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February 2015

MarleyEternit

Profiled sheeting

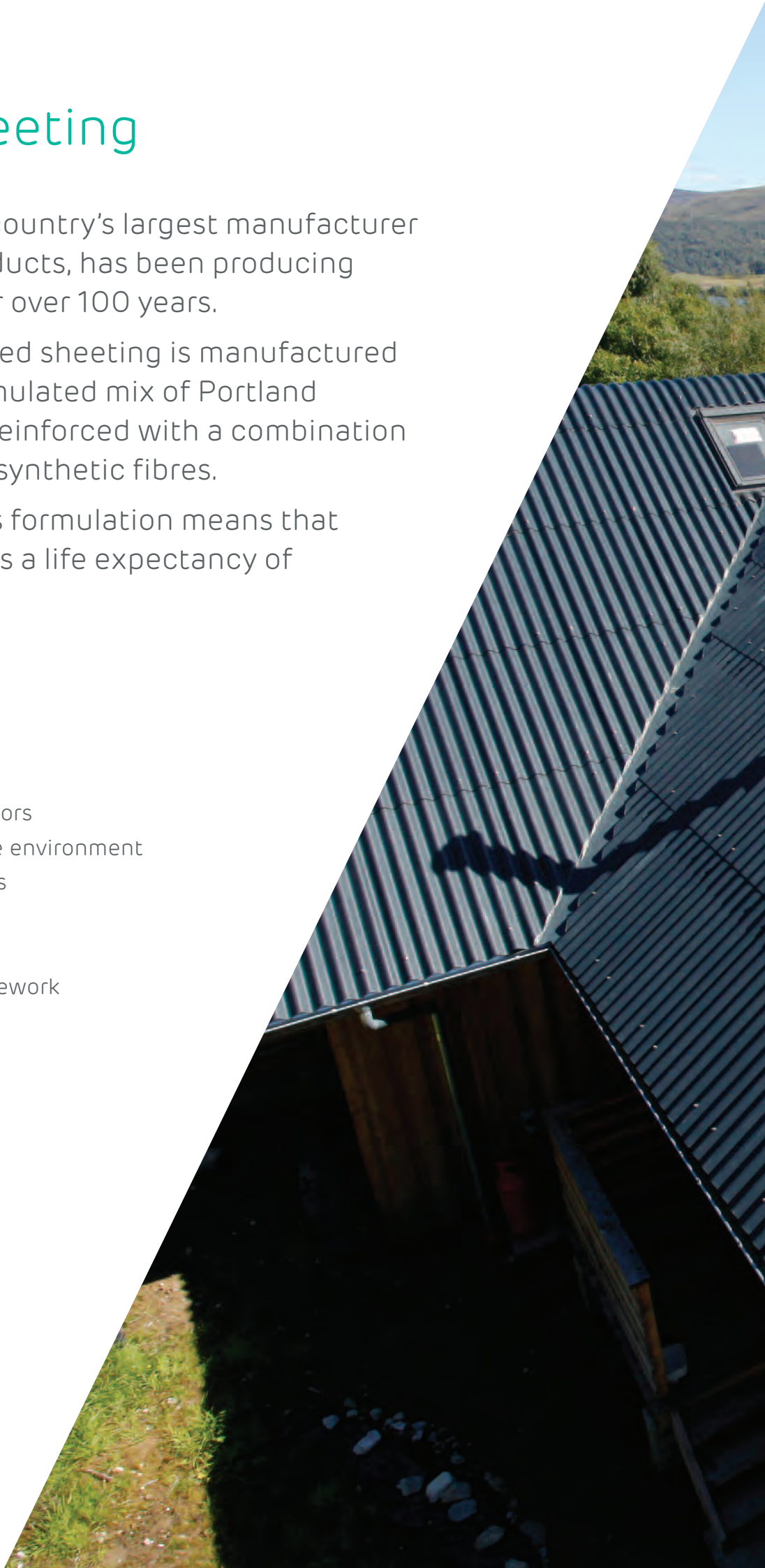
Profiled sheeting

Marley Eternit, the country's largest manufacturer of fibre cement products, has been producing profiled sheeting for over 100 years.

Marley Eternit profiled sheeting is manufactured from a carefully formulated mix of Portland cement and water, reinforced with a combination of both natural and synthetic fibres.

The longevity of this formulation means that profiled sheeting has a life expectancy of at least 50 years.

Contents



Range overview

The Marley Eternit range of Profiled sheeting and rainwater 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.

Adoption of the BES 6001 framework standard for the Responsible Sourcing of Construction Products by Marley Eternit enables us to take a more responsible and sustainable approach to the sourcing of the materials that go into the manufacture of our products.

Advantages of profiled sheeting

01 Can achieve A+ or A ratings in Green Guide

02 Only UK manufacturer of fibre cement

03 Highly cost effective weatherproofing

04 Low maintenance

05 No rust, rot or corrosion

06 Resistant to chemical attack

07 Vapour permeability reduces condensation

08 Excellent noise and thermal insulation

09 Quick and easy to install and fix

10 Wide product and colour range

Profile 6

A high strength fibre cement sheet reinforcement providing maximum impact strength and durability. Profile 6 has a very broad appeal for roofs of 5° pitch and over or vertical profiled sheeting.

More

pages 36-37
samples Tel 01283 722588
web marleyeternit.co.uk/profile

Profile 3

Profile 3 is easy to handle and is suitable for small structures in the agricultural, industrial and domestic sectors, such as garages, general purpose sheds and smaller buildings.

More

pages 40-41
samples Tel 01283 722588
web marleyeternit.co.uk/profile

Farmscape Anthracite

As Profile 6 but designed to reduce the visual impact of buildings on the landscape by applying a subtle surface pigmentation to the top face of the sheet.

More

pages 38-39
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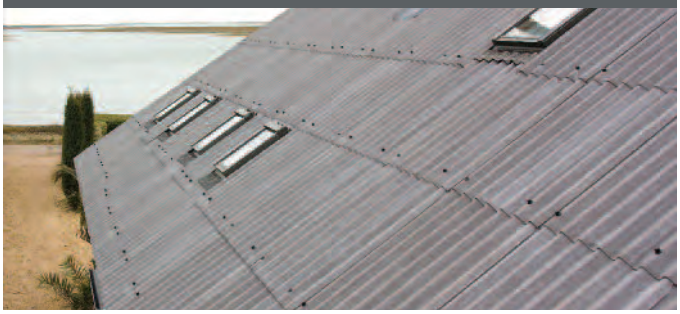


Translucent sheets

A wide range of GRP translucent sheets that meet the requirements of ACR(M)001:2005, and have a fire rating of SAB Class 3.

More

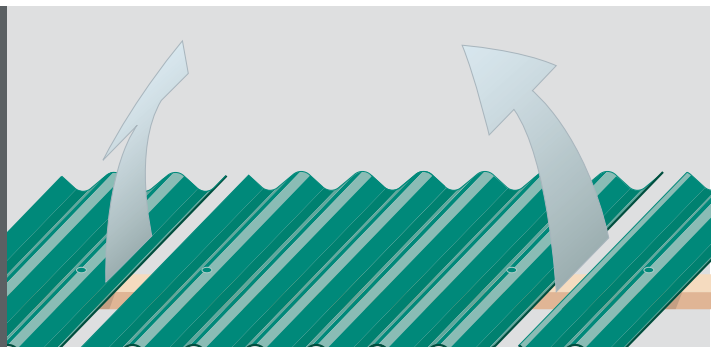
pages 56-57
samples Tel 01283 722588
web marleyeternit.co.uk/profile

Ventilation

A wide and versatile range of ventilation systems for commercial agricultural and industrial applications.

More

pages 65-69
samples Tel 01283 722588
web marleyeternit.co.uk/profile



Applications and sectors

Housing

Daisybank PAD Studio, private residence using Profile 6

Ensworth House, private residence using Farmscape for roof and Profile 3 for wall cladding

Gorthleck, private residence using Profile 6

Profiled sheeting combines well with other modern building materials to give unique visual character to walls or roofs for many residential products.

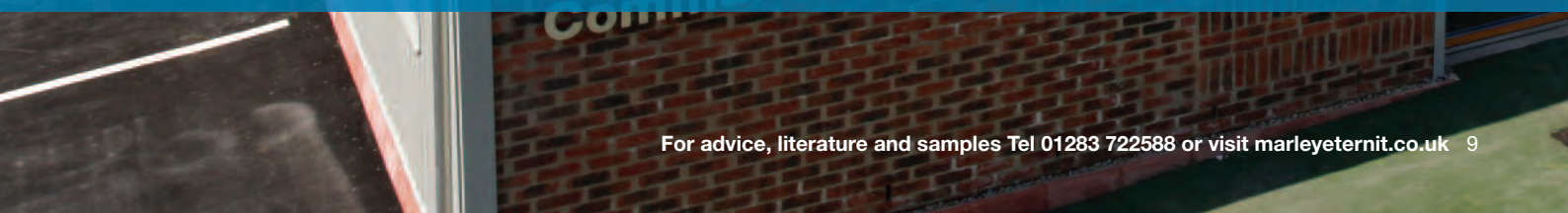
Health and education

Robin Hood School, using Profile 6

Kintore Way Children's Centre, using Profile 6

Sandal Magna School, using Profile 6

The wide ranging performance and aesthetic requirements of healthcare and educational buildings are easily met by profiled sheeting to create durable low maintenance solutions.



