Providing advanced nanotechnology coating solutions to your buildings and infrastructure

- Self-cleaning
- Air purifying
- Reduce life cycle costs
- Graffiti resistance
- Anti-carbonation
- Deodorising
- UV protection
- Improves sustainability
- Anti-fungal, anti-viral and anti-bacterial
ecotio²

PHOTOCATALYST COATINGS
Harness natural light for a natural clean
**WHAT IS A PHOTOCATALYST?**

Photocatalysis is a chemical reaction which is accelerated by light. A photocatalyst is a substance that causes this reaction without being consumed, and therefore even small quantities can repeatedly initiate this reaction when activated by light energy.

A **photocatalyst coating** is energised by light when in the presence of **daylight and visible light**. This excitation of the photocatalyst causes a number of reactions at the surface of the coating that **transforms the coated surface** and imparts **multiple benefits** including **self-cleaning and air purifying**.

**HOW DOES A PHOTOCATALYST KEEP THE SURFACE CLEAN?**

1. **REDUCES ABSORPTION OF DUST AND OTHER PARTICLES**
   - The surface carries no electric charge, therefore reducing the absorption of dust and other particles.

2. **PREVENTS DIRT FROM STICKING TO SURFACE**
   - Activated oxygen decomposes dirt and other organic matter clinging on the surface and helps prevent it from sticking.

3. **HARNESSING THE POWER OF WATER TO WASH**
   - The hydrophilic surface wets out evenly, meaning large water droplets are not formed and this leads to quick drying and greatly reduced dirt sticking to surfaces. The surface acts like a ‘water magnet’ which allows the water to get under the dirt particles and wash them away very easily.
HISTORY OF ECOTIO₂® PHOTOCATALYSTS

- Photocatalysis was discovered by Japanese scientist Prof. Fujishima in 1967, where they have been extensively utilised for 20+ years including a wide range of asset types and surfaces
- PIAJ – Photocatalyst Industry Association Japan was established to regulate and approve product quality and ensure stringent production processes
- SIAA approved products. Antimicrobial properties are tested according to ISO22196 standard

In recent years, many improvements in the technology have been achieved including:

- Thinner, more transparent films with increased photoactivity comprising finer, more active TiO₂ catalyst
- Catalysts that do not require sunlight, but can work in low light or even in the dark
- Tailored products with enhanced key properties such as anti-viral, anti-bacterial, anti-fungal, deodourising, hydrophobic (water repellant) for floors, increased slip resistance for floors and more.

Our external Photocatalyst Coatings contain water and nano-titanium dioxide, these coatings are transparent and are designed for a wide variety of surfaces including (1) Concrete surfaces, (2) Brickwork and masonry, (3) Glass, (4) Painted surfaces and (5) Solar panels.

Internal Photocatalyst products need to activate inside at much lower light intensities, so are ‘doped’ with additives for these conditions. Photocatalyst Coatings utilises market leading ion exchange technology that works in the dark!

Internal surfaces include (1) Tiled floors, grout and ceramics including bathroom equipment (2) Tiled, uncoated concrete and/or painted walls and ceilings, and (3) Stone, man-made stones and benchtops.
ANTI-CARBONATION FOR LONG-TERM PROTECTION

It is well known that carbonation greatly reduces the life of concrete due to atmospheric carbon dioxide reacting with calcium hydroxide producing calcium carbonate. This leads to reduced alkalinity and loss of passivity, and as a direct consequence, corrosion of the steel reinforcement. For this reaction to occur there must be moisture present, preventing this reaction provides a major challenge especially when 100+ years design life is often a requirement.

Our inorganic ecotio²® coating system seals the pores of the concrete, restricting the water ingress and this significantly slows the rate of carbonation.

Testing using phenolphthalein indicator solution can measure the affected depth of carbonation from the surface. The two pictures below show how the ecotio²® system has sealed the surface, protecting the concrete from attack.

GRAFFITI RESISTANCE - SMOOTH OFF FORM CONCRETE

Our ecotio²® coating system has been tested to APAS 1441 Appendix A for graffiti removal. An area is tagged, allowed to dry for 96 hours and then removed using our Nawkaw specialised graffiti remover, which avoids the need to destructive high pressure washing, abrasion and aggressive cleaning chemicals. This process is repeated 3 times in the same location.
ANTI-FUNGAL – SOLUTION FOR BLACK ALGAE

A build-up of **unsightly black algae** is a very common issue that can be even worse in damp areas that have less sunlight. With the current design trend of white and very light-coloured facades this is even more of a problem.

