



## RENDERED WALL SYSTEM

### INSULCLAD<sup>®</sup> EXTERIOR CLADDING SYSTEMS DESIGN AND INSTALLATION MANUAL

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***COMBINING EXTERIOR CLADDING WITH SUPERIOR INSULATION***

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# Insulclad<sup>®</sup> Exterior Insulation Cladding Systems

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## 1. Introduction

The Insulclad<sup>®</sup> systems are crack resistant plastered exterior wall systems that provide full insulation and a weatherproof barrier for residential and light commercial constructions.

The systems consist of sheets of plain polystyrene or premeshed boards fixed either directly to the exterior framing or over a nominal 20 mm cavity.

The polystyrene surface is then coated with an acrylic modified cement-based plaster reinforced with a strong fibre-glass mesh. The base coat is then finished with an Insulclad<sup>®</sup> finishing render which is then painted with two coats of 100% acrylic paint.

### 1.1 Building Regulations

The Insulclad<sup>®</sup> systems, when installed, applied and maintained in accordance with the instructions and recommended details from Foamex Polystyrene will meet the relevant performance provisions of the Building Code of Australia (BCA).

### 1.2 Appraisals

The Insulclad<sup>®</sup> Systems have been subjected to extensive testing and comply with Australian building practices. The Insulclad<sup>®</sup> systems have been appraised by BRANZ. Refer to Appraisal No. 696 (2010) Insulclad<sup>®</sup> Direct Fixed Cladding System, and Appraisal No. 697 (2010) Insulclad<sup>®</sup> Cavity System.

### 1.3 System Components and Accessories

#### Expanded Polystyrene (EPS)

- Insulclad<sup>®</sup> battens are manufactured from very high density (Class VH) expanded polystyrene (EPS) with a nominal density of 28 kg/m<sup>3</sup>. The battens are 25 mm thick by 45 mm wide.
- Insulclad<sup>®</sup> Pre-Meshed Boards are 40, 50, 75 and 100 mm thick Class M EPS with a nominal density of 19 kg/m<sup>3</sup>. The boards are supplied 1200 mm wide x 2500 mm high and must be manufactured to meet the requirements of AS 1366 Part 3. The boards are factory coated with polymer modified cement-based render with an imbedded alkali-resistant fibreglass mesh.
- Plain EPS sheets are 40, 50, 60, 75 or 100 mm thick Class S with a nominal density of 16 kg/m<sup>3</sup>, Class M with a nominal density of 19 kg/m<sup>3</sup>, or Class H with a nominal density of 24 kg/m<sup>3</sup>. The sheets are supplied in lengths ranging from 2.4 to 5.0 m x 1.2 m wide and must be manufactured to meet the requirements of AS 1366 Part 3.

## Renders

- *Insulclad<sup>®</sup> Joint Patch & Primer Additive* is a liquid acrylic copolymer fine resin additive supplied in 1ltr, 5ltr or 15ltr bottles and mixed on site with *Insulclad<sup>®</sup> Base Render* and clean drinking water to a fine consistency. It is applied over the self-adhesive mesh over the joints of the *Insulclad<sup>®</sup> Pre-Meshed Boards*. It is also used as a primer when mixed with *Insulclad<sup>®</sup> Base Render* to form a slurry consistency and is applied to all uPVC components to ensure good adhesion properties between render coatings and uPVC.
- *Insulclad<sup>®</sup> Base Render* is a polymer-modified, Portland cement-based render supplied in 20 kg bags and mixed on site with clean drinking water. It is applied as the base coat over plain EPS sheets in a minimum 2 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface. *Insulclad<sup>®</sup> Base Render* can also be used to achieve a spray textured finish.
- *Insulclad<sup>®</sup> Finishing Renders* are a range of polymer-modified, Portland cement-based finishing renders supplied in 20 kg bags and mixed on site with clean drinking water. They are available in Fine Skim, Medium Float, Coarse Float and Scratch and Drag to provide different surface finishes.

## Paint System Specification

- At least two coats of a latex exterior paint system complying with any of Parts 7, 8, 9 or 10 of AS 3730 must be used over the finishing renders to make the system weathertight and give the desired finish colour to exterior walls. Paint colours must have a light reflectance value of 40% minimum regardless of gloss value. Proprietary paint systems have not been assessed and are therefore outside the scope of the Branz Appraisal.

