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January 2013 (edition 5)

facades

MARLEY Eternit

About this guide

'Facades' is exclusively focused on the design, detailing and specification of Marley Eternit architectural fibre cement cladding material.

The information contained within Facades is comprehensive and designed to inform and inspire.

For more detailed information and advice on bespoke projects, please speak to our experienced and knowledgeable Technical Advisory Team on Tel: 01283 722588.

The Marley Eternit range

EQUITONE [natura] | EQUITONE [tectiva] | EQUITONE [pictura] | EQUITONE [textura] | Other facades

facades

Contents

Equitone [natura] , Office Building, Namur, Belgium

Marley Eternit Limited is at the forefront of the design, development and supply of lightweight fibre cement rainscreen facades and fixing solutions.

Rainscreen is a fast-track, sustainable solution for both refurbishment and new build projects. It is also a dry trade that aligns well with modern methods of construction, and offers both contemporary and flexible design options and versatility in the construction process.

Range overview

EQUITONE [natura]

The through coloured material allows the texture of the fibres to show through, offering a unique visual appearance. This, combined with an extensive colour choice, provides a high degree of flexibility and an aesthetically appealing finish.

→ More

pages 46-51 EQUITONE [natura]

samples Tel 01283 722588
web marleyeternit.co.uk/facades

EQUITONE [tectiva]

This through-coloured material offers elegant shades of natural colour. Each panel is characterised by fine sanded lines and naturally occurring hues which provide a unique aesthetic effect.

→ More

pages 52-57 EQUITONE [tectiva]

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Marley Eternit is committed to sustainable manufacture of high quality, high performing facade solutions.

Our range of products is manufactured under quality management systems, which meet the requirements of ISO 9001 and environmental systems which comply with the internationally recognised ISO 14001 standard.

Advantages

- Can achieve an A+ rating as defined in the BRE Green Guide*
- Fire classifications A2-s1, d0 to EN 13501-1
- Installed life expectancy of at least 50 years
- Designed for rainscreen cladding systems
- Excellent weather and chemical resistance
- Durable facade material
- Resistant to impact damage
- Resistant to insects, mould growth and fungi
- No routine maintenance required
- BBA Certificate No. 06/4355

* Based on generic rating for autoclaved fibre cement single sheet (Element Ref: 80623042, 806230422, 806230447, 806230450)

EQUITONE [pictura]

EQUITONE [pictura] is coated with an additional surface treatment, providing a hard, smooth, silky matt surface. Available in a variety of shades allowing flexibility of design.

→ More

pages 58-63 EQUITONE [pictura]
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web marleyeternit.co.uk/facades

EQUITONE [textura]

EQUITONE [textura] fibre cement panels have a highly glazed and textured finish. A wide range of colours, including factory approved RAL colours, are available ensuring the right colour for your project.

→ More

pages 64-69 EQUITONE [textura]
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Other facades

→ More

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web marleyeternit.co.uk/facades

Fixing system selector – EQUITONE

	[natura]	[tectiva]	[textura]	[pictura]
Screws	✓	✓	✓	✓
Rivets	✓	✓	✓	✓
Omega & Zed	✓	✓	✓	✓
Ventispan	✓	✓	✓	✓
Ventisol	✓	✓	✓	✓
Mechanical secret fix	✓		✓	✓
Structural bonding	✓	✓**	✓	✓

** with restriction, please contact our Technical Advisory Team on Tel: 01283 722588.

→ More

pages 86-115 Fixing systems
samples Tel 01283 722588
web marleyeternit.co.uk/facades

housing

refurbishment

com

healthcare

standards

client satisfaction

new build

education

local authorities

mercial

Applications and sectors

Overcladding

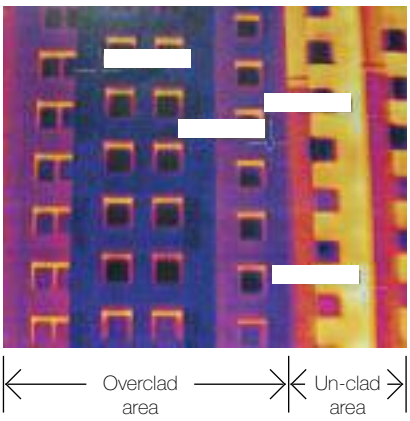
Over time, buildings can become dated and look 'tired'. Alongside this, other problems may arise, including heat loss and the need for frequent maintenance to the existing facade material. Overcladding with one of Marley Eternit's cladding ranges, as part of a rainscreen system, can be a cost-effective solution to increase both visual appeal and thermal performance.

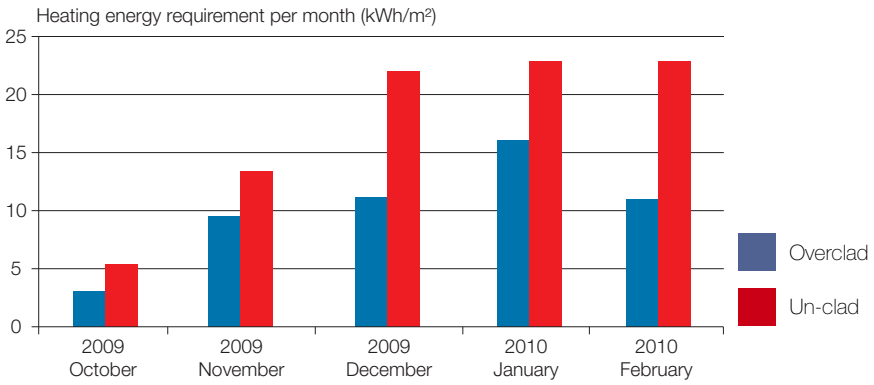
Project:	**St Bede's Catholic High School**
Location:	**Lytham St Annes**
Application:	**Education**
Product:	**EQUITONE [natura]**
Colour:	**Morning Mist, Anthracite and Natural Grey**
Specifier:	**Cassidy & Ashton**

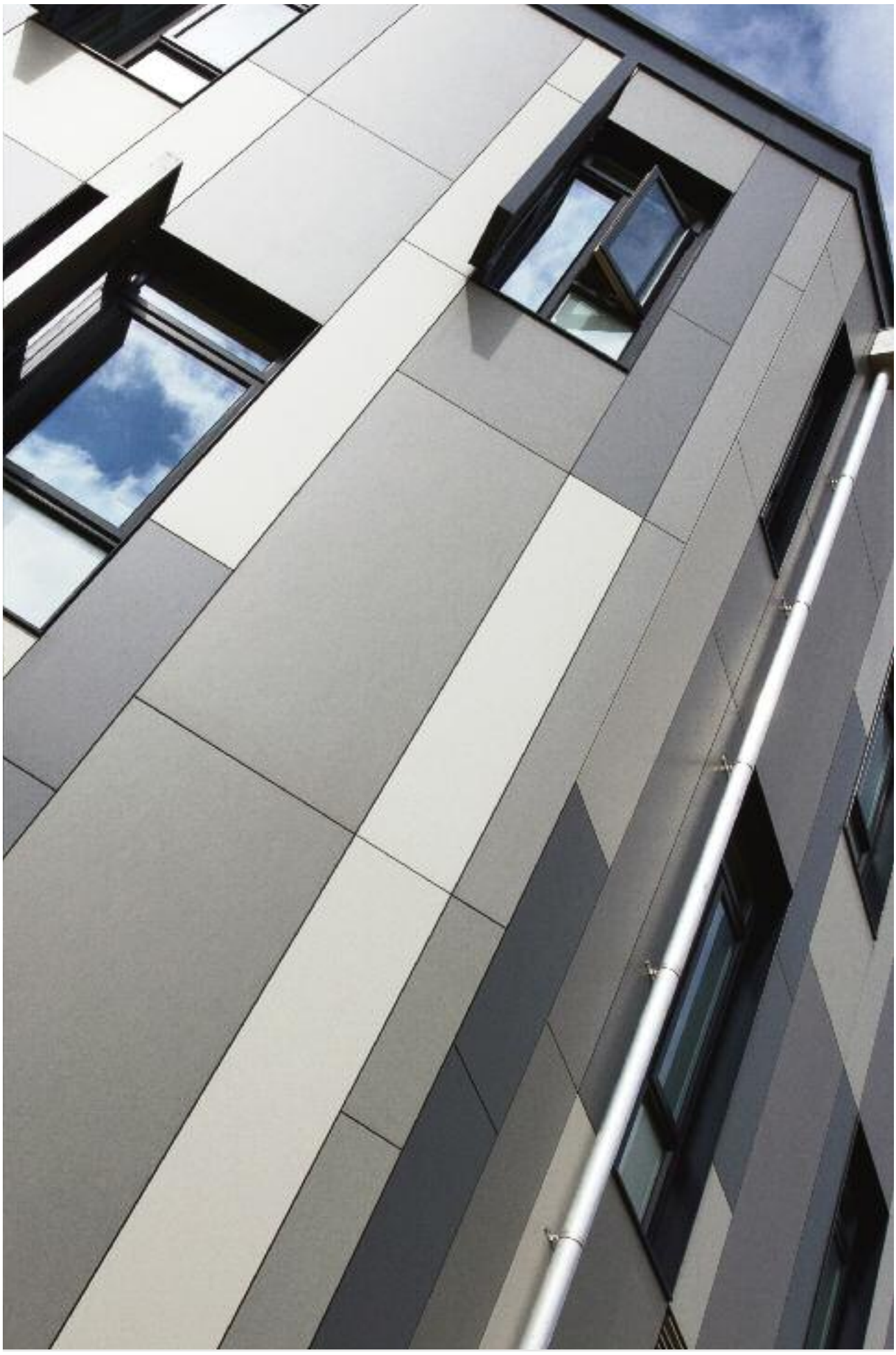
Prior to overcladding

Application:	**Residential**
Product:	**EQUITONE [textura]**
Project size:	**2200m²**

Fixing:	**Aluminium section wall bracket with thermal break element, T- and L-sections**
Insulation:	**Mineral wool**
Average energy saving:	**More than 40%**







EQUITONE [natura] , University Campus, York

Cedral Weatherboard, Hotel, Zaandam, The Netherlands

EQUITONE [tectiva] , Office Building, Casablanca, Morocco

EQUITONE [pictura], Record Bank, Dinant, Belgium

EQUITONE [natura] , Ysbyty Aneurin Bevan Hospital, Ebbw Vale

EQUITONE [natura] , Rehabilitation Centre, Luxembourg

EQUITONE [natura] , Office Building, Cardiff

EQUITONE [tectiva] , Private House, Blanden, Belgium

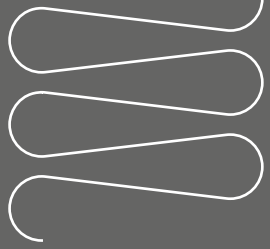
EQUITONE [natura] , Arts Complex, Goole

EQUITONE [natura] , Private House, Utrecht, The Netherlands

EQUITONE [natura] , Northern Design Centre, Gateshead

EQUITONE [textura], Weston College, Weston Super Mare

EQUITONE [textura], Art College, Manchester



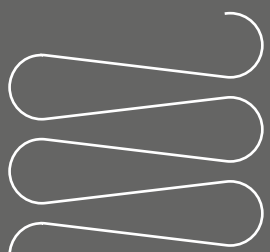
fire resistance

Approved
Document B

standards

rainscreen

aesthetics



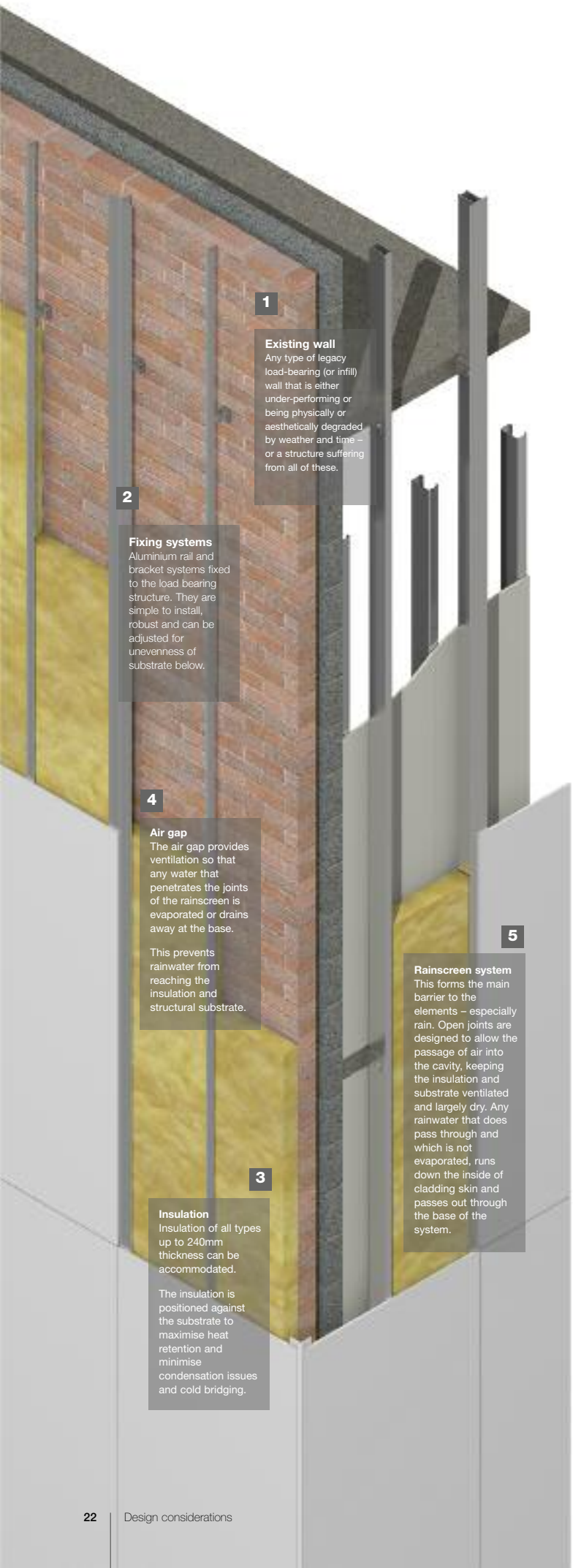
wind resistance

thermal performance

colour

Design considerations

Rainscreen
Principles and benefits



The past

The rainscreen principle is not new, nor is the idea of rainscreen applied to wall design.

For centuries in Norway, drained and back-ventilated claddings were used with both closed and open joints but without any scientific, systematic foundation.

Gradually, on buildings with timber claddings, closed joints were adopted, and openings at both the top and bottom of the cladding allowed for drainage and evaporation of any penetrating rainwater.

By the 1980's, rainscreen was understood and widely used in Canada and Europe. Architects and specifiers have been using rainscreen systems, including those from Marley Eternit, for a wide range of building types across a number of sectors.

Rainscreen

Today's rainscreen systems offer unique aesthetic and performance benefits:

- Contemporary, crisp elevations
- The ability to 'overclad' existing buildings
- Excellent levels of thermal performance (when used with insulation)
- Improved acoustics for building users
- Excellent weather resistance

A special characteristic of the rear ventilated rainscreen system is its guaranteed performance. The system's effectiveness is maintained even when unfavourable internal or external atmospheric conditions are experienced, e.g. in the textile industry, swimming pools and breweries. No other wall construction is currently able to fulfil the growing requirements for heat, moisture, noise insulation, and fire protection.

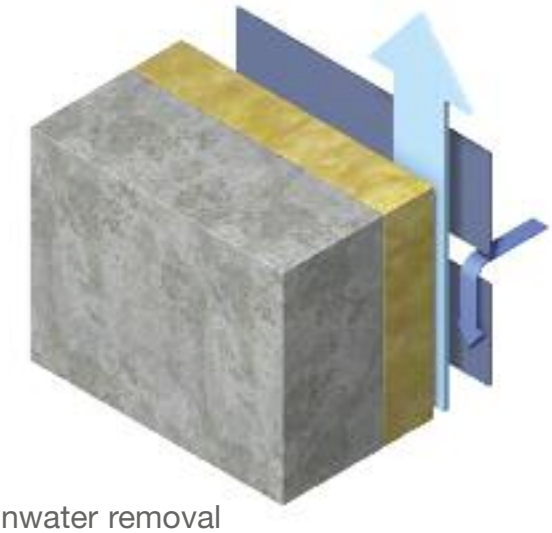
The system works by the provision of ventilation openings at the base and top of the cladding area, avoiding any interruptions, windows and other openings. These openings are protected by mesh or purpose-made closures to prevent entry by birds, vermin or insects. Inlet and outlet gaps should be provided according to the following minimum.

- Up to five storeys – 10mm continuous
- Five to fifteen storeys – 15mm continuous
- Above fifteen storeys – 20mm continuous

A clear minimum cavity of 30mm should be provided continuously behind the cladding panels. Any moisture penetrating the various joints in the main facade will then be effectively removed by the provision of uninterrupted ventilation paths the full height of the cladding.

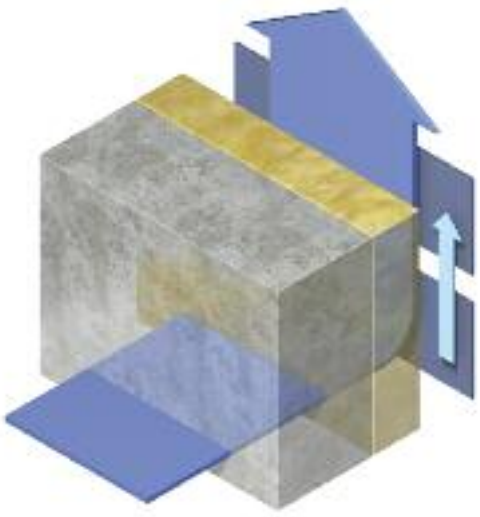
Insulation

- Insulation of up to 240mm thickness can be accommodated using a Marley Eternit framing system
- All types of insulation can be used – from rigid PUR to mineral wool
- Insulation positioned against substrate maximises heat retention and minimises condensation issues
- Externally located insulation maximises internal floor space
- Mineral wool insulation allows moisture to pass through to the cavity where passage of air evaporates it



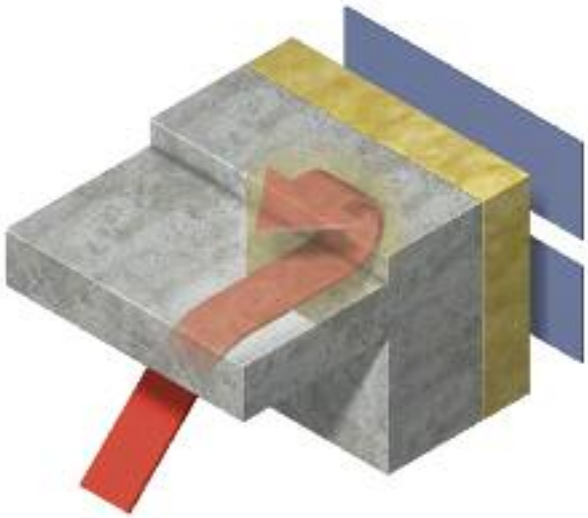
Rainwater removal

- Cladding prevents penetration of most rainwater
- Natural ventilation – stack effect – evaporates penetrating rain
- Residual rainwater drains harmlessly and evacuates at base of system
- Pressure equalised system naturally inhibits ingress of driven rain



Removal of interstitial condensation

- Thermally efficient system
- Any interstitial condensation kept to outside of structure
- Quickly removed via evaporation
- Structure maintained at even temperature
- Structure temperature kept above dew point



Minimisation of thermal bridging

- Continuous insulation envelope possible
- Insulation is external, so no thermal breaks required to accommodate internal structural elements such as floors and beams

Rainscreen and overcladding

The aesthetic, remedial and thermal solution

One of the key ways in which rainscreen can benefit existing buildings is through overcladding.

Apartment and office blocks, retail, healthcare and commercial establishments may well require both remedial and aesthetic work to make them suitable for today's environment.

On top of this, the thermal inefficiencies inherent in this legacy building stock will almost certainly need radically upgrading to meet today's exacting regulations.

Overcladding with rainscreen cladding systems achieves all three key requirements:

- Remedial
- Aesthetic
- Thermal (with insulation)

Key features for overcladding

- Restoration of existing facade
- Extending the life of the building
- Improving appearance and image
- Provide thermal insulation and weather-tightness
- Improve acoustical performance of the building
- Lower maintenance cost
- All weather fix solution

Other benefits

Minimising disturbance

Overcladding is carried out entirely from the outside, so there is usually minimal disruption.

Balconies

Balconies and walkways can be fully enclosed to create buffer zones. If external wall insulation is not considered then enclosing the balconies will also reduce the effect of the thermal bridges associated with them.

Vandalism

Those external wall surfaces prone to vandalism and graffiti – for instance, at ground floor level – can be clad with more suitable material or one such as EQUITONE [natura] incorporating the UV Pro coating offering good protection against graffiti and subsequent removal.

Maintenance

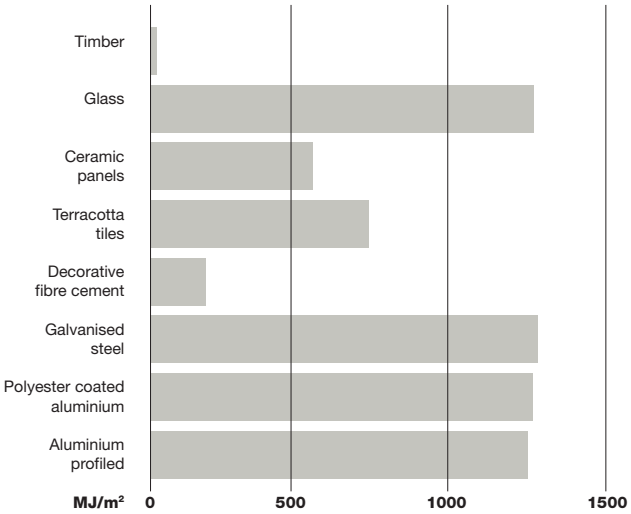
As a non-loadbearing extra 'skin', fixed to the substrate, maintenance or replacement of panels is straight-forward and non-invasive, as is access to the loadbearing structure i.e., columns, beams and slabs.

Building life

Whilst overcladding will not reinstate structural integrity of a building, it will, if designed and installed correctly, extend its life by improving weather resistance.

Embodied energy for facade materials

The table below shows embodied energy for various facade materials. Lower embodied energy will allow the designer to achieve a higher BREEAM rating.



Data from www.sustainingtowers.org/WALLSa.htm

Rainscreen and wall insulation

EQUITONE [natura] , St Bede's Catholic High School, Lytham St Annes

EQUITONE [natura] , Atkinson's Store, Sheffield

Providing thermal insulation for walls

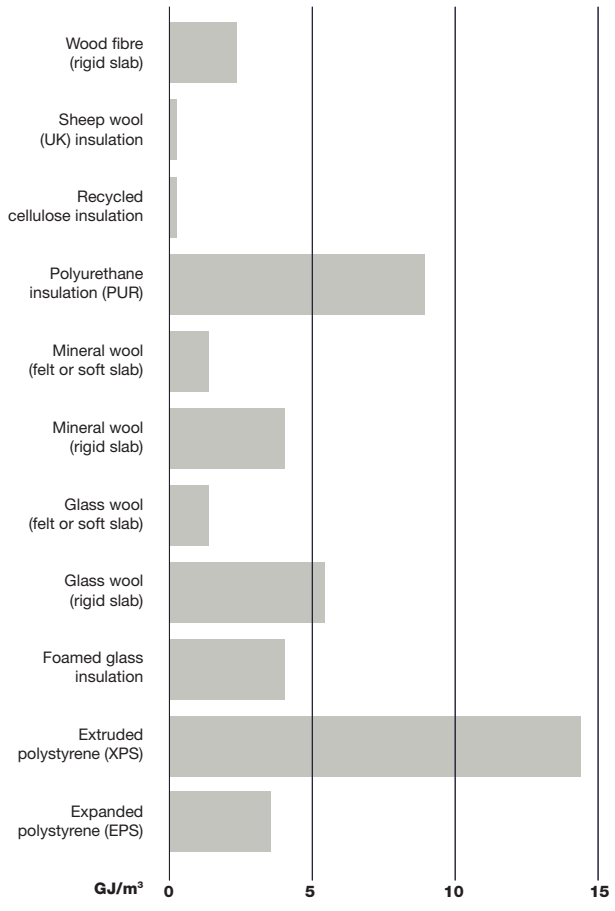
Rainscreen is a relatively high-benefit, low-cost method of providing thermal insulation to external walls for both refurb (overclad) and new projects. It can also help minimise cold-bridging.

Adding insulation to the external surface of the loadbearing structure has three key benefits:

- Increased thermal efficiency – dependent on the fixing system used. Up to 240mm of insulation can be added using a Marley Eternit framing system
- No loss of internal space - insulation added to wall cavities or inner leaf inevitably consumes internal habitable space
- Light weight and easy to fix – insulation can be rapidly and easily fixed to the exterior substrate and adds very little loading to the rainscreen support system

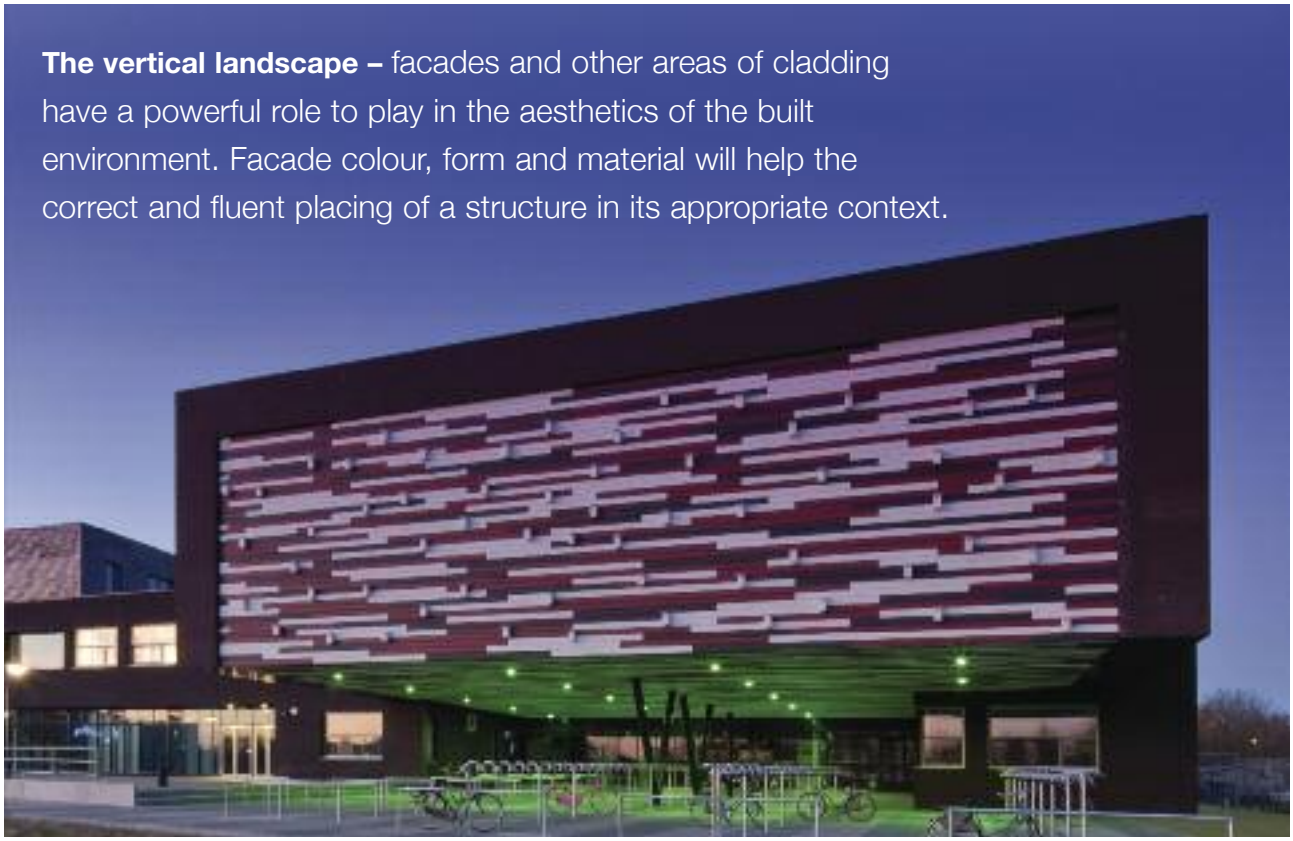
Embodied energy for insulation

The table below shows embodied energy for various insulation products. Lower embodied energy will allow the designer to achieve a higher BREEAM rating.



Data from www.sustainingtowers.org/WALLSa.htm

Aesthetics and colour



The vertical landscape – facades and other areas of cladding have a powerful role to play in the aesthetics of the built environment. Facade colour, form and material will help the correct and fluent placing of a structure in its appropriate context.

Marley Eternit facades offer an extensive and dramatic palette of colour and texture from which the designer can create buildings that are both striking and sympathetic to the built environment.

Cladding in context

Texture, colour, module size, jointing width and fixing method all have their contribution to make to the aesthetic impact of a building envelope or facade.

Subtle changes in any of the above can have dramatic effects across the whole building and combinations of these factors can become a powerful way of 'contextualising' structures – making them harmonious with or deliberately distinct from both large and small scale environments.

Alternatively, it may be important to find regional solutions that respect individual locations, by selecting colours to match the tones of the predominant local materials.

Detail

Colour, shade or texture can be used to pick out detail, emphasise features or to break up monolithic elevations.

Contrast and surprise

Colour and panel shape – as here, tonal gradation and strong vertical lines – can be used to create drama and inject colour to the urban environment.

Context

Here, a facade material and colour has been chosen to create a complete and contiguous building envelope for an individual residence. The panel module size too, has been selected to be in keeping with the building's overall scale.

Panel fixings

The fixing method chosen can have a fundamental and dramatic effect upon the final appearance of the clad building.

Employing a secret fix method, for example, will result in a sheer, smooth facade unobstructed by fixings.

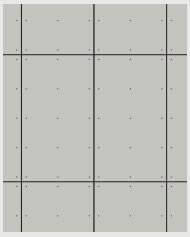
An edge retention system, on the other hand, focuses the eye upon the panel joints and will give the facade a geometric feel, especially when a contrasting colour is chosen for the edge framing members.

The 'visible fixing' systems – screw and rivet fixing – may be seen as providing an appearance somewhere between secret fix and edge retention. The smooth facade of the cladding will be punctuated by the heads of the rivets or screws, although, in practice, these low profile fixings are virtually unnoticeable.

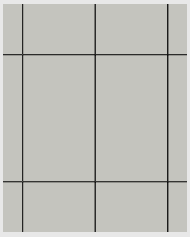
Additionally, fixing methods can be combined to create interesting design detail.

