

warm | shell

Internal

Interior Wall Insulation

Specification

Clauses

Warmshell © 2021

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Lime Green's Warmshell Internal is an internal wall insulation solution designed to radically improve the thermal performance of solid masonry buildings while ensuring moisture is controlled at safe levels within walls.

This moisture control ensures that the structural integrity of the building is maintained and the health of the occupants are not compromised by the introduction of the insulation system. Additional benefits of Warmshell Internal include improved internal acoustics, very low VOCs, which help, along with the antiseptic properties of lime, to maintain good air quality. With the absence of biocides and toxic chemicals Warmshell Internal is safer to produce and use.

Lime Green's supply chain includes specialist distributors and installers who help to ensure high standards of installation, of the Warmshell Internal system, are maintained. Warmshell Internal comes with a 25 year warranty against a product having a manufacturing defect, as outlined in our Warmshell Internal Warranty Terms document.

This Specification Clause document is to be used in conjunction with the Warranty Terms document.

The following clauses should be read in conjunction with Lime Green's.

- Site Assessment Guide and Checklist
- Warmshell Internal Design Guide
- Warmshell Internal Design Details

Everything contained within these clauses is based on information available at the time of writing and covers the material properties of the products supplied, as part of Warmshell Internal, only. Lime Green cannot be held responsible for any site conditions, or for the performance of materials that are not supplied by Lime Green.

Lime Green can also not be held responsible if any materials within the Warmshell Internal system are substituted or system parameters are not followed. Requirements of all relevant British Standards and Industry Codes of Practice should be complied with at all times.

If this document is to be used within a project specification proposal, all clauses that are not applicable should be deleted.

1 General

Internal Wall Insulation (IWI) solutions can be highly effective at reducing heat loss in historic buildings and solid wall properties. However it is key to remember that when insulation is fitted to a wall the inherent physics of the building is changed. If this is not appreciated and the methodologies that have been developed are not implemented correctly then there is a very real risk that the building fabric could be compromised, or more seriously the health of the occupants could be harmed.

This specification clause is written, in conjunction with other Warmshell Internal supporting material, to mitigate against these risks and ensure that the objective of significantly enhanced thermal performance and related benefits of increased comfort are achieved.

2 Site Survey

Before beginning the design specification and the installation of Warmshell Internal the following is required;

- Identify which BRE exposure zone the building is located. Based on Lime Green's Warmshell Internal Design Guide notes 5.2. identify whether Hygrothermal modelling, such as WUFI, is required under BS5250 (Moisture in buildings).

3 Building Survey

Before beginning the design specification and the installation of Warmshell Internal the following is required;

- 3.1. Identify which BRE exposure zone the building is located. Based on Lime Green's Warmshell Internal Design Guide notes 5.2. Identify whether Hygrothermal modelling, such as WUFI, is required under BS5250 (Moisture in buildings).
- 3.2. Complete the Site Assessment Checklist and associated remedial works.
- 3.3. Confirmation, of whether, or not, the wall requires a structural assessment, from the project structural engineer, to receive the system.

4 Design and Specification

The design and specification should follow the Warmshell Design Guide and provide the most effective solution using the three primary considerations: Thermal Performance, Risk and Impact on the Existing Property. (in terms of services, room area and original interior features).

- Thermal Performance: Ensure the principle thermal performance (u-value) has not been over specified in regard to thermal bridging. See Design Guide notes 5.1
- Risk: Ensure that moisture risk to the property has been assessed against BS5250 (Moisture in buildings) This should include assessment against BS EN 15026 using Hygrothermal modelling tools such as WUFI. NB the older BS EN ISO 13788, which the standard dew point calc. is based on, should not be used as it is no longer compliant with the latest version of BS5250 (Moisture in buildings)
- If it has been deemed necessary to remove the existing plaster, determine the thickness of Lime Green's Duro required for dubbing out/parge coating to level the substrate.

- If the walls are to be brought into plumb determine the additional thickness of dubbing required.
- Parged walls must be relatively smooth, within +/-4mm over the length of a Warmshell insulation board, before the boards themselves are applied.
- Airtightness can be achieved over the principle wall area with a continuous minimum layer of 8mm Duro parge coat. Interfaces between the wall and window frame, door frame, joist ends and window sills, should be treated with tapes such as Pro Clima Contega Solido SL (designed to take wet plaster, which must also be meshed), or in the case of joist ends can, alternatively, be parged with Duro).
- Ensure standard build up and details follow those set out in the IWI Design Details which include;
 - Standard Wall Build Ups

- Standard build up	IWI 001a
- External corner	IWI 001b
- Internal corner	IWI 001c
 - Window Reveal Details

- Existing window	IWI 002a
- Existing window + secondary glazing wall	IWI 002b
 - Standard Floor Details

- Intermediate floor [At 90° to Joists]	IWI 003a
- Intermediate floor [Parallel to Joists]	IWI 003b
- When access is available from below the floor	IWI 003c
- When access is available from above the floor	IWI 003d
 - Roof

- Eaves detail cold roof	IWI 004a
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 - Additional Useful Details

- Junction with internal solid wall (A)	IWI 005a
- Junction with internal solid wall (B)	IWI 005b
- Junction with new internal wall, timber	IWI 005c
- Wall below external ground level	IWI 005d
- Integration of services	IWI 005e
- Fixings	IWI 005f
- Consider any other information believed to be relevant by architect / engineer.

