

oakdale
greenscaping® products



Better air, better health, better life



AirPave®
ENVIRONMENTAL PAVING



AirPave® sets new standards in environmental benefits with up to 80% of its raw material content coming from recycled, local sources.

Specification Table

Nominal Size (mm)	Work Size (mm)	Thickness (mm)	BS Designation	Colours	No. Items per Pack	Weight per Flag (kg)	Weight per Pack (kg)	Coverage per Pack* (m²)*	Kg of CO ₂ e per m²	Bending Strength	Slip / Skid Resistance (potential for slip)	Freeze Thaw	Durability EN 1339	External Fire Performance / Reaction to Fire
600x600	597x597	50	B50	Natural, Silver Grey	20	40.0	800	7.20	9.84	Class 3	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x600	597x597	50	B50	Buff, Mocha, Cappuccino, Red, Marigold, Charcoal	20	40.0	800	7.20	10.58	Class 3	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x600	597x597	63	B63	Natural, Silver Grey	16	50.5	808	5.76	12.40	Class 3	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x600	597x597	63	B63	Buff, Mocha, Cappuccino, Red, Marigold, Charcoal	16	50.5	808	5.76	13.33	Class 3	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
450x450	447x447	50	E50	Natural, Silver Grey	40	22.4	896	8.10	9.84	Class 3	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
450x450	447x447	50	E50	Buff, Mocha, Cappuccino, Red, Marigold, Charcoal	40	22.4	896	8.10	10.58	Class 3	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
450x450	447x447	70	E70	Natural, Silver Grey	28	31.5	882	5.67	13.78	Class 3	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
450x450	447x447	70	E70	Buff, Mocha, Cappuccino, Red, Marigold, Charcoal	28	31.5	882	5.67	14.81	Class 3	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x300	597x296	50	na	Natural, Silver Grey	40	19.8	792.8	7.20	9.84	NA	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x300	597x296	50	na	Buff, Mocha, Cappuccino, Red, Marigold, Charcoal	40	19.8	792.8	7.20	10.58	NA	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x200	597x195.5	50	na	Natural, Silver Grey	60	13.1	786	7.20	9.84	NA	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x200	597x195.5	50	na	Buff, Mocha, Cappuccino, Red, Marigold, Charcoal	60	13.1	786	7.20	10.58	NA	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x150	597x145.5	50	na	Natural, Silver Grey	80	9.8	780	7.20	9.84	NA	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1
600x150	597x145.5	50	na	Buff, Mocha, Cappuccino, Red, Marigold, Charcoal	80	9.8	780	7.20	10.58	NA	Extremely Low	Class 3	Class 1	Deemed to Satisfy / A1

AirPave® a revolutionary yet affordable development in photocatalytic concrete to facilitate the reduction of pollution in the urban environment.

Photocatalysis is a well known natural phenomenon and most life on earth depends on photocatalytic reactions such as photosynthesis.

There are a number of materials that display photocatalytic behaviour and are able to oxidise and breakdown pollutants.

Titanium dioxide is one such material.

Advances in nanotechnology have resulted in the production of photocatalytic cement such as TioCem® which incorporates titanium dioxide.

The use of photocatalytic concrete has been proven to improve both external appearance and the environment, through self-cleaning and reducing pollution in the surrounding air ⁽¹⁾. The principle of exploiting photocatalysis in cement-based products is now well established and the performance of photocatalytic concrete surfaces has been proven both in laboratory and in full-scale practical trials and applications.

At present, many UK cities and conurbations clearly exceed the limits for air-borne pollution imposed by the EU Air-quality Directive ⁽²⁾.

Pollution from exhaust gasses is one of the major problems facing cities and other built-up areas. Pollutants such as nitrogen oxide (NOx) are health hazards and increase the risk of respiratory infections and can impair breathing.

Oakdale’s unique manufacturing processes utilize TioCem® in an innovative and efficient manner. The result is AirPave® a new and affordable TX Active® environmental product which combines all the sustainable qualities of our Centurion range with the added benefit of also improving air quality.

