Interview with Daniele Scabini

"Our Sigmaplast AL will revolutionize the market for refractories"

Eredi Scabini, founded in 1945, was one of the first companies in Italy to introduce unshaped (monolithic) refractories as an alternative to conventional bricks. Today, the family-owned company with headquarters in Siziano and a highly skilled staff of over 60 people specialises in the design and production of quality monolithic refractories and preformed shapes based on its own exclusive formulations. More than 30% 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 weighing up to 15 tonnes. One of the company's most recent innovative products is 'Sigmaplast', a family of monolithics based on new nanotechnology with outstanding characteristics. ALUMINIUM had the opportunity to talk to Daniele Scabini, owner of Eredi Scabini together with his sons, at the Aluminium 2014 fair.

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Daniele Scabini at the Aluminium 2014 fair in Düsseldorf

ALUMINIUM: Mr Scabini, would you first describe your business in a few words?

Daniele Scabini: Our business is very easy to describe because we produce only two important product families: monolithic refractory materials and precast shapes in big sizes for the lining of furnaces and containers. Our products are high-performing solutions used in different industrial sectors, but in particular where there is a molten metal content. Our solutions are 'kits' for the modular refractory lining of furnaces or other specific applications.

Furthermore, we not only produce refractories, but also offer a broad range of services, from the careful analysis of specific requirements through to the design, production and installation of the refractories, which is backed up by a comprehensive after-sales service including the maintenance of the refractories during the whole lifetime of a furnace. All our solutions are developed entirely in-house. And all our products are produced in our own plants and based on exclusive formulations. We own the intellectual property rights to hundreds of products and are constantly developing new formulations to meet every type of need.

In order to promote our business and to 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 identify new products for specific requirements. The goal has always been to win our competitors as customers. If they have a particular problem today, they come to Eredi Scabini asking for support: either for small or large quantities and sometimes for special shapes. Our company is recognized as the key to solving problems.

ALUMINIUM: Can you give an example?

Scabini: For instance, take special block burners for heating up the furnace. The geometrical form of these refractories is very complex and the thickness very thin. It could crack or suffer from thermal shock in the course of time. Our specific refractories are resistant to this problem, so even some of our competitors buy our blocks.

ALUMINIUM: You mentioned the importance of research and development to keep you ahead of your competitors. What is the latest innovative product Eredi Scabini has developed?

Scabini: In 2015 our company celebrates its 70th anniversary. Besides *(smiling)*, I myself have been with the company for 50 years. We will then officially introduce a very new family of materials, that is Sigmaplast AL for aluminium and further Sigmaplast products for other industries. This will ring in a real new era for refractories.

ALUMINIUM: How is the Sigmaplast product differentiated from others?

Scabini: This product is based on new nanotechnology. So far, the nanotechnology is used in various applications. In the ceramics and in particular for refractory products, binders based on colloidal silica, which are defined 'nanobond', have been used recently. For us, these systems are already exceeded, outdated! Eredi Scabini is the first and only company that now applies a new nanotechnology to refractories, named Nanoplast. We have invested one million euros to develop this technology and are now ready to introduce it to the aluminium industry. In 2015 we will also adapt the same technology for other non-ferrous alloys, cast iron and steel.

ALUMINIUM: What are the special features of this new product?

Scabini: When using this type of nanoplast technology you not only create a metal-proof skin but also metal-proof of the internal mass of the refractory. As regards aluminium we used non-wetting material in the past to prevent corrosion of the refractory. With Sigmaplast AL we obtain an absolutely non-reactive material, because the complete mass is inert to the metal, and not only the skin of the matrix covered by non-wetting additives. This is completely different from previous products and will revolutionise the market. Sigmaplast AL offers various improvements, such as longer lifetime, exceptional thermal shock resistance, it is corrosion-resistant, and it allows the repair of worn out material by using the same material without having problems at the joint.

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

ALUMINIUM: How important is the aluminium industry for your business?

Scabini: Around 90% of our activities relate to molten metal applications, half of it to the aluminium sector with Europe the largest market region for our molten metal contact business. So the aluminium industry is an important target market for our products. And with this new nanoplastic products we are well prepared for the future needs of our customers. As I like to say, our company does not sell refractories but opportunities for our customers.

ALUMINIUM: Mr Scabini, many thanks for giving an insight into your company and recent R&D efforts. ■

Sigmaplast: The importance of its matrix

The main problem to be solved when formulating a castable is the creation of a matrix, meaning the components with a particle size smaller than 0.5 mm, which is able to resist thermal corrosion and extreme mechanical wear and tear. It is the matrix that bonds the other aggregates together to form the end product. If the matrix gives way, the end product will not deliver the performance required, even if it contains the very best aggregates. If the matrix is sufficiently strong, it will bond to the surfaces of the other aggregates but will never penetrate their cores and transfer its own positive characteristics to them. At least, until now.

With the new Eredi Scabini family of nanoplastic products, especially 'Sigmaplast AL' for the aluminium industry, the nano-additives and binders 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 800 m² (the size of two standard football pitches); so minute that, with the right carrier substances, they are able to penetrate into the porosity of micro-cavities of aggregates, generating nano-umbilical pathways and nanoporosity 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.

In the case of Sigmaplast AL products, a family of monolithics including self-distributing products or ones applied by vibration, ramming, spraying or by means of a trowel, the chemically neutral nanomatrix is based on a mullite bond that generates superb resistance to aluminium alloy corrosion even without the use of conventional 'non wetting' additives, up to temperatures over 1 200 °C, very often reached above the metal level. Sigmaplast AL products do not contain hydraulic, phosphoric or silicate-based binders, which research has shown to promote uncontrolled corundum growth as well as generating poor physical characteristics at the particular working temperatures of the metal and slag contact areas.