For example, a minimal amount of mechanical fixing can be combined with structural adhesive bonding.

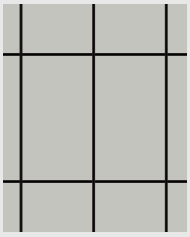
The illustrations below show a diagrammatic view of the generic differences in appearance between some typical fixing systems. Please contact our Technical Advisory Service for further information.



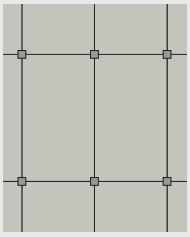
Visible fixing screw or rivet



Secret fix



Edge retention



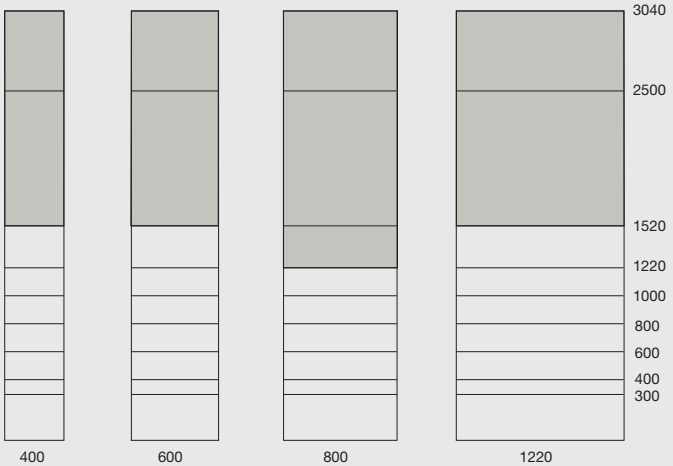
Adhesive fix with square boss at each corner

Economic module sizes

Marley Eternit high performance fibre cement panels can be made to any module and offer the architect and designer wide design freedom. Economics, however, play a significant part in the selection of claddings and should be considered. When designing, the following information is aimed at providing the specifier with guidance on the most economic material usage from standard sheets.

Sizes greater than half the maximum manufacturing lengths become progressively less economical in ratio to the distance downwards from full length to half length as indicated on the charts. The cost involved in factory cutting of high performance facade materials to exact sizes is small in relation to the overall installed cost of facade systems and it may be prudent in some cases to have two small economic panels rather than one large uneconomical panel.

For example an 800mm deep fascia would be more economically clad using 1200mm panel lengths rather than longer panels. The joints in these cases can either be made a feature of or hidden.



The shaded areas indicate the most uneconomic modules cut from a standard sheet (based on 1220 x 3040 sheet).

Recommended design procedure

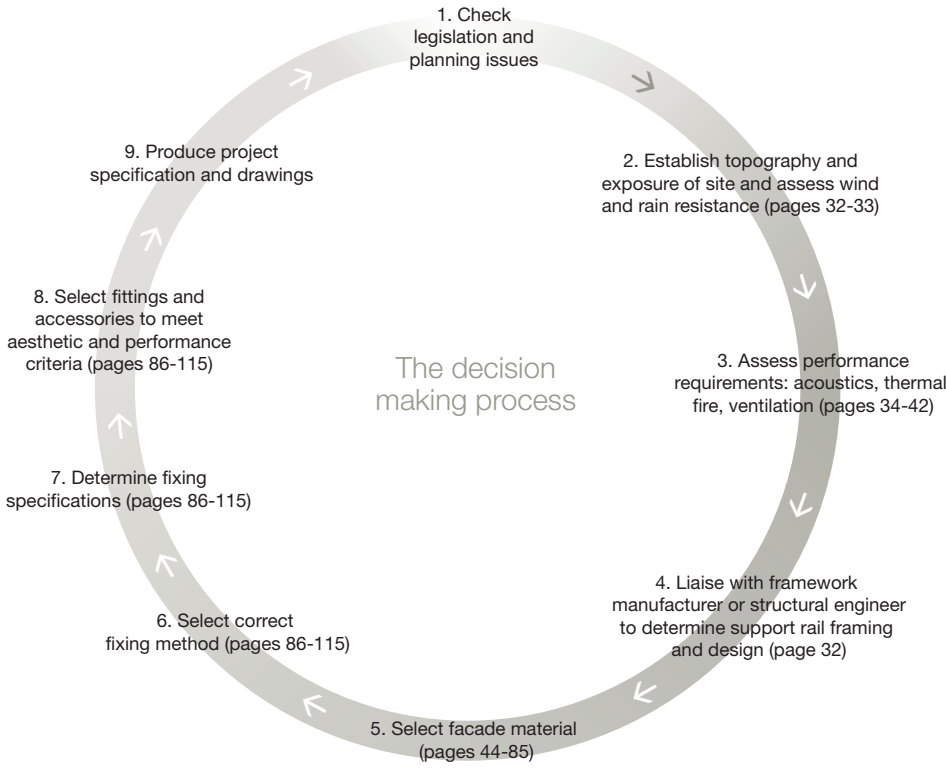
EQUITONE [natura], Brunel University, Uxbridge

Designers are advised to consider the following steps when commencing a design incorporating Marley Eternit products.

Reference should also be made to BS 8200 'Code of Practice for the design of non-loadbearing external vertical enclosures of buildings', also BS 6093 - 'Code of Practice for the design of joints and jointing in building construction', and to BS 8000: Part 6: 'Workmanship on Building Sites: Code of Practice for slating and tiling of roofs and claddings'.

(The following information is provided for guidance only. Designers should ensure that they make all the necessary calculations and take into account all aspects of the specific project design and location.)

Further information can also be found in: CWCT Standard for systemised building envelopes, and NHBC Standards 2011.



Building Information Modelling (BIM)

Marley Eternit offer a range of BIM resources for specifiers which ultimately allow the generation of 'As-built' designs and specification

→ More

page 128

www marleyeternit.co.uk/Resources/BIM

Step 1: Legislation and planning

Guidance on legislation is given on pages 30-31. Planning permission may be necessary in certain areas and is dependent on Local Authority policy and control.

Step 2: Exposure, wind and rain

Establish the exposure zone of the site by reference to the map on page 33. This divides the UK into 2 categories of exposure to driving rain and is based on rain penetration data from BS 8104, 'Code of practice for assessing exposure of walls to wind-driven rain' and BRE Report 262 'Thermal insulation: avoiding risks'. The map applies to buildings of up to 12 metres in height at the ridge.

Calculate the wind suction loading in accordance with BS 6399: Part 2, 'Code of practice for wind loads'.

Step 3: Assess performance against regulatory requirements

Rainscreen performance criteria will vary according to design, building function etc., Further guidance is shown on the following pages: 'Fire', pages 35-37, 'Condensation and ventilation', page 34, 'Acoustics', page 34 and 'Thermal', pages 38-42.

Step 4: Framework and support rail

Determine design of cladding and configuration of support rails with structural engineer and framework manufacturer.

Ensure that the structure is adequate for the total weight of the cladding as installed, and for the calculated wind loading and any other relevant loading criteria (see pages 32-33). Weights of panels are shown on the appropriate product pages.

Step 5: Facade selection

The choice of facade material is a combination of planning, aesthetic and performance criteria. The key factors are shape, size, colour, texture, material and sustainability, see pages 44-85.

Step 6: Fixing Method

Select a fixing method in accordance with the aesthetic and performance criteria.
The panels may use visible screws or rivets, or be secretly fixed. Edge retention systems or a combination of methods can be used to create distinctive design detail, see pages 86-115.

Step 7: Fixing specifications

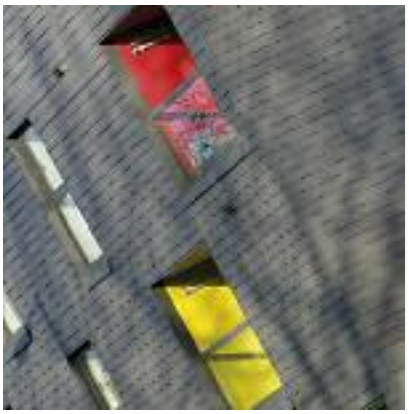
A full fixing specification should be obtained from the Technical Advisory Service, or by visiting www.marleyeternit.co.uk.

Step 8: Fittings & accessories

Check that any fittings or accessories specified are suitable for the design and its associated performance requirements by referring to the fixing systems pages 86-115.

Step 9: Produce project specific specifications and drawings

EQUITONE [natura] , used inside European commercial building



EQUITONE [natura] , New North Road, Islington

→ More

advice E-mail info@marleyeternit.co.uk
Tel 01283 722588

Further information on cladding with respect to colour, shape, size, weights, is on the following pages:

Legislation, guidance and reference

Before contemplating a project incorporating a rainscreen system, the designer and contractor must be aware of the current legislation, the design requirements and standards that govern and influence the style, parameters, performance, products and construction of the project. The following section summarises many of the relevant documents, but is by no means exhaustive.

Structure

England and Wales:
Part A 'Structure'

Scotland:
Technical handbook, Section 1 'Structure'

Northern Ireland:
Part D 'Structure'

Fire

England and Wales:
Part B 'Fire Safety'

Scotland:
Technical handbook, Section 2 'Fire'

Northern Ireland:
Part E 'Fire Safety'

Moisture

England and Wales:
Part C 'Site Preparation and Resistance to Moisture'

Scotland:
Technical handbook, Section 3 'Environment'

Northern Ireland:
Part C 'Site Preparation and Resistance to Moisture'

Sound

England and Wales:
Part E 'Resistance to the passage of sound'

Scotland:
Technical handbook, Section 5 'Noise'

Northern Ireland:
Part G 'Sound insulation of dwellings'

Ventilation

England and Wales:
Part F1 'Means of Ventilation'

Scotland:
Technical handbook, Section 3 'Environment'

Thermal

England and Wales:
Part L 'Conservation of fuel and power'

Scotland:
Technical handbook, Section 6 'Energy'

Northern Ireland:
Part F 'Conservation of fuel and power'

Scottish Technical Handbooks

The sections referred to above are contained in the two Scottish technical handbooks, one covering domestic construction, the other non-domestic.

Building Regulations

These are mandatory regulations and, in England and Wales, are generated and approved by the Department for Communities and Local Government (DCLG).

In Scotland they are generated and approved by the Scottish Executive and in Northern Ireland, by The Office Estates and Building Standards Division (OBD).

They must be complied with for all new-build and a great deal of refurbishment work. They consist of the Building Regulations 2010 and The Building (Approved Inspectors etc.) Regulations 2010, The Building (Scotland) Amendment Regulations 2011, and the Building (Amendment) Regulations (Northern Ireland) 2010.

Compliance with these regulations is the responsibility of the building designer, who may be the owner of the building, his appointed architect, a structural engineer appointed by the owner or his architect or, in the case of small buildings, the actual builder.

The increasing complexity of construction and the codes that govern design has led many building designers to request the specialist services of a cladding or building envelope designer.

The Approved Documents of the Building Regulations (England and Wales), the Technical Handbooks (domestic and non-domestic) (Scotland) and the Technical booklets (Northern Ireland) provide practical guidance for some of the common building situations in respect of the requirements for materials and workmanship.

Copies of the Approved Documents that accompany the Building Regulations 2010 (as amended) for England and Wales can be downloaded from the Department for Communities and Local Government (DCLG) web site (www.communities.gov.uk) or obtained from RIBA Bookshops, 15 Bonhill Street, London EC2P 2EA. (Tel 020 7256 7222, Fax 020 7374 2737).

Copies of the complete set of Handbooks that accompany the Building (Scotland) Regulations 2004 for Scotland can be downloaded from the SBSA web site (www.sbsa.gov.uk). Follow the links to 'Archive', 'Standards and Guidance' then 'Technical Standards'. They can also be obtained on a CD-Rom from the Scottish Building Standards Agency (SBSA), Denholm House, Almondvale Business Park, Livingston, EH54 6GA (Tel 01506 600400, Fax 01506 600401.

Copies of the Northern Ireland Technical Handbook can be downloaded from www.buildingcontrol-ni.com/site

British Standards

A British Standard is a published document that contains a technical specification or other precise criteria designed to be used consistently as a rule, guideline, or definition. They are a summary of best practice and are created by bringing together the experience and expertise of all interested parties – the producers, sellers, buyers, users and regulators of a particular material, product, process or service.

Standards are designed for voluntary use and do not impose any regulations. However, laws and regulations may refer to certain standards and make compliance with them compulsory.

The principal British Standards relevant to this document are:

BS 5534 Gives recommendations for the design, materials, application, installation and performance of slates, tiles, shingles and shakes. It also covers their associated fittings and accessories for use in the construction of pitched roofs and vertical cladding applications. (BS 5534 should be read in conjunction with BS 8000-6)

BS 5588 Fire precaution in the design, construction and use of buildings.

BS 6093: 2006 Design of joints and jointing in building construction.

BS 8200: 1985 Code of Practice for design of non-loadbearing external vertical enclosures of buildings.

BS 476-6: 1989 Fire tests on building materials and structures – Method of Test for fire propagation for products.

BS476-7: 1997 Fire tests on building materials and structures – Method of test to determine the classification of the surface spread of flame of products.

BS EN 12467: 2004 fibre cement flat sheets, product specification and test methods. Provides information on the technical requirements.

BS EN 13501-1: 2002 fire classification of construction products and building elements – Classification using test data from reaction to fire tests.

BS 8000-6: 'Workmanship on building sites. Code of practice for slating and tiling of roofs and claddings'. Applies to the laying and fixing of claddings and their associated fixings and accessories. Common Arrangement of Work Section (CAWS) classifications H60, H61 and H65.

BS 5250: 'Control of Condensation in Buildings' Describes the causes and effects of surface and interstitial condensation in buildings and gives recommendations for their control.

Health and safety

To ensure safe working practices during construction, the designer should consider relevant safety regulations. These include the Construction (Design and Management) Regulations and the Health and Safety Executive's approved code of practice for management of health and safety at work.

Certain advisory bodies such as the National House Building Council (NHBC), Loss Prevention Council (LPC), Building Research Establishment Ltd (BRE) and Timber Research and Development Association (TRADA) also produce recommendations and guidance on construction which should be considered.

→ More

pages 118-119 'Health, safety and sitework guidance'
129 'References'

Wind resistance

Wind forces on buildings

Each year, as many as 200.000 buildings in the UK may be damaged by gales. Wind blowing at 90° to a building is slowed down when it hits the surface of the building, with a consequent build-up of pressure. At the same time, it is deflected around the end walls and over the roof, creating areas of negative pressure or suction. The stronger the wind, the greater the suction.

The force of the wind acting on the windward face of a building creates a positive pressure, although, even here, there are areas where suction develops. Leeward faces are always subject to suction.

Design for wind loading

The standard method in BS 6399-2 'Loading for buildings – Code of practice for wind loads' should be used to determine the basic wind speed of the site, which is then used to calculate the effective wind speed and dynamic wind pressure on the envelope, by applying a series of factors to account for terrain, topography, building height and length etc.

Wind loading

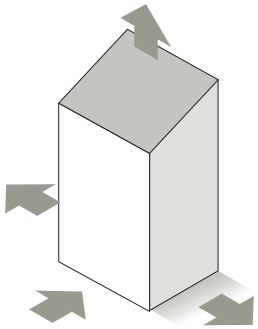
Calculate the dynamic pressures of the wind (including the appropriate pressure coefficients for the building) in accordance with BS 6399-2 wind loading or EN 1991-1-4.

The spacing of the profiles and brackets is determined by calculation once the wind forces on the structure have been determined. The Ventisol system has been wind tested by the Building Research Establishment (BRE) and is classified as permeable when applied to nominally impermeable walls. In this situation, a large proportion of the external wind pressure is able to leak through the cladding to act directly on the building wall, relieving the loads on the cladding. The provisions of all current codes of practice, including that for the UK are intended to give design loadings for typical impermeable buildings and do not provide data in the required form to enable the loading on permeable overcladdings to be assessed.

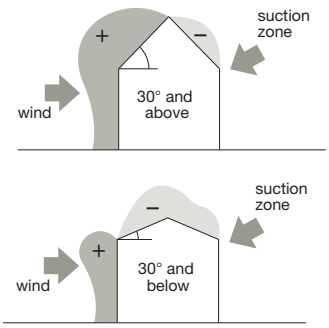
The response of the Ventisol overcladding system to wind loading has been determined by direct measurements. A system performance specification has been defined with which the actual performance is shown to comply.

Using this system performance, a computer based numerical model of the behaviour of the system when installed on a building has been developed and run for a number of typical installations. It is concluded that the maximum nett suction on the standard system without fire-stops can be taken as one-half of the design external wind pressure.

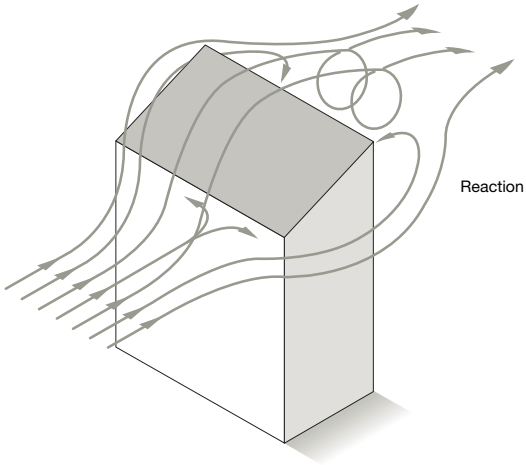
* Note: BS 6399-2 was superseded by Eurocode EN 1991-1-4 in 2010. Please also refer to note on Eurocodes on page 33



Directions of pressures generated by wind force



Pressure distribution in relation to roof pitch



Reaction of wind flow to obstruction

→ More

advice E-mail info@marleyeternit.co.uk
Tel 01283 722588

web marleyeternit.co.uk/facades

Choice and type of anchor

Consideration must be given to:

a) the strength and state of the existing structure.

b) the capability of the chosen anchor to accept the live and dead loads imposed, and an adequate safety factor.

Aircraft vortices

Facades near airports can experience high local wind load forces due to air vortices created by certain aircraft when taking off and landing, which may be greater than the calculated wind loads to BS 5534. Designers should seek advice from the Airport Authority Planning Department when designing in these locations.

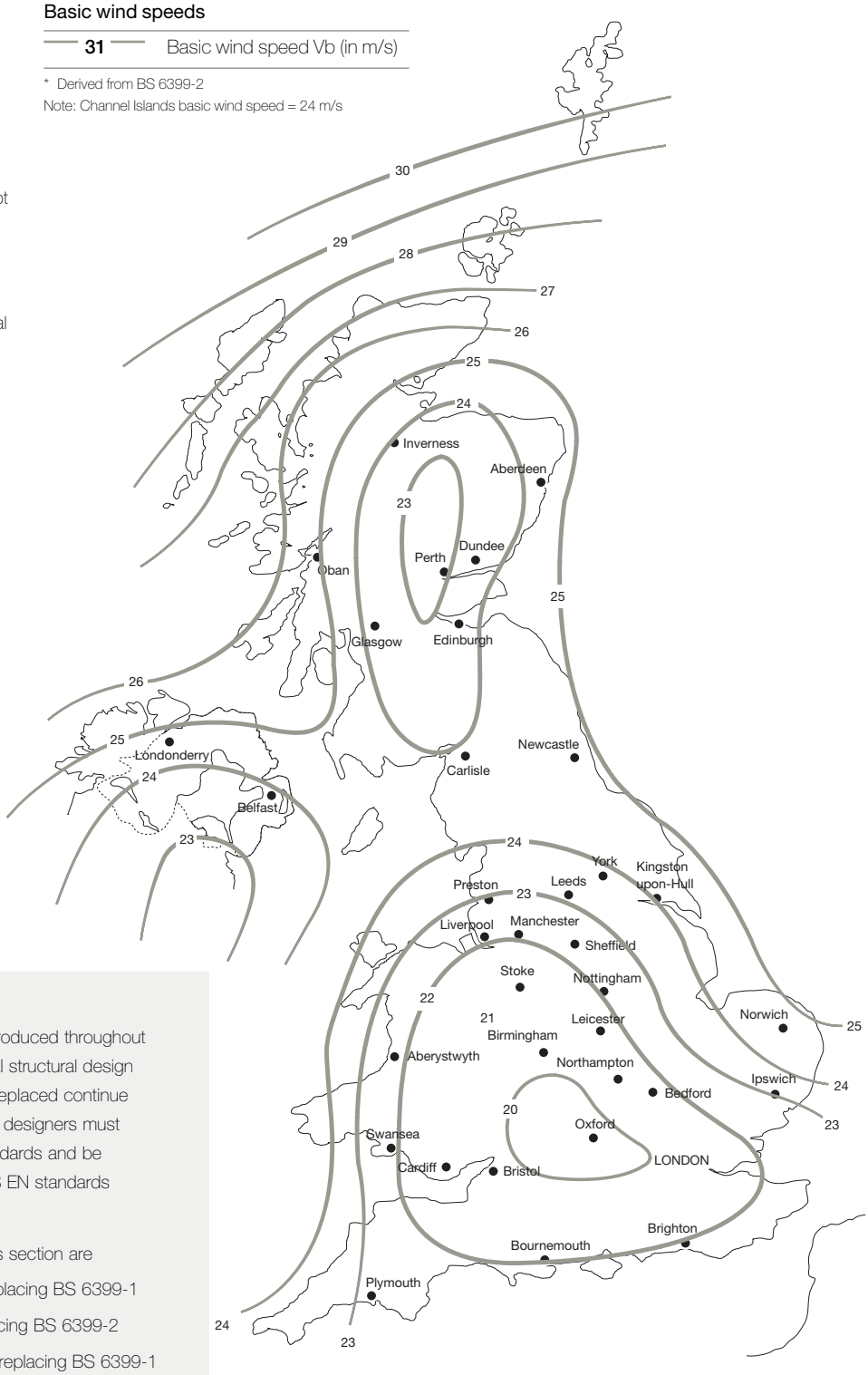
Basic wind speed*

Basic wind speeds

31 Basic wind speed Vb (in m/s)

* Derived from BS 6399-2

Note: Channel Islands basic wind speed = 24 m/s



Eurocodes

A set of structural BS EN Eurocodes was introduced throughout Europe in 2010 to replace conflicting national structural design standards. The British Standards they have replaced continue to have 'deemed-to-satisfy' status. However, designers must consider the appropriate use of relevant standards and be aware of the risk of inappropriately mixing BS EN standards and withdrawn BS design standards.

The BS EN standards that are relevant to this section are

BS EN 1991-1-1:2002 'General Actions', replacing BS 6399-1

BS EN 1991-1-4:2005 'Wind Actions', replacing BS 6399-2

BS EN 1991-1-7:2006 'Accidental Actions', replacing BS 6399-1

Acoustics, condensation, ventilation and fire safety

Acoustics

Building Regulations

The relevant document governing acoustic design, especially for dwellings, is Building Regulations Approved Document E 'Resistance to the passage of sound' within which, the relevant sections are:

E1: Protection of sound from other parts of the building and adjoining buildings.

E2: Protection against sound within a dwelling house.

Other documentation, such as (HTM) Health and Technical Memoranda 56 and 2045 for hospitals and Building Bulletin (BB) 87 and 93 for schools, offers guidance on meeting Building Regulations for specific building types. BS 5821 detailing the 'methods for rating the sound insulation in buildings and of building elements', is also relevant.

Resistance to the passage of sound

Approved Document E deals with the resistance of both airborne and impact sound generated within buildings, and requires that dwellings, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings. Separate requirements apply to schools, where each room or space in the building shall be designed so that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use.

Further information can be obtained by reference to BS 8233 'Sound insulation and noise reduction in buildings' and BS EN ISO 717-1 'Acoustics – Rating of sound insulation in buildings and of building elements. Part 1 Airborne sound insulation', and BS EN ISO 717-2 'Acoustics – Rating of sound insulation in buildings and of building elements. Part 1 'Impact sound insulation'.

Condensation and ventilation

Building Regulations

Approved Document C 'Site preparation and resistance to moisture' contains information relating to the control of and resistance to condensation in buildings.

Approved Document Part F1 'Means of ventilation'.

Contains information on the provision of natural and mechanical ventilation for buildings. This is with specific reference to the reduction and removal of condensation.

Control of condensation

Condensation has become more of a problem with the increase in highly insulated buildings. Moreover, changes in lifestyle have led to higher levels of water vapour in modern buildings. This water vapour naturally ascends to the roof space, where it condenses on contact with cooler surfaces. Further condensation is likely to be caused by climatic conditions, and may eventually result in timber rot, metal corrosion and damage to insulation and fittings.

BS 5250 states that the designer should take account of the following moisture sources in buildings:

- water incorporated during the construction process (including precipitation);
- precipitation after construction;
- water vapour arising from the occupants and their activities;
- temporary condensation occurring when cold weather conditions are followed by warm, humid weather.

Rainscreen

Rainscreen cladding systems, with insulation applied to the outside of the building and a rear ventilated cavity are an excellent way of minimising internal moisture. The condensation sometimes associated with internal insulation simply does not occur. The moisture that penetrates the rainscreen is quickly evaporated by ventilation passing up through the system.

No other wall construction is currently able to fulfil the growing requirements for heat, moisture, noise insulation and fire protection.

Fire safety

All Marley Eternit fibre cement boards have been tested to EN 13501-1:2002 and have achieved Class A2-s1, d0.

The boards do not significantly contribute to fire load or fire growth, have the lowest category for smoke production, do not produce flaming droplets or particles and can provide up to 120 minutes fire resistance.

This makes them excellent candidates for specification in a wide range of fire-resisting applications.

Building Regulations

The relevant document is Approved Document B, 'Fire Safety.'

Key to external wall surface classification

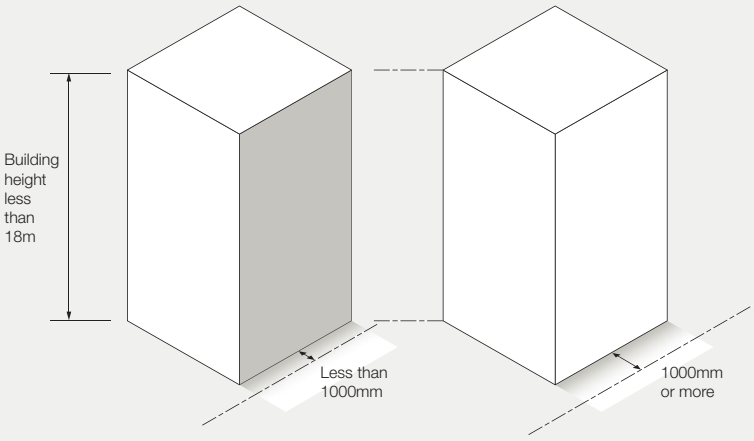
Relevant boundary

No provision in respect of the boundaries indicated

Class 0 (National Class) or class B-s3, d2 or better (European class)

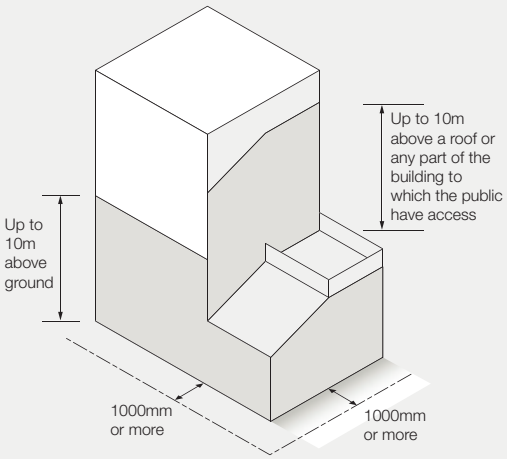
Index (I) not more than 20 (National class) or class C-s3 d2 or better (European class). Timber cladding at least 9mm thick is also acceptable. (The index I relates to tests specified in BS 476: Part 6).

B4 – Provisions for external surfaces of walls

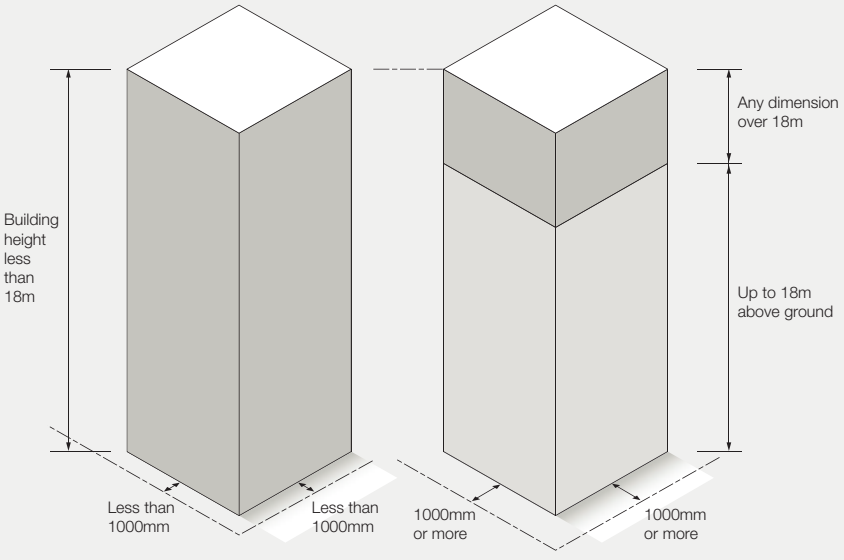


A. Any building

B. Any building other than C.



C. Assembly or recreation building of more than one storey



D. Any building

E. Any building

Notes:
The National classifications do not automatically equate with the equivalent European classifications, therefore products cannot typically assume a European class unless they have been tested accordingly.

When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

Scottish Regulations

'A2' classified materials are classified as non-combustible. Marley Eternit fibre cement cladding products are all A2-s1, d0.

Fire safety (continued)

Minimum periods of fire resistance

The table below, reproduced from Approved Document B of the Building Regulations, sets out the 'specific provisions of test for fire resistance of elements of structure etc'. The details on the following pages show how these provisions may be achieved using Marley Eternit facades.