- The concrete surface decomposes harmful nitrogen oxides (NOx) by means of photocatalysis
- Natural daylight is sufficient for initiating the photocatalytic degradation of harmful NOx into harmless NO₃ which is then washed away by rainfall
- The photocatalytic reaction does not diminish with time and is continuous
- In tests, 40% of NOx was immediately oxidised into NO₃
- TioCem® cement complies with the European standard for cements and durability properties are the same as standard cement
- Ecologically clean and neither toxic nor hazardous to health ⁽³⁾
- TX Active® is a quality label for the photocatalytic activity of building materials which is widely used throughout Europe

References

1. EC project GRD1-2001-40449. Photocatalytic Innovative Coverings Applications for De-pollution Assessment – PICADA, 2002-2006. www.picada-project.com
2. EU Directive 2008/50/EC on ambient air quality and cleaner air for Europe, Annex XI, 2008
3. LEE, J., MAHENDRA, Sand ALVAREZ, P.J.J. Potential environmental and human health impacts of nanomaterials used in construction industry, in Nanotechnology in Construction – NICOM3, BARTOS, P.J. M., BITTNAR, Z., NEMECEK, J., SMILAUER, V, and ZEMAN, J. (Eds.), Proceedings of Int’l Symposium, Prague 31 May to 2 June 2009; Springer-Verlag, Berlin, 2009, ISBN 978-3642-00979-2, pp1-11

Notes

¹Assumes paving is laid with the recommended joint gap of 3mm.
¹¹BS EN 1339 BENDING STRENGTH COMPLIANCE. Compliance requires a mean of 4.0MPa to meet the highest Class (Class 3) requirements.
¹²BS EN 1339 PENDULUM TEST COMPLIANCE. A test value in excess of 75 states the “potential to slip” is Extremely Low”.
¹³BS EN 1339 FREEZE THAW COMPLIANCE. Compliance requires Freeze Thaw weight loss to be less than 1.0kg / m². Oakdale products achieve a mean weight loss of 0.312kg / m² and surpass the highest Class (Class 3).

AirPave® Potential improvement in air quality utilising AirPave® and Centurion

Average Air Quality* µg NOx / m³	Ratio AirPave® : Centurion	Air Quality % Improvement	Potential Air Quality After Installation µg NOx / m³
78.40 - 67.80	1 : 0	49.00 - 41.00	40.00 - 34.60
63.20 - 57.80	3 : 1	36.75 - 30.75	40.00 - 36.60
59.40 - 55.00	2 : 1	32.66 - 27.33	40.00 - 37.00
53.00 - 50.30	1 : 1	24.50 - 20.50	40.00 - 37.80
47.80 - 46.30	1 : 2	16.33 - 13.66	40.00 - 38.70
45.60 - 44.60	1 : 3	12.25 - 10.25	40.00 - 39.10

(8 hour mean value)
Results verified by field trials at Via Borgo Palazzo, Bergamo, Italy

*EU Air Quality Standards Directive states 40µg NOx / m³ is the maximum annual average, 200µg NOx / m³ not to be exceeded more than 18 times a calendar year. DEFRA observe air quality and record the mean daily average for NOx at various monitoring stations throughout the UK. This information is readily available on the DEFRA web-site.

New sizes for 2016

Nominal Size (mm)	Work Size (mm)
900x150	897x145.5
900x200	897x197.5
900x300	897x296
450x150	446x145.5
450x200	446x195.5
450x300	446x296

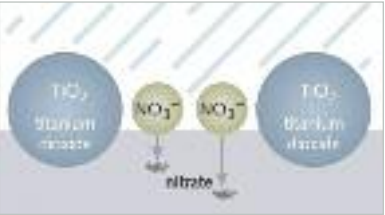
AirPave® and Centurion are fully compatible products. By dedicating a proportion of any scheme to AirPave® and combining it together with our complementary Centurion range it is possible to achieve the desired continuous photocatalytic de-pollution of the surrounding air. The table adjacent demonstrates the concept.

Due to Oakdale’s unique production processes it is now economically viable to incorporate the latest in nanotechnology paving into any hard landscaping design without compromise to carbon footprint, durability or looks.

