

AUGUST 2022

International  
**Cement**review



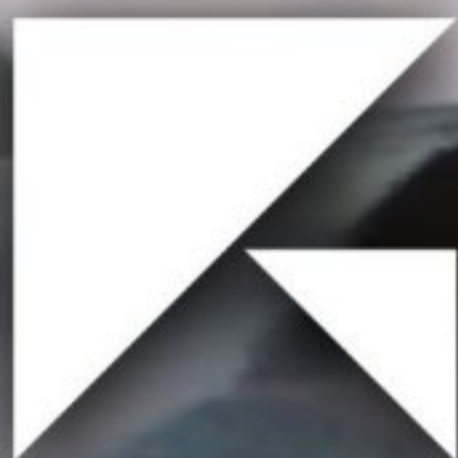
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## CEMENTIR'S INNOVATION ENGINE FOR WHITE CEMENT APPLICATIONS

INWHITE® has become the umbrella brand for commercialized high value adding and high-performing products, which are suitable, sustainable, cost-effective solutions to complex challenges and mega-trends in construction and building materials.

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# White cement applications in action

Over the last few years Cementir Group has been proactively working on consolidating its position in the white cement sector worldwide. Here the company shares examples of projects taken from its global portfolio of white cement references and provides an update on new phases of innovation for this niche market.

■ *by Cementir Group, Italy*

White cement is a niche product with a worldwide consumption level of approximately 19Mta and an estimated CAGR of around three per cent in the next three years, until 2025, accounting for less than one per cent of total cement used. Regarded as a high-end, value-adding product, its use varies from applications for aesthetic to structural requirements, both for renovations (decoration, repairs and maintenance work) and new buildings.

The use and consumption of white cement and its targeted applications demonstrated good resilience during the COVID-19 pandemic and continues to do so today, notwithstanding the uncertainties and difficult economic and geopolitical scenarios and challenges in terms of sustainable cement production.

In the last few years Cementir Group has been proactively working on consolidating its position in the worldwide white cement market by leveraging on its presence in five continents, anticipating demand trends through the development of new products and solutions and strengthening its sustainability agenda – specifically in terms of advances in technology and product development.

“By being directly present in key markets, Cementir benefits from a diversified customer base in terms of size, business, culture, tradition and technological levels. The group aims to differentiate its value proposition on white cement globally by redefining and developing solutions that will support the growth of our clients’ business through customised services and know-how sharing as well as advisory and strategic partnering,” states Michele Di Marino, group chief sales, marketing and commercial development officer.

Mr Di Marino continues: “Looking at sustainability, we are frontrunners on improving our production footprint by investing in process and technical solutions (for instance using alternative fuels and potentially moving into the use of gas and biogas) as well as reshaping the product portfolio.

“The high performances of the clinkers we produce and the full control of strategic raw materials gives us the capability to develop lower carbon/lower clinker ratio cements, while keeping relatively the same performances as for ordinary Portland cements.

“Especially in Europe we are fostering the transition towards a more blended-based range. FUTURECEM®, a limestone calcined clay cement, will surely also play a pivotal role in the near future in our white portfolio. Meanwhile, fit-for-purpose performing CEM II cements will be driving the low-carbon transition more and more.”

## Emerging applications

Beyond the traditional uses of white cement, some emerging and rapidly-growing applications of Cementir’s Aalborg White® cement are linked to the consistent quality and high-end performance that can be achieved in concrete through advanced technologies. High strength and outstanding durability can be achieved by manufacturing very thin panels and elements based on Aalborg White cement, leveraging also on its sulphate resistance – SR5 according to EN 197-1.

Shanghai Astronomy Museum, Shanghai, China



As an example, this principle can be applied to façade elements to achieve compact, high-insulating panels featuring, among others:

- low weight/m<sup>2</sup>
  - total wall thickness is significantly reduced to allow for a more efficient use of the inside area of a building
  - surfaces finished in one process to avoid further treatments
- modular and highly reusable.

## Project references

New solutions based on high value and fast developing technologies like ultra high performance concrete (UHPC) and related applications, including high performance overlays, glass fibre-reinforced concrete (GFRC) and high-end 3D printing applications, have been identified by Cementir and are a primary focus in the coming years.

Below are some exemplary projects taken from the company’s global portfolio of references where its Aalborg White and InWhite Solutions® products have been used.



### Shanghai Astronomy Museum, China – GFRC cladding completed in 2021

The 39,000m<sup>2</sup> Shanghai Astronomy Museum in China is the largest museum dedicated to the study of astronomy in the world. Designed by Ennead Architects and the Arcplus Institute of Shanghai Architectural Design & Research, the building heightens awareness of our fundamental relationship to the sun and the earth's orbital motion through scale, form and the manipulation of light.

Manufactured and installed by Shanghai Zhuo Ou Construction, a total of 4000m<sup>2</sup> of GFRC cladding that spirals upward from the entrance was made using Aalborg White cement, evoking the image of celestial orbit movement. Long trapezoidal GFRC claddings, up to 5.6m in height and based on irregular shapes (including curved and arc surfaces as well as spheres), placed higher demands on both the measurement of dimensions and accurate production.

