



HYDROTECT

Photocatalyst technology by **TOTO**

A dramatic landscape featuring a deep blue sky with scattered white clouds. In the foreground, there are dark, silty hills and lush green vegetation, including ferns. In the background, a mountain range with green slopes and prominent red soil is visible. The text is centered in the upper half of the image.

Harnessing light and water,
the power of nature cleanses the Earth.



The Earth is a miracle, where nature and life combine to create a beautiful harmony.
Today, that miracle is at risk.

Recognizing this, we have responded with our own solution.

HYDROTECT

HYDROTECT harnesses sunlight and rainwater to help protect the environment.

At the same time, it helps to maintain comfortable living conditions.

Spontaneously cleaning the environment with the power of nature,

HYDROTECT is a technology for the future of the Earth.



HYDROTECT

* HYDROTECT is TOTO's environmental cleaning technology, utilizing photocatalysts to harness the power of light and water and bring cleanliness to our lives and to our planet.

The benefits of plants can be seen not only in their oxygen-generating capabilities.



Although it is not widely known, plants also purify the air. For example, they can absorb and remove air pollutants called nitrogen oxides (NOx), which are regarded as a global problem because they cause acid rain and urban ozone (photochemical smog). HYDROTECT removes NOx on the exterior walls of buildings just as effectively as plants.* We deliver clean environments, even in cities where it is not easy to plant trees.

HYDROTECT has the same purifying capabilities as plants.

* For exterior

Do you have any idea roughly how much rain falls around the world?



The answer is 108 trillion tons¹ each year...much more than most people would even guess. In an effort to harness the beneficial properties of this tremendous natural resource, we have equipped HYDROTECT with self-cleaning capabilities, enabling it to use rainwater to clean² dirt from buildings naturally and effectively. Your offices, apartment buildings and homes will become cleaner every time it rains.

HYDROTECT uses rainwater to wash away dirt.

¹ Source : White Paper on Water Resources (2009 Version)(Ministry of Land, Infrastructure, Transport and Tourism of Japan) ² For exterior

Let us tell you something interesting
that will make you like cleaning.



Germans have a saying: "Order is half of life."
As this suggests, it is very important
to keep your surroundings clean
and tidy, because if you can
do so on a day-to-day basis, you somehow get
the feeling that a large part of your life will go well.
HYDROTECT can help you do just that.
Thanks to its antibacterial, anti-mold, anti-dirt
and anti-odor capabilities*, HYDROTECT helps you
keep your surroundings clean and even healthier,
leaving you free to enjoy your life.

**HYDROTECT lends a hand
with day-to-day cleaning.**

What can we do to make the planet healthier
and people around the world happier?



Using natural resources of sun light and water,
HYDROTECT cleans the environment,
reduces environmental burden
and rejuvenates lifestyle
with effortless beauty.
You will see and experience HYDROTECT
more often all over the world
since it is among
the most wanted technologies
that bring green and comfort to your everyday life.

**HYDROTECT will help promote
environmental cleansing the world over.**

Harnessing the power of light to cleanse the environment

HYDROTECT is an environment purification technology and its technology brand, which cleanses the planet as well as our living environment by a photocatalytic reaction by harnessing the power of light and water. A building or building materials coated with a layer of HYDROTECT on its surfaces has effects that are beneficial for our lives and the global environment, such as air purification effect and self-cleaning effect.

HYDROTECT can be used effectively in numerous applications, from exterior walls to interior walls and floors.

