Warmshell External wall insulation system
Design guidelines for masonry




Cladding the outside of a building with Warmshell is an excellent way to upgrade its thermal performance, looks and improve its weather protection.

Warmshell is a high performance construction system that uses insulating wall board and lime-based render. Once in place, it provides an effective and simple way to increase insulation values for a wide range of properties - keeping walls warm, dry and weather-proofed. Warmshell also helps to create a more comfortable and healthier living space within the property itself.

The Warmshell system is designed to be as warm and breathable as possible and is ideal in the thermal upgrade of solid wall masonry walls, historic timber frames and new construction too.	
Highly breathable Boards and render	Good airtightness
Good impact and weather resistance	Tested in accordance with ETAG 004
Lime based mineral render system	Low thermal bridging
Sound protection	Heat storage in hot and cold weather
Good fire protection	Thermal insulation for solid walls and timber frames

The Warmshell system has been tested against and meets ETAG004 external wall insulation and is certified with a CE mark. It is also undergoing BBA assessment.

The Warmshell system consists of interlocking insulation panels made of compressed natural wood fibre. These come in 40mm, 60mm, 80mm and 100mm thicknesses, depending on the insulation levels required.

Once the panels are in place, a first coat of Lime Green Prepbond WP with reinforcing mesh is applied to give structural integrity across the whole wall surface, followed by a top coat of Lime Green Finish WP to a total thickness of 15mm.

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Proprietary render bead profiles and trims are used at wall edges and corners. With Warmshell, the walls remain weatherproof and weather resistant but can still 'breathe', as trapped moisture is able to escape.
Special additives in the render mix reduce the risk of cracking and algae growth, producing a durable, stable finish and vastly reducing the need for maintenance and repair.

To make sure you get the most from your Warmshell system, Lime Green offers an in-depth technical support service that covers all aspects of your build, from pre-planning right through to completion.

System components

The system is composed of an insulation board composed of woodfibre, lime render in two coats incorporating a fiberglass mesh, specific fixings and profiles.
Woodfibre boards are made by pulping wood fibre from sustainably managed sources which is them reformed in to sheet material. No chemicals are used. This type of production uses the wet process, where the action of water and heat reactivates the natural lignin and hemi-cellulose in the wood fibre, ensuring firm bonding.
Ecologically sound adhesives based on modified natural starch are then used to bond them together.
. The product itself takes all aspects of the environment into consideration. Insulation panels are fully recyclable.

Woodfibre boards include only natural materials which cause no health problems. They are predominantly (up to 98%) wood fibres. Only natural substances such as paraffin and natural starch are added to improve some of the properties. The boards are protected against wood-destroying insects and pests due to the removal from the wood of all of the aromatics which attract insects and pests. The final product has approximately a 7-8% humidity content, wood-destroying insects are attracted to softwoods with a humidity content of above 15%.

Areas of application	
Suitable substrates	**Unsuitable substrates**
Solid masonry walls	Painted masonry walls or render Ventilated cavity walls
Good practice Designs with good overhangs, eaves detailing and measures to deal with water should be as robust as possible.	

<u>Masonry walls</u>

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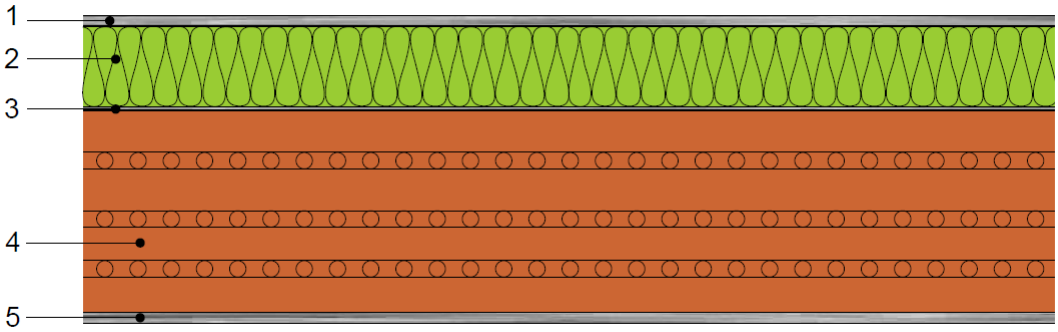
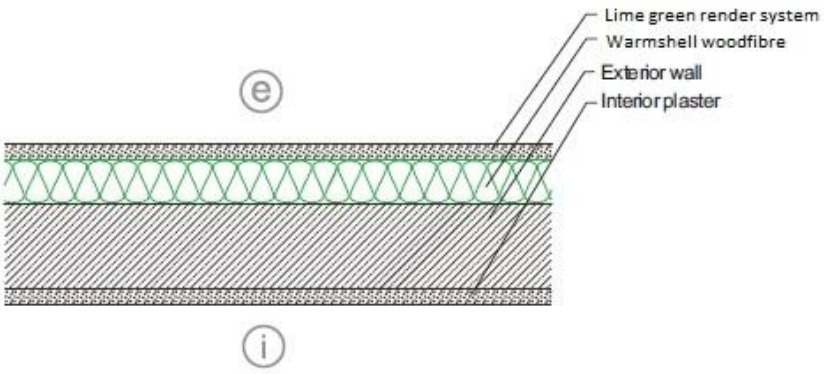


