

# **Technical Guidance Document**

# EXTERNAL WALL INSULATION INCORPORATING DRAINED CAVITIES



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INCA is the recognised trade association for the External Wall Insulation (EWI) industry in the UK, representing the major system designers, a nationwide network of specialist installers and the key component suppliers.

INCA is at the forefront of transforming the energy efficiency of homes and businesses in the UK – the mission: to represent members of the External Wall Insulation industry through technical excellence, effective collaboration, strong marketing and communication and member benefits.

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# INCA would like to thank the membership for their significant contribution to the publication of this guidance:

#### System Designer Members:

On behalf of the wider EWI industry INCA would like to thank the system designer membership for their contribution to the publication of this guidance.



#### Installation Contractor & Associate Members:

On behalf of the wider EWI industry INCA would like to thank the Installation Contractor and the Associate membership for their contribution in the publication of this guidance.

INCA Contractors have a proven track record of delivering high quality EWI projects, both new build and refurbishment, including private homes, social housing and non-residential.

The Associate membership is made up of key EWI component suppliers along with testing and certification bodies.

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## **External Wall Insulation Guidance Document - Drained Cavity System**

This guidance document is issued by INCA to give general guidance on the external wall insulation systems, incorporating a vented and drained cavity. 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 a drained cavity system, we would recommend seeking independent advice and technical specifications and solutions from the appropriate EWI system designer.

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 has its variations, therefore detail information contained in this document is of a general nature.

For the purpose of this document, drained cavity systems have been defined to include the following:

- Systems formed using metal top hat rail sections.
- Systems formed using cavity rails sections
- Systems formed using treated timber battens.
- Systems formed using fixings

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

Insulated Render and Cladding Association (INCA) Company Number 03728766 DE74 2NR Email - info@inca-ltd.org.uk | Website - www.inca-ltd.org.uk



![](_page_3_Picture_1.jpeg)

The Insulated Render and Cladding Association (INCA) is the recognised trade association for the external wall insulation (EWI) industry in the UK, representing the majority of system designers, a nationwide network of specialist installers, in addition to system component suppliers and associated organisations.

External Wall Insulation (EWI), also referred to as Insulated Render, Solid Wall Insulation (SWI) and External Thermal Insulation Composite Systems (ETICS), have been used in the UK for over six decades, in line with the UK's commitment to reduce carbon emission and thermally upgrade existing housing stock. The use of EWI systems has increased significantly in the last 10-15 years and is suitable for both the thermal upgrading of existing properties whilst being an effective solution for new build projects.

INCA is unrivalled when it come to providing EWI experience and INCA members apply the latest skills, innovations and techniques to deliver high quality projects in both the domestic and non-domestic sectors. INCA has established a wide ranging body of technical, installation, training and component information to promote industry best practice, raise awareness and increase the quality standards.

This document is an overall introduction to drained cavity systems, as the requirements for these types of systems are different to other EWI methodologies.

For the purpose of this guidance document, we will refer to the terminology of Drained Cavity Systems, but these types of systems can also be known as an EWI Cavity Rail System, EWI Cavity Drainage System or EWI Vented Cavity System.

These systems are specifically designed for project within the United Kingdom which involve the application of an EWI system to a frame structure (timber frame of steel frame) and for which the purpose of use is solely residential. The requirement for the drained cavity system is mainly due to the building warranty companies who require the specific specification of such a system.

The introduction of the drained cavity system was due to building warranty companies who had concerns regarding the possibility of water ingress into the system through failing junctions and the potential to rot or corrode the timber and metal frames of the structure.

This requirement currently pertains to residential new build where a building warranty is to be issued and the insurers stipulate this type of EWI system through their technical handbook / manual. Although not a requirement for non-residential new build or refurbished buildings, this type of specification is still permissible if the contract documents state the use of a drained cavity system; however, expert advice should always to taken as to whether it is the most appropriate system for the building it is being applied to.

Drained cavity systems are not designed to accept moisture, but are designed to assist moisture escape should it be present. Moisture within the cavity is generally a sign of problems elsewhere and should be monitored and addressed.

