

January 2025

RED\_PIP\_1224\_10000031\_V1

# Redland

## Redland Concrete Roof Tiles & Fittings

**A guide to handling,  
installation, maintenance  
and disposal**

Part of **BMI**

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## Scope

This document is designed to accompany the lifecycle of the product, making the relevant product information clear and accessible.

## CONTENT

- Section 1 : Handling of Construction Products
- Section 2 : Product Installation
- Section 3 : Product Maintenance
- Section 4 : Product Disposal
- Bibliography

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## Section 1: Handling of construction products

**To maintain the quality and appearance of Redland Concrete Roof Tiles and minimize breakage or wastage, proper storage and handling arrangements must be in place.**

- **Storage Requirements:** Redland roof tiles and fittings should be stored in a safe location on-site, protected from potential damage. Pallets must be placed on a smooth, level surface capable of supporting their weight, with each pallet of thin flat tiles weighing approximately 1 tonne.
- **Transportation and Handling:** Appropriate lifting equipment, such as a forklift or mechanical grab, must be used for transporting and repositioning the tiles and fittings. Careful handling is essential during unloading to prevent breakage or damage.
- **Packaging Details:** Redland roof tiles and fittings are supplied palletised, securely banded, and wrapped to ensure they arrive in optimal condition.
- A proper risk assessment and method statement (RAMS) to comply with CDM regulations and site safety requirements must be completed prior to receipt of a BMI delivery.
- (In addition to mandatory personal protective equipment), cut resistant gloves and/or cut resistant sleeves may be necessary depending on the nature of the load being handled (e.g. Items with sharp edges etc.). Chemical resistance gloves (e.g. PVC/Nitrile) will be necessary if handling chemicals.

By following these guidelines, the risk of quality issues and wastage can be significantly reduced.

### SAFE MANUAL AND MECHANICAL HANDLING

#### ALL PRODUCTS GENERAL RULES

It is strongly recommended by the HSE to try eliminating manual handling, whenever possible, before proceeding with manual handling. This should be done through the use of safe mechanical handling. For example all concrete tiles are delivered by BMI on pallets and therefore it is recommended to use devices such as forklifts, hoists and pallet trucks to move the materials from the point of delivery or storage to as near to the point of installation as is practicably possible, prior to involving manual handling. Note care should be taken to ensure that materials are adequately secured to the pallet, to ensure load stability, and therefore we would

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

recommend not to remove the packaging provided as delivered by BMI until the materials are to be removed from the pallet for installation involving manual handling.

## GENERAL MANUAL HANDLING

Manual handling means transporting or supporting a load by hand or bodily force. It includes lifting, putting down, pushing, pulling, carrying or moving loads. Guidance concerning how to deal with risks from manual handling include the following:

Avoid manual handling, so far as reasonably practicable

- Minimise the length and frequency of carry, use mechanical handling wherever possible
- Assess the risk of injury from any manual handling operations that cannot be avoided
- Reduce the risk of injury from manual handling to as low as reasonably practicable
- The weight of a load is important, though the law does not set specific weight limits.

## MANUAL HANDLING IN WINDY CONDITIONS

All laying or handling of concrete roof tiles and fittings at roof level should cease when the mean wind speeds reach 23 mph (gusting to 35 mph or over) as advised by the National Federation of Roofing Contractors (NFRC).

When undertaking vertical work provided this work is carried out from a safe working platform it should be possible to afford additional protection at the position of work which can mitigate the risks associated with working in windy conditions. Nevertheless every situation should be risk assessed individually as local conditions may increase the hazards. Where vertical work is exposed and protection is not possible, then it will be necessary to follow the guidance for roof tiles and fittings, battens and underlay in relation to wind speeds above.

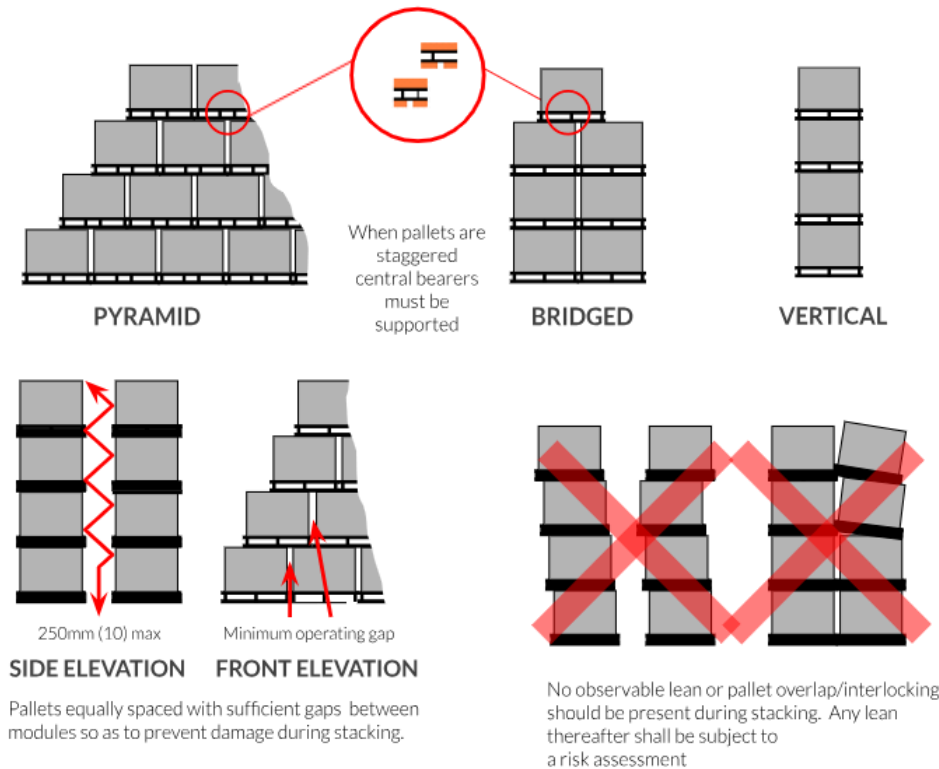
# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## PRODUCT STORAGE

Product pallet stacking height should be no more than three high for Metrics, Plaintile, 49 & Fenland, DuoPlain's, Cambrians, Ridges. All other fittings should be stacked no more than two pallets high.