Extract from Table A1 of Approved Document B

Part of building	Minimum provisions when tested to the relevant part of BS 476 [1] (minutes)			Minimum provisions when tested to the relevant European standard (minutes)[3]	Method of exposure
	Loadbearing	Integrity	Insulation		
5. External walls					
a. Any part less than 1000mm from any point on the relevant boundary	see table below	see table below	see table below	REI see table below	Each side separately
b. Any part 1000mm or more from any point on the relevant boundary[2]	see table	see table	15	REI see table below and REI 15	From inside the building
c. Any part adjacent to an external escape route	30	30	no provision	RE 30	From inside the building

Notes (only relevant notes from Approved document B are shown):

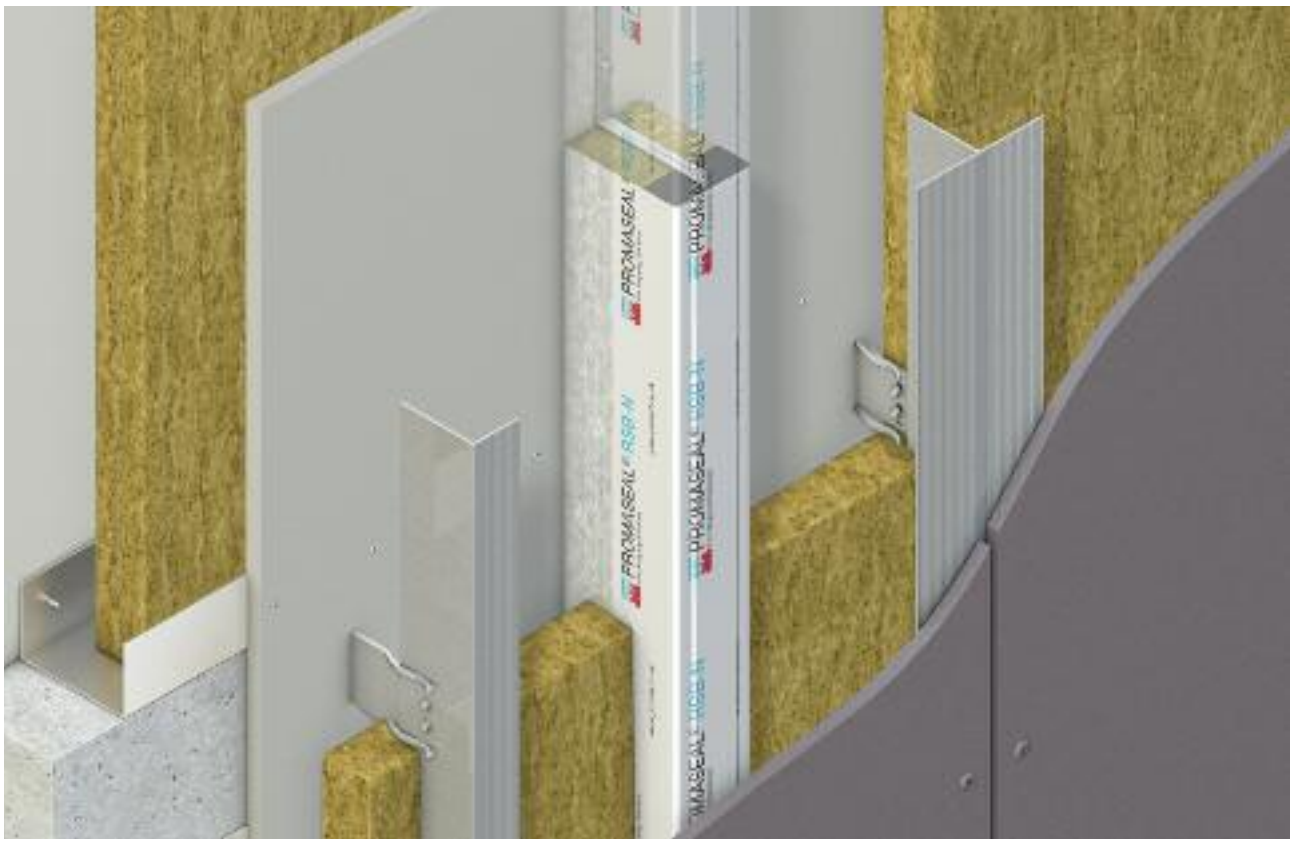
1. Part 21 for loadbearing elements, Part 22 for non-loadbearing elements, Part 23 for fire-protecting suspended ceilings and Part 24 for ventilation ducts. BS 476-8 results are acceptable for items tested or assessed before 1 January 1988.
2. The guidance in Section 9 allows such walls to contain areas which need not be fire-resisting (unprotected areas).
3. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly. 'R' is the European classification of the resistance to fire performance in respect of loadbearing capacity; 'E' is the European classification of the resistance to fire performance in respect of integrity; and 'I' is the European classification of the resistance to fire performance in respect of insulation.

Extract from Table A2 of Approved Document B

Minimum periods (minutes) for elements of structure in a:		
Basement storey[4] including floor over	Ground or upper storey height (m) of top floor above ground	
	Not more than 5	More than 5
30[5]	30[5]	60[6]

Notes: modifications referred to in Table A2:

4. The floor over a basement (or if there is more than one basement, the floor over the topmost basement) should meet the provisions for the ground and upper storeys if that period is higher.
5. Increased to a minimum of 60 minutes for compartment walls separating buildings.
6. 30 minutes in the case of three storey dwelling houses, increased to 60 minutes minimum for compartment walls separating buildings.
7. Refer to Table A1 (above) for the specific provisions of test.



Promat

Compartmentation in facades

For both vertical and horizontal compartmentation Promat UK offer a range a Rainscreen Barrier solutions. The products simply fit within the Rainscreen cavity and helps protect against the spread of fire. For further details please contact Promat UK on 01344 381300 or e-mail rainscreenrsb@promat.co.uk.

Thermal insulation

Building Regulations

The relevant documents are Approved Document L1A 'Conservation of fuel and power in new dwellings'; L1B 'Conservation of fuel and power in existing dwellings' ; L2A 'Conservation of fuel and power in new buildings other than dwellings' and L2B 'Conservation of fuel and power in existing buildings other than dwellings' for England and Wales and Section 6 'Energy' (domestic and non-domestic) for Scotland (see separate leaflet).

The Building Regulations prescribe high standards of building fabric insulation for floors, walls and roofs as well as space heating, lighting, and hot water controls so as to limit the heat loss from the building .

The Part L Approved Documents have been regularly amended over the past ten years to reflect improvements in terms of the energy efficiency of buildings, which are responsible for around 40% of all CO_2 emissions generated.

The 2002 revision of Part L reduced the permitted carbon dioxide emissions by 25% over the 1990 levels and the 2006 revision reduced the levels further by an average of 20% for new dwellings and up to 28% for non-dwellings. This generated an overall improvement in excess of 40% over the 1990 levels. The latest revision which came into effect on 1st October 2010 introduces a further 25% reduction on the annual CO_2 emission rate relative to the 2006 standards.

Compliance

The new requirements of the Regulations are designed to reduce carbon emissions from new buildings and to improve the performance of existing buildings where new work is carried out.

Parts L1A, L1B, L2A and L2B have a single method of compliance. This is expressed in CO_2 emissions in kg/m^2/year and is calculated by the SAP (Standard Assessment Procedure) 2009 method for dwellings and the iSBEM model for non-dwellings or all buildings over 450m^2. This involves a series of calculations based on heat loss of elemental areas, volumes of spaces to be heated, heating systems, solar gain etc., for which computer software models are available.

In terms of the external walls and claddings, designers will no longer be able to specify "walls to comply with Part L" on drawings or in specifications. Products can no longer be labelled 'Part L compliant', as not one element or product can meet Part L without consideration for all other elements in the construction and energy use of the building.

The design process is now more complicated as a number of assumptions have to be made at the design stage when inputting into the SAP or iSBEM calculations before the specification can be finalised, to see if the building will be compliant with Part L compared to a notional building.

The main variables to consider are:-

- External envelope U-values for walls, roofs and floors
- Thermal bridging details
- Ventilation strategy for ensuring fresh air
- Airtightness
- Solar gain

The following sections briefly summarise the content of the four parts of Part L –

Part L1A - 'New dwellings'

There are five criteria where compliance must be demonstrated for all new dwellings:

1 The predicted CO_2 emission (DER) from the proposed dwelling must not exceed the target emission (TER) (based on the notional dwelling*).

*The notional building model has a party wall heat loss of zero, which means that the targeted improvement of 25% is in addition to any heat loss through the party wall.

2 The thermal performance of the building fabric and performance of fixed building services should not be worse than the design limits set out in L1A.

3 The dwelling must have appropriate passive control measures to limit solar gains to reduce or eliminate the need for mechanical cooling.

4 The performance of the 'as built' dwelling should be consistent with the DER and meet the TER.

5 Information must be provided for the energy-efficient operation of the fixed services in the dwelling.

The target CO_2 Emission Rate (TER) for dwellings is calculated using SAP (Standard Assessment Procedure) 2009 for a 'notional' dwelling of the same size and shape as the 'actual' dwelling (based on set construction rules). The emission rate for the notional dwelling is calculated using a fixed set of values for the fabric heat loss, building services and type of fuel. The TER rate is equivalent to a gas heated dwelling insulated to 2002 standards.

Part L1B – 'Existing dwellings'

This includes most extensions, material changes of use, material alterations, provision of controlled fittings and services and provision or renovation of a thermal element. The recommended maximum U-values for an extension may be varied on condition that it is no worse overall than a similar extension built to the standards and that the defined maximum U-values are not exceeded.

SAP 2009 can be used to demonstrate that CO_2 emissions from a dwelling plus an extension taken together are no worse than that of the dwelling complying with regulations plus a separate extension complying with regulations. This process may involve improvements to the existing thermal elements, such as walls, roofs and floors, which must comply with Part L1B standards.

Where more than 25% of the surface area of a thermal element is renovated, the thermal performance of the whole element should be improved to achieve either the standard for replacement thermal elements or as a minimum, the standard that is practicable and cost effective within a simple payback of 15 years.

Part L2A - 'New non-dwellings'

There are 5 key criteria for compliance:

1 CO_2 emissions must be less than target value (TER). A notional building is used for calculating the TER referred to as the 'aggregate 25% approach'. A design-stage TER/BER calculation is also required as a means of helping to improve compliance.

2 The thermal performance of building fabric and services (heating, hot water and fixed lighting) should achieve reasonable overall standards of energy efficiency.

3 The building must have appropriate passive control measures to limit solar gains.

4 The performance of the building, as built, should be consistent with the prediction made in the BER.

5 The necessary provisions for enabling energy-efficient operation should be put in place.

Part L2B – 'Existing non-dwellings'

This applies to extensions and subsequent fit out works, change of use, material changes, work on controlled services etc. New building fit outs for existing buildings should comply with Part L2B.

Part L 2010 introduces 'Consequential Improvements' which may in some situations require the upgrading of windows, boilers, air-conditioning and lighting as well as the inclusion of energy metering systems.

For all parts

Where possible, LZC (Low and Zero Carbon) systems should be installed.

Unit energy costs for each fuel type are detailed in the Approved Documents and should be used for assessing the feasibility of various improvements.

Airtightness/air leakage

Part L 2010 provides requirements for buildings to be tested for air leakage once completed. Testing is carried out using pressurised fans and consultants, to ensure that as well as the theoretical heat loss calculations, the building is not leaky and wasting energy through gaps and cracks due to construction methods.

Workmanship and detailing on site to ensure that a permitted air leakage of $10m^3/hour/m^2$ @ 50 Pa is not exceeded when tested.

The building designer has to make an assumption of what the level of airtightness he can achieve from his building at the design stage. This is inputted into the calculation for his heat loss/SAP calculations. Should the building be found to be higher in terms of air leakage, then remedial measures must be taken to ensure the building meets the required design value.

Design considerations

There are a number of factors to consider when designing buildings that are to meet the new Part L requirements. These will involve the types of windows, doors, rooflights, solar gain, frame factor, air infiltration, U-Values, type of glass, total area and aspect of the dwelling. The designer will also be required to consider the heating system, the impact of any mechanical ventilation systems, along with the controls, and any low and zero carbon technologies, e.g. solar PV, wind power. Credits will be achieved for the use of 'low carbon' and energy saving products, which in many cases will be the preferred route to compliance. This will involve an assessment of the whole building performance and not just each individual value.

In order to improve the quality of design details, a set of 'Accredited Construction Details' have been published to accompany the new Part L. These are updated versions of 2002 Thermal 'Robust Details', and if approved over specifications could limit the requirement for on-site testing.

Attention is given to the provision of suitable insulation to prevent heat loss and cold bridges in roof construction. Guidance measures to prevent moisture ingress, condensation and air leakage are incorporated into the construction details for walls, floors and roofs, with particular attention being given to the junctions of walls to floors and walls to roofs.

As insulation levels increase so does the potential risk of condensation, and so designers should consider the recommendations with regard to the prevention of condensation in 'cold' roof voids contained in BS 5250: 2002 AMD 1, which is also referenced in Approved Document C of the Building Regulations.

Thermal design details

new structures – housing

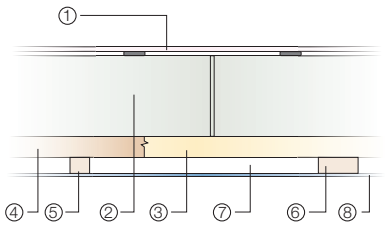
Blockwork wall

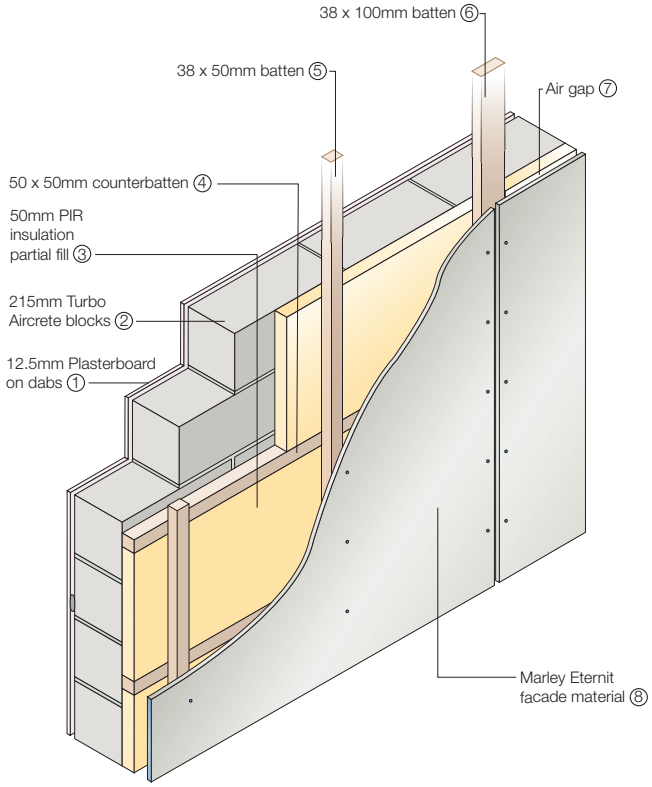
0.25 u-value

- Marley Eternit facade material
- 38 x 50mm and 38 x 100mm timber battens
- Counterbattens 50 x 50mm
- Single skin 440 x 215mm Aircrete blocks
- 50mm PIR insulation

Notes

- Internal wall should be 12.5mm plasterboard on dabs.
- Dew point calculations should always be undertaken to determine dew point and whether a breather membrane is required.





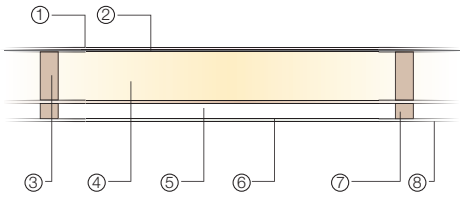
Timber frame wall

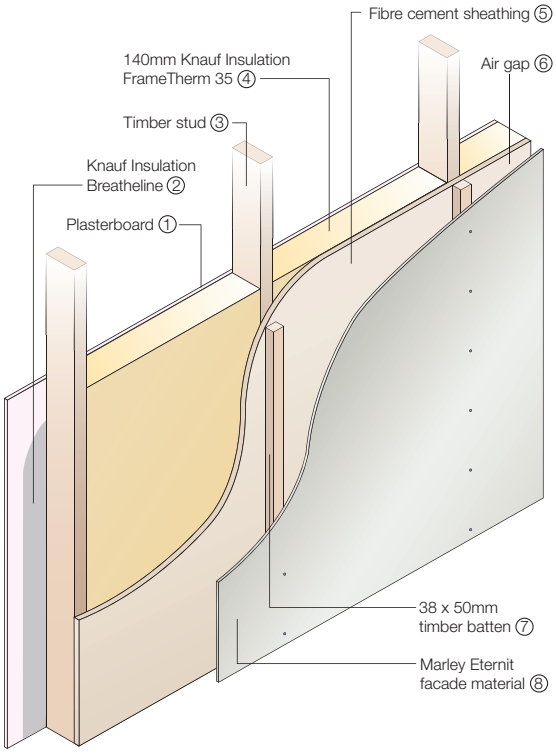
0.29 u-value

- Marley Eternit facade material
- 38 x 50mm timber battens
- 140 x 60mm timber studs
- 140mm Knauf FrameTherm 35 insulation between studs
- Knauf Insulation Breatheline vapour control layer between plasterboard and timber studs

Note

- Dew point calculations should always be undertaken to determine dew point and whether a breather membrane is required.





Thermal design details

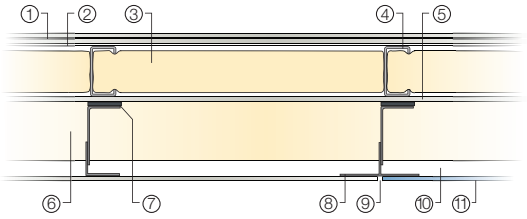
new structures – commercial, education or healthcare

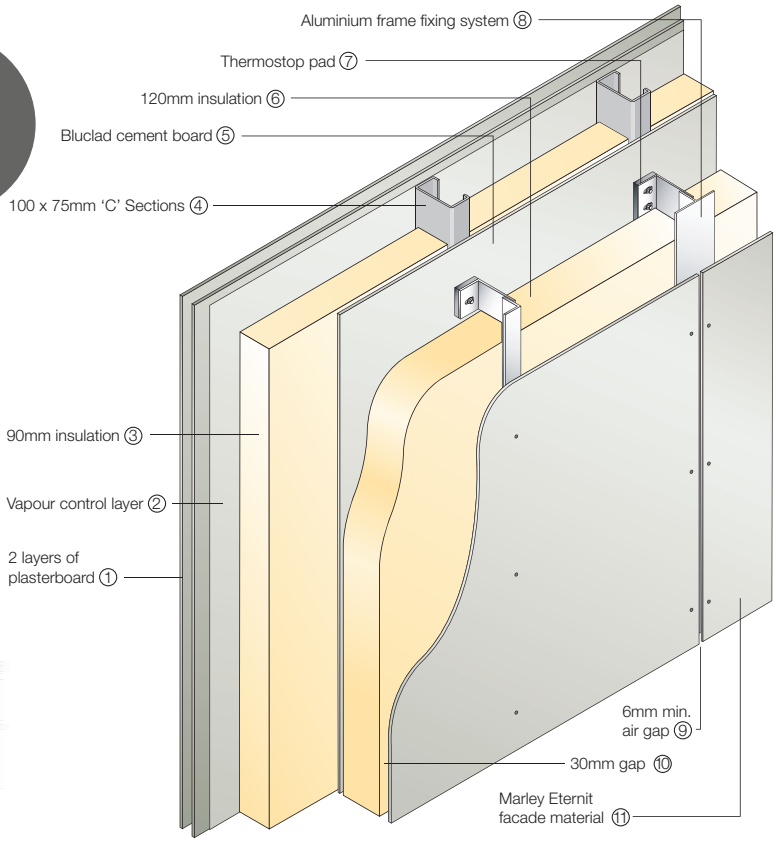
Lightweight steel frame

0.23 u-value

- Marley Eternit facade material
- 125mm stone mineral wool
- Ventisol or similar framing system
- Bluclad cement board
- 100 x 75mm 'C' sections
- 90mm glass mineral wool
- Vapour control layer
- Internal wall should be 2 layers of 12.5mm plasterboard on dabs

Note
- Dew point calculations should always be undertaken to determine dew point and whether a breather membrane is required.



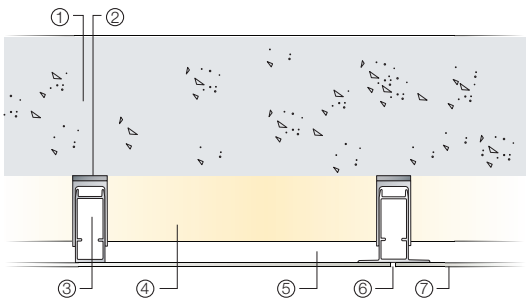


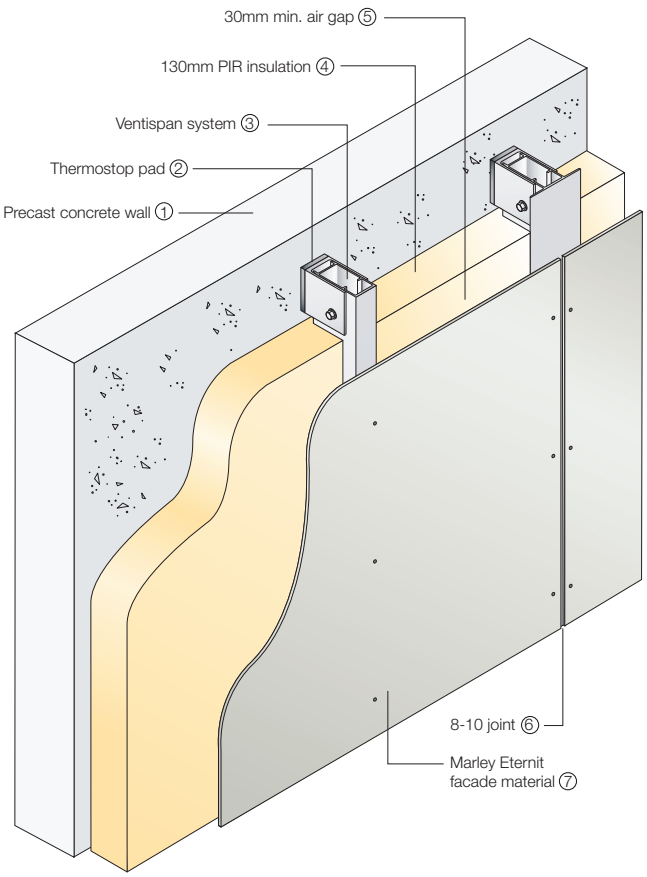
Concrete wall construction

0.14 u-value

- Marley Eternit facade material
- Ventispan framing system
- 130mm PIR insulation
- Structural concrete slab
- Steel framing infill system (between floors)

Notes
- A very wide variety of internal wall finishing options are available, many of which will incorporate further layers of insulation.
- Dew point calculations should always be undertaken to determine dew point and whether a breather membrane is required.





Thermal design details

upgrading existing structures and overcladding

Brickwork wall

0.35 u-value

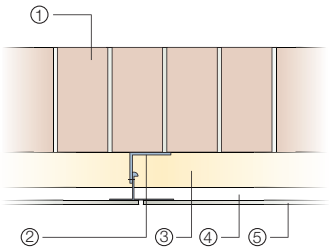
upgrade

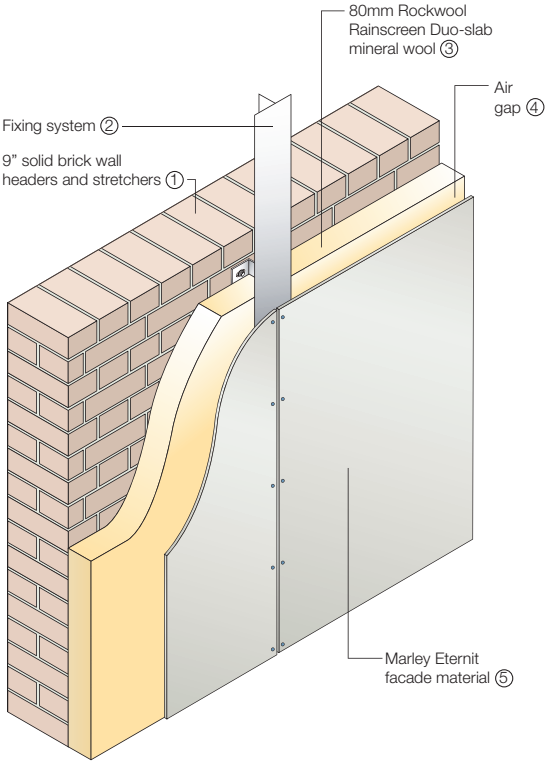
2.00 u-value

- Marley Eternit facade material
- Ventisol fixing system
- Air gap (min. 30mm)
- 80mm Rockwool Rainscreen Duo-slab mineral wool
- 9" solid brick wall (laid as headers and stretchers)

Notes

- 9" solid walls are common in pre-1930 house construction and the brick bonding can be in a number of configurations
- U-values of these types of wall are typically 1.9-2.2 W/m²K
- Other fixing systems can also be used
- Greater (or lesser) depths of insulant can be accommodated
- Dew point calculations should always be undertaken to determine dew point and whether a breather membrane is required.





Block and brickwork wall

0.33 u-value

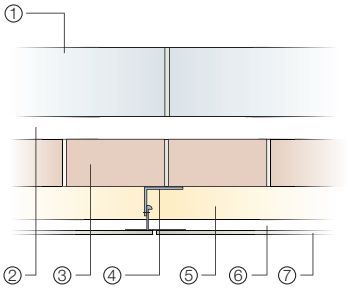
upgrade

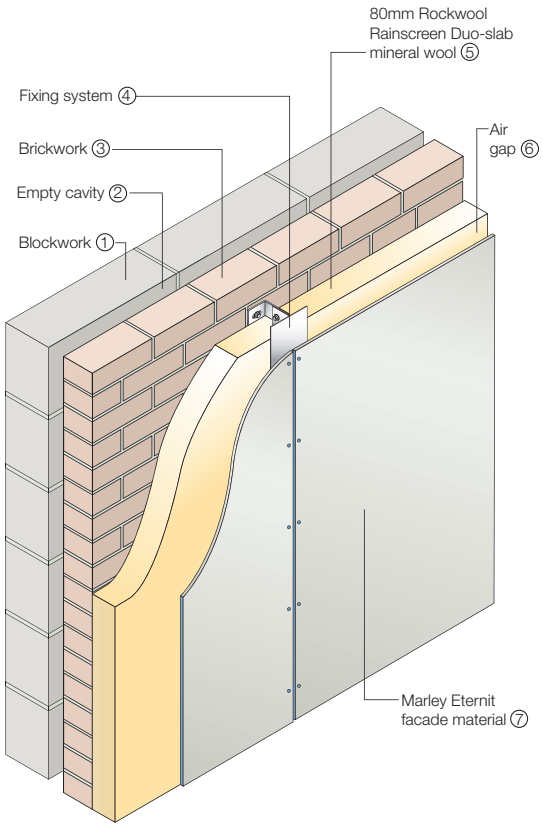
1.50 u-value

- Marley Eternit facade material
- Ventisol fixing system
- Air gap (min. 30mm)
- 80mm Rockwool Rainscreen Duo-slab mineral wool
- Brick outer skin
- Cavity not insulated
- Brick inner skin

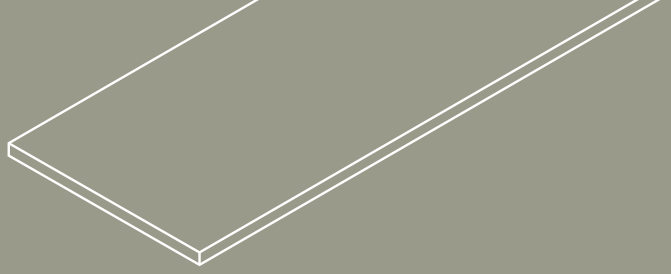
Notes

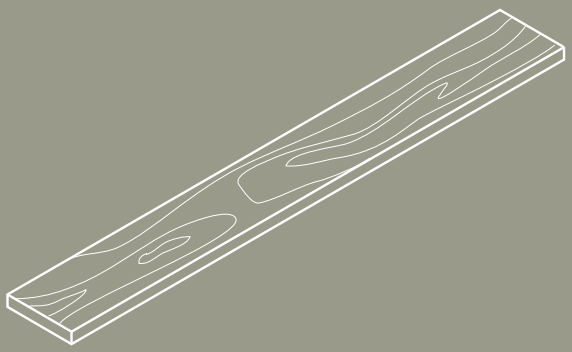
- U-values of these types of un-insulated wall are typically 1.0-1.6 W/m²k
- Other fixing systems can also be used
- Greater (or lesser) depths of insulant can be accommodated
- Dew point calculations should always be undertaken to determine dew point and whether a breather membrane is required.





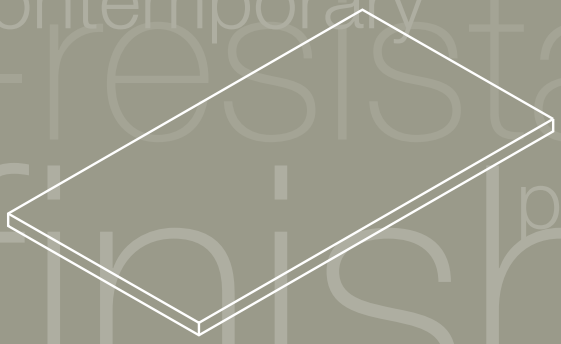
EQUITONE [natural] , Barking Foyer, Barking





contemporary

UV-resistance



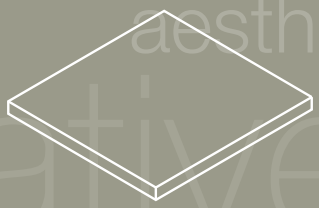
finish

performance

impact resistance

light weight

aesthetics



creative

clean lines

fibre cement

beautiful facades

A+ rating

inspirational

colour

texture

Facade material

EQUITONE [natura]

EQUITONE [natura] through coloured fibre cement material offers specifiers a sustainable and low maintenance facade that combines excellent aesthetics with durability and impact resistance: qualities that will enhance any new build project or equally, improve and upgrade an existing building as an overclad solution.

Available in a range of colours and finishes including an anti-graffiti coating, and both mechanical and secret fix options, EQUITONE [natura] gives specifiers the full creative scope of modern cladding systems with the performance levels contemporary buildings demand.

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CERTIFICATE No 06/4355

Advantages

- Through coloured fibre cement
- Texture of the fibres show through
- Tactile, smooth surface
- Secret fix system
- Available with factory applied anti-graffiti coating

* Fibre Cement Cladding based on generic rating for autoclaved fibre cement single sheet (Element ref: 80623042, 806230422, 806230447, 806230450)

EQUITONE [natura] , University Campus, York

EQUITONE [natura] technical data

EQUITONE [natura] , University Campus Suffolk, Ipswich Marina

EQUITONE [natura] , Private House, Utrecht

Standards

The technical properties of EQUITONE [natura] sheets are in accordance with the prescriptions of BS EN 12467:2004, Category A, Class 3.

Manufacture

EQUITONE [natura] has been developed for external cladding applications and is a coloured fibre cement board which allows the fibres to show through, giving a unique surface appearance.

Please note, traces of manufacture and colour variation are to be expected.

