GRAPHENSTONE®

Graphenstone Ambient Pro+

Graphenstone Ambient Pro+ - Product overview

Graphenstone - the ultimate range of certified ecological paints, offering:

- Natural mineral ingredients & graphene fibres

- Extensive certification (Cradle to Cradle, EPDs + many others)

- BREEAM / WELL / LEED compliance

- Durability and washability – Class 1 Wet scrub

- Breathability – Class 1 Sd

- Excellent coverage – up to 18m²/L

- Easy application - Standard Paint rules apply

**Graphenstone's flagship, Ambient Pro+ has all
the environmental features listed above, in addition to:**

1. Significant $CO_2(e)$ Saving

2. CO_2 Absorption

3. Air Purification

4. Self-Cleaning

5. Trace VOCs (under 0.1%)

6. Durable & Washable

1. CO$_2$(e) Saving

Given the importance of a reduced CO$_2$ footprint as part of a contribution towards Net Zero, all opportunities for environmental savings need to be examined.

The choice of coating is an often overlooked source of ESG savings

Ambient Pro+ offers a significant saving in CO$_2$(e) versus other paints. The saving is a simple mathematical equation based on a comparison of data from published Environmental Product Declarations (EPD).

The Global Warming Potential (GWP) figures from an EPD state the amount of greenhouse gases (GHG) that are produced by a manufacturing product. This is measured in CO$_2$ equivalent - CO$_2$(e).

Global Warming Potential (A1 – A3)	CO$_2$(e) kg / m²
Graphenstone **Ambient Pro+**	0.178g
Industry leading brand	0.399g
Difference per m²	**0.219g**

Figures shown based on 2 coats in current EPDs

Whilst a small number, when multiplied by the m², the total can be significant.

CASE STUDY

Graphenstone paints specified across 11 London student accommodation blocks with major summer works plus on-going refurbishment.
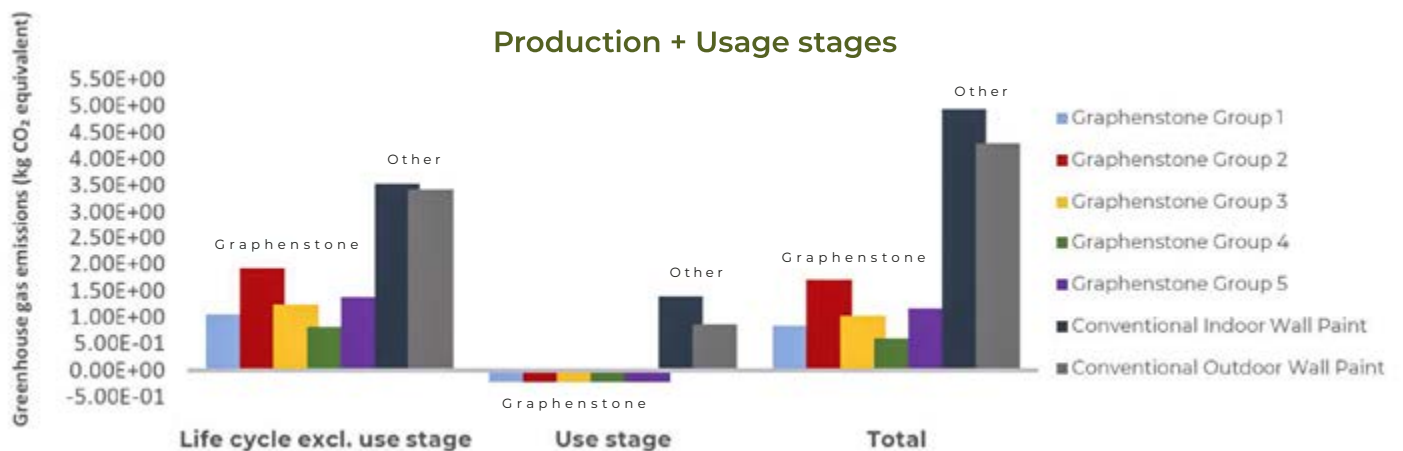
![GRAPHENSTONE logo]

Products used	Ambient Pro+
Project size	Approx. 1,100 student rooms
Contractors	HAS Builders, CLC, Fortis Vision
$CO_2(e)$ Saving *	21 tonnes
CO_2 Absorbed **	2.5 tonnes

* CO_2e Saving is an approximate saving based on the EPD figures of a leading competitor.
** CO_2 Absorption based on 5kg CO_2 absorbed per 15 litre tub of Ambient Pro+

Independent research into CO_2e

A report from Oxford University

An independent study by Professors from Oxford University shows the $CO_2(e)$ footprint of Graphenstone paints during the Production and Usage phases in comparison to an industry leading paint.

Thanks to the unique negative emissions at use stage and the lower emissions over the entire life cycle, the GHG emissions are a fraction of a conventional coating.

