

Pitched roof coverings series

1. Where is it all going wrong?

2. Wet mortar work essentials

3. Weathering details & fixing

This is the third session of a three session series on pitched roof coverings.

The series provides a practical approach to raising the standards of pitched roof coverings on-site.

This session provides guidance on weathering details and fixing requirements.

Key learning points are identified with this symbol:



for Site Managers

Aims of this e-learning series

After each individual e-learning session you should:

Session 1

Where is it all going wrong?

- ✓ Know the extent of pitched roof claims
- ✓ Be clear where to focus your attention as a supervisor

Session 2

Wet mortar work essentials

- ✓ Understand the correct use of mortar on roofs
- ✓ Appreciate the benefits of adopting a team approach on site
- ✓ Be aware of alternative solutions

This session

Weathering details & fixing

- ✓ Have a good understanding of typical roof weathering details
- ✓ Appreciate the importance of correct fixing



Adopting a team approach can be beneficial for all

Acknowledgements

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- ✓ The National Federation of Roofing Contractors Limited
- ✓ Forticrete
- ✓ Marley Eternit
- ✓ Redland
- ✓ Sandtoft

This e-learning session takes a non product specific, general approach for the following reason, manufacturer's may have their own very specific specification or fixing requirements. Therefore please make use of the manufacturer's technical product support relevant to the products used on your site.

NHBC would like to thank The Crowood Press Ltd for giving permission to use their images in this learning series. These images are from the book:

Taylor, K., 2009. Roof Tiling and Slating a practical guide
Marlborough: The Crowood Press Ltd.



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Redland



Flashing and weathering detailing

NHBC continually highlights the importance of detailing in ensuring that claims related to flashings and weathering are avoided. Typical examples where claims are being experienced and detailing is also found to be deficient during recent inspections include:

- abutments
- dormers
- projections through the roof
- chimneys
- cavity tray/flashing interface
- head of valley



If weathering details are unclear then seek the appropriate clarification and avoid ad-hoc details.

Images from **NHBC** claims/inspection services

1. This ad-hoc approach will lead to failure!

2. This damage to the underlay can lead to problems with wind assisted rain/snow ingress.

3. The underlay detail at abutments is important if weather ingress issues are to be avoided.

4. Clearly detailing like this must be avoided. If in doubt seek appropriate advice.



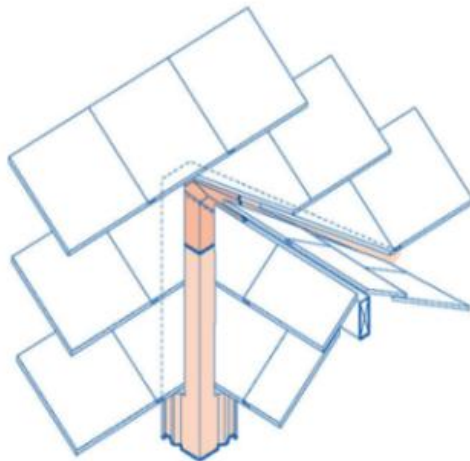
Flashing and weathering detailing - head of valley detail

Avoid running ridge tiles over the valley head as shown in the top image. The mortar depth becomes excessive and prone to failure. This detail often conceals the lack of a lead saddle to the head of the valley.

The bottom right-hand image shows the detail which represents good craftsmanship.



A saddle flashing should be used where a ridge meets the main roof.



GRP valley gutter

Flashing and weathering detailing - abutments

The following applies to small/bay roofs as well as main roofs:

The underlay should be turned up at least 100mm at all abutments to prevent wind assisted rain and snow being blown into the roof space. The underlay will need to be adequately supported at abutments and consideration should be given to the position of the last rafter relative to the wall.

Where a pitched roof abuts the wall at an angle, a stepped cavity tray linked to a stepped flashing should be used. Stepped flashings should be cut from a strip at least 150mm wide.

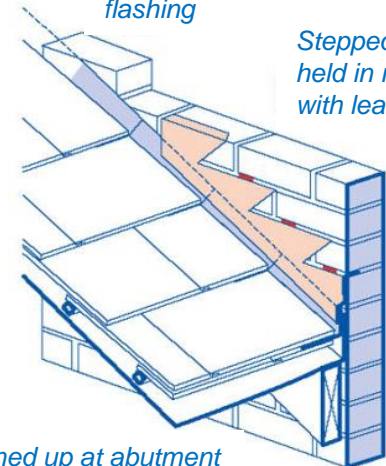
Soakers or a secret gutter should be installed at abutments where plain or flat interlocking tiles are used.

