

EcoLogic roof tiles

Breathing life into the environment

Breathing life...

NO_x: collective noun for nitrogen dioxide (NO₂) and nitric oxide (NO) produced by burning fossil fuels

EcoLogic roof tiles reduce NO_x levels, improve air quality and contain about 50% recycled materials

An EcoLogic roof could remove 100,000 car-miles worth of NO_x in its lifetime

NO_x can contribute to asthma, smog and acid rain

1 child in 10 has asthma

UK government committed to reduction of NO_x by 2010

42% of those with asthma say traffic fumes stop them walking and shopping in congested areas

5.2 million people in the UK are currently receiving treatment for asthma

“

We are familiar with the negative impact that traffic and industrial pollution has on the environment, particularly the urban environment.

As well as the global warming issues associated with CO₂, road traffic exhaust, central heating boilers and industrial output produce Nitrogen Oxides, collectively known as NO_x.

NO_x contributes to the formation of ground level ozone – a major component of smog – and is strongly associated with asthma and other respiratory infections, particularly in the very young and the elderly.

”

...into the environment

EcoLogic is a new roof tile from Marley Eternit that actually absorbs NO_x , and in doing so, improves air quality. Coupled to this, EcoLogic roof tiles are manufactured using close to 50% recycled materials, making it one of the most environmentally beneficial and highly sustainable roofing products in the market today.



The case for EcoLogic

EcoLogic Ludlow Major tiles will have a positive effect on the air quality surrounding the buildings on which they are installed, by removing NO_x . Allied to this are two other key environmental facts:



The tile incorporates about 50% recycled materials, much higher levels than standard concrete tiles

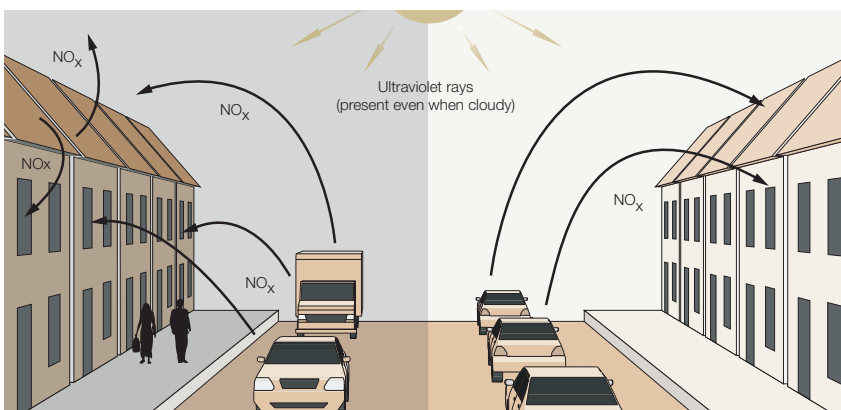


The tile is based on a Ludlow Major tile which can achieve an 'A+' rating (the lowest environmental impact) in the Building Research Establishment's Green Guide to Specification.

So, not only does the tile have active environment-improving properties, it is also a highly sustainable building product reducing the long term impact of construction on the environment.

How much NO_x can EcoLogic remove?

Using typical data on pollution levels in urban areas, coupled with laboratory test data we estimate that over the lifespan of an average sized roof the amount of NO_x the tiles will remove could be equivalent to that emitted by a modern car covering over 100,000 miles.



Non-EcoLogic roofs
High levels of NO_x and poor air quality

EcoLogic roofs
 NO_x absorption and improved air quality



Heol Y Coed, Swansea City Council Housing Association, Wales

How can a roof tile reduce NO_x?

EcoLogic, Northwards Housing, Manchester



Marley Eternit has a proven track record of commitment to sustainability, recycling and the minimisation of the environmental impact of its products. 'EcoLogic' is a ground-breaking new roof tile coating applied to Ludlow Major tiles.

