

Technical datasheet

i.active TECNO BIANCO 42,5 R

LIMESTONE PORTLAND CEMENT EN 197-1 – CEM II/B-LL 42,5 R

Description

i.active TECNO BIANCO 42,5 R is a limestone Portland cement type II with normalized high strength and high early strength.

Composition

i.active TECNO BIANCO 42,5 R contains, in compliance with UNI EN 197-1 (i.e. with reference to the cement mass excluding calcium sulphate and additions), 65% to 89% clinker, limestone with TOC \leq 0.20% by mass (LL),, specific constituents with high photocatalytic activity and other minor constituents.

Product specifications

Chemical requirements	Physical requirements	Compressive strength
Loss on ignition N.R.	Initial setting \geq 60 min	2 days \geq 20.0 MPa
Insoluble residue N.R.	Expansion \leq 10 mm	7 days N.R.
Sulphates (like SO ₃) \leq 4.0%		28 days \geq 42.5 MPa
Chlorides \leq 0.10%		

Use

The excellent physical and chemical properties make i.active TECNO BIANCO 42,5 R ideal for mortars and concretes to be used in applications such as prefabrication (with or without heat curing cycle); major static and/or architectural structures; cast-in-place prestressed structures; non-prestressed vertical or morphologically slender structures; cladding panels; prestigious building works; architectural castings; prestigious flooring; street furniture elements. It is suitable for the preparation of pre-mixes (cementitious paints, skim coats, renders and plasters), self-locking blocks, noise barriers, stuccos, sealing works, roofing tiles.

Advantages

i.active TECNO BIANCO 42,5 R is a bright white cement featuring high versatility thanks to its excellent physical & mechanical characteristics as well as the photocatalytic properties guaranteed by its special formulation. In fact, if natural light (especially the ultraviolet component of the light spectrum) or even appropriate artificial light is available, a strong oxidative process is activated on the material surface, which causes some organic and inorganic substances to decompose when they come in contact with the cement surface. Hence, the structures built with i.active TECNO BIANCO 42,5 R help:

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



Properties

1. Effectiveness against NO_x and other organic and inorganic chemicals

Laboratory tests and field measurements have widely demonstrated the effectiveness of nitrogen oxides (NO_x) abatement. The NO_x reduction test is carried out in the laboratory by making a continuous flow of air mix containing a specific NO_x concentration pass through a chamber of given volume and applying ultraviolet (UV) illumination 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. Recently, the use of this standard at European level (CEN) has been proposed.

The photocatalytic activity was also demonstrated with in-situ tests aimed at monitoring various floorings in urban areas and Italian and European tunnels.

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

i.active TECNO BIANCO 42,5 R can be used for degradation of several organic and inorganic substances as well as with deodorizing effect (reduction of aromatic compounds) for improving air quality in confined spaces.

2. i.active TECNO action on airborne particulate matter (PM)

Thanks to its photocatalytic properties, i.active TECNO BIANCO 42,5 R carries out an effective depolluting action, also against airborne particulates (PM). Two main actions can be identified:

- preventive: i.active TECNO BIANCO 42,5 R reduces the concentration of air pollutants (primarily NO_x), which contribute to the formation of secondary particulate matter, and hence reduces the formation of PM;
- corrective: in the presence of particulate matter, i.active TECNO BIANCO 42,5 R decreases the relative toxicity of the particles that form PM, acting on the organic part (which in urban solid particulate represents about 50% of the total PM).

3. Effectiveness against micro-organisms

Tests in accordance with the standards (for example, UNI 11021), carried out on different photocatalytic cement works built with i.active TECNO BIANCO 42,5 R, have demonstrated a positive bacteriostatic, anti-mould and anti-algae effect.

4. Preservation of cleanliness and original colour of the surfaces

The surfaces exposed to the air in urban areas get dirty because of organic and inorganic pollutants produced by the exhaust gas from vehicles and daily industrial and domestic activities. In addition, colour changes are often observed because of the deposit of micro-organisms such as moulds, fungi and algae. These phenomena are favoured by excessive moisture and the 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 TECNO BIANCO 42,5 R reduces their adhesion power favouring their removal. This "self-cleaning" effect may be measured with a photocatalytic degradation test with rhodamine (UNI 11259-2008), which measures red colour changes of the reagent.

Another beneficial effect from the use of products containing i.active TECNO BIANCO 42,5 R is the preservation of the original surface colour, whether it be white, grey or coloured. The preservation of the original colour over time is demonstrated by colorimetric monitoring of building surfaces made with materials containing i.active TECNO BIANCO 42,5 R. For example, an over 10-year monitoring of a building located in France (Cité des Arts, Chambéry) has allowed measuring the consistency of colour on the facades on all building sides.

Professional product. The use of this product should require investigations and assessments by the user.

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