Cover flashings alone can only be used where they discharge over a roll on a profiled tile.



Soakers beneath each tile overlapped by lead flashing

Stepped lead flashing held in mortar joints with lead wedges



Underlay turned up at abutment

Flashing and weathering - cavity tray interface at abutments

The main issues of concern here are:

1. The position of the weep hole (circled) suggests that the cavity tray is installed too high!
2. The bed joints have been 'ground out' to accommodate the correct flashing position relative to the roof covering, but will the flashings link with the cavity trays?
3. If the cavity trays are in the correct position, have they been damaged by the grinding out process?
4. The underlay does not appear to have sufficient upstand towards the top of the inclined roof abutment!



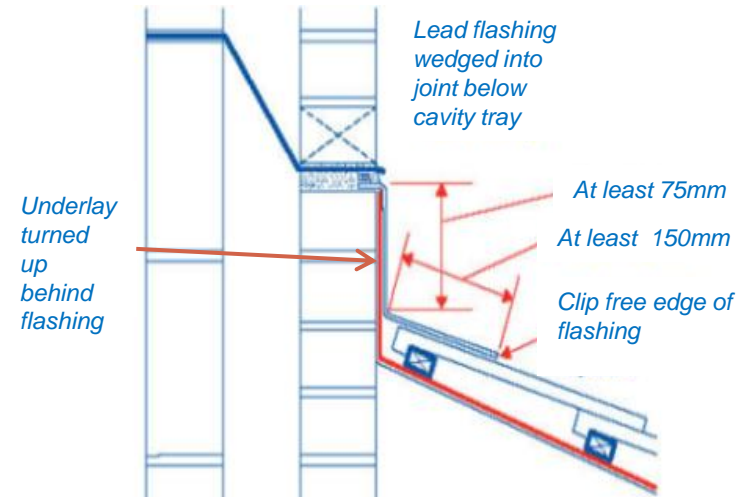
Where flashings link with cavity trays, rake out 25mm of mortar below the dpc before the mortar sets, to allow for the flashing to be tucked in. This is the preferred approach.

Flashing and weathering detailing - abutments

If the cavity tray has been installed at the wrong height to link with the flashing, this will need to be addressed. Where flashings link with cavity trays, rake out 25mm of mortar below the cavity tray to allow for the flashing to be tucked in. In the top image the flashing should have been taken up higher to meet with the cavity tray.

All abutments should be weatherproofed using non-ferrous metal flashings. Lead flashings should be at least code 4 (colour coded blue). Where required, soakers are normally code 3 (colour coded green). Normally, lead flashings should not exceed 1.5m in length, with laps of not less than 100mm.

Flashing should be tucked into a mortar joint 25mm deep and at least 75mm above the tiling level and lead wedged into place. The joint should then be pointed with mortar or using suitable exterior grade sealant.

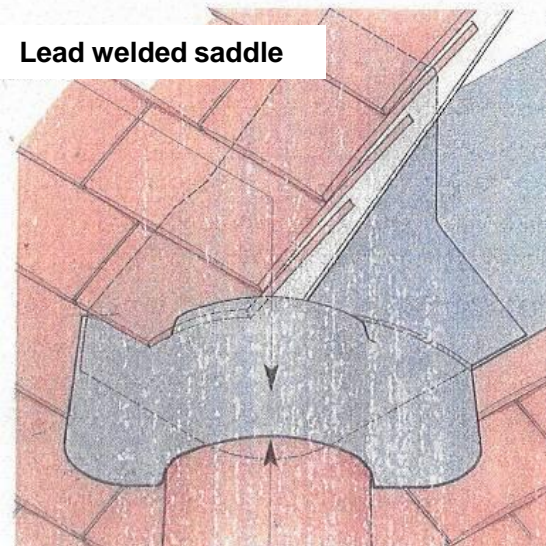


The use of disc cutters to create the recess for the flashing can damage the cavity tray and should therefore be avoided.

Flashing and weathering - Dutch gable detail

The top image is of a Dutch gable, and whilst initially this looks like a neat job, the long term durability must be considered. NHBC looks for saddle flashings to be provided here to prevent water running off the main roof areas and behind the hip tiles through the inevitable cracks that will form between the mortar fillet and hip tile.