Warmshell Internal system components included in these clauses

N.B. Datasheets for all system components can be found on the Lime Green website.

Warmshell Insulation Board:

- Manufactured under licence for Lime Green Products Ltd
- Sole Supplier Product description: Vapour open, capillary active and hygroscopic woodfibre insulation board
- Format: Rectangular with tongue and groove profiled edges
- Thickness: 40/60/80/100 mm
- Board Dimensions: 1430 x 560mm (mm without T&G)
- Thermal conductivity: 0.044 W/mK (40mm, 60mm) 0.40 W/mK (80mm, 100mm) according to EN 12667
- Specific Heat Capacity: 2100 J/kgK
- Density: 195 kg/m³ (40 and 60mm); 130kg/m³ 80mm+
- Compressive Strength : 200kPa @10% deformation (40 and 60mm) or 70kPa (80mm+) according to EN 826
- Tensile strength perpendicular to plane of board: 25 kPa (40 and 60mm) or 7.5kPa (80mm+)
- Sd value: 0.65/0.75/0.85/0.95 m

Duro 'Optional' Levelling Coat, sometimes described as Dubbing Out Coat:

- Manufacturer, Lime Green Products Ltd.
- Use – Dubbing out/parge coat for uneven walls / Optional finish coat
- Bag : 25kg
- Coverage: approximately 1.7Kg/mm/m²
- Water consumption : 4ltr – 5ltr per bag Water vapour Diffusion Resistance (μ) : 5/10
- Capillary water absorption : WO EN 1015-18
- Drying time @ 5°C minutes (varies according to humidity) 3 to 5 days?
- Minimum application temperature: 5°C
- Storage : A cool (frost free) and dry – 6 month lifespan unopened

Warmshell board Adhesive

- Manufacturer, Lime Green Products Ltd.
- Use – to bond Warmshell woodfibre to the wall.
- Bag : 25kg
- Coverage: 2.5m² per bag with a 10mm notched trowel
- Water consumption : approx. 4 1/2 litres per bag
- Capillary water absorption: we need to re-test this.
- Drying time @ 5°C minutes (varies according to humidity)
- Minimum application temperature: 5°C
- Storage : A cool (frost free) and dry – 6 month lifespan unopened

Solo Plaster

- Manufacturer, Lime Green Products Ltd.
- Use – to bond Warmshell woodfibre to the wall.
- Bag : 25kg
- Coverage: 2.5m² per bag with a 10mm notched trowel
- Water consumption : approx. 4 1/2 litres per bag
- Capillary water absorption: we need to re-test this.
- Drying time @ 5°C minutes (varies according to humidity)
- Minimum application temperature: 5°C
- Storage : A cool (frost free) and dry – 6 month lifespan unopened

Ejot H1 eco Fixing (optional)

- Hammer fixing with steel pin and low profile flexible washer
- Anchor diameter – 8mm
- Washer diameter – 60mm
- Minimum embedment in substrate - 25mm (do not incl. Plaster layers)
- Drill hole depth – embedment + 10mm
- Point thermal transmission – 0.001 W/K
- European Technical Assessment – ETA-11/0192

Solo Guard

- Manufacturer, Lime Green Products Ltd.
- Use – Breathable stain repellent for Solo lime plaster
- Tub 10 litre UN cans
- Coverage: approximately 10 m² per litre
- Drying time @ 5°C minutes (varies according to humidity)
- Minimum application temperature: 5°C
- Drying time @ 5°C minutes (varies according to humidity)
- Minimum application temperature: 5°C
- Storage : A cool (frost free) and dry – 12 month lifespan unopened

Solo Mesh

- Use – embedded in the Solo base coat
- Roll : 1m x 50m
- Coverage : 45m² with 10% overlap
- Storage : indefinite

5 Installation

Before Installation all remedial work, listed as required in the assessment Survey Checklist must be completed, ensuring the building is weather tight under all anticipated conditions. The building should also be capable of resisting all dead loads and design live loads, including impact and wind loads, and accommodate Warmshell Internal without damage. Installation should be undertaken by Lime Green approved installers.

6 Site Condition

All industry standard codes of practice and Health and Safety procedures to be followed.

7 Warmshell Internal Installation Requirements

- The installation of the Warmshell Internal system must be carried out by a competent contractor who is familiar with all Warmshell Internal material provided by Lime Green.