A roof covered with EcoLogic roof tiles can help to reduce levels of NO_x over its entire area and will make a positive contribution to the air quality in its vicinity.

How EcoLogic works

The granular layer embedded in a slurry, fused onto the surface of the tiles, contains titanium dioxide. UV rays from sunlight cause the titanium dioxide to create active oxygen. On contact with the oxygen, NO_x is oxidised to form soluble nitrate. Initially, the reaction generates nitric acid ions (Fig.1), but these are rapidly neutralised by the excess calcium carbonate in the concrete to form calcium nitrate (Fig.2). This compound, a plant fertiliser, is washed away as a dilute solution in rainwater.

The granular make up of the coating maximises the photocatalytic surface area and the efficiency of the NO_x removal process. The coating is expected to continue absorbing pollutants for around 25 years.

The graph* (Fig. 3) demonstrates the capacity of the EcoLogic coating to reduce NO_x.

Test conditions from which the graph is derived:

- Sample size = 200cm²
- Gas flow rate = 2.0 litres / minute
- Humidity = 50% RH
- UV Intensity = 20 W/m²

*Typical results for a weathered sample

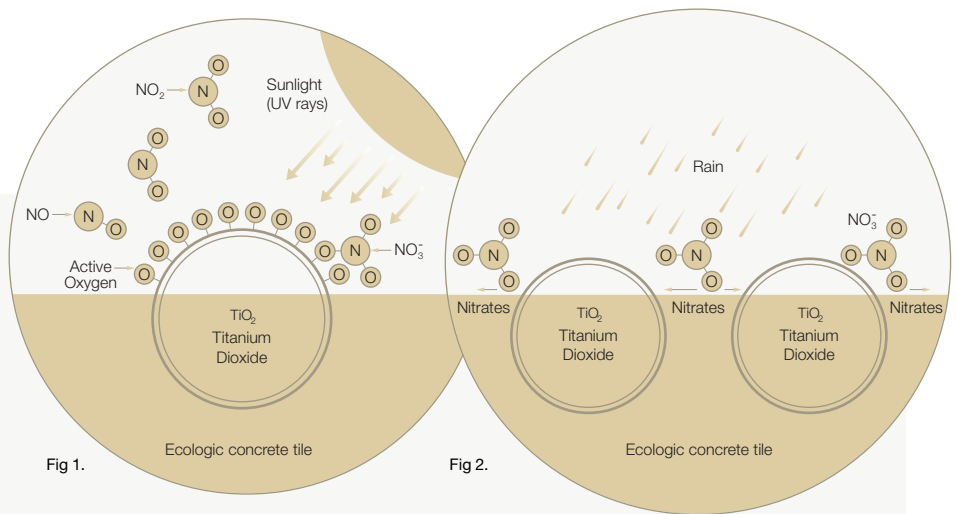


Fig 1.

Fig 2.

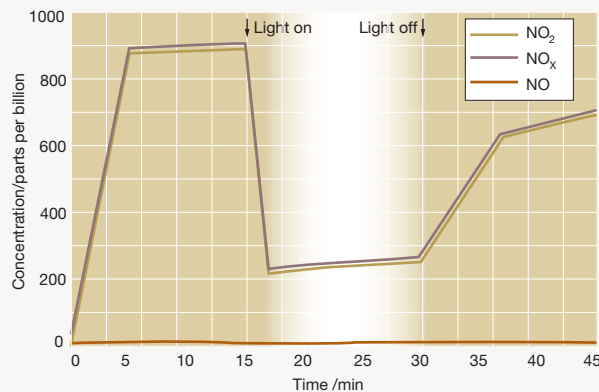


Fig 3.

EcoLogic Ludlow Major

Ludlow Major tiles are a simple, neat and cost effective roof covering often used on urban buildings – particularly popular for social housing schemes.

