An ongoing story of success...

EREDI SCABINI has been on the refractories market for almost 75 years, during which time it has grown exponentially, to become what it is today: a company born by both history and vocation, which has always believed in the importance of good business practice to offer products and services of quality, with ever-improving performance and more and more advanced technologies, with the aim of achieving growth not only for itself but also for its customers.

To enable this to come about, the company’s organisation has also undergone major changes over time: as production has increased, so has the number of sales representatives, and more types of products have been produced. The company has expanded its premises to accommodate the new equipment and the new staff required.

The latest expansion took place in the first half of this year, when the company purchased another 5,000 sqm of factory buildings next to its headquarters. Today, Eredi Scabini has a total operating area of about 80,000 sqm, on two separate sites. The plants are close together and are both strategically located in the Milan hinterland. The complete range of 3 different monolithic and preformed production plants are also recently expanded with 2 new high-temperature furnaces of impressive capacity, several warehouses for raw materials and products in transit, and a brand new control room entirely dedicated to the automation and design phases, which produces and accompanies the birth of the products and services offered to customers: the ATC - Advanced Technology Centre, opened at the end of 2019.

The new ATC focuses professionals of vast experience, including engineers, chemists and designers, who cooperate and exchange ideas on a daily basis in a well-organised process, to create products and services of excellence. It is equipped with state-of-the-art technological tools including WaveLength Dependent X-Ray Fluorescence spectrometer, Electric Furnace Machine for production of bricks (900°C analysis), compressors and fluidic transport process also for large used products, equipment for analysis of apparent density and porosity, pH, wettability and much more.

EREDI SCABINI is a sound, prosperous business, with a wide past and excellent future perspectives, thanks to its innate ability to evolve and keep constantly up to date.

Flextrong®: unity is strength!

Flextrong® is a line of Eredi Scabini product developed and launched recently. However, thanks to its distinctive characteristics it has already achieved a prevalence on the market. One of the most outstanding product features is the high level of performance required by the various industries in which it is applied, such as the steel, metal and ceramic industries.

What makes Flextrong® special? First of all, we need to know that Flextrong® is not a ceramic product but a ceramic composite. Companies are characterized by the combination of two or more different, physically separate substrates, with different properties. The construction thus produced has new physical and chemical properties not provided by any individual constituent material. One excellent example is a composite material in reinforced concrete where aggregate and steel matrix their individual characteristics but generate a product with unique characteristics, the cladding with the tensile load. In this case, the concrete is more resistant to the composite load.

Preformed are easier said than done!

ERSADI is one of the first, if not the first, to operate in the very finely divided refractories market to belong to the sector and in the development of the technology for producing shaped shapes, as an alternative to bricks and castables. More than 50 years have passed since those early days, and time has verified the wisdom of the choice made back then, while it is still patented with a product that belongs to the "accessories" category, such as the basic refractory and the basic bricks or heating furnaces, today there is a lot less reliance on foundries for bricks and metals, even for small quantity sizes. Thanks to its previous work and the use of new technology, new preformed materials have been able to offer new, innovative solutions, which have not been met in the past. The result is a more precise, more homogeneous, more resistant and more resistant to the various working conditions.

Highlights

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Flextrong®: unity is strength!

Preformed are easier said than done!

EREDI SCABINI NEWS

Since 1945, the refractory specialist at your disposal.
**Elite**-insulating foam. Effective, safe innovation.

**Elite** is a product line that represents an aspiration novelty on the market for insulating products. Developed to boost the use of prefabricated models in single-family houses, **Elite** is an insulating constructional solution that enables its design almost a form with very low thermal conductivity, high thermal resistance and good mechanical strength. **Elite** guarantees maximum security thanks to the excellent and very practical properties and stability, enabling to maintain insulating and condensation properties and ensure a plastic behavior for the working life, even in case of contact with metallic material. Moreover, **Elite** is an ecological product and does not contain xenon.