Industrial

Fibre cement has high resistance to aggressive environments and excellent performance characteristics ideal for industrial applications.

Hanson brick manufacturing plant, using Profile 6

Balmenach Distillery, using Profile 6

Imerys tube pressing plant, using Profile 6

Waste management and environmental

Fibre cement has no metallic content and is minimally affected by frost and climatic temperature changes, ideal for the waste management and environmental sector.

Mary Tavy hydro electric plant, using Profile 6

Wrexham Waste Disposal centre, using Profile 6

TEG Environmental composting plant, using Profile 6

Agricultural and equestrian

Titchfield Barn, using Profile 6

Harewood Estate, using Profile 6

Musselburgh Race Course, using Profile 6

Profiled sheeting minimises reverberation for livestock buildings (reducing animal distress) and has a good resistance to aggressive atmospheric conditions, whether it be in agricultural, coastal or marine environments.

Knocknegel, using Profile 6

Pawton Dairy, using Profile 6

Ashford Grange Farm, using Profile 6 with spaced roof ventilation system

Leisure

As with the health and education sectors, excellent performance combined with an extensive colour range offers distinctive solutions for a wide range of environments.

Loch Awe Hostel, using Profile 6

Talgarth Mill, Heritage Centre, Wales

Bowling alley, using Profile 6

Commercial

From distribution centres to business parks, profiled sheeting can be used to create unique building skins with visual impact and maximum durability.

Woodlands Trust Centre, using Profile 6

Erskine Garden Centre, using Profile 6

Gamlingay Eco Centre, using Profile 6

Sustainability and the environment

Adopting best practice

100% of all products used in construction should be responsibly sourced by 2015.

The issues of global warming, climate change and their effect on our environment are becoming ever 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.

BES 6001: Responsible sourcing

Marley Eternit is assessed to BES 6001.

As the UK's leading manufacturer and supplier of roofing and facades products, Marley Eternit is committed to sourcing its raw materials and managing its supply chain in a responsible and sustainable manner and has been accredited BES 6001 'Framework Standard for the Responsible Sourcing of Construction Products'. This accreditation means:

- We are responsible for our supply chain, both who we choose and their actions.
- We are responsible for raw materials we purchase.
- We are responsible for the services we procure.
- We can help architects, designers, developers and builders achieve a high level of points when building sustainably, using either BREEAM, The Code for Sustainable Homes or Eco Homes schemes. A 'good' BES 6001 rating can be worth 2 points in the 'materials' category.

Best practice

Our commitment to best practice in the sustainability of our products, responsible sourcing of the materials used in our products, and the environmental impact of our operations is conducted in the following key areas:

- Health & Safety
- Environment
- Quality
- Corporate Social Responsibility

Marley Eternit operates certified Quality, Health and Safety and Environmental management systems, to the internationally recognised ISO 9001, ISO 14001 and OHSAS 18001 standards at all of its manufacturing locations.

In order to maintain its certification to ISO 14001, Marley Eternit has to minimise the harmful effects on the environment caused by its activities and also to achieve continual improvement with its environmental performance.

The quality of Marley Eternit's products and services remains at the top of the agenda in the overall company business strategy, and the maintenance of a quality management system operating to ISO 9001 ensures that the manufacturing, sales and distribution processes are continually monitored and improved to meet the changing needs of our customers.

Marley Eternit maintains a Health and Safety management system operating to OHS 18001 covering all aspects of the business, including manufacturing, materials handling, administration, engineering, external sales and interaction with customers or contractors either at our sites or on their premises.

"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

Manufacture and carbon reduction

www.marleyeternit.co.uk/Environment

Our factories

All Marley Eternit's factories in the UK are ISO 9001, 14001 and ISO OHSAS 18001 accredited. This means they operate under internationally recognised standards and controls, providing the best in quality and sustainability for the people working in them and the products coming out of them.

Manufacture of fibre cement

This is a low energy process using readily available locally sourced or sustainable resources which are natural and abundant. Production waste is recycled into the production process.

Cement can often be a main contributor to the equivalent carbon dioxide emission during the manufacture of fibre cement products, so we continually develop formulations that replace cement by raw materials of low carbon equivalent.

As the only UK manufacturer of fibre cement slates and profiled sheeting, we can guarantee fewer delivery-miles for these products compared to imported products.

Water recycling

We're saving around 2,000m^3 of water each year through recycling water recovered from manufacturing processes.

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.

Our Keele plant recycles all green waste and re-uses waste water. as well as having its own natural water sources (boreholes).

We have various schemes in place where we re-use all waste concrete material within our products as well as using locally imported re-usable material from other manufacturers. The level of recycled material we use currently in the production of concrete tiles is 20%.

Energy usage monitoring and saving

Many organisations simply rely on information from a single meter to gauge energy consumption.

We've introduced sub-meters and mobile metering that enable us to identify precisely how much energy is used by different facilities on our sites. This means that energy usage can be managed in a much more sophisticated and informed way.

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.

Reducing our carbon footprint

Marley Eternit is developing its sustainable Carbon Management Programme aimed at reducing carbon emissions and improving its 'carbon footprint'. We have set ourselves a target to reduce the carbon emissions from manufacturing processes over six years from an index of 100 (based on 2006 data) to an index of 75.

The monitoring of Marley Eternit's carbon reduction target is overseen by an internal Energy Action Group, which uses a sophisticated computer based energy management system which monitors energy usage and CO_2 generated, against tonnage of material produced.

Lower embodied energy products

A product manufactured using a process which uses less energy and less primary raw materials will generally have a much lower embodied energy (the energy used to acquire, process, and manufacture the product, including any transportation related to these activities). These products will be more sustainable and will help specifiers to attain higher ratings against sustainability requirements set out in current legislation.

Assessing the sustainability of fibre cement profiled sheeting

When used in A+ rated constructions, fibre cement profiled sheeting can achieve 3 credits in the materials category of the Code for Sustainable Homes and can help achieve 'Good' or 'Excellent' ratings for BREEAM for non-residential buildings.

BRE Green Guide on-line

Our range of fibre cement profiled sheeting is UK manufactured and as such, is the only fibre cement profiled sheeting able to achieve A+ or A ratings in the BRE Green Guide to Specification.

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 a '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

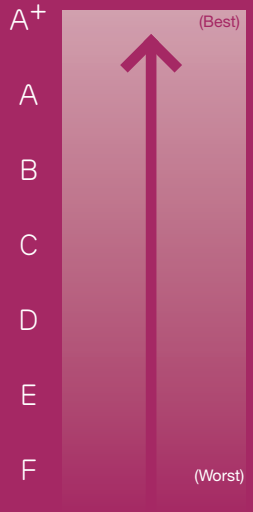
For each element, the 'Green Guide' ratings are displayed alphabetically in tables. Depending on the number of specifications, the element group may have been divided into sub-categories. The ratings are based on the range for the whole element group, not the sub-categories.

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

When used in one of the construction types† listed in the table below, fibre cement profiled sheeting achieves an A+ rating.

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

Description	Summary rating	
	domestic, retail health	commercial industrial, education
Low pitched roof: Galvanised steel rafters and joists, double skin built up profiled roof cladding (coated steel inner, insulation and profiled air cured fibre cement sheeting outer skin) element no. 1012550002	A	A+
8.1d Insulated cladding on steel frame with no internal finish (industrial shed): Fibre cement (air cured) profiled sheet built up cladding with insulation and coated steel liner on steel support, structural steel frame, with no internal finish element no. 1006600001	A	A



Design considerations

Recommended design procedure

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

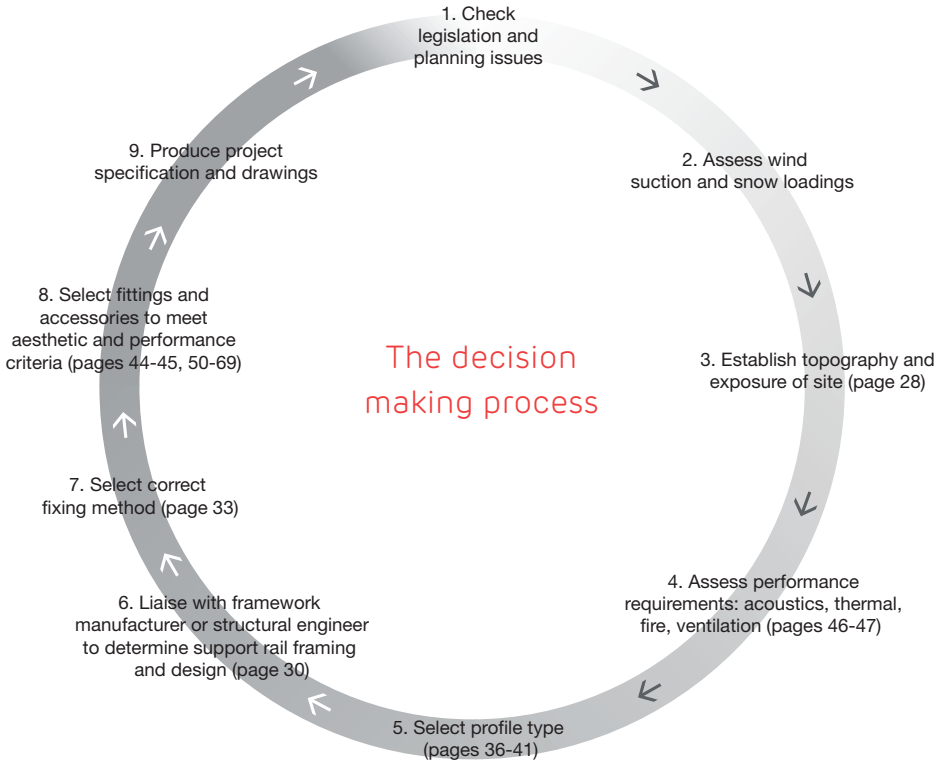
This information is provided for guidance only and designers should ensure that they make all the necessary calculations and take into account all aspects of the specific project design and location.