Reliance upon the underlay for weather proofing is not a robust solution. Instead a lead saddle should be neatly dressed and fitted as shown in the lower image.

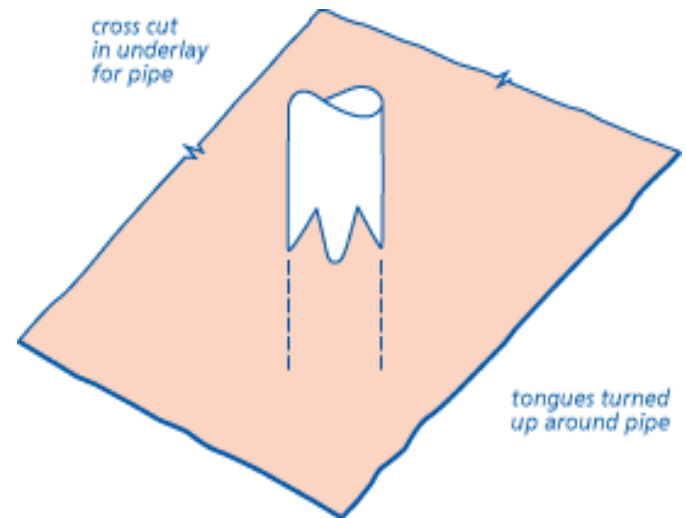


Flashing and weathering detailing - roof projections

Particular care is needed where soil ventilation pipes/proprietary 'ventilation tiles', project through the underlay. Torn underlay around soil ventilation pipes/proprietary 'ventilation tiles' can lead to weather ingress resulting in the ceiling underneath becoming wet and stained.

With soil ventilation pipe projections; cut a small cross in the underlay and sleeve over the pipe so that the tongues of the underlay turn up. A purpose-made one-piece flashing and upstand should be used around pipes projections through tile/slate coverings.

Proprietary 'ventilation tiles' usually come supplied with purpose made soaker tray.



Flashing and weathering detailing - dealing with features

Careful setting out will improve the finished appearance of the roof and helps to avoid problems such as unequal overhangs at verges and often makes it possible to avoid excessive tile cutting at abutments, chimneys and similar obstructions.

Small sections of cut tiles are difficult to fix and should be avoided. This can be achieved by incorporating tile sizes such as double size tiles, tile and a half or half tiles where these are available.

Where small tiles cuts are unavoidable, seek technical advice from the manufacturer. Many offer special clipping arrangements, additional mechanical fixings or specialist adhesives to bond tiles together.

Where appropriate, establish the tolerance range of the flashing detail to determine if the cut line can be adjusted.



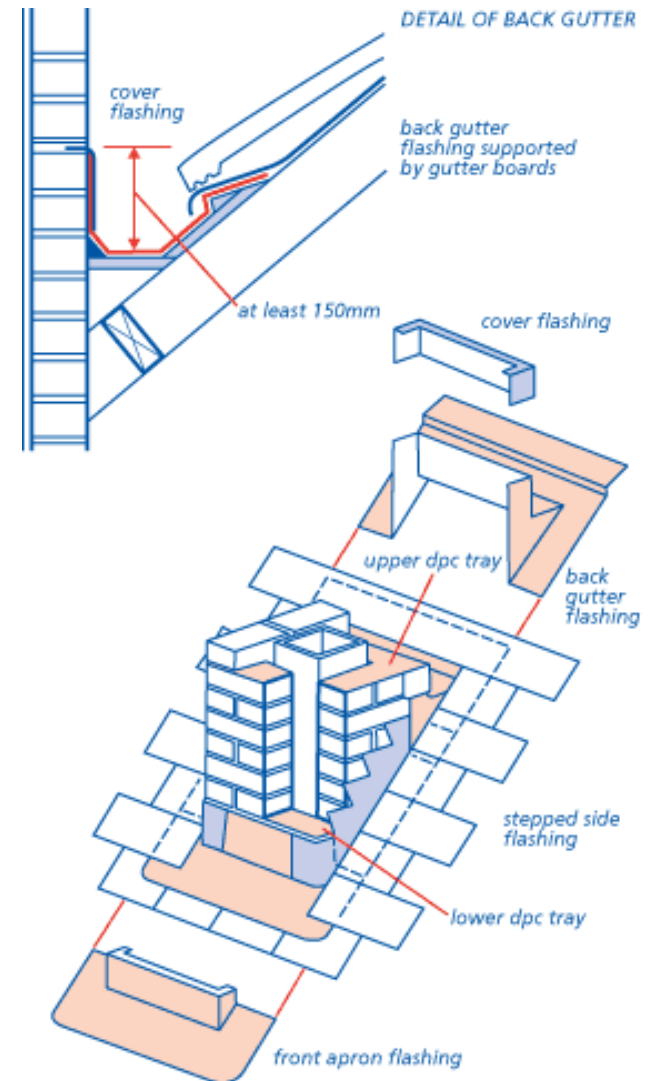
Flashing and weathering detailing - chimneys