The customer whose case history is described below belongs to an international group with production sites in Europe, North America and Asia. It is the biggest producer of various foam products for the packaging industry (boxes and cans), with about 30,000 employees/year. The facility has 3 continuous lines. The customer used to tend to use its prefabricated foamed boxes and laundries with insulating panels clad with adhesive aluminum sheet and various polyurethane materials. The customer has now been using its 26th insulating foam of insulating and for its prefabricated foamed boxes and laundries since 2010. To meet the new requirements, Laticell was instructed. From the start, the easy spreading ability and effective insulation, the customer is also delighted with the reduction in emission formulations in the prefabricated laundries: essentially, foam. **Elite**'s high reactivity and to its volumetric stability guarantee the prefabricated formulates of insulating materials.

**REF. N.6**

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**With Flustone**, lifetime of tilting rotary furnaces lining has increased by +35%.

Flustone is a line of monocore dense castables with excellent fire ability allowing excellent application by self-installation. They are used mainly in working lining requiring high resistance to erosion and erosion to suffer from dust and silicosis. They are self-bonding allowing linings to be prepared without applying the same product to the worn surface without changing the working lining.

The customer is an aluminum refiner with production capacity of about 100,000 tonnes a year. Apart from the numerous working and insulating furnaces, the factory contains 2 tilting rotary furnaces with capacities of 14 and 26 tonnes. The 26-tonne furnace produces aluminum by reducing 4,000 kg of each and it is charged every 6 hours with continuous operation for 6 days a week. The coating problems of thermos shock, abrasion and erosion attack in the past. The rotary furnace linings were clad from Laminar Castable, which tended to wear very quickly, lasting only 6-8 months in tilting furnaces (179 tonnes) and only 36 months in tilting furnaces (143 tonnes) (Photo 1).

What the problems occurred in the ceramic/magnesia field in the first part of the base and on the wall. In our solution, the tilting rotary furnaces were lined with Flustone® castable. The first lining was installed on tilting furnace 1 and lasted 26 months, while the second installation on tilting furnace 2 was still under service after 25 months (Photo 2). The first installation had been taken during production and showed very low fault traces (Photo 2). All the tuyeres lining was now lined with complete Flustone™ linings.

**REF. N.13**

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**ABT increase output and reduce problems.**

Erdi Szabadi has always believed in the development of prefabricated shapes and its ability for producing them in 10 work hours to achieve better results and save the working hours in this sector. Erdi Szabadi ABT - Advanced Block Refractories - are prefabricated prefabricated lining blocks.

The Abt Advantage for this customer comprised several products, including UltraBlock®, furnace preferred shapes with excellent "self-bonding" properties. The low porosity, compacted forms are unique and bonding elements deliver a working corrosion-resistant absorbent and chemical attack.

The customer preferred of insulated aluminum for the internal production of the first prototype for the feed packaging and automotive industry (130,000 tonnes/year). This line for the production of inserts for extrusion lines and for the production of various products for the packaging industry. Moreover, the Aluminothermic™ furnace preferred shapes with "self-sealing" properties.

The first test was done in 1994 with a very low fault rate and almost no erosion. The customer preferred to use Autobond™, an advanced lining materials.

**REF. N.14**

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**Thanks to Flexstrong®, skimming and stirring tool performances are greatly multiplied.**

The customer is a primary aluminum producer specialized in aluminum stocks. Production Flustone®, Erdi Szabadi’s preferred ceramic matrix composite, has captured ideal skimming and stirring tool.

The case house is equipped with several existing lines for the smelting and billet production. Several melting furnaces, with capacities varying from 10 to 39 tonnes are used to melt and alloy the metals. Skimming and stirring tools, fitted with flanges, are used in this new rotary-skimming furnace as - Stirring the billet to keep the alloying elements and speed up the resulting of a molten steel - Skimming slag from the surface of the bath - Slitting the billet to release alloying elements and speed up the resulting of a molten steel

Every day, the test was done 44 times for stirring the bath and skimming the surface. Each stirring cycle lasts from 15 to 20 minutes, depending on the furnace capacity. Typically, the test was made within 30 minutes. After 1 to 2 days, the test was followed by testing with special tools, achieving sterilization of up to 2 days, and then tests with other executional parameters (photo 1), without measuring any sterilization of linear tools. 12 tests in total were done (Photo 1).

