From the “Opening” of Palazzo Italia to the international market: biodynamic cement is now a global product

The innovative cement mortar used to build the external structure and the internal façades of Palazzo Italia at Expo 2015 is presented to the international building community. More than 12,500 hours of research to create i.active BIODYNAMIC, developed in i.lab, the heart of Italcementi’s innovation.

Milan, 10 September 2015 – A beautiful cement to see and touch. A sustainable, durable, resistant material which has great visual quality and is ready to be used in architecturally prestigious works such as Palazzo Italia at Expo 2015. Italcementi’s research and innovation skills have led to conceive a new material for sustainable architecture: **i.active BIODYNAMIC**. A unique product in its properties and features, which is now ready for the market.

A global event to launch a new product

Italcementi presented its new cement mortar during a global event that took place today in the auditorium of Palazzo Italia with the participation of delegations from four continents. Many representatives of the building community have come to Milan to get to know this product, find out about its features and see its first experimental application: the outstanding external structure and the internal façades of Palazzo Italia, designed by Nemesi & Partners to become the iconic place of Expo 2015 Milan.

«*From the silver medal at 1876 Expo in Paris, through to the international success of the Italian Pavilion in transparent cement, the symbol of Expo Shanghai 2010, to the new biodynamic cement that characterizes Palazzo Italia in Expo Milano 2015: Universal Exhibitions have been historically connected to Italcementi based on innovation* – said **Carlo Pesenti, CEO of Italcementi** -. *Also a “traditional” industry like that of building materials can renew and offer new opportunities to the building community. Our research projects lead to performances and solutions thanks to which the ideas of architects and engineers can take shape and create very beautiful buildings, like Palazzo Italia*».

The Italian pavilion is a building visited by thousands of tourists every day and is one of the most photographed of the whole Universal Exhibition.

«*Palazzo Italia stems from a concept of natural architecture, making it a landscape* – explained **Susanna Tradati, designer of Palazzo Italia together with Michele Molé and studio Nemesi & Partners** -. *A petrified forest, whose complexity has been made possible by the plasticity of biodynamic cement. Italcementi is the first company that,*

instead of putting up "boundaries" to our work as architects, encouraged us to go further, to overcome the limitations in design often placed by traditional materials. The success of Palazzo Italia is also due to this new, extraordinary cement».

The result of this coming together of product innovation and architecture is a creation that is bringing glory to Italy as a whole.

«*I remember the looks of amazement on many people's faces, from the very first days of Expo, in front of the immaculate white, the complexity and the massiveness of Palazzo Italia* – said **Diana Bracco, President of Expo and General Commissioner of the Italian Pavilion** -. *I found the same astonishment on the faces of heads of government, ministers and businesspeople when they were told that this material, so beautiful to see, is cement. You do not expect this to be cement, yet this is what it is. And it is the result of Italian research, used by Italian architects to build "the home of Italy" at Expo. A team that is winning the Expo challenge*».

Biodynamic cement: innovative shapes and cleaner air

i.active BIODYNAMIC is a highly fluid cement mortar for the construction of non structural, thin prefabricated architectural elements of complex geometries. The product's name is a summary of its innovative characteristics. The **"bio"** component is given by the new cement's photocatalytic properties, originating from its active ingredient **TX Active** patented by Italcementi. In direct sunlight, the active ingredient in the material "captures" certain pollutants present in the air and converts them into inert salts, helping to purify the atmosphere of smog. Additionally, the mortar is made from 80% recycled aggregates, part of which consist of scraps from the cutting of Carrara marble, and therefore provide a superior brilliance compared to traditional white cements. The **"dynamic"** component is a specific characteristic of the new material, whose particular fluidity allows the creation of complex shapes like those found in the Palazzo Italia panels. Thanks to its high workability, **i.active BIODYNAMIC** is able to penetrate in the frameworks and form the final design of the panel, ensuring an extraordinary surface quality. The new material also features outstanding workability and resistance compared to classic mortars: it has twice the compressive strength and twice the flexural strength.