## Accessories

- Reinforcing mesh - alkali-resistant fibreglass mesh with a nominal mesh size of approximately 4 mm square and a weight of 150 g/m<sup>2</sup> for use in domestic and light commercial situations. Where a greater level of impact resistance is required, 360 g/m<sup>2</sup> alkali-resistant fibreglass mesh with a nominal mesh size of approximately 3 mm square is available.
- uPVC components - jamb flashing, base caps, corner beads, cavity vent strip and horizontal and vertical control joint flashings.
- *Insulclad<sup>®</sup> Pre-Meshed Boards* and EPS sheet fixings (timber frame) - 8-gauge x length specified in "Sheet Fixings" table 1 below. Self-drilling AS 3566 Corrosion Class 3 wood screws in mild or moderate industrial or marine environments and Corrosion Class 4 wood screws in severe marine environments.
- *Insulclad<sup>®</sup> Pre-Meshed Boards* and EPS sheet fixings (steel frame) - 8-gauge x length specified in "Sheet Fixings" table 1 below. Self-drilling AS 3566 Corrosion Class 3 screws in mild or moderate industrial or marine environments and Corrosion Class 4 screws in severe marine environments.

Table 1:

	Sheet Fixings			
	Board Thickness	Timber Frame Wood Screws 8-gauge	Steel Frame Steel Screws 8-gauge	Washer dia
<b>Direct Fixed</b>	40	75mm	75mm	40mm
	50	100mm	75mm	40mm
	60	100mm	100mm	40mm
	75	100mm	100mm	40mm
	100	150mm	125mm	40mm
<b>Cavity System</b>	40	100mm	75mm	40mm
	50	100mm	100mm	40mm
	60	125mm	125mm	40mm
	75	125mm	125mm	40mm
	100	150mm	150mm	40mm

- Washers - 40 mm diameter polypropylene washers.
- Cavity batten fixings – 40 x 2.5 mm hot-dip galvanised steel flat head nails for timber frame, or construction adhesive for temporary fixing to sarking over timber or steel frame.
- Waterproof membrane tapes - tapes covered by a valid BRANZ Appraisal for use as waterproofing membranes over tops of plastered balustrades, fixing blocks and the like.
- Flexible sealant – paintable, UV stable MS sealant complying with Type F, Class 25LM of ISO 11600. EPS foam products are susceptible to chemical damage resulting from the use of sealants that contain solvents. The sealant must be free from solvents and having a VOC level of no more than 70g/Ltr Californian South Coast Air Quality Management District (rule 1168). The sealant must be recommended by Foamex Polystyrene Pty Ltd.
- Window and door trim cavity airseals – self-expanding, moisture cure polyurethane foam airseals for use around window, door and other wall penetration openings.
- Adhesive - EPS compatible adhesive for gluing uPVC components to the Insulclad □ Pre-Meshed Boards and EPS sheet as and where required. EPS foam products are susceptible to chemical damage resulting from the use of adhesives that contain solvents. Only solvent free adhesives with a VOC level of no more than 70g/Ltr or less Californian South Coast Air Quality Management District (rule 1168). The adhesive must be recommended by Foamex Polystyrene Pty Ltd.

**Accessories used with the system which are supplied by the building contractor are:**

- Sarking – kraft-based paper complying with AS/NZS 4200, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall wraps.
- Sarking support - polypropylene strap for securing the sarking in place and preventing bulging of the bulk insulation into the drainage cavity where cavity battens are installed at greater than 450 mm centres. (Note: additional vertical battens may also be installed to provide support.)
- Flexible sill and jamb flashing tapes - flexible flashing tapes complying with ICBO Acceptance Criteria AC148, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- Flashings - including window and door joinery head flashing, parapet cap flashings and horizontal joint flashings. All terminations and junctions must be adequately flashed

using materials which are compatible with the Insulclad<sup>®</sup> Cavity System and comply with AS/NZS 2904.

#### **1.4 Handling & Storage**

Polystyrene sheets must be stored to reduce exposure to direct sunlight. Protect sheets from physical damage. Bags of render must be stored in a dry area, preferably off the floor on timber pallets or timber dunnage. Rotate the stock to ensure that the oldest material is used first. Discard any render which is more than twelve months beyond its manufacturing date.

When transporting bags of render, protect the product from moisture and from being damaged. Do not transport or wrap in any way which could lead to “sweating”. Store the rolls of fibreglass mesh in a dry area.

#### **1.5 Health & Safety**

Render dust is an irritant and paper dust-protection masks must be worn while the render is being mixed. The wet render is alkaline and prolonged skin contact must be avoided.

#### **1.6 Installation**

The application and finishing of the Insulclad<sup>®</sup> Systems requires specialist skills and is to be installed only by approved Foamex Polystyrene contractors. All work must be carried out in accordance with Foamex Polystyrene installation and current detail sheets.

