



**IRISH AGRÉMENT BOARD
CERTIFICATE NO. 09/0331**

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StoTherm External Wall Insulation Systems

**Système d'isolation pour murs extérieurs
Wärmedämmung für Außenwand**

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are '**proper materials**' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2017**.



PRODUCT DESCRIPTION:

This Certificate relates to the StoTherm External Wall Insulation Systems. Each system is comprised of:

- Surface preparation of masonry or concrete substrate;
- Full system beads and render-only beads;
- Insulation board (standard white EPS, graphite enhanced grey EPS, mineral wool);
- Adhesive/Reinforcing coat;
- Glass fibre mesh;
- Silicone finish;
- Mechanical fixings;
- Adhesive fixings;
- Weather-tight joints;
- Movement joints;
- Provision for limiting cold bridging at external wall/floor junctions in compliance with Acceptable Construction Details published by the DoEHLG;

- Provision for fire stopping at external compartment walls and floors.

Sto Ltd are responsible for the design, supply and installation of the system, and for the integration of the design of the system into the building. The system is designed by Sto Ltd on a project specific basis in accordance with an approved design process. The installation of each system is carried out by installers who have been trained and approved by Sto Ltd, and are also approved by NSAI Agrément to install the system.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2017.

USE:

This Certificate covers the system for use as external insulation on new concrete and masonry residential buildings, up to a maximum of 15

storeys (45 metres) in height in purpose groups 1(a), 1(b), 1(c), 2(a), 2(b), 3, 4(a) and 4 as defined in TGD to Part B of the Building Regulations 1997 to 2017.

Detail Sheet 1 covers the system for use as external insulation for refurbishment/retrofit of existing masonry or concrete buildings, up to a maximum of six storeys (18m) in height in purpose groups 1(a), 1(c), 2(a), 2(b), 3, 4(a) and 4 and for use up to a maximum of five storeys (15m) in height in purpose group 1(b), as defined in TGD to Part B of the Building Regulations 1997 to 2017.

The systems have not been assessed for use with timber frame or steel frame construction.

MANUFACTURE, DESIGN AND MARKETING: System Design:

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 Antura, Kingsland Business Park,
 Wade Road, Basingstoke RG24 8EN, UK.
 T: 0044 1256 332770
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Manufacture, Sales and Project Specific Design:

Sto Ltd.,
 Unit 69, Western Parkway Business Park,
 Lower Ballymount Road, Dublin 12.
 T: 01 4602305
 F: 01 4602455

1.1 ASSESSMENT

In the opinion of NSAI Agrément, the StoTherm External Wall Insulation Systems if used in accordance with this Certificate can meet the requirements of the Building Regulations 1997 to 2017, as indicated in Section 1.2 of this Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

REQUIREMENTS:

Part D – Materials and Workmanship

D3 – Proper Materials

The StoTherm External Wall Insulation Systems, as certified in this Certificate, are comprised of 'proper materials' fit for their intended use (see Part 4 of this Certificate).

D1 – Materials & Workmanship

The StoTherm External Wall Insulation Systems, as certified in this Certificate, meet the requirements for workmanship.

Part A - Structure

A1 – Loading

The StoTherm External Wall Insulation Systems once appropriately detailed, designed and constructed have adequate strength and stability to meet the requirements of this Regulation (see Part 3 of this Certificate).

A2 – Ground Movement

The StoTherm External Wall Insulation Systems can be incorporated into structures that meet this requirement (see Parts 3 and 4 of this Certificate).

Part B – Fire Safety

Part B Vol 2 – Fire Safety

B4 & B9 – External Fire Spread

The StoTherm External Wall Insulation Systems can be incorporated into structures that meet this requirement (see Parts 3 and 4 of this Certificate).

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

External walls above DPC level have adequate weather resistance in all exposures to prevent the passage of moisture from the external atmosphere into the building as specified in Part 3 of this Certificate.

Part J – Heat Producing Appliances

J3 – Protection of Building

When the StoTherm External Wall Insulation Systems are used in accordance with Section 4.1 of this Certificate, wall lining, insulation and separation distances meet this requirement.

Part L – Conservation of Fuel and Energy

L1 – Conservation of Fuel and Energy

The walls of the StoTherm External Wall Insulation Systems can be readily designed to incorporate the required thickness of insulation to meet the Elemental Heat Loss method calculations for walls as recommended in Part L of the Building Regulations 1997 to 2017 (see Part 4 of this Certificate).

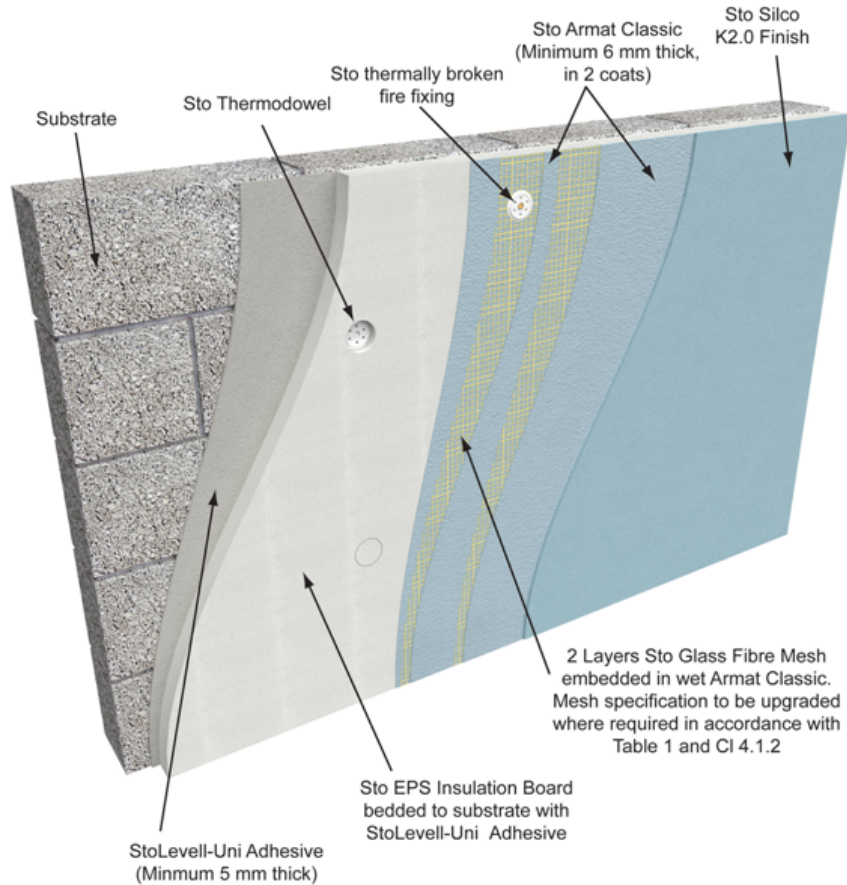


Figure 1.1: StoTherm Classic K – Isometric View – Buildings Less Than 18m

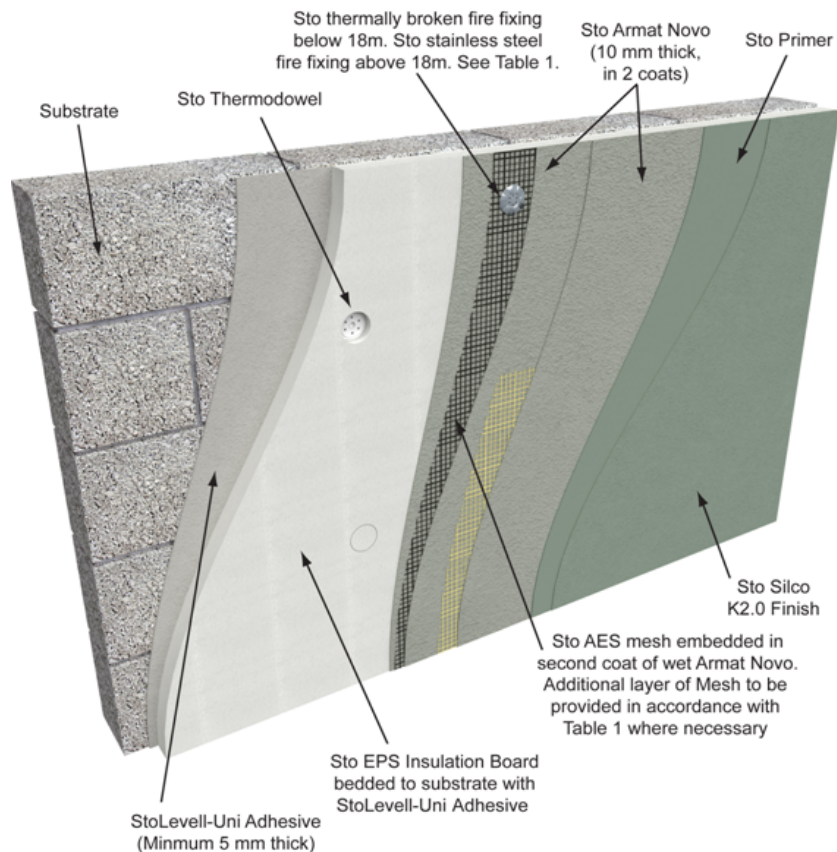


Figure 1.2: StoTherm Vario K – Isometric View – Buildings Up To 45m

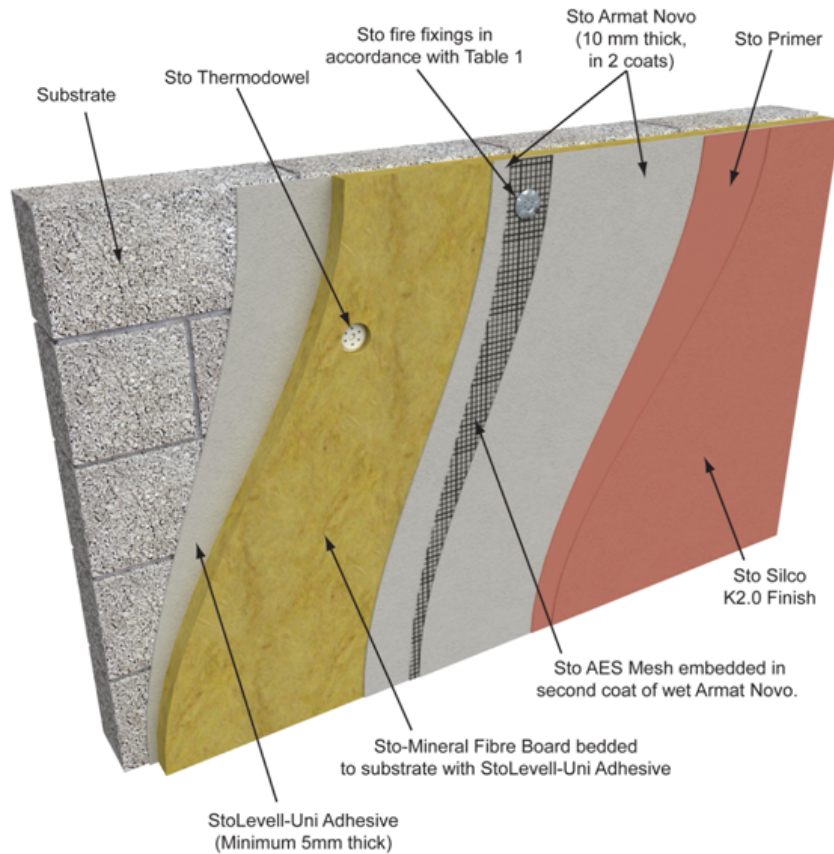


Figure 1.3: StoTherm Mineral K – Isometric View – Buildings Up To 45m

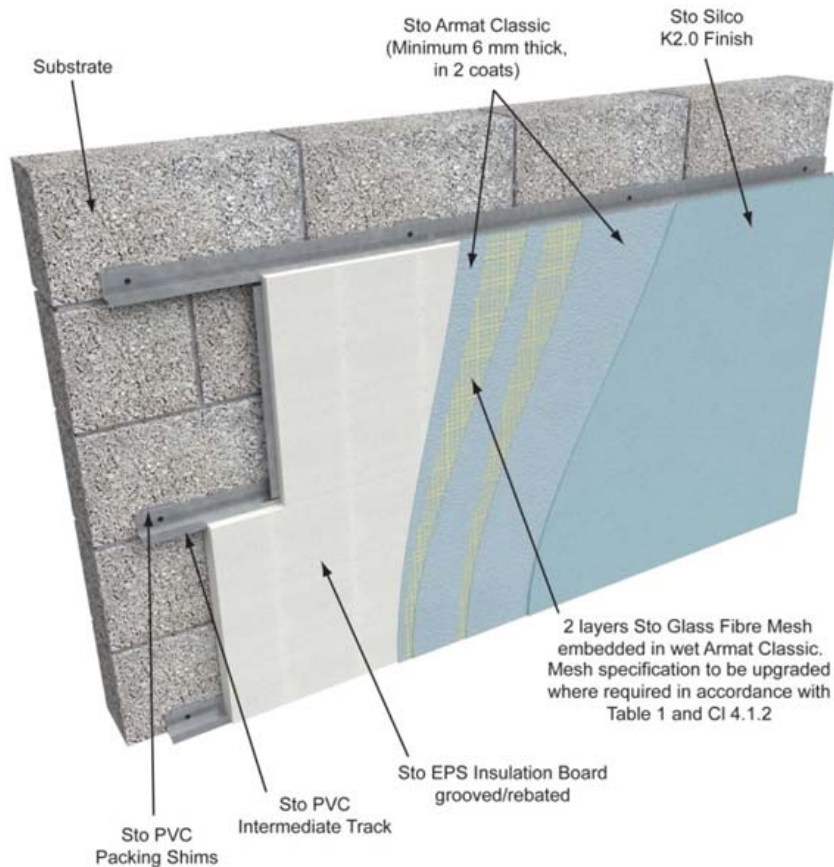


Figure 2.1: StoTherm Classic M – Isometric View – Buildings Up To 18m

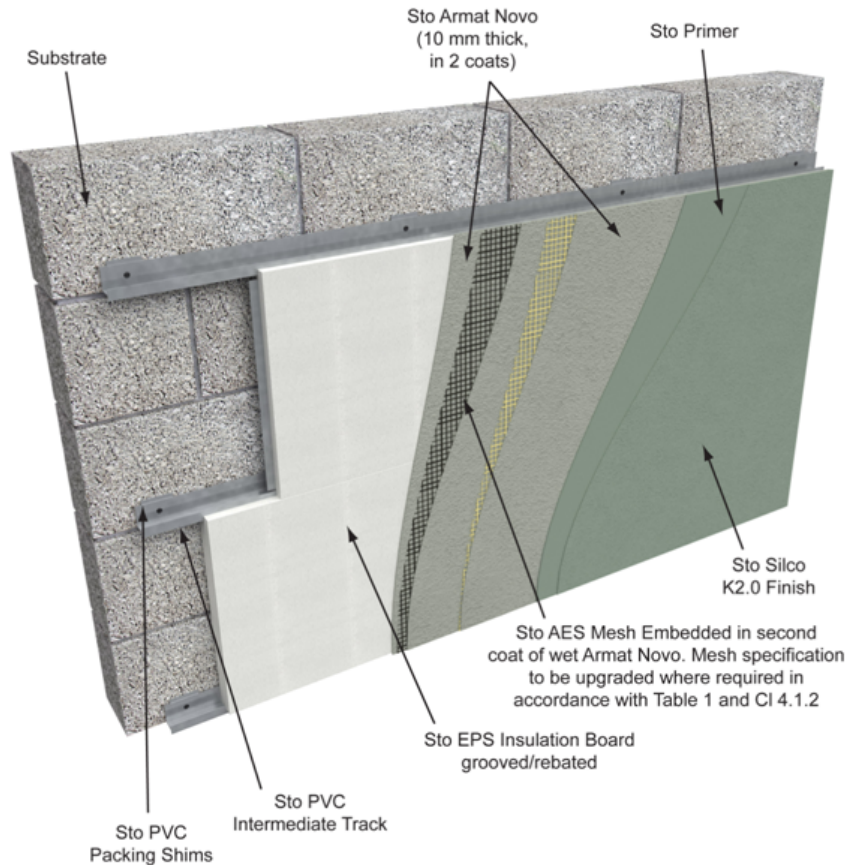


Figure 2.2: StoTherm Vario M – Isometric View – Buildings Up To 45m

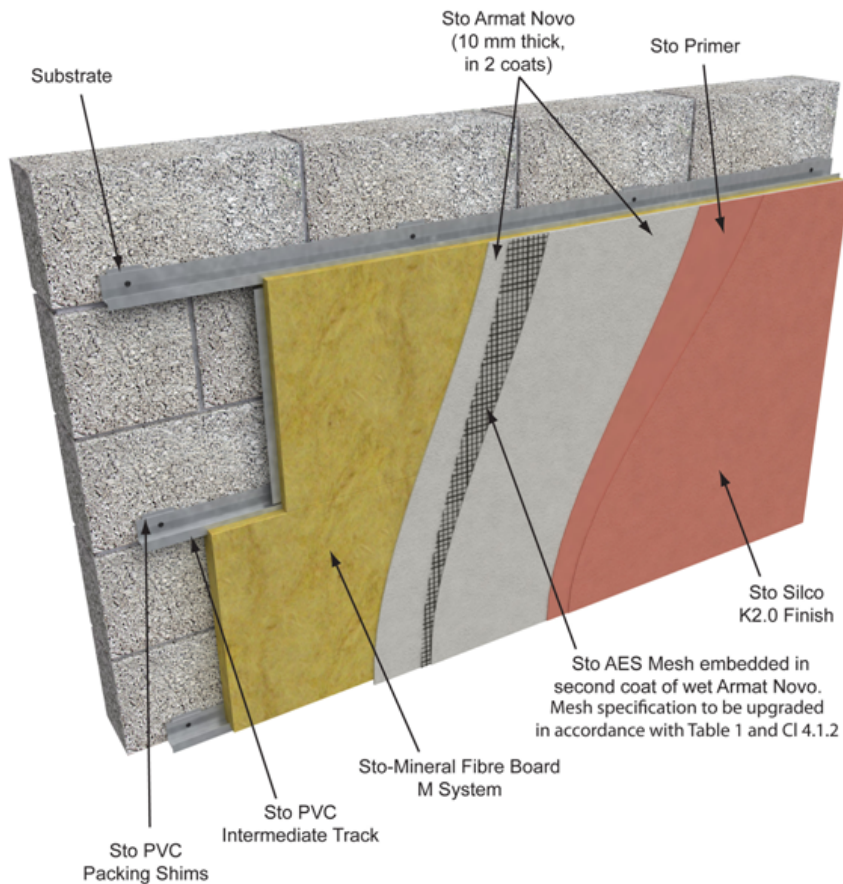


Figure 2.3: StoTherm Mineral M – Isometric View – Buildings Up To 45m

2.1 PRODUCT DESCRIPTION

The StoTherm External Wall Insulation System range is summarised in Table 1. Component specifications are given in Table 2. Ancillary items are listed in Table 3. The EPS insulation should have one of the following codings:

- EPS-EN 13163-T2-L2-W2-S2-P4-DS(70,-)1-DS(N)2-TR100
- EPS-EN 13163-T2-L2-W2-S2-P4-DS(70,-)2-DS(N)2-TR100

In the StoTherm M system (Table 1a), the insulation is rigidly supported by an aluminium/PVC frame which is mechanically fixed to the substrate. In the StoTherm K system (Table 1b), the insulation is adhesively and mechanically fixed directly to the substrate.

The minimum overall render thickness is 8mm for Sto Armat Classic reinforcing coat and silicone decorative finish, and 12mm for Sto Armat Novo and silicone decorative finish.

2.2 MANUFACTURE AND SUPPLY

Sto Ltd is responsible for the manufacture and supply of all components to approved specifications, in accordance with the Sto Ltd approved supplier system.

2.2.1 Quality Control

The Certificate holder operates a quality management system and a quality plan is in place for system manufacture, design and installation.

2.3 DELIVERY, STORAGE AND MARKING

The insulation is delivered to site in the quantities and container types listed in Table 2. Each park is marked with the manufacturer's details, product identification marks and batch numbers. Components are delivered to site as outlined in Table 2 and 3. Each container bears the manufacturer's and the product's identification marks, batch number and the NSAI Agrément logo incorporating the number of this Certificate.

Insulation should be stored on a firm, clean, dry and level base, which is off the ground. The insulation should be protected from prolonged exposure to sunlight by storing opened packs under cover in dry conditions or by re-covering with opaque polythene sheeting. Care should be taken when handling the insulation boards to avoid damage and contact with solvents or bitumen products. The boards must not be exposed to ignition sources. Meshcloth, primers, renders, paints, textured synthetic finish coatings and sealants should be stored in accordance with

the manufacturer's instructions, in dry conditions, at the required storage temperatures. They should be used within the stated pot life.

2.4 INSTALLATION

2.4.1 Approved Installers

Installation shall be carried out by Sto Ltd trained applicators who:

- Are required to meet the requirements of an initial site installation check by NSAI Agrément prior to approval and are subject to the NSAI Agrément ETICS Approval Scheme.
- Are approved by Sto Ltd and NSAI Agrément to install the product.
- Have undertaken to comply with the Sto Ltd installation instructions.
- Are employing ETICS Supervisors and ETICS Operatives who have been issued with appropriate identity cards by Sto Ltd. Each team must consist of at least one ETICS Supervisor and ETICS Operative (can be the same person).
- Are subject to supervision by Sto Ltd, including unannounced site inspections by both Sto Ltd and NSAI Agrément in accordance with the NSAI Agrément ETICS Approval Scheme.