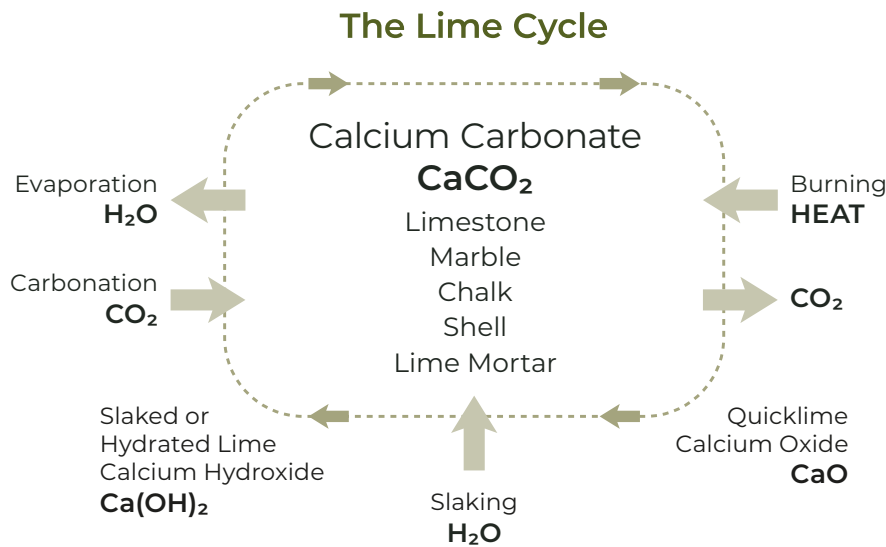Please scan QR code to
use our CO_2e Calculator

Graphenstone paints can offer significant CO_2e savings - just by switching paint brands

2. CO_2 Absorption

Ambient Pro+ is a lime (Calcium hydroxide) based paint. Through a process of heating and hydration, limestone is converted into slaked lime that can be used to create paints. As part of the "Lime Cycle", slaked lime returns to limestone through the absorption of CO_2, after the paint application phase.

The Lime Cycle

Calcium Carbonate
$CaCO_2$
Limestone
Marble
Chalk
Shell
Lime Mortar

Evaporation
H_2O

Carbonation
CO_2

Burning
HEAT

CO_2

Slaked or
Hydrated Lime
Calcium Hydroxide
$Ca(OH)_2$

Slaking
H_2O

Quicklime
Calcium Oxide
CaO

Graphenstone **Ambient Pro+** absorbs CO_2 during the curing phase at a rate of approx. 0.33 kg / litre. This means that a 15 litre tin of **Ambient Pro+** will absorb approx. 5kg of CO_2 during the curing phase. It is important to note that this is a finite reaction; once the paint has cured, it will no longer absorb CO_2.

Whilst CO_2 is given off during 'heat' phase, the majority of it is reabsorbed during the 'curing phase'.

Based on an assumed project of 10,000m²

Meterage of project	10,000 m²
Number of coats	2
Total meterage	20,000 m²
Coverage of a 15 litre tin of **Ambient Pro+**	210 m²
Number of 15 litre tins required	95 tubs
CO_2 absorbed per 15 litre tin	5kg
CO_2 absorbed for total project	**475 kg**

Graphentsone paints absorb CO2 as they cure as part of the natural lime cycle

3. Air Purification

Air Quality

Poor indoor and outdoor air quality, caused by air pollution, is highly damaging for both human health and the natural environment.

Traditional paints can contribute to air pollution through off-gassing toxic gaseous compounds escaping into the air.

Ambient Pro+ contains only trace elements of VOCs but also can reduce airborne pollutants such as Nitrogen oxides. It does this through a process called photocatalysis: "Photo" (light) "Catalytic" (change / reaction)

Photocatalytic Qualities and Benefits

Photocatalytic mineral paints, via the inclusion of titanium dioxide crystals, use the energy from UV light to activate the catalyst (Titanium Dioxide), helping to neutralise pollution converting the molecules into oxygens and harmless nitrates.

The Titanium Dioxide catalyst creates a reaction that occurs on the surface of the paint, while the pollutants are not absorbed into the paint. The catalytic process lasts forever! It is active so long as there is paint on the wall and light to energise the chemical reaction. It does not wear out, the paint does not "get full" or need repainting.

Ambient Pro+ is certified to ISO 22197-1:07 (Class 3)
Independent tests with UeL show a 55% reduction in NOx

April 2023

Method

Sealed chamber was filled with NOx at various concentration levels. A model building painted in Ambient Pro+ was placed inside the chamber and the chamber was exposed to UVA NOx readings were taken before and after the placement of the model inside the chamber.