Lead flashings associated with chimney structures require careful detailing of the masonry work in order to ensure that the dpc's are incorporated at the correct heights above the roof covering. Chimney flashings should link with the chimney dpc trays.

Underlay should have a minimum upstand of 100mm at the chimney abutments.

In addition, timber support to the back gutter lead work is equally important. Adequate support will prevent the lead work becoming depressed and/or sagging and causing potential weather ingress issues.

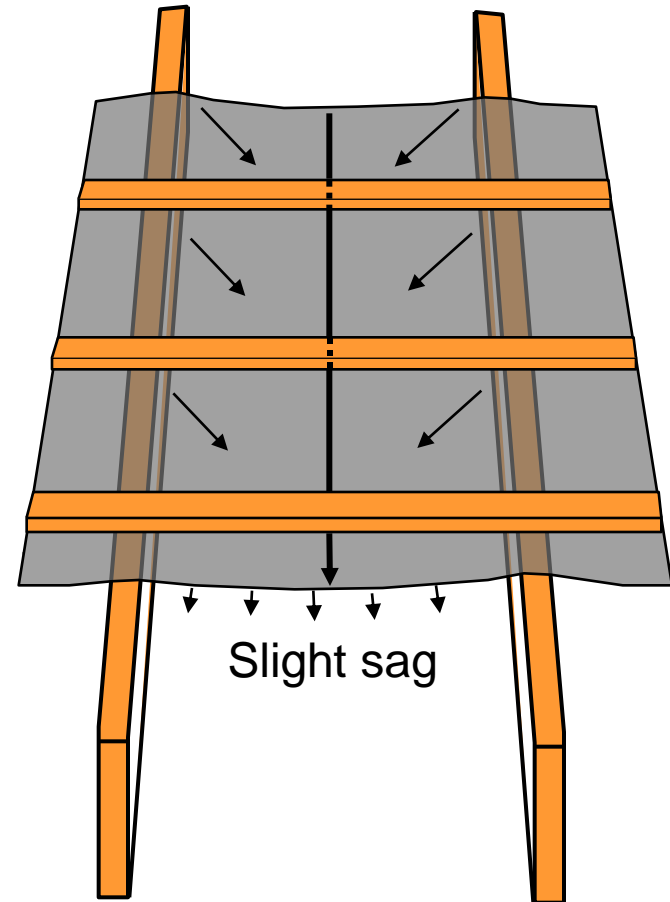
Again it is vitally important that the lead work is firmly fixed/wedged into place in line with good practice, due to its exposed nature.



Flashing and weathering detailing - underlay

Slight sag required to under felt to enable water to drain to gutter, rather than collect at the battens.

If the underlay is too tight, any water will run down the underlay until it reaches a batten, from there it will collect until it eventually seeps through the batten nail holes in the underlay. The image below is an example of this failure.



Nailing and fixing - specifications

The tile fixing specification should be either;

- ✓ As per the manufacturer's calculated fixing schedule (based on BS 5534)