By utilising an ecotio₂® coating system, the concrete will be sealed and water resistant and the active ecotio₂® Photocatalyst will inhibit the growth of black algae coupled with self-cleaning, anti-carbonation and other benefits.

The Lenovo R&D Centre (Beijing) building below, was coated with ecotio₂® Photocatalyst coating in 2012. After being subjected to high pollution levels and extreme weather conditions (cold, hot and humid) for over 6 years, it still looks like new due to the ecotio₂®!

The combination of properties including self-cleaning, anti-carbonation and anti-fungal mean the building looks almost as good as new.

Life cycle costs are significantly lower as any cleaning costs are greatly reduced coupled with the concrete having extended life. The air purifying activity of ecotio₂® Photocatalyst Coating means that the building will help reduce pollution.
Project: ANZAC Memorial

Date: September 2018
Location: Hyde Park, Sydney
Substrate: Precast concrete
Products:
- ecotio® Sealer
- ecotio® Premium

Benefits:
- Long-term Aesthetics
- Self-cleaning
- Reduce Lifecycle costs
- Anti-carbonation
- Air Purifying
- Inhibits black mould
Project: Sky Train
(Sydney Metro Northwest)

Date: September 2017
Location: Northwest Sydney
Substrate: In situ concrete
Products:
- Nawkaw stain
- ecotio₂® Sealer
- ecotio₂® Premium

Benefits:
- Great aesthetics
- Self-cleaning
- Anti-carbonation
- Graffiti resistance
- Air Purifying
- Inhibits black mould
- Reduce Lifecycle costs
<table>
<thead>
<tr>
<th>Segments</th>
<th>Asset types</th>
<th>Substrates</th>
<th>Product benefits</th>
</tr>
</thead>
</table>
| External structures and facades | • Prestigious offices  
• Retail outlets and Showrooms  
• Schools, Universities, TAFE’s  
• High end residential  
• Walls  
• Rail and Bus stations  
• Airports  
• Bridges and Structures  
• Road barriers | • Off form, In-situ and Precast Concrete  
• Brickwork and masonry  
• Cladding  
• Glass  
• Tiled surfaces  
• Painted surfaces | Self-cleaning  
Air purifying  
Reduce life cycle costs  
Graffiti resistance |
| Transportation and Infrastructure | • Aged care and Child care  
• Hospitals  
• Public toilets  
• Food processing, food outlets and restaurants  
• Reception areas – Hotel / offices  
• High end residential  
• Commercial buildings | • Tiled surfaces  
• Concrete walls and floors  
• Stone  
• Stainless steel  
• Painted surfaces  
• Engineered stone | |
| Care and Hygiene                | • Solar farms  
• Privately owned panels  
• Commercial and educational buildings | • Photovoltaics surfaces | |
| Solar Panels                   |                                                                             |                                               |                                               |