In addition to this Profiled Sheeting manual, reference should also be made to the following standards:

BS8219 Installation of sheet roof and wall coverings – Profiled fibre cement – Code of practice.

BS 5427: Part 1, Code of Practice for The use of profiled sheet for roof and wall cladding on buildings Part 1. Design.

BS 5502 Buildings and structures for agriculture, parts 20, 21 and 22.



Step 1: Legislation and planning

Guidance on legislation is given on pages 26-27. Planning permission may be necessary and is dependent on Local Authority policy and control.

Step 2: Wind and snow loadings

Calculate the wind suction loading in accordance with BS EN 1991 Eurocode 1 - Actions on structures – Part 1-4: General actions - Wind actions.

Calculate the snow loadings in accordance with BS EN 1991 Eurocode 1 - Actions on structures – Part 1-3: General actions - Snow loads.

Step 3: Exposure, wind and rain

Establish the exposure zone of the site by reference to the map on page 28. This divides the UK into 2 categories of exposure to driving rain and is based on the table in BS 8219: 2001 + A1: 2013.

Step 4: Assess performance against regulatory requirements

Profiled sheeting performance criteria will vary according to design, building function etc., Further guidance is shown on the following pages: 'Sound insulation', page 46, 'Fire', page 46, 'Condensation control', page 47, and 'Thermal', page 47.

Step 5: Profiled sheeting selection

The choice of profiled sheeting is a combination of planning, aesthetic and performance criteria. The key factors are shape, size, colour, texture, material and sustainability, see pages 36-47.

Step 6: Framework and support rail

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

Ensure that the structure is adequate for the total weight of the profiled sheeting as installed and for the calculated wind loading and any other relevant loading criteria. Weights of panels are shown on the appropriate product pages.

Step 7: Fixing method

Select the fasteners to suit the profiled sheet and type of purlin being used.

Step 8: Fittings and accessories

Select the accessories to suit the particular details of the building by referring to Design Detailing pages 48-69.

Step 9: Produce project specific specifications and drawings

Legislation, guidance and reference

Before contemplating any profiled sheeting project, 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.

Key Standards and regulations

Structure

- England and Wales: Part A ‘Structure’
- Scotland: Technical handbook, Section 1 ‘Structure’
- Northern Ireland: Part D ‘Structure’

Sound

- England and Wales: Part E ‘Resistance to the passage of sound’
- Scotland: Technical handbook, Section 5 ‘Noise’
- Northern Ireland: PartG ‘Sound insulation’ of dwellings

Fire

- England and Wales: Part B ‘Fire safety’
- Scotland: Technical handbook, Section 2 ‘Fire’
- Northern Ireland: Part E ‘Fire safety’

Ventilation

- England and Wales: Part F1 ‘Means of ventilation’
- Scotland: Technical handbook, Section 3 ‘Environment’

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’

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.

Other guidance

- ACR(M)001:2014. Test for Non-Fragility of Large Element Roofing Assemblies (Fifth Edition)
- ACR(CP)001:2007. Recommended Practice for Work on Profile Sheeted Roofs.
- Health and Safety Executive. HSG33 Health and safety in roof work.

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 2000 (as amended) for England and Wales, the Building (Scotland) Regulations 2004, and the Building Regulations (Northern Ireland) 2000.

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 profiled sheeting 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 2000 (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.

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 principle British Standards relevant to this document are:

- BS EN 494: 2012 – Fibre-cement profiled sheets and fittings – Product specification and test methods.
- BS 5427: Part 1: 1996 – Code of Practice for The use of profiled sheet for roof and wall cladding on buildings. Part 1. Design
- BS 8219: 2001 + A1: 2013 – Installation of sheet roof and wall coverings – Profiled fibre cement – Code of Practice.
- BS 5502: Part 20: 1990 – Buildings and structures for agriculture Code of practice for general design considerations.
- BS 5502: Part 21: 1990 – Buildings and structures for agriculture Part 21. Code of practice for selection and use of construction materials
- BS 5502: Part 22: 2013 – Buildings and structures for agriculture Code of practice for design, construction and loading.
- BS 5502: Part 23: 2004 – Buildings and structures for agriculture Code of practice for fire precautions.
- BS EN 1991 Eurocode 1: Actions on structures
  Part 1 – 1: General actions – Densities, self weight, imposed loads for buildings.
  Part 1 – 3: General actions – Snow loads.
  Part 1 – 4: General actions – Wind actions.
- UK National Annex to BS EN 1991 – 1 – 3
- UK National Annex to BS EN 1991 – 1 – 4
- BS 476 Fire tests on building materials and structures - Part 3: External fire exposure roof tests.
- Part 6: Method of test for fire propagation of products.
- Part 7: Surface spread of flame test for materials.
- BS EN 13501-1 – Fire classification of construction products and building elements – Part 1 – Classification using test data from reaction to fire tests.
- BS 8200: 1985 – Code of practice for non-loadbearing external vertical enclosures of buildings.
- BS 6100 – Glossary of building and civil engineering terms.

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.

Wind loadings and lap treatment

Introduction

When specifying profiled sheeting, the windloading and exposure of the site is critical to ensuring the optimal sealing and fixing of the sheets.

As the sheets are fixed through oversize holes in the crest corrugations, they cannot be used in a stressed skin construction, and cannot be assumed to provide lateral restraint to the top flange of a purlin.

When designing the steel structure the maximum purlin deflection under total serviceability loads should not exceed the formula: purlin span/220.

Exposure

Determine the expected degree of exposure by examining the map, below left.

Where buildings stand above their surroundings, or are situated in open country with no windbreaks within about 1km (including sites on or near the sea coast or hilltop sites which are above the general level of trees, etc.), they must be considered subject to severe exposure. Refer to BRE Digest 127 'An Index to Exposure to Driving Rain', or the BSI Draft for Development DD93, taking account of the recommendations regarding localised effects, on high buildings, on buildings of any height, on hill slopes or hill tops, in coastal districts, or in other areas where higher exposure gradings are likely.

Wind loading should be calculated in accordance with BS EN 1991 Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions.

Centres of support

For Profile 6: Purlins at 1375mm c/c for wind suctions of 1.89kN/m². Rails at 1825mm c/c for loadings up to 1.40kN/m².

For Profile 3: Purlins at 925mm c/c for loadings up to 1.79kN/m² (multiple span) or 1.49kN/m² (single span). Rails at 1225mm centres for loadings up to 1.02kN/m² (multiple span) or 0.64kN/m² (single span).

Highlands and Islands specification

For users in the North and West of Scotland and the Isles (indicated by shading), for wind loads up to 2.5kN/m², we recommend the following:

Profile 6 can be fixed to purlins at 1040mm maximum centres using standard fasteners and sealing washers.

Profile 6 can be fixed to purlins at 1375mm centres providing curved diamond washers, together with diamond felt washers are used under the head of the fasteners to increase the bearing area and therefore prevent the sheets lifting over the fasteners. The diamond washers are used in addition to the standard sealing washers.

Profile 3 should be fixed to purlins at 700mm maximum centres using standard fasteners and sealing washers.

Exposure Zones

Approximate volume of wind-driven rain (litres/m²) per spell:

less than 56.5 more than 56.5

Note: Taken from BS 8219

Lap and seal

Establish the requirement for lapping and sealing by reference to the map of the UK left and the tables below.

Sheltered to moderate sites

Less than 56.5 l/m² of wind-driven rain per spell.

Minimum Roof pitch	Minimum End lap	End laps treatment	Side laps treatment
≥22.5°	150mm	Unsealed	Unsealed
≥15°	300mm	Unsealed	Unsealed
≥15°	150mm	Sealed	Unsealed
≥10°	150mm	Sealed	Sealed
≥5° *	300mm	Double sealed	Sealed

* Maximum roof slope length of 15m for roof pitch less than 10° (Profile 6 only).

Moderate to severe sites

More than 56.5 l/m² of wind-driven rain per spell.

Minimum Roof pitch	Minimum End lap	End laps treatment	Side laps treatment
≥25°	150mm	Unsealed	Unsealed
≥17.5°	150mm	Sealed	Unsealed
≥15°	150mm	Sealed	Sealed
≥10°	300mm	Sealed	Sealed
≥5° *	300mm	Double sealed	Sealed

*Maximum roof slope length of 15m for roof pitch less than 10° (Profile 6 only).

Lap treatments

Lap – This describes how much one sheet overlaps another at each end (end lap) and each side (side lap).