2.4.2 General

Sto Ltd prepare a bespoke *Specification & Method Statement* for each project, including U-value calculations, requirements for materials handling and storage, method statements for installation, building details, fixing requirements, provision for impact resistance, maintenance requirements etc. This document forms part of the contract documentation for circulation to the home owner and the installer. Installers will be expected to adhere to the specification. Deviations must be approved by Sto Ltd technical representative. Sto Ltd Technical Advisors will visit the site on a regular basis to assess the work against Sto Ltd requirements, including the project specific *Specification & Method Statement*, and to report any deviations to the installer and to the home owner/main contractor where appropriate.

All windows have to be installed and made weather tight within the opening, before application of the system.

Mineral fibre board and lamella should be protected from moisture prior to and during installation. If the mineral fibre board or lamella gets wet during or post installation, it should not be rendered. Removal and replacement of wet material may need to be considered.

Type	Storey Height	Insulation	Reinforcement	Fixings ^{1,2,3}	Reinforcing Coat	Decorative Finish
StoTherm Classic M	Up to 18m (6 storeys maximum)	Expanded polystyrene board	Standard: 2 Layers Sto-Glass Fibre Reinforcing Mesh Ground floor and high impact areas: Outer layer: Sto-Glass Fibre Reinforcing Mesh Inner layer: Sto-Armour Mesh	PVC-u track system fixed to substrate with stainless steel screw fixings: Notes 1 and 5 Fire fixings: Note 2 and 5	6mm minimum StoArmat Classic applied in 2 x 3mm coats	2mm StoSilco/ StoSilco QS
StoTherm Vario M	Up to 45m (15 storeys maximum)	Expanded polystyrene board	Standard: 1 layer Sto-Shield mesh AES and an additional layer Sto-Glass Fibre Reinforcing Mesh placed in areas at risk of direct flame impingement Ground floor and high impact areas: Outer layer: Sto-Shield mesh AES ⁴ Inner layer: Sto-Armour Mesh	PVC-u track system fixed to substrate with stainless steel screw fixings: Notes 1 and 5 Fire fixings see Note 2 and 5	10mm minimum StoArmat Novo applied in 2 coats	Sto Primer (putzgrund) and 2mm StoSilco/ StoSilco QS or StoMiral Dry Dash (receiver & aggregate)
StoTherm Mineral M	Up to 45m (15 storeys maximum)	Mineral fibre board (MFB)	Standard: 1 layer Sto-Shield mesh AES in outer layer of Sto Armat Novo Ground floor and high impact areas: Outer layer: Sto-Shield mesh AES ⁴ Inner layer: Sto-Armour Mesh	PVC-u track system fixed to substrate with stainless steel screw fixings: Notes 1 and 5 Fire fixings see Note 2 and 5	10mm StoArmat Novo applied in 2 coats	Sto Primer (putzgrund) and 2mm StoSilco/ StoSilco QS

Notes:

- Insulation is rigidly supported in a aluminium/PVC framed system comprising
 - Sto aluminium horizontal starter track; 2.0m or Sto aluminium Flexicurve starter track; 2.5m to radius
 - PVC horizontal intermediate holding tracks; 2.5 m
 - PVC interlocking vertical T-splines; 494 mm
 - Sto plastic shims to align insulation (see CI 3.2 b)
 Starter tracks, horizontal tracks and vertical splines are fixed to masonry or concrete substrates using Sto specified stainless steel or screw set screws in accordance with Sto Ltd recommendations, based on on-site pullout tests. Maximum 300 centres
- Fixing of fire barriers:
 All mineral wool fire barriers are
 - a) adhesively fixed using StoLevell Uni adhesive and
 - b) mechanically fixed as follows:
 Horizontal fire barriers: Stainless steel mechanical fixings through first layer of mesh and into structural substrate at maximum 1 m centres
 Vertical fire barriers: Stainless steel mechanical fixings through first layer of mesh and into structural substrate at maximum 0.5 m centres See Figures 9 and 10.
- Services/Fittings: Secure supports to be provided for soil and rainwater pipe brackets, aerals, lighting, cameras, signage, etc in accordance with **Sto Ltd Specification and Method Statement** using Sto-Fix Rondelle, Sto-Fix Mini, Sto-Fix Midi or Sto-Fix Maxi as appropriate.
- Sto-Shield Mesh AES must be earthed to the building earth by a competent and qualified electrician. earth bonding shall be in accordance with Electro Technical Council of Ireland (ETCI) Regulations.
- The inclusion of mechanical fixings may introduce a cold bridge and may result in the appearance of light spots in the render finish. Where fixings are provided through the mesh, a 200mm x 200mm patch of mesh should be laid over the fixing location to ensure continuity of surface (See Figure 11). Positive fixings must be provided around all window and door openings to ensure adequate and robust edge restraint over the design life. For StoTherm M systems, tracks are fixed horizontally and vertically around openings, to provide this restraint.

Table 1: Product Range, Components and Fixing Requirements
Table 1a: StoTherm M Systems

Type	Storey Height	Insulation	Reinforcement	Fixings ^{1,2,3,4,5}	Reinforcing Coat	Decorative Finish
StoTherm Classic K	Up to 18m (6 storeys maximum)	Expanded polystyrene board	Standard: 2 Layers Sto-Glass Fibre Reinforcing Mesh Ground floor and high impact areas: Outer layer: Sto-Glass Fibre Reinforcing Mesh Inner layer: Sto-Armour Mesh	Adhesive: StoLevell Uni, and supplementary Mechanical fixings: Notes 1,4 and 5 Fire fixings: Notes 1, 4 and 5	6mm minimum StoArmat Classic applied in 2 x 3mm coats	2mm StoSilco/ StoSilco QS
StoTherm Vario K	Up to 45m (15 storeys maximum)	Expanded polystyrene board	Standard: 1 layer Sto-Shield mesh AES and an additional layer Sto-Glass Fibre Reinforcing Mesh placed in areas at risk of direct flame impingement Ground floor and high impact areas: Outer layer: Sto-Shield mesh AES ⁴ Inner layer: Sto-Armour Mesh	Adhesive: StoLevell Uni, and supplementary Mechanical fixings: Notes 2,4 and 5 Fire fixings: Notes 2, 4 and 5	10mm minimum StoArmat Novo applied in 2 coats	Sto Primer (putzgrund) and 2mm StoSilco/ StoSilco QS or StoMiral Dry Dash (receiver & aggregate)
StoTherm Mineral K	Up to 45m (15 storeys maximum)	Mineral fibre board (MFB)	Standard: 1 layer Sto-Shield mesh AES in outerlayer of Sto Armat Novo Ground floor and high impact areas: Outer layer: Sto-Shield mesh AES ⁷ Inner layer: Sto-Armour Mesh	Adhesive: StoLevell Uni, and Mechanical: Notes 3, 4 and 5 Fire fixings: Notes 3, 4 and 5	10mm minimum StoArmat Novo applied in 2 coats	Sto Primer (putzgrund) and 2mm StoSilco/ StoSilco QS

Notes:

- Mechanical fixings to be provided in accordance with the project specific design requirements based on pullout test results. Fixings to be StoThermowidel. Fixings to be recessed into and fixed through insulation, minimum rate of 4/m². One additional Sto thermally broken fire fixing to be provided per metre squared, through the inner layer of mesh. Fire fixings are not required in two storey single occupancy dwellings.
- Mechanical fixings to be provided in accordance with the project specific design requirements based on pullout test results. Fixings to be StoThermowidel. Fixings to be recessed into and fixed through insulation, minimum rate of 4/m². One additional Sto stainless steel fire fixing to be provided per metre squared, through the inner layer of mesh. Fire fixings are not required in two storey single occupancy dwellings.
- In addition to adhesively fixing with StoLevell Uni, all mineral fibre board is mechanically fixed. Mechanical fixings to be provided in accordance with the project specific design requirements based on pullout test results. Mechanical fixings to be StoThermowidel. For mineral fibre board, StoThermowidel fixings to be recessed into and fixed through insulation, minimum rate of 8/m². One additional Sto fire fixing to be provided per metre squared, through the inner layer of mesh. Below 18m fire fixing to be Sto thermally broken fire fixing. Above 18m fire fixing to be Sto approved stainless steel fire fixing. Fire fixings are not required in two storey single occupancy dwellings.
- Fixing of fire barriers:
All mineral wool fire barriers are
a) adhesively fixed using StoLevell Uni adhesive and
b) mechanically fixed as follows:
Horizontal fire barriers: Stainless steel mechanical fixings through first layer of mesh and into structural substrate at maximum 1 m centres. Vertical fire barriers: Stainless steel mechanical fixings through first layer of mesh and into structural substrate at maximum 0.5 m centres See Figures 9 and 10.
- The inclusion of mechanical fixings may introduce a cold bridge and may result in the appearance of light spots in the render finish. Where fixings are provided through the mesh, a 200mm x 200mm patch of mesh should be laid over the fixing location to ensure continuity of surface. See Figure 11. Positive fixings must be provided around all window and door openings to ensure adequate and robust edge restraint over the design life. See Figure 12.
- Services/Fittings: Secure supports to be provided for soil and rainwater pipe brackets, aerals, lighting, cameras, signage, etc in accordance with **Sto Ltd Specification and Method Statement** using Sto-Fix Rondelle, Sto-Fix Mini, Sto-Fix Midi or Sto-Fix Maxi as appropriate.
- Sto-Shield Mesh AES must be earthed to the building earth by a competent and qualified electrician. Earth bonding shall be in accordance with ETCI regulations.

Table 1b: StoTherm K Systems

Component	Description	Dimensions / Quantity	Container
Insulation			
EPS Expanded Polystyrene Board	Grade: SD/FRA. CFC/HCFC-free to IS EN 13163:2001 Thermal insulation products for buildings. Factory made products of expanded polystyrene.; Available in grey (Lambatherm) and white formats. Density 15kg/m³ or 19kg/m³	1000mm x 500mm (for K System) 500mm x 500mm (for M system) Thickness: 50 mm to 150mm Other sizes available on request.	Polythene shrink wrapped package
MFB Mineral Fibre Board	CFC/HCFC-free to IS EN 13162:2001 Thermal insulation products for buildings. Factory made mineral wool (MW) products. Specification ; Density 140 kg/m³ – where dual density product is used for the K systems, the average density is 140kg/m³. Minimum compressive strength 20kNm ⁻² @ 10% compression Contains phenolic resin binder and mineral oil water repellent.	1000mm x 500mm (for K System) 500mm x 500mm (for M system) Thickness: 60mm to 150mm Other sizes available on request.	Polythene shrink wrapped package
MFL Mineral Fibre Lamella	CFC/HCFC-free to IS EN 13162:2001 Thermal insulation products for buildings. Factory made mineral wool (MW) products. Specification Density 95 kg/m³ Minimum compressive strength 20kNm ⁻² @ 10% compression Contains phenolic resin binder and mineral oil water repellent.	1000mm x 200mm Thickness: 40mm to 150mm Other sizes available on request.	Polythene shrink wrapped package
Meshcloth			
Sto-Glass Fibre Reinforcing mesh	Symmetrical interlaced glass fibre made from twisted multi-end strands, styrene butadiene coated to provide a high resistance to alkali attack ; Weight 160 g/m²	Mesh dimension: 3.5mm x 3.5mm Roll size: 1 m x 50 m	Roll
Sto-Armor Mesh	heavy duty, double strand, interwoven glass fibre mesh styrene butadiene coated; Weight 480 g/m²	Mesh dimension: 6 mm x 6 mm Roll size:1 m x 25 m	
Sto-Shield mesh AES	Alkali resistant glass-fibre mesh with carbon coating and stainless steel wire inserts. Must be earthed to building earth by competent person in accordance with ETCI regulations; Weight 180 g/m²	Mesh dimension: 5mm x 5mm Roll size 1 m x 50 m Density 180g/m²	
Substrate Preparation			
	Depending upon specific site conditions, there may be a requirement for additional surface pre-treatment(s). Below is a list of pre-treatment options. Please consult Sto Ltd for confirmation of suitability. StoPrim Fungal: fungicidal wash, where algae or fungus are present. StoPrim Micro: a deep penetrating siloxane based primer, which forms a water-repellent layer in the substrate and reduces the absorbency of porous surfaces and aids surface consolidation. StoPrep Contact : an acrylic based adhesion intermediary for siliconised bricks, ceramic tiles or other low absorbency backgrounds. StoPlex W: An acrylate based, siloxane enhanced primer for treatment of cement particle boards. StoPlex W: An acrylate based, siloxane enhanced primer for treatment of cement particle boards, OSB and plywood. StoPrim Isol: polymer resin based isolating primer for isolation of lignin based stains. StoPrim Isol Q: A polymer resin based isolating primer for isolation of lignin based stains, supplied with added quartz sand for improved keying of subsequent coats. Sto Flexyl: A Cementitious dispersion primer and leveller for priming the substrate below DPC before adhering Sto UHD EPS insulation. StoPrim Activ – A two-part solvent-based epoxy adhesion primer for use on metal and some board substrates, for subsequent application of paint coatings.		
Reinforcing coat			
StoArmat Classic	Cement-free, fibre reinforced acrylic reinforcing coat 6mm thick. A low temperature version (QS) is available for use down to 1°C.	Coverage 3.5kg/m² for 3mm thickness	23 kg pail
StoArmat Novo	Polymer-cement based reinforcing coat, 10mm thick.	Coverage 8-10kg/m² (approx)	20 Kg bags
Primer / Synthetic Finishes			
Sto Primer (Putzgrund)	A water based alkali resistant primer for use on mineral substrates prior to application of finish render. A low temperature version (QS) is available for use down to 1°C.	coverage 0.3kg/m² per coat	23 kg pail
StoSilco	Cement free silicone resin render	Coverage 2.4 to 4.5kg/m² depending on texture size	25 kg pail

Table 2: Component Specifications and Supply Details

Component	Description	Dimensions / Quantity
Sto Filler Foam	Sto Filler Foam SE: Polyurethane filler foam for board joints up to 5mm, for use with insulation stated in Table 2.	Aerosol can
Track system	Sto aluminium horizontal starter track; Sto-Aluminium Flexicurve starter track; PVC intermediate holding tracks; PVC interlocking vertical splines;	2.0 m 2.5 m to radius 2.5 m 494 mm
Sto Ltd profiles	Range of standard profiles include: Sto PVC Mesh Angle Beads Sto Armour Angle Sto Movement Joint Bead Type 'E' Sto Movement Joint Bead Type 'V' Sto Drip Edge Bead	2.5 – 3.0 m lengths
Sto Ltd profile fixings	A range of fixings is available to suit insulation thickness and substrate type, including stainless steel screws, polypropylene plug type with steel expansion pins, and integral plastic expansion sleeve with mushroom heads and steel screw/pin insert Fixings are specified on a project specific basis, based on pullout strength tests and loading calculations. Where non-stainless steel fixings are used, they must be completely protected in an integral plastic plug and end cap.	Varies
Sto Ltd Sealants	Sto Seal tape: compressible waterproofing sealing tape to BS 6093: 2006 <i>Design of joints and jointing in building construction. Guide Table 1.</i> Sto approved sealant to be one-part Low Modulus Modified Polymer Sealants, Class F 25LM to IS EN ISO 11600:2003+A1:2011 <i>Building Construction - Jointing Products - Classification and Requirements for Sealant</i> , have 20-25 year life expectancy, be compatible with STO systems and to be installed in accordance with the requirements of BS 6093:2006+A1:2013 <i>Design of joints and jointing in building construction. Guide.</i>	Varies
Fixing into / through system	Sto-Fix Rondelle 10 mm deep x 90 mm diameter recessed fixing plate for the secure attachment of lightweight items (number/name plates, switch boxes etc)	
	Sto-Fix Mini ND 98mm x 98 mm and Sto-Fix Midi ND 98mm x 138 mm mounting blocks manufactured from rigid EPS foam for fixing light fittings, pipe clips and other light to medium weight objects. Not suitable as a compression underlay for heavy weight items.	
	Sto-Fix Maxi HD 198mm x 198mm Rigid Polyurethane foam blocks, compressive strength 2.3 N/mm ² , used as compression underlay for fixing heavy items through insulation to structural substrate. Used to prevent compression of insulation	
	Sto-Fix Spiral ID 60 – a post-completion component for fixing of lightweight items such as some pipe clips, security lights, signage, etc. Maximum load: 5Kg. NOTE: Sto-Fix Spiral fixings are suitable only for use in StoTherm Classic systems. Sto-Fix Spiral fixings are not suitable for use in StoTherm Mineral systems.	

Table 3: Ancillary Items

2.4.3 Site Survey and Preliminary Work

A comprehensive pre-installation survey of the property shall be carried out and recorded to confirm suitability of substrate for application, modifications/repairs necessary, pullout resistance of proposed mechanical fixings etc. Internal wet work e.g. screeding or plastering, should be completed and allowed to dry, prior to system application.

Substrate preparation to be in accordance with Sto Ltd *Specification & Method Statement*.

2.4.4 Procedure

- Base beads and all full system beads are fixed as specified.
- Adhesive, frame, insulation and render only beads are fixed as specified in the Sto Ltd *Specification & Method Statement*.
- Reinforcing coat is mixed and applied, mesh is laid and a further application of reinforcing coat (and mesh if appropriate) is applied to achieve the appropriate thickness (see Table 1).
- Primer is applied to cement based reinforcing coats prior to the application of the selected textured finish.
- Mechanical fixings are provided in accordance with the project specific design requirements based on pullout test results (see Table 2).
- Renderers (adhesives, base coats, primers, finish coats) must not be applied if the temperature is below 5°C or above 25°C at

the time of application. In addition, cementitious-based renders must not be applied if the temperature will be below 0°C at any time during 72 hours after application, and cement-free, synthetic-resin, silicone-resin and silicate renders must not be applied if the temperature will be below 5°C at any time during 72 hours after application. StoSilco QS can be used at temperatures above 1°C where the finished elevations are conditioned with external heat source and protective sheeting as per the Sto Installation Manual.

- Application of the reinforcing coat and finishes should be carried out within the permitted temperature range and should be protected from rapid drying.
- A dash finish may be applied to StoMiral Dry Dash Receiver. The coating must be at least 6mm thick, with the 6mm to 8mm aggregate applied immediately after application, while the coating is still soft. On completion, the surface must be checked to ensure an even coverage of spar dash has been received. Where necessary, the aggregate should be lightly tamped to ensure a good bond.
- All rendering should follow best practice guidelines e.g. BS 8000-0:2014 *Workmanship on construction sites – Introduction and general principles* and IS EN 13914-1:2016 *Design, preparation and application of external rendering and internal plastering – Part 1: External rendering*.

- Movement joints shall be provided in accordance with the *Specification & Method Statement* (see Figure 8). For mineral based reinforcing coats, the recommended panel size is 45m² with an aspect ratio of no less than 4:1. For organic based reinforcing coats, panel size is determined by the applicator's management of the project and the location of building movement joints.
- Sealants to be installed in accordance with BS 8000-16:1997 *Workmanship on building sites – Code of practice for sealing joints in buildings* by approved installers.
- Window and door reveals must be insulated to minimise the effects of cold bridging in accordance with the recommendations of the Acceptable Construction Details Document published by the DoEHLG, Detail 2.21, to achieve an R-value of 0.6m²K/W.
- At all locations where there is a risk of insulant exposure, e.g. window reveals, eaves or stepped gables, the system must be protected, e.g. by an adequate overhang or by purpose made sub-sills, seals or flashings (see Figure 5, 6, 7, 13 and 14).
- Care must be taken in the detailing of the system around openings and projections.
- On completion of the installation, external fittings, rainwater goods etc. are fixed through the system into the structure, in accordance with the Certificate holder's recommendations.