### Examples of three pallet stacking

- In winter conditions all ice must be removed before stacking.
- Careful consideration should be given to ease of access to facilitate product stacking and to ensure good stock rotation.
- Local risk assessments are required on all racked products to ensure a safe condition.
- All products must be stored on a level, hard surface and not on slopes or soft ground.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## PRODUCT TRANSPORTATION

Concrete tiles and fittings should be transported on pallets with appropriate securement to the pallet (e.g. shrink wrap and banding). All pallets loaded onto vehicles should be strapped to the vehicle bed to eliminate movement in transit. Materials damaged in transit should be replaced.

Deliveries are always made only to the nominated delivery address and must be offloaded on to safe, hard ground.

Standard Vehicle Types include:

- Curtain-sided Artic vehicle
- Curtain-sided Rigid vehicle
- Transit Van (Parcel Service)

Mechanical offloading facilities (e.g. fork lift truck) will be required to remove the transported products from the vehicles. Please note that no offloading facilities are provided on standard vehicle types.

Specialist Vehicle Types include:

- Flat Bed
  - Flat Bed with Moffat
  - HIAB Crane vehicle
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# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## Section 2: Product installation

**Installation of a Construction Product is the incorporation of the Construction Product into the construction works for temporary or permanent use.**

### Minimum requirements:

- Safe installation and access
- Competency requirements for installation
- Specialist equipment and tools
- Sequencing of works
- Interface with other products
- Installation guidance to achieve tested performance
- Legal requirements
- Implications for BMI Redland Guarantees
- Record keeping requirements

### SAFE INSTALLATION AND ACCESS

For work on pitched roofs, safe access and full edge protection is required on all roof elevations to which access is needed unless the work is of very short duration and low risk. Edge protection requirements are set out in more detail in HSG 33 ([www.hse.gov.uk/pubns/priced/hsg33](http://www.hse.gov.uk/pubns/priced/hsg33))

Tiling works should be carried out by the roofer standing or kneeling on the tile battens over the intersection with the rafters (never at the mid-span of the battens) to avoid walking on the completed tiling. Care must be taken when stripping old roofs as the battens will have deteriorated and should not be relied upon to provide secure footholds. Attention should be paid to the need for appropriate PPE requirements, in particular the wearing of gloves, when installing concrete tiles and fittings.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

Installers should also abide by the recommendation outlined in the following documents:

- HSE HSG 33 Health and Safety in Roof Work ([www.hse.gov.uk/pubns/priced/hsg33](http://www.hse.gov.uk/pubns/priced/hsg33))
- Roof Tile Association Health and Safety ([rooftileassociation.co.uk/tech lib/health-safety](http://rooftileassociation.co.uk/tech_lib/health-safety))
- Manual Handling at Work ([www.hse.gov.uk/pubns/indg143](http://www.hse.gov.uk/pubns/indg143))

## COMPETENCY REQUIREMENTS FOR INSTALLATION

In the UK, roofing contractors and other roof workers can demonstrate competence in a number of ways:

- Roofers can gain qualifications through a Level 6 in Roofing Occupations, a modern apprenticeship, or a Specialist Applied Skills Programme. They can also have RoofCERT accreditation by passing a knowledge test, proving they have a relevant NVQ/SVQ Level 2 or above, and passing a practical assessment.
- Roofers should have knowledge of building and construction, be able to work well with their hands, and be physically fit. They should also be able to operate and control equipment, and be able to carry out basic tasks on a computer or hand-held device.
- Roofers should also hold the relevant insurance to protect them in case of potential damage to people and property during their work.

In Building Regulation 7: Materials and Workmanship, of the England Building Regulations and its national equivalents in Wales, Scotland and Northern Ireland there is a requirement in Clause 7.(1) (b) to carry out building work in a workmanlike manner. To satisfy the requirements of Building Regulation 7 the workmanship should be such that, where relevant materials are adequately mixed or prepared and applied, used or fixed so as to perform adequately the functions for which they are intended.

Under Section 2: Workmanship of Approved Document 7 it sets out the ways of establishing the adequacy of workmanship. For products that are CE-marked, such as concrete roof tiles and fittings that are CE marked to the harmonised product standard BS EN 490: Concrete roofing tiles and fittings for roof covering and wall cladding – Product specifications, it is important that only CE marked products are used, as well as installed in accordance with the current BS 8000-0: Workmanship on Construction Sites - Introduction and general principles and BS 8000-6: Workmanship on construction sites - Slating and tiling of roofs and walls.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

BMI's range of concrete roof tiles and fittings technical data for each product can be found in the specific product page for each product on the BMI UK & Ireland website at [www.bmigroup.com/uk/redland-pitched](http://www.bmigroup.com/uk/redland-pitched).

## SPECIALIST EQUIPMENT AND TOOLS

In order to undertake some tasks, it may be necessary to use the following specialist equipment and tools:

- A hand held heavy duty cut-off circular power saw with an attachment for water suppressant is required to cut BMI Redland concrete tiles and fittings along with a heavy duty cutting board and a dedicated area on the scaffolding. Once the BMI Redland tile or fitting has been cut any dust residue and water staining needs to be removed from the surface of the BMI Redland concrete tile or fitting.
- Respiratory protective equipment to BS EN149, eye protection to BS EN166, ear defenders to BS EN 352-1:93 and suitable clothing and gloves to BS EN 388 +A1 : 2018 must be worn at all times when cutting BMI Redland concrete tiles and fittings.