Availability

The most popular colours are usually available on short lead times. All other colours are made to order and will be subject to longer lead times.

Dimensions

Panel thickness	8/12mm
Sheet sizes*	2500 x 1250mm 3100 x 1250mm

See pages 50-51 for colour range

Nominal weight	8mm: 13.6kg/m^2 12mm: 20.4kg/m^2
Tolerance on thickness	±10%

* These are the maximum panel sizes after trimming by a fabricator.

Properties (air dry)

Density	1650kg/m^3
Bending strength: Longitudinal Transverse	 26N/mm^2 17N/mm^2
Modulus of elasticity	15,000N/mm^2
Porosity	20%
Hydric movement	1mm/m
Co-efficient of linear expansion	10 x 10^{-6}m/mK
Thermal conductivity	0.4W/mK
Frost resistance	Fully frost resistant
Reaction to fire: EN 13501-1	 A2-s1, d0

Finishes

EQUITONE [natura] is supplied with unfinished edges and must be cut by a specialist fabricator. Cut edges of EQUITONE [natura] must be sealed with Luko solution. Please contact Marley Eternit for more information.

Fixing overview

In facade applications, EQUITONE [natura] has a number of fixing options. Please refer to pages 88-115 for fixing system information.

Batten sizing

At panel joints: min 100 x 38mm.
At intermediate points: min 50 x 38mm.

Batten rail spacing

Maximum batten centres 600mm.
For 1.5kN/m^2 wind load.

Bonding for secret fixing

If EQUITONE [natura] is to be glued, the adhesive must be used in accordance with the application guidelines and guarantee conditions of the adhesive supplier (SikaTack-Panel). Further information is available from Marley Eternit.

Screwing

Stainless steel screws with mushroom head and torx drive.

Screws can be used in pre-drilled holes only.

- 5.5 x 35mm for 8mm thickness.
- Screws must be used in conjunction with top hat sleeve.

See diagram, right.

Blind riveting

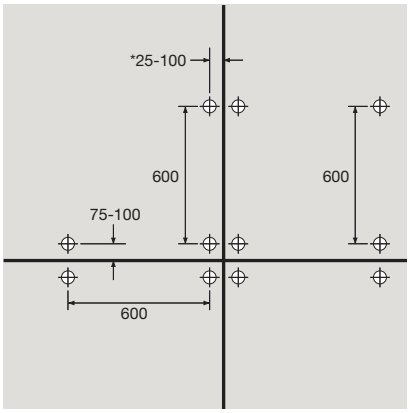
Aluminium rivets and associated cylindrical spacer sleeve in 9.5 mm holes.

Aluminium rivets:

- 4 x 18 – K15mm for 8mm thickness.
- Special rivet-setting tool must be used

Mechanical secret fix

In facade applications where a smooth unbroken surface is required, Marley Eternit offer a concealed mechanical fixing system. Hangers are fixed to the rear face of 12mm thick EQUITONE [natura] panels. The hangers hook onto horizontal rails, which, in turn, are fixed to vertical rails.



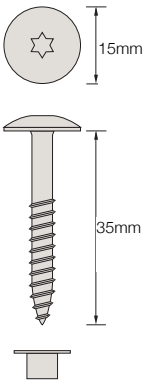
Hole sizes

Pre-drilled holes in the panels should be 6mm. For EQUITONE [natura] panels with Pro coating, please contact the Technical Advisory Service for more information.

Notes

1 In all cases it is important to have the corner fixings staggered at unequal spacings from the two edges.

2 A minimum 8-10mm gap should be allowed between all panels.



Sleeve – for EQUITONE [natura] Pro coating only

Other fixing systems and design detailing

EQUITONE [natura] can be fixed using the systems below.


Timber battens (90-93)


Omega and Zeds (94-99)


Ventisol (100-103)


Ventispan (104-107)


Structural bonding (109-111)


Mechanical secret fix (112-113)

→ Application instructions

Marley Eternit offer a full range of Application Instructions for their fixing systems, setting out details and installation data.

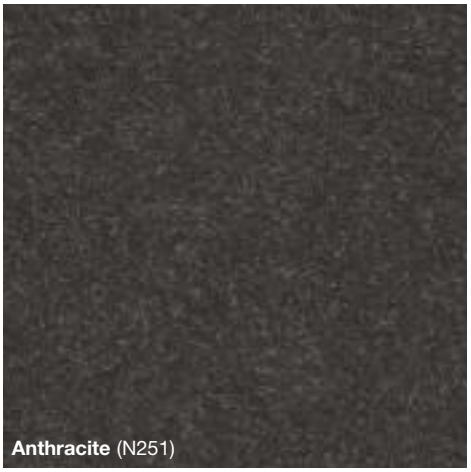
Please contact the Technical Advisory Service for further information on 01283 722588.

EQUITONE [natura] colour range

EQUITONE [natura] is offered in a range of colours to meet both aesthetic and performance needs.

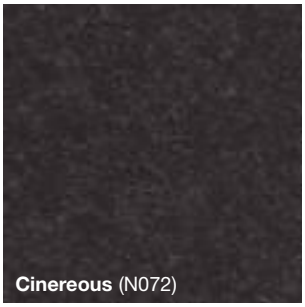
EQUITONE [natura] allows the texture of the fibres to show through. This, combined with the extensive colour choice, offers the designer a high degree of visual flexibility.

EQUITONE [natura] is also available with a UV 'Pro' coating to provide excellent graffiti resistance characteristics.

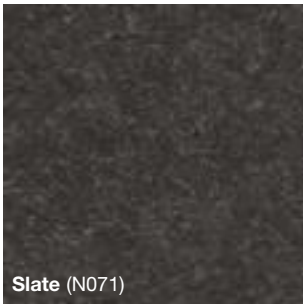

Anthracite (N251)

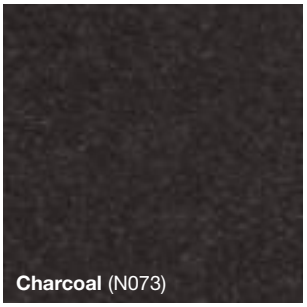

Soft Green (N592)

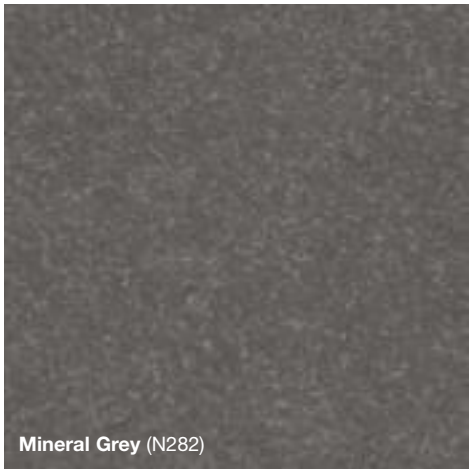

Sage (N572)


Cinereous (N072)

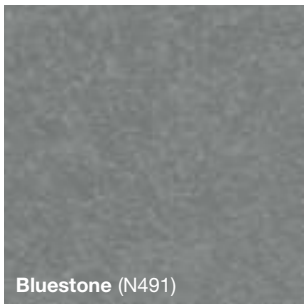

Grass Green (N573)

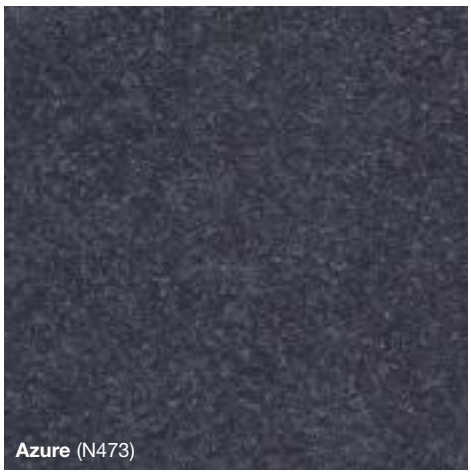

Slate (N071)

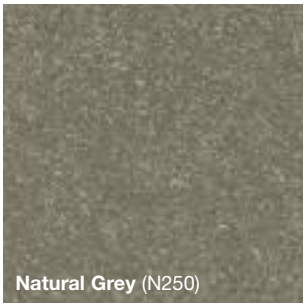

Charcoal (N073)


Mineral Grey (N282)

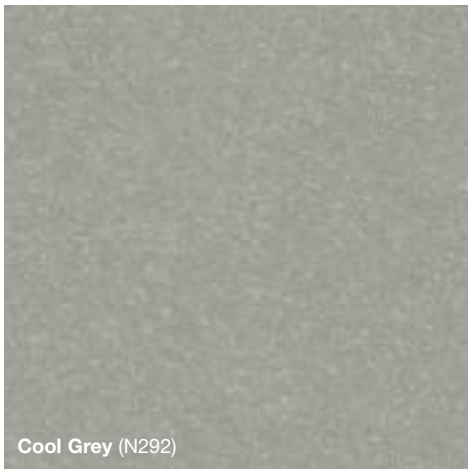

Silver Grey (N283)


Bluestone (N491)

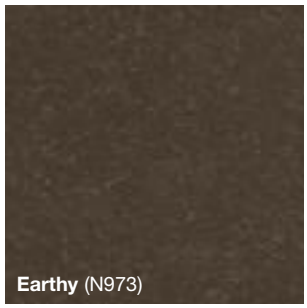

Azure (N473)

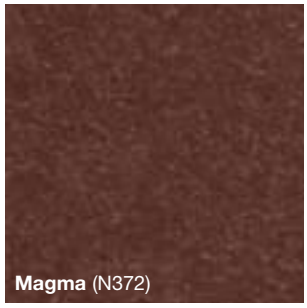

Natural Grey (N250)


Sepia (N972)


Cool Grey (N292)


Muted Stone (N271)


Earthy (N973)

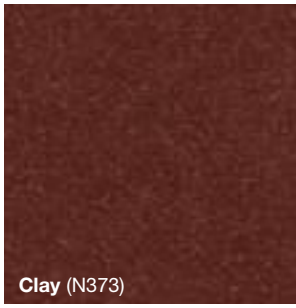

Magma (N372)


Beach Stone (N891)


Cream White (N154)


Morning Mist (N191)


Ruby (N359)


Clay (N373)

EQUITONE [tectiva]

EQUITONE [tectiva] is a through coloured fibre cement material that offers elegant shades of natural colour providing a unique aesthetic effect.

EQUITONE [tectiva] is characterised by the fine sanded lines and naturally occurring hues within the material. These enhance the natural matt appearance which comes to life with the effects of light and shade to provide a distinctive and beautiful facade.

Advantages

- Through coloured fibre cement
- Unique and natural appearance
- Subtle shades

* Fibre Cement Cladding based on generic rating for autoclaved fibre cement single sheet (Element ref: 80623042, 806230422, 806230447, 806230450)

EQUITONE [tectiva], Passivhaus, Blanden, Belgium

EQUITONE [tectiva] technical data

EQUITONE [tectiva], Office Building, Temse, Belgium

Standards

The technical properties of EQUITONE [tectiva] sheets are in accordance with the prescriptions of BS EN 12467:2004, Category A, Class 4.

Manufacture

EQUITONE [tectiva] has been developed for external cladding applications and is a through coloured fibre cement board with a fine sanded textural finish.

Please note, traces of manufacture and colour variation are to be expected.

Availability

The most popular colours are usually available on short lead times. All other colours are made to order and will be subject to longer lead times.

Dimensions

Panel thickness	8mm
Sheet sizes	2500 x 1220mm 3050 x 1220mm
Nominal weight	8mm: 14.9kg/m^2
Tolerance on thickness	±0.5mm

Properties (air dry)

Density	1580kg/m^3
Bending strength: Longitudinal Transverse	 32N/mm^2 22N/mm^2
Modulus of elasticity	14,000N/mm^2
Porosity	< 25%
Hydric movement	1.6mm/m
Co-efficient of linear expansion	<0.01mm/mK
Thermal conductivity	0.39W/mK
Frost resistance	Fully frost resistant
Reaction to fire: EN 13501-1	 A2-s1, d0

Fixing overview

In facade applications, EQUITONE [tectiva] can be screwed to vertical timber battens or riveted to an aluminium sub-frame. Please refer to pages 88-115 for fixing system information.

Batten sizing

At panel joints: min 100 x 38mm.
At intermediate points: min 50 x 38mm.

Batten rail spacing

Maximum batten centres 600mm.
For 1.5kN/m² wind load.

Bonding for secret fixing

If EQUITONE [tectiva] is to be glued, the adhesive must be used in accordance with the application guidelines and guarantee conditions of the adhesive supplier (SikaTack-Panel). Further information is available from Marley Eternit.

Screwing

Stainless steel screws with mushroom head and torx drive.

Screws can be used in pre-drilled holes only.

- 4.8 x 38mm for 8mm thickness.

Blind riveting

8.3mm holes for fixed point and 11mm holes for sliding point.

Aluminium rivets:

- 4.8 x 20 – K15mm for 8mm thickness.

Astro rivet fixing system

This is a bespoke fixing system for EQUITONE [tectiva] allowing the panels to be simply, rapidly and securely fixed to aluminium or steel support systems. The installation procedure is as follows:

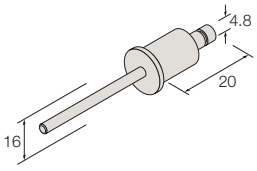
1 Fix the self-adhesive strips to the vertical metal profiles.

2 Pre-drill the EQUITONE [tectiva] panels according to the correct fixing pattern and using the correct size drill bits.

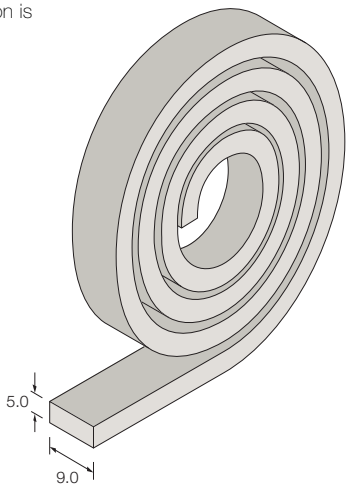
3 Position each panel correctly against the vertical metal profiles and hold it steady.

4 Drill through the F alignment hole and fix the Astro rivet.

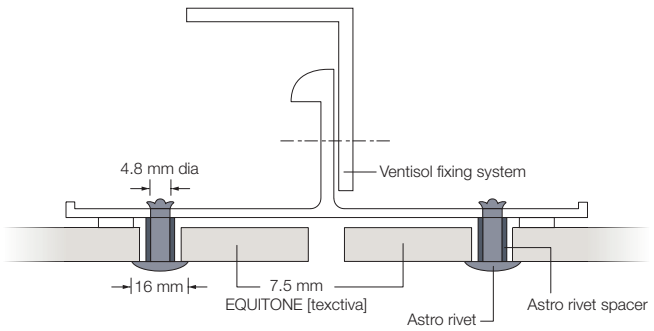
5 Drill the G-holes and fix the remaining Astro rivets.



Astro rivet



Self-adhesive tape



Plan section showing EQUITONE [tectiva] panels fixed to aluminium section with Astro rivet fixing system

Other fixing systems and design detailing

EQUITONE [tectiva] can be fixed using the systems below.

Timber battens (90-93)

Omega and Zeds (94-99)

Ventisol (100-103)

Ventispan (104-107)

Structural bonding (109-111)

Mechanical secret fix (112-113)

→ Application instructions

Marley Eternit offer a full range of Application Instructions for their fixing systems, setting out details and installation data.

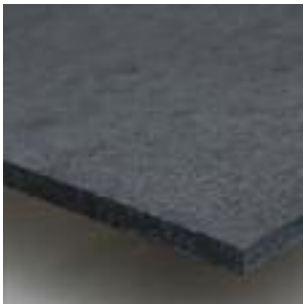
Please contact the Technical Advisory Service for further information on 01283 722588.

EQUITONE [tectiva] colour range

EQUITONE [tectiva]* is available in nine organic through colours where the pigment is held within the mass of the board to provide a timeless colour that fits perfectly into contemporary architecture.

* Naturally occurring white flecks may be visible which add to the aesthetics of the material

Calico (TE00)



Pebble (TE20)

Chalk (TE90)

Mineral Black (TE80)

Linen (TE10)


Sahara (TE40)


Sandstorm (TE30)


Pistachio (TE50)


Hessian (TE60)

EQUITONE [pictura]

EQUITONE [pictura] incorporates an additional surface treatment onto the fibre cement material. The main characteristic of this treatment is the hard, smooth, silky matt surface.

The UV cured top layer offers good protection against many types of staining and mechanical damage during construction.

Whilst the EQUITONE [pictura] surface is smooth and easily cleanable, it also provides protection against graffiti produced by common aerosol and other paints. Graffiti can be eliminated with common graffiti removers.

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CERTIFICATE No 06/4355

Advantages

- Smooth and silky finish
- Anti-graffiti protection as standard
- Available in 15 bold colours

* Fibre Cement Cladding based on generic rating for autoclaved fibre cement single sheet (Element ref: 80623042, 806230422, 806230447, 806230450)

EQUITONE [pictural] , Record Bank, Dinant, Belgium

EQUITONE [pictura] technical data

EQUITONE [pictura], Bournside School, Cheltenham

EQUITONE [pictura], Darlington Hospital

Standards

The technical properties of EQUITONE [pictura] sheets are in accordance with the prescriptions of BS EN 12467: 2004, Category A, Class 3. The panels are manufactured to ISO 9001 and ISO 14001.

Manufacture

EQUITONE [pictura] is produced on a Hatschek machine and is pressed and air-dried. The surface is smooth, not glossy, with an acrylic coating and a UV hardened top layer, to produce a strong impact and dirt resistant finish. This finish gives a hard surface, offering 'anti graffiti' protection from most kinds of paint.

Availability

The most popular colours are usually available on short lead times. All other colours are made to order and will be subject to longer lead times.

Dimensions

Nominal thickness	8mm/12mm
Sheet sizes*	2500 x 1250mm 3100 x 1250mm
Nominal weight:	8mm: 15.4 kg/m^2 12mm: 22.8 kg/m^2
Tolerance on thickness	±10%

* These are the maximum sheet sizes available after trimming by a fabricator.

Properties (air dry)

Density	1650 kg/m^3
Bending strength: Longitudinal Transverse	 26N/mm^2 17N/mm^2
Modulus of elasticity	15,000N/mm^2
Hydric movement	1.0mm/m
Co-efficient of linear expansion	10 x 10^{-6}m/mK
Thermal conductivity	0.6 W/mK
Frost resistance	Fully frost resistant
Reaction to fire: EN 13501-1	 A2-s1, d0
Temperature – durability	rated up to 80 °C

Finishes

EQUITONE [pictura] is supplied with unfinished edges and must be cut by a specialist fabricator. Cut edges of EQUITONE [pictura] must be sealed with Luko solution. Please contact Marley Eternit for more information.

Fixing overview

In facade applications, EQUITONE [pictura] can be screwed to vertical timber battens or riveted to an aluminium sub-frame. Please refer to pages 88-115 for fixing system information.

Batten sizing

At panel joints: min 100 x 38mm.
At intermediate points: min 50 x 38mm.

Batten rail spacing

Maximum batten centres 600mm.
For 1.5kN/m^2 wind load.

Bonding for secret fixing

If EQUITONE [pictura] is to be glued, the adhesive must be used in accordance with the application guidelines and guarantee conditions of the adhesive supplier (SikaTack-Panel). Further information is available from Marley Eternit.

Screwing

Stainless steel screws with mushroom head and torx drive.

Screws can be used in pre-drilled holes only.

- 5.5 x 40mm for 8mm thickness, 7mm diameter.
- Screws must be used in conjunction with top hat sleeve.

See diagram, right.

Blind riveting

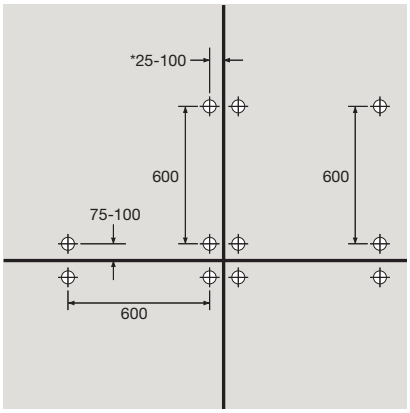
Aluminium rivets and associated cylindrical spacer sleeve in 9.5 mm holes.

Aluminium rivets:

- 4 x 18 – K15mm for 8mm thickness.
- Special rivet-setting tool must be used

Mechanical secret fix

In facade applications where a smooth unbroken surface is required, Marley Eternit offer a concealed mechanical fixing system. Hangers are fixed to the rear face of 12mm thick EQUITONE [pictura] panels. The hangers hook onto horizontal rails, which, in turn, are fixed to vertical rails.



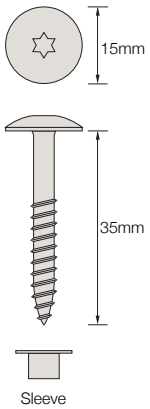
Hole sizes

Pre-drilled holes in the panels should be 7mm.

Notes

1 In all cases it is important to have the corner fixings staggered at unequal spacings from the two edges.

2 A minimum 8-10mm gap should be allowed between all panels.



Other fixing systems and design detailing

EQUITONE [pictura] can be fixed using the systems below.


Timber battens (90-93)


Omega and Zeds (94-99)


Ventisol (100-103)


Ventispan (104-107)


Structural bonding (109-111)


Mechanical secret fix (112-113)

→ Application instructions

Marley Eternit offer a full range of Application Instructions for their fixing systems, setting out details and installation data.

Please contact the Technical Advisory Service for further information on 01283 722588.

EQUITONE [pictura] colour range

Liquid Blue (PU441)

Deep Green (PU541)

Khaki (PU543)

Olive (PU542)

Chocolate (PU941)

Camel (PU943)

Sunset (PU741)

Volcanic Red (PU341)

Roman Stone (PU842)

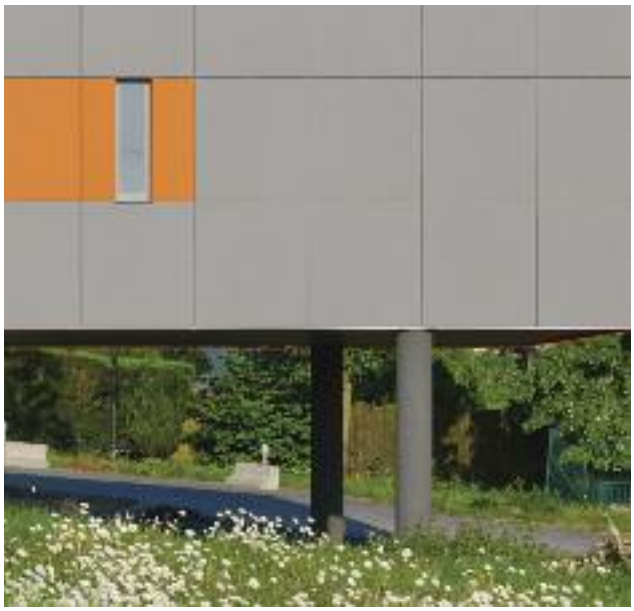
Parchment (PU841)

Moonstone (PU243)

Porcelain (PU141)

Matt Black (PU041)

Flint (PU242)



Gunmetal Grey (PU241)

EQUITONE [textura]

EQUITONE [textura] combines vivid colour, texture and toughness to create distinct and unique designs.

With a highly glazed, granular finish available in any factory-approved RAL colour, it is impact resistant yet strong, light in weight and easy to use.

Its performance pedigree is second to none, complying with British and European Standards with regard to fire resistance and spread of flame.

EQUITONE [textura] can be surface-fixed, or secured with specially designed, concealed fixings.

BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No 06/4355

Advantages

- Available in any factory-approved RAL colour (subject to minimum order)
- Granular finish
- Vibrant colours as standard

* Fibre Cement Cladding based on generic rating for autoclaved fibre cement single sheet (Element ref: 80623042, 806230422, 806230447, 806230450)

EQUITONE [textura], Art College, Manchester

EQUITONE [textura] technical data

Standards

The technical properties of EQUITONE [textura] sheets are in accordance with the prescriptions of BS EN 12467:2004, Category A, Class 3.

Manufacture

EQUITONE [textura] has been developed for external cladding applications and is a fully compressed fibre cement board.

Availability

The most popular colours are usually available on short lead times. All other colours are made to order and will be subject to longer lead times.

Factory-approved RAL colours

Our production facility is able to produce a wide range of RAL colours. For specific project requirements check availability with the Technical Advisory Service 01283 722588.

Dimensions

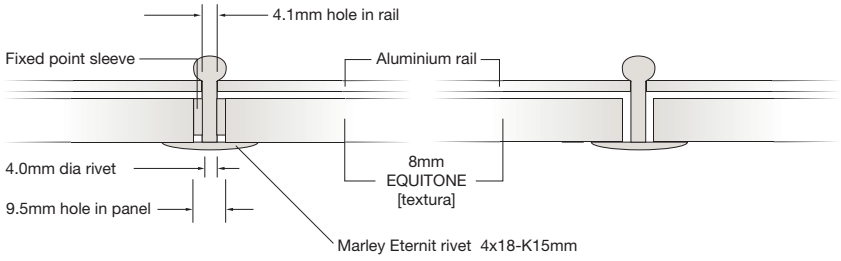
Nominal thickness	8/12 mm
Sheet sizes*	2500 x 1250mm 3100 x 1250mm 3100 x 1500mm
Nominal weight	8 mm: 15.4kg/m^2 12 mm: 22.8kg/m^2
Tolerance on thickness	±10%

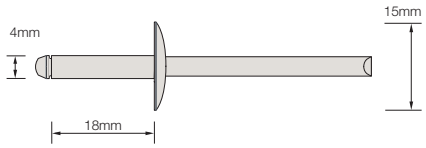
* These are the maximum panel sizes after trimming by a fabricator.

Properties (air dry)

Density	1650kg/m^3
Bending strength: Longitudinal Transverse	 24N/mm^2 17N/mm^2
Modulus of elasticity	15,000N/mm^2
Hydric movement	0.5mm/m
Co-efficient of linear expansion	10 x 10^{-6}m/mK
Thermal conductivity	0.4W/mK
Frost resistance	Fully frost resistant
Reaction to fire: EN 13501-1	 A2-s1, d0

Rivet fixing to aluminium rails





EQUITONE [textura] colour matched rivet

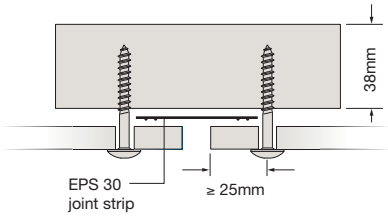
Screw fixing to timber battens

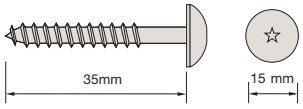
EQUITONE [textura] is also suitable for surface fixing. Marley Eternit offer colour matched rivets and screws (screws shown below).

Minimum batten sizes:

- 100 x 38mm at panel joints
- 50 x 38mm for intermediate positions

Screws: 5.5 x 35mm





EQUITONE [textura] colour matched screw

Finishes

EQUITONE [textura] is supplied with unfinished edges and must be cut by a specialist fabricator. Cut edges of EQUITONE [textura] must be sealed with Luko solution. Please contact Marley Eternit for more information.

Fixing overview

In facade applications, EQUITONE [textura] can be screwed to vertical timber battens or riveted to an aluminium sub-frame. Please refer to pages 88-115 for fixing system information.

Batten sizing
At panel joints: min 100 x 38mm.
At intermediate points: min 50 x 38mm.

Batten rail spacing
Maximum batten centres 600mm.
For 1.5kN/m^2 wind load.

Bonding for secret fixing
If EQUITONE [textura] is to be glued, the adhesive must be used in accordance with the application guidelines and guarantee conditions of the adhesive supplier (SikaTack-Panel). Further information is available from Marley Eternit.

Screwing
Stainless steel screws with mushroom head and torx drive.

Screws can be used in pre-drilled holes only.

- 5.5 x 35mm for 8mm thickness.
- Screws must be used in conjunction with top hat sleeve.

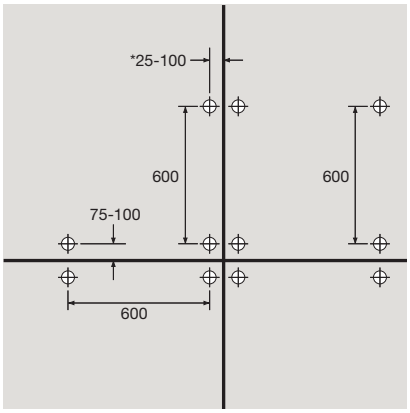
See diagram, right.

Blind riveting
Aluminium rivets and associated cylindrical spacer sleeve in 9.5 mm holes.

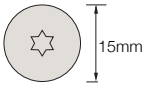
Aluminium rivets:

- 4 x 18 – K15mm for 8mm thickness.
- Special rivet-setting tool must be used

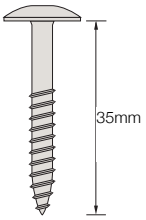
Mechanical secret fix
In facade applications where a smooth unbroken surface is required, Marley Eternit offer a concealed mechanical fixing system. Hangers are fixed to the rear face of 12mm thick EQUITONE [textura] panels. The hangers hook onto horizontal rails, which, in turn, are



Hole sizes
Pre-drilled holes in the panels should be 6mm.



Notes
1 In all cases it is important to have the corner fixings staggered at unequal spacings from the two edges.
2 A minimum 8-10mm gap should be allowed between all panels.



Other fixing systems and design detailing

EQUITONE [textura] can be fixed using the systems below.


Timber battens (90-93)


Omega and Zeds (94-99)


Ventisol (100-103)


Ventispan (104-107)


Structural bonding (109-111)


Mechanical secret fix (112-113)

→ Application instructions

Marley Eternit offer a full range of Application Instructions for their fixing systems, setting out details and installation data.

Please contact the Technical Advisory Service for further information on 01283 722588.

EQUITONE [textura] colour range

Colour codes

Please note:

TA prefix indicates Anthracite core.

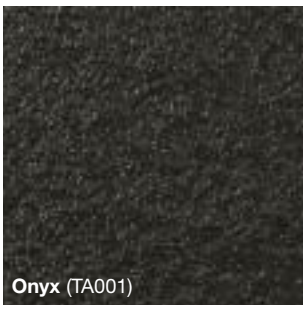
TG prefix indicates Grey core.

Factory-approved RAL colours

Our production facility is able to produce a wide range of RAL colours.

For specific project requirements check availability with the Technical Advisory Service on 01283 722588.

Any factory-approved RAL colour is available subject to minimum quantity.