	ORDINARY MORTAR	i.active BIODYNAMIC
Initial fluidity	100 mm	> 300 mm
Compressive strength	30 MPa	> 60 MPa
Flexural strength	5 MPa	> 10 MPa

Another product feature, equally significant for the project, is its durability; the levels of water absorption of prefabricated elements made with i.active BIODYNAMIC are extremely low, thanks to its compact matrix and low porosity, and they show significant resistance to the weather, such as storms, freeze and thaw cycles. i.active BIODYNAMIC is easy to use: items of high aesthetic value can be made by just adding water, for different architectural solutions in just one production stage and without any post-processes.
Items in different colours can be made by adding inorganic dyes and/or fine coloured aggregates.

A team of 15, more than 12,500 hours of research

15 Italcement researchers were involved in creating this new product, dedicating a total of 12,500 hours to research, experimental tests, laboratory tests, scaled down applications to make the panels and staying closely in touch with the designers of Palazzo Italia, to then get to the final formulation and to the first panel models together with Styl Comp, the Bergamo based company that made the over 750 panels of the building. Throughout the experimental stage, Italcementi partnered with the University of Naples for the issues related to the product's dynamic performance and with the University of Florence for investigating its mechanical performance. The biodynamic cement is covered by 5 global patents.
Another important element in this research project is its LCA (Life Cycle Assessment) approach, a sort of check-up that confirmed the product's sustainability. The base of this biodynamic cement is white cement produced by the Italcementi plant in Rezzato, Brescia. This cement naturally does not contain chrome, a feature that further enhances the "bio" element in its name.
All these decisions are in line with the request of the designers from the Nemesi office, which was to make a "Zero Emission building".

Innovation, Italcementi's Leadership

According to Italcementi, being innovative means developing products and applications to more efficiently and cheaply build structures that are sustainable, safe, comfortable and with a high visual value, staying very much aware of the needs of the local environment and significantly reducing the use of raw materials. **Since 2005, Italcementi's innovation**

rate has been constantly increasing, from 1.5% to 6.5% in terms of sales resulting from innovative products with respect to overall sales. A significant rate in the industry of construction materials which is always seen as always remaining traditional. The marked propensity for product innovation has led over the years to the development of a wide range of unique and innovative products: the photocatalytic cement, based on the **TX Active** ingredient, able to help improve air quality with its de-polluting and self-cleaning properties; **i.light,** the transparent cement used for the exterior walls of the Italian Pavilion at Shanghai Expo 2010, highly appreciated by the world of architecture; i**.design EFFIX** for creative applications, used by designers to created interior decoration complements; **i.idro DRAIN**, the draining cement for the construction of roads and paving that respect the natural cycle of water and, finally, the innovative product used for the construction of Palazzo Italia at EXPO 2015, biodynamic cement **i.active BIODYNAMIC**: an innovative mortar characterized by high mechanical strength and smoothness, for use in the construction of non structural, slender architectural elements of complex geometries.
The products developed by Italcementi are made available to the world of architecture, with which the company has maintained close cooperation relations for decades. Researchers and architects work side by side to find solutions and materials able to meet new challengers and reach beyond the traditional characteristics of construction materials, setting new standards in terms of safety, durability, design and sustainability.
The heart of the Group innovation is **i.lab, Italcementi's new Research and Innovation Centre**, designed by American architect Richard Meier and located in the Kilometro Rosso Science park, near Bergamo. The building has an overall surface area of 23,000 m^2 and hosts engineers, technicians and researchers all engaged in investigating and developing innovative technological, functional and aesthetic solutions for new construction materials.
Built in line with the Group's concept of innovation, sustainability and architectural excellence, i.lab is the synthesis of this trail blazing technology in terms of quality of materials and green construction technologies. i.lab has been rated LEED Platinum.

Palazzo Italia in figures

- **9000 m^2,** the external surface area
- Over **750 flat and curved panels**, all different
- **4 by 4.20 metres,** the typical panel size
- **12,500** hours of research dedicated to the development of **i.active BIODYNAMIC**
- **15** researchers and technicians that developed the new product and made the panels
- **2000** tonnes of biodynamic cement used

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