete repair varied from 10 to a maximum of 14 months. Eredi Scabini suggested constructing the entire furnace lining with its state-of-the-art Sigmaplast<sup>®</sup>, which immediately gave great satisfaction because - amongst other benefits - it completely eliminated the corundum problem, allowing the furnace to be cleaned effectively and more easily. In spite of the passing months, the Eredi Scabini Sigmaplast<sup>®</sup> nanoplastic lining is still in brand-new condition (Photo 2). The furnace, which has now been in service for 10 months, is still free from corundum (Photo 3). The customer, very happy with this performance, has decided to use Sigmaplast<sup>®</sup> lining in other furnaces.



Photo 1 - Conventional lining: after 11 months

Photo 2 - Sigmaplast® lining: after 4 months

Photo 3 - Sigmaplast® lining after 10 months

## **ABT**: the right solution for reverberatory furnace lining.



This major European secondary aluminium foundry produces about 500,000 tons/year of slabs for the internal production of rolled products for the food packaging and automotive industries. ABT (Advanced Block Technology), is the solution developed by Eredi Scabini to replace conventional refractory lining with big preformed shapes

The production line consists of 2 reverberatory melting furnaces of 100 tons each and 1 holding furnace. Every day, the line produces about 700 tons of series 3xxx and 5xxx Aluminium. 4 regenerative burners are installed on each melting furnace. The original solution comprised a traditional brick lining which required maintenance on the hearth every 12 months and complete reconstruction every 48 months. The customer had been looking for some time for a solution capable of guaranteeing better performances, meaning achievement of the following aims:

- Reduction of furnace downtimes due to complete reconstruction of the refractory lining;

- Reduction of the number of scheduled maintenance stoppages;

- Extension of the time interval between complete reconstruction of the refractory lining and the next;

- Increase in output thanks to the reduction of the number and duration of stoppages.

The Eredi Scabini's solution provided the right answer, and uses large preformed blocks for the hearth, walls and roof of the furnace. The use of big blocks guarantees the highest quality since they are manufactured under the strictest quality controls and, thanks to the heat treatment carried out in our kilns, the lining thus produced is uniform throughout its thickness. What's more, the large size of the blocks drastically reduces the number of joints, well known to be the weakest part of the lining. Thanks to its quick installation, the new design by Eredi Scabini has enabled the customer to produce 35.000 tons more aluminium compared to the previous stoppage and the expectation is that the time interval between maintenance stoppages will be doubled, while the overall life of the lining will be increased by 50%.









Photo 1 - Upper and lower side walls



Photo 4 – Furnace in operation

## Fle)(trong® HT: the Eredi Scabini answer to sill problems!



The company is an European aluminium refiner specialized in the production of nuts. Flextrong® is a preformed ceramic matrix composite reinforced with heat resistant steel used to replace both refractory linings and metal castings.

The foundry has two 60 tons dual chamber reverberatory furnaces which produce 120 tons per day. In these operating conditions, the refractory lining of the sill in the holding chamber is exposed to thermal shock, abrasion and chemical attacks. The door frame lining of the furnace's main door used to be constructed of refractory castable, which due to the thermal shock, abrasion and chemical attacks wore very quickly, lasting no more than 6/8 months. The most serious problems occurred on the sill due to the abrasion caused by the skimming tool. Another problem was caused by the oxidation of the containment plates installed both on the sill and on the jambs, which forced their complete replacement after just 10/12 months (Photo 1). Eredi Scabini designed a solution using Flextrong<sup>®</sup> HT preformed shapes, which

would protect the metal plates in the sill, with the complete stripping of the metal from the two jambs and the lintel (Photo 2). Today, after 18 months in service, the preformed shapes are still in excellent condition, even though they have undergone a large number of skimming cycles, and the protection applied for the metal plates underneath has meant that they have not required replacement (Photo 3).



Photo 1 - Conventional solution after 5 months in service



Photo 2 - Eredi Scabini solution after 5 months in service



Photo 3 - Eredi Scabini solution after 12 months in service

ADVANCED REFRACTORY SOLUTIONS

#### Better performances with **Ultrablock**<sup>®</sup> for casting launders.



#### The customer is an aluminium re-melter with a production capacity of about 65,000 tons of coils per year. The foundry belongs to a major multinational group with production plants all over the world. Ultrablock<sup>®</sup> is the preformed solution that Eredi Scabini offer for launder systems.