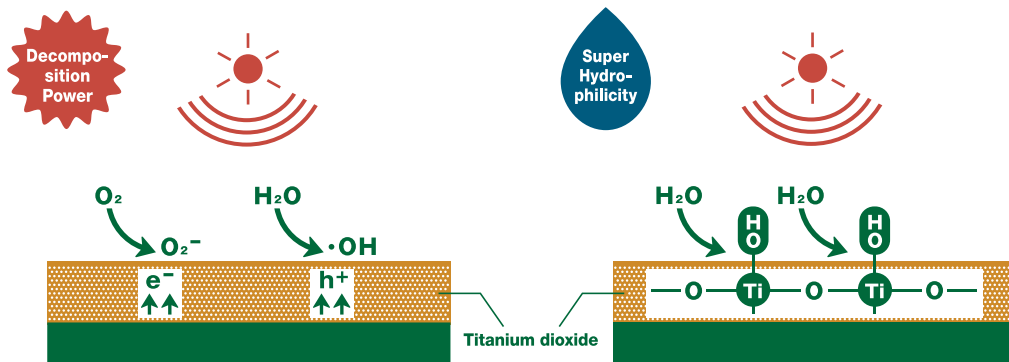


〈Application fields〉

Paints, Coating materials	Tiles	Films	Stones	Flat glass
Tents	Metal sidings	Fiber cement sidings	Polycarbonate panels	Automotive mirror etc.

The photocatalytic properties of HYDROTECT

HYDROTECT produces a number of environmentally-beneficial effects, including air purification and self-cleaning, through a process similar to photosynthesis in plants. When exposed to sunlight, HYDROTECT's photocatalytic layer (titanium dioxide) breaks down organic material so that it is easily washed away with rain or water.



When exposed to light, titanium dioxide (TiO_2) produces electrons (e^-) and holes (h^+). These react with oxygen and water (O_2, H_2O) in the air and produce activated oxygen ($O_2^-, \cdot OH$), which decomposes various organic substances and bacteria, on the surface of products.

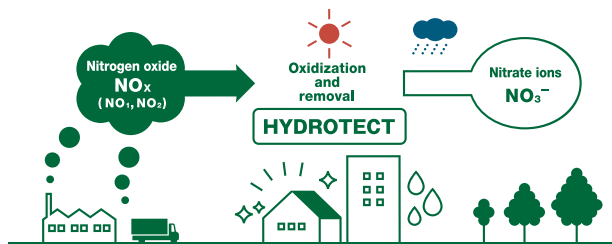
When titanium dioxide (TiO_2) is exposed to light, the titanium (Ti) reacts with water (H_2O) in the air, producing a hydrophilic group ($-OH$) layer that blends easily with water on the surface of products.

Air purification D

When exposed to sunlight, HYDROTECT on the surface of buildings exterior walls removes nitrogen oxides (NOx) produced by exhaust fumes and smoke, and purifies the air.

Air purification mechanism

Removes pollutants in the air (NOx) through a photocatalytic reaction and purifies the air.



* NOx is oxidized and converted into nitrate ions. The nitrate ions are washed away when it rains.

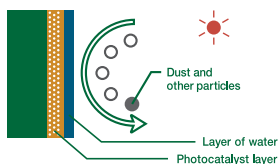
(For exterior)

Self-cleaning D H

Since HYDROTECT keeps buildings clean effortlessly, it reduces the amount of detergents and cleaning water needed for maintenance and improves environmental conservation.

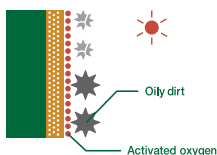
Self-cleaning mechanism

Reduces adsorption of dust and other particles



The layer of water reduces adsorption of dust and other particles through static electricity.

Helps stop oily dirt from sticking



Activated oxygen decomposes dirt clinging on the surface and helps prevent it from sticking.

Harnessing the power of the rain to wash surfaces



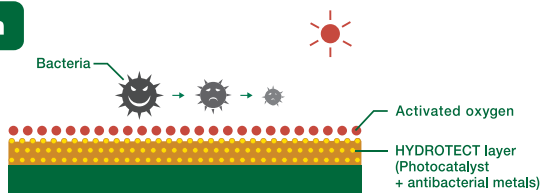
Rainwater gets in under dirt, lifting it off of the surfaces and washing it away.

(For exterior)

Antibacterial, anti-mold, anti-dirt and anti-odor capabilities D

By decomposing organic substances, photocatalysts also help improve hygiene inside and outside buildings, making it easy to keep walls, floors and other surfaces clean in locations such as toilets, bathrooms and kitchens and exteriors.

Antibacterial mechanism



Activated oxygen is generated in areas exposed to the light. In conjunction with the antibacterial metals, the bacteria that cause odors and stains are reduced.

