Ecologic

A roof tile that eats pollution

MARLEY Eternit

Breathing life…

NO_x – collective noun for nitrogen dioxide (NO_2) and nitric oxide (NO), produced by burning fossil fuels.

NO_x can contribute to asthma, smog and acid rain.

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

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

5.2 million people in the UK currently receive treatment for asthma.

Ecologic roof tiles reduce NO_x levels, improve air quality and contain about 50% recycled mateirals.

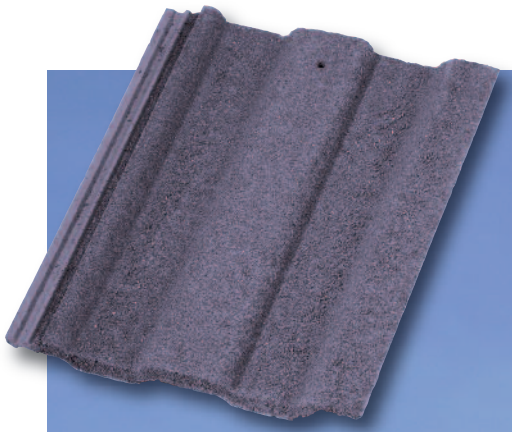
1 child in 10 has asthma.

Manufactured in the UK, Marley Eternit's concrete Ecologic tiles **can achieve an A+ rating for the lowest enviromental impact** in the Green Guide to Specification.

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 CO_2, road traffic exhaust, central heating boilers and industrial output produce Nitrogen Oxides, collectively known as NO_x.

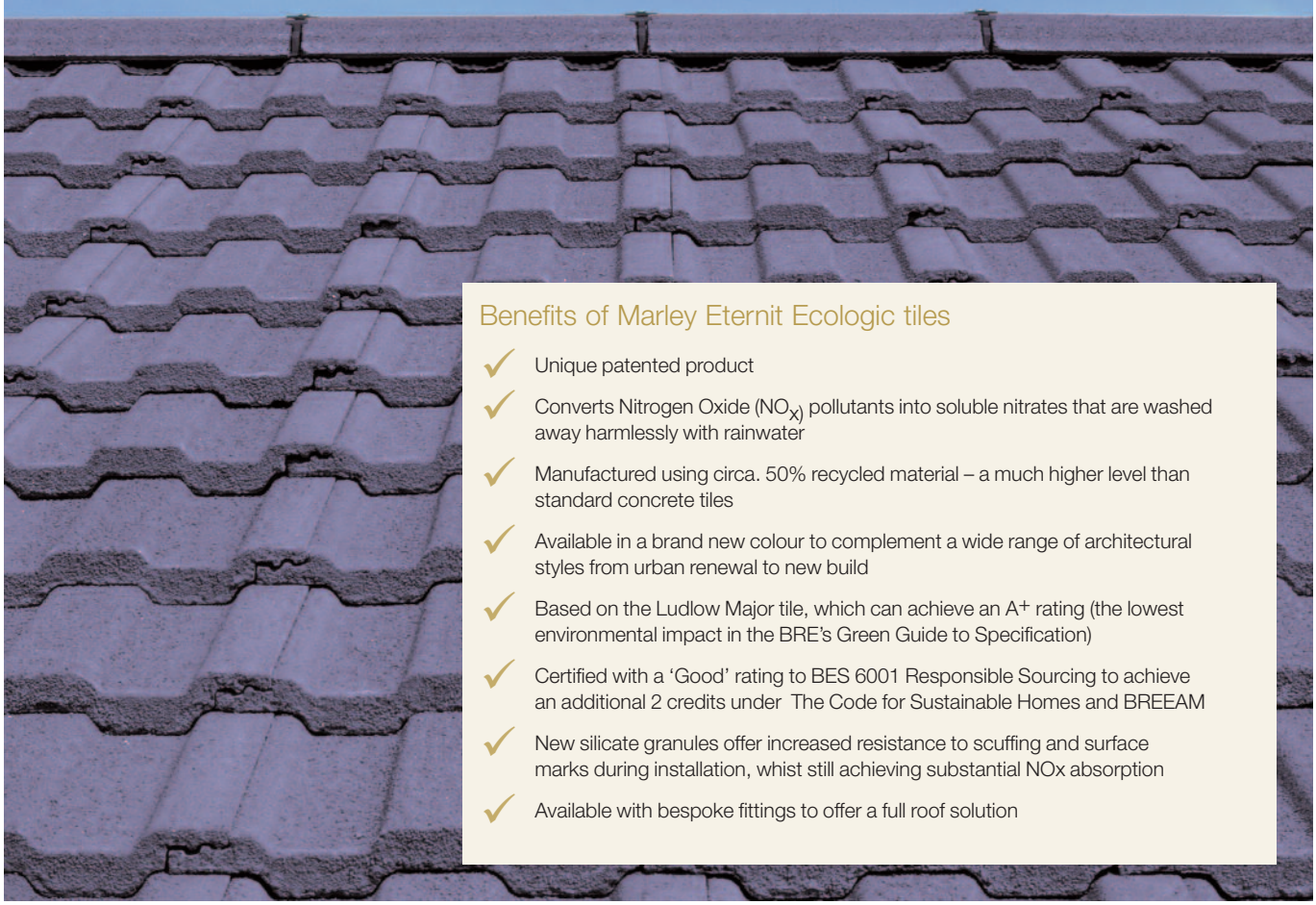
NO_x contributes to the formation of ground level ozone – a major component of smog – and is strongly associated with asthma and other respiratory infections, particularly in the very young and the elderly.