The foundry has 5 production lines, each with a melting furnace and 2 holding furnaces. The launder working lining is prepared both in high-density calcium silicate and in ceramic material. Due to thermal shock, abrasion by the metal and manual cleaning by the operator, which tends to scratch the surface, the refractory lining wear quite rapidly (Photo 1 and Photo 2): the customer normally replaces parts of the launders after only 6/10 months in service. A more efficient solution therefore had to be found. For the lining of the fifth, new casting launder, Eredi Scabini designed and installed a solution using Ultrablock®, together

with the 2lite<sup>®</sup> insulating foam for the backup lining. With this new solution, the customer was able to install the whole line in a very short time (Photo 3), and throughout the period in operation none of the problems experienced with the traditional solution has occurred. As of today, after 24 months in service, none of the launders has yet been replaced (Photo 4, Photo 5 and Photo 6). **REF. N.25** 



Photo 2 - High density calcium silicate launder after 5 months

Photo 4 - Ultrablock® launder after 8 months

Photo 6 - Ultrablock® launder after 24 months

#### More insulation and greater safety for launders with **Zlite**<sup>®</sup>.



The customer belongs to a multinational company which is a leading producer of rolled products for the automotive industry. In one of its European foundries, a complex network of launders connects the 5 casting lines to the degassing / filtering systems and the 15 furnaces installed in the plant.

2lite® is a dual component nanoplastic foam with very low thermal conductivity, high mechanical strength and excellent non-wetting properties.

The launder working lining is made with preformed shapes, insulated by means of a combination of insulating concrete and panels. The insulation obtained with this solution was unsatisfactory, and the safety level in the event of metal infiltration was not sufficient; what's more, lengthy preheating was required to eliminate the moisture from the concrete. Eredi Scabini therefore recommended and installed the new-generation product 2lite<sup>®</sup>, a dual component nanoplastic foam with very low thermal conductivity and high mechanical strength and thermal shock resistance.

The product is quickly installed by mixing the two components and pouring the mixture into the interface between the preformed launder and the steel shell (Photo 1).

Once installed, the mixture expands and an exothermic reaction dries the moisture from it (Photo 2). In the event of metal infiltration, there is no damage to 2lite<sup>®</sup> due to its excellent non-wetting properties (Photo 3). During the months in operation, none of the problems previously experienced with the traditional solution has occurred. Using 2lite® it was possible to replace the working lining preformed shapes without repairing the insulating part (Photo 4). The customer has subsequently installed 2lite<sup>®</sup> on several production lines.



Photo 1 - Installation



Photo 2 - Expansion and exothermic reaction



Photo 3 - Excellent non-wetting properties



Photo 4 - 2lite® after removal of the preformed launder after 12 months in operation

#### **REF. N.26**

## Thanks to Fle (trong<sup>®</sup>, skimming and stirring tool performances are greatly multiplied.



#### The customer is a primary aluminium producer specialized in aluminium alloys production. Flextrong<sup>®</sup>, Eredi Scabini's preformed ceramic matrix composite, has replaced steel skimming and stirring tools.

The cast house is equipped with several casting lines for ingots and billet production. Serval melting furnaces, with capacity varying from 19 to 30 tons are used to re-melt and alloy the metal. Skimming and stirring tools, fitted on forklifts, are used in the reverberatory melting furnaces for:

- Stirring the bath to re-melt alloying elements and speed up the re-melting of recycled scrap
- Skimming slag from the surface of the bath
- Cleaning the lining.

Every day, the tool is used 48 times for stirring the bath and skimming the surface. Each stirring cycle lasts from 13 to 20 minutes, depending on the furnace capacity Originally, the tools were made of carbon steel plate (photo 1), and lasted from 1 to 2 days; in the past, the customer also performed tests with special steels, achieving lifetimes of up to 7 days, and more tests with other, competitor composites (photo 2), without ever exceeding a lifetime of 7 days. In 2005 Eredi Scabini supplied the first 2 Flextrong<sup>®</sup> tools (photo 3), which immediately gave results considerably better than the competitor products. The company then went on to develop and produce a tool for the customer with connecting arm lined for about 1.5 meters (photo 4), to prevent the latter from being corroded and extend the tool's lifetime. Since 2012 Eredi Scabini has been supplying the customer with skimming tools with arm in Flextrong<sup>®</sup>, achieving lifetimes of as much as 100 days, and Flextrong<sup>®</sup> tools without lined arm with lifetimes of up to 35 days. **REF. N.27** 



#### $CPS^{\mathbb{R}}$ the exclusive solution for lining coreless induction furnaces with no rivals on the market.



2015

The customer is a leading Middle Eastern company which produces rolled aluminium products with continuous casting machinery. Their production capacity is about 250,000 tonnes/year in two plants. CPS® - Crucible Preformed System – is the Eredi Scabini solution for relining coreless induction furnaces with a pre-formed and pre-sintered crucible.