Pitch – This describes the degree to which the roof slopes.

The table above is based upon BS 8219 and applies to roof slopes not exceeding 32m.

(Consult the Marley Eternit Technical Department for advice on roof slopes that exceed 32m.)

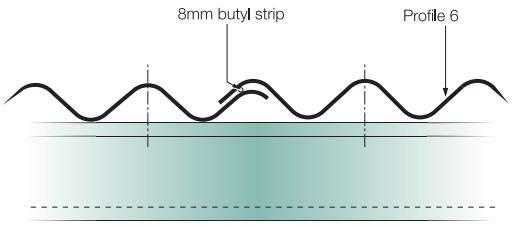


Fig.1a Profile 6 side lap

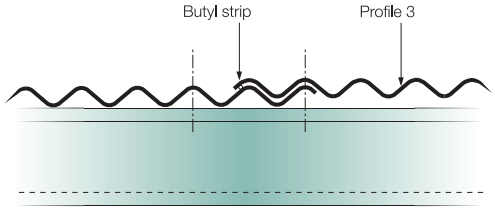


Fig.1b Profile 3 side lap

Minimum roof pitches

The minimum pitch for Profile 6 sheets is 5° and 10° for Profile 3.

Where slopes are between 5° and 10°, the maximum slope length should be 15m, with double sealed end laps and single sealed side laps.

On roofs over 10° pitch, where parapets might allow snow build-up, 300mm double sealed end laps and single sealed side laps are recommended. On such roofs, workmanship as regards positioning and placing of butyl strips is more critical and greater care is necessary with lap sealing.

Sealing

Sealants*

It is important to select a good quality sealant. Inferior sealants can lead to cracking, chalking and failure in use. For best results, BS 8219 recommends a pre-formed 8mm diameter mastic ribbon of butyl or a polyisobutylene-based material, which has a rubbery, tacky consistency, and which will adhere to both surfaces when sheets are overlapped.

* Sealants are available from the following companies:
Fixfast (tel. 0845 4507483), Woodall Fastening Systems (tel. 01384 263900), Hodgson Sealants (tel. 01482 868321), Premier Sealant Systems (tel. 01724 864100).

Side laps

When sealed side laps are required, butyl strips should be positioned as shown in Fig.1 below.

End laps

The minimum end lap for Profiles 6 and 3 is 150mm, fixed as shown in Fig.2 below.

Where double sealing is necessary, with a 300mm end lap, the second butyl strip should be positioned 100 to 200mm below the fixing, as shown in Fig.3 below.

Fittings

The requirement for sealing laps also applies to any fibre cement fittings that are used together with the sheets.

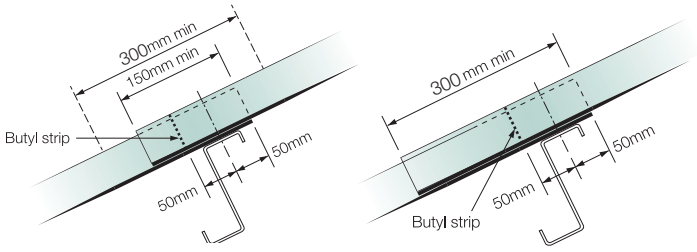


Fig. 2 End lap section (Profiles 6 and 3)

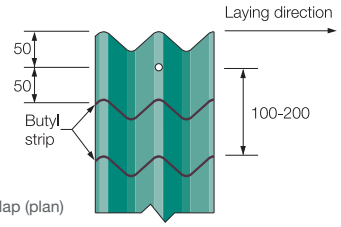


Fig. 3 End lap (plan)

Setting out the roof

Laying the sheets

Roof sheeting should commence from one end of the building at eaves level, rising in vertical tiers, one sheet wide, from eaves to ridge. Where cranked crown sheets are used, it is especially important that the slopes are accurately aligned with each other. Vertical sheeting should also be fixed in tiers, one sheet wide, from the lowest level of the profiled sheeting.

The end laps of each row of sheets should form a continuous straight line from gable to gable and must not be staggered. Similarly, the side laps should be aligned from eaves to ridge.

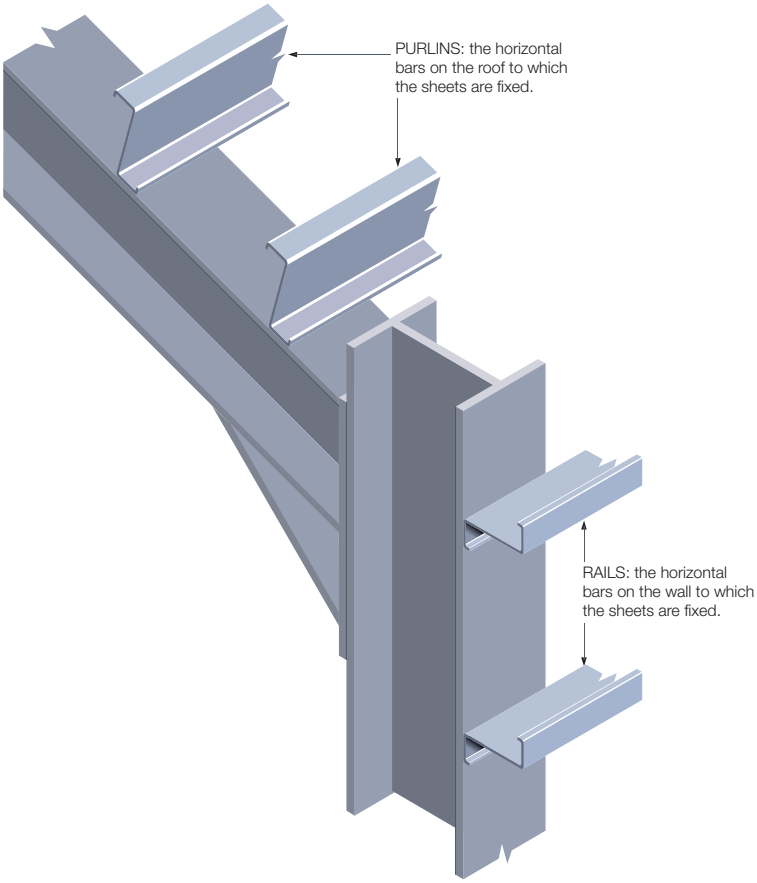
Checking the structure

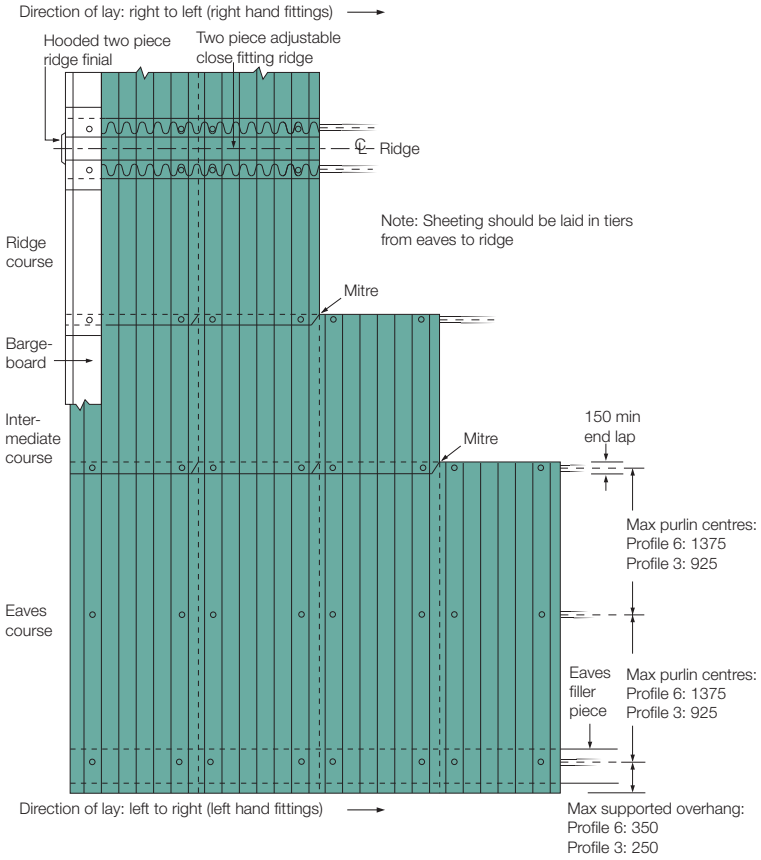
Before sheeting is commenced, the structure should be checked to ensure that all purlins and rails are in a true plane, correctly spaced and securely fixed and adequately restrained.

Setting out plan

Typical double slope roof is shown below with two piece adjustable close fitting ridge and Profile 6 sheets.

Note: For typical mitring detail with 150mm end lap, see following page.





Mitring

General guidance

To avoid four thicknesses of sheeting at the junctions of side and end laps, it is necessary for two of the sheets at each junction to be mitred at the corners so that they lie in the same plane.

Mitres on Profile 6 and 3 sheets should be cut from a point 150mm up the vertical edge from the corner (or the amount of the end lap) to a point 70mm (131.2mm for Profile 3) along the horizontal edge, i.e., the width of the side lap by the length of the end lap.