Ecologic is an innovative 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 circa. 50% recycled materials, making it one of the most environmentally beneficial and highly sustainable roofing products in the market today.

...into the environment

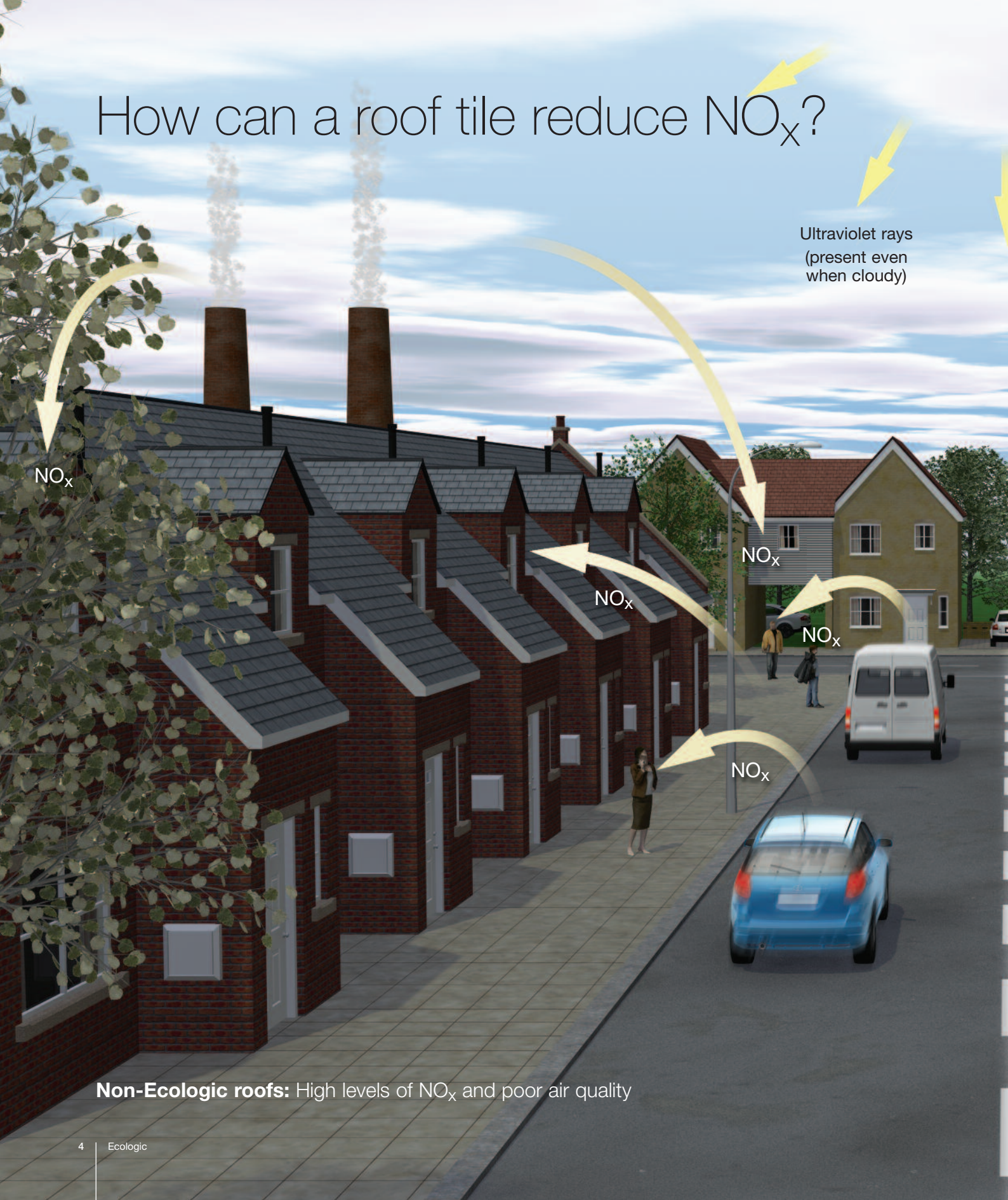
Ecologic Ludlow Major tiles will have a positive effect on the air quality surrounding the buildings on which they are installed, by removing NO_x.