The customer uses a 4-tons coreless induction furnace to re-melt production returns. This furnace is charged with return coils which weigh up to more than 750 kg per coil, so it is constantly subjected to heavy stresses. The customer used to line the coreless induction furnace with a dense refractory castable. After the installation, this solution required curing and then a drying/sintering schedule; a procedure which took 6 or 7 days, during which time the furnace could not be used. This type of lining did not last more than 8/9 months. Since 2010 Eredi Scabini has been supplying this customer with the CPS® solution, which comprises a pre-fired, pre-formed working lining and a dry rammed backup lining. Installation takes less than one day, as does the first heat-up schedule. The customer can therefore start to produce molten aluminium at the end of the second day. The average lifetime of the Eredi Scabini CPS® solution is 12-14 months. **REF. N.28** 





Photo 1 - Preassembly of the lining

#### **RBT** increases output and reduces problems for channel induction furnaces.

The customer is a multinational company with several secondary aluminium facilities to produce aluminium slabs for the internal production of flat products for the food packaging and automotive industries.

ABT - Advanced Block Technology- solutions are customized preformed furnace lining kits.

The kit developed for this customer comprised several products, including Ultrablock<sup>®</sup>, dense preformed shapes with excellent "non-wetting" properties.

The low porosity, controlled pore size and unique bonding system deliver a winning combination against abrasion and chemical attack. Eredi Scabini has always believed in the development of preformed shapes and its capability for producing them up to 15 tonnes in weight places the company amongst the undisputed world leaders in this market sector.

This line for the production of series 5000 Al alloys comprises

2 channel melting furnaces of 45 tons each and 1 holding furnace. 4 inductors are installed on each melting furnace. The project for rebuilding the furnaces with big-blocks arose and was developed in a number of phases in response to the customer's need to use a refractory lining technology capable of achieving the following aims: reduction of furnace downtimes, increase of the two furnaces' capacity, reduction in repair and maintenance costs, reduction of the number of maintenance stoppages, extension of the time interval between two complete reconstructions of the refractory lining, increase in output due to reduction of the number and duration of stoppages plus the increase in the inductor melting capacity.

In the original solution, the basin was lined with bricks, the throat with ramming mix and the top cap with low cement castable. Maintenance work was performed frequently and major repairs were needed whenever an inductor was replaced. The first phase of the project began in March 2010. It involved the reconstruction of the throats of one furnace with Eredi Scabini Flustone<sup>®</sup> castable. In view of the good results achieved, in 2011 the throat of the second furnace and the top cap of both furnaces were rebuilt using the same castable. The rest of the lining was unchanged. Compared to the original solution, even this partial introduction of Eredi Scabini products generated considerable improvements: the throats and top cap required very little maintenance - the lifetime of the throats was doubled (from 18 to 36 months). The definitive project includes the use of Ultrablock<sup>®</sup> bigblocks for the working lining, combined with a monolithic back-up lining in Flustone<sup>®</sup> and Cast-Lite<sup>™</sup>.

The reconstruction of the two furnaces was completed in 40% less time than with the previous solution, drastically reducing the plant downtime. Staff immediately reported that the furnaces were needing less cleaning, since aluminium and slag do not stick to the lining easily.

The furnaces' capacity was increased, but even though these modifications reduced the total thickness of the lining, there are no significant increases in the temperature on the steel shell. Simultaneously with the design of the basin, Eredi Scabini also developed a solution for the lining of the inductors which increased their lifetime by 300% compared to the previous lining. **REF. N.14** 



The customer is an aluminium refiner with production capacity of about 100.000 tons a year. 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.

Apart from the various melting and holding furnaces, the foundry contains 2 tilting rotary furnaces with capacities of 14 and 20 tons. The tilting furnace produces aluminium by melting Al slag and salt (10%) and is charged every 6 hours, with continuous operation for 6 days a week. This causes problems of thermal shock, abrasion and chemical attack. In the past, tilting rotary furnace linings used to be made from Low Cement Castable, which tended to wear very quickly, lasting only 8/12 months in tilting furnace 1 (14 tons) and just 6/8 months in tilting furnace 2 (20 tons) (Photo 1). Most of the problems occurred on the

charging/pouring door, in the first part of the basin and on the end wall.