Installers should also abide by the recommendation outlined in the following HSE information sheets:

- No 36: Construction dust ([www.hse.gov.uk/pubns/cis36](http://www.hse.gov.uk/pubns/cis36))
- The Control of Vibration at Work Regulations 2005 ([www.hse.gov.uk/pubns/priced/l140](http://www.hse.gov.uk/pubns/priced/l140))
- Safe use of work equipment (<https://www.hse.gov.uk/pubns/priced/l22.pdf>)

## SEQUENCING OF WORKS

### METRIC TILES

The roof structure should be checked to determine if there are any structural defects prior to any roofing works being carried out.

The rafter pitch and length would also need to be checked to confirm that the tile selected is suitable for its application.

Prior to the installation of the underlay any ventilation, rafter trays, eaves protection systems or any required insulation needs to be installed.

Next comes the installation of the underlay in line with BMI Redland's guidance.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

The first tile batten is fixed to the rafters at a gauge to ensure the tile overhangs over the fascia/board eaves is 50mm minimum, the battens need to have the correct overhang of the verge/hip following guidance from the dry fix component supplier.

This batten is a fixed point and from this a measurement should be taken to where the next fixed point is which is a ridge, top edge abutment and roof window as these have a specific measurement where these tiling battens need to be fixed.

To find the correct batten gauge measure the distance between the top of the eaves batten and the top of the fixed point batten, divide this distance by the maximum gauge of the tile being used, then round this figure up to the next whole number to give the number of courses up the slope, then divide the measured distance by the number of courses to give the batten gauge.

## Worked Example

Distance of top of eaves batten to first fixed point	5700mm
Maximum Gauge for a Redland Grovebury (30 degree pitch)	343mm
Number of courses	$5700 / 343 = 16.62$
Round up to the next whole number	17
Batten Gauge	$5700 / 17 = 335\text{mm}$

Profiled tiles are laid straight bond. Most interlocking flat tiles are laid half bond with the exception of MockBond or DuoPlain tiles that are laid with a 3/4 tile offset.

The roof is marked out depending on what tile type is being used with perpendicular lines struck on the battens to allow the tiles to run straight, maintain half bond and to use the shunt within the tiles to keep any cuts to a consistent size.

Once this has been completed the tiles are loaded out evenly over the roof mixed from at least three different pallets to minimise the risk of colour variation on the finished roof.

Tiling can commence once components such as valleys, bonding strips, undercloaks, and secret gutters, if required, are installed.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

Tiles must be at least once nailed/mechanically fixed and perimeter tiles twice mechanically fixed. A FixMaster fixing specification is strongly recommended which will provide the fixing requirements which take account of relevant factors such as roof geometry, geographical location and level of exposure.

## PLAIN TILES

The sequence for the installation of the underlay and battens is the same as for metric tiles, but due to the size of plain tiles and them being double lapped, the battens are fixed much closer together, at 100mm gauge, therefore a 38 x 25mm tiling batten is the standard size used.

An eaves course of tiles is laid under the first course of tiles and likewise at the apex of the roof a top course of tiles is laid.

The tiles are laid half bond and tile and halves are used in alternate courses along the verge, side abutments and hips and valleys. Purpose-made valley, bonnet and arris hip tiles are available from BMI Redland.

The minimum fixing requirement stated in BS 5534 for roof pitches over 60 degrees is for tiles to be twice nailed every fifth course, above 60 degrees every tile should be nailed twice. For a site specific fixing specification, we recommend that a FixMaster specification is used which is available online on the BMI Redland website.

Plain tiles are the most common product for use on vertical applications and further guidance is available via the Roof Tile Association website ([rooftileassociation.co.uk/tech\\_type/plain-tiling-guide](https://rooftileassociation.co.uk/tech_type/plain-tiling-guide)).

Further information can be found in the following reference documentation:

- BS 8000-6: 2023 Workmanship on Construction Sites Part 6 : Slating and Tiling of roofs and walls-Code of Practice
- BS5534:2014+ A:2018 Slating and tiling for pitched roofs and vertical cladding-Code of practice
- Roof Tile Association Large Format Tiles ([rooftileassociation.co.uk/tech\\_type/large-format-tiles](https://rooftileassociation.co.uk/tech_type/large-format-tiles))
- BMI Redland FixMaster Online ([www.bmigroup.com/uk/support/pitched-roofing-services/fixmaster](https://www.bmigroup.com/uk/support/pitched-roofing-services/fixmaster))

## INTERFACE WITH OTHER PRODUCTS

Consideration should be given to any detail or intersection where the concrete tile or fitting interfaces with other products.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

BMI Redland SpecMaster offers a complete specification with components that have been designed to be installed alongside BMI Redland concrete tiles and fittings, enabling the issuing of a BMI Redland SpecMaster 15 year Guarantee.

Where not wishing to achieve the BMI Redland SpecMaster 15 year Guarantee, Klober products may be used as an alternative.

Where traditional materials are proposed at intersections and abutments (e.g. Lead Flashings) then the details provided by the Lead Sheet Training Academy (LSTA) should be followed. Alternatively BMI Redland recommends the use of lead-free Wakaflex, and this is included within the BMI Redland SpecMaster 15 year Guarantee.

## INSTALLATION GUIDANCE TO ACHIEVE TESTED PERFORMANCE

Where specific BMI Redland Guarantees require a full Redland specification to be followed it is mandatory that all the BMI Redland-specified concrete tiles and fittings and other accessories and components are installed and used together to achieve the guaranteed roof system performance.

When installing BMI Redland tiles and fittings please refer to the relevant technical data sheets made available [HERE](#) through the BMI UK websites. Particular care should be taken to work within the required minimum and maximum pitch and rafter lengths, as well as headlap requirements.

All BMI Redland concrete roof tiles and fittings should be fitted in accordance with the BMI Redland fixing specification, which can be obtained through our free BMI Redland FixMaster service found [HERE](#).

All BMI Redland and Klober components have instructions that can be downloaded from either the [BMI UK website](#) or the [Klober website](#). Many products include their installation instructions within the packaging.

