MAYAN
ROOFING SYSTEMS

# INSTALLATION GUIDE

# ARMOURED STONE
## Reclaimed

The Mayan ArmouredStone Reclaimed is a patent pending, single-lap stone roofing system that significantly improves the performance of traditional stone roofing. The versatile ArmouredStone system can be used with many types of new and reclaimed stone.

Fitting instructions for the Reclaimed stone application.

- 43% less stone required
- Lightweight - only 70kg / $m^2$ average - no need for a structural roof
- Low pitch allows installation on roofs as low as 17.5° pitch
- 4 adjustable and diminishing batten gauges to fit any roof
- Suitable with any stone width
- Quick and easy to install
- Considerable cost savings in roof structure and installation times
- Can be used with any type of stone slates including strip-off and re-use applications
- Available with TrueStone pre-graded and selected reclaimed stone

Mayan ArmouredStone is a single lap stone system designed for installation on standard 25mm roofing battens in the open roofing method.

* This fitting guide is subject to continued improvement. Please ensure you follow the latest version, which can be found at mayanroofingsystems.com/stone

## Contents



## Products Available in the System

Click for full product specification or see page 12.

ARMOURED STONE 15/17/19/23

REAL RIDGE

ARMOURED Flashing

StoneFix 38 / 50 / 60

RidgeFix 60 / 100

## Site Safety !

In all cases ensure a safe working environment. Site health and safety measures must be properly adhered to.

- ☑ Personal protective equipment must always be worn.
- ☑ Consideration should always be given when using ArmouredStone where the wind conditions might lift the product into the air or destabilise the handler.
- ☑ The products must be properly handled and stored to avoid becoming a dangerous missile on site.

## Storage

The ArmouredStone plate is lightweight and must be stored flat and out of direct sunlight. ArmouredStone must be secured to a stable area or platform in certain weather conditions to avoid it being blown into the air by strong winds. Natural stone slates are very heavy when palletised and must be stored on a level surface to avoid the pallets toppling over.

## Accreditation

bre

Building Research Establishment (BRE)
Wind driven rain test to PD CEN/TR 15601 2012 18th May 2021
Report number P120308-1000

## Lap Distance

| Roof pitch | Stone lap length |
|---|---|
| Over 25° | At least 100mm (4″) |
| Between 17.5° and 25° | At least 125mm (5″) |

## Stone Sizing and Batten Gauge

| ArmouredStone size | Plate size | Stone slate length | Fixing hole position from bottom of stone slate | Batten gauge (100mm lap) |
|---|---|---|---|---|
| ArmouredStone15 | 345mm<br>13.5″ | 370mm<br>14.5″ | 332mm<br>13″ | 245mm<br>9.5″ |
| ArmouredStone17 | 395mm<br>15.5″ | 420mm<br>16.5″ | 382mm<br>15″ | 295mm<br>11.5″ |
| ArmouredStone19 | 445mm<br>17.5″ | 470mm<br>18.5″ | 432mm<br>17″ | 345mm<br>13.5″ |
| ArmouredStone23 | 545mm<br>21.5″ | 570mm<br>22.5″ | 532mm<br>21″ | 445mm<br>17.5″ |

# Preparing the Stone

Pre-sized and drilled reclaimed stone is available with the ArmouredStone system. If preparing your own stone for the project, skill and judgment are required to ensure the stones are graded and selected correctly for placement on the roof.

In order to efficiently size and drill the stone slates, we recommend that a gauging table is constructed to assist you - see image.

After marking the slates, cut with an abrasive cutting wheel. We recommend the installer hires a special cutting table for this. When sizing the stone slates, it is preferable to only cut the top off the reclaimed stone slate so that the 'riven edge' appearance is maintained. Cuts to the width of a stone slate should be done at the abutment or verge of the roof. If a stone slate needs to be cut then it should be 'dressed' at one side so it is sympathetic to the overall appearance of the finished roof.

Whilst cutting the stone, ensure appropriate dust control measures are used, respiratory protective equipment (PPE), ear defenders and eye protection are worn.

For more information see HSE construction information sheet no 54 at https://www.hse.gov.uk/pubns/cis54.pdf.