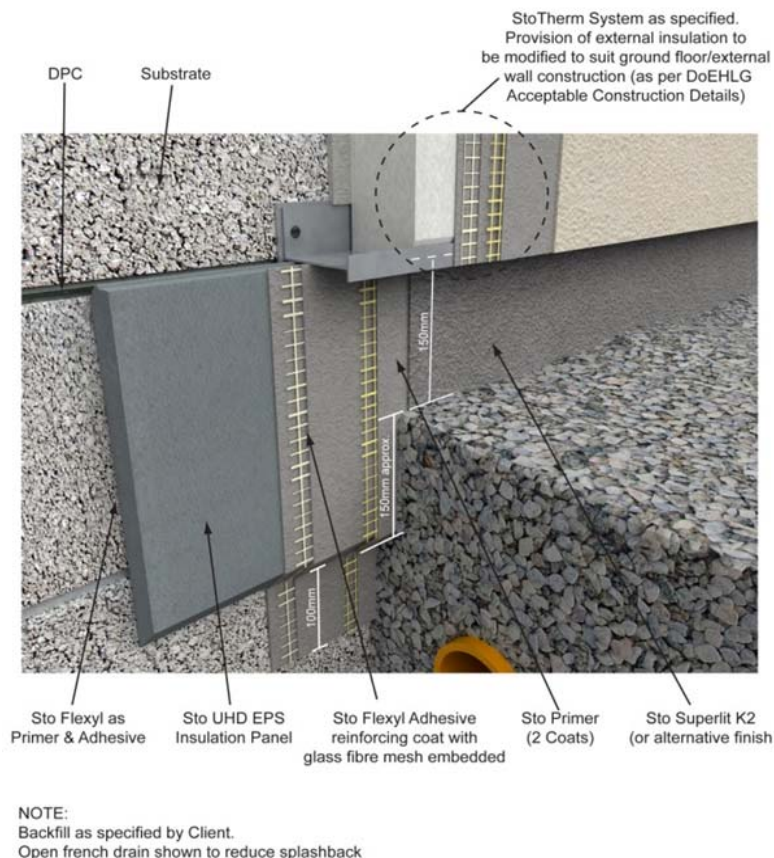


Figure 3: Typical Detail – Insulated Base

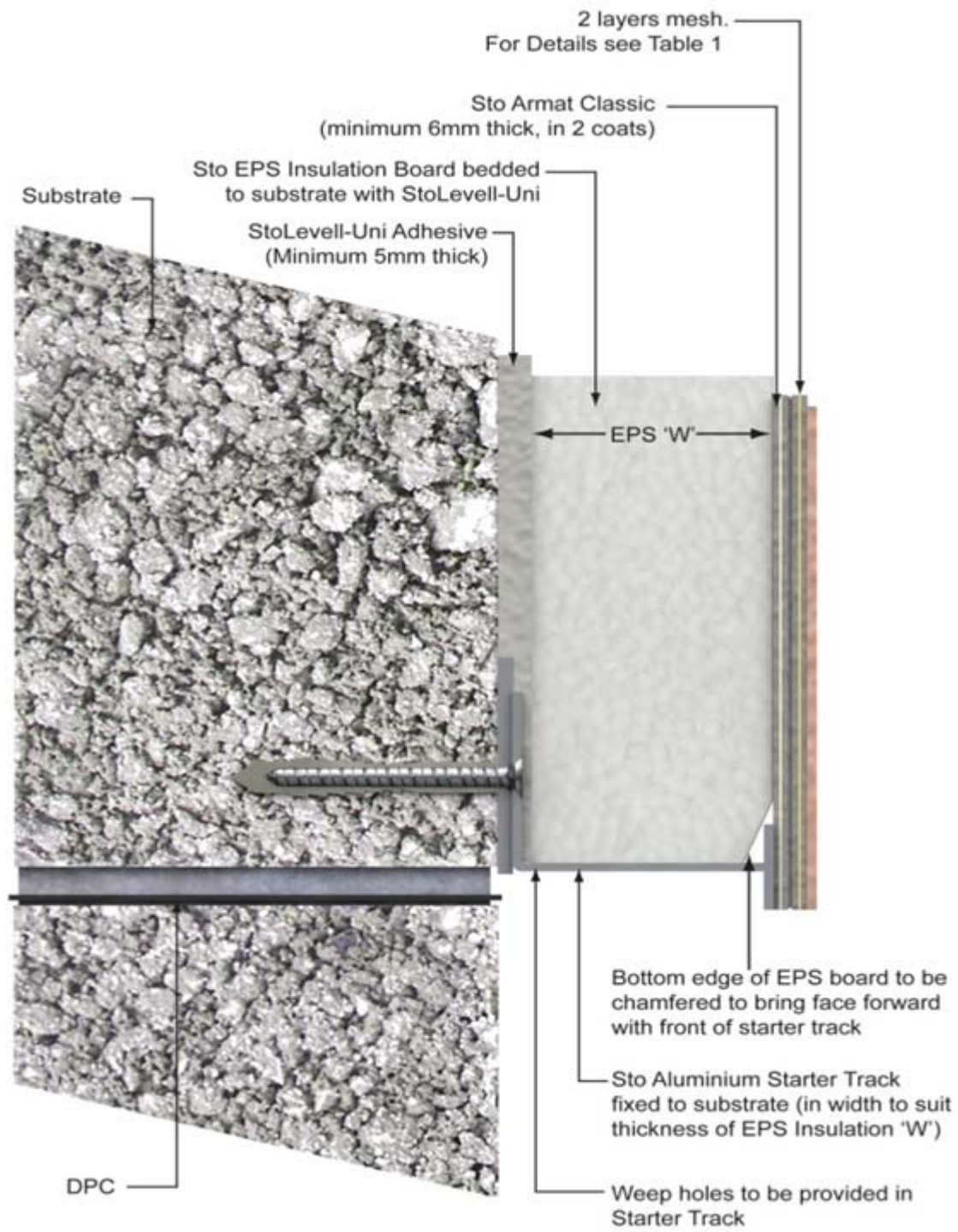


Figure 4: Typical Detail – StoTherm Classic K – Aluminium Starter Track

Window Unit and cill to be compatible so as to provided a fully sealed, flush finished joint at interface. Other cill/window interface options must achieve an equivalent standard of sealing, fixity and movement accommodation at the cill/window frame interface and the cill/reveal interface, as the detail shown here. Cill upstand should not interfere with window drainage.

Sto Sill Profile with stop ends, where stop end extends more than 75mm beyond reveal, upstand is not required. Cill have to have minimum fall of 10 degrees.

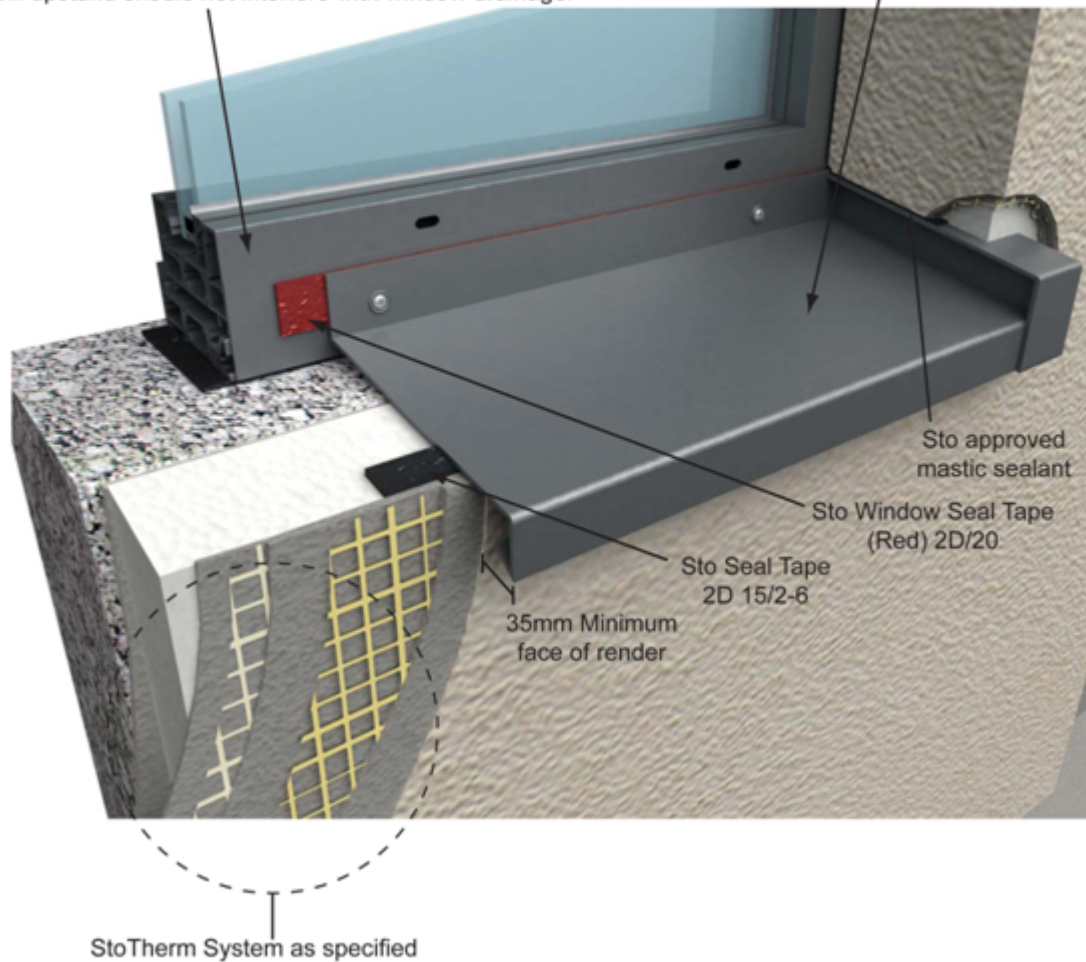


Figure 5: Typical Detail – Sill with Stop End

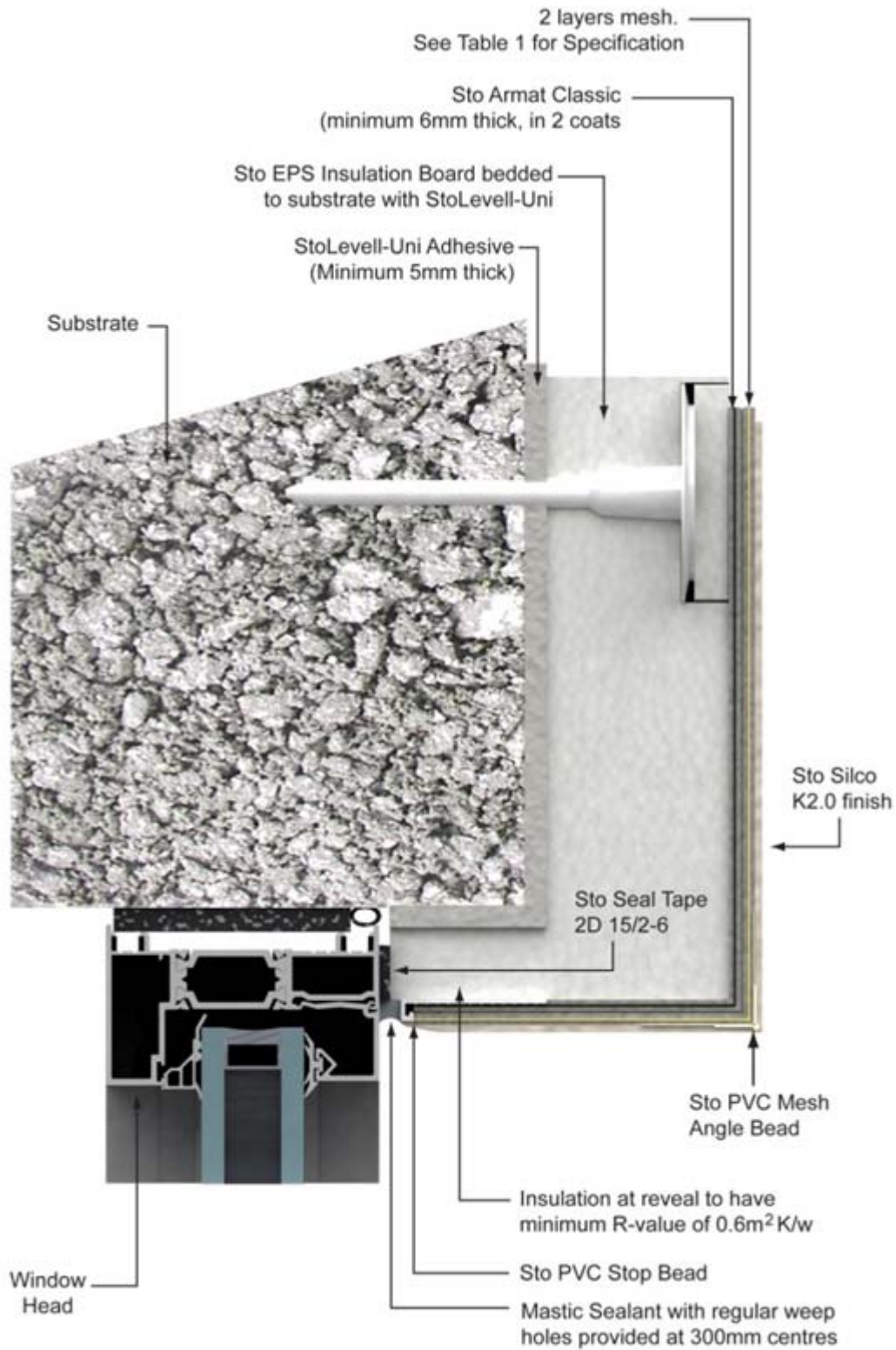


Figure 6: Typical Detail –StoTherm Classic K – Window Head

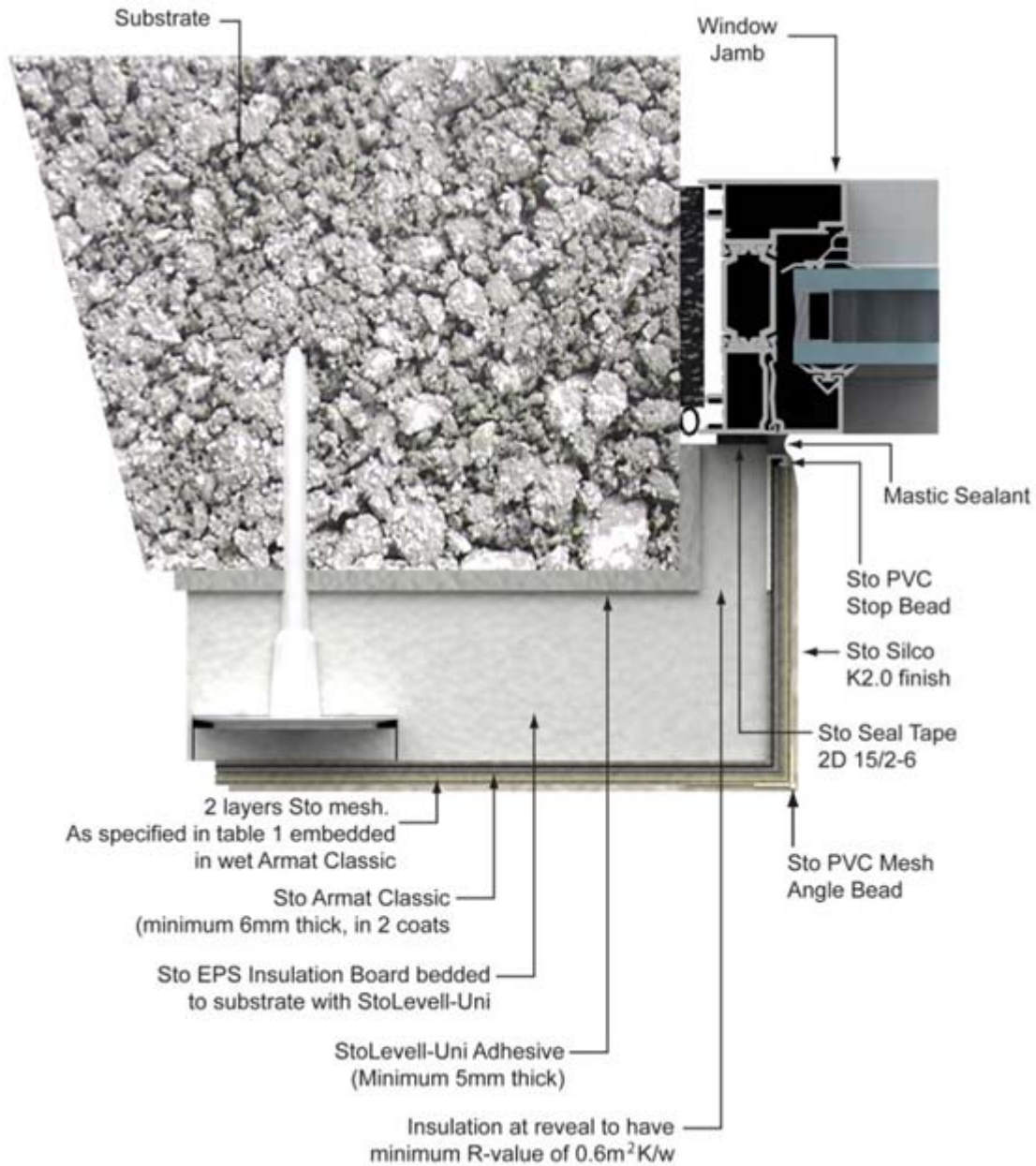


Figure 7: Typical Detail – StoTherm Classic K – Window Reveal

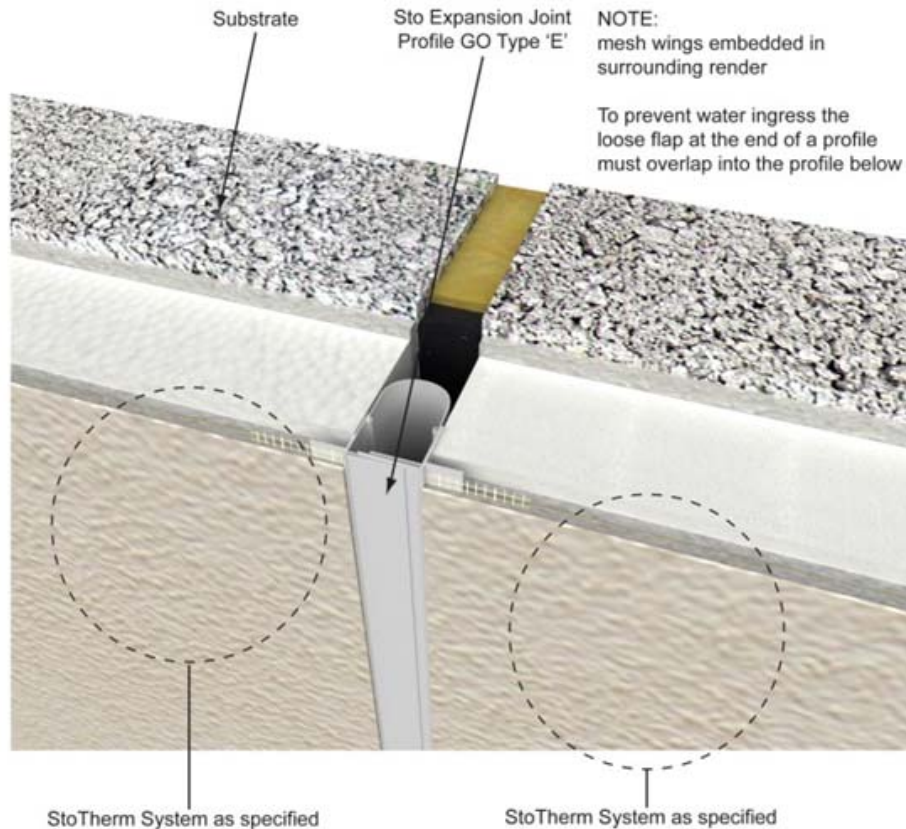
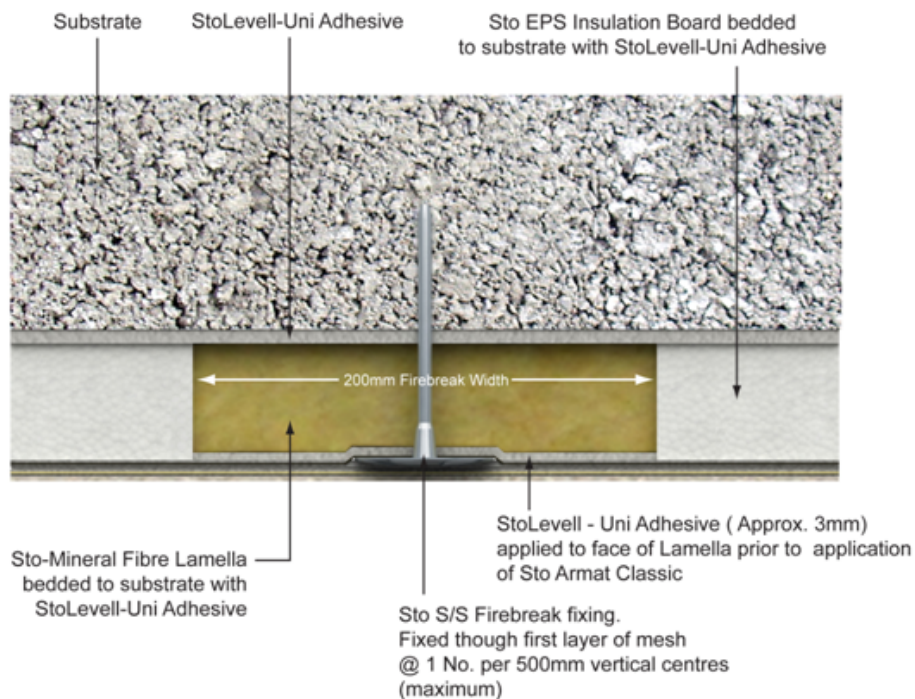


Figure 8: Typical Detail – Vertical Expansion Joint



NOTE:
Lamella to be fully bonded over entire firebreak width with StoLevell-Uni Adhesive. Minimum vertical overlap at fire break to be 100mm. EPS boards either side of firebreak should be cut to maintain break bond pattern with overlap of 100mm.

