## External Wall Insulation Systems incorporating Roofline Closure Systems

This bulletin note is issued by INCA to give general guidance on the use of Roofline Closure Systems with external wall insulation. INCA and the organisations responsible for its content do not accept any liability arising in any way from relying on this guide.

For all projects incorporating external wall insulation, we would recommend seeking independent advice and technical specifications and solutions from the appropriate EWI system designer and project designer / coordinator.

This guidance document is for reference only and does not supersede any information or advice issued by the system designer

It should be noted that each system designer may have a different Roofline Closure System solution or recommendation; however, the general guidance should be utilised as a minimum standard, but system designers may have an acceptable variation to the guidance.


Requests to use any part of this guidance note should be made in writing to:

Insulated Render and Cladding Association (INCA)
Company Number 03728766
DE74 2NR
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## Introduction

The use of traditional verge trims were banned under PAS 2030:2017 due to a number of associated failures; however, it should be noted that the use of verge trims is still acceptable for schemes not implementing the PAS standard, but all verge trims should be installed in line the recommendations of the manufacturer and system designer and provide adequate weather protection and guidance on maintenance.

Issues associated with verge trims:

- Poor quality of installation / lack of detailing.
- Cheapening of components.
- Over reliance on mastic / no secondary line of defence.
- Training of installers.
- Large thermal bridges.
- The ability to maintain the trims installed at the head of the property.

## The Solution

The alternative solution to verge trims was to extend the roofline and whilst this remains the most robust solution when designed and installed in an appropriately suitable way, it left many properties without the possibility of an external measure being applied if the property was a mid terrace, one half of a semi-detached or for other technical reasons where extending the roofline was not feasible.

A project proposal was put to DESNZ (Department for Energy Security and Net Zero) to introduce a more robust approach that would remove the need for regular maintenance, provide secondary moisture protection and eliminate the thermal bridging.

The proposal to move forward with this was accepted by DESNZ subject to the approval of the Retrofit Standards Task group.

The task group required site trials to be undertaken and that these should cover at least one full heating season.

The task group worked with Industry, experts and DESNZ to conduct 20 trials that covered all exposure zones using 11 standard details.

During these trials it became clear that the substrate at the tops of the properties were often poor through lack of maintenance and that there would be a requirement for more than 11 standard designs. As a result, the task group developed a principles design approach to enhance the options beyond the 11 standard tested details and identified the need for an initial survey of the roof interface area to pick up any pre-enabling works.

The project took three years to complete with the solutions and process now embedded in the External Wall Insulation and Specification for Weathering and Thermal Bridge Control Document 2024 and is accepted for use in all currently funded retrofit schemes.

**Specification for Weathering and Thermal Bridge Control document-August 2024**

## The Roofline Closure Process

To comply with the requirement of PAS, you must follow the simple process set out within this guidance bulletin.

The process covers the two routes to compliance:

*Route 1.*

This route covers the approach where the initial RCS survey identifies a roofline that can use one of the thirteen standard details in the Weathering and Thermal Bridge Guide (August 2024 edition)

*Route 2.*

This route covers the approach where the initial survey identifies a RCS need that is not covered in the guide, in this case the contractor provides the RCS survey to the system designer who, with the fabricator, develop a bespoke solution following the RCS design principles.

In either case, the initial RCS survey should identify any existing issues with the roof / wall interface and detail the remedial works required, such as:

- Broken slates.
- Missing felt.
- Ripped felt.
- Cracked cement fillets.
- Damaged and missing cement fillets.
- Damaged and missing undercloaks.
- Position of the existing roof insulation.
- Thickness of the existing roof insulation.

Any remedial works identified, need to be completed prior to the installation of the EWI system and the RCS.

## The Roofline Closure System Process Map

Carry out an inspection in accordance with the roofline closure survey form and carry out any necessary repairs.

Are the example details shown in the 'External Wall Insulation Specification for Weathering and Thermal Bridge' industry document (also referred in this document as the 'Weathering Guide') suitable for the closure types required on the property in question?

**No**

Use Design Principles to develop detail(s) with the EWI System Designer.

Use Survey form to confirm that the relevant requirements are met.