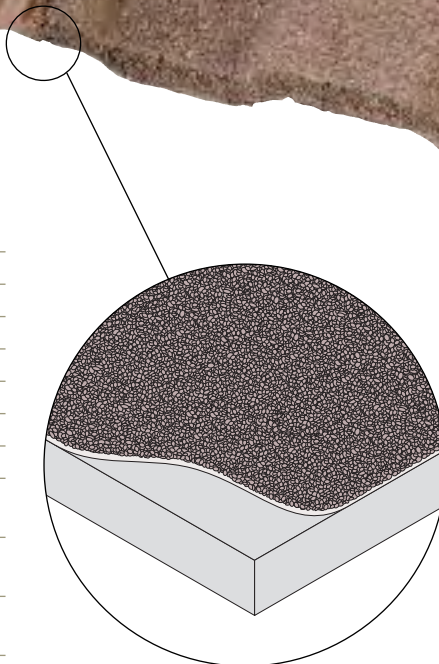
As more emphasis is being placed on the sustainability of building materials for such projects, any one of these characteristics would present a good case for specification, particularly where the optimisation of the inhabitants' environmental conditions are paramount. EcoLogic roof tiles incorporate environmental properties, sustainability and the cost effective performance characteristics of concrete tile technology into one product, making them an unbeatable choice for today's urban projects.






Technical data

Size of tile	420mm x 330mm
Minimum pitch*	30° (75mm headlap)
Maximum pitch	90°
Minimum headlap	75mm
Maximum gauge	345mm
Cover width	295mm (nominal)
Hanging length	399mm (nominal)
Covering capacity (net)	9.8 tiles/m ² at 75mm headlap
Weight of tiling (approx.)	45 kg/m ² (0.44 kN/m ²) at 75mm headlap
Battens required (net)	2.9 lin.m/m ² at 75mm headlap
Batten size recommended (fixed to BS 5534)	38 x 25mm for rafters/ supports not exceeding 450mm centres 50 x 25mm for rafters/ supports not exceeding 600mm centres
Tile nails	55mm x 3.35mm
Fixing clips	Eaves, verge and tile clips

* The minimum recommended pitch and lap may be influenced by special circumstances, please refer to the Technical Advisory Service.



EcoLogic composition

-  Photocatalytic titanium dioxide granules embedded into slurry. Granules are fixed as slurry sets in curing process. Granules maximise photo catalytic area.
-  Pigmented, cementitious fine grained slurry adhesive. This also contains the photocatalyst to provide additional reactivity.
-  Concrete body: Portland cement, recycled aggregates and pulverised fuel ash, together about 50%, primary aggregates.

Colour availability



Authority

Along with all Marley Eternit concrete roof tiles and slates, EcoLogic Ludlow Major tiles are Kitemark certified as being manufactured to the requirements of BS EN 490. Marley Eternit operate a Quality System to BS EN ISO 9001 and comply with the Environmental Standard BS EN ISO 14001 (independently assessed by BSI), and Health and Safety standard OHSAS 18001.

Questions & answers

Heol Y Coed, Swansea City Council Housing Association, Wales



EcoLogic, Cheshire Peaks and Plains Housing Trust, Macclesfield

What is the composition of the tile?

The tile combines a high level of recycled aggregate plus cement replacements giving about 50% substitution of primary raw materials, with revolutionary new anti-pollution coating.

How does the coating work?

EcoLogic is a unique granule finish on a concrete roof tile that uses titanium dioxide (TiO₂) catalysts in a combination of surface layers of granule and cement slurry coatings.

The coating works as a photocatalyst stimulated by sunlight, to remove both forms of nitrogen oxide (NO_x) that form nitrogen dioxide (NO₂) and nitric oxide (NO). These can cause respiratory problems and contribute to smog in built-up areas.

In addition studies have shown these materials to be active against other atmospheric pollutants such as sulphurous oxides (SO_x).

The NO_x reacts with the TiO₂ and sunlight to produce nitrates, which are then harmlessly washed from the surface by rain. In effect a roof covered with EcoLogic tiles acts as a giant air purifier removing atmospheric pollution.