Onyx (TA001)

Natural Titanium (TA207)

Metal Grey (TG404)

Graphite (TG206)

Pearl (TG205)

Arctic (TG102)

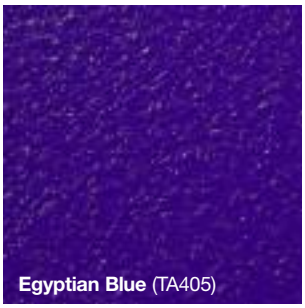
Pacific White (TG504)


Straw (TG803)


Sand (TG602)


Celestial Blue (TG403)


Buttermilk (TG601)


Egyptian Blue (TA405)


Sienna Red (TA305)


Ember (TA701)


Deep Red (TA304)

colour

soffits

profiled sheetin

render backing

finish

facade materials

tile hanging

clean lines

fibre cement

operal

weatherboarding

practical

ng

Other Marley Eternit facade materials

Operal

Operal, Beverlo, Belgium

Operal, Beverlo, Belgium

Operal is ideal for decorative and protective soffits and fascias

Operal is a cost effective, easy to fix material with a range of 23 colours, that complement the Cedral Weatherboard range (pages 74-77), to provide practical and aesthetic benefits to the designer requiring cost effective and attractive external cladding solutions.

Standards

The technical properties of Operal sheets are in accordance with the prescriptions of BS EN 12467:2004, Category A, Class 3.

Applications

Operal is ideal for soffits and fascias.

Manufacture

Operal is an autoclaved fibre cement material which is manufactured from a mixture of cement, organic fibres, fillers and water.

Touch up paint

Touch up paint is available in 0.5 litre quantities.

Dimensions

Sheet sizes*	3050 x 1220mm 2500 x 1220mm
Nominal thickness	9mm
Nominal weight	13.0kg/m^2
Tolerance on thickness	±10%

Advantages

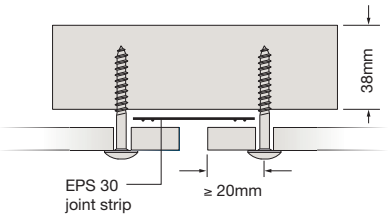
- Lightweight and easy to fix
- Easy to work on site
- Fire classifications A2-s1, d0 to EN 13501-1
- Can achieve an A$^+$ rating in the BRE's Green Guide to Specification*
- BBA Certificate No. 06/4355

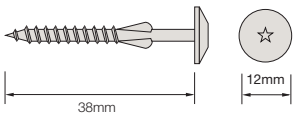
* Based on generic rating for autoclaved fibre cement single sheet (Element ref. 80623042, 806230422, 806230447, 806230450).

*Supplied in large format modules for cutting to size.

Fixing overview

For small applications (e.g. fascias, soffits), the





Operal colour matched screw

Availability

The most popular colours are usually available on short lead times. All other colours are made to order and will be subject to longer lead times.

→ More

samples Tel 01283 722588
web marleyeternit.co.uk/facades
literature Cedral Weatherboard and Operal brochure

Operal, Grimbergen, Belgium

Other systems and design detailing

For further details on fixing using timber battens, see pages 90-93.

Application Instructions

Marley Eternit offer a full range of Application Instructions for their fixing systems, setting out detailed design and installation data.

Please contact the Technical Advisory Service for further information on 01283 722588.

OP01 White

OP02 Beige

OP03 Grey Brown

OP04 Dark Brown

OP05 Grey

OP06 Grey Green

OP07 Cream White

OP08 Sand Yellow

OP09 Ochre

OP10 Blue Grey

OP11 Beige Yellow

OP12 Lavender Blue

OP13 Lilac Blue

OP14 Atlas Brown

OP15 Dark Grey

OP16 Cevennes Green

OP17 Oriental Green

OP18 Slate Grey

OP30 Brown

OP31 Pine Green

OP32 Orange Brown

OP33 Red

OP50 Black

Cedral Weatherboard

Cedral Weatherboard, Cutembourg School, The Netherlands

Advantages of Cedral Weatherboard

- Excellent aesthetics
- Resistant to rot, immune to attack by pests and insects
- Stands up to the harshest weather conditions
- No routine maintenance required
- Easy to install
- Range of complementary aluminium trims available
- Use in the same way as wood
- Fire classifications A2-s1, d0 to EN 13501-1
- Ideal for use where traditional timber boards might be considered especially for facades and window and door surrounds
- Can achieve an A^+ rating in the BRE's Green Guide to Specification*
- BBA Certificate No. 06/4299

* Based on generic rating for autoclaved fibre cement (calcium silicate) cladding (Element ref. 806220701, 806220675, 806220676).

Fibre cement Cedral Weatherboard is the ideal low maintenance, rot free alternative to traditional timber weatherboarding.

With the visual appeal of natural timber, yet simple to install and resistant to rot, Cedral Weatherboard is an attractive low maintenance alternative to PVCu.

Cedral Weatherboard can be supplied in a range of 23 factory applied solid colours and 4 woodstain finishes, or in a natural finish for on-site painting.

Our comprehensive colour range provides an aesthetic option to suit many project requirements.

Installing Cedral Weatherboard

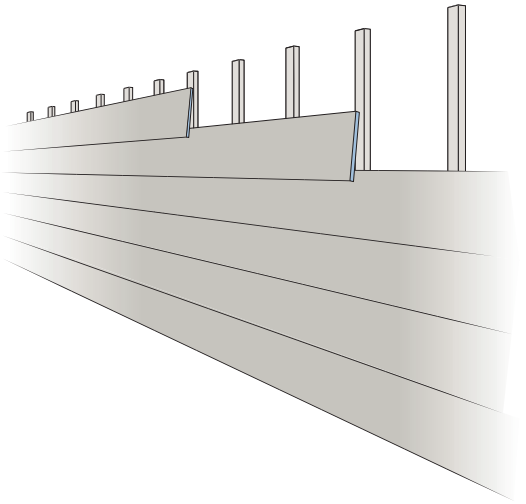
Each plank must be fixed at least once to every support. The end of every plank must also coincide with a support. Where specified, install vapour barrier or breather membrane over the wall or framework behind the timber studs. Installation begins at the bottom of the facade, where a start profile is fixed first. This is overlapped by the first plank, which starts the layering of the planks. Allow at least 150mm between bottom edge of Weatherboard and the ground. Fixing is done through the upper edges. There is no side overlap, the strips being simply loose butted against one another, and the joint must coincide with a timber support.

A strip of black polyethylene soaker should be applied under the vertical joints to protect the batten.

For other applications; vertically, laid flat or ship lapped, please contact Marley Eternit's Technical Advisory Service

Battens for Cedral Weatherboard

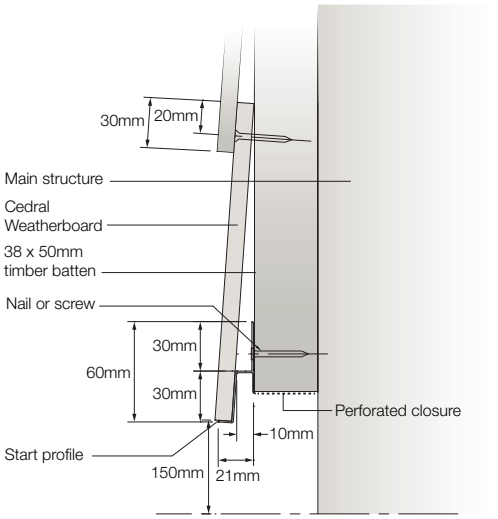
Cedral Weatherboard needs to be fixed to vertical timber battens (preservative treated and planed on 2 sides) of at least 50mm wide spaced at a maximum of 600mm across the elevation. The Cedral Weatherboard should be fixed to at least three battens; if it is only fixed to two then the batten spacing should be reduced to 400mm.



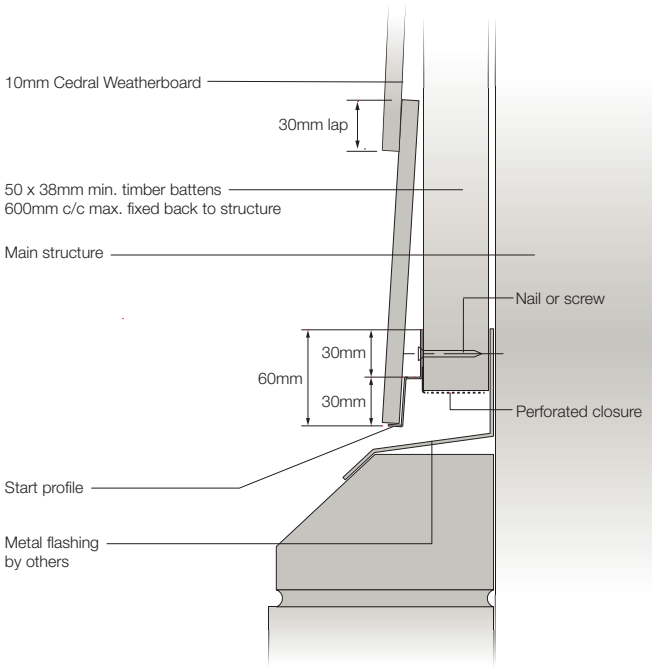
Cedral Weatherboard, Repton Park, Ashford, Kent

Cedral Weatherboard, East Beach Road, Selsey, West Sussex

Base of cladding



Plinth detail



Cedral Weatherboard
colour range

C01 White

C05 Grey

C11 Beige Yellow

C06 Grey Green

C12 Lavender Blue

C07 Cream White

C13 Lilac Blue

C02 Beige

C08 Sand Yellow

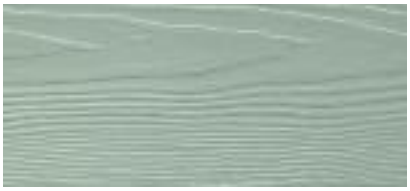
C14 Atlas Brown

C03 Grey Brown

C09 Ochre

C15 Dark Grey

C04 Dark Brown



C10 Blue Grey

C16 Cevennes Green

C17 Oriental Green

C31 Pine Green

C50 Black

C18 Slate Grey

C32 Orange Brown

C00 Natural

C30 Brown

C33 Red

Woodstain colours

Cedral Weatherboard is also available in a range of woodstain shades to simulate the colour and texture of a variety of timber stocks.

* Due to the transparent coating, it is not recommended to install Cedral Weatherboard woodstain colours vertically.

CL102 Pine

CL103 Ebony

CL104 Light Oak

CL105 Dark Oak

Bluclad

Bluclad is the ideal backer for render to use in weather-exposed locations.

A flat, vapour-permeable Class 0 building board with outstanding dimensional stability, Bluclad is moisture, frost, mould and impact resistant. It can be used as a substrate for a variety of surface coatings, particularly thin coat polymeric renders and textured finishes – and also to provide a seamless finish.

Available in a standard 10mm thickness, Bluclad is off-white in colour with a smooth surface on the front for painting and is textured on the reverse for thin coat polymeric renders.

Bluclad, Mailbox Apartments, Birmingham

Advantages

- Easy to cut, work and decorate
- Moisture resistant
- Lightweight and easy to cut and fix
- Fire classifications A2-s1, d0 to EN 13501-1
- Frost proof

Bluclad
technical data

Bluclad, Mailbox Apartments, Birmingham

Bluclad, Dundee University, Scotland

Standards

The technical properties of Bluclad boards are in accordance with the prescriptions of BS EN 12467: 2004, Category B, Class 3. The panels are manufactured to ISO 9001 and ISO 14001.

Manufacture

Bluclad is produced on a Hatschek machine and autoclaved. Bluclad consists of fibre reinforced calcium silicate and is supplied with a water repelling treatment on both faces. Bluclad is off-white in colour with a smooth surface on the front and textured on the reverse. The textured face is ideal for thin coat polymeric renders.

Dimensions

Nominal thickness	10mm
Sheet sizes	2400 x 1200mm
Nominal weight	14.2 kg/m^2
Tolerance on thickness	±5%

Properties (air dry)

Density	1180 kg/m^3
Bending strength: Longitudinal Transverse	 23N/mm^2 17N/mm^2
Modulus of elasticity	10,000N/mm^2
Hydric movement	1.2mm/m
Thermal conductivity	0.19 W/mK
Fire resistance Class (EN 13501-1)	 A2-s1, d0
Thermal expansion coefficient	 6.5 x 10^{-6} m/mK

Fixing overview

In facade applications, Bluclad can be nailed or screwed to vertical timber battens or, using self-drilling screws to an aluminium or steel sub-frame.

Batten sizing

At panel joints: min 75 x 38mm.
At intermediate points: min 50 x 38mm.

The alignment of the battens shall be true in both planes, variation not to exceed 1 in 300, i.e. 2mm over 600mm (non accumulative).

Batten rail spacing

Maximum batten centres 600mm. For fixing centres, see below.

Fixings of battens to substructure

The choice and spacings of the appropriate anchors should be decided in consultation with a reputable fixings manufacturer and will be dependent on the structure to be fixed to and the loadings required. The fixing manufacturer's recommendations must be observed.

For fixing centres, see below.

Panel installation

Bluclad is normally installed horizontally in a stretcher bond pattern. A 3mm gap must be left between each board to board joint.

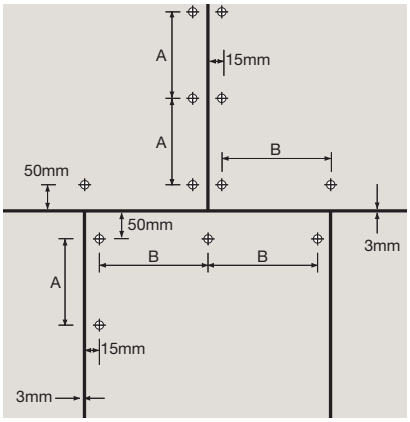
Renders

Bluclad is suited to the application of most types of thin coat polymeric render, such as those manufactured by Weber or Strikolith UK Ltd.

Fixing details

Fixing (stainless steel)	Support material	Fixing centres mm (A)	Support centres mm (B)	Wind load KN/m²
Screws	timber	400	600	0 - 1.5
45mm x No 8 Csk	timber	300	600	1.5 - 2.0
Nails - min. head 5.5mm	timber	150	600	0 - 1.5
Self-drilling screws No. 8 equivalent	aluminium/ steel	300	600	0 - 2.0

The maximum fixing centres are shown in the table above. Also shown are the maximum wind loads for which the standard recommendations are suitable. For greater loadings, the Technical Department should be consulted. Where exceptional impact loadings are anticipated, such as at low level where there is public access, or in school and leisure facilities, additional battens can be incorporated between the fixing battens to improve the impact resistance of the panel.



Profiled sheeting

Profile 6, Robin Hood Primary School, Nottingham

Profile 3, Ensworth Coastal House, Hampshire

Profiled sheeting can be used in a wide range of vertical details for commercial, industrial, residential and agricultural applications.

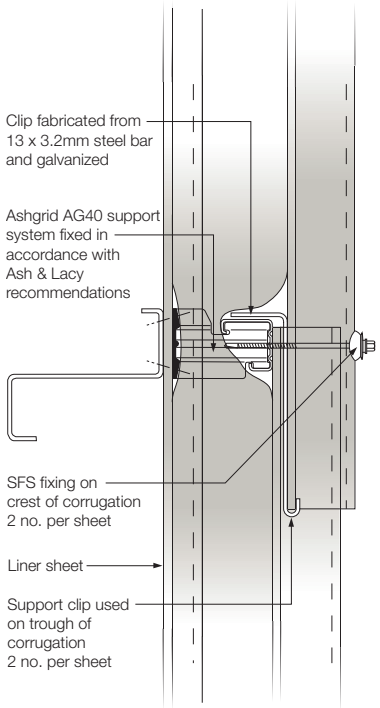
Top fix systems

When fixing Profile 6 using top-fix fasteners on a vertical application, some provision must be made to support the weight of the sheets, otherwise the sheets will sag down from their intended position and both the fasteners and the fibre cement will be overstressed.

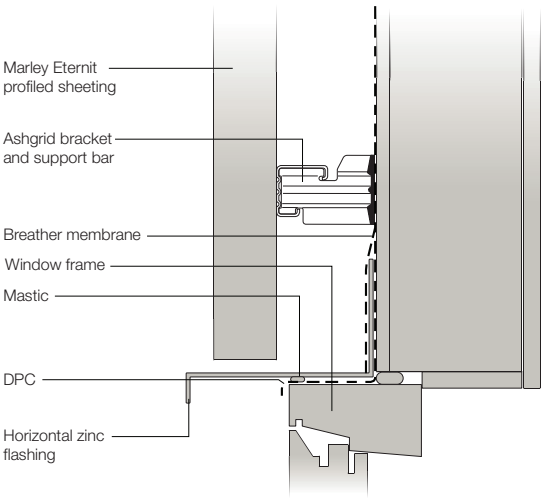
The base of each sheet should be supported on two support clips which hook over the sheeting rail. The support clips should be positioned in the valley corrugations adjacent to the fixing position.

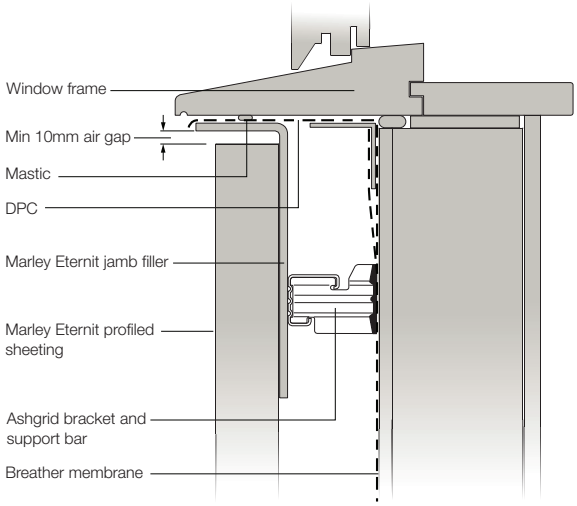
Valley fasteners

An alternative solution, which doesn't require the support clips, is to fix the sheets in the valley corrugations. The sheets should be pre-drilled with a 2mm oversize hole.



Typical double skin vertical cladding





Window detail

Profile 6, Erskine Garden Centre, Scotland

Profile 6, Sandal Magna School, Wakefield

Vertical tile hanging

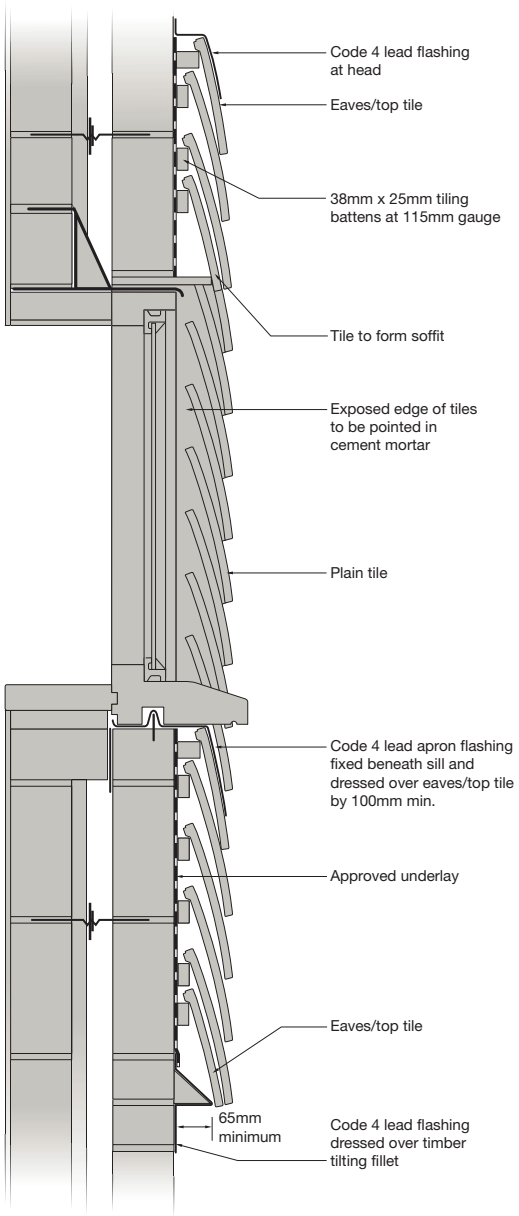
Plain tiling and slates are an excellent, weatherproof and attractive cladding to the vertical walls of any building.

Ashdowne Aylesham Mix (roof) and Ashurst (vertical tiling and fittings)

Ashdowne Aylesham, Collegiate School, Berkhamsted

Vertical tiling with plain tiles

Feature and ornamental tiles may also be used with normal plain tiles to create decorative patterns. Fibre cement slates can also be used for vertical cladding.

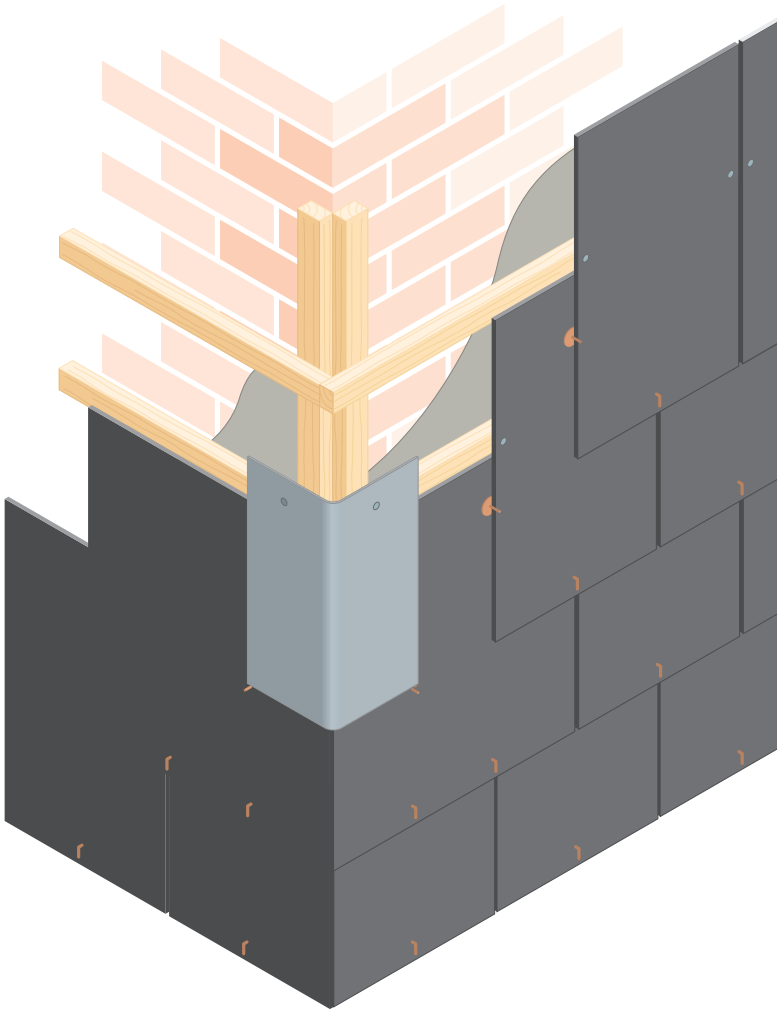


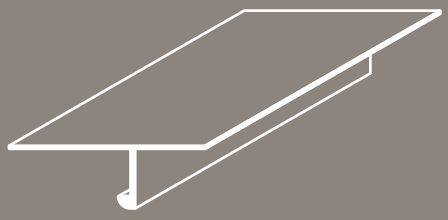
Thrutone Blue/Black, Wimlands Farm, West Sussex

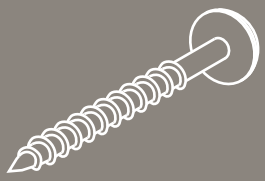
Birkdale Blue/Black, Tally Ho Police Training College, Birmingham

Vertical slating with fibre cement slates

Fibre cement slates can be fixed to vertical surfaces and provide an attractive and weatherproof cladding on both timber frame and masonry constructions.

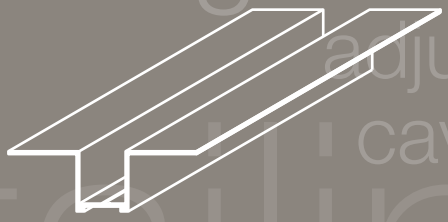






junctions

interchangeability

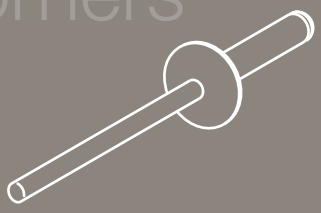


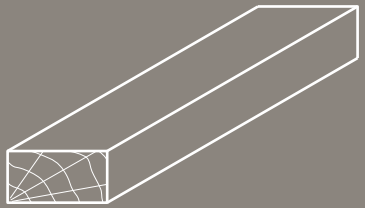
adjustable

cavity depths

detailing

internal corners





engineered
light weight
concealed fixing

Fixing systems

Introduction

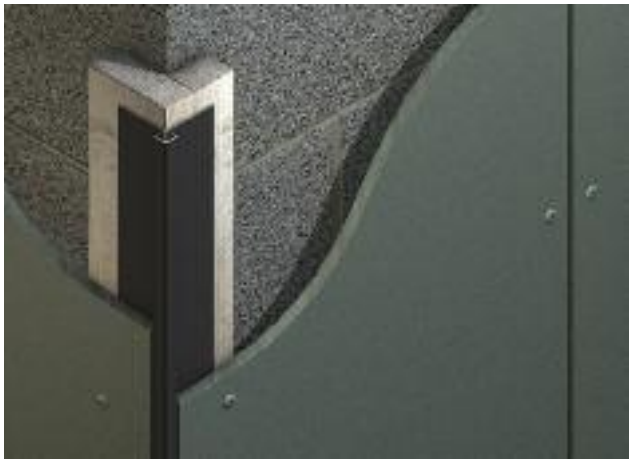
The variety of rainscreen facade solutions available from Marley Eternit is matched by a comprehensive range of fixing systems.

The interchangeability of panel and system means that the design permutations are wide and careful choice of product and system will allow any specifications to be met.

The aesthetic end result of the various fixing options (i.e. whether panels are visibly fixed, edge retained or secret fixed) are discussed on page 27.

In addition to the fixing systems detailed on this page, there are a number of special systems and applications for Marley Eternit Cladding Panels such as tunnel lining, infill panels, balconies, portable buildings etc.

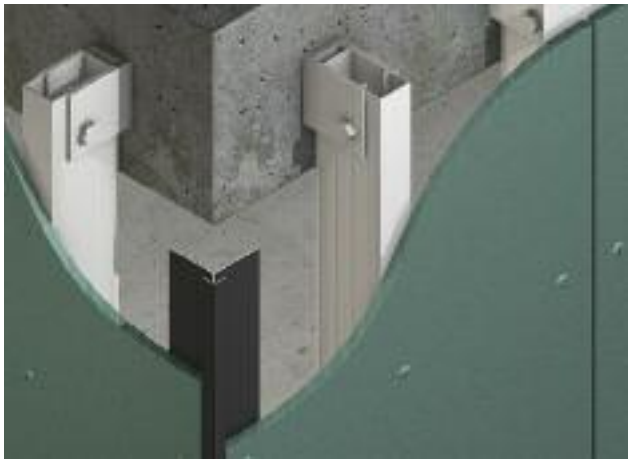
Visible fixing systems



Timber battens (pages 90-93)
Economical and durable, timber battens are widely used for all applications from fascias and soffits to total cladding.

Omega and Zed (pages 94-99)
A simple metal component system easily installed in a similar fashion to timber battens with the added benefit of non-combustibility and a completely rot-proof construction.

Ventisol (pages 100-103)
A highly engineered system of top quality components specially developed for fixing to new or existing structures. The adjustment within the components allows a true plane to be easily achieved for the new cladding facade.



Ventispan (pages 104-107)
The Ventispan system provides a framework for the cladding of both concrete and steel framed structures, and is designed to be anchored to the structure at each floor level with vertical profiles spanning from floor to floor between anchor/bracket positions.

Application Instructions

Marley Eternit offer a full range of Application Instructions for their fixing systems, setting out detailed design and installation data.

Please contact the Technical Advisory Service for further information on 01283 722588.

Secret fix systems

Site bonding structural adhesive (pages 109-111)

The structural bonding system utilises structural adhesives to fix internal and external cladding panels for a secret fix system.

Mechanical secret fix (pages 112-113)

This secret fix system is suitable for use with 12mm thick fibre cement material and supports the cladding panels by means of aluminium profiles.

Fixings and accessories (pages 114-115)

Marley Eternit offer a comprehensive range of fitting and accessories purpose-designed to work with our cladding systems and to provide maximum design and fixing flexibility for all of the above fixing systems.

The range includes:

- Corner pieces
- Colour matched screws and rivets
- Horizontal joint trims
- Perforated closures
- Flexible jointing strips

BENCHMARK By Kingspan

All of Marley Eternit facades can be installed on to the BENCHMARK Konnect or Karrier Panel System using a secret-fix or face-fix solution. Two build options from BENCHMARK that are simple and fast to install.

For further details please contact:
Tel: +44 (0)1352 716100
Email: info@kingspanbenchmark.com
www.kingspanbenchmark.com

Timber battens introduction

An economical method of application for Marley Eternit facade panels is that of mounting on a timber framework using rainscreen construction principles.

Unless specific fire performance requirements or irregularities to the substrate are encountered (where other adjustable Marley Eternit Systems are employed), timber battens will provide an economical and speedy installation.

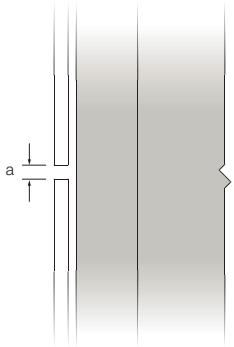
Timber protection

Timber battens can be protected against decay and insect attack in accordance with BS 5268: Part 5.

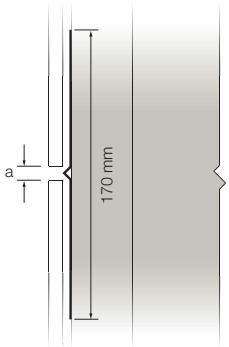
Horizontal joint alternatives

Horizontal joints may be formed using Marley Eternit horizontal joint profiles Type HJP. Alternatively, an open joint detail may be used.

	Dimension (mm)
Product - EQUITONE	a
[natura]	10
[pictura]	10
[textura]	10



Horizontal open joint



Horizontal joint profile type HJP

Timber battens
vertical joints & corner profiles

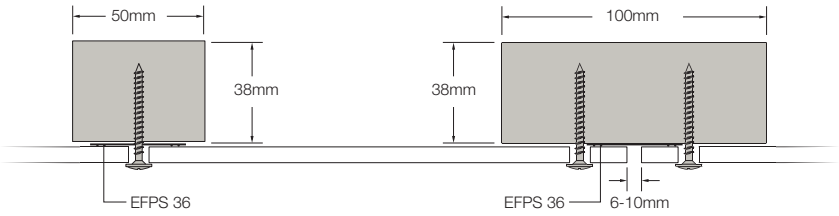
Vertical joint and intermediate panel fixing

Marley Eternit supply black flexible jointing strips to protect and close vertical joints.