Benefits of Marley Eternit Ecologic tiles

- ✓ Unique patented product
- ✓ Converts Nitrogen Oxide (NO_x) pollutants into soluble nitrates that are washed away harmlessly with rainwater
- ✓ Manufactured using circa. 50% recycled material – a much higher level than standard concrete tiles
- ✓ Available in a brand new colour to complement a wide range of architectural styles from urban renewal to new build
- ✓ Based on the Ludlow Major tile, which can achieve an A^+ rating (the lowest environmental impact in the BRE's Green Guide to Specification)
- ✓ Certified with a 'Good' rating to BES 6001 Responsible Sourcing to achieve an additional 2 credits under The Code for Sustainable Homes and BREEAM
- ✓ New silicate granules offer increased resistance to scuffing and surface marks during installation, whist still achieving substantial NOx absorption
- ✓ Available with bespoke fittings to offer a full roof solution

How can a roof tile reduce NO_X?



Non-Ecologic roofs: High levels of NO_X and poor air quality

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 NOx. Allied to this are two other key environmental facts:

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

A+

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 air cleansing properties, it is also a highly sustainable building product reducing the long term impact of construction on the environment.

Ecologic roofs: NO_x absorption and improved air quality

How can a roof tile reduce NO_X?

Marley Eternit has a proven track record of commitment to sustainablility, 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 NOx 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, NOx 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 NOx 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 NOx.

Test conditions from which the graph is derived:

- Sample size = 200cm^2
- Gas flow rate = 2.0 litres / minute
- Humidity = 50% RH
- UV Intensity = 20 W/m^2

* Measured from an actual Ecologic tile

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 NOx the tiles will remove could be equivalent to that emitted by a modern car covering over 100,000 miles.

Fig 1.

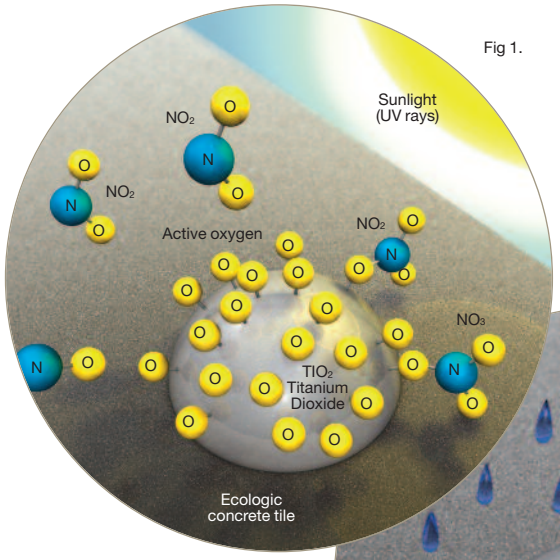


Fig 2.

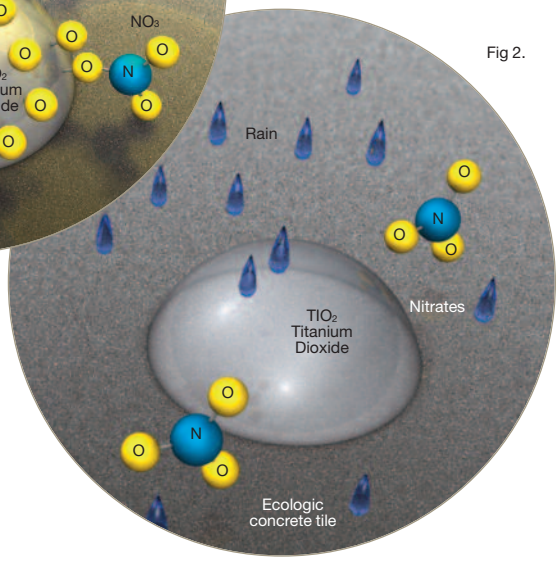
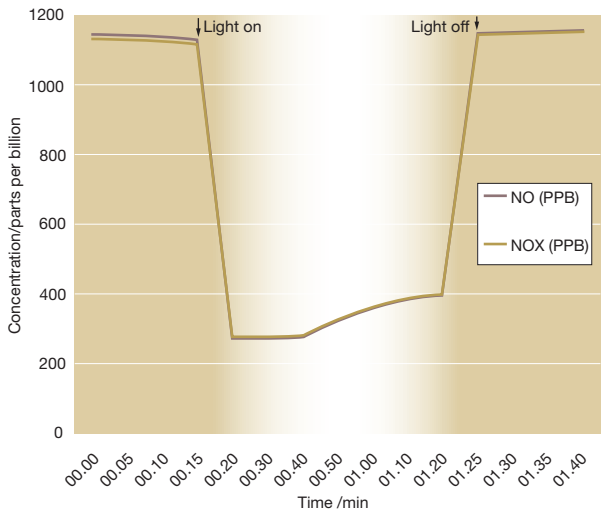