Figure 9: Typical Detail – StoTherm Classic K – Vertical Fire Barrier

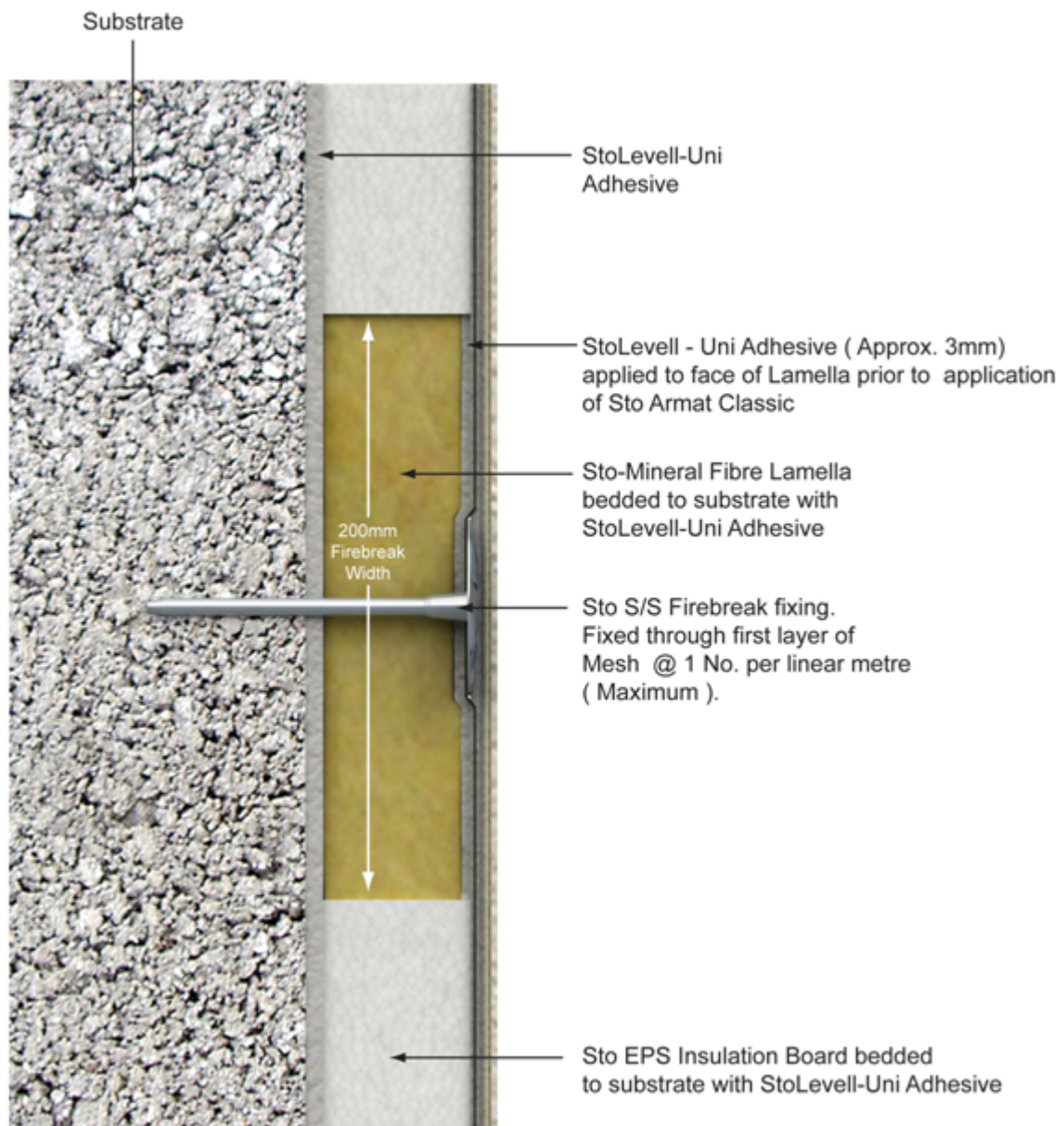
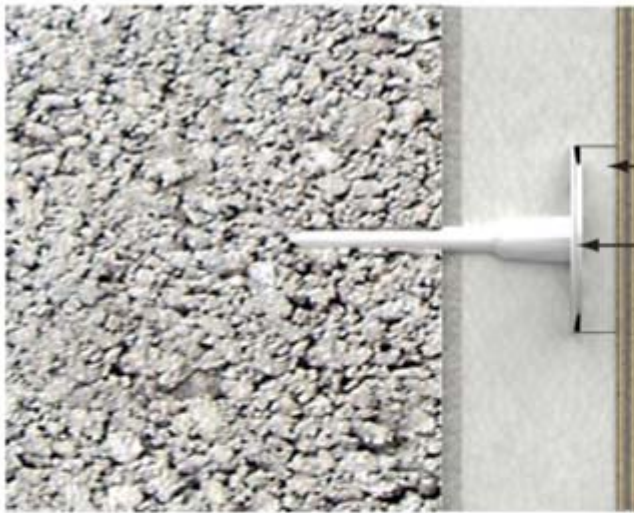


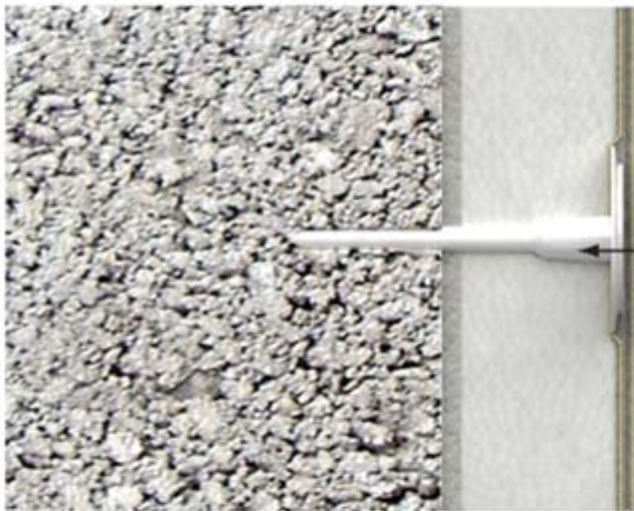
Figure 10: Typical Detail – StoTherm Classic K – Horizontal Fire Barrier



Sto Thermodowel Detail @ 4 per M²

Sto Thermodowel cap (ETA) Ø60mm
Article No. 00931-001

Sto Thermodowel (ETA) 8/60



Sto Thermally broken dowel fixing Detail :
@ 1 per M²

Sto Thermally broken dowel fixing.
Fixed through first layer of Mesh.
See Table 1



Sto stainless steel fire fixing Detail :
@ 1 per M²

Sto stainless steel fire fixing to be
fixed through first layer of mesh.
See Table 1

Figure 11: Typical Detail – StoTherm Classic K – Dowel Positions

-  Sto Thermodowel between positions - minimum $4/M^2$
-  Supplementary dowel positions around Window Aperture
-  Sto Thermally broken dowel fixing through first layer of Sto Glass Fibre Mesh

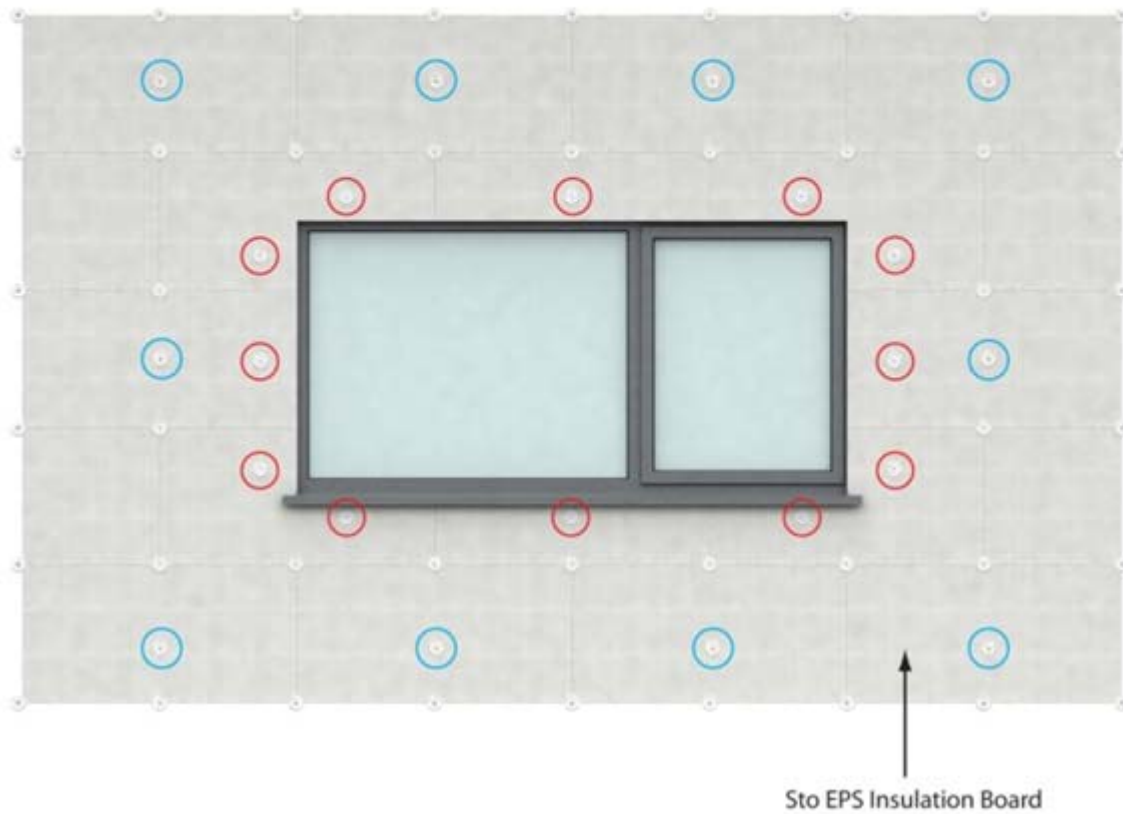


Figure 12: Typical Detail – StoTherm Classic K – Supplementary Dowel Positions at Openings

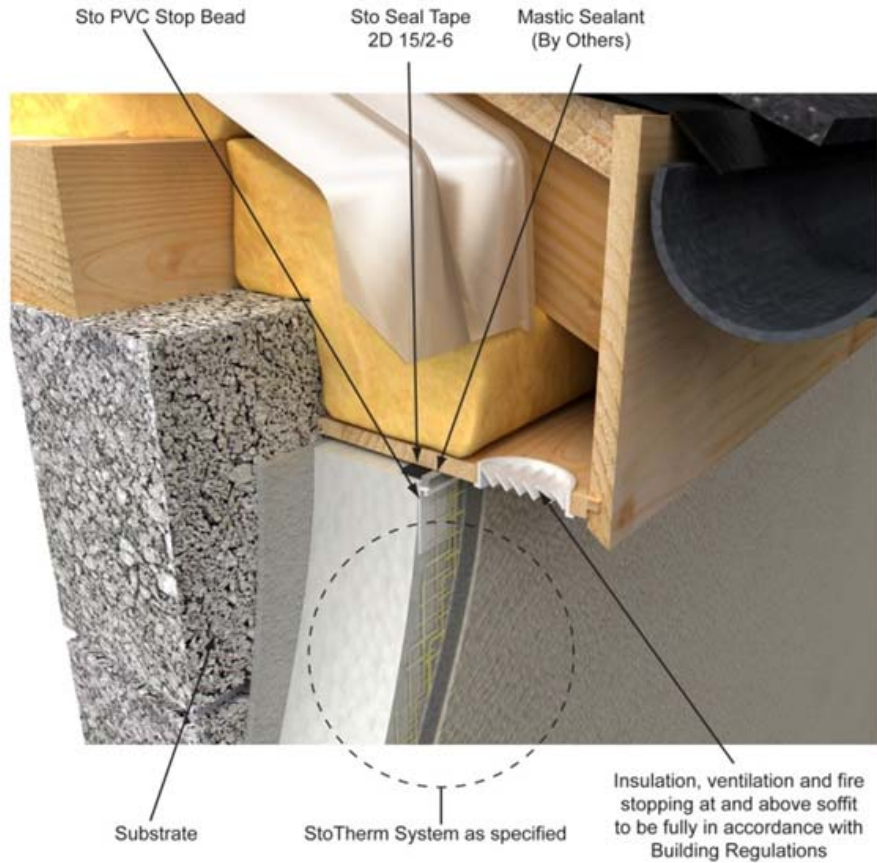


Figure 13: Typical Detail – Eaves

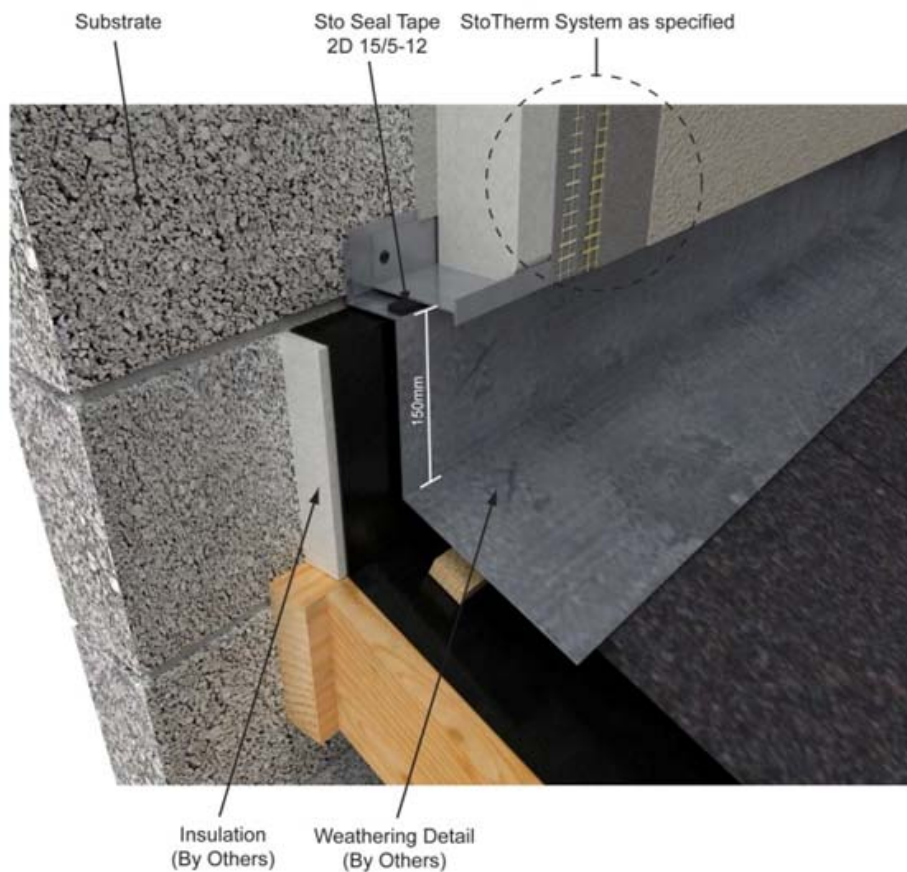


Figure 14: Typical Detail – Stepped Gable

3. GENERAL

The system is designed by Sto Ltd on a project specific basis in accordance with the approved design process.

The design will include for:

- a) The completion and recording of a site survey.
- b) Evaluation and preparation of substrate.
- c) Minimising risk of condensation in accordance with recommendations of BS 5250:2011+A1:2016 *Code of practice for control of condensation in buildings*. This includes the use of approved Sto Ltd detailing incorporating the requirements of SR 54:2014 *Code of practice for the energy efficient retrofit of dwellings* and, where possible, meeting all of the Acceptable Construction Details published by the DHPLG.
- d) Thermal insulation provision to Part L of the Building Regulations 1997 to 2017.
- e) Resistance to impact and abrasion.
- f) Resistance to thermal stresses.
- g) Resistance to wind loading.
- h) Design of fixings to withstand design wind loadings, using a safety factor of three for mechanical fixings and a safety factor of nine for adhesive. In addition, fixings around window and door openings shall be at a maximum of 400mm centres in each board or section of board so as to provide positive and robust restraint over the life of the system.
- i) The design for wind loading on buildings greater than two stories should be checked by a chartered engineer in accordance with I.S. EN 1991-1-4:2005 *Eurocode 1 – Actions on structures – General actions – Wind actions*.
- j) Design for fire resistance, fire spread and fire stopping.
- k) Design of a water management system to prevent ingress of water at movement joints, windows, doors, openings for services etc. For sealing requirements see Table 4. Particular attention is required to ensure that window and sill design are coordinated to achieve a fully integrated design (see Figure 5).
- l) Movement joints.
- m) A site specific maintenance programme for inclusion in the *Building Owner's Manual*.
- n) Durability requirements.

Sto Ltd generates U value calculations for each project to meet the clients requirements and the Building Regulations 1997 to 2017.

Where the mechanical rail system is specified, Sto Ltd requires a minimum 3mm gap behind the insulation/rail on the high points of the substrate such that the average gap is kept to a minimum. The U value calculations will include for this air gap, unless the project requires a deeper cavity to meet customer requirements. In such cases, Sto Ltd will increase the thickness of insulation to achieve the required U value.

Where there are localised problem areas, e.g. a severely undulating background, Sto Ltd specifies that the maximum gap behind the rail shall not exceed 50mm. Each situation shall be considered on a case by case basis. A gap of this magnitude is not acceptable over any significant area.

Detailing and construction must be to a high standard to prevent the ingress of water and to achieve the design thermal performance. Windows should be designed so that where possible they can be removed and replaced from within the building.

Adequate provision should be made at a design and installation stage for release of trapped moisture, e.g. above window heads. Seals to windows and doors shall be provided in accordance with Table 4 (see Figure 5, 6 and 7).

When designed and installed in accordance with this Certificate, the systems will satisfy the requirements of TGD to Part L of the Building Regulations 1997 to 2017. The design shall include for the elimination of cold bridging at window and door reveals, eaves and at ground floor level in compliance with the Acceptable Construction Details published by the DHPLG.

Care should be taken to ensure that any ventilation or drainage openings are not obstructed.

In areas where electric cables can come into contact with EPS, in accordance with good practice all PVC sheathed cables should be run through ducting or be re-routed.

Building Storey Height	Maximum height above ground level	Window sealing requirements
Up to and including 15 storeys	45 metres	PVC adhesive trim and either a concealed sealant or compressible foam seal <i>and</i> Stop end or equivalent eg profiled trough type sub-cill (A mastic sealant will not suffice).

Table 4: Height of building – Window weatherproofing requirements

4.1 STRENGTH AND STABILITY

4.1.1 Wind Loading

The StoTherm External Wall Insulation Systems can be designed to withstand the wind pressures (including suction) and thermal stresses in accordance with the Building Regulations 1997 to 2017. The design for wind loading on buildings greater than two stories should be checked by a chartered engineer in accordance with I.S. EN 1991-1-4:2005. A general factor of safety of 1.5 is applied to design wind loads.

4.1.2 Impact Resistance

- a) The systems described in Table 1 have been classified as defined in Table 5 to be suitable for use as defined in TAG 004 Cl 6.1.3.3 Table 8, as follows:

Category I: A zone readily accessible at ground level to the public and vulnerable to hard impacts but not subject to abnormally rough use. There are no restrictions on the use of Category I systems.

Category II: A zone liable to impacts from thrown or kicked objects, but in public locations where the height of the system will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care. Category II excludes use on wall at ground level adjacent to a public footpath, but includes use on properties with their own private walled-in garden.

Category III: A zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects. Category III is taken to exclude the use on any wall at ground level.

Note: The above classifications do not include acts of vandalism.

In an Irish context, Category II excludes any wall at ground level adjacent to a public footpath but includes on with its own private, walled-in garden. Category III excludes all walls at ground level.

- b) The design should include for preventing damage from impact by motor vehicles or other machinery. Preventative measures such as provision of protective barriers or kerbs should be considered.

4.2 BEHAVIOUR IN RELATION TO FIRE

The external surfaces of the system are classified as Class O or B-s1, d0 as per Clause A12 of TGD to Part B of the Building Regulations 1997 to 2017.

Systems that achieve a Class B Reaction to Fire Classification are suitable for use up to a maximum of six storeys (18m) in height on purpose groups 1(a), 1(c), 2(a), 2(b), 3, 4(a) and 4(b), and for use up to a maximum of five storeys (15m) in height on purpose group 1(b), as defined in TGD to Part B of the Building Regulations 1997 to 2017.

The mineral wool board is classified as non-combustible as per Table A8(d) of TGD to Part B of the Building Regulations 1997 to 2017.

With regard to fire stopping of cavities and limitations on use of combustible materials, walls must comply with Sections B3.2, B3.3 and B4 of TGD to Part B of the Building Regulations 1997 to 2017.

Fire fixings to be provided in accordance with Table 1. The fixing design should take account of the extra duty required under fire conditions.

Vertical and horizontal fire barriers shall be provided at each compartment floor and wall, including the second floor level of a three-storey single occupancy house (see Diagram 12 of TGD to Part B Volume 2 of the Building Regulations 1997 to 2017). Maximum separation between horizontal fire breaks to be 4m (see Figure 9, 10 and 11). Firebreaks should be adhesively bonded to the substrate and mechanically fixed with stainless steel fire fixings at maximum 500mm centres (vertical) and 1000mm centres (horizontal).

The fire barrier shall be of non-combustible material, i.e. stone mineral wool slab of minimum density 120kg/m³, be at least 200mm high, continuous and unbroken for the full perimeter of the building and for the full thickness of the insulation. Glass wool is not suitable for use as a firestop.

4.3 PROXIMITY OF HEAT PRODUCING APPLIANCES

Combustible material must be separated from a brick or blockwork chimney by at least 200mm from a flue, or 40mm from the outer surface of the brick or blockwork chimney, in accordance with Clause 2.15 of TGD to Part J of the Building Regulations 1997 to 2017. Metal fixings in contact with combustible materials should be at least 50mm from a flue.

4.4 THERMAL INSULATION

Assessments were carried out to verify that the requirements of Part L of the Building Regulations 1997 to 2017 can be achieved using the StoTherm External Wall Insulation Systems. The manufacturers' declared thermal conductivity values ($\lambda_{90/90}$) taken from their CE marking Declarations of Performance are 0.038W/mK for the standard white EPS board, and 0.036W/mK for the mineral wool board. These have not been assessed by NSAI Agrément.

When the system is to be applied to a masonry cavity wall, consideration should be given to the treatment of the ventilated cavity. In order to ensure the thermal effectiveness of the external insulation system, it is critical to eliminate airflow within the cavity void. It is essential to seal the cavity to achieve an unventilated air layer. This eliminates heat losses due to airflow within the cavity circumventing the ETIC system. Best practice is to fill the cavity void with an NSAI Agrément approved Cavity Wall Insulation (CWI) system. Ventilation to the building must be maintained in accordance with the requirements of TGD to Part F of the Building Regulations 1997 to 2017.

4.4.1 Limiting Thermal Bridging

The linear thermal transmittance (ψ) or Psi describes the heat loss associated with junctions and around openings. Window and door reveal

design used on the StoTherm External Wall Insulation Systems have been assessed and when detailed in accordance with this Certificate, can meet the requirements of Table D1 of Appendix D of TGD to Part L of the Building Regulations 1997 to 2017.