**Our solution**: the tilting rotary furnaces were lined with Flustone<sup>®</sup> castable. The first lining was installed on tilting furnace 1 and lasted 28 months, while the second, installed on tilting furnace 2, is currently still in service after 25 months (Photo 3). A number of infrared pictures were taken during production and showed very low heat losses (Photo 4). All this foundry's tilting rotary furnaces now have complete Flustone® linings. **REF. N.13** 



## High temperatures and oxidizing atmospheres are no longer a problem for tilting rotary furnace lip ring with re(trong HT.



The customer is a major European secondary aluminium foundry which, as well as producing rolled aluminium products,

also produces and distributes aluminium ingots, T-bars and liquid aluminium for a total production of 250.000 tons per year. Flextrong<sup>®</sup> is a preformed ceramic matrix composite reinforced with heat resistant steel used to replace both refractory linings and metal castings.

Some of the aluminium is produced by refining scraps in tilting rotary furnaces. Apart from charging aluminium for melting and refining, the mouth of the furnace is used for discharging the refined aluminium, followed by the slag and the refining salts. The lip ring - the edge of the mouth of the furnace - is subject to erosion due to the passage of the aluminium and slag, aggravated by the thermal shock due to the continual opening of the door for charging and

discharging of the various elements; it is in this door that the burner is mounted. The lip ring used to be lined with concrete, secured to the metal structure by means of welded anchors. Since the lip ring is the extremity of the furnace, it was not always dried and sintered correctly, as this took place at the same time as the drving of the complete furnace lining. The customer was usually forced to repair the refractory lining of the lip ring before the time for routine annual maintenance came round, causing an unscheduled production stoppage. The use of preformed blocks of Flextrong<sup>®</sup> HT, specifically developed by Eredi Scabini for high temperature applications and oxidising atmospheres, offers the customer a solution with excellent resistance to thermal shock and impacts, fracture strength and resistance to oxidation and contact with molten metals. What's more, replacing the blocks is much quicker and easier, and the preformed material does not require drving. The preformed Flextrong<sup>®</sup> HT solution was installed during the maintenance shutdown over the 2014 Christmas holidays and is currently still in excellent condition. **REF. N.29** 



Photo 1- Preassembly at the Eredi Scabini plant



Photo 2 - Installation

 Photo 3 - Installation



Photo 4 - In operation

CONTINUED FROM PAGE 1

### Yesterday, today and tomorrow: opportunities, never just products.

I can still remember those looks of his which gave me so much strength and support to help me go on in the most difficult times. I was still at school; I knew nothing about refractories and even less about the world of work. But I was a proud lad and I decided that I wanted to carry on with the challenge my father had begun. So I decided to start working for the business, which then consisted of three people, myself included. I had to stop going to school in the daytime and I attended various evening courses in industrial chemistry. I was immediately fascinated by those special shapes for boilers. I can even still remember their names: Neca, 3 e 4HF .... and so I started to think about ways to manufacture them without having to use those suppliers who, as time went on, I discovered were producing for us but were also selling to our competitors. I wanted to maintain our exclusive rights but there was no question of taking the matter to court; I couldn't afford to. The opportunity came when I met an Englishman who worked for Atlas Refractory. They were developing a hydraulic cement which could be laid and would set like an ordinary construction cement.

I threw myself into the project, I saw the prospect for exclusive rights, my enthusiasm overcame all the other problems and the result was "Thermojet", the first cement produced by Eredi Scabini Snc (this was the company's new name after the death of my father; it would later be converted from a partnership - snc - to a limited liability company - srl), and it was used for the development of the first pre-formed products. And this is how our company's history began. What has changed since then? None of the things that really matter, luckily! Over the years which followed, the company has moved several times to expand, it has increased the size of its workforce and its plant, it has changed its organisational structure, and so on and so forth but - by the clear decision of its owners - it has always kept to the same principles as then: uniqueness (at the state-of-the-art) in designs and materials.