Fig 3.



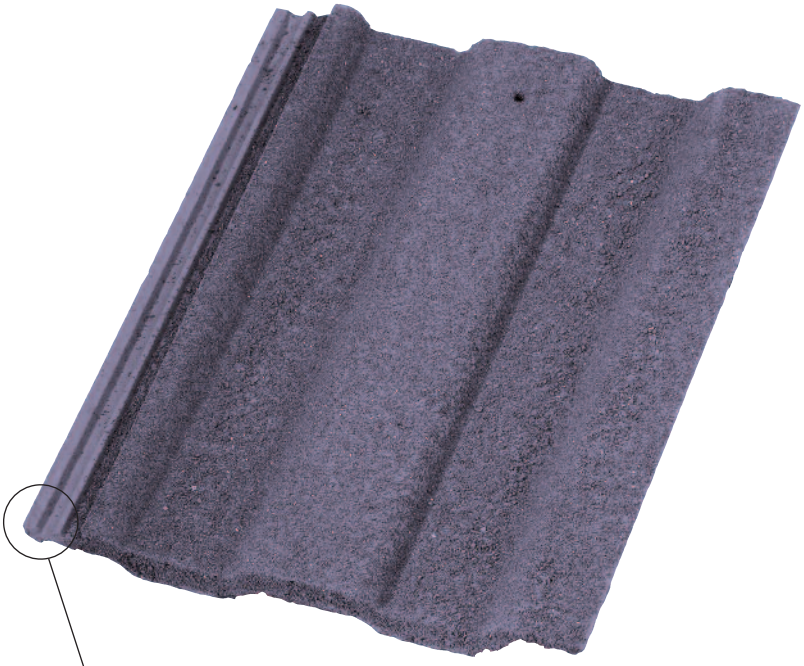
Ecologic Ludlow Major

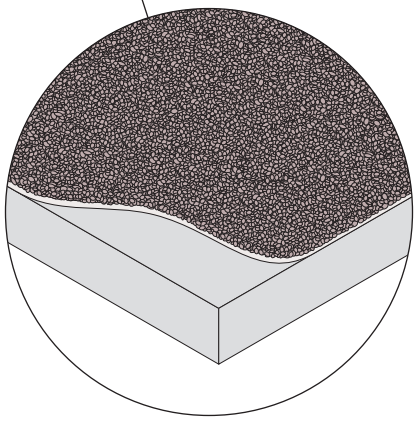
Description

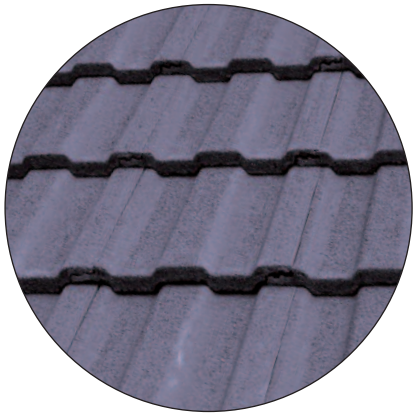
Ludlow Major tiles are a simple, neat and cost effective roof covering often used on urban buildings – particularly popular for social housing schemes.

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 optimisation of the inhabitants' environmental conditions are paramount.

Ecologic roof tiles combine environmental properties, sustainability and the cost effective performance characteristics of concrete tile technology into one product, making 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

Photocatalyic titanium dioxide granules embedded into slurry. Granules are fixed as slurry sets in curing process. Granules maximise photo catalytic area.

Pigmented cement 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.

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.

In addition, Ecologic Ludlow Majors are certified with a 'good' rating to BES 6001.