Ideally, the gap between mitres should be a minimum of 3mm to a maximum of 6mm. Box mitres should be avoided. The mitred joint is covered top and bottom by the other two sheets, and is thus weatherproof and unseen (see typical mitring details below.)

Note: Mitres must not be cut in situ.

Mitring layouts

The procedure for mitring the sheets for single and double slope roofs is indicated on the mitre plans below (Figs.1-3).

On double slope roofs with two piece adjustable close fitting ridges or cranked crown ridges, one slope must be laid left to right and the other right to left.

When cranked crown ridge pieces are used, both top courses of roofing sheets and the cranked crowns should be mitred.

When using two piece ridges, the top courses of sheets and the ridges should not be mitred.

Note: All mass-produced building products are allowed certain dimensional tolerances. This applies to both profiled fibre cement sheets and steelwork. Because of these permitted variations in dimensions, regular checks should be carried out on measurements at mitres, and adjustments made as and when necessary.

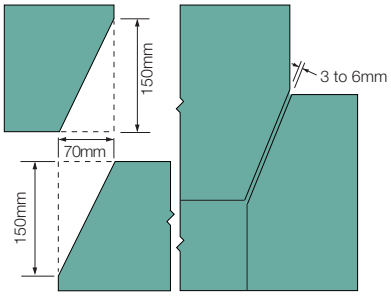


Fig.1a Mitring detail – Profile 6

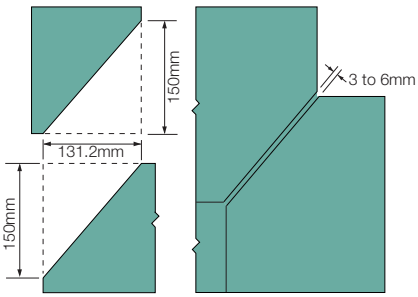


Fig.1b Mitring detail – Profile 3

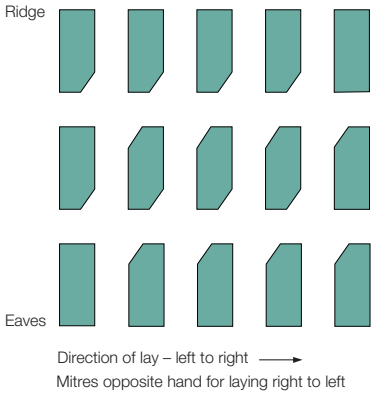


Fig. 2 Mitring plan – single slope roof

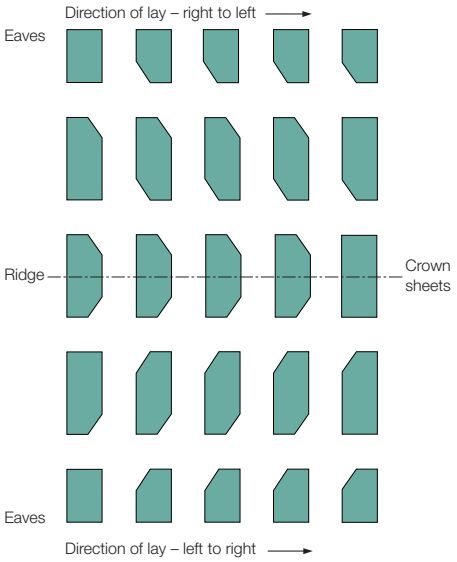


Fig. 3 Mitring plan – double slope roof

Fixing

General guidance

All sheets must be fixed in accordance with the recommendations of BS 8219.

Profiled sheeting should always be fixed with 2 fasteners per sheet per purlin.

The selection of the correct sheet fastener is extremely important. The integrity of the roof covering, type of purlin or rail system, and weatherproofing with washers and caps all must be considered to avoid premature failure, corrosion or a leaking roof.

Topfix fasteners

Self-drilling, self-tapping 'topfix' fasteners are generally used to fix Profile 6 sheets to the purlins (Fig. 4). These fasteners drill through the Profile 6 sheet, creating a 2mm oversize hole and self tap into the purlin. It is important that the fasteners are installed using the correct power tools, which should have an adjustable depth setting device to ensure the washers are seated correctly. The fasteners typically have different drill points to suit the different purlin types:

When following the recommendations of the fastener manufacturers, please give particular regard to minimum purlin thickness and maximum roof pitch.

Traditional fasteners

In certain circumstances it may be preferable to use traditional fasteners such as hook bolts, crook bolts and drive screws. There are, however, additional health and safety implications to consider when using these fixings.

The fasteners are generally 8mm diameter for Profile 6 and are fixed through 10mm diameter pre-drilled holes in the sheet. For hook and crook bolts, the fixing should be positioned 4mm upslope from the back leg of the purlin. Drive screws should be located centrally on the purlin.

Profile 3 sheets are generally fixed using 6mm diameter fasteners and an 8mm diameter hole should be drilled through the sheet.

Notes: When fixing to timber purlins, BS 5268: Structural use of Timber, recommends that the minimum edge distance of the fixing should be five times the fixing diameter to avoid undue splitting of the timber.

Fasteners should be installed perpendicular to the plane of the roof.

With some types of insulated cladding, or where sealant has been used, sheet settlement can take place. It may be necessary to retighten the fixings after a suitable period.

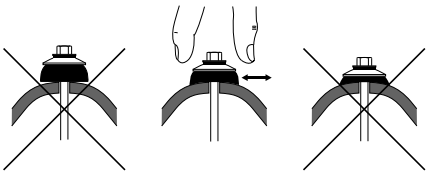


Fig. 4 Checking the topfix fasteners for tightness

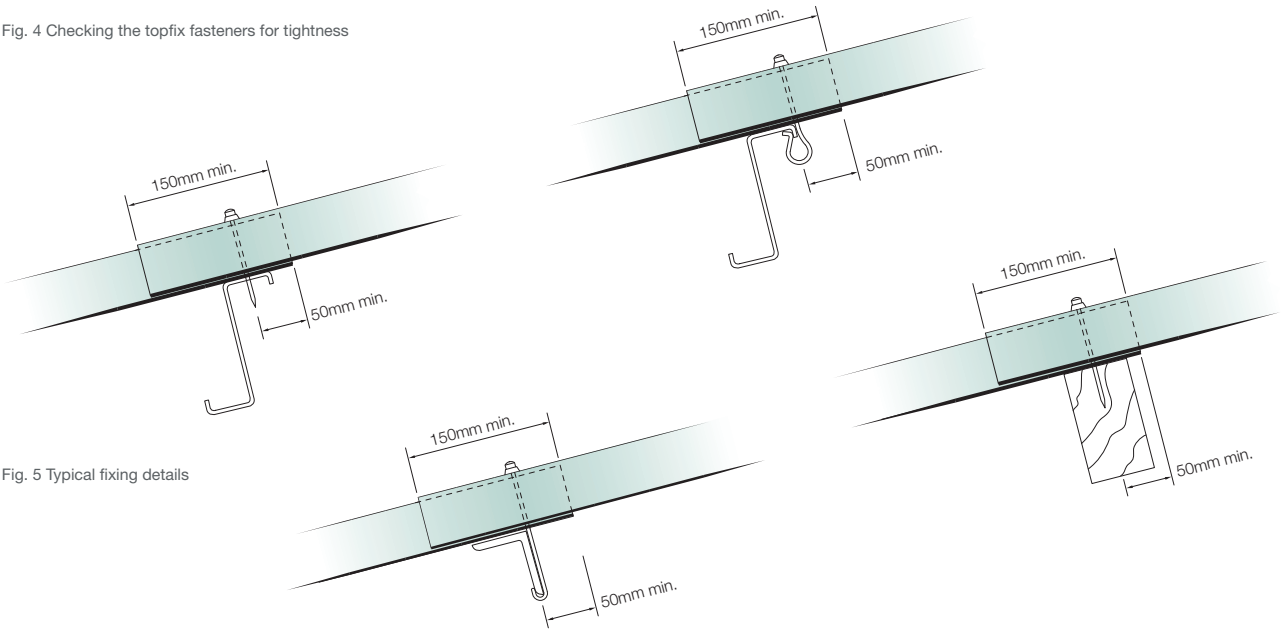


Fig. 5 Typical fixing details


C15
A15

Product range

Profile 6

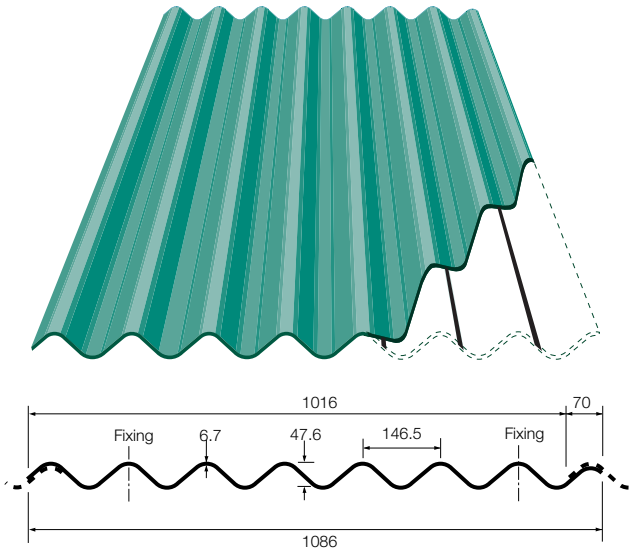
Description

Profile 6 is a high strength fibre cement sheet with polypropylene reinforcement strips inserted at precisely engineered locations that run along the length of the sheet. This provides maximum impact strength without affecting the durability of the product.