**Icon Key:**  
- Self-cleaning  
- Air purifying  
- Reduce life cycle costs  
- Graffiti resistance
<table>
<thead>
<tr>
<th>Product features</th>
<th>Value to owner / operator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Co2" /></td>
<td>Extended time to major maintenance / replacement → assets have extended life due to protection</td>
</tr>
<tr>
<td><img src="image" alt="Wind" /></td>
<td>Reduced life cycle costs → protected for water / CO2 ingress</td>
</tr>
<tr>
<td><img src="image" alt="Viruses" /></td>
<td>Excellent appearance / image → cleaner, no unsightly black mould and easier graffiti removal</td>
</tr>
<tr>
<td><img src="image" alt="Dollar" /></td>
<td>Much lower cleaning costs → see above</td>
</tr>
<tr>
<td></td>
<td>Reduction of airborne pollution and VOC’s → Greener / better sustainability</td>
</tr>
<tr>
<td></td>
<td>Improved HS&amp;E (less requirements for potentially dangerous access for cleaning)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Wind" /></td>
<td>Save time and money</td>
</tr>
<tr>
<td><img src="image" alt="Cleaning" /></td>
<td>Self-cleaning → Reduced life time cleaning costs / more in service time</td>
</tr>
<tr>
<td><img src="image" alt="Fungi" /></td>
<td>Anti-fungal, anti-viral and anti-bacterial → Cleaner / reduced chance of infections / improved HS&amp;E / less potential illness</td>
</tr>
<tr>
<td><img src="image" alt="Dollar" /></td>
<td>Greener / better sustainability → reduces need to use harmful cleaning chemicals</td>
</tr>
<tr>
<td></td>
<td>Extended time to major maintenance / replacement</td>
</tr>
<tr>
<td></td>
<td>Removes foul odours / reduction of internal VOC’s → Fresher and cleaner environment</td>
</tr>
<tr>
<td></td>
<td>Improved image to customers, general public and employees</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Wind" /></td>
<td>Self-cleaning, anti-fungal and antistatic → panels will generate more power as more sunlight will hit the PV cells / increased revenue / decrease costs</td>
</tr>
<tr>
<td><img src="image" alt="Recycle" /></td>
<td>Greener / better sustainability → more green energy generated per m2 of panels. Improved use of earth resources</td>
</tr>
<tr>
<td><img src="image" alt="Viruses" /></td>
<td>Air purifying → pollutants and VOC’s that contact the surface will be broken down</td>
</tr>
</tbody>
</table>

**Product Features:**
- Anti-carbonation
- Anti-fungal, anti-viral and anti-bacterial
- Deodorising
- UV protection
- Sustainability
Project: Arc by Crown
Date: September 2018
Location: CBD, Sydney
Substrate: Concrete
Products:
- Nawkaw stain
- ecotio₂® Sealer
- ecotio₂® Premium
Benefits:
- Great aesthetics
- Self-cleaning
- Inhibits black mould
- Anti-carbonation
- Air purifying
- Reduce lifecycle costs
Project: Princess Wharf
Date: August 2017
Location: Auckland, New Zealand
Substrate: Marble tiles and grout
Product:
- ecotio2® Ultra C

Benefits:
- Reduced life time cleaning costs
- Water repellent sealing tiles and grout
- Anti-bacterial, anti-mould and anti-viral
- Fresher and cleaner environment
- Improved health and safety
- Enhanced long term appearance
- Deodorising
Project: Crescent Head SLSC
Date: September 2015
Location: Crescent Head, NSW
Substrate: Ceramic tiled roof

Products:
- ecotio\textsubscript{2}® Premium

Benefits:
- Self-cleaning
- Reduced cleaning costs
- Inhibits black mould
Project: Various high end residential
Date: Since 2016
Location: NSW
Substrate: Glass, brickwork and concrete
Products:
  - Nawkaw stain
  - ecotio₂® Sealer
  - ecotio₂® Premium

Benefits:
  - Great long-term aesthetics
  - Self-cleaning (Concrete and glass)
  - Anti-carbonation
  - Air purifying
  - Inhibits black mould
  - Reduce lifecycle costs
Project: Parramatta Leagues Club
Date: February 2018
Location: Parramatta, NSW
Substrate: Precast concrete
Products:
- ecotio²® Sealer
- ecotio²® Premium

Benefits:
- Self-cleaning
- Anti-carbonation
- Air purifying
- Inhibits black mould
- Reduce lifecycle costs
Project: Deakin University
Date: April 2017
Location: Geelong, Vic
Substrate: Precast concrete

Products:
- ecotio²® Sealer
- ecotio²® Premium

Benefits:
- Self-cleaning
- Anti-carbonation
- Inhibits black mould
- Great long-term aesthetics
- Reduce lifecycle costs
ecotio²® Photocatalyst Coatings has a wide range of uses and benefits to make your work, living or care environments better for everyone while reducing lifecycle maintenance costs of your buildings and infrastructure.

Contact us at Photocatalyst Coatings, we would love to discuss your specific projects requirements, so we can tailor the best solution for your project including critical performance needs, budget, practical site requirements, and contractual responsibilities.

Why ecotio²®?

- Innovation with proven performance – Providing your project with a differentiated nano solution.
- Reduced lifecycle costs due to less maintenance and extended asset life. These multiple benefits are for a wide range of external and internal surfaces.
- Helps to achieve corporate sustainability goals.
- ‘Supply and apply’ option for single point responsibility and peace of mind

CONTACT US:

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