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![](_page_4_Picture_0.jpeg)

To meet the NHBC standard, EWI systems must be designed and certificated to ensure adequate in-service performance is achieved. This includes the introduction of a cavity with a minimum depth of 15mm between a sheathed timber or steel framed substrate and the insulation to allow any incidental moisture the ability to naturally dry, or a free passage of drainage during normal usage. In the event of fire, the installed horizontal fire breaks must have the capability of preventing fire spread through the cavity by closing it off. Many systems incorporate heat activated intumescent strips or grill systems to fulfil this requirement, which is applicable to both combustible and non-combustible EWI systems. In accordance with the guidance provided in BR 135 the fire performance of these types of fire barriers can be tested as a complete system at large scale e.g., BS 8414; however, firebreak design can be tested for fire resistance via a linear joint seal test, which will define the performance of an intumescent strips or fire rails.

The cavity must maintain moisture drainage during normal usage, but in the event of fire the barrier installed must have the capability of preventing fire propagation through the cavity. Special attention to detailing around vulnerable openings such as windows and doorways should be made and if required vertical fire breaks to prevent lateral fire spread.

It is essential that a vented drained cavity system has the appropriate third-party certification, such as British Board of Agrement (BBA) or KIWA BDA Agrement. The introduction of the cavity within the system presents many essential details relating to the spread of fire and or smoke and the adequate tracking of moisture should the system suffer from water ingress through a failed junction or design.

![](_page_4_Picture_5.jpeg)

![](_page_4_Picture_6.jpeg)

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

- Fire Performance Requirements for EWI Systems.
- 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.

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![](_page_4_Picture_13.jpeg)

![](_page_4_Picture_14.jpeg)

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![](_page_5_Picture_0.jpeg)

All drained cavity systems are designed to provide a clear cavity to allow for the passage of moisture from anywhere within the cavity and to dissipate at the base of the system. This requires the use of deflection beads to prevent moisture building up at the heads of openings and fire stopping measures due to the incorporation of the cavity.

The cavity must have a minimum clear depth of 15mm, although greater depths can be achieved if the design of the project requires this, but each system will have a maximum depth of cavity it can create.

NHBC stipulate that for steel frame a drained cavity is required and for timber frame a drained and vented cavity is required. Drained cavities must be capable of freely draining any moisture, whilst a drained and vented cavity must allow for some low level air movement but not through ventilation.

Each system designer will have their own technical solutions as part of the system they supply and it is critical that all specifications and recommendations are followed to ensure that the system can perform to the expected levels.

There are a number of different types of vented drained cavity systems available and for the purpose of this guidance document, we have shown just three typical solutions. The three system shown in this document all utilise cavity spacers of one form or another to create the cavity; however, other systems are available which can create the cavity by use of specialist fixings.

#### Top Hat cavity spacer system

![](_page_5_Figure_8.jpeg)

Key

- 1. Steel / timber frame substrate.
- 2. Suitable sheathing board
- 3. Cavity spacer
- 4. Insulation with fixings
- 5. Basecoat
- 6. Reinforcing mesh
- 7. Primer if applicable
- 8. Finish coat

The Top Hat cavity spacer system typically utilises a galvanised steel (also available in other materials) profile section which is fixed to the supporting wall to provide a cavity spacer of at least 15mm. These top hat sections are generally installed at a maximum of 600mm centres with variations for openings such as windows and doors. The insulation boards are then fixed with suitable fixings through to the top hat sections before the application of the basecoat, reinforcing mesh, primer (if applicable) and the topcoat / slip finish.

With all the drained cavity systems, finishes such as thincoat renders and lightweight brick slips can be used, although the use of heavier cut brick systems, which are suitable for other types of EWI systems, are generally not recommended due to the increase in the system loading.

![](_page_6_Picture_0.jpeg)

![](_page_6_Picture_1.jpeg)

## Cavity track and rail system

![](_page_6_Figure_3.jpeg)

#### Key

- 1. Steel / timber frame substrate.
- 2. Suitable sheathing board
- 3. Track and Rail cavity spacer
- 4. Insulation with fixings
- 5. Basecoat
- 6. Reinforcing mesh
- 7. Primer if applicable
- 8. Finish coat

The cavity track and rail system uses specific horizontal rails which are set on packers to create the required cavity. The insulation boards used are designed with a preformed groove so that they will slide onto the rails, whilst each insulation board is located with a vertical T-Splines or for increased resistance to windloading, fixed vertical profiles. Following the installation of the insulation then the application of the basecoat, reinforcing mesh, primer (if applicable) and topcoat / slip finish.