Vast amounts of NO_x are being emitted into the atmosphere and although EcoLogic tiles alone cannot eliminate this, they will make a positive difference to help reduce NO_x levels.

What happens to the NO_x when it is removed?

The NO_x converts into nitrates through reaction with the concrete tile body, and is dissolved in rain water.

The concentration of nitrates will not reach a damaging level in rainwater runoff from a roof. Even for the driest areas of the UK we estimate that additional levels of nitrate will not average more than 1 mg/l (milligrams per litre) or peak at more than 14 mg/litre.

For comparison, rivers with water catchments in agricultural areas often exceed 25 mg/litre whilst the EU permissible maximum for drinking water is 50 mg/litre.

EcoLogic simply accelerates the natural processes that operate within the Nitrogen Cycle and converts the NO_x from potentially harmful nitric acid to calcium nitrate, a liquid fertiliser which is harmless to the environment.

So, rather than harming the plants in the garden, after this conversion the NO_x could actually do them some good, as calcium nitrate is widely used in liquid fertiliser solutions.

Can the run off be used to help fertilise a garden?

Yes. The water soluble nitrates generated by EcoLogic could be stored in a rainwater harvesting system and used to both water and help to fertilise a garden.

Don't nitrates cause pollution problems?

At high levels, yes. But the nitrate content in water running off EcoLogic tiles is very low, perfectly safe and well below levels classed to be pollutants.

Where do NO_x and SO_x come from?

These are pollutants formed during the combustion of fossil fuels, the principal source being exhausts from motor vehicles. Although SO_x, the pollutant that causes acid rain, has been greatly reduced through control measures such as ultra low sulphur vehicle fuels and flue gas scrubbers in power stations, NO_x levels remain high, particularly in urban environments.

Details on NO_x concentrations in your area can be found on the UK National Air Quality Archive www.airquality.co.uk



Why should we worry about NO_x?

The emission of NO_x pollutants is causing serious disruption to the natural nitrogen cycle of the Earth which in turn disrupts ecosystems and presents another threat to our long term future.

In the short term NO_x has been linked to a range of respiratory health problems and can exacerbate asthma and bronchial conditions, even at low levels over a period of long-term exposure. So although this has nothing to do with global warming it still presents a significant environmental threat.

Although NO_x emissions have declined due to stricter controls of exhausts from vehicles and power stations, the UK is still emitting around 1.5 million tonnes of these gases each year.

Which sectors is EcoLogic suited to?

EcoLogic Ludlow Major provides specifiers with lots of scope, as its green credentials are superb. The tile has a brown granular textured surface to complement a wide range of architectural styles, from urban renewal to new build developments. However, they are particularly popular for social housing schemes.

As more emphasis is being placed on the sustainability of building materials for such projects, EcoLogic would present a good case for specification, particularly where the optimisation of the inhabitants environmental conditions are paramount. EcoLogic roof tiles incorporate environmental properties, sustainability and the cost effective performance characteristics of concrete tile technology into one product, making them an unbeatable choice for today's urban projects.

Where has EcoLogic been used?

EcoLogic has been used in a number of projects, including Cheshire Peaks social housing projects. They installed EcoLogic tiles on 62 bungalows as part of a major refurbishment programme.

To read more about an Ecologic case study, please visit www.marleyeternit.co.uk/ecologic

How many credits can EcoLogic get in the CFSH?

EcoLogic tiles will obtain 3 credits from the 'materials category' in the Code for Sustainable Homes.

The pollution removal and fertilising properties of EcoLogic coating may also contribute to the 'Ecological Enhancement' category, but this would be subject to the view of a suitably qualified ecologist as stated in the Code.