### Nanchang Wave, Vanke Waterfront City, China – GFRC cladding completed in 2020

The Nanchang Wave in Jiangxi, China, designed by the Nordic Office of Architecture, consists of a landmark spiral tower and a horizontal commercial building, which form the heart of a large residential community.

A total of 657 GFRC double curve elements, based on Aalborg White cement, were used for the tower cladding. Hyperbolic GFRC technology with precise dimensions and a secure installation system, developed and manufactured by Nanjing BeiLiDa, can be flexibly modified and/or removed as desired. The use of Building Information Modelling (BIM) technology allowed precasters to share design, production, installation and maintenance information with the other parties involved.

### Nautilus and Atlantis complex, Belgium – precast concrete cladding completed in 2019 and 2021

The Nautilus complex in Brussels, Belgium, is an urban residential and commercial construction project designed by Axent Architects. It consists of four buildings with 197 apartments, arranged around a vast green esplanade, ensuring the harmonious combination of housing and shops. The Atlantis complex completed in 2021 is complementary yet quite different from the nearby Nautilus project because of its

contemporary design and very avant-garde identity. The whole project stands out with its simple, luminous and contemporary architecture thanks to the white concrete elements.

The white prefabricated concrete wall panels and balconies based on Aalborg White cement were produced by C-Concrete, which optimised the layout of the elements to minimise the number of constituent parts. The prefabricated concrete producer ensured strict quality control standards, including colour, detailing of the fillets, integrated drains, balcony slabs and the smoothness of the top surface of the balconies.

### New phases of innovation

Based on Cementir's patented FUTURECEM technology and under the InWhite Solutions series, Cementir rolled out its UHPC Aalborg Extreme® and Aalborg Excel® in 2019. Both products have been successfully used in the thin and slim architecture concrete elements of commercial and residential projects thanks to their performance in terms of excellent compressive and tensile strength, shrinkage and durability.

In May 2022, starting with European markets, the company also launched Aalborg INBIND®, a white pre-mixed cementitious product. Based on FUTURECEM technology, it is a valuable complement to the existing ranges under the InWhite Solutions umbrella.

INBIND allows precasters to achieve a sustainable quality product supply thanks to FUTURECEM technology that relies on limestone and calcined clays as the main constituents, without being constrained by



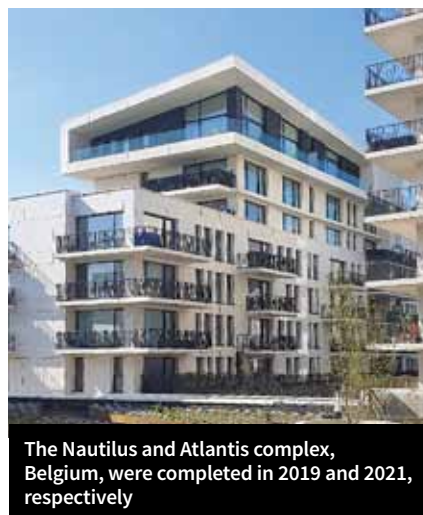
May 2022 saw the European market launch of Aalborg Inbind®, a white pre-mixed cementitious product

the availability and quality of byproducts from other industries (ie, mainly slag and fly ash). The product is a reliable binder solution for UHPC thanks to its predictable performance with fully-documented properties. It provides precast producers with efficient support so that they can easily formulate their desired UHPC and quickly seize project opportunities and optimise costs.

"We are proud to accelerate Ultra High Performance Concrete technology utilisation by launching a new binder solution. The scaling-up of UHPC technology depends mainly on the stable supply of supplementary cementitious materials (SCMs). Moreover, the specific needs of local projects have led precasters to look for their own UHPC by using local aggregates and chemical admixtures. UHPC development is, indeed, complex, time-consuming with a high trial-and-error cost, requiring a large amount of SCM materials that are often in short supply. INBIND is set to meet market needs by providing a flexible and user-friendly binder solution, optimising costs by leveraging on local available materials," explains Mr Di Marino.

As part of the fast prototyping and pre-launch phases, INBIND has been tested by selected customers. With the support of a technical team on the co-designing of mixes, a compressive strength at 165MPa has been achieved. Key steps during the co-designing stage were optimising aggregates packing, fixing the water to binder ratio at 0.25 and adjusting the superplasticiser dosage to achieve a self-levelling material.

On future developments, Mr Di Marino adds: "We are also excited about our next phase of innovation as our UHPC bridge overlay product Aalborg Recover™ has been in the trial phase and will be available for infrastructure applications by the end of 2022." ■



The Nautilus and Atlantis complex, Belgium, were completed in 2019 and 2021, respectively



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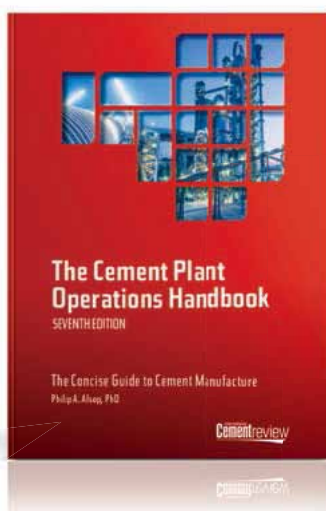
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