



▶ ALLERGIES AND ODORS REDUCTION. ELIMINATION OF VIRUSES, BACTERIA AND MICROORGANISMS



▶ ECONOMIC AND RELIABLE SOLUTION TO THE SBC PROBLEM



▶ CREATES SAFE AND PLEASANT ENVIRONMENT IN YOUR OFFICES AND WORKPLACES WITH LESS SICK DAYS AND HEADACHES



# Solution for Sick Building Syndrome

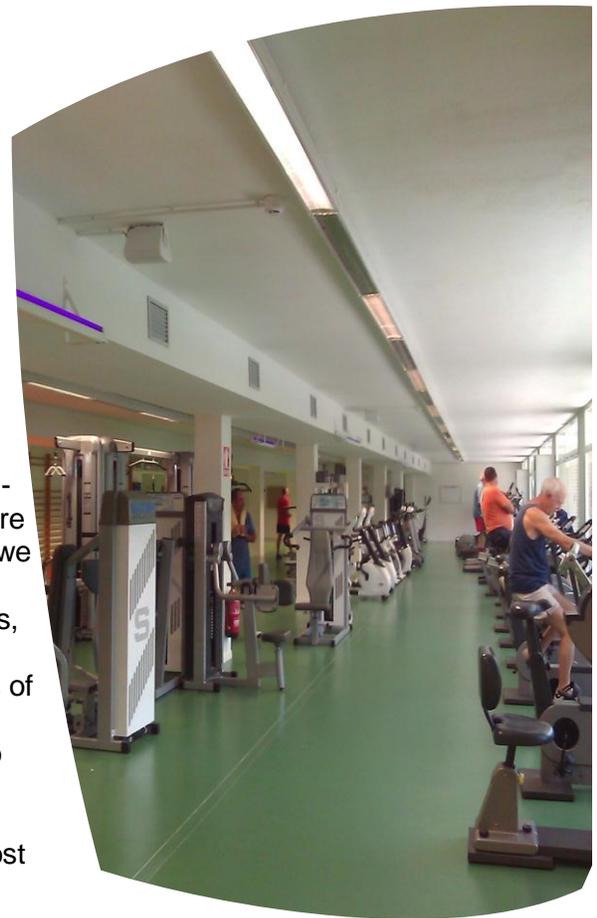
*Imagine turning your building walls into one giant efficient air cleaner that cleans the air inside and outside, doesn't make noise, doesn't need direct power input to run, doesn't need maintenance, doesn't break down, will work for many years with the same unchanged efficiency, and doesn't produce any side effects. Impossible? Not quite!*

*focus*



Deterioration in air quality and pollution increase causes a rise in many allergies and chronic diseases. Daily, we are exposed to many unhealthy residues from plastics and other toxic materials, industrial wastes, car exhalations, and many other harmful pollutants. Excessive use of antibiotics and even genetic experiments may result in the formation of new viruses with higher strength and resistance to our immune system and medications. On the top, there

is new "asbestos" of 21<sup>st</sup> century - molds, fungi and spores, which are present in many of the buildings we occupy. The list can go on and on... We can use various air filters, humidity controllers, ionizers, polarisers, and some other forms of air filtration to minimize the risk. However, such filters can only do so much. They are power depended, need to be changed regularly and involve on-going cost and maintenance.



## Sick Building Syndrome (SBS)

Numerous studies conducted in Europe, USA, Canada and other countries, showed that about 30% of air-conditioned buildings and its occupants suffer from "Sick Building Syndrome" or "Building Related Illnesses". The World Health Organization says that over 15% of chronic illnesses are directly linked to the poor air quality.



# Principles of Photocatalysis

*Practical effect can be explained on a common situation - room filled with cigarette smoke, where air and cigarette smoke molecules co-exist side by side without conflict. As soon as the smoke particles get in contact with the active FN<sup>®</sup> photocatalytic layer, they oxidize and produce molecules of H<sub>2</sub>O and CO<sub>2</sub>, leaving the room with clean air. All other organic based pollutions are removed in the same way. This effect removes smells and prevents musty odors.*

Photocatalytic FN<sup>®</sup> film cleans the air simply by reacting with pollutants under the daylight or its equivalent. A thin layer of FN<sup>®</sup> applied on the wall surface cleans the air of carcinogens, viruses, bacteria, toxins from mites, smoke, smells, allergens, and other pollutants. FN<sup>®</sup> not only cleans the air, but also provides a UV protection and self-cleaning ability to the base paint or surface, and inhibits mold and fungal growth. All the above helps to create the healthy and clean environment we wish to live in every day. FN<sup>®</sup> contains photocatalytic nanoparticles of titanium dioxide. TiO<sub>2</sub> is a harmless substance commonly used as the white pigment in

foods, paints, medications and toothpaste for over hundreds of years. From the physics prospective, TiO<sub>2</sub> is N – type semiconductor. FN<sup>®</sup> Photocatalyst substance's "miracle" lies in the energy difference between the valence and conducting band of 3 – 3.2 eV. The electrons (e<sup>-</sup>) on the valence band can be excited by the light of the wavelength of 365 nm or shorter, and transitioned to the conduction band. Broad corresponding holes (h<sup>+</sup>) on the valence band then generates active oxygen and hydroxyl radicals with high oxidation.