## *Stone Thickness*

Reclaimed stone often varies greatly in thickness and grading can be done on a gauging table. When installing the stone slates onto the roof the installer should avoid placing any that are markedly different in thickness next to each other in favour of choosing a stone slate that is no more that 10mm different in thickness. For a more uniform look the installer might choose to pre-grade into thickness groups and install these in individual courses, thinner stone slates should be installed higher up the roof.

Whilst selecting we recommend that stone slates with a thickness below 25mm are graded out gradually next to those with a similar thickness. These should be fixed with the 38mm StoneFix screws.

The correct length StoneFix screws should be used for the varying stone slate thicknesses.

| Stone thickness | StoneFix length |
|---|---|
| Below 25mm thick | StoneFix38 - 38mm |
| 25-35mm thick | StoneFix50 - 50mm |
| Over 35mm thick | StoneFix60 - 60mm |

# INSTALLATION OVERVIEW

Single lap stone slate system designed for installation on standard 25x50mm roofing battens in the open rafter roofing method.

## Ensure

- The ArmouredStone plate is a waterproofing system therefore, all gaps and holes must be properly sealed using a polyurethane mastic or ArmouredFlashing.
- Ensure you meet the requirements for roof space ventilation and the roof is correctly ventilated.
- Install in accordance with BS 5534.
- Store all materials correctly.
- Ensure safe working practice at all times.

The vertical abutment join in the stone slates is not a critical weathering element with the ArmouredStone system, however, in order to maintain the traditional appearance of the installed roof we recommend that the vertical perpendicular abutment joins (perp joins) are offset by at least 100mm (4 inches) so that the roof is installed in the broken bond method.

## Process Overview

1. Ensure the top of the fascia board will set the starter stone slates correctly.
2. Install the roofing ventilation products and eaves protector.
3. Install a roofing membrane over the rafters.
4. Set out the battens to suit the sizes of the available, prepared stone slates.
5. Install the Mayan ridge/hip runner brackets and batten if required.
6. When using cement pointing at the roof edge (verge), the ArmouredStone should be positioned at least 50mm back from the edge to allow the cement to adhere to the stone, cement will not adhere to the ArmouredStone GRP plate.
7. Commence installation at the right-hand side of the roof.
8. Install the first ArmouredStone plate by simply hooking it over the roof batten. When installing the next ArmouredStone plate, it should overlap the previously installed plate by 50mm as indicated by the pre-installed weld tape. Remove the weld tape cover paper and press the ArmouredStone plates together ensuring that the lap join is fully adhered.
9. Install the first course of the larger stone by aligning the top of the stone with the top of the ArmouredStone plate. When happy with the general position of the stone, fix to the battens by screwing through the stone and the ArmouredStone plate into the batten using the Mayan StoneFix screws.
10. Install a varied selection of different width stone slates across the course. When approaching the end of the course select an arrangement of appropriate stone slates to ensure that the end stone slate is at least 18" wide (457mm).
11. The offcut of the ArmouredStone can be carried across and up to start the next course and eliminate waste.
12. Avoid vertical alignment of the stone abutment joins, offset by at least 100mm.
13. Continue to cover the whole roof to completion by gradually reducing (diminishing) the courses.
14. When using a block/hip end, screw a 100mm long RidgeFix screw (supplied) through the pre-drilled hole into the runner batten. Fix an additional 60mm long RidgeFix screw (supplied) through the pre-drilled hole in the connector and into the ridge runner batten.
15. Slide the next RealRidge over the last connector so that the retainer brackets are engaged under the RealRidge connector. Screw through the ridge connector using RidgeFix 60mm screw and continue along the ridge/hip.
16. At the end of the course or when installing a hip/ridge, the RealRidge hip/block end should be cut to size. Drill a second hole through the top of the cut RealRidge to twice fix in place, using 2 X Ridgefix 100mm screws. Install a lead saddle underneath the cut RealRidge at the junction of the hip-ridge.

# Requirements

The Mayan ArmouredStone roofing system must be installed in accordance with this installation guide using only high-quality Mayan Roofing Systems products, including self-adhesive ArmouredFlashing and all fixtures and fittings provided.

- The Mayan ArmouredStone system allows reclaimed natural stone slates to be installed in the single lap format (in a similar way tiles are installed) therefore eaves cut or ridge (shorter) stone slates are not required. However, because the stone slates should be installed in the broken bond format (staggered vertical joints) the wider stone slates should be used at the verge and in the valley to avoid the use of stone slates narrower than 300mm. In all cases it is preferable to adjust the verge overhang (under cloak) to accommodate any difference between the natural stone widths (in increments of 150mm) and the building width so as to avoid a visible cut edge. The ArmouredStone plate should be at least 50mm in from the edge of the verge so that the cement pointing will adhere to the stone slates - it will not bond to the GRP.

