

CLAir® Asphalt

Clean Air Asphalt – CLAir® Asphalt for short – is an air-purifying, noise-reducing asphalt surface course that is offered by STRABAG AG and used throughout Germany. CLAir® Asphalt reduces the concentration of toxic nitrogen oxides such as nitrogen dioxide (NO₂) in the air. Nitrogen oxides are produced, for example, by combustion processes in vehicle engines, especially by diesel engines, and often reach critical levels in urban areas due to the high traffic volumes.



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Simple idea, enormous impact: reducing pollution through photocatalysis

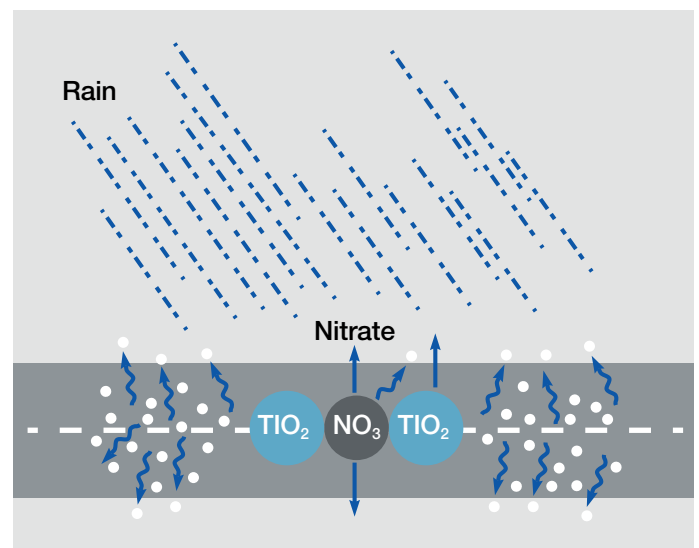
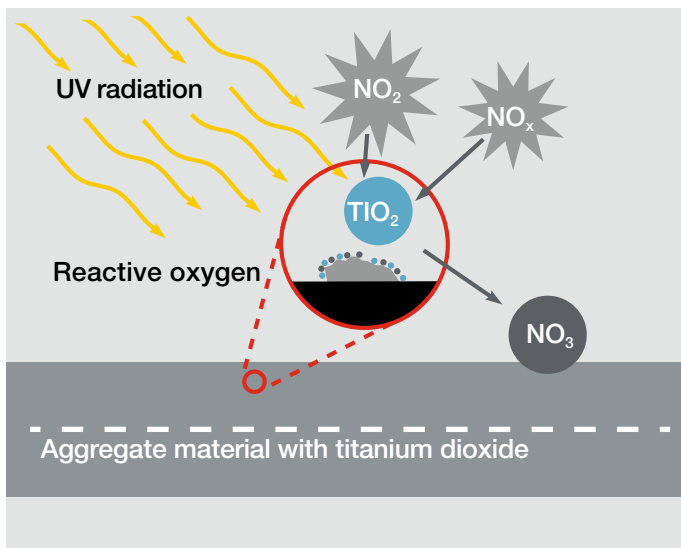
ClAir® Asphalt achieves its pollutant-reducing function through the use of titanium dioxide (TiO_2). Titanium dioxide is a naturally occurring material, obtained as a powder, with a photocatalytic function that is used by the asphalt to help protect the environment. Through the UV component of normal sunlight, titanium dioxide acts as a catalyst to convert the nitrogen oxides (NO_x) bound in the air into harmless nitrates.

For the asphalt surface course, ClAir® Asphalt uses an aggregate made of crushed ultra-high-performance concrete (UHPC) mixed with small amounts of titanium dioxide. The titanium dioxide is firmly integrated into the concrete granulate and accounts for less than 1 % of the total mass – but even this small amount makes a big difference for air quality.



Photocatalysis: conversion of nitrogen oxides through UV light

1 Aggregate of ultra-high-performance concrete loaded with titanium dioxide © STRABAG AG



Joint development of a sustainable road surface

STRABAG's TPA competence centre developed the air-purifying asphalt together with nine partners from science and industry as part of the NaHiTAs (Sustainable HighTech Asphalt) research project funded by the German government. The TPA Group Process Stability in Road Construction (PSS), the lead partner in the project, is now coordinating the implementation of ClAir® Asphalt projects in cooperation with the respective operating units of STRABAG AG.



ClAir® ASPHALT

has been a registered trademark
since 2019.

Direct installation during road construction

Since the titanium dioxide only acts through direct contact with UV radiation, the pollutant-reducing material must be present directly at the road surface. For this purpose, the STRABAG competence centre TPA has developed an innovative new type of paver with integrated spreader that can sustainably incorporate the photocatalytic aggregate into the still hot road surface directly during the asphalt paving process. To guarantee an uninterrupted asphalt feed, the newly designed innovation hopper consists of two chambers, one for the asphalt and the other for the titanium dioxide aggregate.



2 Installation of ClAir® Asphalt with the innovation paver and hopper in Erlangen. © STRABAG AG/
3 The first ClAir® Asphalt pilot project in April 2019 at Neckartor in Stuttgart © STRABAG AG/Thomas L. Fischer

Up to 25 % less nitrogen dioxide

ClAir® Asphalt makes use of photocatalysis to reduce the nitrogen dioxide concentration in the air by up to 26 % under good conditions – lots of sun and little wind. These figures were determined by the NaHiTas project partners in a field test. The effectiveness of the method depends not only on the weather, but also on the surrounding buildings.

An important fact: The titanium dioxide is not used up during photocatalysis but remains in the road surface and maintains its functionality – another sustainable aspect of ClAir® Asphalt.



Up to 50 % less traffic noise

Similar to special noise-optimised asphalt wearing courses, ClAir® Asphalt makes a noticeable contribution to noise reduction, as measurements at reference speeds of 40 km/h to 50 km/h have shown. The study demonstrated that ClAir® Asphalt can reduce traffic noise levels by 2 dB(A) to 4 dB(A), which corresponds to a reduction in traffic volume of up to 50 %. So the innovative process helps to protect the environment from excessive noise emissions as well.

Contact/Coordinator
ClAir® Asphalt

Sebastian Czaja

TPA GmbH Gesellschaft für Qualitätssicherung und Innovation, Project Manager Group Process Stability in Road Construction (PSS)



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