Provide RC/RD with survey form and design. Confirm minimum material specification is met. Copy of the survey, design to principles and min material specification supplied to GT provider at prenotification stage and to Trustmark at Lodgement. (Trustmark Audit item)

Ensure Retrofit Contractor operatives have received appropriate training in roofline closure system installation. System designer and GT provider require evidence of training at prenotification stage. (Trustmark Audit item)

Install detail (s), taking photographs at each stage and using the checklist. (Use system holder stage photo template.) GT provider obtains checklist and photo evidence template at sign off. (Trustmark Audit item)

Obtain sign off for the EWI system including roofline closure system. Retrofit Contractor provides sign off documents and these form the current sign off lodgment requirements for Trustmark. (Trustmark Audit item)

**Yes**

Provide Retrofit Coordinator (RC)/ Retrofit Designer (RD) with survey form and design. Clearly identify which 'Weathering Guide' detail is appropriate for each closure type identified in the survey. Confirm minimum material specification is met. Copy of the survey, chosen detail (s) and min material specification supplied to Guarantee (GT) provider at prenotification stage and to Trustmark at Lodgment (Trustmark Audit item)

Ensure Retrofit Contractor operatives have received appropriate training in roofline closure system installation. System designer and GT provider require evidence of training at prenotification stage. (Trustmark Audit item)

Install detail (s), taking photographs at each stage and using the checklist. (Use system holder stage photo template.) GT provider obtains checklist and photo evidence template at sign off. (Trustmark Audit item)

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## The Initial Survey

The Initial survey is designed to identify the roof profile(s) and assist in identifying the roof closure type required, and should be carried out by the installer or the person / company that is responsible for providing the scope of works.

The first part of the survey covers the existing interface condition; this should pick up any existing faults like (loose and / or missing masonry, degraded felt into gutter and cracked or missing cement fillets)

Photographs covering the above should be taken and supplied to the Retrofit Coordinator / Retrofit Designer and the system designer along with the remedial actions list, (if there is one).

The survey should also identify the roof insulation position and thickness to enable the RCS solution to be designed to eliminate any thermal bridging.

The remaining items on the survey cover the design support details that will assist the system designer and their fabricators in providing the most suitable detail, whether from the standard set in the Weathering Guide or development of a solution from first principles using the RCS design principles document. These should include the following:

- Roof overhang depth.
- Existing ventilation. (If this is at eaves and will be covered up, then alternative ventilation should be designed).
- Pitch of the roof.
- Proposed depth of the external wall insulation, to include for all layer up to the finished surface.

Once the survey has been completed, a copy should be provided to the Retrofit Coordinator (RC), the Retrofit Designer (RD), the system designer and the guarantee provider.

### The Roofline Closure Survey Form

In all cases, extending the roofline rather than utilising a roofline closure system is considered to be the preferred solution. Where it is impractical or not feasible the use of a roofline closure system can be considered.

| Stage | Design development items | Tick | Comment |
|---|---|---|---|
| 1 | Carry out an inspection of those elevations of the building which are being considered for a roofline closure system, (gable - eaves etc) | | |
| 2 | Identify and record any remedial works required, (missing / damaged felt - loose brickwork - cracked or missing cement fillets - broken roof tiles rotten tile battens etc). Photograph all areas identified for which remedial works are required. | | |
| 3 | Measure and record (photographic evidence required) the existing roof overhang at eaves and verge | | |
| 4 | Check the roof angle and note this on this form to assist with the design from system holder | | |
| 5 | Identify depth of proposed system and calculate trim depth based on current overhang and proposed system design depth allowing for min 40 mm overhang (sheltered and moderate exposure) or min 50 mm overhang (severe or very severe exposure zones) | | |
| 6 | Identify and record if the space below the roof is a heated space (Room in roof) | | |
| 7 | Identify and record potential sites of thermal bridging which need to be rectified in the design. | | |
| 8 | Identify and record existing ventilation (Photographic evidence required). Identify any additional ventilation requirements to assist with the design. | | |
| 9 | Identify and record (Photographic evidence required) type and position of rainwater outlets | | |
| 10 | Identify and record (Photographic evidence required) any other penetrations, services etc which may be affected by the introduction of a roofline closure system | | |
| 11 | If there is a risk of the presence of asbestos the national health and safety guidance should be followed for its safe removal | | |

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## The Design of the Solutions

The RCS design starts with the information gathered from the RCS survey.

The system designer will identify if the solution is one of the standard details in the Weathering Guide, if not, they will create a design using the RCS design principals.