EFPS 36mm – standard panel joints

EFPS 60mm – corner joints

Note: To ensure an even surface, an EFPS 36 strip should be placed behind intermediate panel fixing.

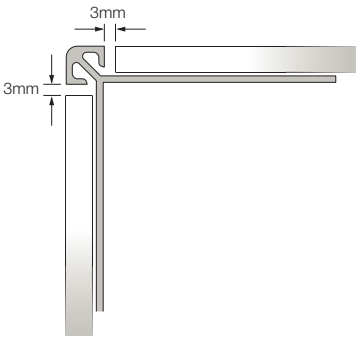


Corners

Corners are created using flat sheets and the appropriate jointing strips and corner profiles.

Universal corner profiles

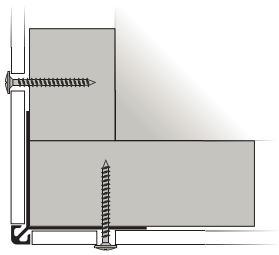
These are supplied black or mill finished as standard.



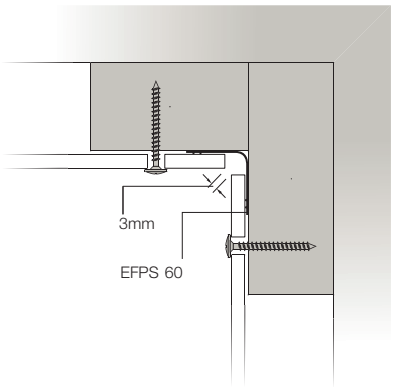
External corner

Universal corner profile – UCP

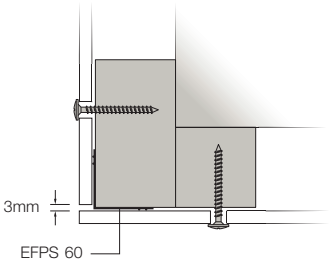
For good site practice it is necessary to vary the position of screw fixings to ensure that adequate penetration occurs. The example below illustrates a batten configuration employing 38mm deep battens and the respective screw positions



Open joint – internal

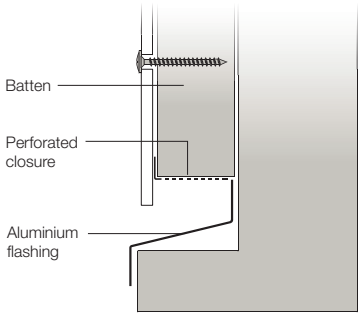


Open joint – external

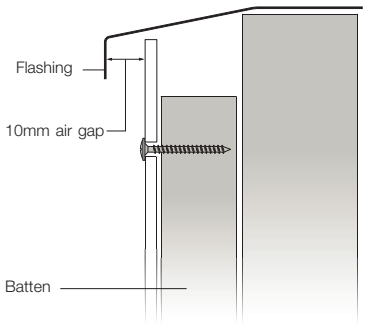


Timber battens
cladding junctions

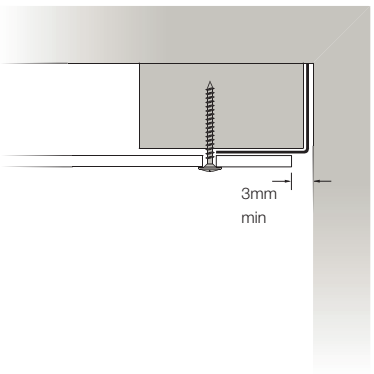
Base of cladding



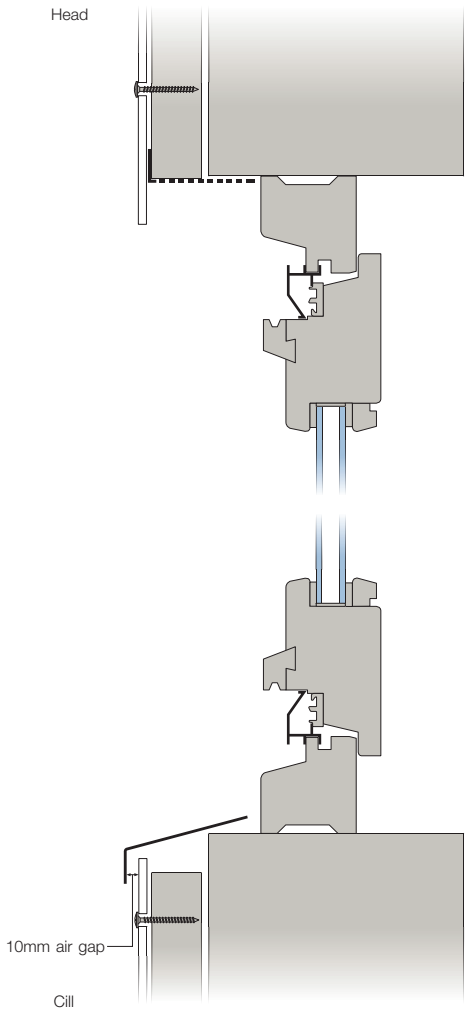
Top of cladding



Brickwork abutment

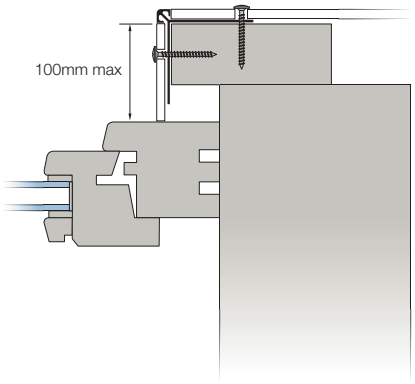


Typical window detail



Jamb

For all jambs in excess of 100mm, additional fixings are required.



Timber battens fixing details

Batten sizing

Screws

Panel joints min 100 x 38mm
Intermediate min 50 x 38mm

Larger battens are required if fixings are more than 25mm from the vertical edge.

High wind loadings or exceptional impact requirements

Should wind loading exceed ± 2.0 kN/m^2, please consult the Technical Advisory Service. Where exceptional impact levels to cladding panels can be anticipated, i.e. low level applications near pedestrian access, schools, leisure facilities etc., additional timber battens, between the fixing batten, can be incorporated to increase the panel's resistance.

Screw holes

Pre-drilled holes dimensions for the panels are set out below:

Facades – EQUITONE	Fixed hole (if required)
[natura]	6mm
[natura] with Pro coating	7mm
[tectiva]	5mm (fixed point) 8mm (all other holes)
[pictura]	7mm
[textura]	6mm

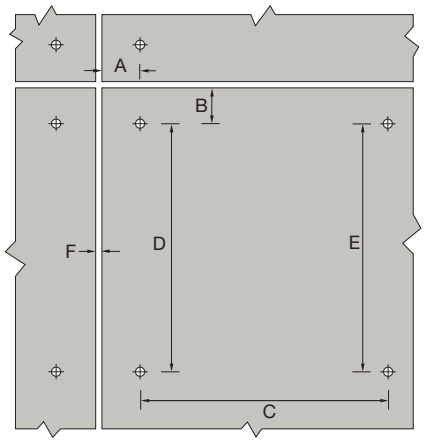
Surface mounted features

Where other building features, i.e. signs, gutters, canopies etc. are to be fixed then additional batten work should be included and clearance holes must be provided through the cladding. Under no circumstances should cladding panels receive any additional structural loads.

Fixing centres (all dimensions in mm) – EQUITONE

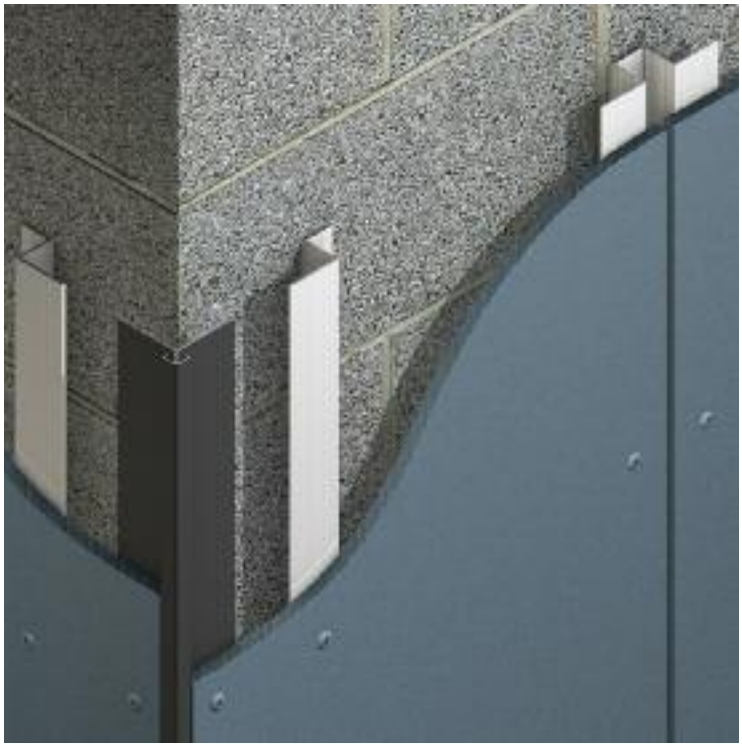
Product	[natura]* 8mm	[tectiva]	[pictura] 8mm	[textura] 8mm
Windload kN/m^2	1.5	1.5	1.5	1.5
Dims				
A	25	25	25	25
B	75-100	75-100	75-100	75-100
C	600	600	600	600
D	600	600	600	600
E	600	600	600	600
F	10	8-10	10	10
Fixing length	35	38	35	35

* For EQUITONE [natura] with Pro coating, call our Technical Advisory Service on 01283 722588.



N.B. In all cases it is important to have the corner fixings staggered at unequal spacings from the two edges.

Omega and Zed introduction

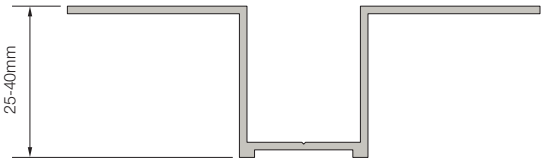


As an alternative to timber battens, particularly where there is a specific requirement for non-combustible frameworks, a lightweight aluminium framework can be used.

These can be fixed either directly to a concrete, brick or block wall, or to a purpose-designed rail system. Marley Eternit's facade material, EQUITONE [natura], EQUITONE [tectiva], EQUITONE [pictura] and EQUITONE [textura] can then be rivet-fixed to the Omega and Zed.

Omega profile

The Omega profile is supplied in 6m lengths and employed at panel joints. Weight = 1.1kg/lin. metre



Zed profile

The Zed profile, also supplied in 6m lengths, is used at intermediate, corner and abutment positions. Weight: 0.9kg/lin. metre

Omega and Zed horizontal joints

Fixing to horizontal joints

Where it is envisaged that Omega and Zed are fixed to a horizontal rail system please note:

- The rail centres should not exceed 1500mm
- A wind barrier should be sheathed over the front of the horizontal rails

All profiles and fixing accessories are carefully selected for their compatibility in normal atmospheric conditions.

Profiles

Material

Aluminium to BS 1474 Grade 6082 T6.

Finish

Mill finish.

Anchoring of Omega and Zed to building substrate

The profiles should be affixed adequately back to a wall/rail system with suitable proprietary anchors or fixings. The Omega and Zed profiles have been designed to span up to 1500mm where dynamic wind loadings do not exceed ± 2.0kN/m^2.

The design and selection of a specialist anchor to suit the substrate's characteristics should be based on engineering calculations and referred to reputable manufacturers such as Hilti, Fischer, Leibig, Rawlplug, Buildex, Spit etc.

A 10mm expansion joint should be provided between vertically adjacent Omega and Zed profiles, with an anchor provided within 200mm of the ends of all profiles.

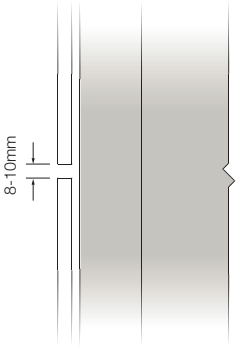
High wind loadings or exceptional impact requirements

Should wind loading exceed ± 2.0kN/m^2, please consult the Technical Advisory Service. Where exceptional impact levels to cladding panels can be anticipated, i.e. low level applications near pedestrian access, schools, and leisure facilities, additional rails can be incorporated to increase the panel's resistance.

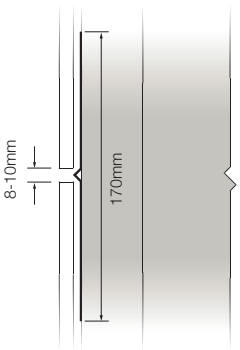
Horizontal joint alternatives

Horizontal joints may be formed using aluminium joint profiles type HJP. Alternatively, an open joint detail may be used.

With an open joint, the aluminium profiles will be visible between two panels. Black paint or PVC tape can be used to mask this effect.



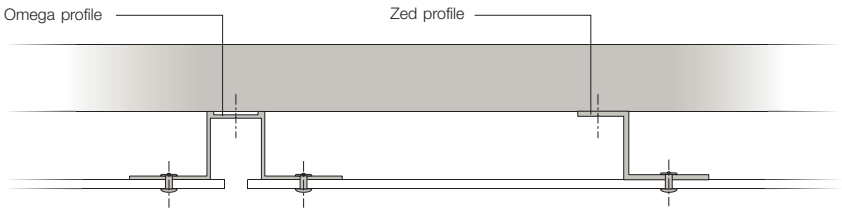
Horizontal open joint



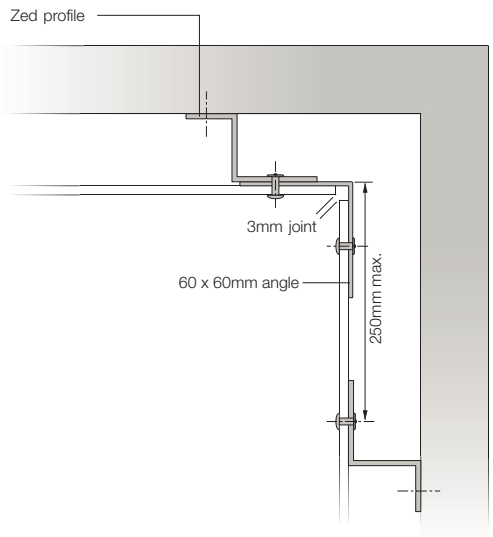
Horizontal joint profile type HJP

Omega and Zed
vertical joints & corner profiles

Vertical joint and intermediate fixing

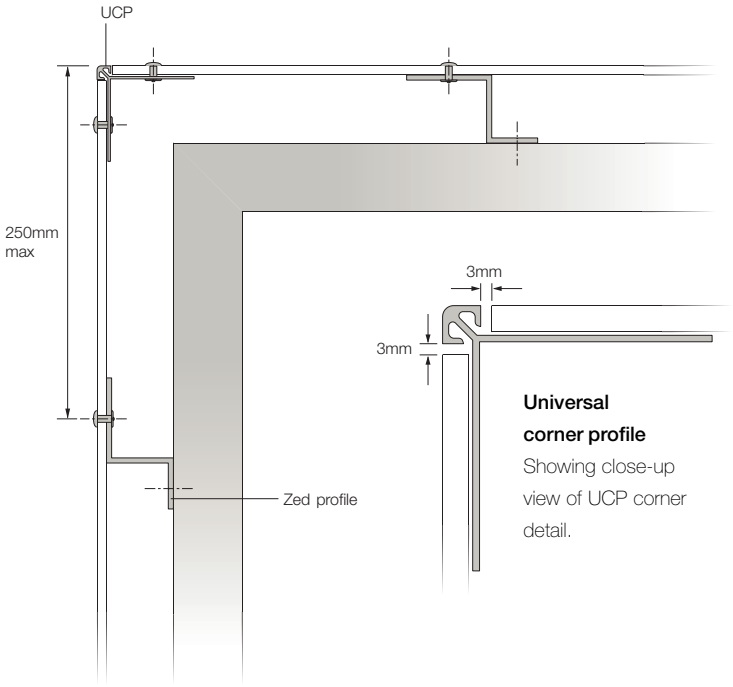


Internal corner



External corner

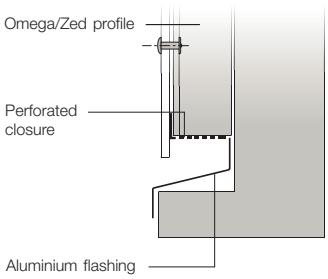
Universal corner profile (UCP)



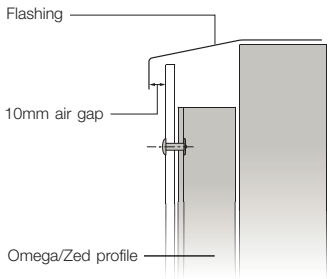
Universal corner profile
Showing close-up view of UCP corner detail.

Omega and Zed cladding junctions

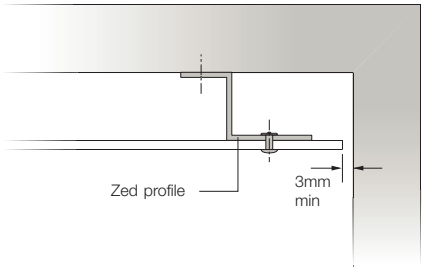
Base of cladding



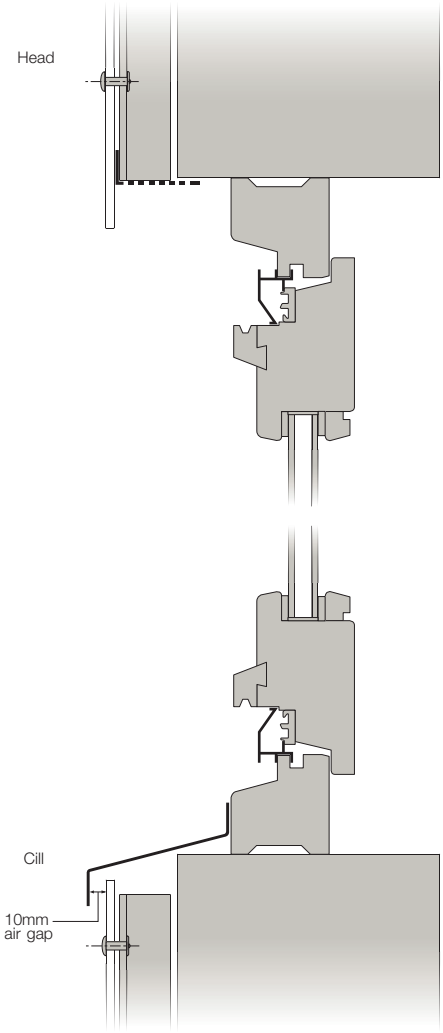
Top of cladding

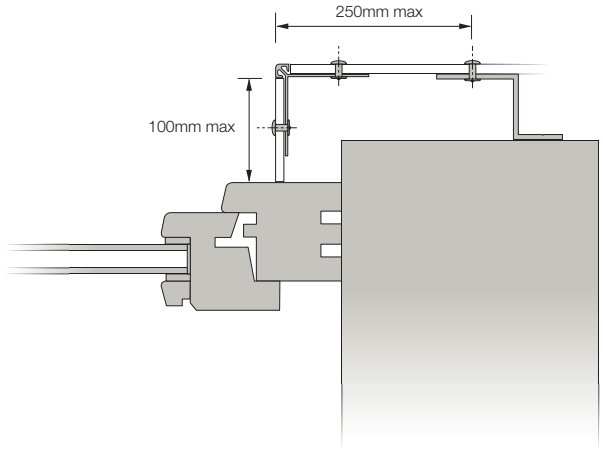


Brickwork abutment



Typical window detail





Jamb

For all jambs in excess of 100mm, additional fixings are required.

Omega and Zed fixing details

Omega and Zed profile spacing

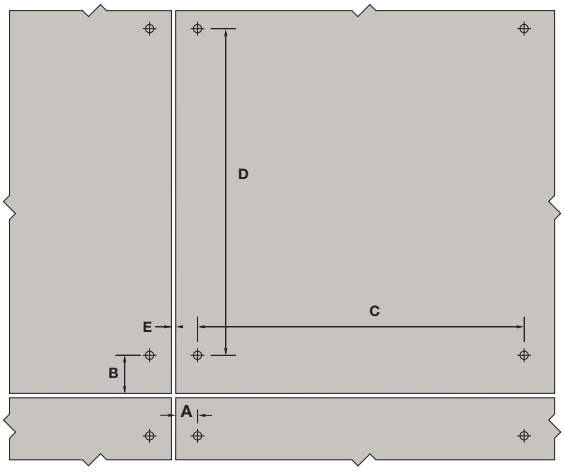
Profiles are spaced horizontally across the elevation to suit the panel requirements, up to maximum centres of 600mm.

Universal corner profiles (aluminium)

These are supplied black or mill finished as standard.

Maximum panel rivet fixing centres (all dimensions in mm) for all products

Windload kN/m²		**up to 1.5**	**1.5 – 2.0**
Dims	A	40	40
	B	75-100	75-100
	C	600	500
	D	600	500
	E	10	10

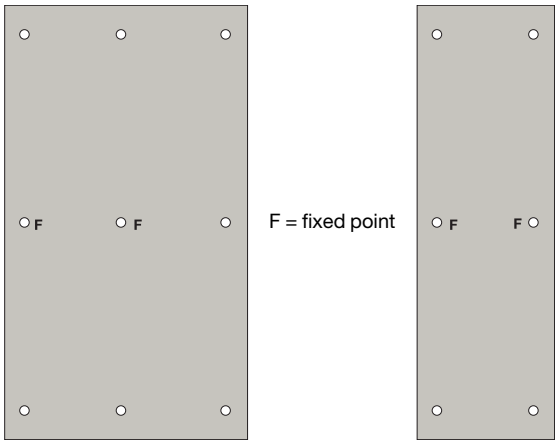


Rivet holes

Facades are supplied by Marley Eternit fabricators with the fixing holes pre-drilled to an agreed pattern.

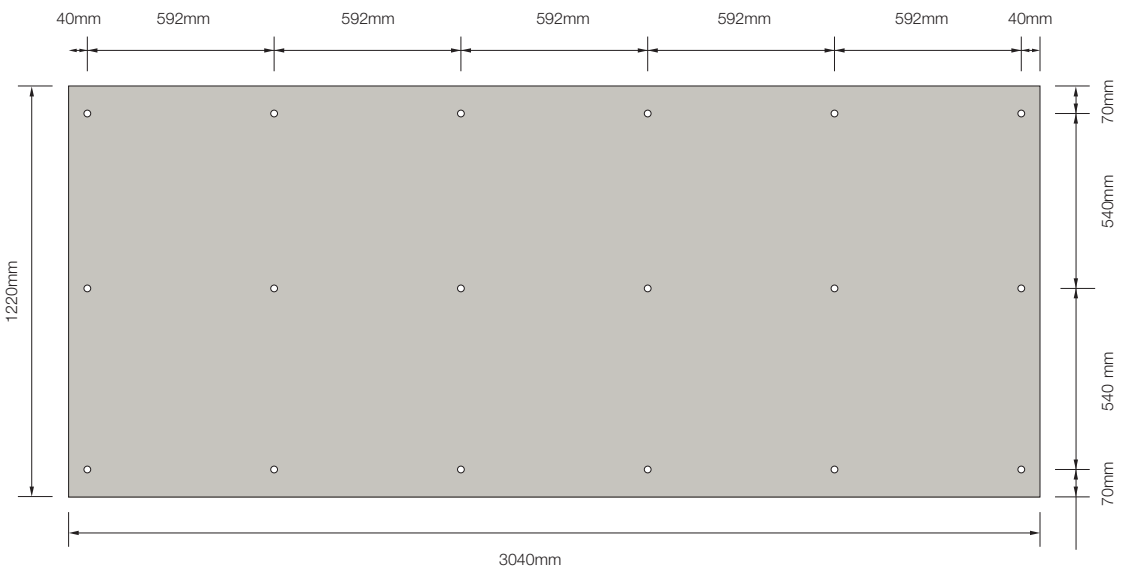
Hole sizes

Pre-drilled holes in the panels shall be as described in the relevant Application Instructions. For full fixing information, please refer to the Technical Advisory Service.



Typical panel/ holing layout

Example using EQUITONE [natura].



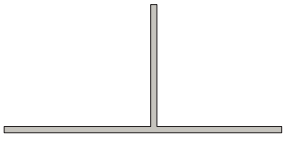
EQUITONE [natural], Brunel University, Uxbridge

Ventisol introduction

An aluminium frame fixing system able to provide adjustable void depths to accommodate insulation, and able to overcome irregularities in the supporting substrate.

Components

'L' profile

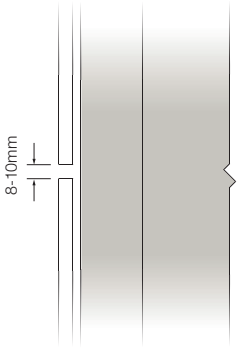


'T' profile

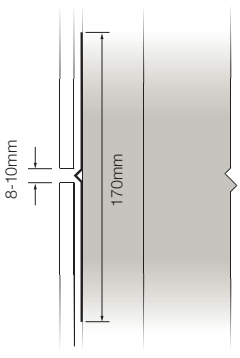
Horizontal joint alternatives

Horizontal joints may be formed using aluminium joint profiles type HJP. Alternatively, an open joint detail may be used.

With an open joint, the aluminium profiles will be visible between two panels. Black paint or PVC tape can be used to mask this effect.



Horizontal open joint



Horizontal joint profile type HJP

Ventisol
application instructions

Anchoring of the Ventisol framework to the existing structure

The choice of the appropriate anchor, based on the substructure and calculated loadings, should be decided in consultation with a reputable fixings manufacturer, such as Fischer, Hilti, Rawlbolt, Leibig and their recommendations must be adhered to.

The vertical spacing of the anchor points will depend upon the windload calculations as noted below. For combination of Marley Eternit Support Rail system and Ventisol please contact Technical Advisory Service.

Horizontal spacing of the anchor points will be determined by the panel and rail layout, and the maximum rivet spacing of 600mm.

Each length of vertical cladding rail must be anchored to the building at a minimum of two points.

No vertical rail should oversail its last bracket/ clamp assembly anchored to the wall by more than 300mm.

Choice and fixing of support brackets

The choice of brackets will depend upon the required spacing between the face of the existing building and the back of the cladding panel.

By intermixing brackets, a total range of 75-275mm is obtainable.

Contact the Technical Advisory Service for further information.

Attaching vertical cladding rails to the brackets

Cladding panel horizontal joints should always coincide with expansion joints in the Ventisol Profiles. Under no circumstances should any cladding panel be riveted to two different 'T' and 'L' profiles in the vertical plane.

Assembly and alignment

Vertical alignment of the cladding rail and the standoff distance from the back of the cladding panel to the existing building should be set in accordance with the specifier's instructions.

In setting this standoff distance, check that it will be possible to maintain it across the elevation without exceeding a tolerance true in either plane – variation not to exceed 1 in 300, i.e. 2mm over 600mm, non-accumulating.

Note: Although irregularities in the face of the existing building may result in the specified standoff being exceeded in some areas, the standoff must never be reduced to a figure less than the total of the thickness of the insulation plus the specified ventilation void.

No additional load must be imposed upon the cladding panels or framework without written agreement or specified design from the Technical Advisory Service. Where service vents or grills are to be installed on the face of the cladding panels, specific guidance should be sought from Marley Eternit Ltd.

EQUITONE [natura], Northern Design Centre, Gateshead

Ventisol
application instructions

Insulation

The type and make of insulation will be chosen by the specifier, and must be fastened direct to the building in accordance with the manufacturer's instructions.

The insulation must be packed closely around the support brackets to minimise any potential cold bridge situation. Insulation slabs must be closely abutted at all edges so that they form a continuous cover on all walls. Where services have to penetrate the cladding, the insulation must be packed closely around them at the point where they exit from the building. No gaps should be left in the insulation.

Cavity fire barriers

Where specified on the contract drawing, cavity fire barriers should be incorporated into the overcladding system. As these components will form a continuous barrier horizontally (and/or vertically) at the specified location, provision for interrupting the Ventisol Profiles and/or the panels will have to be made. It is difficult to generalise about the installation of the cavity fire barrier components as each project will have its own inherent details. Specific reference to the installation of the Cavity Fire Barrier should be noted on the Contract Drawings.

For more information, please refer to pages 35-37.

Fixing the cladding panels

It is essential that the panels are fixed correctly if subsequent damage is to be avoided. Horizontal and vertical panel joints must be carefully aligned for aesthetic reasons.

Installers may have their own preferred method of locating the panels correctly, and providing the fixing recommendations are strictly adhered to, Marley Eternit will have no objection to this.

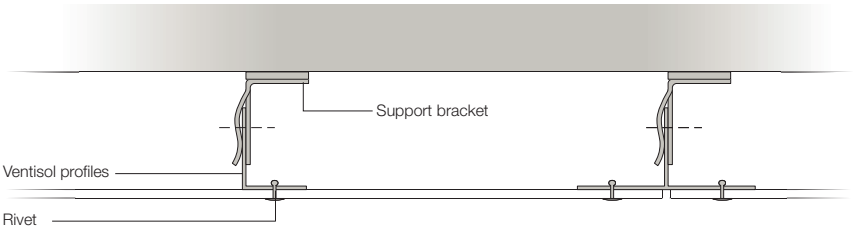
Fixing details

The contractor is to supply to the cladding fabricator the necessary information for cutting, drilling and delivery of the panels. A list of fabricators can be supplied on request.

Rivet holes should be located in accordance with the specifier's drawings, and specific Marley Eternit product literature. Fixing centre of the rivets will depend upon the windload calculations, but must not exceed 600mm. All rivet holes should be designed to align vertically and horizontally to give the neatest appearance.

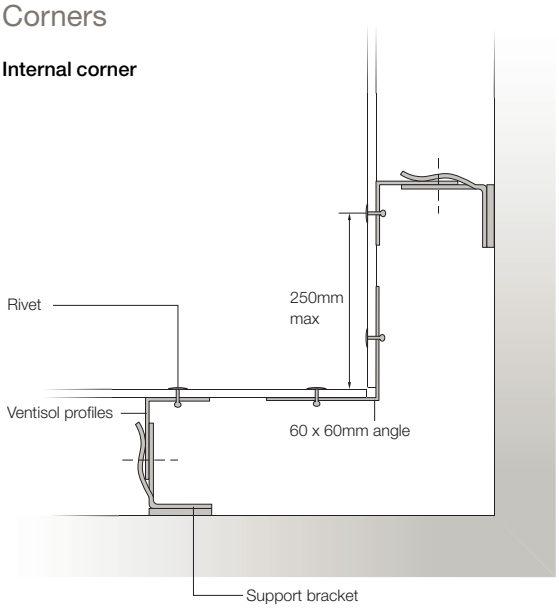
Marley Eternit high performance fibre cement material is normally supplied cut and drilled by specialist distributors. If limited cutting or drilling has to be actioned on site refer to the Technical Advisory Service for specific cutting advice.