BMI Redland and Klober installation instructions should be followed without exception. If further detail is required please contact the [BMI Redland Technical Services department](#) or [Klober Technical Services](#).

## LEGAL REQUIREMENTS

There are several legal requirements that one needs to be mindful of when installing BMI Redland concrete roof tiles and fittings. Compliance with the Building Regulations in terms of the materials and workmanship used to install the products; this is Building Regulation 7 in England and its equivalents in the Wales, Scotland

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

and Northern Ireland building regulations. For concrete roof tiles and fittings this means that only CE-marked products should be used, as these products are covered by a harmonised European product standard, BS EN 490 - Concrete roofing tiles and fittings for roof covering and wall cladding – Product specifications. In terms of the design of how the products are used, all the parts of the relevant national Building Regulations must be satisfied in accordance with Building Regulations and the Building Safety Act 2022.

There are a range of laws relevant to roof work health and safety including The Health and Safety at Work Act 1974, The Work at Height Regulations 2005, The Management of Health and Safety at Work Regulations 1999, The Construction (Design and Management) Regulations 2015, The Lifting Operations and Lifting Equipment Regulations 1998 and The Provision and Use of Work Equipment Regulations 1998.

From a health and safety perspective the Construction (Design and Management) Regulations 2015 set out the legal requirements for the whole construction process from concept to completion, and what each duty holder (clients, designers, contractors, workers etc) must or should do to comply with the law to ensure projects are carried out in a way that secures health and safety.

The Building Safety Act 2022 has also named the Health and Safety Executive (HSE) as the new Building Safety Regulator as well as introducing new duties relating to fire and structural safety.

With regards to external fire, Commission Decision 2000/553/EC states that concrete roof covering products can be considered to fulfil all of the requirements for the performance characteristic “external fire performance” without the need for testing to DD CEN/TS 1187: 2012 Test 4 in the UK, subject to any national provisions on the design and execution of works being fulfilled. All BMI Redland concrete tiles and fittings comply with Commission Decision 96/603/EC and therefore are deemed to achieve  $B_{ROOF}(t4)$  without need for testing.

Concerning reaction to fire, EN 490 states that concrete tiles and fittings that contain less than 1% by weight or volume of homogeneously distributed organic material are classified Class A1 in accordance with the provisions of Commission Decision 96/603/EC and therefore BMI Redland uncoated concrete tiles and fittings are classified Class A1.

All coated BMI Redland concrete tiles and fittings are classified A2, s1d0 in accordance with coating testing carried out at a notified laboratory.

## IMPLICATIONS FOR BMI REDLAND GUARANTEES

It is a condition of BMI Redland Guarantees for pitched roofs specified and installed with BMI Redland concrete tiles and fittings and other accessories, even though they provide no explicit cover for the standard

## **Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal**

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

of workmanship used in the installation, that the products are fitted in accordance with BMI written instructions using normal standards of good workmanship and the requirements of the British Standard codes of practice for slating and tiling BS 5534: Slating and tiling for pitched roofs and vertical cladding, BS 8000-0: Workmanship on Construction Sites - Introduction and general principles, and BS 8000-6: Workmanship on construction sites - Slating and tiling of roofs and walls.

BMI Redland Guarantees for BMI's range of Redland concrete roof tiles and fittings vary from those that just provide cover for defective product supplied only to those that provide more comprehensive cover for roof leakage caused not only by defective BMI Redland materials installed but also caused by defective BMI design or specification.

It is recommended that the [BMI Redland Technical Services](#) department be contacted for further information on guarantee types and requirements..

### **RECORD KEEPING REQUIREMENTS**

Clients must retain the BMI Redland Guarantee for the BMI Redland products sold or for the BMI Redland specified and supplied roof for the whole period of the guarantee cover after completion for record keeping and to ensure any future claim process against the guarantee is valid.

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# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## Section 3: Product maintenance

**Maintenance of a Construction Product is the regular inspection and required interventions to maintain the performance of the Construction Product in use.**

### Minimum requirements:

- Maintaining BMI Redland Guarantees
- Safe access
- Legal requirements
- Competency requirements for maintenance
- Replacement parts
- Specialist equipment and tools
- Cleaning requirements
- Record keeping requirements

### MAINTAINING BMI REDLAND GUARANTEES

It is important that this document is read in its entirety as it contains important guidance throughout that needs to be followed. If a BMI Redland Guarantee is in place for your roof it should be read alongside this document so you understand clearly the scope of cover of the guarantee as well as the terms and conditions relevant to the specific guarantee.

For BMI Redland concrete tiles and fittings covered by a BMI Redland Guarantee, in the first instance contact the [BMI Redland Technical Services](#) in the event of a roof leak or complaint, so that any potential claim can be properly investigated.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## ROOF MAINTENANCE

The Client shall arrange two inspections per year of their roof as a minimum - ideally in Spring and Autumn - and maintenance in accordance with the current standards BS 5534, BS 8000-0, BS 8000-6. Additional inspections should also be carried out after any maintenance works on the roof or after major storms. All inspections should be carried out by an appropriately qualified professional contractor.

If the roof is especially prone to leaves from nearby or overhanging trees or other debris more frequent inspections and maintenance than twice per year may be advisable e.g. quarterly.

The location of internal evidence of dampness can be used to pinpoint any serious problems that exist. Such checks should be carried out prior to an exterior inspection. Where practicable, roofs from the outside should be inspected from the eaves or gable.

When correctly installed and maintained in accordance with the recommendations of BS 5534, BS 8000-0, BS 8000-6, and this document, a completed roof or wall clad with concrete tiles and fittings should perform for the guaranteed life of the product without the need for extensive maintenance or repair.

To achieve the full benefits of a roof or wall clad with concrete tiles and fittings there are a number of standard procedures which should be drawn to the attention of the building owner or maintenance operative, when considering the building.