## *Roof Ventilation*

- The roof ventilation requirements should be established prior to the commencement of works and the fascia height set accordingly. Guidance on roof ventilation should always be sought from the appropriate roof designer/architect.

## *Adjust the Fascia*

- The top of the fascia board/vent should be adjusted so that the first course of stone slates is set at the same angle as the rest of the stone slates of the roof, prior to the installation of the eaves protection system (EPS or eaves tray). In any event the stone slates must not 'tip' forward. Depending on the roof pitch the fascia should be approximately 50mm above the rafter line. If roof ventilation is required, then the height of the ventilation strip should be taken off the height of the fascia.

## Eaves

The top of the fascia or over fascia ventilator should be approximately 55mm (vertically) or 47mm perpendicular above the top of the rafter line to ensure all the stone slates sit at the same pitch.

Install an eaves protection system (EPS) or starter trim directly on top of the rafter so that it sits over the fascia directed into the gutter. Securely fix through the top section of the EPS to the rafters. Lengths of the EPS/ starter trim should be lap joined on top of a supporting rafter.

Best practice can be achieved by applying a double-sided tape along the lower edge of the EPS, as shown in the image.

## Membrane

Unroll the roofing membrane over the rafters for the width of the roof. The membrane should be pulled into position and released prior to fixing so that the membrane is sufficiently draped across the rafters, allowing for a 10mm gap beneath the batten to ensure adequate water run off.

Position the lower edge along the line of the fascia and on top of the double-sided tape, remove the tape protection and stick the roofing membrane in place, the membrane should also be fixed to the rafters at the top edge.

When installing the valley, a runner strip of membrane should be first dressed up the line of the valley and lateral rolls of membrane dressed into the valley.

Valley runner battens should be installed equidistant on either side of the valley trough so that the valley outer flanges sit neatly on and between them. Remove the section of the fascia between the runner battens so that the valley can pass through the fascia and discharge into the guttering. Cut a 'V' into the end of the valley that follows the internal roof corner. Insert the valley trough between the runner battens and pin into position by fixing through the outer flange only and into the runner batten, the fixings should not go through the membrane.

## *Ridge Batten*

If a vented ridge is required, then the membrane should be cut along the centre line of the ridge so that an air gap of at least 10mm is created.

The ridge runner brackets should be fixed over the rafters or truss and the timber runner batten should be fitted into the brackets.

Hip runner battens should also be fitted to either side of the central batten to ensure that mitred battens and cut stone slates are securely double fixed. Cut stone slates can be re-drilled to ensure a double fixing.

With consideration to the dry ridge system, the top batten should be positioned a minimum of 40mm down from the very apex of the rafters/truss.

## *Batten Gauge*

The batten gauge can only be calculated after it is understood how many courses are required, taking into account the size and amount of stone slates available.

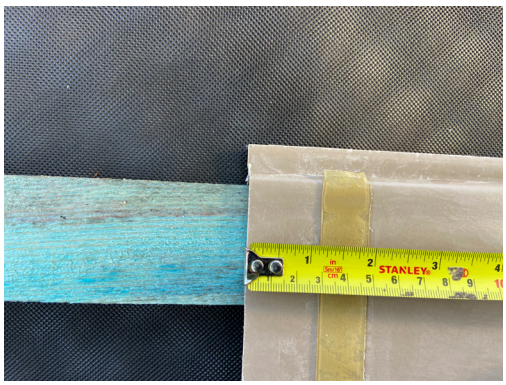
The installer should use skill and judgment to ensure efficient usage of the stone slates available. Alternatively, the installer can simply cut any stone slates in accordance with their requirements.