8 Preparation

- Remove all existing wallpaper. It is preferable to remove wallpaper without steam to reduce excessive moisture being pushed into the wall, which can damage old lime based plasters will require increased drying times.
- Remove impermeable coatings, such as oil based, paints. Scratch and score existing emulsion paints. (If the external brick is painted it must be in sound condition)
- Carefully remove all existing features such as skirting, coving, dado and picture rails etc.
- Reroute electrical services away from the wall/or/make good services to receive Warmshell Internal.
- Remove Plasterboard.
- Remove existing plaster if unstable or gypsum based, as required.
- Apply Duro as a dubbing out/levelling/parge coat if existing plaster has been removed, to a thickness that will level out the surface to +/- 4mm, over the length of a Warmshell insulation board.
- Duro requires a drying time of typically 1mm/day, subject to room humidity and temperature.

9 Warmshell Insulation

- Ensure Warmshell insulation boards are installed above DPC.
- Consider board layout to ensure minimum wastage
- Cut back floorboards to the depth of the Warmshell insulation. This also provides access to fit insulation in the intermediate floor zone, see Design Details IWI 003a / 003b
- Cut insulation boards to fit tight against abutting surfaces working from the bottom to the top of the wall. When cutting use localised extraction.
- Apply Warmshell board adhesive with a toothed trowel over the FULL surface of the back of the insulation. **NB do not dot and dab** the insulation onto the wall as this could lead to mould growth affecting the integrity of the building fabric or the health of the occupants.
- Ensure that the board is pressed and slid into location onto the wall, while the Warmshell adhesive is still wet, to eliminate all air gaps.
- Fit the boards in a 'brick bond' pattern with a minimum 200mm offset between courses.
- Where the substrate that takes the insulation is even the Warmshell adhesive will be sufficient to hold the board in place.
- If the profile of the wall curves, then fixings may be required as an additional measure to the Warmshell board adhesive. Fixings must be thermally broken (Ejot H1 Eco) and be fitted through the Warmshell Insulation board and into substrate. Ensure that the length of the fixing takes account of the insulation thickness, the Warmshell adhesive, any original plaster thickness and/or dubbing out coat and a minimum embedment into the substrate of 35mm.

10 Internal Plastering, First pass and Second pass

10.1. Before applying the internal Solo base coat

10.1.1. Ensure all electrical services that are to remain on the inside face of the external wall, are accounted for, either by chasing into the existing wall and dubbing in with Duro, or by chasing into the surface of the Warmshell insulation, running within conduit and dubbing in, this time with Solo plaster.

10.1.2. Apply beadings to corners where needed.

10.2. Apply a first pass of Solo plaster approximately 4mm in depth, then fully mesh the surface. Run the mesh from top to bottom. Ensure a 100mm overlap with adjacent mesh falls, ensuring that the edges of the first mesh are pressed into the Solo before overlapping with the second. This ensures the overlapping mesh is not in direct contact with the first.

- 10.3. Use additional mesh, or meshed beading, to reduce the risk of cracking, along all exposed board edges and around all openings, such as window reveals. Bed the mesh in the first pass overlapping the edges, of adjacent mesh, by 100mm.
- 10.4. Apply a second 4mm pass of Solo plaster over the first, while it is still wet, so that the mesh is within the centre of the full Solo build up.

11 Finishing off the Internal Plaster

- 11.1. Once the Solo plaster is firm use a wet sponge to draw out some of the lime to the surface.
- 11.2. The surface can then be troweled flat using a steel or fixable trowel.
- 11.3. Other surface textures can be produced as shown in the Installation Guide, or email Lime Green for a sample panel at info@lime-green.co.uk.

12 Detailing

- 12.1. Bathrooms: Large areas of tiling should not be applied directly onto Warmshell Internal. Contact Lime Green for advice if this is required.
- 12.2. For walls that are below the external finished ground level, or DPC, Warmshell XPS plinth board should be fitted, see IWI Design detail IWI 005d.
- 12.3. For junctions to internal solid walls, where the insulation thickness exceeds 60mm, reference; IWI Design detail IWI 005a and 005b the returns should also be insulated to a minimum of 200mm along party/internal wall.
- 12.4. Ensure intermediate floor voids are insulated, where possible. Cut back floorboards to depth of the insulation thickness. Embedded joists must be taped, or dubbed out with Duro, at the interface of wall and joist. Also ensure that the wall is dubbed out with Duro minimum 8mm if the masonry work is bare. Ensure that 50mm flex insulation is then tightly fitted against the exterior wall. see IWI Design detail IWI 003a. Where joists are parallel to the wall tightly pack flex between the wall and joist. See IWI Design detail IWI 003b. Muck in with Duro if gap is too small for flex insulation.
- 12.5. For window reveals fit insulation to the reveal and cut back to thickness required.

13 Completion and Handover

On completion the site should be cleared of all unused materials and equipment. The work should be inspected by the project supervisor and photographed if required. Any snagging required should be listed and feed back to the relevant individuals.