Both concrete roof tiles and fittings should be treated as fragile and basic precautions should be taken to avoid access to the roof by window cleaners, chimney sweeps, aerial installers etc., without the correct use of crawling boards, roof ladders or access platforms. Failure to use adequate access equipment can damage fragile tiles and fixings and may be in contravention of Health and Safety Regulations. When access to the roof surface is essential then appropriate roof traffic equipment (crawling boards, roof ladders etc.) must be used.

Any leaves and debris should be removed from valleys, gutters, and drain pipes, and any moss or lichen growths that restrict the flow of water off the roof slope (See section on Mosses and Lichens). Gutter joints should be inspected for defective sealant or loose clips.

Check that there are no loose ridge, hip or other components and the function of any roof space ventilation components is adequate. Clear any grilles or apertures to ensure adequate air flow into the roof void. Normally dry-fixed components should be maintenance-free if correctly installed, however, mortar bedded ridges, hips, verges and valleys can be susceptible to cracking of the mortar and hence possible displacement of the components if they are not mechanically fixed. It is important therefore that mortar bedded roof details are carefully checked as part of the visual inspection of the exterior.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## REPAIR PROCEDURES

### BMI REDLAND UNDERLAY:

Repair any large-scale tears, holes or cuts in the underlay by cutting a slit above the hole and placing a sizable piece of material large enough to fit under and lap onto the underlay around the hole by at least 150 mm.

Secure under the battens or fix to the adjacent rafters using felt nails. For smaller-scale tears or holes proprietary repair tapes can be used. Please consult BMI Redland Technical Services for more information.

### BATTENS:

Defective battens should be replaced for a minimum of two rafter spacings to ensure adequate fixing. Always cut back to the centre of the rafter and nail the end. Never allow battens to be unsupported.

### BMI REDLAND PLAIN TILES:

The damaged concrete tile can be removed by blocking up the neighbouring tiles with a timber wedge, and by sliding it out with the nibs clearing the top of the batten. Any nails should be removed using a slate ripper or zax. The replacement tile can then be inserted back into position using the same technique in reverse. If a method of mechanical fixing for the replacement concrete roof tile is required then consult BMI Redland Technical Solutions for a method statement.

### BMI REDLAND INTERLOCKING TILES:

The damaged concrete tile can be removed by first easing it up slightly, so that it is possible to slide it out with the nibs clearing the top of the batten. Timber wedges and a flat trowel will facilitate this procedure. If the damaged tile is nailed, then the neighbouring tiles should be lifted to expose the nail, which should be extracted carefully using a slate ripper or zax. The replacement concrete roof tile can be inserted using the same procedure in reverse.

Isolated replacement concrete roof tiles which require fixing should be mechanically fixed. A detailed method statement for both flat tiles laid in broken (half or three quarter) bond and profiled tiles laid in straight bond can be obtained from BMI Redland Technical Services. A suitable stainless steel screw with sealing washer can be used to secure both the head and tail (as appropriate depending on degree of fixing required) of the replacement concrete roof tile to the battens below. If all the damaged concrete tiles are clipped, and for aesthetic reasons stainless steel screws are not considered acceptable by the building owner, it may be necessary to strip back the roof to the nearest verge or valley/hip in order to re-clip the replacement concrete roof tiles.

### BMI REDLAND FITTINGS:

Concrete ridge and hip tiles can be replaced individually and re-bedded and fixed with new mortar and/or mechanically fixed where required. Ensure the correct mortar mix is used complying with BS 5534 and that all fittings are pre-soaked in water prior to laying. Valley tile replacement may necessitate stripping out adjacent

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

tiles in order to replace existing valley tiles. Ensure any replacement tiles adjacent to the valley are re-fixed by clips and/or nails.

## MAINTENANCE ITEMS

### EFFLORESCENCE:

Efflorescence is a general term used in the construction industry, to describe the white deposits found on building materials such as concrete roof tiles and fittings, paving blocks, clay bricks, calcium silicate bricks, mortar, concrete etc. The term efflorescence covers a number of different phenomena and different forms of efflorescence can occur on all concrete products as a result. With BMI Redland concrete roof tiles and fittings, subtly different reaction mechanisms at various stages of the production process and lifespan of the products can give rise to the formation of calcium carbonate, which appears on the surface of the tiles as a white haze. Efflorescence may sound like a complicated chemical phenomenon, but in reality, it is merely a superficial characteristic feature of good quality concrete roof products.

Efflorescence as found on BMI Redland concrete roof tiles and fittings is often categorised as 'lime bloom', which is a deposit apparent either in the form of white patches or as a more general lightening in colour. When the latter effect is seen, it is often misinterpreted as a fading or 'washing out' of the colour of the concrete. Efflorescence forms more readily when the concrete tile becomes wet and dries slowly and therefore there are more occurrences during the winter. It is also generally only likely to occur in the early life of concrete roof tiles and materials installed for a year or more without experiencing lime bloom, are unlikely to be affected in the future.

Perhaps the most important factor for the specifier, builder and property owner is that the natural weathering process gradually removes efflorescence on concrete tiles. The white deposits will themselves gradually wash off and disappear due to formation of soluble bicarbonate by the action of rainwater (usually within one and at most two years). This natural removal restores the original colour of the product and in no way affects the product's impermeability, colour consistency or continuing strength growth with age.

### WHITE STAINING AROUND LEAD FLASHINGS:

In rainy or damp conditions new lead sheet flashings will produce an initial, uneven mix of insoluble white carbonates and sulphates on the surface. The lead flashings take a long time before the surface becomes oxidised and chemically stable, so this process can continue for many years. This can be aesthetically unacceptable in some situations but, more importantly, the white deposits can be washed off by rain to cause unsightly staining on concrete roof tiles below the flashings.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

These insoluble salts are also toxic to many organic materials so the white stains tend to persist and don't get masked by surface growths such as algae and lichens (it is quite common to see this effect on BMI Redland concrete roof tiles where the tiles stay cleaner for longer below lead flashings).