Please contact Foamex Polystyrene for a list of contractors in your area.

### **2. Construction Information**

#### **2.1 Framing**

Framing set out requires studs at 600 mm maximum centres. Support must be provided for all EPS sheet edges and all exterior walls shall be straightened prior to fixing any sheets.

Only the 75 mm thick Insulclad<sup>®</sup> sheets can be joined horizontally without edge support provided the sheet edges are glued. At bottom plate level, ensure the plate is flush or slightly past the outer edge of the flooring platform.

#### **2.2 Joinery Details**

Joinery details are provided in the construction detail drawings section of this Manual.

#### **2.3 Ground Clearance**

The Insulclad<sup>®</sup> Systems can be carried on below the minimum bottom plate coverage of 50mm, but at ground level, finished surfaces, such as footpaths, must be kept clear of the bottom edge of the cladding system by a minimum of 100mm, and unpaved surfaces by

175mm. When using timber foundations any sub-floor ventilation requirements must still be met.

## **2.4 Fixing Blocks**

Timber backing blocks for items such as downpipe brackets, garden taps, outside light fittings should be fixed to the framing face or over timber cavity battens at the appropriate locations. Use treated timber ripped down to thickness to suit 40, 50 & 75mm thick polystyrene. Timber blocks should be no longer than 400mm in length. The approved contractor will cut the polystyrene around these blocks and apply the reinforced rendered finish over them.

## **2.5 Bracing**

The Insulclad<sup>®</sup> System is not a bracing element. Where external bracing is required, plywood panels can be nailed direct to the framing. Over these bracing panels or cavity battens, sheets of polystyrene less the thickness of the plywood can be fixed to maintain a flat exterior surface. Internal sheet bracing is preferred.

## **2.6 Impact Resistance**

The standard reinforced Insulclad<sup>®</sup> System has a long history of satisfactory impact strength for residential and commercial construction. A heavy duty Insulclad<sup>®</sup> System is available with four times greater impact strength for use in areas likely to be at risk from hard body impacts. Simply specify “Insulclad<sup>®</sup> Commercial Finish”. For areas such as Insulclad<sup>®</sup> walls abutting car parks, additional protection or barriers must be provided.

## **2.7 Pipes and Outlets**

Before rendering begins make sure all the plumbing that is going through the walls is in place. If the work can't be finished, at least get short sections installed through the walls so they can be sealed in place before the rendering begins.

This also applies to meter boxes, outside taps, certain types of light fittings, etc. All electrical cable that pierces through the polystyrene, e.g. for light fittings, must be protected by a conduit.

## **3. Design Criteria**

### **3.1 Thermal Insulation**

The polystyrene used with the Insulclad<sup>®</sup> Systems must satisfy the performance requirements of Australian Standard 1366.3. The specifier must select the appropriate polystyrene sheet thickness to achieve the required thermal resistance.

### 3.2 Wind Loading

The Insulclad<sup>®</sup> Systems are suitable for use in non-cyclonic wind zones up to, and including N3. Insulclad Pre-Meshed Boards and EPS sheets must be fixed to the wall framing or through the cavity battens and cavity spacers to the wall framing at maximum centres specified in Table 2.

Table 2: Insulclad<sup>®</sup> Pre-Meshed Boards and EPS Sheet Fixing Centres for Edges and Intermediate Studs

BCA 2010 Wind Class	Maximum fixing centres (mm) with studs at maximum 600 mm centres	Maximum fixing centres (mm) with studs at maximum 400 mm centres
N1	300 <sup>1</sup>	300 <sup>1</sup>
N2	300 <sup>1</sup>	300 <sup>1</sup>
N3	200 <sup>2</sup>	300 <sup>1</sup>

Notes:

1. One fixing is required into each dwang and top and bottom plates at mid-nog length.
2. Fixings are also required into each dwang at 200 mm centres and top and bottom plates at mid-nog.

### 3.3 Control Joints

Control joints are required in walls longer than 20 metres or higher than two storeys. For residential construction a construction joint is not required for two storeys plus a gable end.

Inter-storey drained joints must be provided for cavity walls over 2 storeys in height.

*(Note: It is the responsibility of the building designer to determine the requirements for barriers to vertical fire spread at inter-storey junctions.)*

### 3.4 Weight

The 40 mm thick Insulclad<sup>®</sup> System weighs approximately 7 kg/m<sup>2</sup>.

### 3.5 Curing

Cement-based renders must only be applied when the temperature is between 5° and 38°C and they must be protected from rain and water run-off for the first 24 hours. To aid curing, cement-based renders should be protected from hot drying winds and direct sunlight for the first 16 hours.



