

Important Facts about **TioCem**®

- **TioCem**® is a premium cement, which reduces the level of nitrogen oxides (NOx) by means of an integrated photocatalyst.
- The photocatalytic oxidation of NOx into harmless NO3- is a contact reaction activated by light and only takes place on the surface.
- The produced NO3- is neither toxic nor hazardous to health. It reacts with the calcium hydroxide on the concrete surface and washes off with the next rain.
- The rate of the photocatalytical oxidation depends on the light intensity and the air flow. In laboratory tests, 40% NOx was immediately oxidized to NO3-.
- Natural daylight is sufficient for initiating the photocatalytic effect.
- The photocatalyst is not consumed during the photocatalytic reaction. It is safe for use in mass processing and provides longlasting protection.
- Proprietary TiO2 technology is used for TioCem®. TiO2 is used in many articles of daily life, for example, in cosmetics.
- **TioCem**® can be processed like any other cement, no special measures are necessary.
- **TioCem**® cement fulfills EN 197 part 1 and ASTM C 150 for cement with pigment. Its processing and durability properties are the same as those of standard cement. No special technical approval is necessary.

TX Active®: It's What's Inside

TX Active® is the active ingredient empowering the photocatalytic process in **TioCem**® cement. Developed by license partner Italcementi S.P.A., **TX Active**® is manufactured to strict standards and precisely formulated into HEIDELBERG Cement Group's **TioCem**® to provide optimum durability, as well as aesthetic and environmental benefits.

® = **TX Active** is a registered trademark under license

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TioCem® Photocatalytic Cements

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Photocatalysis: The Power of Light

Photocatalysis is a natural phenomenon in which a substance known as a photocatalyst uses light to expedite the rate of a natural oxidation process.

Using light energy, photocatalysts can induce the formation of strong oxidizing reagents which decompose some organic and inorganic substances in the atmosphere by oxidation.

Photocatalysis is therefore an accelerator of oxidation processes that already exist in nature. It promotes faster decomposition of pollutants and prevents them from accumulating.

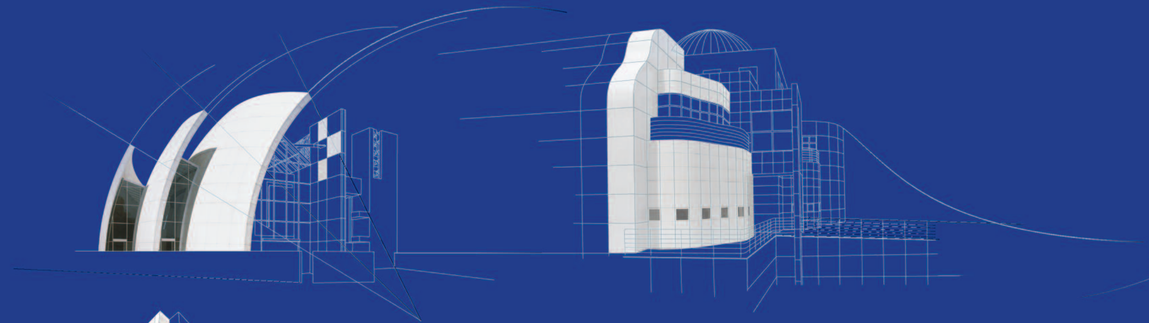
For over a decade, photocatalysis has been applied to various materials—glass, ceramic, cementitious binders—to obtain a "self-cleaning" effect.

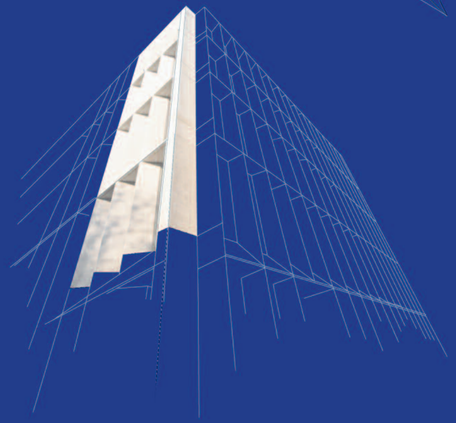
Ever-increasing air pollution affecting urban areas has recently compelled researchers to take advantage of photocatalytic properties to abate the noxious substances that are contaminating the environment.

Introducing the Photocatalytic City: A Vision of the Environmental Future.

(1) CO, VOCs (Benzene, Toluene, etc.), Methyl Mercaptan (gas), Organic Chloronates, Aromatic Polycondensates, Acetaldehyde Formaldehyde (2) Nox SOx NH_3 (gas), CO

TioCem®: Architecture In A New Light



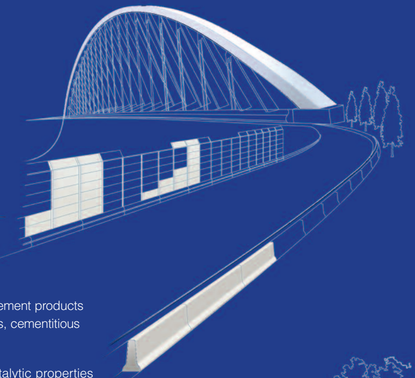


Photocatalytic cement with **TX Active**® was developed in 1996 to achieve the strict design specifications demanded by Richard Meier for his Dives in Misericordia Church project in Rome: purity of white, eye-opening brilliance and the preservation of these final aesthetic qualities throughout the ensuing decades.

Since then, photocatalytic cements like **TioCem**® formulated with **TX Active**® have been the product of choice for many prestigious architectural works; projects in which the quality of the building materials and their final appearance are equally important in achieving the original architectural vision.

In addition to ensuring the same physical and mechanical properties of traditional concrete, **TioCem**® made with **TX Active**® offers extraordinary brilliance and "self-cleaning" properties so that the original beauty is retained for years.

TioCem®: Preserve the Environment



TioCem® provides a comprehensive range of cement products for formulating into all varieties of mortars, stuccos, cementitious veneers and many other concrete end uses.

TioCem® imparts into these materials photocatalytic properties enabling them to abate noxious substances produced by human activities such as industry, transport and residential heating systems.

Applications of **TioCem**®:

Horizontal Structures

- Concrete sidewalks
- Interlocking concrete pavers
- Pavement and road surfacing
- Cement-based tiles
- Concrete roof tiles

Vertical Structures

- Architectural precast panels
- Tilt-up concrete panels
- Stucco
- Exterior plaster
- Cladding elements
- Noise barriers for roads and highways
- Concrete median barriers