(For interiors)

Global network of HYDROTECT Partners

We are committed to establishing the HYDROTECT brand as a trust mark of environmental technology across all industries and continue to expand HYDROTECT partner network. We have been working with a wide variety of manufacturer partners in Europe, United States, Japan and other countries to help create a sustainable global society.



〈 Projects 〉

Coating



TOYOTA Tsutsumi Plant
(Saitama, Japan)
TOTO LTD.

Tile



Shopping center
(Roermond, The Netherlands)
Deutsche Steinzeug Cremer & Breuer AG



Hotel
(Tokyo, Japan)
ICOT RYOWA. co., Ltd.



Juntendo University
(Tokyo, Japan)
NITTAI-KOGYO. co., Ltd.



Residential building
(Gifu, Japan)
NAGoya MOSAIC-TILE co., Ltd.



Hokkaido University
(Hokkaido, Japan)
DANTO CORPORATION



Residential building
(Shanghai, China)
TOTO LTD.

Film



School facilities
(Gifu, Japan)
UBENITTO KASEI CO., LTD.



Shopping center
(Ibaragi, Japan)
KIMOTO CO., LTD.



Office building
(Osaka, Japan)
SEKIGAHARA STONE. co., Ltd.



CHUBU CENTRAIR International Airport
(Aichi, Japan)
Nippon Sheet Glass Company, Limited



"Jardin de table" office space
(Paris, France)
Pilkington Group Inc.



Cowboy Stadium
(Dallas, U.S.)
TAIYO KOGYO CORPORATION



Office building
(Aichi, Japan)
YKK AP Inc.

Stone

Glass

Tents

Aluminium panel

Feedback from our Partners



Craig Belnap, President
Alcoa Architectural Products

"Green building" is more than just a passing trend. It represents a fundamental change of thinking within the construction industry. Combining HYDROTECT with our own innovative coating technology has enabled us to add self-cleaning and air purification capabilities to our products.

We are delighted to have entered into partnership with HYDROTECT because it gives us the opportunity to make a real impact on architects and building owners.

Making an internationally recognized contribution to the environment

To date, HYDROTECT Partners have installed HYDROTECT across a surface area of approximately 94 million square meters^{*1}, on both the interior and exterior of buildings. In terms of air purification, this will have the same impact as approximately 170 million square meters of green space^{*2}. That is equivalent to eliminating NOx emissions from approximately 2.1 million cars.

HYDROTECT is recognized as a unique technology that harnesses the power of nature to clean buildings and the air around them, and has been highly acclaimed by a number of official bodies. We are determined to continue promoting HYDROTECT in order to help protect the environment in the future.



*Please refer to our company's website for details on the bases for calculating the air purification effect.

*1: Based on the volume (m³) of interior and exterior HYDROTECT products shipped to domestic and overseas HYDROTECT Partners as of the end of April 2011

*2: Based on the volume (m³) of products with air purification capabilities shipped to domestic and overseas HYDROTECT Partners.

*3: Calculation based on NOx emissions of 362.2mg per day when a DBA gasoline powered passenger vehicle with an emission coefficient of 0.0125 drives 29.0km, the average daily driving distance of private cars.

References for the passenger cars, vehicle types, models and emission coefficient were obtained from Emission Coefficient, a reference guide for preparation programs related to the Ministry of Land, Infrastructure, Transport and Tourism of Japan, the Road Transport Bureau's Automobile Usage Management Plan and Regular Report, which are published under the Act Concerning Special Measures for Total Emission Reduction of Nitrogen Oxides and Particulate Matter from Automobiles in Specified Areas. The average daily driving distance of private cars was calculated based on the average annual driving distance of private cars (10,575km) provided in the 2004 Basic Survey on Automobile Inspections, Check-ups and Maintenance published by the Road Transport Bureau of the Ministry of Land, Infrastructure, Transport and Tourism of Japan.

*4: Awards received by TOTO, in recognition of the fact that HYDROTECT is an environmental technology and HYDROTECT products are widely used the world over.

HYDROTECT global website <http://www.hydrotect.com>

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