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#### Double board cavity system

Key

- 1. Steel / timber frame substrate.
- 2. Suitable sheathing board
- 3. Cavity spacer / stud
- 4. Adhesive
- 5. Insulation with fixings
- 6. Basecoat
- 7. Reinforcing mesh
- 8. Primer if applicable
- 9. Finish coat

The double board cavity system creates the required cavity by using two non-combustible fillets between two layers of suitable sheathing boards, fixed to the structural members. This then allows for the EWI system to be adhesively and mechanically fixed to the outer sheathing board before the application of the basecoat, reinforcing mesh, primer (if applicable) and topcoat / slip finish.

![](_page_7_Picture_0.jpeg)

The drained cavity systems have specific details and requirements with regard to moisture and fire stopping. Although these details are typically generic, the precise details of the requirements can be bespoke to the chosen system and system designer. The information below pertains to standard requirements and potential solutions, but should not be considered to over-ride any specifications issued by the system designers.

#### Vented Base Rails

Unlike standard EWI system base rails, the base rails used with the drained cavity system must be vented and provide a minimum open area of 600mm<sup>2</sup> per linear metre run of wall, to allow for any residual trapped moisture from the construction to escape to the outside. The holes in this base rail must be circa 6mm and used in conjunction with an insect mesh to prevent the ingress of birds, animals and small insects. Some system designers require the drilling of ventilation holes into the specified base tracks

It is important to remember that the system is slightly vented, in that there is no requirement for any ventilation at any other points other than the base rail. If ventilation holes are installed anywhere else for the cavity, a fully ventilated cavity will occur, which will negate the thermal efficiency of the insulation.

![](_page_7_Picture_6.jpeg)

### **Moisture Deflection Beads**

Moisture deflection beads are used within the cavity to deflect any moisture around openings such as windows and doors, to enable that moisture to drain through the vented base rail. The deflection beads are bedded on silicone sealant and fixed to allow for a minimum 10° angle, with both ends of the bead extending past the area of the opening.

![](_page_7_Figure_9.jpeg)

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![](_page_8_Picture_0.jpeg)

### **Intumescent Strips**

Intumescent strips are sometimes used at floor levels to provide protection within the cavity to the possibility of the progression of fire should one occur. The intumescent strip is designed to expand and close off the cavity should it be exposed to fire or heat, therefore containing the fire for a specific time. The strips are fixed directly to the sheathing board with some specifications also including a bracket to sit the strip on. Variations in the depth of cavity can occur and it is critical that the depth of the cavity never exceeds the maximum expandable depth of the intumescent strip.

![](_page_8_Figure_4.jpeg)

### **Cavity Fire Barriers**

A cavity fire barrier is a passive fire protection measure, which is utilised to segregate void spaces within walls. They are manufactured to suit cavity widths and are held in place by a combination of compression, fixings and multi-purpose brackets. If used with a drained cavity system, then these will generally be required to be ventilated cavity fire barriers and located at floor levels, party walls, edge of cavities etc.

![](_page_8_Picture_7.jpeg)

The use of these will be dictated by the exact nature and requirements of the project; however, these can be used on recladding projects where small areas of the substrate might increase the cavity width beyond that which the intumescent strip can adequately perform.

![](_page_8_Picture_9.jpeg)

![](_page_9_Picture_0.jpeg)

![](_page_9_Picture_1.jpeg)

#### **Sheathing Boards**

The use of the correct sheathing board is critical to the EWI system, although this may not be included as part of the EWI system specification, and may be supplied and installed as part of the steel / timber frame contract.

The sheathing board must have the required pull out resistance for the profile / system fixings as specified by the system designer. Confirmation of this should be sought before the commencement of works.

Good practice is to keep the boards laid flat and not on end to prevent any warping of the boards and during the installation try and avoid steps between the boards as this can increase or decrease the size of the cavity.

![](_page_9_Figure_6.jpeg)

#### **General Note**

The specification and use of the drained cavity system should always be in strict accordance with the EWI system designers recommendations and that of the applicable Building Regulations and British Standards. The fire strategy for the cavity should be developed by the design team and relevant fire engineer.

Fire stopping measures within the cavity and fire barriers are critical and it is recommended that suitably experienced site supervision is provided and a full photographic record is documented during the installation process.

For more information on the drained cavity systems, please contact one of the INCA system designer members, who can assist further.

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![](_page_10_Picture_0.jpeg)

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![](_page_10_Picture_4.jpeg)

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![](_page_11_Picture_4.jpeg)