The customer preferred to use Autobond™ for its good mechanical properties and good wear resistance, which is the standard product for this customer. The company then went to a double and produced a test tool for the customer with connecting anexit line for about 15 minutes (photo 4), to prevent the water from being overheated and exceed the exit's limit. Now, 2022 Erdi Szabadi has been supplying the customer with skimming tools with Aluminothermic™, achieving sterilization of up to 11 hours. 120 hours, Flexstrong® tools without exit lines with Flustone™ up to 25 hours.

**REF. N.27**

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**CPS™ the exclusive solution for coreless induction furnace linings with no rivals on the market.**

The customer is a leading Mid-Eastern country company which produces rolled aluminum products with continuous casting process, with production capacity of about 520,000 tonnes/year in two Aluks. The melting furnaces are connected to the continuous casting machine by the furnace, which convey the metal from the furnace to the degassing unit, the filter box and finally the casting machine itself.

In the past, the working lining used to be limited and insulating instead of two sets of working panels; the working was made inside them and secured by hinges at the front. The customer started to use Erdi Szabadi’s products for the furnaces in 2017. The furnaces were constructed using UltraBlock®, which has excellent non-working properties and equalizing resistance to thermal shock, impact, and in particular the abrasive effects of the liquid metal. Moreover, the long service life makes the furnace thicker to build. Thanks to these characteristics, the linings received better than standard performance (-50% weight), In response to these highly promising results, the customer has shown it also uses UltraBlock™ prefabricated lining for this degassing unit and filter box.

**REF. N.28**
Eredi scabini: No. 1 FOR OEMs TOO!
The company is an international corporation specializing in the design and production of industrial furnaces for ferrous and non-ferrous metals. Their range also includes automation, melting, handling and heat treatment furnaces.

Over time, Eredi Scabini has built a major partnership with this company, resulting in the two firms to work in synergy to provide end customers with a complete, absolutely efficient service, as well as a top-quality product. In this case, Eredi Scabini saw the benefit of a 20 ton reverberatory furnace for melting and refining, with responsible furnaces. The casting produced by EREDI SCABINI is then sold to their customers interested in this type of furnace, since the furnace has been developed:
- Faster, easier installation
- A high possible misalignment strength for both the hearth and the ramp, the areas that require the most complex furnaces for high temperatures and heavy atmospheres.

As a result, the complete lining installation procedures required just eighteen 10 hour shifts. This furnace is still in constant operation with no stoppages. Thanks to the remarkable results achieved, the customer decided to crown the second-year even with the Eredi Scabini solution.

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fle(trong)® and Flatone®
make up a complete lining.

fle(trong)® is a preformed ceramic matrix composite reinforced with near-net-shape steel. The product has excellent resistance to thermal shock, impact, fretting and erosion as well as to contact with molten metals. Fle(trong)® is designed for installation via shot blast and wall torching provided. Fle(trong)® HT has been specifically developed for applications at high temperatures and in the presence of oxidizing atmospheres.

The customer is an European company which is a leading international producer of rail products, producing more than 150,000 tons of aluminium a year and exporting to more than 80 countries. A supplier was chosen after careful searching for potential improvement in the production process to maintain a high quality standard over time. In this case, the customer was about to completely replace a 650 ton reverberatory furnace and gained the need to severely reduce the time the furnace of the new line was exposed to the traditional type of steel or iron impact plates to eliminate the furnace, the continuous maintenance costs and the high wear of the steel due to the slag. The customer also required a high-quality refractory material with strong resistance to aluminium corrosion, high resistance, and a high thermal expansion coefficient in a variety of products from the Fle(trong)® line of microporous dense castables with high resistance to corrosion and to the replacement of the old floor with new ones.

A mix of products and methods for tower furnaces applied by true specialists.

The company has offered and conducted the in-house development of such innovative concepts in the field of refractories. The range now comprises hundreds of different furnaces, used for the extraction of refractory and handling metallinis as required by the customer and the customer's specific needs, also using a wide set of methods. In this case, the preferred option was the Fle(trong)® line, which comprises a range of microporous setting dense castables usually used for the reinforcement of linings requiring high resistance to erosion and corrosion by metals and/or slag. The Flatone® line is used for lining, allowing linings to be repaired by applying the same product to the worn surface without changing the whole lining.