#### **4 Maintenance**

Damaged areas, cracks or sealant details which could allow water to penetrate the cladding, must be repaired to ensure the building remains watertight.

Accidental damage can be repaired using new render and where required additional fibreglass mesh. Finish the repair with the appropriate product. Minor cracks can be sealed with a polyurethane type sealant and be repainted. Suspect sealant joints must be raked out, the joints cleaned and the sealant replaced.

#### **5 Termites**

Please seek expert advice for termite prevention.

#### **6 Cleaning**

The chosen finishing render system should be regularly washed down to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent. Solvent based cleaners must not be used.

#### **7 Recoating**

Acrylic painted surfaces will need repainting after 5 to 10 years depending on location and the condition of the paint. Simply clean the painted wall surfaces with a suitable detergent wash and rinse off. Ensure any lichen or moss growth is removed and any loosely adhered paint is wire brushed off. Repaint with two coats of acrylic paint.

#### **8 Technical Advice**

An advisory service is available to specifiers of the Insulclad<sup>®</sup> Exterior Cladding Systems. Contact: Foamex Polystyrene at [nswsales@foamex.com.au](mailto:nswsales@foamex.com.au).

#### **9 Insulclad<sup>®</sup> Construction Details**

The details listed below represent typical Insulclad<sup>®</sup> construction techniques and are designed to assist specifiers. These details are not a complete and comprehensive range, but do describe the most commonly used applications of the system. If you wish to modify a detail to suit a different design, you must contact Foamex Polystyrene to discuss the intended modification. It is the responsibility of the specifier to ensure that the details provided meet their own requirements and the performance requirements of the BCA 2010.

**Insulclad<sup>®</sup> Direct Fixed Cladding System Installation Details**Refer to Insulclad<sup>®</sup> Construction Drawings PDF File

<b>Name</b>	<b>Rev No</b>	<b>Page No</b>
Internal Square Corner - Direct Fixed	Nov 2010	1
External Square Corner - Direct Fixed	Nov 2010	2
Concrete Slab Floor - Direct Fixed	Nov 2010	3
Timber Floor Foundation - Direct Fixed	Nov 2010	4
Timber Floor Foundation - Direct Fixed	Nov 2010	5
Rebated Concrete Slab Floor - Direct Fixed	Nov 2010	6
Roof / Wall Junction - Direct Fixed	Nov 2010	7
Pipe Penetration - Direct Fixed	Nov 2010	8
Soffit Detail - Direct Fixed	Nov 2010	9
Vertical Control Joint - Direct Fixed	Nov 2010	10
Fixing Block - Direct Fixed	Nov 2010	11
Meter Box - Head and Jamb - Direct Fixed	Nov 2010	12
Window Head - Direct Fixed	Nov 2010	13
Window Sill - Direct Fixed	Nov 2010	13
Window Jamb - Direct Fixed	Nov 2010	13

**Insulclad<sup>®</sup> Cavity System Installation Details**Refer to Insulclad<sup>®</sup> Construction Drawings PDF File

<b>Name</b>	<b>Rev No</b>	<b>Page No</b>
Internal Square Corner - Cavity	Nov 2010	14
External Square Corner - Cavity	Nov 2010	15
Concrete Slab Floor - Cavity	Nov 2010	16
Timber Floor Foundation - Cavity	Nov 2010	17
Pier Foundation - Cavity	Nov 2010	18
Rebated Concrete Slab Floor - Cavity	Nov 2010	19
Rebated Concrete Slab Floor - Cavity (in between vents)	Nov 2010	20
Enclosed Balcony - Cavity	Nov 2010	21
Parapet Metal Capping - Cavity	Nov 2010	22
Balcony Capping - Cavity	Nov 2010	23
Flush Eaves - Cavity	Nov 2010	24
Roof / Wall Junction - Cavity	Nov 2010	25
Pipe Penetration - Cavity	Nov 2010	26
Soffit Detail - Cavity	Nov 2010	27
Soffit Edge Detail - Cavity	Nov 2010	28
Vertical Control Joint - Cavity	Nov 2010	29
Fixing Block - Cavity	Nov 2010	30
Interstorey Drainage Joint - Cavity	Nov 2010	31
Meter Box - Head and Jamb - Cavity	Nov 2010	32
Window Head - Cavity	Nov 2010	33
Window Sill - Cavity	Nov 2010	33
Window Jamb - Cavity	Nov 2010	33
Typical Batten Layout	Nov 2010	34

Foamex Polystyrene reserves the right, to revise and change its construction details without notice. Please consult a Foamex Polystyrene Technical Adviser to confirm the validity of our current details or to seek advice regarding new developments.