To avoid staining and also provide a pleasing appearance, a coat of patination oil should be applied to lead flashings as soon as practical after fixing. Preferably the oil should be applied no later than the end of the day's work since overnight rain can cause the white stain to develop. Patination oil should be applied evenly with a soft cloth and, in vulnerable locations such as mansard flashings fixed over dark grey concrete roof tiles it is important to oil under the lower edge of the flashings and between the laps. Clips along the edges of flashings should be turned over after the oil has been applied.

## **MOSESSES & LICHENS ON BMI REDLAND CONCRETE ROOF TILES AND FITTINGS**

The principal cause of the growth of mosses and lichens on BMI Redland concrete tiles and fittings is due to their rough surface which filters dirt out of rainwater. Decaying matter in the form of dead leaves which fall onto the roof, also tend to lodge on the surface. Spores and seeds of mosses and lichens are also blown on to the roof, or get carried there by the feet of birds, and sooner or later take root in the dirt and begin to grow. Inevitably, the surface of some BMI Redland concrete roof tiles and fittings that have a sanded or granule facing, are the first to attract moss growth. Moss tends to flourish on roofs where trees are nearby and where there are shady, damp conditions. Steeper pitched roofs are less likely to support moss and lichen growth as they shed water more quickly than low-pitched roofs. By contrast, north facing slopes that remain damp longer may attract the growth of mosses and lichens faster than south-facing slopes. The primary effect of moss on a roof is that it holds water. Thus, the flow of water into gutters is slowed down and the water is held on the roof in contact with the tiling for a much longer time. If the mosses and lichens affect the drainage of water down the roof and in valleys, abutment gutters and the interlocking drainage channels of the roof tiles, they should be removed. Generally, most moss and lichen growths are not unsightly and in some circumstances can impart a mellow and pleasing weathered appearance to the roof. In normal circumstances, the growths are not deleterious to concrete. In circumstances where they are considered undesirable, there are several methods of removal.

## **METHODS OF LICHEN / MOSS REMOVAL**

### **SPRAYING WITH BIOCIDAL WASH:**

This is perhaps the least expensive method, but very great care has to be taken. Any spray that is toxic to moss can also be dangerous to garden plants in the vicinity of the roof and perhaps to the plants in adjoining gardens. There is also the possibility of ill effects to animals and birds. Biocidal washes take a few days to be fully effective and should preferably be applied during a spell of dry weather, since rain may wash them off before they have had time to act. The action is hastened if thick growths are removed and the wash is well brushed in. Normally, one treatment is sufficient to kill the growths but sometimes repeat applications are

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

necessary. The dead growths will eventually weather off and disappear. It is recommended that the biocidal wash is applied evenly to the moss and lichens or other biological growths using a garden watering can or other non-pressurised spraying device, taking care not to spray up, but down the roof. It is not recommended that a high pressure jet of water is used since this can in many cases either cause mechanical damage to the roof tiles (and subsequent leakage) or undesirable changes to the appearance of the roof tiles e.g. with granular finished concrete tiles it can remove the surface granular finish exposing the bare concrete. Some biocidal washes leave a residue which discourages subsequent growth, but even under favourable circumstances the residual effect is unlikely to last for more than 2 or 3 years. A wide range of biocidal washes are available, but care must be taken with regard to Environmental and Health & Safety Regulations. Further information and guidance can be found in BRE Digest 370. Always consult the manufacturer of the biocidal wash for detailed instructions.

## **COPPER WIRE:**

A more permanent answer to the problem of maintaining a clear roof can be obtained by trailing copper wires across the roof surface. These can be fixed at intervals up the roof slope, directly below the front edge of the tiles, so that with every shower of rain, the copper slowly oxidises in the atmosphere and provides the roof with a wash of biocidal copper salts which prevent renewed growth.

## **SCRAPING:**

This is certainly not recommended as it almost inevitably results in broken or damaged tiles and consequent roof leaks. In addition, it also leaves behind a trail of unsightly scrape marks which, however carefully the work is carried out, will have to be repeated in the future as the mosses and lichens return.

## **OTHER SURFACE TREATMENTS:**

Not all surface treatments have a benign effect on the performance and durability of concrete roof tiles and fittings. It should be borne in mind that most, if not all, tile manufacturers, BMI Redland included, offer product guarantees regarding the durability of their tiles. The use of such surface treatments will invalidate these guarantees.

This document considers some aspects of the work required to maintain and repair concrete tiled roofs and claddings consisting of concrete roof tiles.

## **SAFE ACCESS**

For access to pitched roofs for inspection and maintenance purposes it is recommended that HSG 33 Health and Safety in Roof Work (HSE) be consulted for guidance. HSG 33 can be downloaded from <https://www.hse.gov.uk/pubns/books/hsg33.htm>.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

Where you cannot avoid work at height, access to the roof should be planned and any risks associated with the work should be risk assessed and mitigated.

## LEGAL REQUIREMENTS

When it comes to maintaining and repairing roofs installed with BMI's range of concrete roof tile and fitting products there is a range of law relevant to roof work health and safety including The Health and Safety at Work Act 1974, The Work at Height Regulations 2005, The Management of Health and Safety at Work Regulations 1999, The Construction (Design and Management) regulations 2015, The Lifting Operations and Lifting Equipment regulations 1998 and The Provision and Use of Work Equipment Regulations 1998.

The Construction (Design and Management) regulations apply to all building work, including maintenance and repair. These regulations require roofs to be designed with safety in mind throughout their life, including for maintenance, inspections and repairs.

## COMPETENCY REQUIREMENTS FOR MAINTENANCE

In the UK, roofing contractors and other roof workers can demonstrate competence in a number of ways:

- Roofers can gain qualifications through a Level 6 in Roofing Occupations, a modern apprenticeship, or a Specialist Applied Skills Programme. They can also have RoofCERT accreditation by passing a knowledge test, proving they have a relevant NVQ/SVQ Level 2 or above, and passing a practical assessment.
- Roofers should have knowledge of building and construction, be able to work well with their hands, and be physically fit. They should also be able to operate and control equipment, and be able to carry out basic tasks on a computer or hand-held device.
- Roofers should also hold the relevant insurance to protect them in case of potential damage to people and property during their work.