The customer is a multinational specializing in the production of aluminium castings, ready for the automotive industry. The aluminium castings are matched with high productivity tower melting furnaces. One of the production units has a melting capacity of 8,000 kgs, provided by three tower furnaces. The customer is the first customer of Eredi Scabini reverberatory furnaces. Before 1999, during operating maintenance of the reverberatory furnace required repair of the refractory on the rods walls, and to reinforce this area damaged by impact during charging. For this reason, especially for this area subjected to the highest impact from the charge and thermal shocks from the hotter furnace. A Fle(trong)® range product was used.

The analysis, designed and three produced by Eredi Scabini for this customer's melting furnaces, involved the use of specific products chosen to suit the characteristics and needs of the chamber's different zones. The product chosen for the hearth, back wall and the sloped area impacted by the charge was Flatone®. A self-adjusting compound with excellent mechanical impact and thermal shock resistance, as well as outstanding non-wetting properties even at high temperatures.

Fle(trong)® HT was also used for the walls of the charging hopper and on the charging door sill, reinforced with exposed carbon fibre to increase mechanical and thermal shock resistance for the burner area, where the use of a non-wetting product would be too aggressive, a Fle(trong)® product with excellent thermal shock resistance was selected. In 2010, the furnace's refractory lining was modernized, including the holding chamber, using specific products to suit the different zones.

The furnace hearth and walls were lined with Flatone® HT, a suitable for installation by vibration, with high thermal resistance and excellent non-wetting properties, while the products chosen for the crown was Fle(trong)® HT is suitable for installation by vibration with high mechanical and thermal shock resistance and low thermal conductivity. The Flatone® used in the melting chamber burner zone was also used in the burner zone of the holding chamber. Thanks to this careful selection of varying products for the different areas of the furnace, maintenance of some parts, such as the crown, subjected not to impact from the charge and the walls of the charging hopper and melter chamber was reduced compared to conventional solutions. In particular, Fle(trong)® HT solutions to give excellent results in the areas exposed to the most intensive mechanical and thermal stresses. And not least, even retained from the walls of the furnace was preferable.

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With RESISTONE™ mechanical abuse and high temperatures are no longer a problem.

As well as a large range of refractory castables and preformed shapes, the company has a line of products specifically developed for industrial furnaces subjected to extreme mechanical and chemical stress combined with heat RESISTONE™. RESISTONE™ products are installed by procedures similar to those used for construction ceramics, but develop extremely high mechanical strength within a few hours and can be used with temperatures up to 1200°C even in contact with metal as it solidifies. The rapid installation and ease of use also make RESISTONE™ ideal for maintenance purposes.

The customer is a Italian, Italian company which specializes in the production of silicones for the refractories industry, with a total of 38,000 tons a year destined to the world market. During the aluminium alloy melting process, heat is produced; this is skimmed off and collected by the melting plants prior to storage in a dedicated area. This slag, moreover, still has residual aluminium oxides, at very high temperatures, together with the continuous mechanical abuse from the ladle during handling, and helping, causes the refractory chamber lining to break up over time, with the formation of fines up to as much as 40 cm deep. This client was then treated to carry out continuous partial relining, as well as to improve the refractories. Considering the needs expressed by the customer, Eredi Scabini decided to carry out surface from few days heavy-duty applications and recomposed RESISTONE™ HT, a mechanically very refractory carbonized based on special silicium. Instead of the preformed products as construction ceramics, the preformed solution has the highest mechanical integrity within just a few hours. In spite of the considerable increase in productivity since its installation, the RESISTONE™ HT lining has been in service without a break for more than five years, with no maintenance or partial repair works.

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ADVANCED REFRACTORY SOLUTIONS

For further information: sales_dept@erediscabini.com

n° 9
Papers
Refractory concrete: knowing and limiting the explosion hazard.