When all bridged junctions within a building comply with the requirements of this table, the improved 'y' factor of 0.08 can be entered into the DEAP Building Energy Rating calculation. Alternatively if all junctions can be shown to be equivalent or better than the DoEHLG publication *Limiting Thermal Bridging & Air Infiltration – Acceptable Construction Details*, then the improved 'y' factor of 0.08 can be used, i.e. R value = 0.6m²K/W for window/door reveals.

Where either of the above options are shown to be valid, this information should be recorded on the 'Certificate of Compliance' for that project for use in future BER calculations.

' ψ ' values for other junctions outside the scope of this Certificate should be assessed in accordance with the BRE IP1/06 *Assessing the effects of thermal bridging at junctions and around openings*, and BRE report BR 497 *Conventions for calculating linear thermal transmittance and temperature factors*, in accordance with Appendix D of TGD to Part L of the Building Regulations 1997 to 2017.

4.5 CONDENSATION RISK

Areas where there is a significant risk of interstitial condensation due to high levels of humidity should be identified during the initial site survey e.g. bathrooms and kitchens. Condensation risk analysis will be carried out by Sto Ltd in accordance with BS 5250:2011+A1:2016, and the design modified as appropriate to reduce the risk of surface condensation to acceptable levels.

4.5.1 Internal Surface Condensation

When improving the thermal performance of the external envelope of a building through external wall insulation, designers need to consider the impact of these improvements on untouched elements of the building. As discussed in Section 4.4.1 of this Certificate, thermally bridged sections of the envelope such as window jambs, sills and eaves will experience a lower level of increased thermal performance. The degree of improvement to these junctions can be limited due to physical restrictions on site i.e. footpaths, soffit boards or hinges for windows.

When bridged junctions meet the requirements of Appendix D Table D1 of TGD to Part L of the Building Regulations 1997 to 2017, the coldest internal surface temperature will satisfy the requirements of Section D2, namely that the temperature factor shall be equal to or greater

than 0.75. As a result, best practice will have to be adopted in order to limit the risk of internal surface condensation which can result in dampness and mould growth.

When site limiting factors give rise to substandard levels of insulation at bridged junctions, guidance should be sought from the Certificate holder as to acceptable minimum requirements.

4.5.2 Interstitial Condensation

An interstitial condensation risk analysis will be carried out by Sto Ltd in accordance with BS BS 5250:2011+A1:2016 and the design modified as appropriate to reduce the risk of surface condensation to acceptable levels.

4.5.3 Ventilation

When installing the external insulation system, the works to be undertaken must not compromise the existing ventilation provisions in the home. When these existing ventilation provisions do not meet the requirements of Part F of the Building Regulations 1997 to 2017, the homeowner should be informed and remedial action should be taken before the external insulation system is installed.

4.6 MAINTENANCE

Adequate provision should be made, in the initial design phase, for access for inspection and maintenance over the life of the system.

The system shall be inspected and maintained in accordance with the Certificate holder's instructions, as detailed in the Sto Ltd *Repair and Maintenance Method Statement*, which is incorporated into the *Building Owner's Manual*. Repairs should be carried out in accordance with the Sto Ltd method statement for inspection and repair. Repairs to plumbing etc should also be carried out as required to prevent deterioration or damage, and to protect the integrity of the system.

Synthetic finishes may be subject to aesthetic deterioration due to exposure to UV light. They should be re-painted as necessary to maintain appearance. Care should be taken to ensure that the paint used is compatible with the original system and that the water vapour transmission or fire characteristics are not adversely affected (see also Section 4.8.2).

Sealants shall be subject to regular inspection (at least annually). They should be replaced as required and fully replaced every 18 to 20 years to maintain performance.

4.7 WEATHERTIGHTNESS

When designed and detailed in accordance with this Certificate, the system will prevent moisture

from the ground coming in contact with the insulation.

The external render has adequate resistance to water penetration when applied in accordance with the Certificate holder's instructions.

Joint designs and sealant specifications were assessed and are considered adequate to ensure that water penetration will not occur, assuming that regular maintenance is carried out in accordance with the Certificate holder's instructions.

Recommendations for detailing at windows and doors have been assessed and are considered adequate to ensure that water penetration will not occur, assuming that regular maintenance is carried out in accordance with the Certificate holder's instructions.

4.8 DURABILITY

4.8.1 Design Life

An assessment of the life of the system was carried out. This included an assessment of:

- Design and installation controls;
- Proposed building heights;
- Render thickness and specification;
- Material specifications, including insulant, mesh, beading and fixings specifications;
- Joint design;
- Construction details;
- Maintenance requirements;
- Accelerated aging test data.

The assessment indicates that the system should remain effective for at least 60 years, providing that it is designed, installed and maintained in accordance with this Certificate. Any damage to the surface finish shall be repaired immediately and regular maintenance shall be undertaken as outlined in Section 4.6 of this Certificate.

Beadings and nosings shall be as shown in building details. The use of exposed plastic beads/nosings for weathering purposes is not permitted.

4.8.2 Aesthetic Performance

As with traditional renders, the aesthetic performance of the systems, e.g. due to discolouration, soiling, staining, algal growth or lime bloom, is dependent on a range of factors such as:

- Type, colour and texture of surface finish;
- Water retaining properties of the finish;
- Architectural form and detailing;
- Building orientation/elevation;
- Local climate / exposure conditions / atmospheric pollution

Adequate consideration should be given at the design stage to all of the above to ensure that the level of maintenance necessary to preserve the aesthetics of the building is acceptable.

4.9 PRACTICABILITY

The practicability of construction and the adequacy of site supervision arrangements were assessed and considered adequate. The project specific designs and method statements for application, inspection and repair were reviewed.

4.10 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING

- Structural strength and stability.
- Behaviour in relation to fire.
- Impact resistance.
- Pull-out resistance of fixings.
- Thermal resistance.
- Condensation risk.
- Site erection controls.
- Durability of components.
- Dimensional stability of insulants.

4.11 OTHER INVESTIGATIONS

- (i) Existing data on product properties in relation for fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Special building details (e.g. ground level, window and door openings and movement joints) were assessed and approved for use in conjunction with this Certificate.
- (iv) Site visits were conducted to assess the practicability of installation the history of performance in use of the product.

System	Base	Finish	Sto-Glass Fibre Reinforcing Mesh	Sto-Shield AES Mesh	Sto-Armor Mesh + Sto-Glass Fibre Reinforcing Mesh
StoTherm Classic	StoArmat Classic	StoLit or StoSilco	II	-	I
StoTherm Mineral	StoLevell Uni	StoSilco	II	II	I
StoTherm Vario	StoArmat Novo	StoSilco	II	II	I

Table 5: Impact Resistance

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:

- (a) the specification of the product is unchanged.
- (b) the Building Regulations 1997 to 2017 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
- (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
- (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
- (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
- (f) the registration and/or surveillance fees due to NSAI Agrément are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number and must remove them from the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to;

- (a) the absence or presence of patent rights subsisting in the product/process; or
- (b) the legal right of the Certificate holder to market, install or maintain the product/process; or
- (c) whether individual products have been manufactured or installed by the Certificate

holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

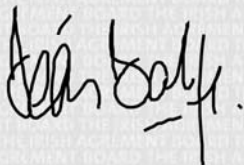
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

NSAI Agrément

This Certificate No. **09/0331** is accordingly granted by the NSAI to **Sto Ltd.** on behalf of NSAI Agrément.

Date of Issue: **March 2009**

Signed



Seán Balfe
Director of NSAI Agrément

Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément, NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie

Revisions: August 2009

August 2009: Amendment to Figure 5.

11th January 2018: References to Building Regulations and standards updated.



StoTherm Retrofit External Wall Insulation Systems

PRODUCT DESCRIPTION

This Detail Sheet relates to the StoTherm Retrofit External Wall Insulation Systems, as defined in NSAI Agrément Certificate 09/0331. This Detail Sheet must be read in conjunction with NSAI Agrément Certificate 09/0331, which gives the system's position regarding the Building Regulations and the Conditions of Certification.

USE:

The systems are for use as external insulation for refurbishment/retrofit of existing masonry or concrete buildings, up to a maximum of six storeys (18m) in height in purpose groups 1(a), 1(c), 2(a), 2(b), 3, 4(a) and 4 and for use up to a maximum of five storeys (15m) in height in purpose group 1(b), as defined in TGD to Part B of the Building Regulations 1997 to 2017.

1.1 ASSESSMENT

In the opinion of NSAI Agrément, StoTherm Retrofit External Wall Insulation Systems, if used in accordance with this Detail Sheet, meet the requirements of the Building Regulations 1997 - 2011 as indicated in Section 1.2 of Certificate 09/0331.

1.2 BUILDING REGULATIONS 1997 to 2017

This matter is dealt with in NSAI Agrément Certificate 09/0331.

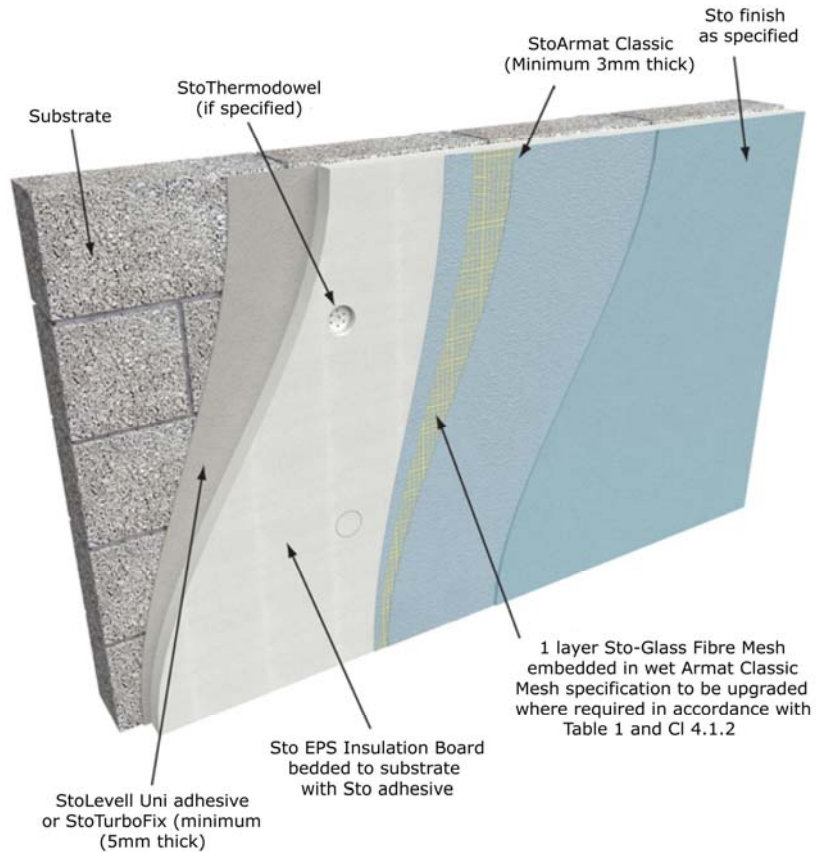


Figure 1.1: StoTherm Retrofit Classic K – Isometric View

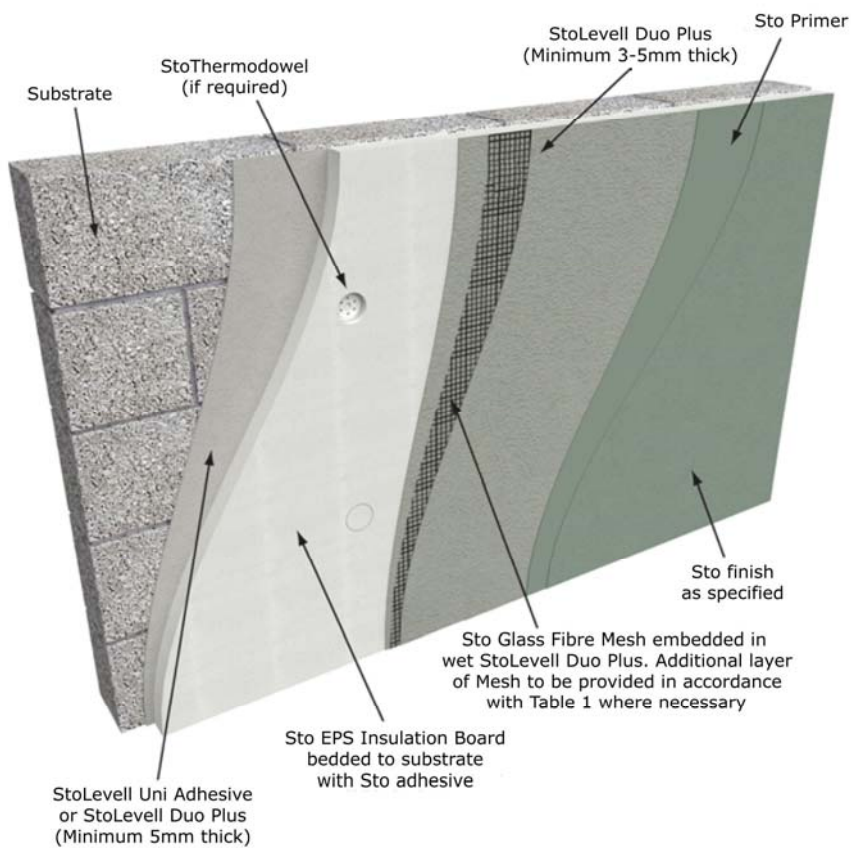


Figure 1.2: StoTherm Retrofit Vario K – Isometric View

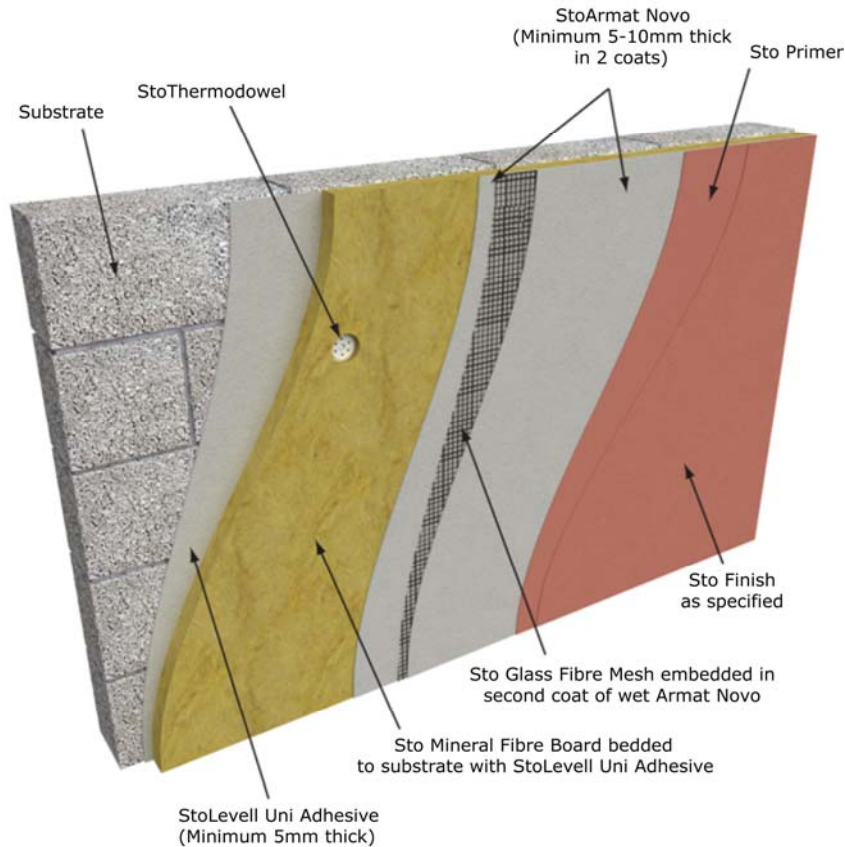


Figure 1.3: StoTherm Retrofit Mineral K – Isometric View

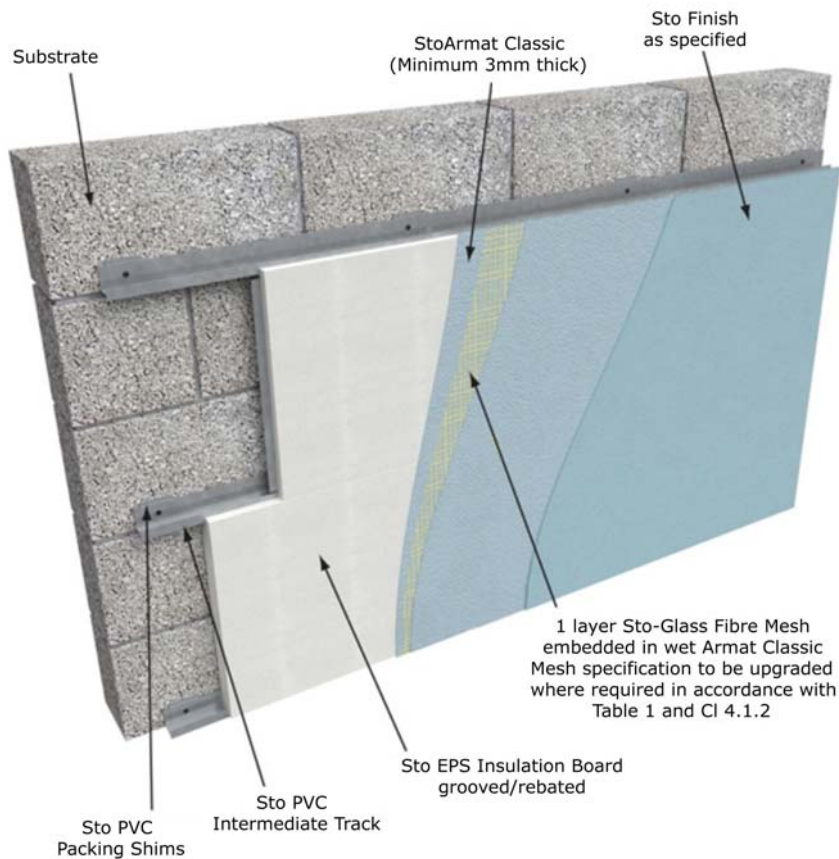


Figure 2.1: StoTherm Retrofit Classic M – Isometric View

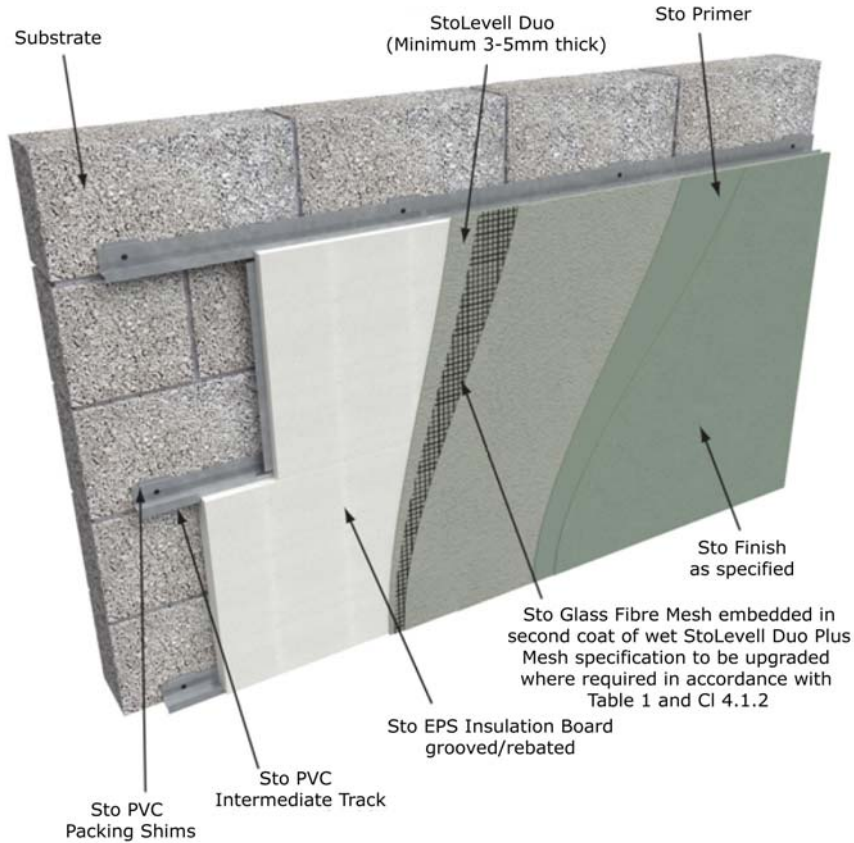


Figure 2.2: StoTherm Retrofit Vario M – Isometric View

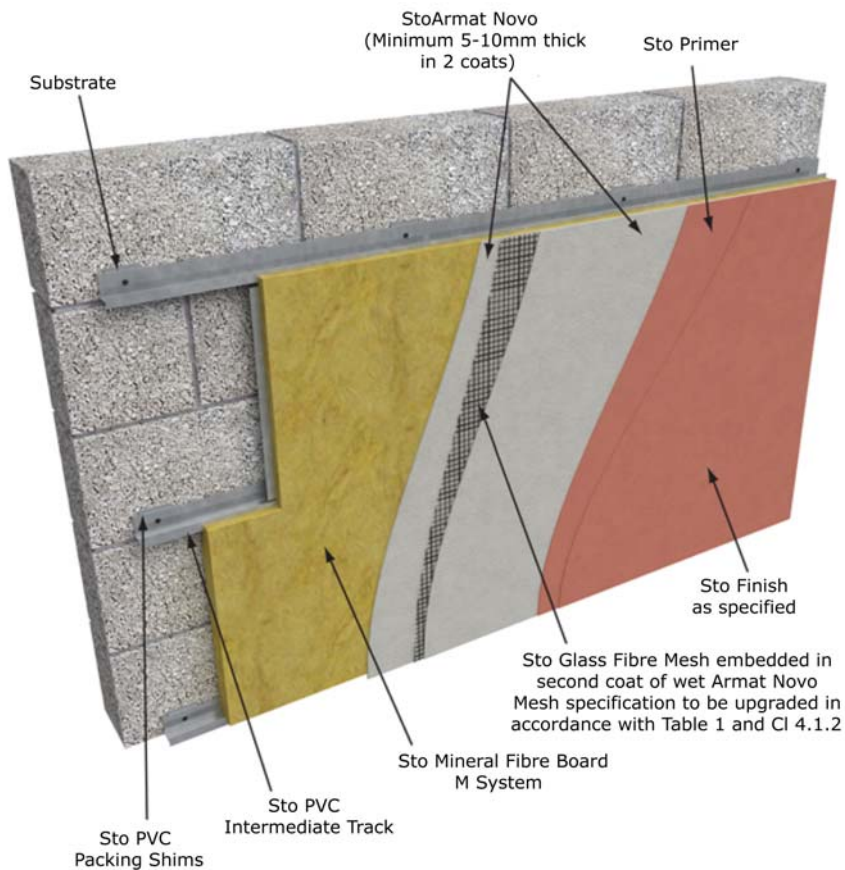


Figure 2.3: StoTherm Retrofit Mineral M – Isometric View

2.1 PRODUCT DESCRIPTION

The StoTherm Retrofit External Wall Insulation Systems are summarised in Table 1. The EPS insulation should have one of the following codings:

- EPS-EN 13163-T2-L2-W2-S2-P4-DS(70,-)1-DS(N)2-TR100
- EPS-EN 13163-T2-L2-W2-S2-P4-DS(70,-)2-DS(N)2-TR100

StoTherm Classic M & K systems are based on EPS insulation supported on PVC rails fixed back with stainless steel screw fixings (to suit substrate) or adhesively fixed. Supplementary fixings required in accordance with structural analysis and exposure conditions. Render reinforcing coat to be Sto Armat Classic cement free reinforcing plaster applied to a nominal thickness of 3mm in one coat and incorporating one layer of Sto Glass Fibre mesh – in areas of high impact and where damage is likely to occur, heavy duty Sto Armour Mesh must be used.

