

Technical datasheet

i.active ULTRA BIANCO 52.5 R

CEM I 52,5 R WHITE

Description

i.active ULTRA BIANCO 52.5 R is a white photocatalytic Portland cement type I with very high normalized strength and high early strength.

Composition

In compliance with EN 197-1, i.active ULTRA BIANCO 52.5 R contains 95% to 100% of white clinker by cement mass excluding calcium sulfate and additives, as well as specific constituents with high photocatalytic power and other minor constituents.

Product specifications

Chemical requirements	Physical requirements	Compressive strength
Loss on ignition $\leq 5.0\%$	Initial setting ≥ 45 min	2 days ≥ 30.0 MPa
Insoluble residue $\leq 5.0\%$.	Expansion ≤ 10 mm	7 days N.R.
Sulphates (like SO_3) $\leq 4.0\%$		28 days ≥ 52.5 MPa
Chlorides $\leq 0.10\%$		

Use

The very high strengths and the very short time taken to achieve them allow the use of this product instead of the common Portland 52.5 R cements, thus avoiding longer formwork removal times and obtaining works that do not require surface treatments.

i.active ULTRA 52.5 R is ideal for designers, even the most daring and demanding, as it can meet any aesthetics/functionality requirements as well as static calculation needs.

It can be used for slender vertical prestressed cast-in-place structures, elements and/or jets that require rapid formwork removal and/or displacements; prestigious constructions, architectural works with patterns containing colored aggregates, prestigious floorings, special pre-mixes, colored mortars and concrete, stuccoes, sealing works, restorations, fixing operations, positioning of street furniture elements, joints and various repair works.

Advantages

i.active ULTRA BIANCO 52.5 R is a consistent, stable and brilliant white cement that offers many possibilities of use due to its excellent physical-mechanical performance and photocatalytic properties ensured by its special formulation. In fact, in the presence of natural light (especially the ultraviolet component of the light spectrum) or even appropriate artificial light a strong oxidative process activates on the material surface causing some organic and inorganic substances to decompose as they come in contact with the cementitious surface. Hence, i.active ULTRA BIANCO 52,5 R confers the manufactures the ability:

- to purify air ensuring a substantial reduction of organic and inorganic pollutants mainly produced by human activities – industry, transport, domestic heating – responsible for air pollution;
- to enhance and maintain over time the aesthetic characteristics of the works reducing the need of cleaning and aesthetic maintenance operations.



Properties

1. Effectiveness against NO_x and organic and inorganic chemicals

Laboratory tests and field measurements have widely demonstrated the effectiveness of reducing nitrogen oxides (NO_x). The NO_x reduction test is carried out in laboratory where a continuous flow of air mix containing a specific NO_x concentration is passed through a chamber of a given volume and subjected to ultraviolet (UV) lighting from a suitable lamp. The effectiveness can be measured both as percentage reduction, according to UNI 11247-2010, and as degradation rate as a function of the exposed surface, according to UNI 11284-2013. The application of this standard at European level (CEN) has been recently proposed.

The photocatalytic activity was also demonstrated with in situ tests aimed at monitoring various types of flooring within urban areas and some Italian and European tunnels.

Similar test methods (for example, according to UNI 11238-1) demonstrate the product effectiveness also with VOC (volatile organic compounds), as occurred in European research projects (PICADA and CLEAR UP) performed at internationally recognized laboratories (ITC-CNR of San Giuliano Milanese and the European laboratory JRC of Ispra).

In addition, i.active ULTRA BIANCO 52.5 R can be used for its deodorizing effect (reduction of aromatic substances) to improve air quality in confined spaces.

2. Action of i.active ULTRA on airborne particulate matter (PM)

Thanks to its photocatalytic properties, i.active ULTRA BIANCO 52,5 performs an effective depolluting action also against airborne particulates (PM). Two main actions can be identified:

- preventive: i.active ULTRA BIANCO 52,5 R reduces the concentration of air pollutants (primarily NO_x), which contribute to the formation of secondary particulate matter, and hence reduces PM formation;
- corrective: in the presence of particulate matter, i.active ULTRA BIANCO 52,5 R reduces the relative toxicity of the PM particles, modifying the organic component (which in urban solid particulate represents about 50% of the total PM).

3. Effectiveness against micro-organisms

Tests in compliance with the standards (for example, UNI 11021), carried out on different photocatalytic cementitious products prepared with i.active ULTRA BIANCO 52,5 R, have demonstrated a positive bacteriostatic, anti-mold and anti-algae effect.

4. Cleanliness and original surface colour maintained over time

The air-exposed surfaces in urban areas foul because of organic and inorganic pollutants produced by vehicle exhaust gas and daily industrial and domestic activities. In addition, color changes are often observed because of the deposit of micro-organisms such as molds, fungi and algae. These phenomena are favored by excessive moisture and the type of surface finish (roughness).

Photocatalysis not only reduces the adhesion of these pollutants, but also indirectly reduces the negative effect of dirt produced by common dust particles. These latter, in fact, use organic molecules to adhere to the surfaces; the photocatalytic action of i.active ULTRA BIANCO 52,5 R reduces their adhesion power favoring their removal. This "self-cleaning" effect can be measured with a photocatalytic degradation test with rhodamine (UNI 11259-2008), which measures red color changes of the reagent.

Another advantage offered by the use of products containing i.active ULTRA BIANCO 52,5 R is the preservation of the surface original color, whether it be white, gray or colored. The preservation over time of the original color is demonstrated by colorimetric monitoring of building surfaces built with materials containing i.active ULTRA BIANCO 52,5 R. For example, an over 10-year monitoring of a building located in France (Cité des Arts, Chambéry) has allowed measuring the color consistency of the facades on all sides of the building.

For professional use only. The user is advised to conduct tests and assessments in order to define the suitability of the product for the intended application.

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