In general, water performs various functions in refractory castables. It seals the open pores so it serves as a lubricant between particles after the open pores have been activated. It also chemically reacts with some elements in the dry cast to create new chemical compounds (internal or chemically bonded water). This phenomenon generates a foundation of reaction binder that solidifies the product, and as such it plays a primary role. In general, lower temperature where the water is added has less tendency to form an internal hydration, and higher temperature is less conducive to form an internal hydration. Water addition is a sudden release of thermal and mechanical energy generated by a pressure build-up, generated by the production and expansion of gases, normally at high temperatures. In the case of refractory castables, in 90% of cases explosion problems are generated by the presence of water. All castables (except dry-mixing mix) contain smaller amounts of water.

Why does a material explode?

Because the pressure and expansion of the gases inside the mechanical strength with which it is able to retain them. The vibration and destructive power of the explosion depends on the density and porosity of the material. High density and low porosity (especially when the pores are closed) lead to more explosive with destruction effects on the surroundings, while the expansion of the low density, open pores tend to take the form of "smoke" or less significant explosions and whistling. It should be noted that the open pores and porosity of the castables used, plastic removal mixers are generally more porous and was less likely to cause conventional castables to more porous than the low pressure mixture but they contain less chemical water available because they have more available free flow. Castables are more likely to lose the conventional and low pressure types even if their total porosity is the same, open pores mix containing is the most porous of all castables, but it is important to take care with "Build-up" systems or special capsules (those without closed-open pores), where the total porosity is high but the number of open pores is low. "Abraded" castables have an apparent porosity that is always open, with porosity diameters of more than 0.1 micrometers, 50% of the chemical castables contain and expansion films which help to prevent explosions but which are unable to guarantee that castables containing metal fibres are less likely to explode than those without them.

Installation by remoistening is less likely to lead to explosions when casting or vibration is used. Installation by spraying or shotblasting (pre-remoistened materials) can be less likely than installation by vibration a pumped material will be less likely than castables installed by conventional delivery systems.

Castables have different chemical settings. Interesting Refractory castables, causes lower problems that those with low water. Namely, the water is present, the greater the risk.

Chemical reactions are affected by the ambient temperatures and the temperatures of the products components and the water used, which may cause physical and chemical transformations leading to the risk of explosions during the initial heating process.

Soil through without seeping are more likely to cause explosive and explosive, curing at high temperature (350-470°C) with low ambient relative handiness increases the green strength, an important factor in order to control the pressure and expansion of steam at temperatures up to 150°C. Cooling with plastics film which does not allow for this surface to be present in the coating film and ensures that handiness is the same as that of the layers beneath.

It should also be born in mind that a cast bulk particles are more at risk than a cast-coated sheet of the same density, porosity, maximum thickness and planimetric flow. The thicker the layers, the more accurately the initial heating curve must be designed. Considering all these factors, Refractory castables initial heating curves are the outcome of thermal simulators and the company's practical experience built up over the last 40 years, INCONTRO. 1200 CONSOLIDATIONS, BESIDE ensure every detail of the project has been weight up.

Moreover, vacuole-blast heat treatment equipment (Ovens, burners, thermoconductive membranes, fans, etc. is not just a newly executed project of heat, causing an explosion while destroying the environment when the refractory is installed and also causes serious risks for the people concerned.

Text of Figure 10: Similar to Camera mode

Open road per day

Initial heating curves for castables and performed shapes.

There is a difference between these two operations. For castables, the heat energy travels to the cold external part and in a less amount by other means of materials, including the insulators. While performed shapes, the heat travels the whole surface and travels to reach their core after the water present is gradually eliminated. While for shapes the variable factor for the same quality is thickness, for castables vary on the thicknesses and they must all be considered, but the abscissa difference in terms of time is not as great. The curves are virtually the same. 

We simulated a comparison between a preferred shape and an isostatic casting with the same material and thickness.

For the isostatic casting we called the following additional assumptions concerning hazardous analysis and safety testing.

"A" = 110 cm of Miscropor SF1100 boards
"B" = 8 cm of Miscropor SF1100 boards + 19 cm of Pressatex 94 castables (pre dried)
"C" = 8 cm of Miscropor SF1100 boards + 14 cm of 23 mm Isolfrack boards + 14 mm of 40% Acibon dense bricks.

The final result of the two heating curves at 830°C and related loadings indicated 4040 hours for the preferred shape and above of average the three mentioned of 3420 hours.

Written by Daniele Scucci