StoTherm Mineral M & K systems are based on rock mineral fibre insulation supported on plastic rails fixed back with appropriate screw fixings (to suit substrate) or adhesively fixed. Supplementary fixings required in accordance with structural analysis and exposure conditions for M system but must have a minimum of 8 fixings per m² for K system. Render reinforcing coat to be Sto Armat Novo modified lightweight cement reinforcing plaster applied to a thickness of up to 10mm and incorporating Sto Glass Fibre Mesh – in areas of high impact and where damage is likely to occur, heavy duty Sto Armour Mesh must be used.

StoTherm Vario M & K systems are based on EPS insulation supported on PVC rails fixed back with stainless screw fixings (to suit substrate) or adhesively fixed. Supplementary fixings required in accordance with structural analysis and exposure conditions. Render reinforcing coat to be Sto Levell Duo Plus modified lightweight mineral reinforcing plaster applied to a nominal thickness of 3 – 5mm in one coat and incorporating one layer of Sto Glass Fibre Mesh – in areas of high impact and where damage is likely to occur, heavy duty Sto Armour Mesh must be used.

Component specifications and ancillary items are listed in NSAI Agrément Certificate 09/0331 Table 2 and Table 3.

2.2 MANUFACTURE, SUPPLY AND INSTALLATION

This matter is dealt with in Section 2.2 of NSAI Agrément Certificate 09/0331.

2.3 DELIVERY, STORAGE AND MARKING

This matter is dealt with in Section 2.3 of NSAI Agrément Certificate 09/0331.

2.4 INSTALLATION

2.4.1 Approved Installers

Installation shall be carried out by Sto Ltd trained applicators who:

- Are required to meet the requirements of an initial site installation check by NSAI Agrément prior to approval and are subject to the NSAI Agrément ETICS Approval Scheme.
- Are approved by Sto Ltd and NSAI Agrément to install the product.
- Have undertaken to comply with the Sto Ltd installation instructions.
- Are employing ETICS Supervisors and ETICS Operatives who have been issued with appropriate identity cards by Sto Ltd. Each team must consist of at least one ETICS Supervisor and ETICS Operative (can be the same person).
- Are subject to supervision by Sto Ltd, including unannounced site inspections by both Sto Ltd and NSAI Agrément in accordance with the NSAI Agrément ETICS Approval Scheme.

2.4.2 General

Sto Ltd prepare a bespoke *Specification & Method Statement* for each project, including U-value calculations, requirements for materials handling and storage, method statements for installation, building details, fixing requirements, provision for impact resistance, maintenance requirements etc. This document forms part of the contract documentation for circulation to the home owner and the installer. Installers will be expected to adhere to the specification. Deviations must be approved by Sto Ltd technical representative.

Sto Ltd Technical Advisors will visit the site on a regular basis to assess the work against Sto Ltd requirements, including the project specific *Specification & Method Statement*, and to report any deviations to the installer and to the home owner/main contractor where appropriate.

Type	Storey Height	Insulation	Reinforcement	Fixings	Reinforcing Coat	Decorative Finish
StoTherm Classic M	Up to 18m (6 storeys maximum)	Expanded polystyrene board	Standard: 1 Layer Sto-Glass Fibre Reinforcing Mesh Ground floor and high impact areas: Outer layer: Sto-Glass Fibre Reinforcing Mesh Inner layer: Sto-Armour Mesh	PVC-u track system fixed to substrate with stainless steel screw fixings: Notes 1 and 5 Fire fixings: Note 2 and 5	3mm minimum StoArmat Classic	2mm Stolit/Stolit QS, StoSilco/ StoSilco QS, StoLotuson, StoSilco MP & Dash, Sto Resin Brick Slips
StoTherm Vario M	Up to 18m (6 storeys maximum)	Expanded polystyrene board	Standard: 1 layer Sto-Glass Fibre Reinforcing Mesh Ground floor and high impact areas: Outer layer: Sto-Glass Fibre Reinforcing Mesh Inner layer: Sto-Armour Mesh	PVC-u track system fixed to substrate with stainless steel screw fixings: Notes 1 and 5 Fire fixings see Note 2 and 5	3-5mm minimum StoLevell Duo	Sto Primer (putzgrund) and 2mm Stolit/Stolit QS, StoSilco/ StoSilco QS, StoLotuson, StoMiral Dry Dash, Sto Resin Brick Slips
StoTherm Mineral M	Up to 18m (6 storeys maximum)	Mineral fibre board (MFB)	Standard: 1 layer Sto-Glass Fibre Reinforcing Mesh in outer layer of Sto Armat Novo Ground floor and high impact areas: Outer layer: Sto-Glass Fibre Reinforcing Mesh Inner layer: Sto-Armour Mesh	PVC-u track system fixed to substrate with stainless steel screw fixings: Notes 1 and 5 Fire fixings see Note 2 and 5	5-10mm minimum StoArmat Novo applied in 2 coats	Sto Primer (putzgrund) and 2mm Stolit/Stolit QS, StoSilco/ StoSilco QS, StoLotuson, StoSilco MP & Dash, Sto Resin Brick Slips

Notes:

- Insulation is rigidly supported in a aluminium/PVC framed system comprising
 - Sto aluminium horizontal starter track; 2.0m or Sto aluminium Flexicurve starter track; 2.5m to radius
 - PVC horizontal intermediate holding tracks; 2.5 m
 - PVC interlocking vertical T-splines; 494 mm
 - Sto plastic shims to align insulation (see CI 3.2 b)
 Starter tracks, horizontal tracks and vertical splines are fixed to masonry or concrete substrates using Sto specified stainless steel or screw set screws in accordance with Sto Ltd recommendations, based on on-site pullout tests. Maximum 300 centres
- Fixing of fire barriers:
 All mineral wool fire barriers are
 - a) adhesively fixed using StoLevell Uni adhesive and
 - b) mechanically fixed as follows:
 Horizontal fire barriers: Stainless steel mechanical fixings through first layer of mesh and into structural substrate at maximum 1 m centres
 Vertical fire barriers: Stainless steel mechanical fixings through first layer of mesh and into structural substrate at maximum 0.5 m centres See Figures 9 and 10.
- Services/Fittings: Secure supports to be provided for soil and rainwater pipe brackets, aerals, lighting, cameras, signage, etc in accordance with **Sto Ltd Specification and Method Statement** using Sto-Fix Rondelle, Sto-Fix Mini, Sto-Fix Midi or Sto-Fix Maxi as appropriate.
- The inclusion of mechanical fixings may introduce a cold bridge and may result in the appearance of light spots in the render finish. Where fixings are provided through the mesh, a 200mm x 200mm patch of mesh should be laid over the fixing location to ensure continuity of surface (See Figure 11). Positive fixings must be provided around all window and door openings to ensure adequate and robust edge restraint over the design life. For StoTherm M systems, tracks are fixed horizontally and vertically around openings, to provide this restraint.

Table 1: Product Range, Components and Fixing Requirements
Table 1a: StoTherm M Systems

Type	Storey Height	Insulation	Reinforcement	Fixings	Reinforcing Coat	Decorative Finish
StoTherm Classic K	Up to 18m (6 storeys maximum)	Expanded polystyrene board	Standard: 1 Layer Sto-Glass Fibre Reinforcing Mesh Ground floor and high impact areas: Outer layer: Sto-Glass Fibre Reinforcing Mesh Inner layer: Sto-Armour Mesh	Adhesive: StoLevell Uni or Sto Turbofix, and supplementary Mechanical fixings: Notes 1, 3 and 4 Fire fixings: Notes 1, 3 and 4	3mm minimum StoArmat Classic	2mm Stolit/Stolit QS, StoSilco/StoSilco QS, StoLotuson, StoSilco MP & Dash
StoTherm Vario K	Up to 18m (6 storeys maximum)	Expanded polystyrene board	Standard: 1 layer Sto-Glass Fibre Reinforcing Mesh Ground floor and high impact areas: Outer layer: Sto-Glass Fibre Reinforcing Mesh Inner layer: Sto-Armour Mesh	Adhesive: Sto ADH-B or StoLevell Duo Plus, and supplementary Mechanical fixings: Notes 1, 3 and 4 Fire fixings: Notes 1, 3 and 4	3-5mm minimum StoLevell Duo	Sto Primer (putzgrund) and 2mm StoIsplit, Stolit/Stolit QS, StoLotuson, StoSilco/StoMiral Dry Dash, Sto Resin Brick Slips
StoTherm Mineral K	Up to 18m (6 storeys maximum)	Mineral fibre board (MFB)	Standard: 1 layer Sto-Glass Fibre Reinforcing Mesh in outerlayer of Sto Armat Novo Ground floor and high impact areas: Outer layer: Sto-Glass Fibre Reinforcing Mesh Inner layer: Sto-Armour Mesh	Adhesive: StoLevell Uni, and Mechanical: Notes 2, 3 and 4 Fire fixings: Notes 2, 3 and 4	5-10 mm minimum StoArmat Novo applied in 2 coats	Sto Primer (putzgrund) and 2mm Stolit/Stolit QS, StoSilco/StoSilco QS, StoLotuson, StoSilco MP & Dash

Notes:

- Mechanical fixings to be provided in accordance with the project specific design requirements based on pullout test results. Fixings to be StoThermowell. Fixings to be recessed into and fixed through insulation, minimum rate of 4/m².
- In addition to adhesively fixing with StoLevell Uni, all mineral fibre board is mechanically fixed. Mechanical fixings to be provided in accordance with the project specific design requirements based on pullout test results. Mechanical fixings to be StoThermowell. For mineral fibre board, StoThermowell fixings to be recessed into and fixed through insulation, minimum rate of 8/m².
- Fixing of fire barriers:
All mineral wool fire barriers are
a) adhesively fixed using StoLevell Uni adhesive and
b) mechanically fixed as follows:
Horizontal fire barriers: Stainless steel mechanical fixings through first layer of mesh and into structural substrate at maximum 1 m centres. Vertical fire barriers: Stainless steel mechanical fixings through first layer of mesh and into structural substrate at maximum 0.5 m centres See Figures 9 and 10.
- The inclusion of mechanical fixings may introduce a cold bridge and may result in the appearance of light spots in the render finish. Where fixings are provided through the mesh, a 200mm x 200mm patch of mesh should be laid over the fixing location to ensure continuity of surface. See Figure 11. Positive fixings must be provided around all window and door openings to ensure adequate and robust edge restraint over the design life. See Figure 12.
- Services/Fittings: Secure supports to be provided for soil and rainwater pipe brackets, arials, lighting, cameras, signage, etc in accordance with **Sto Ltd Specification and Method Statement** using Sto-Fix Rondelle, Sto-Fix Mini, Sto-Fix Midi or Sto-Fix Maxi as appropriate.

Table 1b: StoTherm K Systems

Mineral fibre board and lamella should be protected from moisture prior to and during installation. If the mineral fibre board or lamella gets wet during or post installation, it should not be rendered. Removal and replacement of wet material may need to be considered.

External works that alter the external appearance of the building to the extent it is inconsistent with neighbouring buildings may require planning permission. The status of this requirement should be checked with the local planning authority as required.

2.4.3 Site Survey and Preliminary Work

A comprehensive pre-installation survey of the property shall be carried out by a suitably qualified Sto Ltd technical representative or a Sto Ltd and NSAI Agrément approved contractor, and all key information is recorded on the site survey form. Sto Ltd pre-installation survey is also used to price the project and identify all the relevant factors/technical information which needs to be considered in the design of the external cladding system and important information to be included in the site specific pack. This pack would typically include wind load calculations and a fixing specification summary sheet, thermal bridging evaluation, condensation risk analysis, elemental wall U-value calculation, and a full set of project specific building details. The survey will also establish the suitability of the substrate, and Sto Ltd technical representative will determine if pullout resistance testing is required and what substrate preparation is required.

The substrate must be free of paint, coatings, water repellents, dust, dirt, efflorescence and other harmful contaminants or materials that may interfere with the adhesive bond. Remove projecting mortar or concrete parts mechanically.

Where discrepancies preventing installation of the StoTherm Retrofit External Wall Insulation System in accordance with this Certificate and the Certificate holder's instructions exist, these discrepancies should be discussed with the Certificate holder and a solution implemented with the approval of the Certificate holder.

2.4.4 Procedure

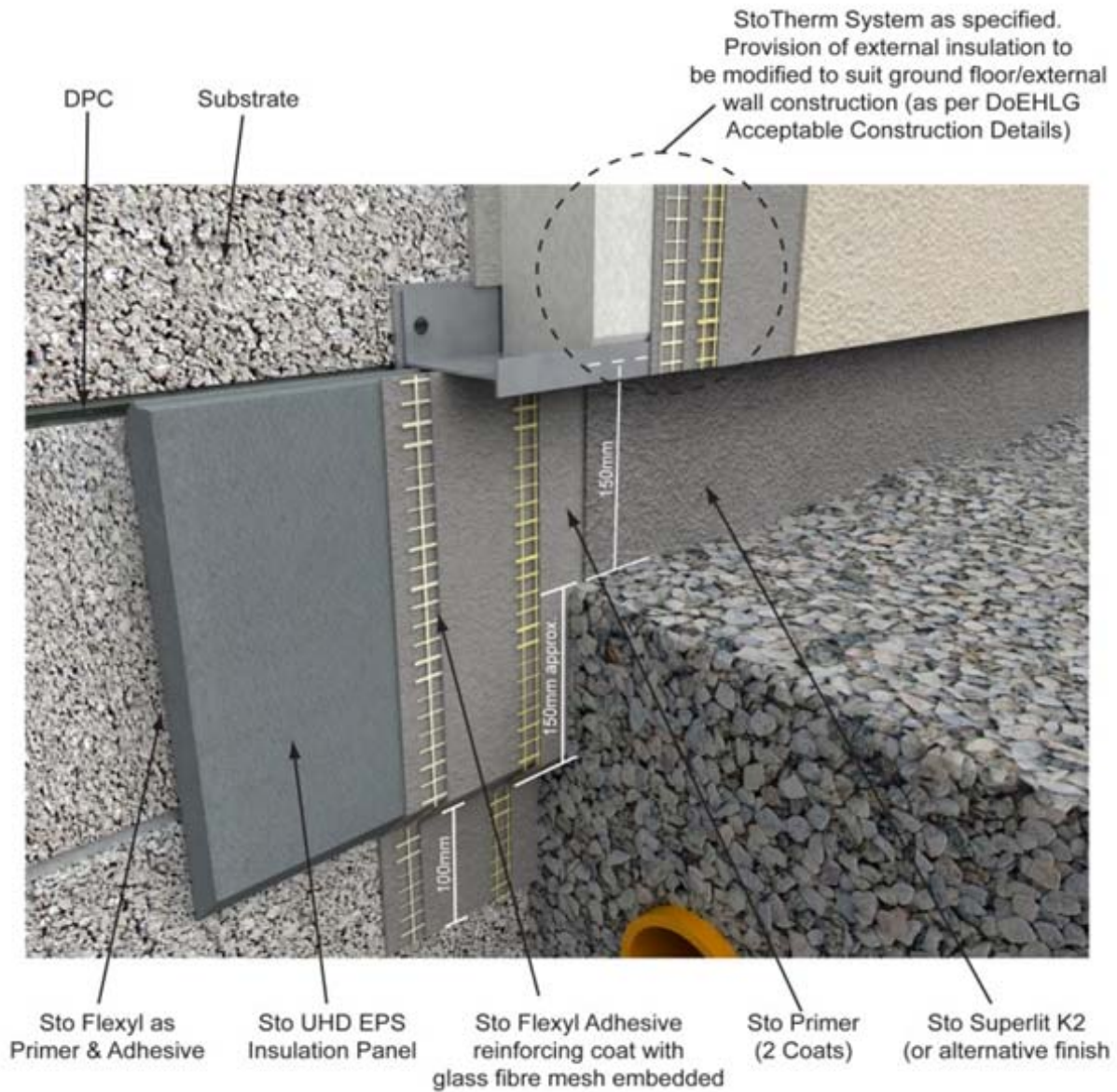
- Prepare substrate in accordance with the project specific *Specification & Method Statement*. This will include brushing down of walls, washing with clean water and treatment with a fungicidal wash as required.
- Ensure the substrate is sound by checking the substrate surface with a hammer and listening for a hollow sound. If render is loose it must be removed and replaced.
- At external window and door frame reveals the plaster reveals should only be removed if a minimum clearance of 30mm cannot be achieved between the reveal and the window/door frame. This clearance must allow for opening sections of window and door frames. This is to allow the application of insulation around the reveals and heads of the doors and windows to significantly reduce cold bridging.
- Existing concrete sills may be insulated over however best practice is to cut back the concrete sill to minimise the effects of cold bridging at this junction.
- Renders (adhesives, base coats, primers, finish coats) must not be applied if the temperature is below 5°C or above 25°C at the time of application. In addition, cementitious-based renders must not be applied if the temperature will be below 0°C at any time during 72 hours after application, and cement-free, synthetic-resin, silicone-resin and silicate renders must not be applied if the temperature will be below 5°C at any time during 72 hours after application. Stolit QS and StoSilco QS can be used at temperatures above 1°C where the finished elevations are conditioned with external heat source and protective sheeting as per the Sto Installation Manual.
- Refer to the *Specification & Method Statement* for guidance on modifications of down pipes, soil and vent pipes, pipe extensions etc. Where possible, all pipework should be relocated as required to accommodate the insulation. Where pipework cannot be relocated and is to be housed in the depth of the system, access for maintenance must be maintained through the use of a removable cover or similar.
- Base beads and all full system beads are fixed as specified. Adhesive, frame, insulation and render only beads are fixed as specified in the Sto Ltd *Specification & Method Statement*.
- A plinth strip/starter track is mechanically fixed to the substrate level with the DPC line. This provides a horizontal line for the installation of insulation panels as well as providing reinforcement to the lower edge of the system. Adjacent starter track profiles are connected using special mounting clips.
- At plinth level, HD EPS boards are then fixed to the wall below the starter track to provide the necessary resistance to impact and capillary action.
- The insulation boards are bonded to the wall by applying the specified adhesive to the boards.
- When adhesively fixing, care must be taken to ensure an appropriate amount of adhesive is used and that the appropriate adhesive spread and board fixing patterns are used. The adhesive must not be applied onto the sides or fill the gaps between insulation boards. Mechanical fixings are provided in accordance with the project specific design requirements based on pullout test results

(see NSAI Agrément Certificate 09/0331 Table 2).