Results

At 100ppm concentration, the level of NOx was reduced by 55%

Ambient Pro+ can help neutralise pollutants such as NOx, SOx and VOCs
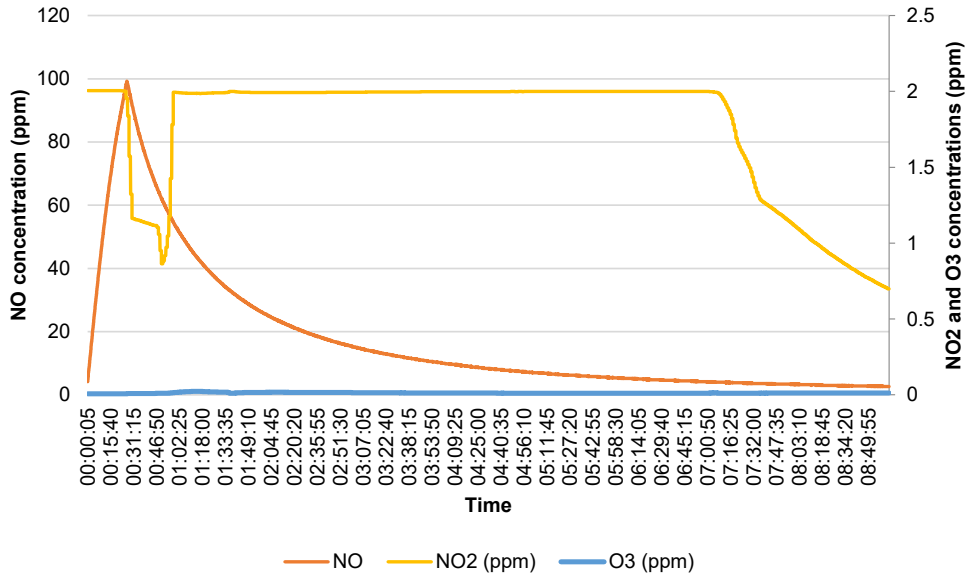
Figure 4. NO concentration (ppm) during the photoexperiment with 100ppm maximal NO concentration inside the chamber
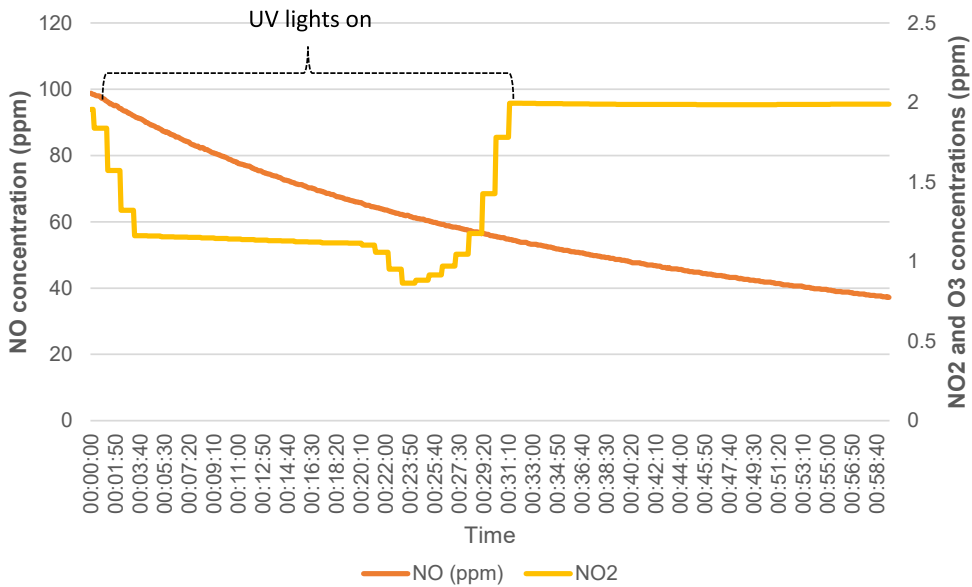

Figure 5. NO and NO₂ concentrations during the first hour with UV lights on inside the chamber in an experiment of a maximum of 100 ppm of NO concentration.

Ambient Pro+ can reduce the levels of NOx by upto 55%

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Graphenstone Ambient Pro+ "Self-Cleaning" Technology"

Graphenstone paints offer various benefits: including absorption of carbon dioxide, an ultra-low CO_2(e) footprint, and air purification (neutralisation of NOx). It can also exhibit 'self cleaning' properties due to its unique mineral formula.

"Self-Cleaning"

The air purification quality is due to the inclusion of the natural mineral titanium dioxide (TiO_2). One of the often overlooked benefits of TiO_2, in crystalline form is, its "self-cleaning" quality – meaning that airborne dirt, dust and various pollutants do not stick to the painted surface. This of course does not mean that, like all paints, when given a hard knock it will not mark, but it will prevent airborne matter from settling. It can simply wash off.