## Patented Technology

FN<sup>®</sup> works as superefficient, low cost and reliable air cleaner which can be simply installed with a brush or spray gun. Incorporation of TiO<sub>2</sub> photoactive materials into commercial products such as paints isn't trivial and represents a crucial problem for many companies, who have tried unsuccessfully for years to blend new photoactive materials with existed paints based on silicon, silicate or acrylic base.

In the last few years, after decades of research, we have started to see optimized products such as the composition with high photocatalytic effect - FN<sup>®</sup>.

FN<sup>®</sup> products are based on inorganic binding agents, which expel anatase nanoparticles to its surface, where unlike in the silicate and silicone based products, do not bond to TiO<sub>2</sub> – and are not blocking the surface. The potent photoactive component is the well-known material Degussa P25. Another big advantage of this composition is that it can be used to create active layers in situ, such as on concrete slabs, prefabricates and many other common building materials.

FN<sup>®</sup> active layer is more effective than other traditional air filters, it doesn't break down, doesn't require maintenance, and with zero or very low power consumption.

High TiO<sub>2</sub> concentration and special binding agents, which doesn't block active layer, provides best possible contact of photoactive layer with air pollutants and fast decompose microorganisms. This ensures a very high air cleaning effect that is in several classes better than of any other photocatalytic paints based on silicate or silicon basis.

**SMART  
INVESTING IN  
YOUR  
HEALTH**



Unlike many chemical based products, photocatalysis isn't selective and "burns" all organic microorganisms. It doesn't pose as a health risk or have side effects like irritating smells from disinfections and dangerous residues.

TiO<sub>2</sub> gets fully excited in the spectrum of a safe soft UV-A light of 365nm. This makes it suitable for use even in the absence of sufficient daylight where artificial light is needed for activation of photocatalytic layers. The wavelength of 365nm is safe and common in decorative lights.

FN<sup>®</sup> active layers produce unmatched and unprecedented efficiency, when cleaning airborne pollutants and allergens. One square meter of FN<sup>®</sup> photoactive layer is capable to clean kilograms of exhalations in concentrated areas, or hundreds of grams in a polluted environment in one year.

## High efficiency in practical use

*FN<sup>®</sup> application is capable of cleaning contaminated surfaces / areas in the events of major pandemic, industrial or biological disaster, and release of chemical or biological warfare agents. This decontamination can happen without human intervention and without losses in efficiency /effectiveness. All that is needed is light.*

**NO  
CHEMISTRY  
INVOLVED!**

A typical sized room of 50 m<sup>2</sup>, treated with FN<sup>®</sup> creates an active surface with TiO<sub>2</sub> nano particles bigger than the equivalent of 2 football fields. Photocatalyst TiO<sub>2</sub> standard - Degussa P25 used in FN<sup>®</sup> products is much more effective than for example sol-gel products. It was thoroughly examined, scrutinized and documented in thousands of scientific and practical studies. It has been proven as very effective cleaning tool for NO<sub>x</sub> and other exhaust gases.

Another positive "side-effect" of cleaning organic compounds from the air is that it removes odors; cigarette smoke or kitchen smells after cooking and frying. FN<sup>®</sup> layer also prevents fat or smoke and other unwanted molecules from depositing on walls, windows, kitchen or furniture, and keeps the house cleaner for a longer time without developing musty odors.

FN<sup>®</sup> is a very gentle and non-aggressive way to create a healthier and cleaner environment. Not only does it not leave behind more poisons as is typical for most of cleaning products with aggressive chemical agents, FN<sup>®</sup> also kills and quickly decomposes bacteria, viruses and spores, including any toxins created by their decomposition. When standard disinfectant or cleaning products are used, dead viruses/ bacteria decompose slowly, often producing more toxins that are released back to the environment. This doesn't happen in photocatalysis, which burns the dead bacteria and toxins from their decomposition. FN<sup>®</sup> ecologically removes dead microorganisms. FN<sup>®</sup> can be used together with other cleaning or disinfectant products. The active layer will quickly remove chemical agents, reducing their exposure and negative effects.

### Protection against graffiti

The hydrophilic character and porosity of FN<sup>®</sup> photocatalytic active layer work as a partial anti-graffiti protection, if it is applied in multiple layers. The hydrophobic spray paint doesn't penetrate the active FN<sup>®</sup> layer easily, and the sprayer needs to use up to 5 times more paint. Then it can be simply removed with a hard brush without damaging the base paint.

Photocatalytic suspension can be applied on the surface with a brush, roller or spray gun. It creates a transparent layer, 10 times thinner than human hair, with a whitish hue. Typical coverage is 1 liter per 10 m<sup>2</sup>.



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