- Before applying adhesive to mineral wool, the boards must be cleared of dust and loose particles. The boards should be initially covered with adhesive by applying a thin layer using a smooth edge trowel in order to increase adhesion.
- Subsequent rows of insulation boards are installed on top of the starter track and positioned so that the vertical board joints are staggered and overlapped at the building corners.
- To avoid thermal bridging, ensure a tight adhesive free joint connection between adjacent insulation boards. Boards may require rasping to ensure a tight fit. Foam filler approved by the Certificate holder may be used for filling gaps up to 5mm. Larger gaps should be avoided. Where larger gaps greater than 5mm cannot be practically avoided these gaps shall be filled with ETICS insulation material cut to size and sufficiently fixed to the substrate.
- At façade openings, e.g. window and door opens, full insulation boards must be installed across these openings in elevation and then the insulation is cut back to reinstate the clearance at the opening. This method of installation will minimise the linear length of abutments and joints between boards at openings. In addition, vertical joints should be staggered. Any projecting EPS boards should be levelled out using a rubbing board with local trimming as required on mineral wool boards.
- Window and door reveals should, where practicable, be insulated to minimise the effects of cold bridging in accordance with the recommendations of the Acceptable Details Document published by the DECLG, Detail 2.21, to achieve an R-value of 0/6m²K/W. Where clearance is limited, strips of approved insulation should be installed to suit available margins and details recorded as detailed in Section 4.4.1 of this Certificate.
- To minimise the effects of cold bridging in all other junctions over and above windows and doors, designers should consider the recommendations of the Acceptable Details Document, Section 2 – External Wall Insulation. Where clearance is limited, strips of approved insulation (with better thermal resistance values) should be installed to suit available margins and details recorded as outlined in Section 4.4.1 of this Certificate.
- Details of mechanical fixings (including their arrangement in the insulation boards) are specified in the project specific design based on pullout test results, substrate type and wind loading data. Installation of mechanical fixings shall commence no earlier than 2 days after the insulation panels have been adhesively fixed.
- Anchors must be installed to the required depth into the substrate, with the head fixed tightly to the insulation board to ensure there is no risk of pull off.
- For drilling holes in thin or cavity materials (hollow block), a drill with an engaged hammer action should not be used. Minimum pullout resistance of mechanical fixings must be established, alternatively low pullout values will require an increased frequency of fixing.
- Mechanical fixings should be carefully fitted. The heads of fixings cannot protrude beyond the plane of the boards, i.e. they should be exactly flush. Excessively deep insertion of fixing heads in the insulation material can cause cracking of the boards which in turn weakens the insulation. Filling indentations in these areas can cause thermal bridges and consequently may lead to plaster loosening in such areas.
- Refer to the Certificate holder's instructions and the project specific site package regarding the installation method and location of the fixings through the reinforcing mesh where fire stops have also been installed. Additional layers of mesh are also applied at these locations. Fire fixings to be provided at a rate of one per m² above two stories. The fixing design should take account of the extra duty required under fire conditions.
- Purpose made powder coated aluminium window sills are installed in accordance with the Certificate holder's instructions. They are designed to prevent water ingress and incorporate drips to shed water clear of the system.
- Lamella fire stops are installed in accordance with the Certificate holder's instructions as defined in Section 4.2 of this Certificate, at locations defined in the project specific design package.
- For EPS insulation, any high spots or irregularities should be removed by lightly planeing with a rasp to ensure the application of an even thickness of base coat. After sufficient stabilisation of the installed insulation (normally 2 days, during which time the insulation should be protected from exposure to extreme weather conditions to prevent degradation), the insulated wall is ready for the application of the base and finish coats.
- EPS boards exposed to UV light for extended periods prior to the application of the render coatings are subject to breakdown and should be rasped down as required in preparation for rendering.
- Reinforcing coat is mixed and applied, mesh is laid and a further application of reinforcing coat (and mesh if appropriate) is applied to achieve the appropriate thickness (see Table 1).

- Primer is applied to cement based reinforcing coats prior to the application of the selected textured finish.
- Application of the reinforcing coat and finishes should be carried out within the permitted temperature range and should be protected from rapid drying.
- All rendering should follow best practice guidelines e.g. BS 8000-0:2014 and IS EN 13914-1:2016.
- Movement joints shall be provided in accordance with the *Specification & Method Statement*. For mineral based reinforcing coats, the recommended panel size is 45m² with an aspect ratio of no less than 4:1. For organic based reinforcing coats, panel size is determined by the applicator's management of the project and the location of building movement joints.
- Sealants to be installed in accordance with BS 8000-16:1997 by approved installers.
- At all locations where there is a risk of insulant exposure, e.g. window reveals, eaves or stepped gables, the system must be protected, e.g. by an adequate overhang or by purpose made sub-sills, seals or flashings.
- Building corners, door and window heads and jambs are formed using angle beads bonded to the insulation in accordance with the Certificate holder's instructions.
- To minimise the thermal bridge effect during the installation of railings, exterior lighting, shutter guide rails, canopies, aerials, satellite dishes etc, the Certificate holder offers a range of anchoring options. These anchors must be installed in accordance with the Certificate holder's instructions, as defined in the project specific site package, during the installation of the insulation boards.
- Where the external insulation meets intersecting walls etc and the abutting structure cannot be cut back, the edge of the insulation where it meets the wall should be protected using PVC universal stop-trim, followed by the application of a low modulus silicone sealant between the top coat and the abutting structure.
- Prior to application of base coat and finish coat, all necessary protective measures such as taping off of existing window frames and covering of glass should be in place.
- If it is not possible to install the ETICS to all external walls, alternative forms of thermal upgrades, such as full fill cavity wall insulation or dry lining should be provided where physically and economically feasible. There should be an adequate overlap at the junction between the ETICS and the alternative insulated method selected to limit thermal bridging at this interface.
- If unusual levels of movement are expected then the use of an expansion joint at the intersection is recommended and should be incorporated into the project specific design provided by the Certificate holder. In the case of un-heated lean-to buildings, the ETICS should continue around the lean-to.
- In sunny weather, work should commence on the shady side of the building and be continued following the sun to prevent the rendering drying out too rapidly.
- The appropriate base coat is prepared in accordance with the manufacturer's instructions, and is trowel applied over the insulation boards no sooner than two days after the adhesive bonding of the boards and after the mechanical fixings have been installed. Base coats requiring the addition of water should be mixed mechanically using a drill and mixer.
- Apply the base coat to the insulation boards to the width of the mesh.
- The reinforcing mesh must be pressed into the base coat with a 100mm overlap. This mesh should be free of rippling or creases and must be fully embedded in the basecoat.
- The mesh should always be embedded in such a way that in the case of thin-layered reinforcement the mesh is in the middle of the base coat layer, and in the case of thick-layered reinforcement it is in the upper third of the base coat layer. The mesh can be laid either vertically or horizontally.
- In the case of double reinforcement, the whole procedure should be repeated before the initial layer dries. Overlaps in each layer when double reinforcing should be offset from one another. The reinforcing mesh should extend over the edges of laths and be cut back once the coat has dried.
- Where required fixings can be installed through the reinforcing mesh. This should be done before the basecoat hardens. Mechanical fixings placed through the reinforcement should be smoothed over with basecoat as soon as they have been installed.
- An additional diagonal reinforcement must be applied around the façade openings. This involves embedding the diagonal reinforcement strips of mesh 200x350mm into the basecoat at a 45° angle in relation to the lines determined by the reveal.
- Base profiles and corner profiles are fixed as specified in the site specific pack. Existing structural expansion joints should be extended through the surface of the ETICS with full system expansion beads.
- The primer and/or finish coat must not be applied until after the base coat has dried out fully (3 days approximately depending on weather conditions).
- On completion of the installation, external fittings, rainwater goods etc are fixed through the system into the substrate in accordance with the Certificate holder's instructions.
- Care must be taken in the detailing of the system around openings and projections.

- All necessary post-application inspections should be performed and the homeowner's manual completed and handed over to the homeowner accordingly.



NOTE:
Backfill as specified by Client.
Open french drain shown to reduce splashback

Figure 4: Typical Detail – Insulated Base

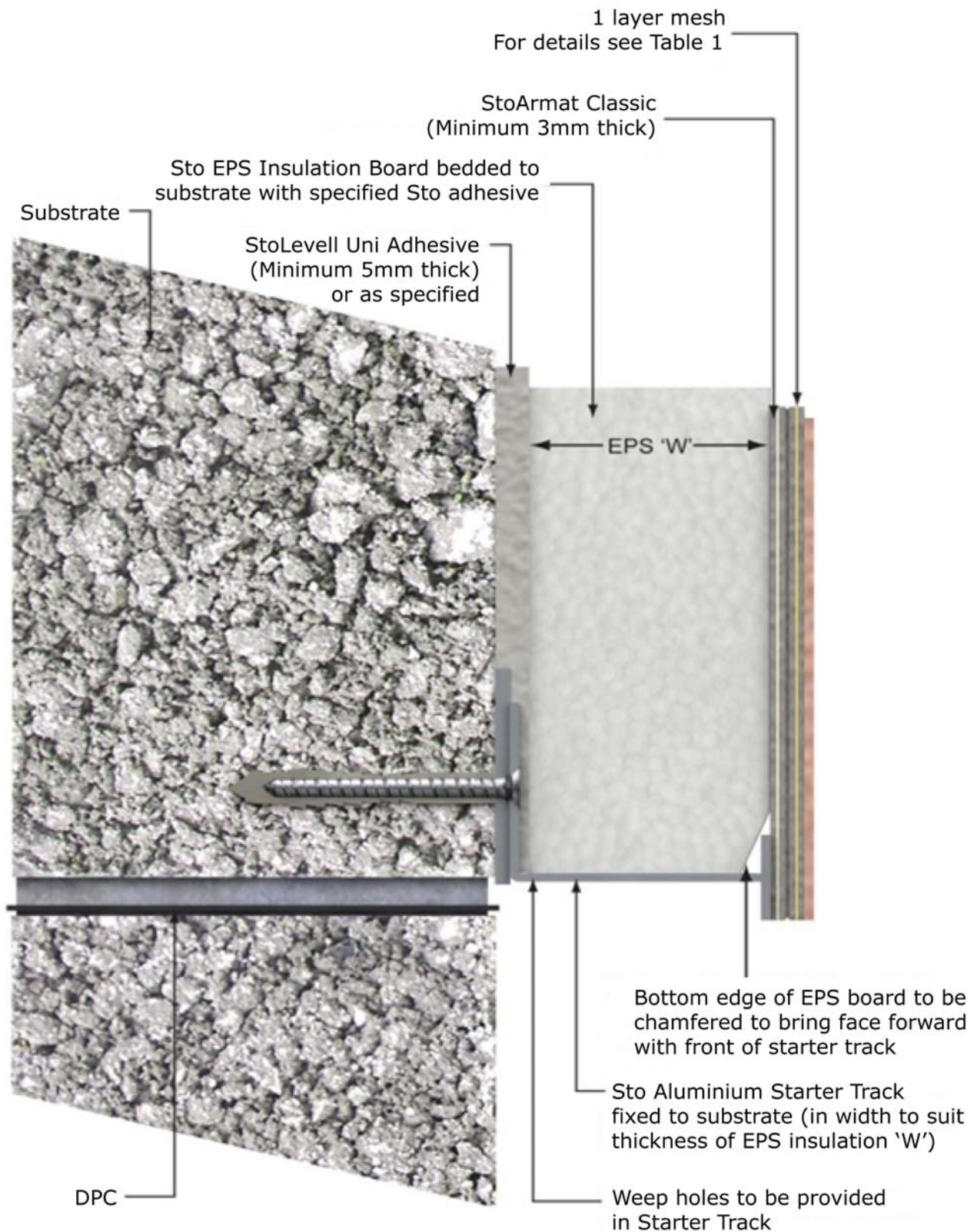


Figure 5: Typical Detail – StoTherm Retrofit Classic K – Aluminium Starter Track

Window Unit and cill to be compatible so as to provided a fully sealed, flush finished joint at interface. Other cill/window interface options must achieve an equivalent standard of sealing, fixity and movement accommodation at the cill/window frame interface and the cill/reveal interface, as the detail shown here. Cill upstand should not interfere with window drainage.

Sto Sill Profile with stop ends, where stop end extends more than 75mm beyond reveal, upstand is not required. Cill have to have minimum fall of 10 degrees.