In Building Regulation 7: Materials and Workmanship, of the England Building Regulations and its national equivalents in Wales, Scotland and Northern Ireland there is a requirement in Clause 7.(1) (b) to carry out building work in a workmanlike manner. To satisfy the requirements of Building Regulation 7 the

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

workmanship should be such that, where relevant materials are adequately mixed or prepared and applied, used or fixed so as to perform adequately the functions for which they are intended.

Under Section 2: Workmanship of Approved Document 7 it sets out the ways of establishing the adequacy of workmanship. For products that are CE-marked, such as concrete roof tiles and fittings that are CE marked to the harmonised product standard BS EN 490: Concrete roofing tiles and fittings for roof covering and wall cladding – Product specifications, it is important that only CE marked products are used, as well as installed in accordance with the current BS 8000-0: Workmanship on Construction Sites - Introduction and general principles and BS 8000-6: Workmanship on construction sites - Slating and tiling of roofs and walls.

## REPLACEMENT PARTS

BMI Redland does not provide replacement parts for its products. Should a product prove faulty then a full replacement should be employed. BMI's range of concrete roof tiles and fittings technical data for each product can be found in the specific product page for each product on the BMI UK & Ireland website at [www.bmigroup.com/uk/redland-pitched](http://www.bmigroup.com/uk/redland-pitched).

## SPECIALIST EQUIPMENT AND TOOLS

In order to undertake some tasks, it may be necessary to use the following specialist equipment and tools:

- A hand held heavy duty cut-off circular power saw with an attachment for water suppressant is required to cut BMI Redland concrete tiles and fittings along with a heavy duty cutting board and a dedicated area on the scaffolding. Once the BMI Redland tile or fitting has been cut any dust residue and water staining needs to be removed from the surface of the BMI Redland concrete tile or fitting..
- Respiratory protective equipment to BS EN149, eye protection to BS EN166, ear defenders to BS EN 352-1:93 and suitable clothing and gloves to BS EN 388 +A1 : 2018 must be worn at all times when cutting BMI Redland concrete tiles and fittings.

Installers should also abide by the recommendation outlined in the following HSE information sheets:

- No 36: Construction dust ([www.hse.gov.uk/pubns/cis36](http://www.hse.gov.uk/pubns/cis36))
- The Control of Vibration at Work Regulations 2005 ([www.hse.gov.uk/pubns/priced/l140](http://www.hse.gov.uk/pubns/priced/l140))
- Safe use of work equipment (<https://www.hse.gov.uk/pubns/priced/l22.pdf>)

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## CLEANING REQUIREMENTS

Any leaves and debris should be removed from valleys, gutters, and drain pipes, and any moss or lichen growths that restrict the flow of water off the roof slope. Gutter joints should be inspected for defective sealant or loose clips.

Scraping is certainly not recommended as it almost inevitably results in broken or damaged tiles and consequent roof leaks. In addition, it also leaves behind a trail of unsightly scrape marks which, however carefully the work is carried out, will have to be repeated in the future as the mosses and lichens return.

It is not recommended that a high pressure jet of water is used since this can in many cases either cause mechanical damage to the roof tiles (and subsequent leakage) or undesirable changes to the appearance of the roof tiles e.g. with granular finished concrete tiles it can remove the surface granular finish exposing the bare concrete.

A wide range of biocidal washes are available, but care must be taken with regard to Environmental and Health & Safety Regulations. Further information and guidance can be found in BRE Digest 370. Always consult the manufacturer of the biocidal wash for detailed instructions.

Not all surface treatments have a benign effect on the performance and durability of concrete roof tiles and fittings. It should be borne in mind that most, if not all, tile manufacturers, BMI Redland included, offer product guarantees regarding the durability of their tiles. The use of such surface treatments will invalidate these guarantees.

## RECORD KEEPING REQUIREMENTS

A comprehensive record or log of inspections and any observations and subsequent maintenance should be kept by the building owner or their agents to demonstrate compliance with the terms and conditions of the BMI Redland Guarantee (if applicable) with regard to the building owner's obligations to maintain the roof.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## Section 4: Product disposal

**The disposal of a Construction Product is the removal from the site of waste which has occurred due to pre-installation damage, offcuts/damage during installation, post installation damage and end of life disposal.**

### Minimum requirements:

- End of life information
- Recycling options (including reuse)
- Safe disposal
- Legal requirements
- Environmental hazards

Disposal is the removal from the site of waste which has occurred due to pre-installation damage, offcuts/damage during installation, post installation damage and end of life disposal.

### END OF LIFE INFORMATION

Reduce and reuse are priorities for good circular economy practice. When this is not possible, BMI Redland concrete tiles and fittings can be recycled at the end of their life.

BMI Redland concrete tiles and fittings are made up of only a small number of materials – the main ones being sand and cement. When recycled, concrete tiles can be broken up and turned into aggregates, used as sub-base materials, fill and hardcore, replacing new aggregates. The recycling process can be repeated in perpetuity to provide a low carbon aggregate resource for a range of applications. This recycling process has been in place for a number of years in the UK, and feedback from demolition contractors is that practically all concrete demolition waste is recycled.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## RECYCLING OPTIONS (INCLUDING REUSE)

DEMOLITION AND SORTING: During demolition or renovation, BMI Redland concrete tiles and fittings should be removed and may generate debris that must be handled carefully. These products should be separated from other waste materials such as wood, drywall, or metal. Once sorted, the tiles should be securely stored in a designated on-site area to prevent contamination and maintain their suitability for recycling.

