

MAXIMUM

**Porcelain panels that
are good for your health**

ACTIVE
CLEAN AIR & ANTIBACTERIAL CERAMIC





Cladding
Travertino matt
Design by Tim Roberts Design

Building Materials	Emission of NOx to produce 1m ²	Years to make up for the NOx emission
Parquet	22 g	No compensation
Cement Tiles	28 g	No compensation
Traditional ceramic tiles	32 g	No compensation
Active 2.0	33 g	2 years*

Fig. 1

Healthy Building Syndrome: porcelain panels that are good for your health

We spend so much of our lives inside buildings – houses, offices, schools, shopping centres – but, while these structures do a good job of protecting us from the elements, they also expose us to a range of chemicals that can have a significant impact on our health. Heating and air conditioning systems bring in pollution with outside air, while furniture, paint, building materials and cleaning products release volatile organic compounds (VOCs), and harbour mould and bacteria. The phenomenon is known as Sick Building Syndrome (SBS) and, for unfortunate building occupants, it manifests in symptoms ranging from irritated eyes and skin to headaches and nausea, and more serious conditions.

Products like VOC-free paint and natural floorcoverings have gone some of the way to reducing the prevalence of SBS, but only now has a building product been designed that actively removes air contaminants from indoor spaces. Active 2.0 is a photocatalytic coating developed for MAXIMUM pressed porcelain panels that reduces indoor nitrogen oxide and VOC levels, has antibacterial and anti-odour properties, and is self-cleaning.

Removing toxic nitrogen oxides from the air

Nitric oxide and nitric dioxide (commonly known as NOx) are air pollutants produced by cars, coal-fired power stations and industrial combustion processes. On their own, they can cause respiratory problems, but they're also highly reactive with other chemicals in the environment, creating an array of dangerous vapours and particles. Active 2.0 puts the reactive nature of NOx to good use, however, through a photocatalytic process that decomposes the NOx on contact, removing it from the air.

Of course, as with all building products, the manufacture of MAXIMUM itself leads to NOx emissions. But after only two years, each Active 2.0-coated MAXIMUM panel will have removed an amount of NOx equivalent to that created by its production. From then on, it works purely for the benefit of general air quality. So MAXIMUM panels coated with Active 2.0 aren't just NOx neutral, they're NOx negative! As you can see in Fig.1 above, other popular building materials just can't compare.

Reducing concentrations of dangerous VOCs

Not all VOCs are harmful to humans, but three of the worst are found in high concentrations in indoor air. Benzene, released from cars, plastics and resins, is a known human carcinogen. Formaldehyde, which is emitted from paints, adhesives and furniture, and chlorine derivatives, produced by cleaning products, have also been linked to cancer. Removing these from the air should be a priority in every modern building.

One of Active 2.0's chemical properties is that it can directly oxidise organic compounds, so VOCs that come into contact with it are effectively destroyed, not just in UV light but under LED lights too. And because it acts as a catalyst in these VOC-destroying reactions, the coating is unaffected and won't "wear out" over time.

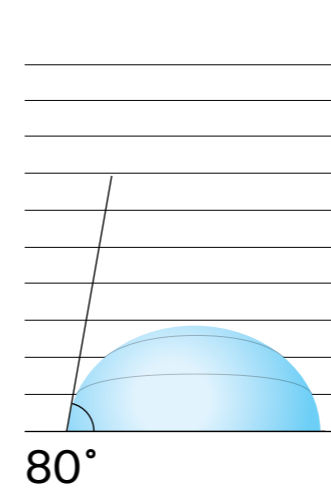
The multiple benefits of self-cleaning, anti-odour building materials

Another powerful behaviour exhibited by Active 2.0 is hydrophilicity, or extreme attraction to water. As you can see in Fig.2 above, this creates a very low "contact angle" between water and the Active 2.0 surface, so water flows readily across the surface rather than beading into droplets.

Combined with the photocatalytic destruction of organic material described above, it means that MAXIMUM panels coated in Active 2.0 are essentially self-cleaning, and therefore require a much smaller amount of mild detergent for regular maintenance, compared to other building materials. This has benefits other than saved time and money. As we've mentioned, cleaning products are a major source of indoor VOCs. Typically, the more aggressive the detergent, the more VOCs are released into the air. So Active 2.0 not only removes VOCs from indoor air, it reduces the degree to which they're introduced in the first place.

A parallel effect plays out with regard to indoor odours. Because the majority of odours, pleasant or otherwise, are actually VOCs, Active 2.0's photocatalytic reactivity directly removes them from the air. Being able to specify an anti-odour building material is valuable in itself, but it comes with an added benefit – it reduces the need for air freshener, which is another significant contributor to indoor VOC levels. So again, Active 2.0 directly reduces VOCs while also limiting the amount introduced through routine building maintenance.