Vertical joint and intermediate fixing

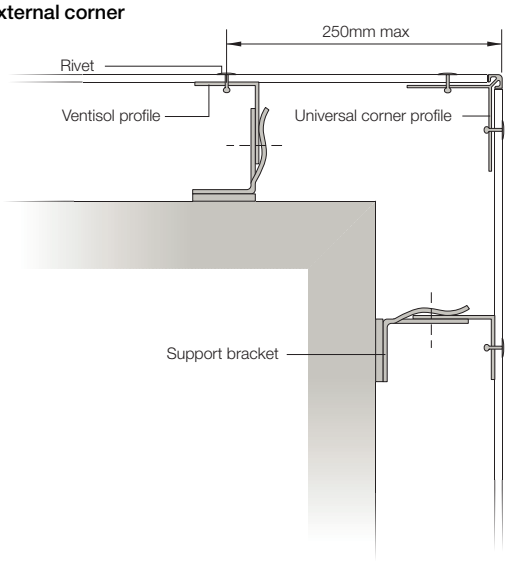


Corners

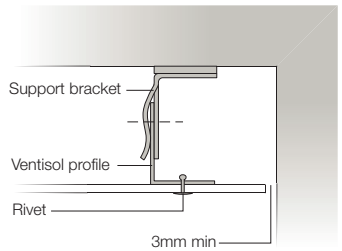
Internal corner



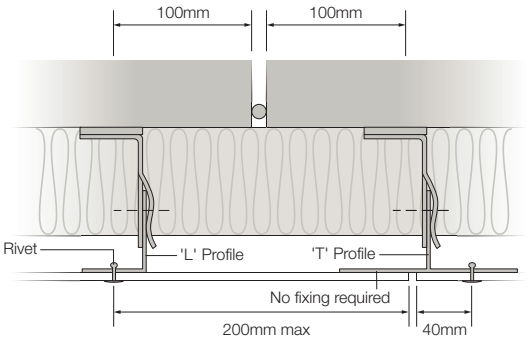
External corner



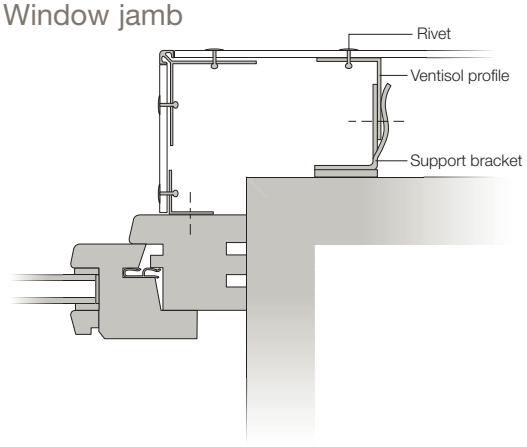
Brickwork abutment



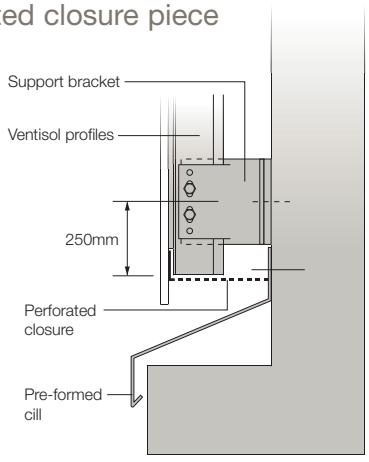
Expansion joint



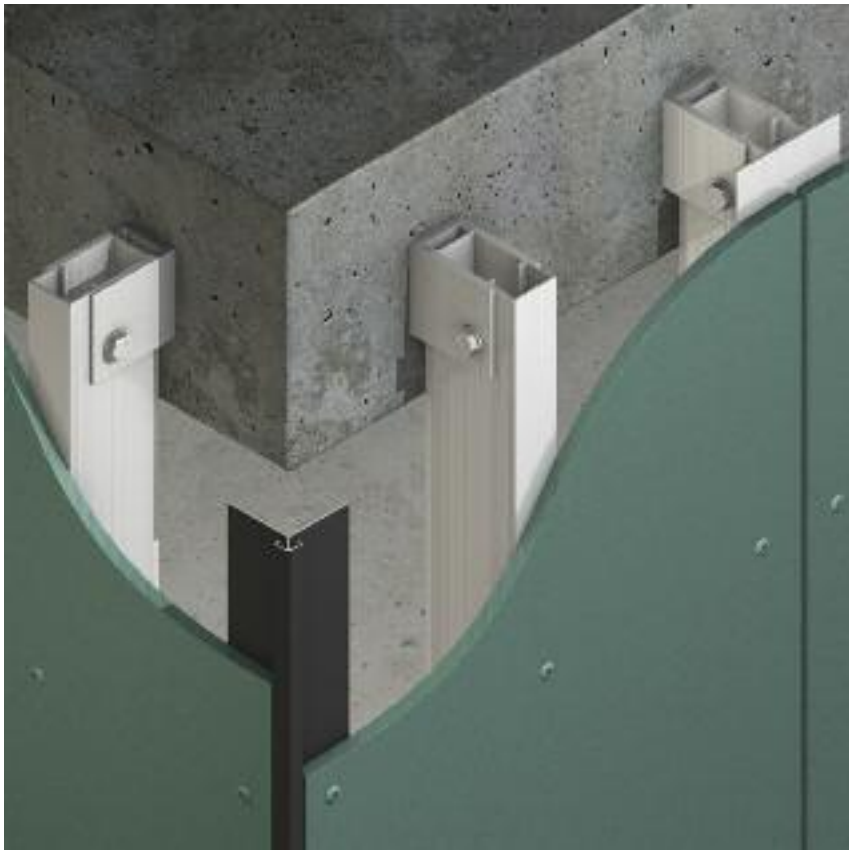
Window jamb



Perforated closure piece

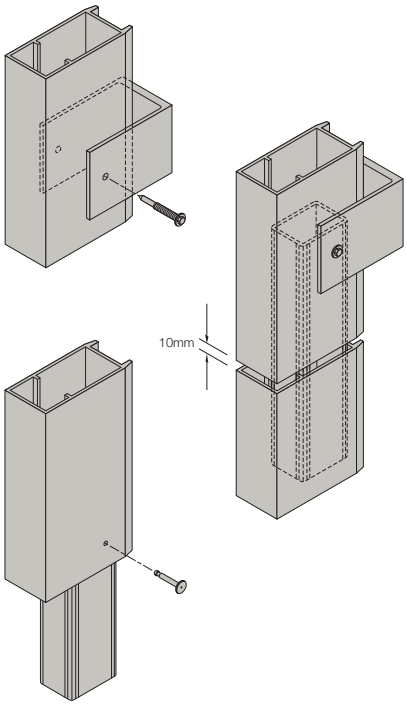


Ventispan introduction



A highly adjustable system allowing for irregularities in substrate surface, Ventispan is ideal where poor quality infill material on existing buildings dictates that fixings can only be secured at floor slab positions.

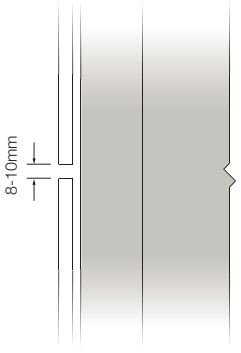
Components



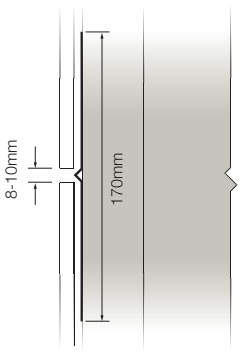
Horizontal joint alternatives

Horizontal joints may be formed using aluminium joint profiles type HJP. Alternatively, an open joint detail may be used.

With an open joint, the aluminium profiles will be visible between two panels. Black paint or PVC tape can be used to mask this effect.



Horizontal open joint



Horizontal joint profile type HJP

Ventispan
application instructions

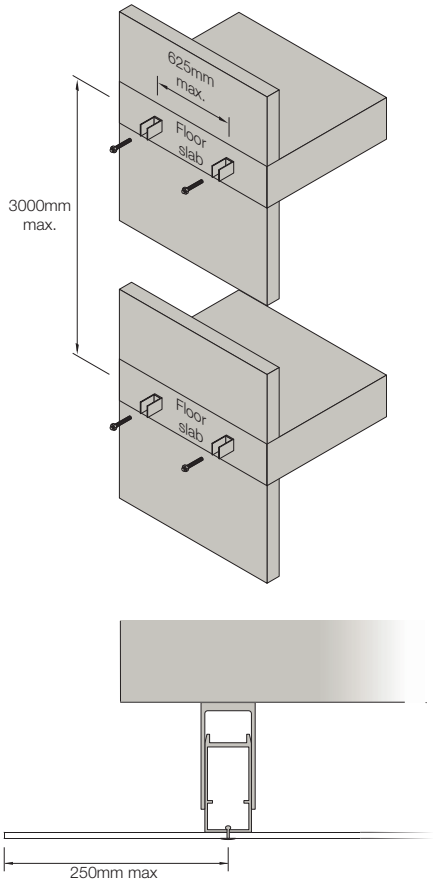
Anchoring Ventispan to the existing structure

The system is designed to be anchored into floor slabs. The choice of appropriate anchor based on the substructure and calculated loadings should be decided in consultation with a reputable fixings manufacturer.

Pull out tests of primary anchors must be compared with the system's design requirements, with an adequate factor of safety. Formal certification of any testing should be kept.

The vertical spacing of the brackets anchor points will depend upon wind load calculations, which should be undertaken by a competent engineer. The vertical spacing must not exceed 3 metres without the written approval of Marley Eternit.

The horizontal spacing of bracket anchor points across the facade will depend on wind loadings, choice of panel material and panel layout but will not normally exceed 625mm. Spacings in excess of this can be permitted but only with the use of stiffened panels and the prior approval of Marley Eternit.



Anchoring

All brackets should be secured to the structure with one anchor in the central slot (which allows for some sideways adjustment). Where a single anchorage cannot be made, alternative brackets provide for dual anchors in side wings.

The brackets must be installed at 90° ± 2 to the structure with plumb alignment.

If the existing structure's surface is irregular, local concrete repairs should provide a flat base for the bracket.

Isolation membranes are required where brackets are in contact with new concrete pads, repairs.

At external corners the bracket/rail position must accommodate the maximum over sail of the panels 250mm.

Due consideration should be given to the positioning of primary anchors to achieve minimum edge dimensions.

Anchor bolts should not protrude so as to foul fitting of the rails.

Choice and fixing of support brackets

The choice of bracket type will initially depend upon the required cavity spacing of the installation.

Brackets allow a cavity range from 95-225mm

Attaching rails to the brackets

Ventispan rails can be installed either from the top of the structure working down or from the bottom of the structure working up. Experience has shown the latter to be more common practice.

The brackets are designed to grip the rails via the 'helping hand' principle. Thus the rails can be easily aligned by tapping in or out of the 'helping hand' prior to fixing.

The rails are connected together with a splice sleeve which can also be secured with the bracket rail fixing.

There must be a 10mm gap at rail connections and this splice sleeve must only be fixed one side of the connection to allow for expansion.

Note: For safety reasons it is preferred, unless otherwise required, to pre-rivet the splice sleeve into the bottom of each rail before positioning.

Ventispan
application instructions

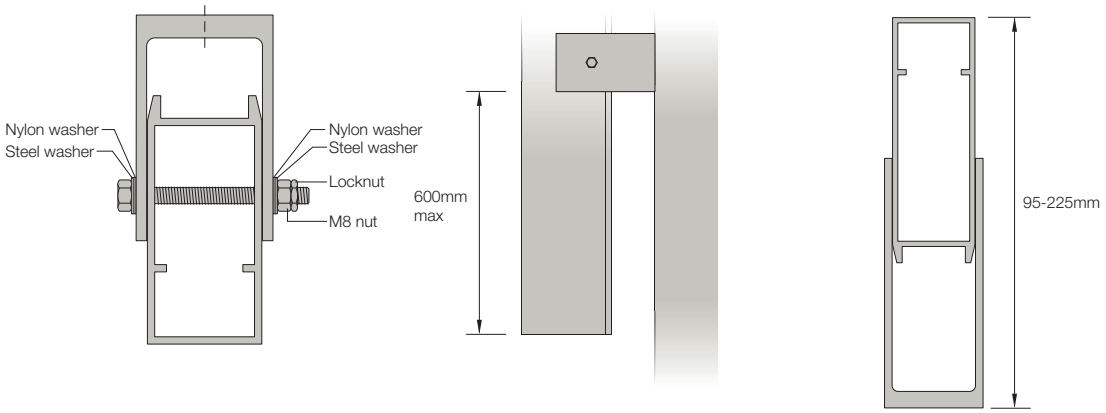
Bracket to rail fixings

Sliding Bracket Fixing

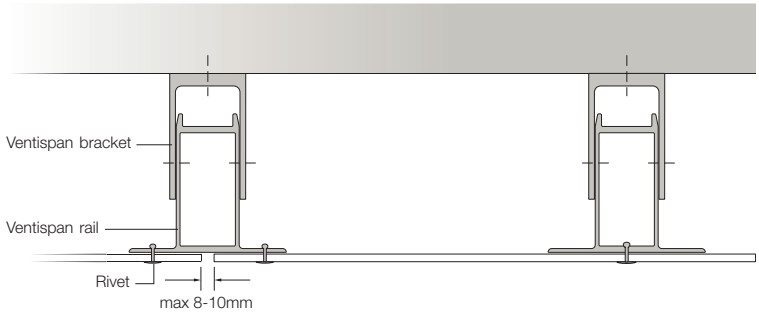
Inevitably one Ventispan rail, usually at the top, will have to be fixed to two brackets. To allow for possible thermal expansion a special slotted bracket should be used.

Oversail

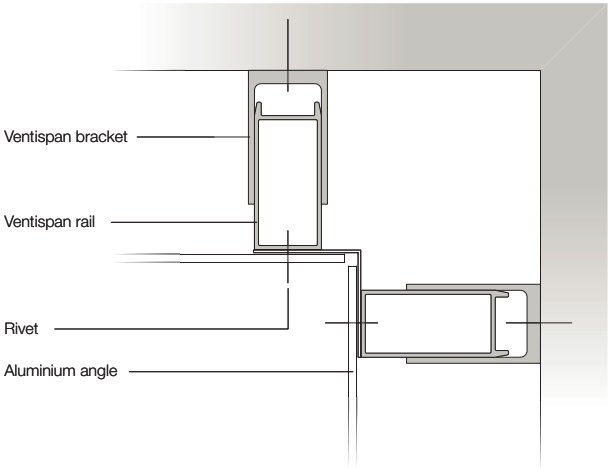
Maximum rail oversail from support brackets 600mm. The rails must fit into the brackets a minimum of 40mm leaving a maximum 70mm visible depth of rail.



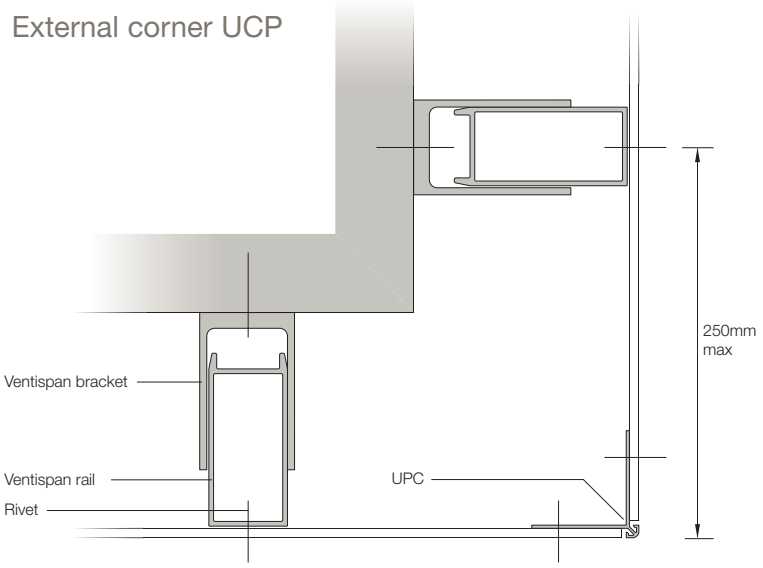
Vertical joint and intermediate fixing



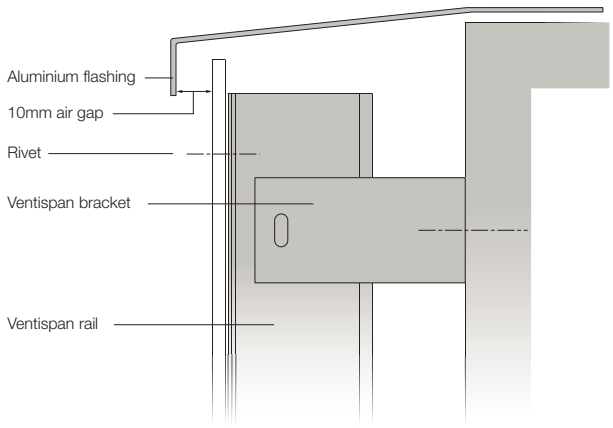
Internal corner



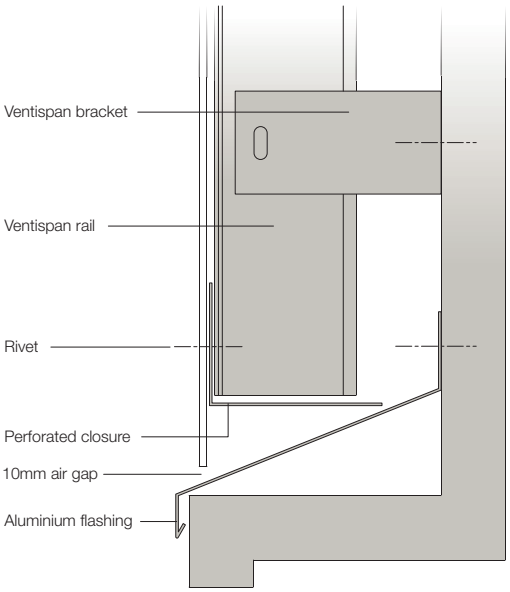
External corner UCP



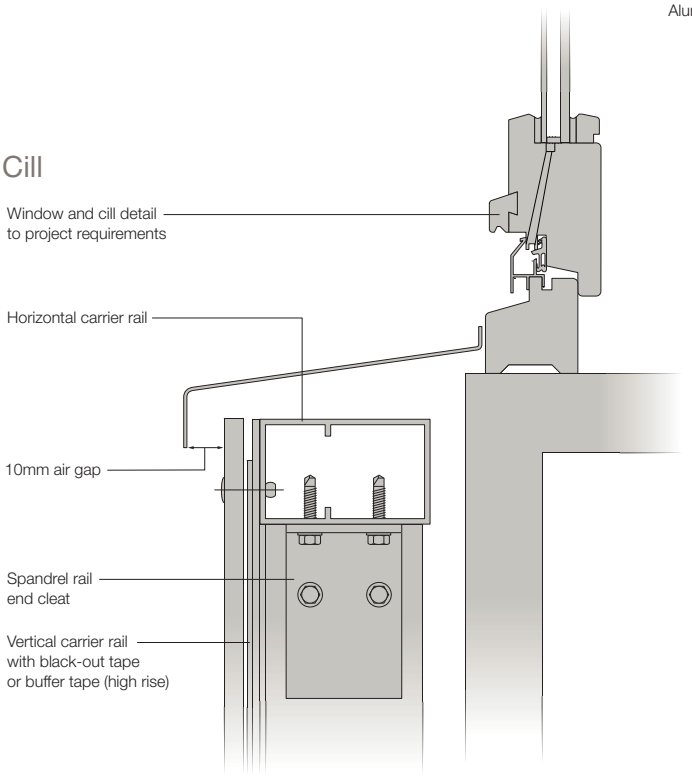
Top of cladding



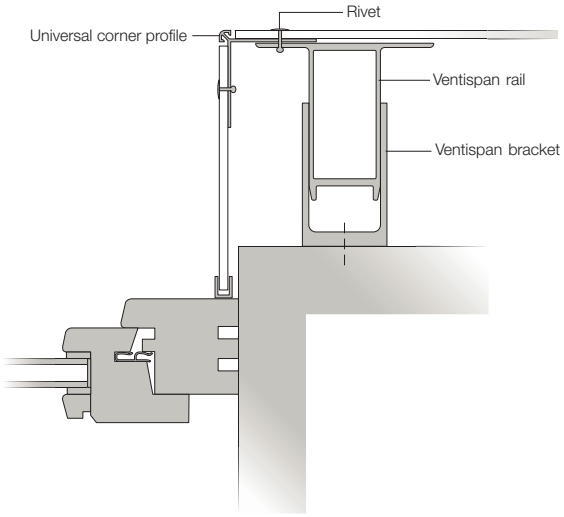
Base of cladding



Cill



Jamb



Insulation

The type and make of insulation will be chosen by the specifier, and must be fastened direct to the building in accordance with the manufacturers' instructions. Insulation should be vapour permeable to allow water vapour to migrate from the structure into the cavity.

The insulation must be packed closely around the support brackets to minimise any potential cold bridge situation.

Insulation slabs must be closely abutted at all edges so that they form a continuous cover on all walls. Where services have to pass through the cladding zone, the insulation must be packed closely around them at the point where they exit from the building. No gaps should be left in the insulation.

Cavity fire barriers

Cavity fire stops may be required to be installed on any multi-storey structure. Placement of these will be as required by the specification and/or as detailed on the drawings.

At the required fire stop location the support angle is fixed to the structure at 500mm centres along the angle up stand. The slotted fire stop is then positioned with the leading edge flush with the face of the rails and rivet fixed to the support angle at 300mm centres.

Where Ventispan rails pass through the fire barrier, it should be neatly trimmed and intumescent foam used to close all gaps.

→ More

See pages 35-37 for more information about fire safety.

Secret fix systems introduction

The fixing method chosen can have a fundamental and dramatic effect upon the final appearance of the facade. Employing a secret fix method will result in a sheer, smooth facade unobstructed by fixings.

In practice, many versions of secret fixing exist, including infill or composite panels.

This design guide however provides details for two specially developed Factory fabricated systems, and also a structural bonding system developed for on site use.

Site bonding is limited to application within the temperature range 5°C to 35°C and only in dry weather (check with adhesive manufacturer).

Structural bonding

Mechanical secret fix (for EQUITONE [natura], EQUITONE [textura] and EQUITONE [pictura])

Site bonding structural adhesive introduction

The structural bonding system utilises structural adhesive to fix both internal and external cladding panels to a support framework. It will bond panels to either a timber or aluminium framework.

The system employs a combination of double sided tape and continuous beads of adhesive to fix the panels.

The double sided tape controls the spread of adhesive as the panel is applied and provides initial contact retention whilst the adhesive cures.

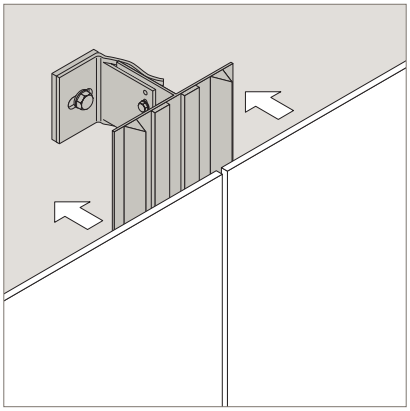
Extensive testing by participating companies has demonstrated the performance of the structural adhesive in several important areas.

- Laboratory testing indicates that the structural adhesive will have an expected life in excess of 40 years
- The adhesive remains permanently flexible during the life of the product, accommodating hydro-thermal movements in the structure and the cladding panel
- Factors of safety, both short and long term, indicate that both static and dynamic loads can be more than adequately resisted. In fact, the safety factors are many times greater than traditional methods of fixing.

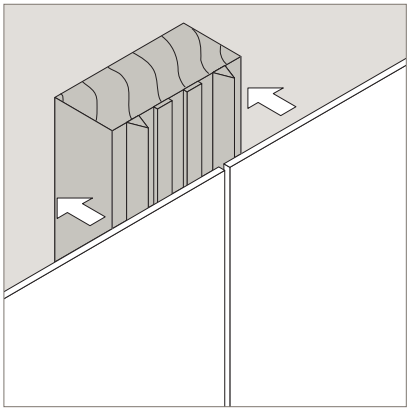
Fixing centres – EQUITONE

	Framework centres (mm) for max 2kNm^2 windload
[natura]	500
[tectiva]*	500
[pictura] 8mm	500
[textura]	500

* Restrictions apply, please contact the Technical Advisory Service for further information on 01283 722588.



Panels bonded on Marley Eternit aluminium framework



Panels bonded on timber substrate

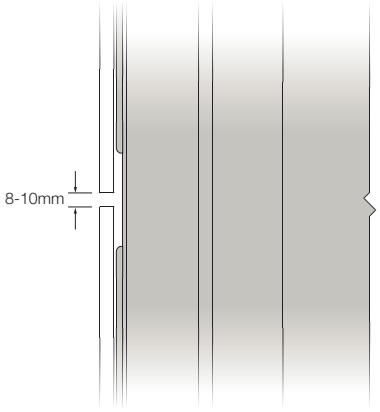
Site bonding structural adhesive design details

Horizontal joint alternatives

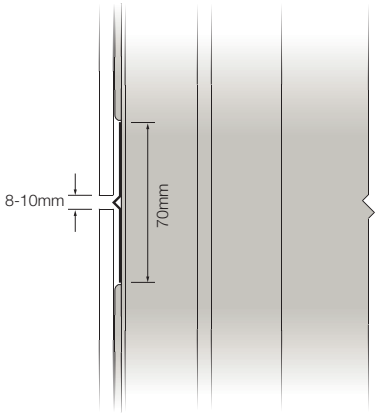
Horizontal joints may be formed using aluminium joint profiles type HJP 70. Alternatively, an open joint detail may be used.

With an open joint, the aluminium profiles or timber will be visible between the panels. Black paint or PVC tape can be used to mask this effect.

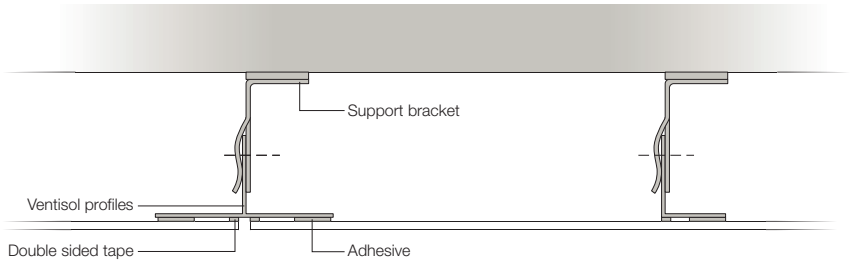
Horizontal open joint



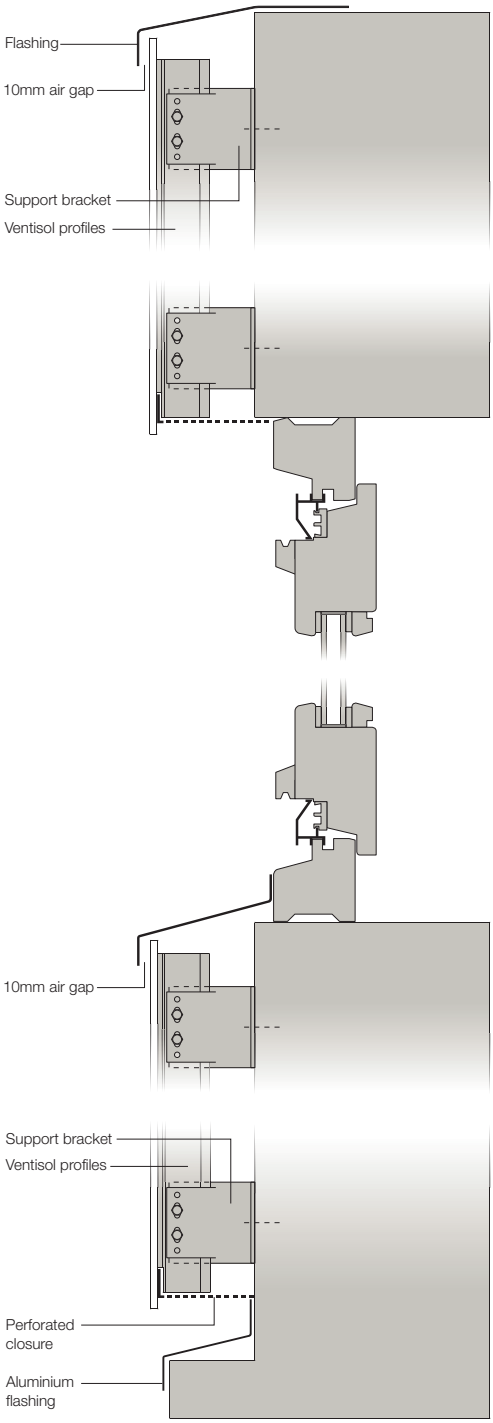
Horizontal joint profile type HJP70



Vertical panel joint and intermediate fixing

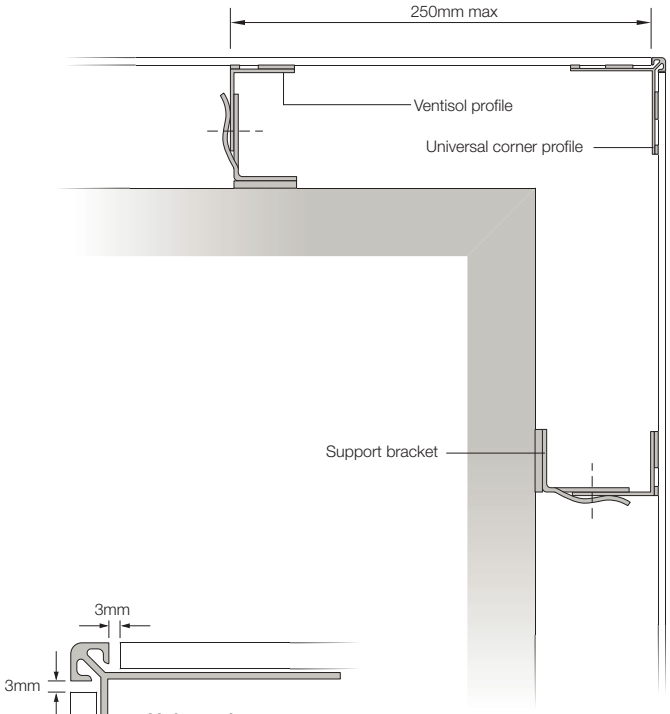


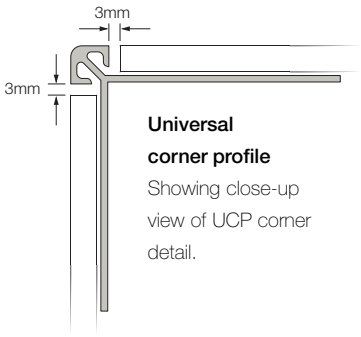
Typical details showing panels fixed to the Ventisol system



Corners

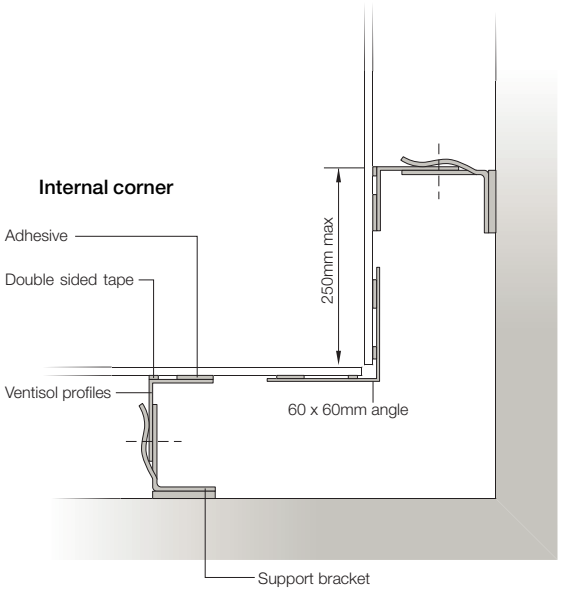
External corner





Universal corner profile
Showing close-up view of UCP corner detail.