Questions & answers

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 (NOx) 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 (SOx).

The NOx 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 NOx are being emitted into the atmosphere and although Ecologic tiles alone cannot eliminate this, they will make a positive difference to help reduce NOx levels.

What happens to the NOx when it is removed?

The NOx 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 NOx 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 NOx 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 soluable nitrates generated by Ecologic could be stored in a rainwater harvesting system and used to both water and help to fertilise a garden.

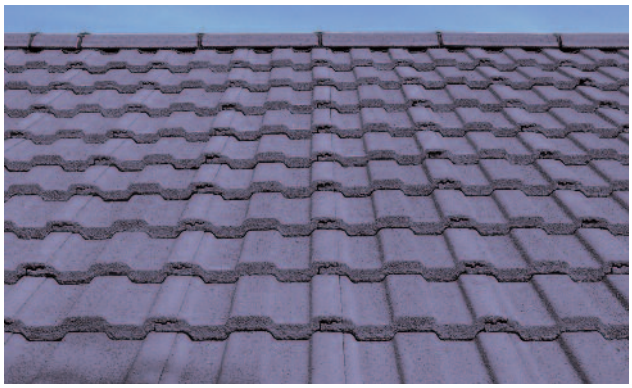
Don't nitrates cause pollution problems?

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 NOx and SOx come from?

These are pollutants formed during the combustion of fossil fuels, the principal source being exhausts from motor vehicles. Although SOx, 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, NOx levels remain high, particularly in urban environments.

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



Why should we worry about NOx?

The emission of NOx 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 NOx has been linked to a range of respiratory health problems and can exacerbate asthma and bronchial conditions, even at low levels over extended exposure. So although this has nothing to do with global warming it still presents a significant environmental threat.

Although NOx 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 grey/blue 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.

Where has Ecologic been used?

Ecologic has been used in a number of projects, including Cheshire Peaks social housing projects. Ecologic tiles were installed 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's A^+ rating obtains 3 credits from the 'materials category' in the Code for Sustainable Homes. The addition of Marley Eternit's BES 6001 accreditation means they get an additional 2 credits, making 5 in total.

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.

Let ME lighten your load

People and tools to support your needs...

At times roofing and cladding specification can be complex and heavy going. That's why we're on hand to offer practical, experienced support in a host of useful ways. From creating bespoke NBS, BIM or CAD details to answering questions on any aspect of your roofing or cladding project. We will deliver urgent samples where and when they're needed and provide products that help you achieve an A+ rating. We're always happy to take the weight off your shoulders. **Because with ME, it's all about you.**

Technical Advisory Service

Specifiers require prompt, knowledgeable and detailed responses to a vast range of enquiries covering everything from the embodied energy of a typical roof tile, to the different ventilation options available.

Our Technical Advisory Service is staffed by a qualified team with specialist knowledge not only of all Marley Eternit products, but also crucially, how those systems integrate with other roofing components and comply with Building Regulations, Health and Safety, environmental and other critical roofing criteria.

In addition to general technical enquiries, the services available from the Technical Advisory Service include:

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

Estimating the quantities: Calculation of materials required for any roofing project including tiles, battens, underlay, ancillary fittings and accessories.

We also have on-line tools which can help create fixing specs or with estimating quanities.

contact tel 01283 722588
e-mail info@marleyeternit.co.uk

Sample Services

Samples of all our roofing and cladding products are available on request.

contact tel 01283 722588
e-mail info@marleyeternit.co.uk
web marleyeternit.co.uk/samples

Sales Support

Our Area Service Managers have indepth knowledge of you local area, local building types and your specific needs.

The are available to come to visit you site to carry out a roof survey and to offer specific solutions for both new build and refurb projects.

contact tel 01283 722588
e-mail info@marleyeternit.co.uk

Customer Services

Marley Eternit is committed to providing outstanding customer care and is staffed by experienced personnel. Services include:

Training Centre: We have a purpose-built training centre where we are able to impart our expertise through a range of practical and classroom courses.

Tel 08705 626400

Advice and ordering information
contact tel 08705 626400
e-mail info@marleyeternit.co.uk

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

contact tel 08705 626400
e-mail info@marleyeternit.co.uk

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

contact tel 08705 626400
e-mail info@marleyeternit.co.uk

FSC logo (black)

Call on 01283 722588
Email at info@marleyeternit.co.uk
Or visit www.marleyeternit.co.uk/ecologic

an Etex GROUP company

Marley Eternit Limited, Lichfield Road, Branston, Burton on Trent DE14 3HD