

HeidelbergCement, the parent company of Hanson Cement, has developed TioCem, a new cement that decomposes air pollutants. Using a photocatalytic reaction based on patented technology, TioCem offers the chance to improve air quality in our cities.

For any additional information on TioCem please contact

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TioCem[®]
Reducing pollution in
the urban environment



Borgo Palazzo Street, Bergamo, Italy with photocatalytic concrete block paving.

TioCem – Reducing pollution in the urban environment

Pollution from exhaust gases is one of the major problems facing cities and other built-up areas. Pollutants such as nitrogen oxides (NO_x) are health hazards and increase the risk of respiratory infections and can impair breathing. Hanson Cement is at the forefront of producing cementitious solutions to help the environment. TioCem is a new cement that decomposes air pollutants. Using a photocatalytic reaction, TioCem helps improve air quality in our cities.

Titanium dioxide – A natural photocatalyst

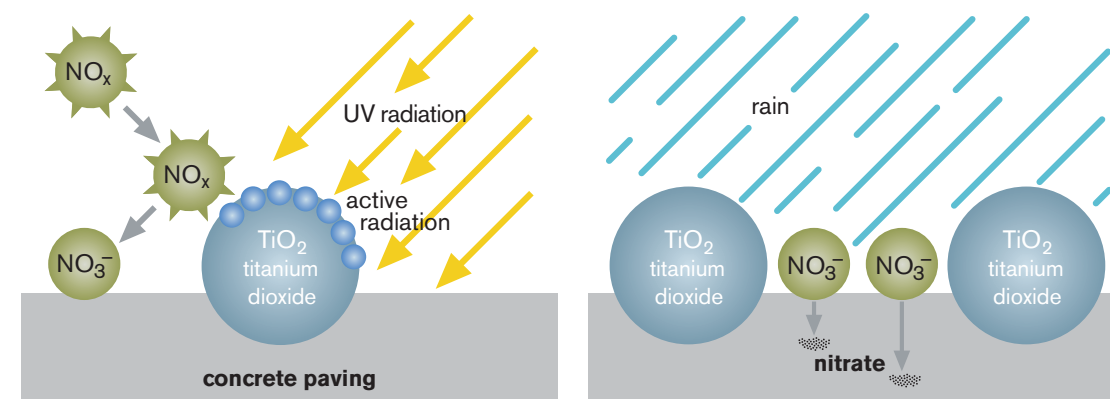
TioCem contains nano-crystalline titanium dioxide. This differs from normal grades because its nano-crystalline structure makes it a highly effective photocatalyst in concrete, providing 'self-cleaning' and pollution-reducing properties. Daylight initiates a reaction that converts harmful nitrogen oxides (NO_x) into harmless nitrates (NO_3^-). This means that in sunny weather, up to 90% of pollutants such as nitrogen oxides, aldehydes, benzenes and chlorinated aromatic compounds can be eliminated from the atmosphere. Even when the sun isn't shining, and UV radiation is low, up to 70% of pollutants can still be eliminated. And because the reaction doesn't consume the photocatalyst, it keeps on working.

Key uses for TioCem

- Paving slabs
- Paving blocks
- Roof tiles
- Façade elements
- Road surfaces
- Noise barriers and visual screens
- Tunnel linings
- Safety barriers
- A clean and stable environmental solution

Reaction process – How TioCem reduces NO_x

The velocity of the photocatalytical oxidation depends on the light intensity and air flow. In tests 40% NO_x immediately oxidises to NO_3^- .

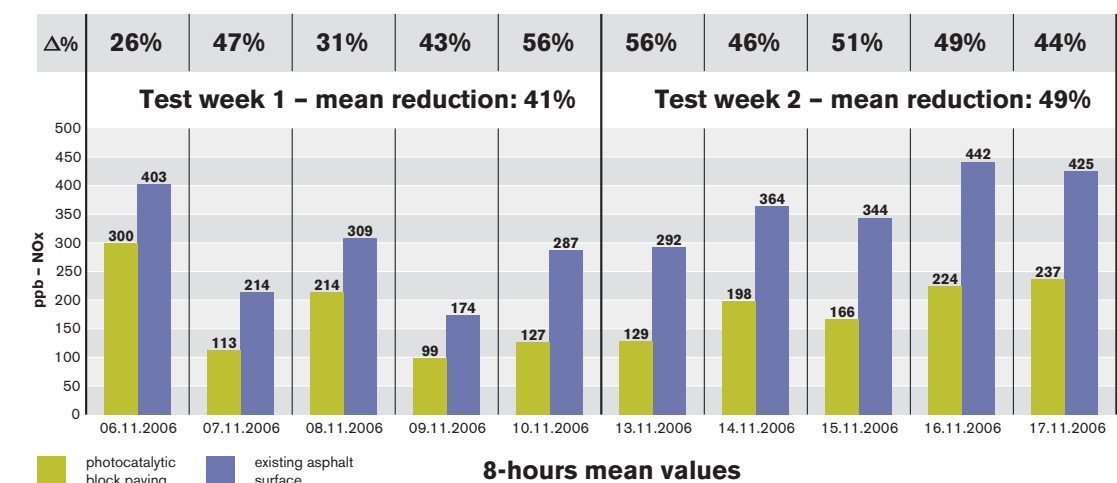


Innovations for a healthier environment

Using TioCem to reduce NO_x in high traffic areas can considerably improve air quality. For example, TioCem can be used in concrete block paving to create both a durable road surface and one that reduces air pollutants. A two-week study in November 2006

compared a normal asphalt street with an area renovated using photocatalytic concrete block paving. The results, highlighted in the chart below, clearly demonstrate efficient reduction of pollutants in the renovated section.

Example of NO_x reduction – November 2006



Proven quality for your peace of mind



TX Active® is a registered trademark under licence.

TioCem has been developed for the UK market by HeidelbergCement, parent company of Hanson Cement, and the licence partner Italcementi S.p.A. To ensure quality, strict standards have been defined for TioCem as well as for the products produced using TioCem. "TXActive®" is a quality mark used to validate the photocatalytic activity of building materials. In the UK, only manufacturers of building products using TioCem will be allowed to use the TX Active® logo. To ensure the cement and the finished products meet the high requirements of TX Active®, HeidelbergCement measures the photocatalytic activity of finished products to ensure that they will perform as expected.

Important facts about TioCem

- TioCem is a special cement that decomposes nitrogen oxides (NO_x) by means of a photocatalyst incorporated into the cement.
- The photocatalytic oxidation of NO_x into harmless NO_3^- is a contact reaction activated by light and thus only takes place on the surface.
- The resulting NO_3^- is neither toxic nor hazardous to health. It reacts with the calcium hydroxide of the concrete surface and drains off with the next rain.
- Natural daylight is sufficient for initiating the photocatalytic effect and the photocatalyst is not consumed during the photocatalytic reaction.
- TioCem can be processed like any other cement, special measures are not necessary.
- TioCem cement corresponds to EN 197 part 1 the European standard for common cements. Its processing and durability properties correspond to those of standard cement.