## SAFE DISPOSAL

To comply with UK Government regulations you must:

- keep waste to a minimum by doing everything you reasonably can to prevent, reuse, recycle or recover waste (in that order)
- sort and store waste safely and securely
- complete a waste transfer note for each load of waste that leaves your premises or site
- check if your waste carrier is registered to dispose of waste
- not allow the waste carrier to dispose of your waste illegally and report them if they do.
- You have extra responsibilities if you're dealing with hazardous waste.

Dust should be sealed in an appropriate bag or container and disposed of as hazardous waste.

## LEGAL REQUIREMENTS

In the UK, construction companies have a legal duty of care or are obligated to responsibly manage waste under the Environmental Protection Act 1990, Section 34. Although there is no legal requirement for a Site Waste Management Plan (SWMP) in the UK, its implementation allows more effective material management, waste reduction, and cost savings and represents best practice. If a SWMP is implemented, all construction employees are responsible for adhering to the plan including following their employer's waste management procedures and comply with the relevant aspects of the duty of care for waste. This includes the disposal of non-hazardous, hazardous and recyclable materials in separate skips. After storing your waste, you can then arrange construction waste removal by licensed waste carriers.

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## ENVIRONMENTAL HAZARDS

The Control of Substances Hazardous to Health Regulations 2002, The Health and Safety at Work etc Act 1974, The Management of Health & Safety at Work Regulations 1999, The Consumer Protection Act and The Chemicals (Hazard Information and Packaging for Supply) Regulations, requires us to provide relevant information with regards to our products in respect of its properties, correct use, storage & handling and disposal without risk to health. The following information conforms to the above legislation.

Under the REACH Enforcement Regulations 2008, these products do not require a material safety data sheet to be created as they are classified as an article (finished good). However, when they are modified through mechanical cutting or drilling, then they can produce potentially hazardous dust.

## EXPOSURE CONTROLS / PERSONAL PROTECTION

Workplace Exposure Limit (WEL)

- Dust – 8 hr Time Weighted Average (TWA).
- 10 mg/m<sup>3</sup> (total inhalable dust)
- 4 mg/m<sup>3</sup> (total respirable dust)
- Respirable Crystalline Silica – 8hr T.W.A. - 0.1 mg/m<sup>3</sup> respirable silica

Reduce the exposure to dust containing quartz (crystalline silica) by utilising water suppression equipment when cutting or drilling BMI Redland tiles and fittings. Work in a well-ventilated area. Use hand tools or slow running mechanical tools by preference. Collect dust with a vacuum cleaner, hose down or wet sweep work areas. Further information can be found in the [NFRC guidance HSGS05 - Controlling Silica when Disk Cutting Roof Tiles](#).

BMI Redland concrete tiles and fittings have edges and some have granular coatings that may be sharp or abrasive, therefore appropriate gloves should be worn when handling. When handling wet tiles, impervious PVC or Nitrile gloves should be worn. Other suitable personal protective equipment should also be worn to prevent contact with the wet tile surface, which may become alkali.

Appropriate safety eyewear should be worn in accordance with BS EN 166, along with appropriate overalls and safety footwear.

All laying or handling of concrete roof tiles and fittings at roof level should cease when the mean wind speeds reach 23 mph (gusting to 35 mph or over) as advised by the National Federation of Roofing Contractors (NFRC).

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

## Bibliography

**Further guidance on pitched roof care, inspection, maintenance and repair procedures is given in the following documents. Where the reference is undated, the current version of the document should be followed.**

1. The Building Regulations: The Building Regulations 2010 (England and Wales) (as amended), The Building (Scotland) Regulations 2004 (as amended), The Building Regulations (Northern Ireland) 2012 (as amended)
2. BS 5534: 2014 + A2: 2018, Slating and tiling for pitched roofs and vertical cladding. Code of practice
3. BS 8000-6: 2023 Workmanship on construction sites - Slating and tiling of roofs and walls. Code of practice
4. BS EN 517: 2006 Prefabricated accessories for roofing. Roof safety hooks
5. BS EN 516: 2006 Prefabricated accessories for roofing. Installations for roof access. Walkways, treads and steps
6. BS EN 280-1: 2022 Mobile elevating work platforms - Design calculations. Stability criteria. Construction. Safety. Examination and tests
7. BS EN 1004-1: 2020 Mobile access and working towers made of prefabricated elements. Materials, dimensions, design loads, safety and performance requirements
8. BS EN 12811-1: 2003 Temporary works equipment. Scaffolds - Performance requirements and general design
9. Health & Safety and Environmental Regulations:
  - Health and Safety at Work Act 1974
  - Reporting of Injuries, Diseases & Dangerous Occurrences (RIDDOR) Regulations 2013
  - The Construction (Design & Management) Regulations 2015
  - Control of Substances Hazardous to Health (COSHH) Regulations 2002
  - The Manual Handling Operations Regulations 1992
  - The Personal Protective Equipment at Work Regulations 1992
  - The Work at Height Regulations 2005
  - Health & Safety in Roof Work, HSG 33 (HSE)

# Redland concrete roof tiles & fittings: A guide to handling, installation, maintenance and disposal

FOR USE WITH BMI REDLAND PRODUCTS IN THE UK & IRELAND

January 2025 | Version 1 | RED\_PIP\_1224\_100000031\_V1

The Management of Health & Safety at Work Regulations 1998

Working on roofs INDG 284 (HSE), 2011

The Workplace (Health, Safety & Welfare) Regulations 1992

The Lifting Operations and Lifting Equipment Regulations 1998

Environmental Protection Act 1990

10. Rolled Lead Sheet - The complete manual. Lead Sheet Training Academy, 2018

11. BRE Digest 370 Control of lichens, moulds and similar growths, 1992

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Information is accurate at the time of printing. Product information, technical standards and codes of practice are under constant review. We reserve the right to change and amend product information without prior notice. For the latest information, suitability and specification advice, please refer to our website or please contact our Technical Services team for up-to-date product information.

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