The reinforcing strips within Profile 6 only become effective when the sheet is fully fixed.

Profile 6 has a very broad appeal. It is designed for roofs of 5° pitch and over and for vertical profiled sheeting in both single skin and insulated constructions.

A comprehensive range of accessories is available and apart from the natural grey finish, sheets and accessories can be supplied in a wide range of colours (see pages 43).



Dimensions	
Standard lengths	1220, 1375, 1525, 1675, 1825, 1975, 2125, 2275, 2440, 2600, 2750, 2900, 3050mm
Farmscape Anthracite lengths	1525, 1675, 2440, 2750, 2900, 3050mm (see page 39)

Approximate covering capacities for estimating purposes:
- (1375mm purlin spacing, normal side lap, 150mm end lap) approx 1.13m² of material covers 1.0m²
- (1375mm purlin spacing, normal side lap, 300mm end lap) approx 1.19m² of material covers 1.0m²

Technical data	
Overall width	1086mm
Net covering width	1016mm
Thickness (nominal)	6.7mm
Minimum density	1400kg/m³
Pitch of corrugation (nominal)	146.5mm
Depth of profile	47.6mm
Type of product	NT
Profile height category	C
Class	1X
Side lap	70mm
Minimum end lap	150mm
Maximum purlin centres	1375mm
Maximum rail centres	1825mm
Maximum unsupported overhang	350mm
Approx. weight of roofing as laid with 150mm end laps: single skin including fixings	17kg/m²
Minimum roof pitch	5°
Depth of profile	47.6mm

Measured crest to crest, the sheet has 6 full corrugations of 146.5mm and 1 corrugation of 136.8mm.

A+ Manufactured in the UK, Marley Eternit's fibre cement profiled sheeting can achieve up to an A+ (the lowest environmental impact) in the Green Guide to Specification.

A+ Manufactured in the UK, Marley Eternit's fibre cement profiled sheeting can achieve up to an A+ (the lowest environmental impact) in the Green Guide to Specification.

Farmscape Anthracite

Description

The Farmscape product range is designed to reduce the visual impact of buildings on the landscape by giving them a weathered look from new. This is done by applying a surface pigmentation to the top surface of the sheet during manufacture. Unlike a dense layer of gloss paint, this process allows the distinctive texture of the fibre cement substrate to show through and give the product a far more natural appearance than that traditionally available to planners and designers.

Features of Farmscape

- Economically priced product for buildings that have to blend into the landscape
- Factory-applied matt finish
- Vapour-permeability minimises condensation
- Non-fragile material suitable for HSG 33 applications
- Easy to install and fix

Technical data

As for Profile 6, see pages 36-37.

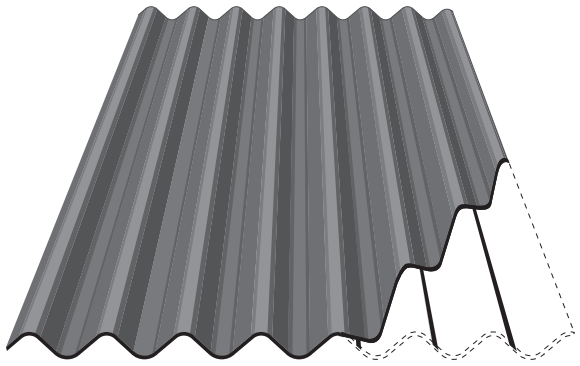
Fittings

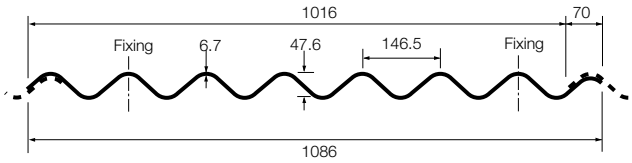
A limited range of fittings is available for the Anthracite sheets but the full range of Profile 6 fittings is available in Natural Grey.

Dimensions	
Standard lengths (all in Anthracite finish)	1525, 1675, 2440, 2750, 2900, 3050mm

Approximate covering capacities for estimating purposes:

- (1375mm purlin spacing, normal side lap, 150mm end lap) approx 1.13m² of material covers 1.0m²



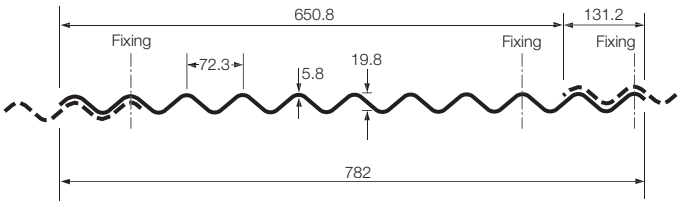


Profile 3

Description

Profile 3 is easy to handle and is suitable for small structures in the agricultural, industrial and domestic sectors, such as garages, general purpose sheds and smaller buildings.

A comprehensive range of accessories is available. The sheets and accessories can be supplied in a wide range of colours (see page 43).



Dimensions

Standard lengths	1525, 2450, 3050mm

Approximate covering capacities for estimating purposes:

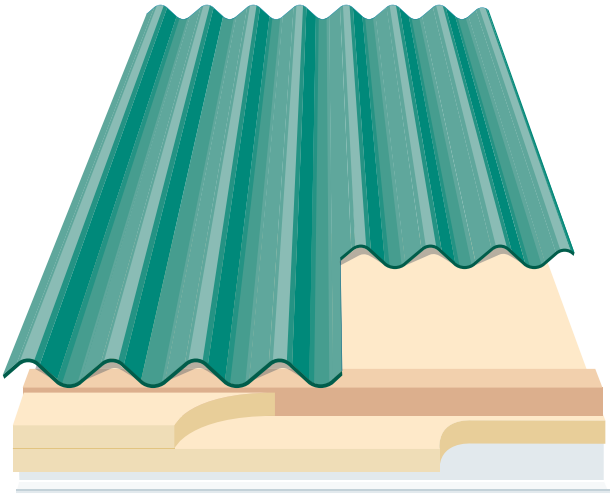
- (917mm purlin spacing, normal side lap, 150mm end lap) approx 1.27m² of material covers 1.0m²
- (917mm purlin spacing, normal side lap, 300mm end lap) approx 1.33m² of material covers 1.0m²

Technical data

Overall width	782mm
Net covering width	650.8mm
Thickness (nominal)	5.8mm
Minimum density	1400kg/m³
Pitch of corrugation (nominal)	72.3mm
Depth of profile	19.8mm
Type of product	NT
Profile height category	A
Class	1X
Side lap	131.2mm
Minimum end lap	150mm
Maximum purlin centres	925mm
Maximum rail centres	1225mm
Maximum unsupported overhang	250mm
Approx. weight of roofing as laid with 150mm end laps: single skin including fixings	14.5kg/m²
Minimum roof pitch	10°

A+ Manufactured in the UK, Marley Eternit's fibre cement profiled sheeting can achieve up to an A+ (the lowest environmental impact) in the Green Guide to Specification.

Insulated systems



Built up systems using either a fibre cement or metal lining tray, together with a quilt insulation, have commonly been used in conjunction with fibre cement sheeting.

In more recent years, rigid insulation boards sometimes supported in a T bar grid, have also been used. There are other methods of insulating a roof that may be more appropriate for the design of the roof structure and the required thermal performance.

Please contact Marley Eternit for further advice.

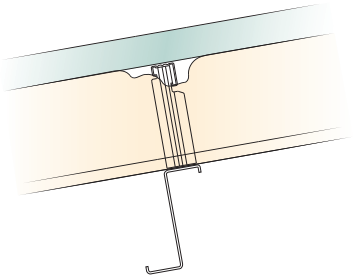


Fig.1 – Steel liner, spacer bar system, quilt insulation

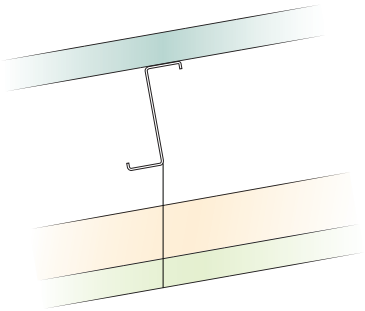


Fig.2 – Rigid insulation board suspended in a T bar grid and additional insulation

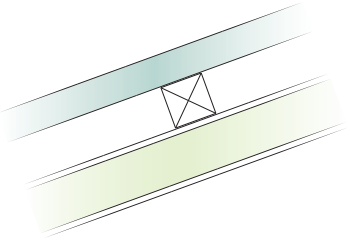


Fig.2 – Sipps panel, timber spacer

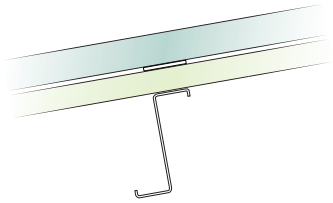


Fig.4 – Rigid insulation board and bearer piece

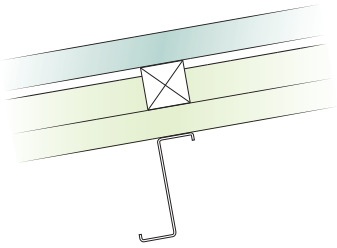


Fig.5 – Rigid insulation board, timber spacer and second insulation layer

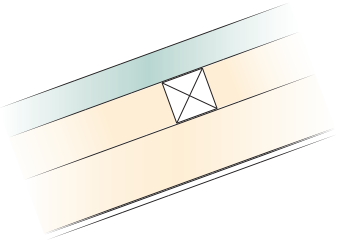


Fig.6 – Insulation between rafters and between purlins

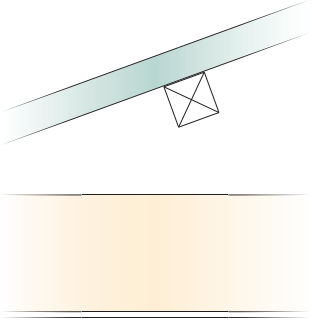


Fig.7 – Insulation at ceiling level

Colour range

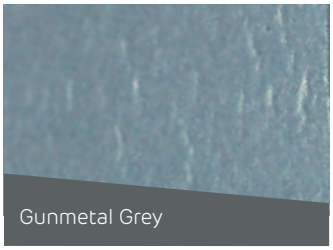
Natural Grey

Natural Grey is the standard finish for Profile 6 and Profile 3. Sheets can be supplied painted.