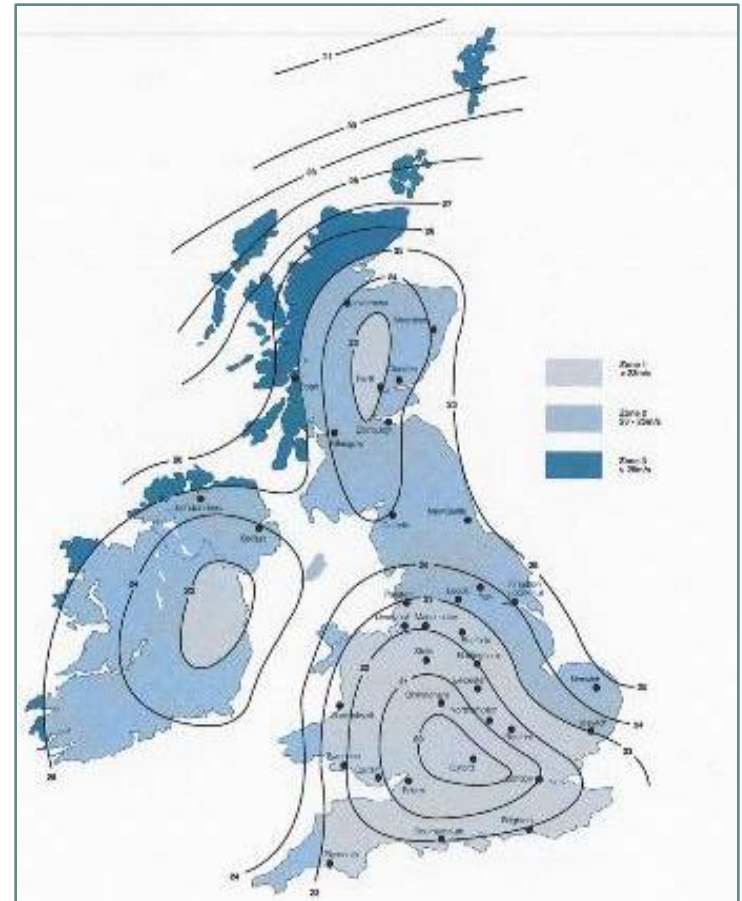
Or

- ✓ As per the contractor's fixing specification based on the 'zonal method'. The zonal fixing method was devised to avoid having to go to the manufacturer for a fixing specification and is acceptable to NHBC

Typical factors affecting fixing specifications include:

- ✓ tile type
- ✓ site address and postcode
- ✓ roof pitch
- ✓ height of building to eaves
- ✓ width of building

Some tiles require specific fixing schedules (manufacturers to advise).



Nailing and fixing - generally

Slates should be fully nailed over the whole roof.

The fixing specification should specify the number of fixings for clay and concrete tiles.

Careful setting out will improve the finished appearance of the roof and helps to avoid problems such as unequal overhangs at verges and often makes it possible to avoid excessive tile cutting at abutments, chimneys and similar obstructions. Small sections of cut tiles are difficult to fix and should be avoided. This can be achieved by incorporating tile sizes such as double size tiles, tile and a half or half tiles where these are available.

Single lap Interlocking tiles have a tolerance of approximately 3mm in the joint. For double lapped plain tiles and slates, joints should be slightly open. This allows some flexibility in setting out and should avoid tile cutting.



Nailing and fixing - tile clips

In addition to standard nailing, and verge clips, many fixing specifications will require additional clipping to all or certain specified tiles.

1. A typical general tile clip.

2. A typical eaves tile clip.

3. A typical tile to tile clip.



Materials - roof coverings

The following roof coverings are acceptable:

- clay tiles and fittings to BS EN 1304
- concrete tiles and fittings to BS EN 490 and BS EN 491
- fibre cement slates and fittings to BS EN 492
- natural slates- only certain grades to BS EN 12326 are acceptable to NHBC (see Appendix 7.2– G)

Natural stone should be used in accordance with established custom and practice.

Use of reclaimed materials is covered in the NHBC Standards; Chapter 7.2 clause M6.

Proprietary coverings should be assessed in accordance with the NHBC Standards Technical Requirements R3.



Slate packing crate showing BS EN reference

Summary - raising the standards of pitched roof coverings

You should now:

- ✓ Know the extent of pitched roof claims (from session 1)
- ✓ Be clear where to focus your attention as a supervisor (from session 1)
- ✓ Understand the correct use of mortar on roofs (from session 2)
- ✓ Appreciate the benefits of adopting a team approach on site (from session 2)
- ✓ Be aware of alternative solutions (from session 2)
- ✓ Have a good understanding of typical roof weathering details
- ✓ Appreciate the importance of correct nailing and fixing

If in doubt, contact:

- ✓ Your NHBC inspector
- ✓ The product manufacturer's technical department
- ✓ NFRC (if the roofer is a member)

End of session