This publication is based on the latest information available at the time of printing. Due to product changes, improvements and other factors, Marley Eternit reserves the right to change or withdraw information contained herein without prior notice.
Furthermore, the advice given in isolation should not be taken as providing any guarantee of the performance or suitability of the product for specific applications. For specific applications users should refer to the relevant Standards and Codes of Practice for guidance or contact the Technical Advisory Service for advice.
The printing process restricts the exact representation of colours. For true colour reference, please request product samples.
For tiles and slates, it is recommended that, to enhance the appearance of the roof, pallet loads are mixed whilst the roof is being loaded.
Efflorescence can occur from time to time in all products with a high cement content, but is a temporary effect and is not detrimental to the function of the product. Natural weathering will remove the salt deposits that cause this harmless effect.
The photography shown in the document should not necessarily be taken as illustrating good practice.
Marley Eternit's employees or agents are not authorised to make any representations, or give any advice or recommendations, concerning any goods or services unless confirmed by Marley Eternit in writing.

Services



Technical Advisory Service

Marley Eternit provides a free Technical Advisory Service which is staffed by personnel with specialist knowledge of the use of all Marley Eternit roofing products and systems. Services include:

Fixing specifications

Bespoke fixing specifications can be provided, taking into account location, dimensions and degree of exposure for individual buildings.

→ To create your own fixing specification, visit:
www.marleyeternit.co.uk/tilefix

Estimating tile quantities

Calculation of all materials required for any roofing project including tiles, battens, underlay, ancillary fittings and accessories.

→ For a materials estimate, visit: www.marleyeternit.co.uk/estimator

National Building Specification clauses (NBS)

All essential clauses for Marley Eternit roof specifications are available, detailing all work items items in section H65 'Single lap roof tiling' and H60 'Plain roof tiling' and H61 'Fibre cement slates'.

→ For instant NBS clauses, visit: www.marleyeternit.co.uk/specrite

→ **T** 01283 722588 **E** roofing@marleyeternit.co.uk
CAD www.marleyeternit.co.uk/CAD



Marley Eternit Assured Roofing Specification Scheme

Operated through Marley Eternit's Technical Advisory Service, this unrivalled and comprehensive advice and support service for specifiers of major roofing projects offers the following:

- ✓ In-depth technical advice
- ✓ Project-specific fixing specifications
- ✓ Project-specific NBS clauses

Level of cover

Marley Eternit offer 15 years cover for design performance, fixing specification and for product durability when correctly installed in accordance with our recommendations and the requirements of BS 5534.



Customer Services

Marley Eternit is committed to providing outstanding customer care and is staffed by experienced personnel in departments dedicated to providing the following services:

Advice, literature and samples

→ All current product and technical literature can be downloaded from: www.marleyeternit.co.uk/downloads

For samples, visit: www.marleyeternit.co.uk/samples

→ **T** 01283 722588 **E** roofinginfo@marleyeternit.co.uk

Quotations and ordering information

→ **T** 08705 626400 **E** roofingsales@marleyeternit.co.uk

Stockist information

→ To find details for stockists of Marley Eternit products, visit: www.marleyeternit.co.uk/stockists

→ **T** 08705 626400 **E** roofingsales@marleyeternit.co.uk

Marley Eternit roofing ranges

As one of the industry's foremost innovators for over 100 years, Marley Eternit has done more than any other manufacturer to shape the roofscape of modern Britain. From familiar regional styles to the radically modern, urban or rural, new build or refurbishment, Marley Eternit offers the specifier a comprehensive selection of complete pitched roofing solutions.

- ✓ Clay and concrete plain tiles
- ✓ Fibre cement slates
- ✓ Interlocking slates
- ✓ Clay and concrete interlocking tiles
- ✓ SolarTile®
- ✓ Ventilation and dry fix roof accessories
- ✓ Fittings and accessories

Marley Eternit also offer comprehensive ranges of Claddings, Building Boards, Profiled Sheeting and accessories.

Information for all these products is available on request.
www.marleyeternit.co.uk **T** 01283 722588

www.marleyeternit.co.uk



an **Etex** GROUP company