The obvious benefit being that external surfaces will stay cleaner for longer, meaning less frequent repainting required.

Case Study

In conjunction with the Epsom & St Helier University Hospitals NHS Trust, in June 2022 we painted sections of three external high traffic areas with Graphenstone Ambient Pro+ and with a competitor trade exterior masonry coating.

We revisited the painted areas four months later and noted the differences in the areas with the two different paints.

As can clearly be seen on the areas at the foot of the panels, the dirt and pollutants emitted by traffic driving past the panels has not adhered to the panels painted with Graphenstone Ambient Pro+

We are running similar trials with Grosvenor Estates and Cheam High School

June 2022

October 2022

NHS
Epsom and St Helier
University Hospitals
NHS Trust

Photocatalytic paints will due to a reaction with light help to keep surfaces clean

5. Volatile Organic Compounds (VOCs)

What are they and what harm can they cause?

VOCs are chemical compounds that due to their inclusion in many products and materials are everywhere in both indoor and outdoor environments. They are a major source of indoor and outdoor air pollution and can cause health issues such as: headaches, dizziness & light-headedness, nausea, sinus irritation, worsened asthma symptoms and itchy eyes.

What VOCs are found in paint and why?

There are many different VOCs, some used in paint are Benzene and Toluene. VOCs can be found in some solvents, and additives and chemical preservatives, and can off gas for months - even years - following application.

Graphenstone paints use naturally occurring minerals, sustainable materials and no toxic chemicals - Calcium Hydroxide, Calcium carbonates, silicates, vegetable resins – and are thus significantly less polluting from the outset. Graphenstone paints are classified as having only Trace VOCs

Definition of "Trace VOC" from The British Coatings Federation

"From May 2022, decorative paints manufacturers will be able to adopt the use of the statement 'TRACE' Volatile Organic Compounds (VOC) as part of the British Coatings Federation (BCF)'s VOC Globe scheme to improve communication to consumers highlighting which products have the lowest levels of VOCs.

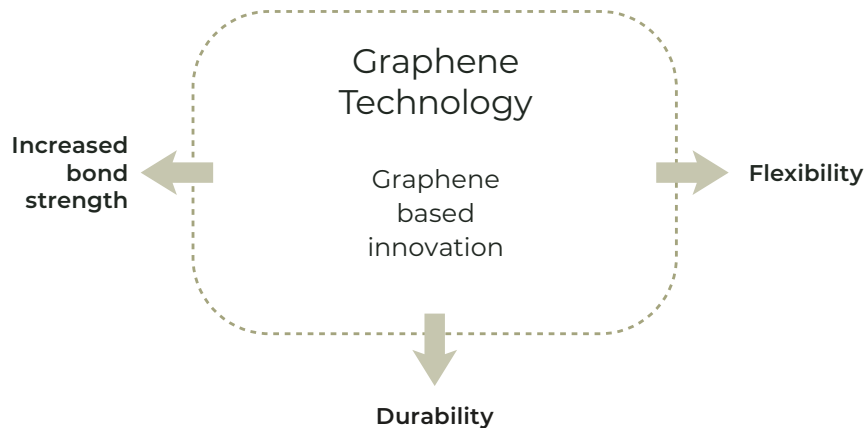*The TRACE globe will be used for products with VOCs of <0.1% content of less than 0.1%."*

Ambient Pro+ has a VOC figure of less than 1g / litre, less than 0.1%/kg
One of the lowest VOC figures of any paint on the market

6. Durability and Washability

Our "magic ingredient" is graphene.

Graphene
Technology

Graphene
based
innovation

Increased bond strength

Flexibility

Durability

The graphene fibres, fused with a unique natural polymer, provide Graphenstone paints with innovative qualities including, increased durability, flexibility, and bond strength, transforming the traditional lime and mineral bases into paints with modern day performance.

We use this technology to achieve more efficient materials that meet the requirements of today's highly demanding market which is committed to new and more sustainable methods of manufacturing.

Due to the addition of graphene technology, Graphenstone Ambient Pro+:

- Removes the need for acrylic binders

- Has increased flexibility

- Has an improved bond strength

- Is durable to Class 1 - the equivalent of modern, professional paints

Graphenstone paints offer traditional materials with modern day performance

Graphenstone Ambient Pro+

Sizes	Available in 1, 4 and 15 litre tins
Coverage	Up to 18m² / litre
Certifications	Cradle to Cradle Gold & Silver (Colour base), C2C Health Gold * ,Solingesa CO_2(e) * , CDPH v1.2 *
Test data	Reduction of Nitrogen oxides to ISO 22197-1:2012 Air Purification performance UNE 127197-1:2013 Class 3 Removal of formaldehydes to JCT 1074-2008
Application	Brush, roller or spray.
Compliance	BREEAM, LEED, WELL, SKA
Colours	White and Pastels

* White base only

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