No Active



80°

Fig. 2

Active



10°

Degradazione alpha-pinene %

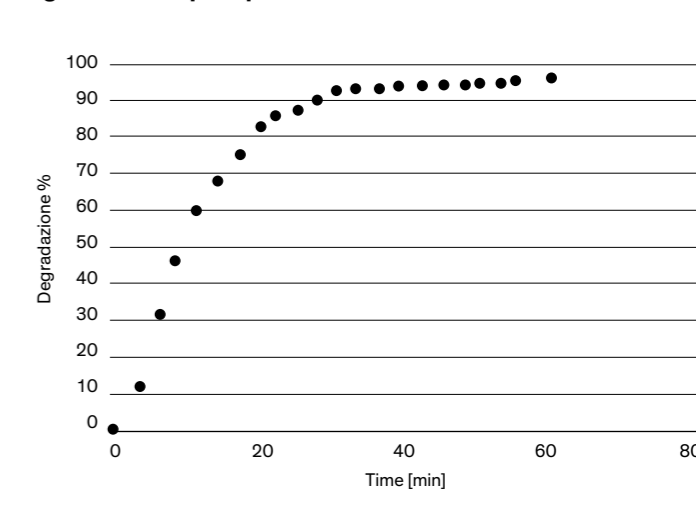


Fig. 3

The anti-odour effect of Active 2.0

Fig. 3 illustrates the dramatic effect Active 2.0 has on alpha-pinene, commonly used for pine-scented deodorising products. In a laboratory, [X amount] of alpha-pinene was introduced into an Xm3 space with Xm2 of Active 2.0 and after only one hour, the chemical was almost completely degraded.

Preventing the spread of bacteria

Two of the bacteria most often linked to human illness are E. Coli, a common cause of food poisoning, and MRSA, an antibiotic-resistant bacterium that can cause serious and difficult-to-treat infections throughout the body. Testing has revealed that Active 2.0 reduces growth of both E. Coli and MRSA by between 99.6% and 99.9%, not only in UV and LED light but in the dark too. This not only mitigates the risk of infection, with all of the trauma that entails, it reduces the need for intensive antibacterial detergents, again limiting the amount of VOCs released into the air.

The antibacterial effect of Active 2.0

To meet the requirements of ISO 27447, bacteria placed on Active 2.0 was exposed to UV light at 0.25 W/m2 for eight hours. Escherichia Coli (E. Coli) levels were reduced by 99.99% and Staphilicoccus Aureus MRSA levels were reduced by 99.98%.

For ISO 22196 compliance, bacteria placed on Active 2.0 was left in the dark for the same period of time. Escherichia Coli levels were reduced by 99.99% and Staphilicoccus Aureus MRSA levels were reduced by 99.61%.

There's no ISO for antibacterial properties under LED light, but with consideration for the increasing popularity of LED lamps, Active 2.0 was tested under LED at 1000 lux for eight hours. Escherichia Coli levels were again reduced by 99.99%.

Floor & Wall
Statuario matt
Lilyfield House by Dom Alvaro



A unique answer to Sick Building Syndrome

The “healthy building” benefits of Active 2.0 come on top of the wide range of advantages offered by MAXIMUM porcelain panels, including their 100% natural composition, free of the toxic resins and chemical binders used in engineered stone. And of course, their aesthetic beauty, with colours and markings matched to natural stone, marble, concrete and more.

A handful of other products claim to offer similar antipollution and antibacterial performance, but their methods of production have a range of serious shortcomings. The most fundamental is that their coatings are applied as nanoparticles, so in seeking to create a healthy building environment, which introduces health risks to the manufacturing process. But beyond this, their performance is limited: they're fixed to the surface using a polymer, which is slowly destroyed by the coating's photocatalytic process, so it wears out over time; they don't exhibit antibacterial properties in darkness or under LED light; and their speed of degradation of NOx is less than half of Active 2.0. Perhaps because of all of these factors, they don't come with the backing of stringent scientific validation.

This leaves MAXIMUM Active 2.0 as the singular building product on the market that is a true antidote to Sick Building Syndrome. For business owners, it means less sick leave, greater productivity and greater profitability. And for all of us, it means a greater sense of wellbeing and a healthier life.

Please note, Active 2.0 is offered as an optional addition to standard MAXIMUM panels and minimum order quantities apply.

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Benchtop & Splashback
Aster Moon
M House by DKO Architects