Painted colour range

Experience gained over many years has shown that the Marley Eternit colour range will meet the wide ranging design requirements in both rural and urban areas. All the colours have been chosen for their ability to harmonise with the most commonly used building materials – brick, slate, stone, concrete and timber.

* Matt finishes

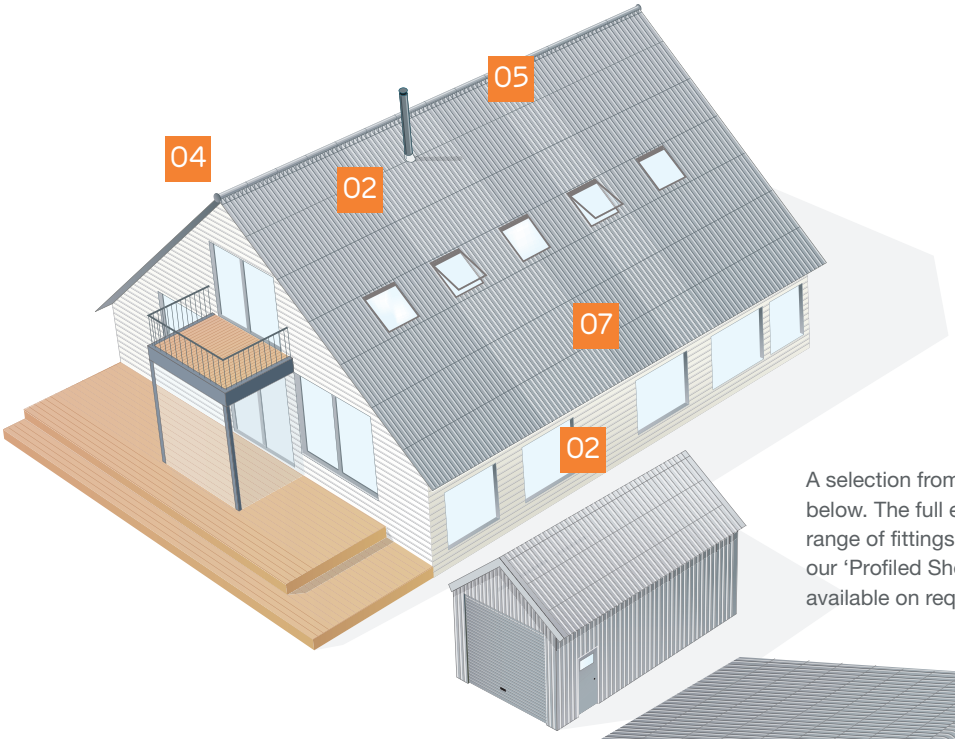


* Matt finishes

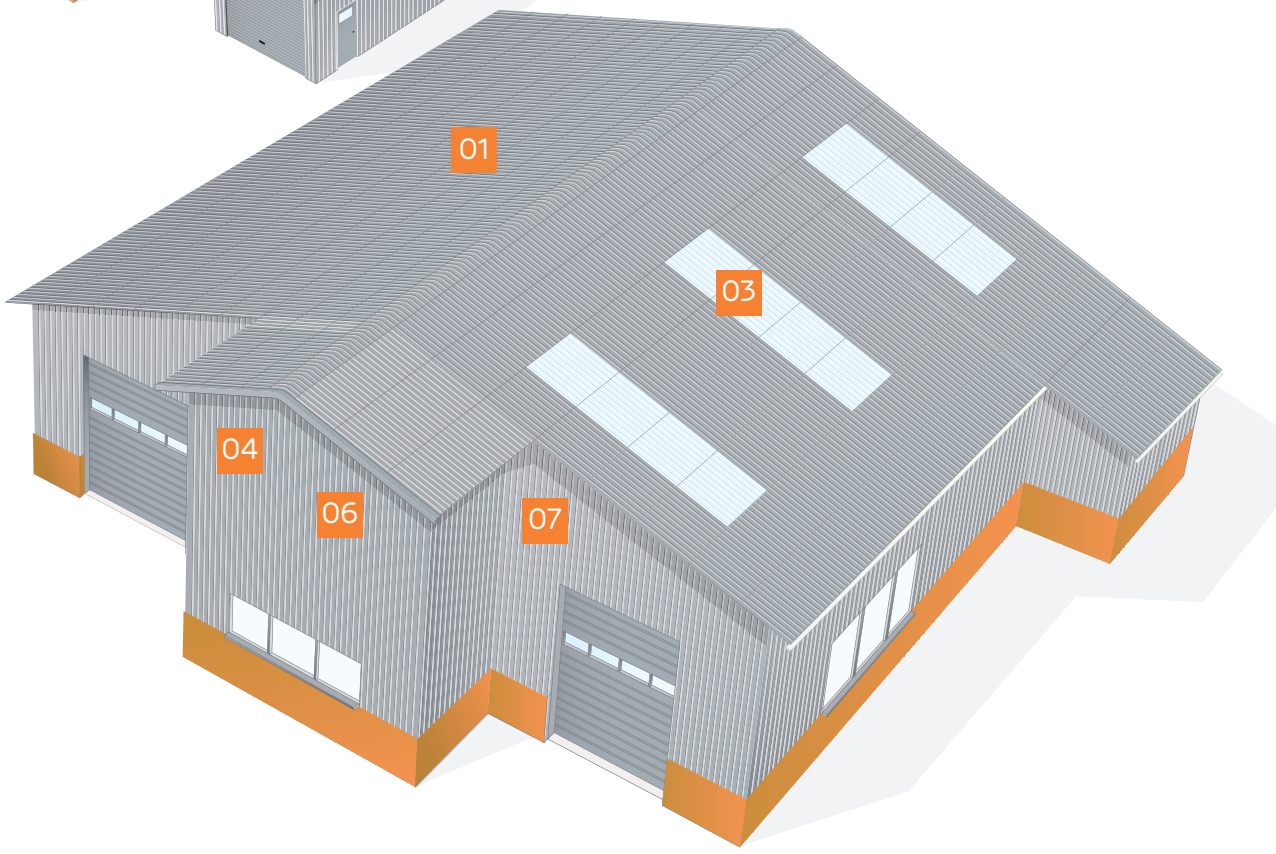
Farmscape Anthracite

Anthracite sheets have a pigmented surface layer. Together with subtle variations in tone inherent in any natural cementitious product, the appearance will blend with almost any landscape from the day the building is erected.

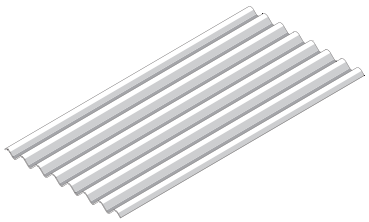
Accessories



A selection from our range of fittings is shown below. The full extent of our comprehensive range of fittings and accessories is set out in our ‘Profiled Sheeting Parts List’, which is available on request.