### Design Principals for Roofline Closure Systems

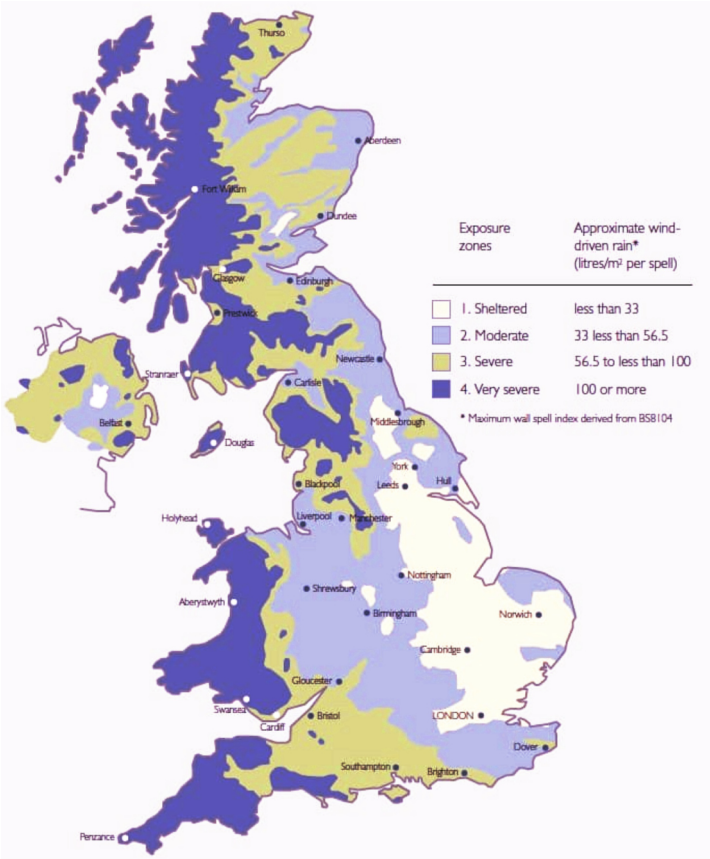
These principles are a support tool for the roofline closure details documented in the External Wall Insulation Specification for Weathering and Thermal Bridge Control Guide 2024. It is recognised that the documented details are not exhaustive and therefore these principles are designed to be used to develop new roofline closure solutions that comply with the PAS 2030 2019.

*1.Redundancy of seals*

At least two lines of weathering protection are required. Sealants shall not be employed to provide the primary barrier to water penetration. Additional redundancy can be achieved with an additional trim or suitable membrane. All joints must have a double seal to comply with the PAS requirements.

At eaves with insufficient roof overhang: Protection afforded to the top of the EWI system must include a secondary waterproof membrane and / or flashing that tucks under the existing sarking felt. The overhang must be appropriate for exposure zone, (40mm for moderate or sheltered exposure and 50mm for severe or very severe exposure) based on the BRE wind driven rain map in BR262 Thermal insulation: avoiding risks

– Appendix A:WP2 / (publishing.service.gov.uk)



*2.Gable-to-eaves junctions*
Must be achieved with overlapping, prefabricated units/connectors: Site fabrication is not permissible though minor site trimming is permissible. Any joints between the primary and secondary seal must be staggered by 100 mm. Insulation to be maintained in corner of gable wall up to the level of loft insulation as per the Retrofit Designer requirements.

*3.Gable apexes*
Must be formed using prefabricated elements: Site bent flashing can be utilised; however, secondary lead / lead replacement flashing is required over the apex. Site-formed mitre joints using two separate profiles are not permissible.

*4.Connections between adjacent sections of roofline closure systems*
Must incorporate an under or over connector that extends min. 40 mm on each side of the joint.Connectors must be sealed to both sections of the metal profile (roofline closure, etc) using proprietary sealing tapes or proprietary sealants that must extend for the full width of the trim. Any joints between the primary and secondary seal must be staggered by 100 mm.

*5.Use of Lead for flashing*
If using lead as a solution, the maximum length in a single piece should be 1200 mm and overlaps should follow best practice. Ensure health and safety requirements are complied with the Control of Lead at Work (Third edition), Control of Lead at Work Regulations 2002, Approved Code of Practice and guidance from (hse.gov.uk). If Lead replacement flashings are used, these should be securely fixed in accordance with the manufacturer's recommendations.

*6.Soffit / Roof overhangs*
If soffit / roof overhangs are 40 mm (50 mm for high exposure) or less then trims / flashings should be embedded into the masonry, or below the cement pointing at verges and sealed. Any joints between a primary and secondary layer of redundancy must be overlapped by a minimum 100mm. The sand and cement fillet should be replaced with a suitable flexible mortar.

*7.weathering protection details*
The installation of the weathering protection details must be separately included within the EWI system holder training that is provided to registered EWI installation contractors.

*8. Continuity of insulation*
In all cases there should be continuity of the roof insulation and the insulated roofline closure solution to provide a minimum "thermal resistance of 0.6m2K/W (and ensure that there is no thermal bridging). As this is a junction detail, this should be confirmed by way of a thermal modelling calculation.

*9. Non-Compliant details*
Roofline closure details that do not meet the requirements above are not acceptable for use with any funded or private schemes.

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INCA has produced a number of technical guidance documents and best practice guides, which are recommended to be read along side this document.

- External Wall insulation Maintenance Guidance Manual.
- Best Practice Guide for External Wall Insulation Incorporating Renders.
- Best Practice Guide for External Wall Insulation Incorporating Brick Slips.
- Technical Guidance Document for External Wall Insulation Incorporating Drained Cavities.