To be certain of achieving this, we have included a clause in our articles of association which require us to invest 50% of the company profits in research and development every year. It may be easy to say this, but I assure you it's a bit more difficult to put it into practice. For some past projects, and others still ongoing, the time required to achieve our objectives is very long, because in this sector, industrial trials are the litmus test and they are the only way to do the job properly; bearing in mind that an industrial trial only reveals whether or not a solution has worked after several months, or sometimes years, it is easy to appreciate how strongly the concept of uniqueness is rooted in our family. We are not prepared to be second best, although many companies would be delighted with this position. Customers always expect something more from us, because we have led them to count on this and we don't want to let them down. In a scenario of large multinationals, focusing mainly on profit, we are a successful medium-small enterprise which makes the quality of its products and the genius of its designs its mission. To quote an aphorism by Mr Stanhope, a Englishman of letters to whom we turned for inspiration in defining our creed: "Everything that is worth doing at all, is worth doing well."

And I think this will hold true for the future as well. We do not want to grow to the point where it is difficult for our customers to discuss

assure the end product specific performances, giving customers a vast range of options for dealing with every requirement in the best possible way, in terms of both performance and costs.

#### Alfaplast<sup>®</sup> – The Nanoplast<sup>™</sup> pioneer

Alfa is the first letter of the Greek alphabet, and Alfaplast is the first product in the Scabini Nanoplast series.

It is the pioneer product in the Nanoplast project, and also the most versatile in the range, since it can be used in a very wide range of applications and sectors.

Alfaplast was developed as the Eredi Scabini response to all the other "nano technological" products currently on the market.

Alfaplast<sup>®</sup>: Amorphous Silico-Aluminate bonded refractory products. Cement-free, fast-setting, fast-firing two components products with excellent thermal shock resistance and bonding properties.

The large number of industrial tests on our customers' premises have clearly demonstrated that the product is far superior to conventional alternatives (LCC or ULCC), as well as to other, competitor "nano technological" products.

#### $Sigmaplast^{\texttt{®}}$ and $Zetaplast^{\texttt{®}}$ - The evolution

 $Sigmaplast^{\circledast}$  and  $Zetaplast^{\circledast}$  are an evolution of  $Alfaplast^{\circledast}.$ 

These products were created by applying the same innovative

principles as Alfaplast<sup>®</sup>, but - as already explained - with different binders. They are highly specific products, developed for applications requiring particular performance levels and/or features suitable to meet specific demands; they are high-performance products unrivalled on the market.

Sigmaplast<sup>®</sup>: Amorphous Mullite-bonded refractory products. Cement-free, Silica-free, fast-firing two-component or ready-to-use products with exceptional thermal shock resistance, excellent bonding properties and corrosion resistance.

Zetaplast<sup>®</sup>: Special amorphous Corundum-bonded refractory products developed to protect Silicon Carbide, Silicon Carbide/Graphite and Alumina/ Carbon products from oxidation up to 1,650°C.

The Nanoplast<sup>M</sup> range includes vibrating, self-distributing, patching, gunning and ramming materials, as well as pre-formed and pre-fired shapes.

Eredi Scabini is the first and only company that can offer this new nanotechnology. With these new nanoplastic products we are ready to face major new challenges in the most important industrial sectors of iron, steel, and non-ferrous alloys, especially Aluminium.

Welcome to a real new era for refractories: The Nanoplast era.

their problems with us in detail, and we are unable to help them to resolve them because the quantity of refractory material involved means that "it's not worth it"! Successful products such as our CPS<sup>®</sup> (Crucible Pre-formed System) and ABT<sup>®</sup> (Advanced Block Technology), together with our most famous castables such as Flustone<sup>®</sup> and Histone<sup>®</sup>, were developed partly thanks to our invaluable discussions with our customers, and have gone on to actually change the whole approach to refractories. Today our new Nanoplast<sup>™</sup> are once again revolutionising the fundamentals of our sector; one example is the new IPS<sup>™</sup> (Inductor Preformed System) project, which is opening out unprecedented management options for foundries. I like to think it and I am proud to state it: Eredi Scabini, yesterday, today and tomorrow too, offers its customers opportunities, never just products.

Daniele Scabini, President

#### CONTINUED FROM PAGE 1

#### **"WELCOME INTO THE FUTURE!"**

All this offers various improvements compared to traditional products, such as longer lifespan and exceptional thermal shock and corrosion resistance, and it allows worn out material to be

repaired using the same material, with no problems at the joint. Our Nanoplast products are divided into 3 big families, according to the different binders; each of them has different properties that



COMPARATIVE HOT MODULE OF RUPTURE<sup>[1]</sup>





ADVANCED REFRACTORY SOLUTIONS