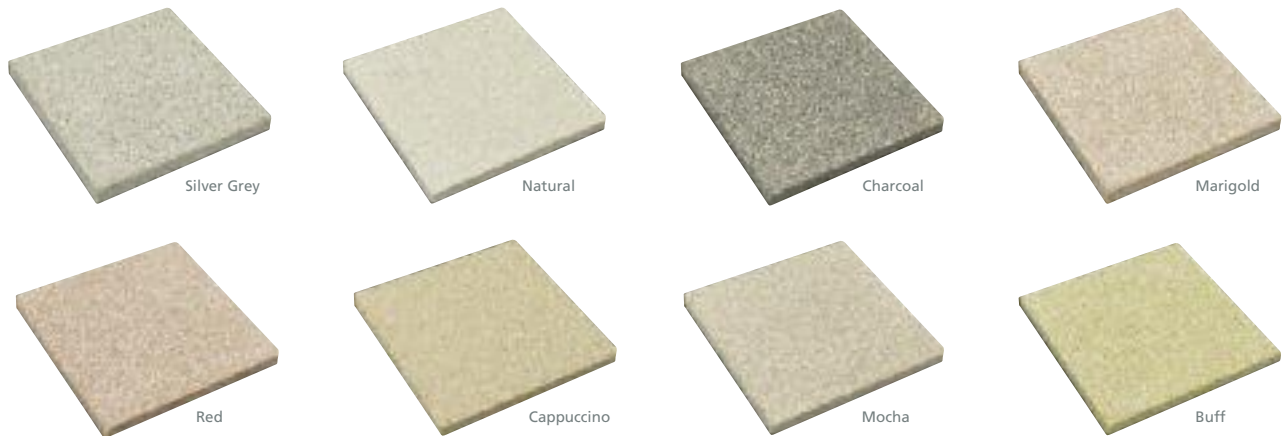
Reaction Process
How TioCem® reduces NOx

The velocity of the photocatalytical oxidation depends on the light intensity and air flow.

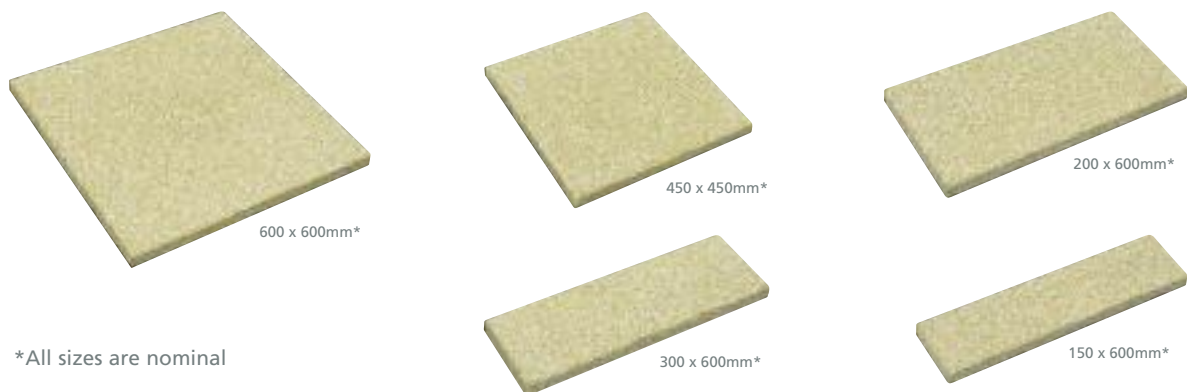
In tests 40% NOx immediately oxidises to NO₃.



Paving Colours



Paving Sizes



*All sizes are nominal

Every effort is made to ensure that colour samples match as closely as possible to the product. It is advisable to open packs and mix contents together prior to commencing a project. This ensures even colour spread throughout the project. Due to printing and photographic processes, all colours should be used as a guide only.

How was this Carbon Footprint Calculated?

This is a cradle to gate calculation. This means it takes into account the extraction/creation and primary processing of the raw materials; transporting them to our plant; processing them into our products and packaging them for the customers (the manufacture of the packaging materials is also included).

Processing energy is relevant to the calendar year 2012. All other activity data, including material type and quantity, packaging, supplier data and methods of transport, was current as of Summer 2013. As specified by the PAS 2050 product carbon footprinting standard, primary activity data was collected for all operations under our control, including material input, packaging use, and processing energy.

There are no non-attributable processes included in the inventory. The only excluded attributable process is transport of packaging materials from the supplier, which was excluded on the grounds of materiality, being less than negligible and cannot be measured.

Emissions factors for materials were sourced from secondary data from reliable and industry-standard sources including Bath University's ICE database and WRAP's AggRegain database. For most materials, an industry-agreed standard emissions factor was readily available. UK DECC / Defra 2012 emissions factors were used for transport and energy emissions. All emissions factors apply to Europe and, in most cases, to the UK; and all were published within the last ten years.

The calculations are in compliance with the Greenhouse Gas Protocol Product Standard Product. A relevant product rule, International EPD System CPC 3754: Tiles, flagstones, bricks and similar articles, of cement, concrete or artificial stone, Version 2.0, August 2011, was also referred to.

TioCem®

 **Hanson**
HEIDELBERGCEMENT Group