Internal corner



Mechanical secret fix

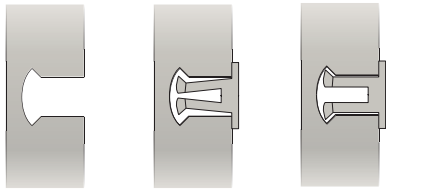
In facade applications where a smooth unbroken surface is required, Marley Eternit offer a concealed mechanical fixing system. Hangers are fixed to the rear face of 12mm thick EQUITONE [natura], EQUITONE [pictura] and EQUITONE [textura] panels. The hangers hook onto horizontal rails, which, in turn, are fixed to vertical rails.

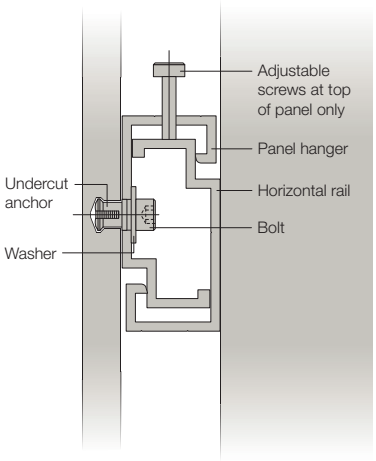
Fixing centres

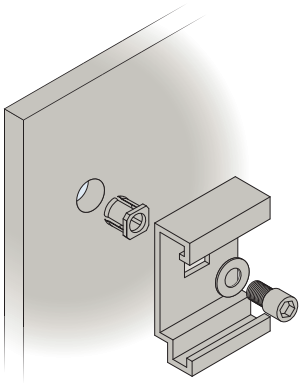
Wind load kN/m^2	Max anchor/rail spacing
0.5	750mm
1.0	620mm
1.5	500mm
2.0	420mm

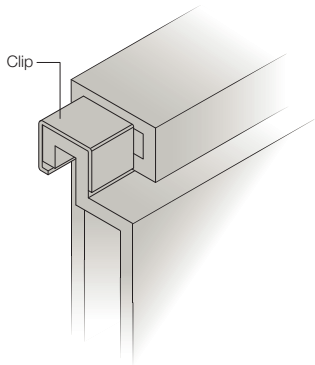
Undercut anchors

Marley Eternit supply specially designed plugs for fixing into pre-drilled holes in the backs of the panels. These ensure a positive fixing for bolts into the panels. The special plugs also have square collars to provide more secure location in the square or rectangular holes in the hangers.

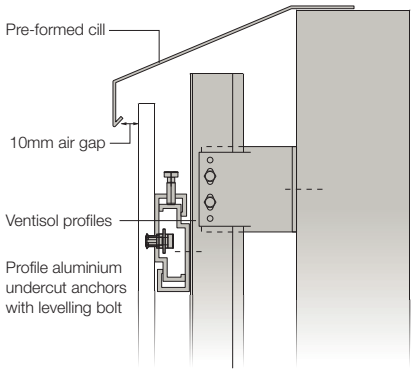




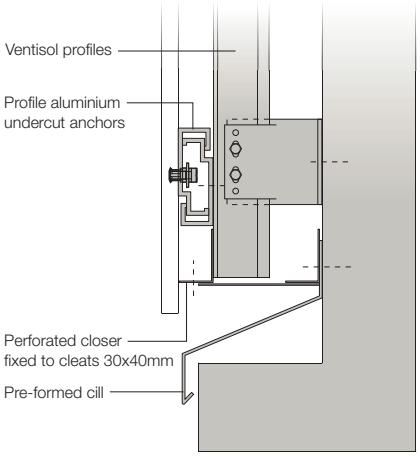




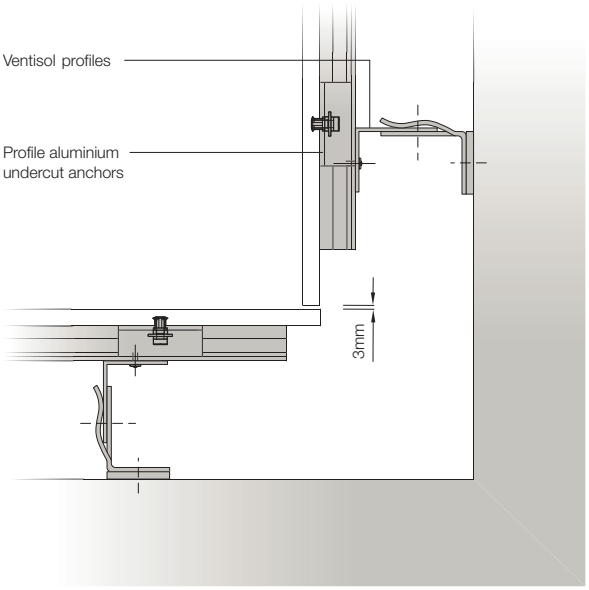
Top of cladding



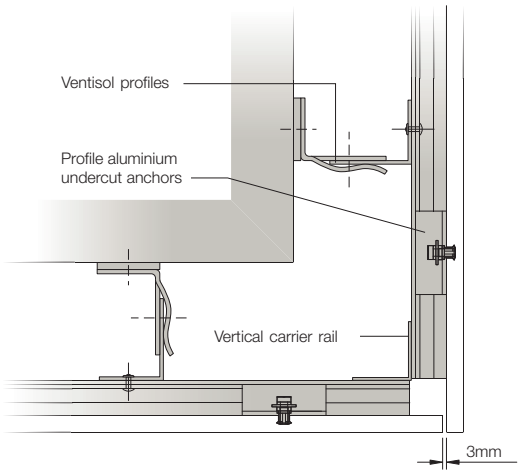
Base of cladding



Internal corner

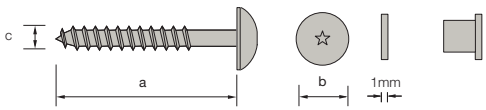


External corner



Fixings and accessories

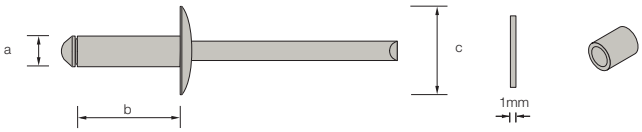
Screws (colour matched)



Screw dimensions – EQUITONE

Dimensions (mm)	a	b	c	gasket	sleeve
[natura]	35	15	5.5	No	No
[tectiva]	38	12	4.8	No	No
[pictura]	35	15	5.5	No	Yes
[textura]	35	15	5.5	No	No

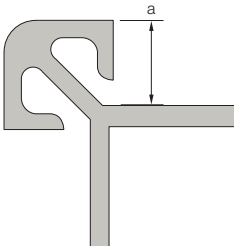
Rivets (colour matched)



Rivet dimensions – EQUITONE

Dimensions (mm)	a	b	c	gasket	spacer	rivet-setting tool
[natura]	40	18	15	No	Yes	No
[tectiva]	4.8	20	16	No	Yes	No
[pictura]	4.0	18	15	No	Yes	Yes
[textura]	4.0	18	15	No	Yes	No

Universal corner profiles (black and mill finish)



Universal corner profile dimensions – EQUITONE

Dimensions (mm)	a
[natura]	8
[tectiva]	8
[pictura]	8
[textura]	8

Available in 2.5m lengths.

EFPS Profiles (black)

EFPS 36

EFPS 60

Marley Eternit supply two flexible jointing strips to protect and close vertical joints when using timber battens.

EFPS 36 - standard panel joints

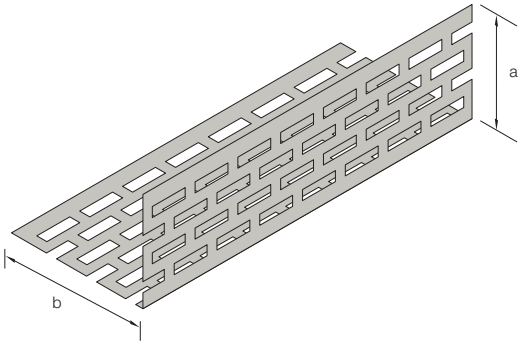
EFPS 60 - corner joints

Available in 100m rolls.

Perforated closures

Perforated closures are installed at the base of rainscreen cladding constructions and can be selected to accommodate varying thicknesses of insulation.

The perforations maintain airflow, whilst minimising ingress of birds, insects and vermin.



Perforated closure dimensions

Dimensions (mm)	a	b
	30	40
	30	50
	30	70
	30	100

Available in 2.5m lengths.

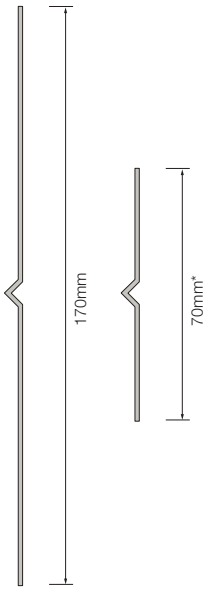
Horizontal joint alternatives (black)

Horizontal joints may be formed using aluminium joint profiles type HJP. Alternatively, an open joint detail may be used.

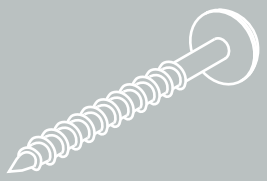
With an open joint, the aluminium profiles will be visible between two panels. Black paint or PVC tape can be used to mask this effect.

Available in 2.5m lengths*

* HJP 70mm only used with structural adhesive.



Horizontal joint profiles



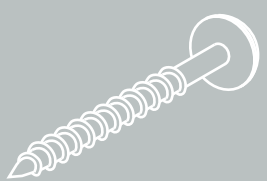
rivet

overcladding

maintenance

BS 8200

COSHH



fixing work at height CDM

Health, safety & sitework

Health, safety & sitework guidance

Good cladding practice is the result of many years of experience in the practical application of cladding across a wide range of applications.

Marley Eternit offer a full range of Application Instructions covering our facade material and fixing system ranges.

The following is an overview of some of the key factors that should be considered prior to commencement of actual fixing.

Safety regulations

The Construction Regulations made under the Factories Act 1961 comprise :

- The Health and Safety at Work Act 1974
- The Construction (Design and Management) Regulations 2007
- The Management of Health and Safety at Work Regulations 1999
- Control of Substances Hazardous to Health Regulations 2002
- Work at Height Regulations 2005
- Health and Safety in Roofwork HSG33: 1999

Health and Safety Commission

Control of lead at work – Control of Lead at Work Regulations 1998

Management of Health and Safety at Work Regulations 1992 – Workplace (Health, Safety and Welfare) Regulations 1992 – Approved code of practice, regulations and guidance.

COSHH Statements

For a copy of the Marley Eternit COSHH datasheets, visit www.marleyeternit.co.uk

Fabricators

All Marley Eternit high performance facade material is supplied through a network of fabricators who specialise in cutting to size, pre-drilling and supplying to site complete with all approved accessories. They will offer assistance with site measurement, applications, fixing advice etc.

Marley Eternit always recommend the pre-cutting and drilling of their products by fabricators and that quality standards, especially of edge detail where visible be established with the fabricator prior to commencement of supply of material.

In situations where pre-cutting/drilling cannot be carried out because of the irregular site conditions, then limited on-site working can be carried out as follows.

Cutting to size

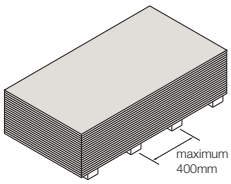
All facade material

These products have a hard decorative coating fused to a dense fibre cement sheet. To achieve the best results in respect of edge finish and accuracy, the following points should be carefully considered and employed. Alternatively, contact a Marley Eternit fabricator.

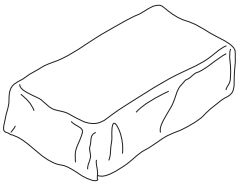
- Firm work benches capable of fully supporting the panel
- Clamp two sheets face to face
- Saw blades of the highest quality should be used; Diamond or tungsten carbide cutting blades for angle grinders; Diamond dusted circular saws: Diamond dusted or tungsten carbide black jigsaw blades
- Speed of cut will be dependent on the power tool used and by practical trial.

General

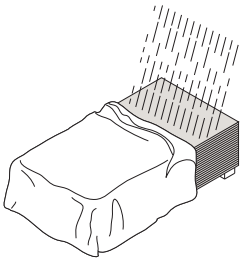
When cutting any high performance facade material care must be taken to avoid direct contact of the face with the cutting table. Ideally only one sheet should be cut at a time and protected clamps should be used to hold the panel rigid on the work bench to avoid any slipping.



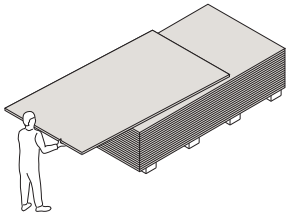
Stacked on a level surface



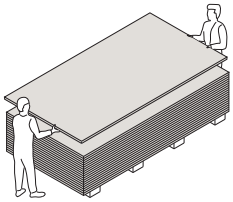
Store under cover



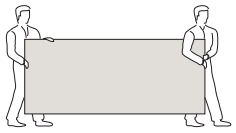
Must be protected from the weather



Do not drag sheets off the stack



Sheets must be lifted off the stack



Carry on edge but do not store on edge

Drilling

Fibre cement

High speed masonry drills are recommended for drilling these products. Where possible two flat sheets of material should be clamped face to face.

Forming notches and apertures

When it is necessary to form notches or apertures in panels for vent pipes etc., then consideration must be given to the relative size of opening compared to the panel dimension as excessive sizing may weaken the panel to the detriment of site handling and installation.

To achieve the best results, the corner positions for notches and apertures should first be drilled out and then saw the panels up to these points. Immediately after cutting / drilling, remove dust using a vacuum or soft brush or dry soft and clean cloths. Cut edges of EQUITONE [natura], EQUITONE [pictura], EQUITONE [textura] and Cedral Weatherboard woodstain must be sealed with Luko solution. It is also advisable to coat the undercoat anchor holes with Luko solution.

General site work

It is important to note that any unevenness of the framework to which the cladding panels are affixed may be reflected in the finished surface. Special attention must be paid to the accuracy of frame spacing, alignment, level, joint widths, panel layout and fixing arrangements.

Storage

Panels are supplied with protective paper or plastic between the decorated faces. This protection should not be removed, nor should panels be placed face to back before fixing.

All Marley Eternit high performance materials must be stored flat on pallets, inside and undercover in dry conditions, protected from weather and other trades. If moisture is allowed to penetrate between the stored sheets, permanent surface staining may occur.

Handling

Always lift panels off each other, never slide since scratching may occur. To carry panels stand on edge and lift with two people (one person at each end) protecting the face from scratching or damage.

Applications instructions

Further information is available from Marley Eternit on request.

→ More

literature COSHH data sheets
Tel 01283 722588
Web www.marleyeternit.co.uk

advice E-mail info@marleyeternit.co.uk
Tel 01283 722588

natural resources

reducing

EcoHomes

saving energy

BREEAM

ecopoints

bre

ISO 14001

cutting pollution

waste

Green Guide

EcoHomes

Sustainability & the environment

Adopting best practice

EQUITONE [textura], Kendal College, Lake District

> Sustainability is that which meets the needs of the present without compromising the ability of future generations to meet their own needs...

The United Nations World Commission on the Environment and Development

The issues of global warming, climate change and their effect on our environment are becoming increasingly more important throughout the construction industry.

At Marley Eternit we are at the forefront of helping our customers and suppliers to put environmental best practice at the top of their agenda.

Adopting best practice

The driving force behind our environmental practice is the optimisation of the sustainable use of natural resources. The following represent how Marley Eternit are leading the way to turn sustainability into an everyday part of our working life.

Reducing waste

Wherever possible, all our sites recycle waste rather than send it to landfill. We've installed waste-to-heat power plants at two of our factories, converting all sorts of waste – from cement bags to irreparably damaged timber pallets – to heat. At the end of their life, Marley Eternit products can be recycled, for example as an aggregate in other concrete products.

Saving energy

Electricity, gas, oil and water consumption is measured and compared across our factories. The monthly data helps us to identify where improvements can be made. At one site we periodically use methane produced by a local landfill to generate the heat which cures tiles and heats the workplace.

Cutting pollution

Marley Eternit products provide no direct risk of pollution to either the air or water. The stable and inert waste products derived from them can either be recycled or – where that's not possible – used as bulk material for landscaping etc.

On the roads, we use eco-friendly, low-emission and fuel-efficient vehicles and where possible ensure that there is a return load for every trip.

Sustainability policy

Marley Eternit are firmly committed to meeting our customer requirements with regard to the quality of our products and services, whilst recognising the impact that our business activities have on the environment.

We manage all of our activities to minimise environmental impact by adopting good, sustainable practice at every level of business. We recognise the benefits of continual improvement in product/service quality and environmental performance, taking into account technological and financial constraints.

Product development

Marley Eternit are well known for the development and bringing to market of environmentally sustainable products. Amongst these are Solesia – a photovoltaic roof tile able to generate electricity from sunlight – and Ecologic, which has a unique 'pollution-eating' coating and which is manufactured from around 50% recycled materials.

Assessing the sustainability of claddings

EQUITONE [natura], Commercial European application

At Marley Eternit, we were among the first in the industry to achieve ISO 14001 accreditation, the internationally recognised environmental management standard.

All of our products are able to achieve an A or A+ rating when used in those constructions specified in the new BRE 'Green Guide to Specification'.

BRE Green Guide 2008 on-line

The BRE 'Green Guide' online:

www.thegreenguide.org.uk

contains a listing of building materials and components which are assessed in terms of their environmental impact across their entire life cycle – from 'cradle to grave', within comparable specifications.

The Green Guide contains more than 1200 specifications used in various types of building which examine the relative environmental impacts of the construction materials commonly used in six different generic types of building covering six sectors.

Materials and components are arranged on an 'building element' basis so that designers and specifiers can compare and select comparable systems or materials that may be used in, say, roofs, walls, floors etc.

Across these building element categories, the Guide provides an extensive, but not complete catalogue of building specifications covering most common building materials.

This data is set out as an A+ to E ranking system, where A+ represents the best environmental performance/least environmental impact, and E the worst environmental performance/most environmental impact. BRE has provided a summary environmental rating – 'The Green Guide' rating – which is a measure of overall environmental impacts covering the construction specifications (i.e. they are not manufacturer specific).

Ratings tables

For each element, the 'Green Guide' ratings are displayed alphabetically in tables. Depending on the number of specifications, the element group may have been divided into sub-categories. The ratings are based on the range for the whole element group, not the sub-categories.

The table below contains information taken from 'The Green Guide' and details some of the specifications covered in the rainscreen cladding section.

Ratings

When used in one of the construction types† listed in the table right, fibre cement claddings achieve an A+ rating.

† The constructions shown right are excerpts from the 'Green Guide to Specification'. There are many other constructions covered at **www.thegreenguide.org.uk**

Commercial external wall construction

Rainscreen cladding	Summary rating
Steel frame with block infill	
Autoclaved fibre cement single sheet and timber battens, breather membrane, insulation, structural steel frame, medium dense solid blockwork with cement mortar, plasterboard on battens, paint (element no. 806230421)*	A+
Coated aluminium profiled single sheet and steel support, breather membrane, insulation, structural steel frame, medium dense solid blockwork with cement mortar, plasterboard on battens, paint (element no. 806230419)*	A
Precast concrete panel (non-load bearing) with "reconstructed stone" finish and support system, structural steel frame, breather membrane, insulation, medium dense solid blockwork with cement mortar, plasterboard on battens, paint (element no. 806230429)*	C
Precast concrete panel with brick finish and support system, structural steel frame, breather membrane, insulation, medium dense solid blockwork with cement mortar, plasterboard on battens, paint (element no. 806230680)*	C
Precast concrete panel (non-load bearing) with limestone facing panels, support system, breather membrane, insulation, structural steel frame, medium dense solid blockwork with cement mortar, plasterboard on battens, paint (element no. 806230427)*	D

*Typical breakdown using element no. 806230421 (by environmental issues):

Summary Rating	*A+*	Acidification	A
Climate change	A	Water extraction	A+
Mineral resource extraction	A+	Stratospheric ozone depletion	A
Human toxicity	A+	Ecotoxicity to freshwater	A+
Nuclear waster (higher level)	A+	Ecotoxicity to land	A
Eutrophication	A+	Photochemical ozone creation	A
Waste disposal	A+	Fossil fuel depletion	A

Measuring environmental success

BREEAM and the Green Guide

The BRE's Environmental Assessment Method (BREEAM) is a design and management stage assessment tool that provides an environmental label for buildings, based on good practice.

BREEAM is widely used to specify overall environmental performance. One of the aims of BREEAM is to encourage the use of materials that have lower impact on the environment, taking account of the full life cycle of the materials in question.

How do materials credits within BREEAM and EcoHomes work?

BREEAM

Within BREEAM, materials credits are achieved by specifying materials which achieve an 'A' rating in the Green Guide to Specification, where at least:

Credits are available where significant use of crushed aggregate, crushed masonry or alternative aggregates are specified for high grade aggregate uses (such as the building structure, ground slabs, roads etc). Credits are also available where materials used in structural elements are responsibly sourced (eg. materials should have EMS certification such as ISO 14001).

EcoHomes

Within EcoHomes, materials credits are achieved by specifying materials which achieve an 'A' rating in the Green Guide to Specification.

Credits are also available where materials used in key building elements (including the roof structure and cladding) are responsibly sourced (eg. from a manufacturer who has ISO 14001).

How does BREEAM work?

BREEAM assesses the performance of buildings in the areas shown:

Credits are awarded in each area according to performance. A set of environmental weightings then enables the credits to be added together to produce a single overall score.

The building is then rated on a scale of Pass, Good, Very Good or Excellent.

Specifiers are encouraged to consider these issues at the earliest opportunity to maximise their chances of achieving a high BREEAM rating.

Management
Overall management policy, commissioning site management and procedural issues.

Health and well being
Indoor and external issues affecting health and well being.

Transport
Transport-related CO_2 and location related factors.

Ecology
Ecological value conservation and enhancement of the site.

Materials
Environmental implication of building materials, including life-cycle impacts.

Energy use
Operational energy and carbon dioxide (CO_2) issues.

Pollution
Air and water pollution issues.

Land use
Greenfield and brownfield sites.

Water
Consumption and water efficiency.

EQUITONE [natural], the Osborne House at BRE

Code for Sustainable Homes

The Code is designed to ensure homes are built to progressively improving sustainability ratings and that, by 2016, all newly built homes achieve the highest (level 6), zero carbon rating.

Marley Eternit facade materials, in conjunction with insulation and other products can help materially improve the sustainability and code ratings of new-build housing.

→ More

To find more on the sustainability of Marley Eternit systems, please visit the following link:

marleyeternit.co.uk/environment

fast information delivery

fixing

knowledge

on-line

specification creation

Quantity estimation

samples
specifications
www.marleyeternit.co.uk

fast information
delivery

Services

Services & support

Customer Support

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

Literature: All current product and technical literature can be downloaded from:
www.marleyeternit.co.uk/downloads
contact tel 01283 722588
e-mail info@marleyeternit.co.uk

Samples: Facade samples are available on request.
contact tel 01283 722588
e-mail info@marleyeternit.co.uk
web marleyeternit.co.uk/facades

Stockist information:
e-mail info@marleyeternit.co.uk
web marleyeternit.co.uk/findastockist

Advice and ordering information
contact tel 01283 722894
e-mail info@marleyeternit.co.uk

Technical Advisory Service

We are able to provide prompt, knowledgeable and detailed responses to a vast range of enquiries covering everything from the embodied energy of facade material, to the different fixing 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 components and comply with Building Regulations, Health and Safety, environmental and other critical criteria.

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

BIM

The content of BIM models is 'intelligent' with detailed information such as dimensions, component placement, material specifications, carbon content, structural performance, manufacturers' details, and maintenance requirements embedded. BIM can produce 3D models of a building using the specifications of all processes, models and materials that will go into a project, including plans, sections and elevations.

- ✓ Collaborative tool used by suppliers, architects, specifiers, contractors alike
- ✓ Greater predictability: 'Build before you build'
- ✓ Faster project delivery
- ✓ Less waste
- ✓ Accurate analysis of performance
- ✓ Generate 'as-built' drawings
- ✓ After-build access for owners and contractors

BIM services
contact tel 01283 722588
e-mail info@marleyeternit.co.uk
www.marleyeternit.co.uk/Resources/BIM

Website

Our site contains wide-ranging information on all of our Facade ranges, including colours and fixing systems along with brochure and case study downloads.

www.marleyeternit.co.uk/facades

Training centre

We have a purpose-built training centre where we are able to impart our expertise and demonstrate our ongoing commitment to training within our industry.

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

References

Relevant documents

- BS 1202-1, *Specification for nails – Part 1: Steel nails.*
- BS 5250, *Code of practice for control of condensation in buildings.*
- BS 5268-2, *Structural use of timber – Part 2: Code of practice for permissible stress design, materials and workmanship.*
- BS 5268-5, *Structural use of timber – Part 5: Code of practice for the preservative treatment of structural timber.*
- BS 5925, *Code of practice for ventilation principles and designing for natural ventilation.*
- BS 6399 -1,-2,-3, *Loading for buildings.*
- BS 6651, *Code of practice for protection of structures against lightning.*
- BS 8000-6, *Workmanship on building sites – Code of practice for slating and tiling of roofs and claddings.*
- BS 8104:1992, *Code of practice for assessing exposure of walls to wind-driven rain.*
- BS EN 300, *Oriented strand boards (OSB) – Definitions, classification and specifications.*
- BS EN 312-5, *Particleboards – Specifications – Part 5: Requirements for load-bearing boards for use in humid conditions.*
- BS EN 312-7, *Particleboards – Specifications – Part 7: Requirements for heavy-duty load-bearing boards for use in humid conditions.*
- BS EN 313 (all parts), *Plywood – Classification and terminology.*
- BS EN 622-3, *Fibreboards – Specifications – Part 3: Requirements for medium boards.*
- BS EN 634-2, *Cement-bonded particle boards – Specification – Part 2: Requirements for OPC bonded particleboards for use in dry, humid and exterior conditions.*
- BS EN 635 (all parts), *Plywood – Classification by surface appearance.*
- BS EN 12811-1, *Temporary works equipment. Scaffolds. Performance requirements and general design.*
- BS EN 13501-2, *Fire classification of construction products and building elements, Part 2- Classification using data from fire resistance tests (excluding products for use in ventilation systems).*
- BS EN 14437, *Determination of the uplift resistance of installed cladding.*
- EN 1187, *Test methods for external fire exposure to walls.*
- BS EN 12467: 2004 *Fibre cement flat sheets – Product Specification and test methods.*
- BS EN 438:6:2005, *Decorative high pressure laminates based on thermosetting review. Classification and Specification for exterior grade compact laminate of thickness 2mm and greater.*
- BS5588: *Fire precaution in the design, construction and use of buildings.*
- BS EN 13501-1:2002, *Fire classification of construction products and building elements, Classification using test data from reaction to fire tests.*
- BS 6093:2006, *Code of practice for the design of joints and jointing in building construction.*
- BS 5427-1:1996: *Code of practice for use of profiled sheet for roof and wall cladding on buildings.*
- BS 476-6:1989: *Fire tests, on building materials and structures Method of Test for fire propagation for products.*
- BS 476-7:1997, *Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products.*
- CWCT, *Standard for systemised building envelopes.*
- NHBC, *Standards 2006:Chapter 6.9 curtain walling and cladding.*

Other publications

Construction (Design and Management) Regulations 2007. London: The Stationery Office.

Construction Products (Amendment) Regulations 1994. London: The Stationery Office.

Control of Substances Hazardous to Health Regulations 2002. London: The Stationery Office.

Building Regulations 2000, as amended by the Building (Amendment) Regulations 2001, the Building (Amendment) Regulations 2002 and the Building (Amendment) (No 2) Regulations 2002. London: The Stationery Office.

Thermal insulation: avoiding risks. BR 262. London: CRC Ltd, 2002.

The Building (Scotland) Regulations 2004. The Scottish Building Standards Agency.

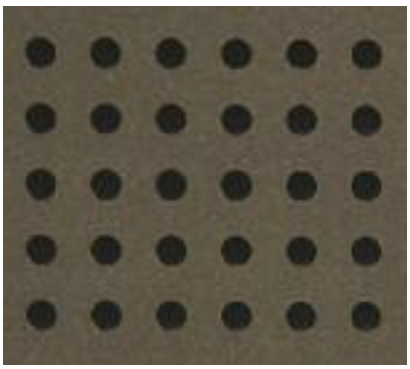
Building Regulations (Northern Ireland) 2000. London: The Stationery Office.

Limiting thermal bridging and air leakage robust construction details for dwellings and similar buildings. London: The Stationery Office, 2001.

Rainscreen cladding: A guide to Design Principles and practice.
Anderson J.M & Gill JR (1998)

The Green Guide to Housing Specification
BRE, Jayne Anderson and Nigel Howard











Index