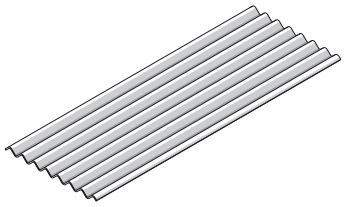
01



Profile 6

Lengths available: 1220, 1375, 1525, 1675, 1825
1975, 2125, 2275, 2440, 2600, 2750, 2900, 3050

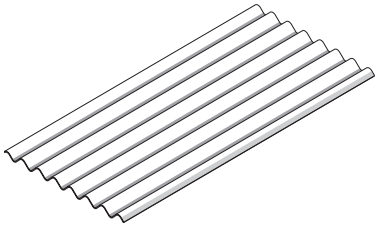
02



Profile 3

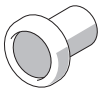
Lengths available: 1525, 2450, 3050

03

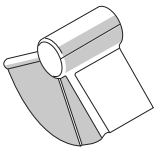


GRP translucent sheet
Profile 6 only

04

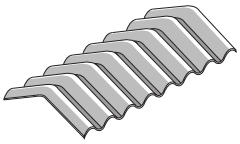


Disc type ridge finial
Available in Profile 6 and Profile 3 to suit two piece adjustable ridges

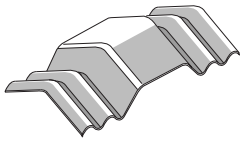


Hooded two piece ridge finial
Profile 6 to suit roll top barge boards

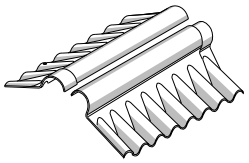
05



Cranked crown sheet
Profile 6 only, girth 900 and 750 mm. For roof pitches 5° to 22.5° (in 2.5° increments)

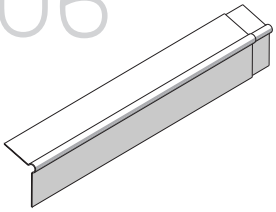


Ventilating cranked crown sheet
Profile 6 only, girth 900 and 750 mm. For roof pitches 5° to 22.5° (in 2.5° increments)
For agricultural use only

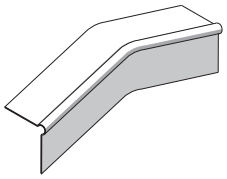


Two piece close fitting ridge
Available in Profile 6 and Profile 3

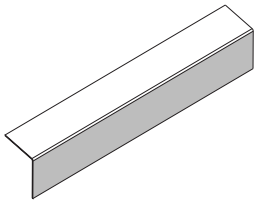
06



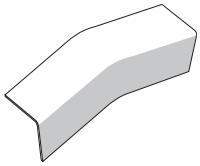
Roll top barge board
Wing dimension 200 mm
Length 1525, 2440 and 3000 mm



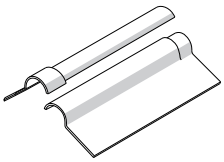
Cranked crown roll top barge board
Wing dimensions 200 mm
Girth 1050 and 1300 mm



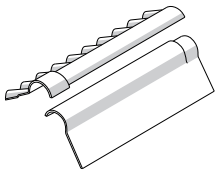
External corner
Wing dimensions 200 and 300 mm
Lengths 1800, 2440, 3000 mm



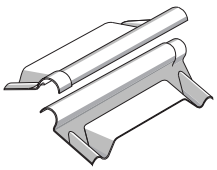
Cranked external corner piece
Wing dimensions 200 and 300 mm
Girth 1300 mm



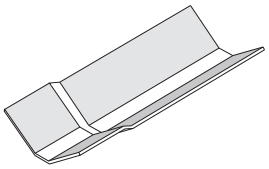
Two piece plain wing ridge
Available in Profile 6 and Profile 3



Two piece north light ridge
Available in Profile 6 and Profile 3

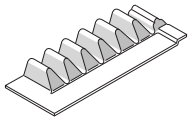


Two piece ventilating ridge
Available in Profile 6 and Profile 3
For agricultural use only

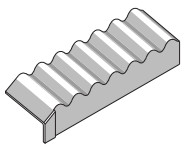


Open protected ridge flashing
Profile 6 only
Cover length 2200 mm
For agricultural use only

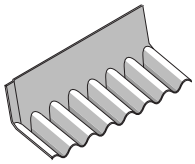
07



Eaves filler piece
Profile 6 universal, Profile 3 handed



Eaves corrugation closure piece
Available in Profile 6 universal, Profile 3 handed
Various back lengths available



Apron flashing piece
Profile 6 left hand only, Profile 3 right hand only

Description, properties and performance

Identification
Marley Eternit offers a comprehensive range of products fabricated from a man-made fibre formulation, including profiled sheets, fittings and rainwater goods.

The range of profiled sheeting products allows design flexibility and speedy construction with overall economy for the roofing and vertical profiled sheeting of all types of buildings, including industrial, commercial and agricultural. It is a material that will comply with the Building Regulations and the Building Standards (Scotland) Regulations.

Quality
Profiled sheeting is manufactured in accordance with a quality system registered under BS EN ISO 9001 and to the European BS EN 494 product specification for Class 1X sheets. Marley Eternit also operate in accordance with Environmental Management System BS EN 1S0 14001.

Description
Profiled sheeting is manufactured from Portland cement and water, reinforced with natural and synthetic fibres.

Thickness tolerance
Profiled sheeting thickness tolerance is ±10%, but not exceeding 0.6mm, as laid down in BS EN 494.

Impact resistance
The Test for Non-Fragility of Large Element Roofing Assemblies, ACR(M)001:2014, consists of a 45kg bag being dropped from a height of 1200mm onto a fixed sample of roofing. It is intended to provide information about whether the roof can support the instantaneous loads imposed on it by persons stumbling or falling onto it. A roof is classified as fragile if the bag passes through the roof assembly.

If the bag is retained on the test assembly and no other drop tests are carried out, the assembly shall be classified as Class C non-fragile assembly. Profile 6 sheets meet this requirement. The reinforcing strips within Profile 6 only become effective when the sheet is fully fixed.

Sound insulation
The average sound reduction index over the usual measurement frequency range of 100 to 3150Hz has been calculated to be:

- Profile 6 single skin – 28 decibels
- Profile 3 single skin – 27 decibels

Breaking strength
The minimum breaking strength for profiled sheeting is defined under BS EN 494.

The minimum against grain breaking load (purlin to purlin) for Profile 6 is 4250N/m. The minimum with grain bending moment at rupture (ridge to ridge) for Profile 6 is 55Nm/m.

The minimum against grain breaking load (purlin to purlin) for Profile 3 is 1400N/m. The minimum with grain bending moment at rupture (ridge to ridge) for Profile 3 is 40Nm/m.

Installed weight
The approximate installed dry weight of single skin profiled sheeting with fixings and the required side and end laps is as follows:

- Profile 6 single skin – 17.0kg/m^2
- Profile 3 single skin – 14.5kg/m^2

Fire
External fire exposure: the sheets have a P60 (external SAA) rating to BS 476: Part 3: 1975, and can be classified Class 0 in accordance with the Building Regulations. Under the European Fire Test Standards, Marley Eternit fibre cement profiled sheets are classified A2 to BS EN 13501-1:2002 and are considered to fulfil all requirements for external fire performance of roof coverings without the need for testing, in accordance with Commission Decision 2000/553/EEC.

Fibre cement profiled sheeting can be classified as non-combustible under the Building Standards (Scotland) Regulations.

Water tightness
Fibre cement complies with BS EN 494: Clause 5.3.4.

Moisture content
When new, fibre cement sheeting has a relatively high moisture content. If humid conditions prevail, damp patches (without formulation of droplets) may appear on the underside of the sheets. This phenomenon is in no way detrimental to performance and will disappear within 12 months, in the course of natural exposure.

Condensation control

Whilst Profile 6 and Profile 3 are watertight, the sheets have the ability to absorb up to 25% of their dry weight in moisture and dissipate it in more favourable conditions. This material characteristic has a significant effect in reducing condensation occurrence.

Effects of chemicals

Over the years chemical and industrial atmospheric pollution will cause a slight softening of the surface of natural finish fibre cement sheets. The acrylic paint finish provides added protection against many acids, alkalis and solvents normally found in the atmosphere.

Where fibre cement is to be used in particularly aggressive atmospheres, with higher than normal concentrations of acids, alkalis, fats or salts, please contact the Marley Eternit Technical Department for advice.

Biological

Profiled sheeting is vermin and rot-resistant, but lichen may grow on the outer surface. For advice on removal, please contact the Marley Eternit Technical Department.

Light reflectance

Mean results for natural grey sheets are 40% dry and 16% wet, using magnesium carbonate as 100%.

Effects of low and high temperature

Profiled sheeting is designed to be minimally affected by frost or climatic temperature changes.

For buildings in which higher than normal temperatures occur, or in areas which are expected to be subjected to sudden changes in temperature, special considerations may be necessary. (Consult the Marley Eternit Technical Department for recommendations).

Thermal and other movements

The amount of movement is negligible, but it is necessary to provide movement joints in association with the structural framework. (For details of movement joints, see pages 66-67). The co-efficient of linear expansion for profiled sheeting is 8 x 10^{-6}m/mK.

Thermal conductivity

Profiled sheeting has only low thermal conductivity when compared with other sheet roofing products. This serves to reduce heat build up in summer and heat loss in winter.

Thermal conductivity = 0.48 W/mK.

Durability

In normal atmospheric conditions, profiled sheeting may be regarded as having a normal life of at least 50 years, but the durability of the fixing accessories should be taken into account.

Atmospheric pollution is not normally sufficiently concentrated to be harmful. Measures should be taken to prevent corrosion of the fixing accessories, e.g. by the use of plastic washers and caps.

Profiled sheeting is resistant to most forms of atmospheric attack but, with age, becomes less elastic and a small deflection will be experienced, which may make it less resistant to impact. Its transverse strength, however, is maintained.

Maintenance

Profiled sheeting in natural grey finish requires no routine maintenance. Decorative or preservative treatment should be renewed or treated as necessary.

Fixings and washers may, however, deteriorate and should be inspected at intervals according to the type of fixing and degree of exposure.

Appearance

When a painted finish is applied, the colour intensity will reduce due to weathering, but when the roof is viewed from a reasonable distance the colour intensity will appear harmonious.