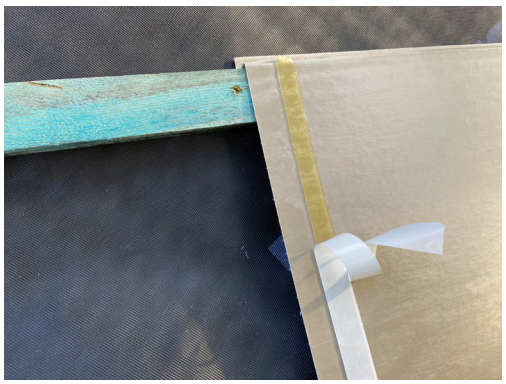
In all cases, the headlap can be adjusted, by increasing or decreasing the batten gauge through several courses to ensure a correct overall fit of the final course and achieve the desired overall appearance.

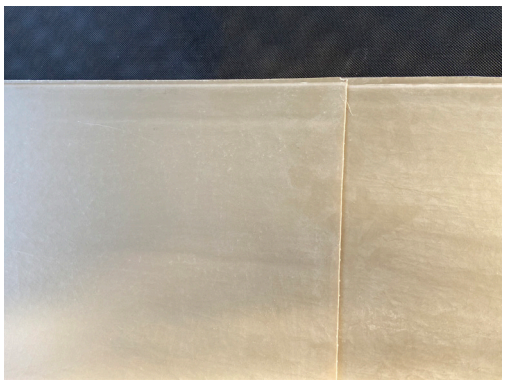
## *Installation of ArmouredStone*

For ease of installation the lap is predetermined for working from right to left on the roof. Hook the curved upper edge of the first sheet of ArmouredStone over the top of the first batten, do not fix through or damage the upper surface of the ArmouredStone plate. Any holes or damage in the plate must be repaired using a high-quality sealant or ArmouredFlashing.

The ArmouredStone must always be side lapped by at least 50mm. Ensure the lap is clean, dry and free from dust. Remove the protection tape from the self-adhesive side strip and press the side lap join firmly together to ensure a permanent seal. Continue across the full width of the roof. Cut the last piece to fit.





We recommend that the ArmouredStone plate should be cut with a fine abrasive cutting blade.

Continue across the full width of the roof, when you reach the verge cut the last piece 50mm back from the edge to allow for the cement pointing to adhere to the stone slates.

Offcuts at the end of a course can be carried to the start of the next course to eliminate waste.

Ensure that the lap tape is always used to seal the lap.

If the product is fitted against a wall or up-stand, then the ArmouredFlashing should be fitted onto the ArmouredStone and dressed up the wall. The flashing must be well adhered to all substrates and the surfaces should be clean, dry and free from dust before application. Flashing should be the full length, covering at least 100mm of ArmouredStone and rise up the wall by at least 100mm. A flat wheeled roller should be used to press the ArmouredFlashing into position and ensure good adhesion.

## *Installation of the Stone*

The ArmouredStone system is designed to be installed in the random and diminishing application whereby the stone slates have a variety of random widths and 4 different diminishing lengths. These should be installed starting with the longer ArmouredStone23 lengths at the lower (eaves) course. The courses should diminish in variable amounts up the roof, finishing with the shorter ArmouredStone15 at the upper ridge course. At all times, each course should use a random arrangement of varied stone slate widths. Care should be taken to avoid the vertical alignment of the visible perp joins so that a broken bond is maintained.

Larger stones should be used at the verge. Because of the irregular widths of the stones used it is prefereable to cut the width of the stone slates at the verge to acheieve a straight line.

We do not recommend that stone slates less than 250mm wide are used on the roof. When cut stone slates are required the narrower stone slates should be 'shuffled' so that the wider stone slates are used for cuts at the verge edges and into the valley.

The correct length StoneFix screws should be used for the varying stone slate thicknesses.

| Stone thickness | StoneFix length |
|---|---|
| Below 25mm thick | StoneFix38 - 38mm |
| 25-35mm thick | StoneFix50 - 50mm |
| Over 35mm thick | StoneFix60 - 60mm |

Reclaimed stone, although predominantly rectangular, is often irregular shaped and the installer should use skill and judgment to position the stone slates accordingly so that the roof has a traditional overall appearance.

Install the first stone slate by positioning it on top of the ArmouredStone plate so that the top cut edge of the stone aligns approximately with the top of the plate, however, this is only a guide because the alignment of the lower edge is more important for the look of the roof. The installer must use their skill and judgment to align the stone slates. Select the correct length StoneFix screw and fix the stone slate into position.

When positioning the next piece of stone try to avoid placing stone slates next to each other that have a large thickness variation as they will be seated unevenly and twist and gaps will be created. Again the installer must use their skill and judgment in this regard.