## 10 Installation

The Insulclad<sup>®</sup> System must only be applied by approved contractors who have a good working knowledge of Foamex Polystyrene systems and who are aware of Foamex Polystyrene current product information and are kept up-to-date with proprietary detailed application instructions.

Due to the specialist nature of the systems, all the render products, fibreglass mesh and PVC flashing components that make up the Insulclad<sup>®</sup> Systems shall be supplied directly to the contractor by Foamex Polystyrene or its selected reseller of the Insulclad<sup>®</sup> Systems.

This section of the literature should be read in conjunction with the installation details.

### 10.1 Sarking and Flashing Tapes

The selected sarking and flexible sill and jamb tape system must be installed in accordance with the manufacturer's instructions prior to the installation of the EPS or cavity battens. The sarking must be installed horizontally and be continuous around corners. Sarking must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Particular attention must be paid to the installation of the sarking and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed timber wall framing in the opening is protected. All penetrations through the sarking must be sealed and joints sealed or lapped 150 mm.

### 10.2 Cavity Battens

Cavity battens must be installed over the sarking to the wall framing at a maximum of 600 mm centres where the studs are at 600 mm centres, or at 400 mm centres when studs are at 400 mm centres. Where the studs are at greater than 400 mm centres, a sarking support, e.g. polypropylene strap or additional vertical battens must be installed over the sarking between the cavity battens at maximum 300 mm centres to prevent the sarking bulging into the drainage cavity.

For the Insulclad<sup>®</sup> Cavity System, the selected cavity vent strip must be installed so a minimum 15 mm drip edge to the bottom of the EPS is maintained at all times.

### 10.3 Window Joinery

Aluminium window and door joinery and associated flashings must be installed in accordance with the window manufacturer's instructions. A 7.5 - 10 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

## 10.4 Fixing Panels

To avoid excessive waist, fix sheets horizontally and cut around window and door openings. Sheets can be fixed vertically and all joints must be glued. External corners can be lapped or mitred. Internal corners must be butt joined and glued.

## 10.5 PVC Edge Trims and Finishing

Fix PVC Edge Trims in place. Refer to construction details. Place 200 mm wide self-adhesive mesh over all joints and glue on pre-meshed corners to all externals. Place a 200 mm x 300 mm strip of mesh diagonally across the corners of all wall penetrations.

Mix one bag of Insulclad<sup>®</sup> Base Render with 2.25 litres of Insulclad<sup>®</sup> Joint Patch & Primer Additive fine resin and 2.25 litres of water. Mix to a creamy consistency, let stand for five minutes then re-stir. Spread thinly over joints and feather out all edges. Stop over washers and PVC edges with a mix that is slightly thicker in consistency (if it slumps it is too thin).

Allow jointing to dry then apply one coat of Insulclad<sup>®</sup> Coarse Float. Finish off with a plastic float. For a quick and easy texture apply one coat of Insulclad<sup>®</sup> Medium Float finish over a dry Coarse Float. Finish with a good quality 100% acrylic paint applied to manufacturer's specification.

## 11 General

Foamex Polystyrene Pty Ltd guarantees that its pre-mixed render products are manufactured to a high specification. Foamex Polystyrene Pty Ltd's liability (in contract, tort, negligence or otherwise) for any loss, damage, expense, cost or liability arising from application of the product is limited to making good any defect solely attributable to the Foamex Polystyrene Pty Ltd manufacturing process. Foamex Polystyrene Pty Ltd shall not be liable for any defective workmanship or application of its products by any contractor, approved or otherwise or any other person.

The long-term durability of the Insulclad<sup>®</sup> System is dependent on the correct preparation and application of all of its components in strict accordance with the relevant written instructions and detail sheets. On-site application is beyond the control of Foamex Polystyrene Pty Ltd and it cannot guarantee workmanship or the correct preparation and application of its products or systems.

The approved Insulclad<sup>®</sup> contractor shall take the overall responsibility for on-site supervision, staff training, installation and quality control.

The purchaser of the components of these systems will indemnify Foamex Polystyrene Pty Ltd and its personnel of any damage, loss or expense incurred by Foamex Polystyrene Pty Ltd which is not proved to be the direct consequence of defective manufacture of the product, and the customer will pay the amount of that damage, loss or damages within 10 days of Foamex Polystyrene Pty Ltd or its personnel making a demand in writing to the customer for payment of the same.