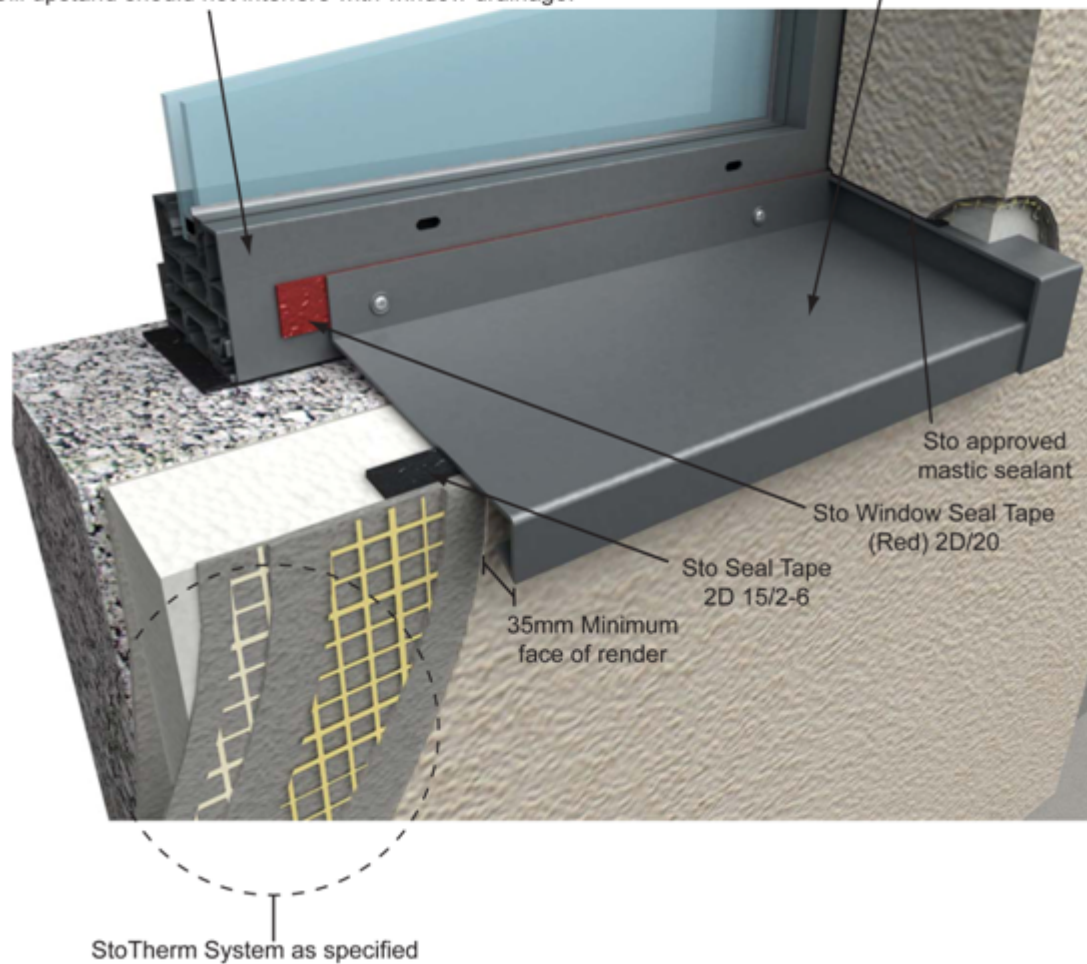


Figure 6: Typical Detail – Sill with Stop End

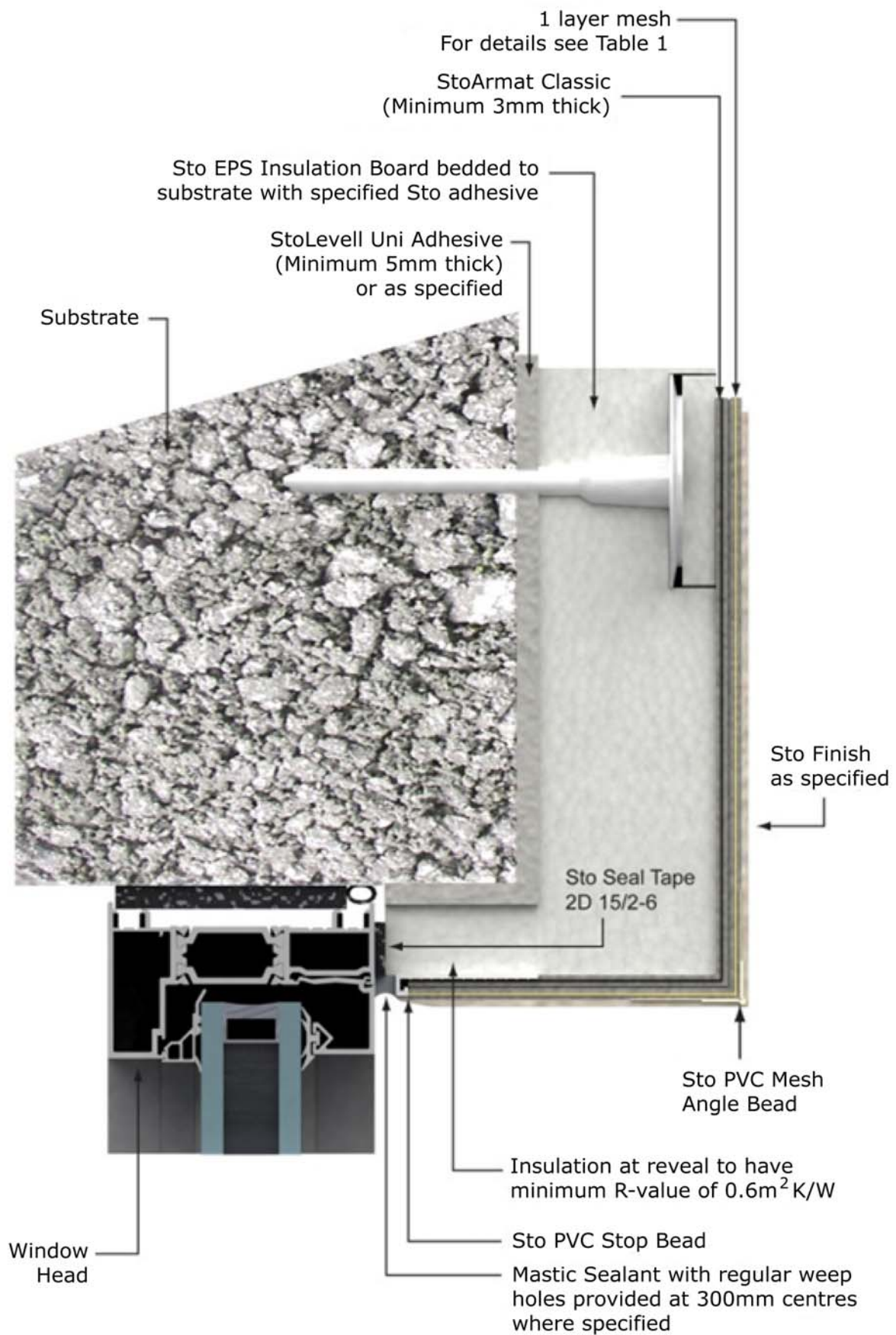


Figure 7: Typical Detail –StoTherm Retrofit Classic K – Window Head

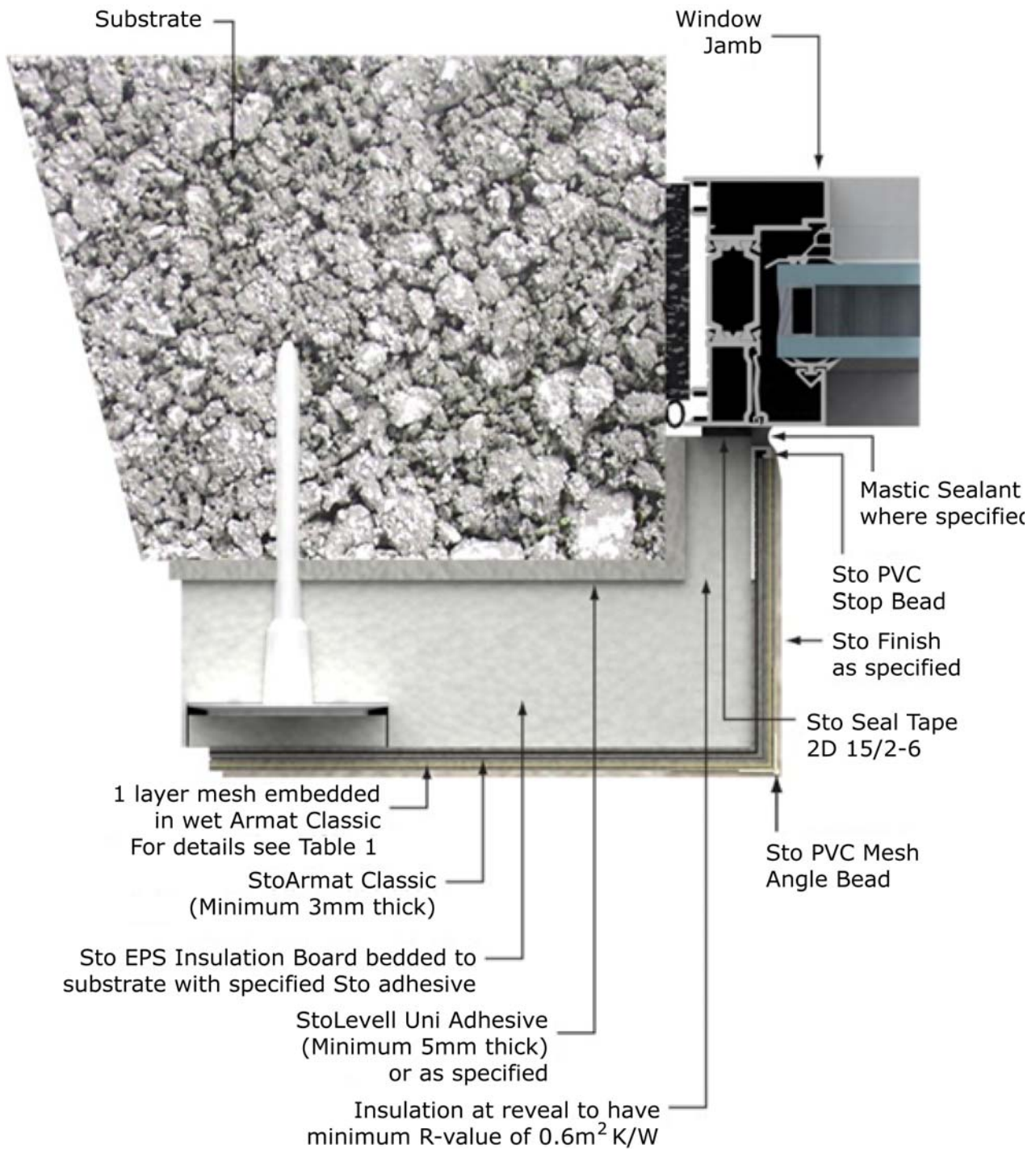


Figure 8: Typical Detail – StoTherm Retrofit Classic K – Window Reveal

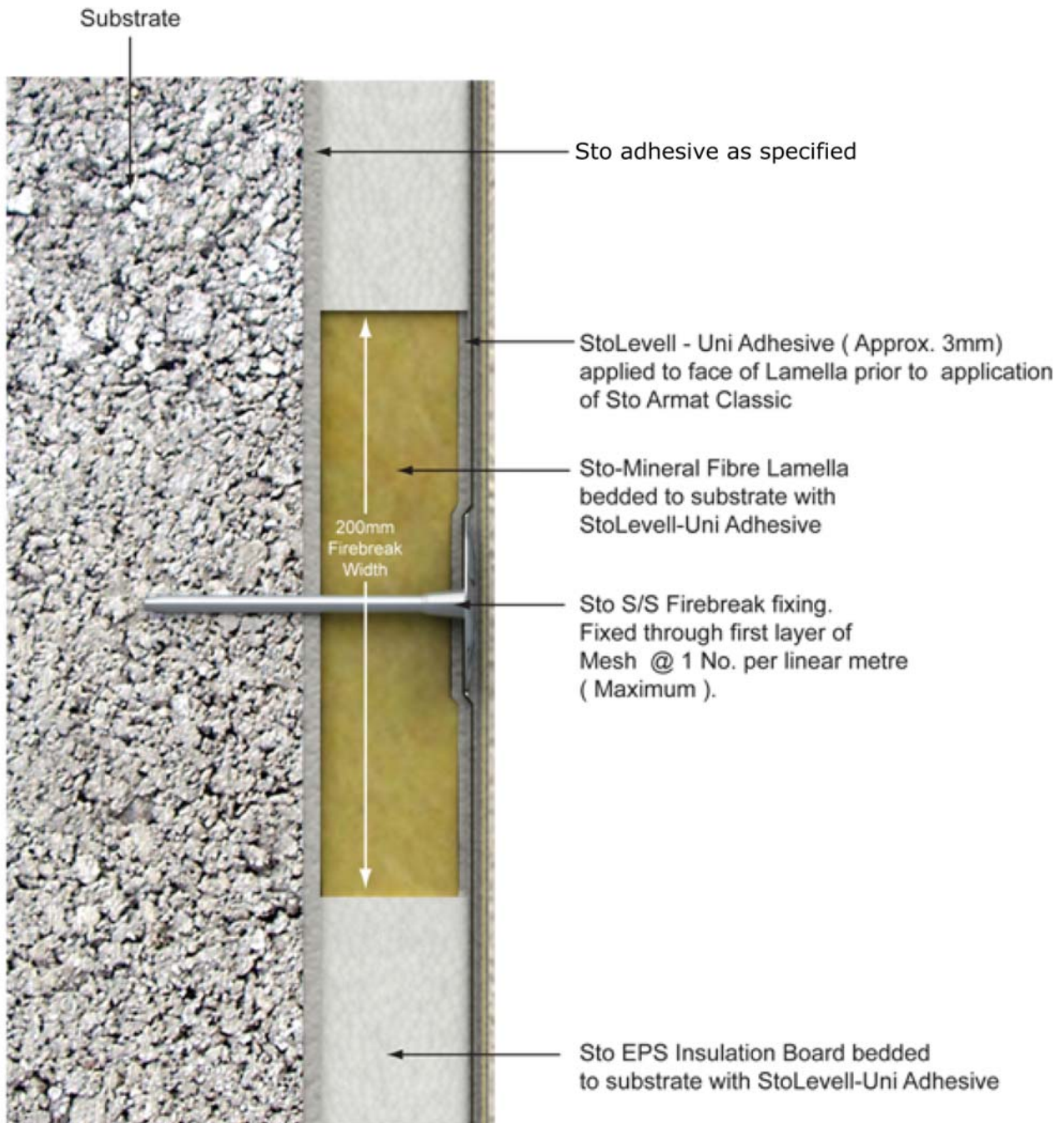
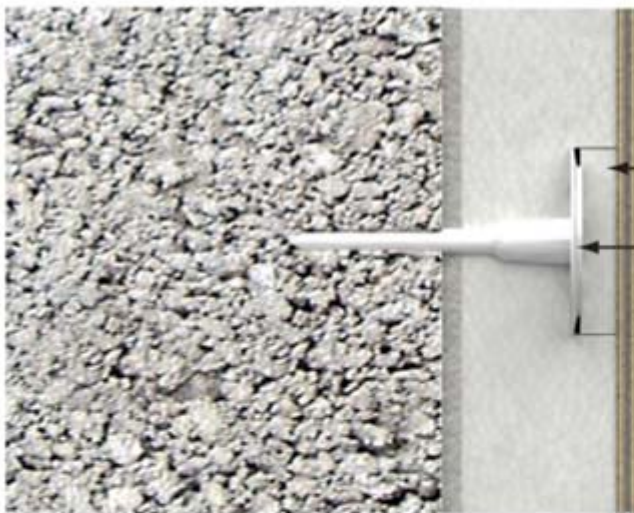
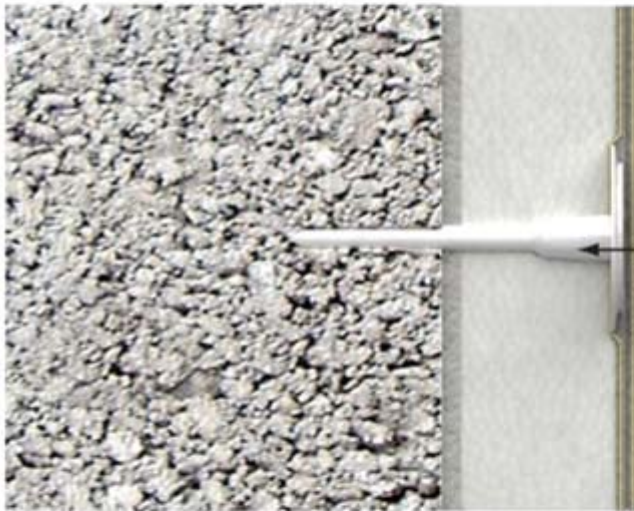


Figure 11: Typical Detail – StoTherm Retrofit Classic K – Horizontal Fire Barrier



Sto Thermodowel Detail @ 4 per M²

- Sto Thermodowel cap (ETA) Ø60mm
Article No. 00931-001
- Sto Thermodowel (ETA) 8/60



Sto Thermally broken dowel fixing Detail :
@ 1 per M²

- Sto Thermally broken dowel fixing.
Fixed through first layer of Mesh.
See Table 1



Sto stainless steel fire fixing Detail :
@ 1 per M²

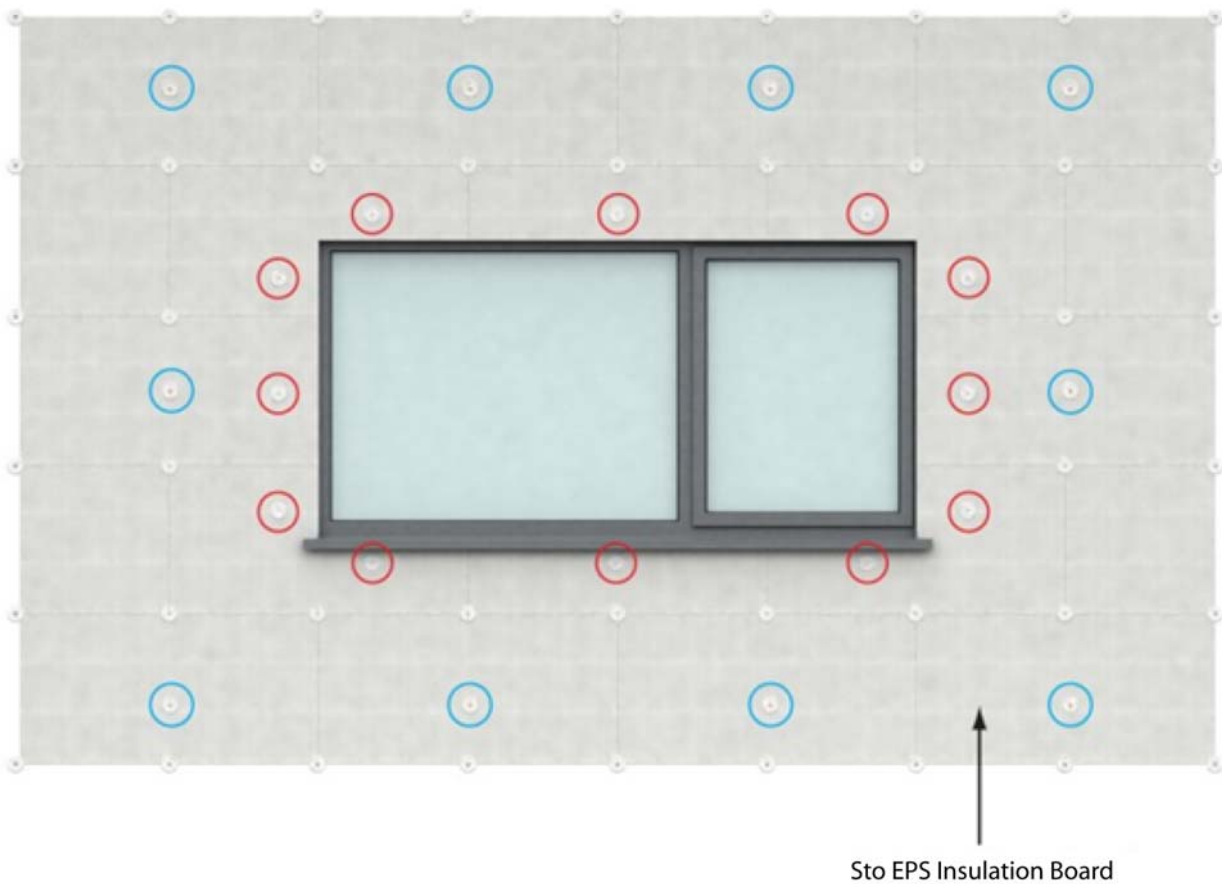
- Sto stainless steel fire fixing to be
fixed through first layer of mesh.
See Table 1

Figure 12: Typical Detail – StoTherm Retrofit Classic K – Dowel Positions

① StoThermowell between positions - minimum 4 per m² for buildings greater than 2 storeys

○ Supplementary dowel positions around Window Aperture, where specified

○ StoThermally broken dowel fixing through first layer of Sto Glass Fibre Mesh, where specified



**Figure 13: Typical Detail – StoTherm Retrofit Classic K –
Supplementary Dowel Positions at Openings**

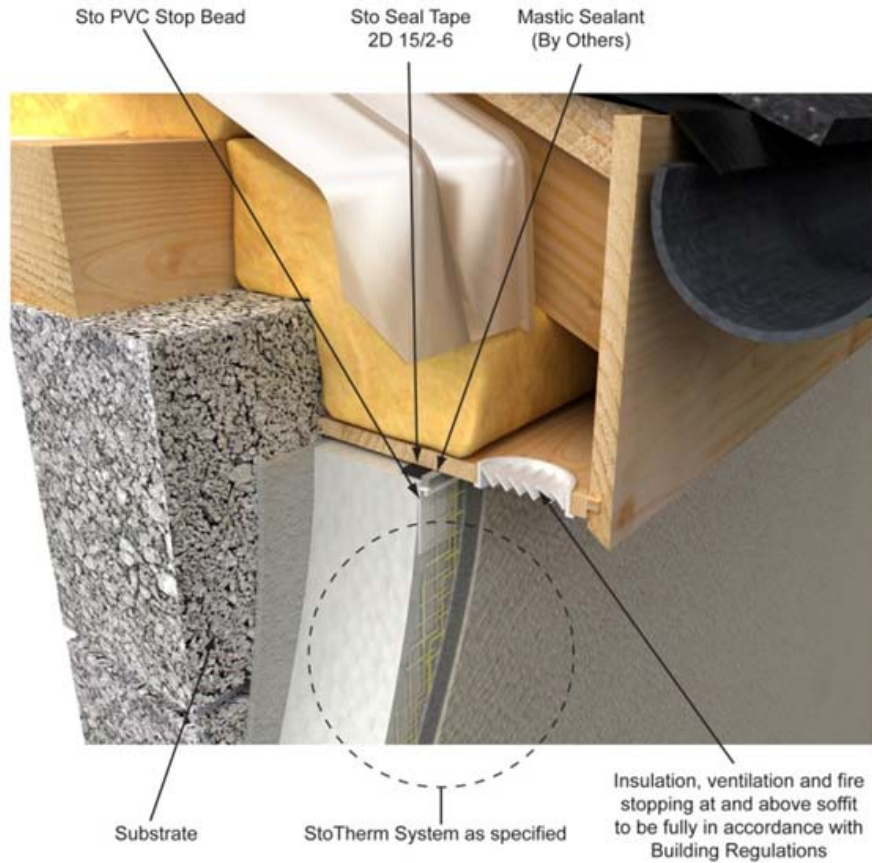


Figure 14: Typical Detail – Eaves

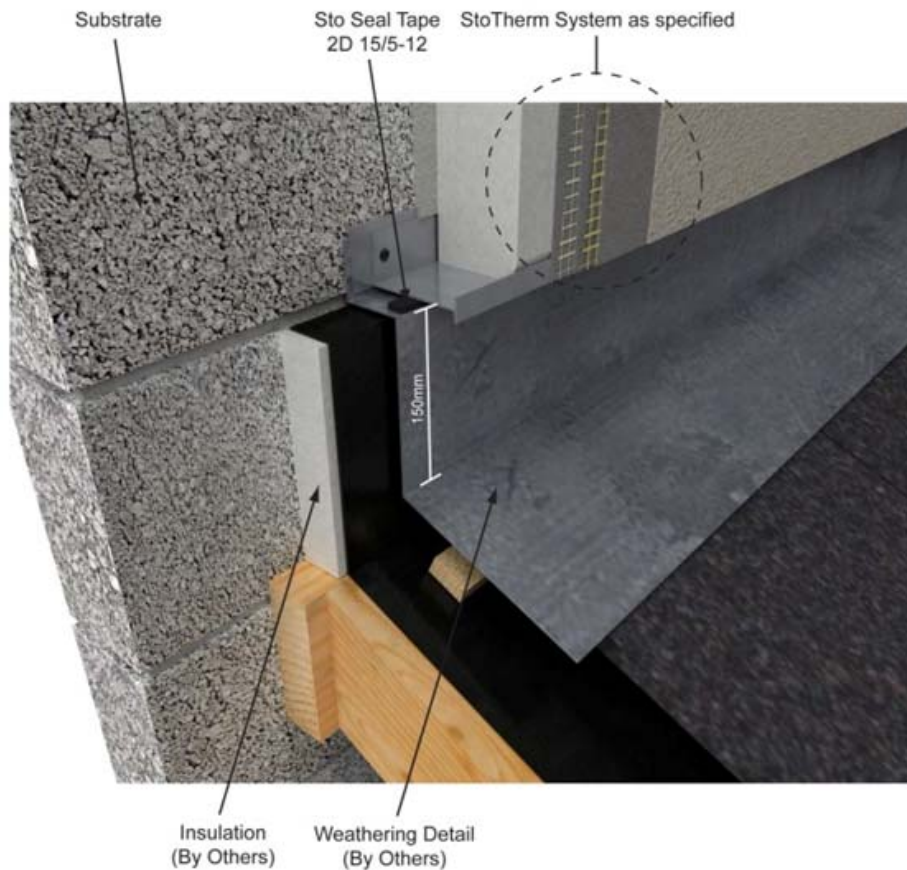


Figure 15: Typical Detail – Stepped Gable

3. GENERAL

The system is designed by Sto Ltd on a project specific basis in accordance with the approved design process. Sto Ltd assess the building and advise on how to maximise the benefits of the external insulation system for that building. The assessment should take into account any other refurbishment works planned e.g. upgrading of existing windows, replacement of footpaths, eaves and soffits etc., and should aim to increase levels of insulation without compromising any other aspect of the building performance.

The design will include for:

- a) A site survey shall be carried out and recorded.
- b) Evaluation and preparation of substrate.
- c) Minimising risk of condensation in accordance with recommendations of BS 5250:2011+A1:2016. This includes the use of approved detailing incorporating the requirements of SR 54:2014 and, where possible, meeting all of the Acceptable Construction Details published by the DHPLG.
- d) Thermal insulation provision to Part L of the Building Regulations 1997 to 2017.
- e) Resistance to impact and abrasion.
- f) Resistance to thermal stresses.
- g) Resistance to wind loading.
- h) Design of fixings to withstand design wind loadings, using a safety factor of three for mechanical fixings and a safety factor of nine for adhesive. In addition, fixings around window and door openings shall be at a maximum of 400mm centres in each board or section of board so as to provide positive and robust restraint over the life of the system.
- i) The design for wind loading on buildings greater than two stories should be checked by a chartered engineer in accordance with I.S. EN 1991-1-4:2005.
- j) Design for fire resistance, fire spread and fire stopping.
- k) Design of a water management system to prevent ingress of water at movement joints, windows, doors, openings for services etc. Particular attention is required to ensure that window and sill design are coordinated to achieve a fully integrated design.
- l) Movement joints.
- m) A site specific maintenance programme for inclusion in the *Building Owner's Manual*.
- n) Durability requirements.

Detailing and construction must be to a high standard to prevent the ingress of water and to achieve the design thermal performance. Consideration should be given to maximising

improvement of thermal insulation at window reveals, door openings, sills etc.

Where the mechanical rail system is specified, Sto Ltd requires a minimum 3mm gap behind the insulation/rail on the high points of the substrate such that the average gap is kept to a minimum. The U value calculations will include for this air gap, unless the project requires a deeper cavity to meet customer requirements. In such cases, Sto Ltd will increase the thickness of insulation to achieve the required U value.

Where there are localised problem areas, e.g. a severely undulating background, Sto Ltd specifies that the maximum gap behind the rail shall not exceed 50mm. Each situation shall be considered on a case by case basis. A gap of this magnitude is not acceptable over any significant area.

Adequate provision should be made at a design and installation stage for release of trapped moisture, e.g. above window heads.

When designed and installed in accordance with this Certificate, the systems will satisfy the requirements of TGD to Part L of the Building Regulations 1997 to 2017. The design shall include for the elimination of cold bridging at window and door reveals, eaves and at ground floor level.

The system is intended to improve the weather resistance of the external walls. Seals to windows and doors shall be provided in accordance with the project specific site plan.

Care should be taken to ensure that any ventilation or drainage openings are not obstructed.

In areas where electric cables can come into contact with EPS, in accordance with good practice all PVC sheathed cables should be run through ducting or be re-routed.

Domestic gas installations must not be adversely affected by the fitting of external insulation. If the external insulation has an impact on the gas service line/meter location, then Bord Gáis Networks must be contacted so that a suitable solution can be achieved. If altering a gas installation, a Registered Gas Installer (RGI) must be employed.

In locations where frost heave is likely to occur, plinth insulation must be kept 10mm above ground level.

4.1 STRENGTH AND STABILITY

This matter is dealt with in Section 4.1 of NSAI Agrément Certificate 09/0331.

4.2 BEHAVIOUR IN RELATION TO FIRE

This matter is dealt with in Section 4.2 of NSAI Agrément Certificate 09/0331.

4.3 PROXIMITY OF HEAT PRODUCING APPLIANCES

This matter is dealt with in Section 4.3 of NSAI Agrément Certificate 09/0331.

4.4 THERMAL INSULATION

This matter is dealt with in Section 4.4 of NSAI Agrément Certificate 09/0331.

4.5 CONDENSATION RISK

This matter is dealt with in Section 4.5 of NSAI Agrément Certificate 09/0331.

4.6 MAINTENANCE

This matter is dealt with in Section 4.6 of NSAI Agrément Certificate 09/0331.

4.7 WEATHERTIGHTNESS

This matter is dealt with in Section 4.7 of NSAI Agrément Certificate 09/0331.

4.8 DURABILITY**4.8.1 Design Life**

An assessment of the life of the system was carried out. This included an assessment of:

- Design and installation controls;
- Proposed building heights;
- Render thickness and specification;
- Material specifications, including insulant, mesh, beading and fixings specifications;
- Joint design;
- Construction details;
- Maintenance requirements;
- Accelerated aging test data.

The assessment indicates that the system should remain effective for at least 30 years, providing that it is designed, installed and maintained in accordance with this Certificate. Any damage to the surface finish shall be repaired immediately and regular maintenance shall be undertaken as outlined in Section 4.6 of this Certificate. Beadings and nosings shall be as shown in building details. The use of exposed plastic beads/nosings for weathering purposes is not permitted.

4.8.2 Aesthetic Performance

This matter is dealt with in Section 4.8.2 of NSAI Agrément Certificate 09/0331.

4.9 PRACTICABILITY

This matter is dealt with in Section 4.9 of NSAI Agrément Certificate 09/0331.

4.10 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING

This matter is dealt with in Section 4.10 of NSAI Agrément Certificate 09/0331.

4.11 OTHER INVESTIGATIONS

This matter is dealt with in Section 4.11 of NSAI Agrément Certificate 09/0331.