When a course of stone slates has been installed the next course can be commenced by placing the ArmouredStone plate as before, with the lower edge resting on top of the previous stone slate course.

## *Installation of the Stone*

When installing the next course of stone slates, it is important to avoid the abutment join (perp join) from aligning with the perp join in the course below. This is easily done by selecting another sized stone.

When installing stone slates at the valley, the ArmouredStone plate must be fully positioned over the valley, just under the stone slates.

To achieve the traditional appearance the installer should use their skill and judgment when selecting the number of courses and the arrangement of diminishing sizes of the ArmouredStone.

This method should be continued up the roof until the whole roof is fully covered with stone slates.

## *Installation of RealRidge Tiles*

Starting from one side, the built in GRP RealRidge connector faces inward so that the next RealRidge connects onto it with the connector brackets engaged beneath the connector. When installing the first hip or ridge always ensure that the first ridge is fixed into position using 2 RidgeFix stainless steel screws with nitrile washers. Drill a 6mm dia hole 100mm in from the end straight down from the apex and fix with a 100mm long RidgeFix screw (supplied). Fix the second 60mm RidgeFix screw (supplied) through the ridge connector hole.

Install the next RealRidge by ensuring that the retaining clips are located under the RealRidge connector of the previous ridge tile. Screw each RealRidge into place through the connector and continue across the ridge. At the end of the course, cut to length and install so that the cut is located over the previous ridge connector. Using a masonry bit, drill a 6mm dia hole down through the top of the ridge 70mm in from the cut end, do not use the masonry setting on your drill, and screw the last ridge into place using the screws and washer. If the cut end ridge is smaller than 300mm then use a whole ridge at the end and place the cut ridge in between the last two whole RealRidge tiles.

## Stone Slates- Reclaimed in various sizes and thicknesses

Can be purchased pre-graded and sorted with the ArmouredStone system from TrueStone Roofing.
Can be sourced separately for use with ArmouredStone, for example on a re-roof when recycling the stone.
Ensure an experienced person correctly grades the stone.

## ArmouredStone- UV stable GRP preformed sheeting


| | |
|---|---|
| **Colour:** | Grey beige RAL 1019 |
| **Length:** | 1500mm |
| **Hanging lengths available:** | 15" / 17" / 19" / 23" |
| **Thickness:** | 1mm |
| **Weight:** | 2kg/m² |
| **Finish:** | Matt finish |
| **Resistance:** | Resistant to infestation and degradation |
| **Fire rating:** | SAB, Class 3 to BS476 parts 3 & 7 |

## StoneFix Screws- Stainless steel screw

**StoneFix** 38 / 50 / 60

| | |
|---|---|
| **Size:** | 4.8 x 38mm / 50mm / 60mm |
| **Type:** | Low profile, TX20 drive, pan head, A2 stainless steel |

## RealRidge Stone- Natural stone ridge and hip system


| | |
|---|---|
| **Colour:** | Various - Natural stone |
| **Size (width x length) :** | 200mm x 750mm |
| **Thickness:** | 22mm |
| **Weight:** | 19.8 kg (average) |
| **Vent:** | 5mm continuous |
| **Angles:** | 90° ; 105° ; 120° ; 135° |

## RealRidge Fixings (included with RealRidge)

**RidgeFix** 60 / 100

| | | |
|---|---|---|
| **RidgeFix 100 screw with nitrile washer** | Stainless steel Pozi 4.5 x 100mm | 1 per RealRidge |
| **RidgeFix 60 screw with nitrile washer** | Stainless steel Pozi 4.5 x 60mm | 1 per RealRidge |
| **Ridge runner bracket** | Galvanised steel | 1 per RealRidge |

## ArmouredFlashing- Aluminium sheet on self-adhesive butyl

ARMOURED Flashing

| | |
|---|---|
| **Roll size:** | 250mm wide 6m long rolls |
| **Thickness:** | 1.77mm |

**The ArmouredStone system is supplied by:**

TRUESTONE
SUPERIOR ROOFING SOLUTIONS

**www.truestoneroofing.com**

**Enquire directly to:**

**T: 01484 664410**
**E: Dave@truestoneroofing.com**
**A: Burdwell Works,**
**New Mill Road,**
**Brockholes, Holmfirth**
**HD9 7AZ**

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