1. *Lime green Render 15mm*
2. *Warmshell insulation boards 40, 60,80 and 100mm fixed with mechanical fixings*
3. *Leveling coat if required*
4. *Masonry*
5. *Internal plaster*



Building - physical values	Thermal transmittance U [W/(m².K)]			Temperature phase shift ψ [hour.]			Airbourne sound insulation Rw [dB]		
	Insulation thickness in mm								
Hofatex® SysTem	60	80	100	60	80	100	60	80	100
	0,56	0,44	0,39	8,3	9,6	11,0			

Expected u values on Old Solid Brick Wall		
Build Up	Thermal Board Thickness (mm)	Thermal performance U value W/(m^{2}K)
Solid brick wall (225mm) Warmshell Board Lime green Render 15mm	0	2.02
	40	0.71
	60	0.65
	80	0.38
	100	0.26

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Preparation
Old walls need to be suitably flat and clean; use Beecks Fungicide to kill any algae growth. Remove all down pipes and any other services. Gutters must be re-routed away from the building during the works.
Uneven walls need leveling before board installation; use lime green Duro.

An inspection of the building should be performed before designing and installing the system (e.g. condition of the wall, surface evenness, etc.) The results shall be taken into account when designing and specifying the type of fixing and detailing.

- Having determined the correct fixing type; the number, position and layout is dependent on the substrate, location and height of the building to be insulated with the system.
- Before fixing of the boards, checks should be made to ensure that the masonry type is matched to the correct fixing and is sound. We supply different types and are always happy to advise on which one to specify.

Woodfibre insulation Board
The Warmshell insulation board is a woodfibre tongue and groove board that both insulates the wall and carries the render. It is produced from renewable material; it achieves very good thermal insulation values along with good acoustic insulation. In addition the high thermal capacity ensures a very good protection against summer heat, exhibiting very good phase shift properties
Because of its high permeability to water vapour these boards are designed for use in diffusion open constructions guaranteeing a quality indoor living environment.

Thicknesses available; 40,60,80 & 100mm. Any of these may be combined together.

Where the insulation boards abut another material e.g. a window, door frame or between the above and beneath DPC system, a foam sealant strip such as Compriband 600 should be used to provide a weather tight seal between the two materials.

Base Rail
An aluminium profile specially designed for starting the system and protecting the boards at the bottom of a wall or anywhere the system starts. Ensure that the base rail supplied is the right thickness to match the boards being fixed. Fix the base rail to the masonry wall using the correct ZH fixings. The base rail should be fitted a minimum of 150mm above the finished ground level or just above DPC. Please ensure the rail is level and each length is joined using the dedicated joining strip as this will provide the support for the first row of boards, dictating the levels for the system.

Cutting the boards
Protect edges from damage during handling.

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The boards can be cut with conventional electric tools used for cutting or sawing wood or wood based materials. Also an electric jigsaw with special blades for cutting of soft insulation materials can be used.
Any board waste may be disposed of in the same manner as untreated wood waste.
When cutting and handling products please ensure the correct personal protection equipment is used and inhalation of any dust produced is prevented.
Insulation panels must be stored flat and protected from the weather.

Fixing the boards
Special fixings are used to fix the boards to the wall. These fixings are designed to conduct less heat, keeping the wall warmer . Various types are available for different backgrounds; please consult us for further details regarding fixing type and length.

Masonry types A B & C- specify *WT Hammerset* fixing
Structural fixing for brick, stone and block backgrounds.
N.B not all stone walls are easy to fit hammer fixings to; it may be worth considering a timber batten arrangement with flexible insulation between battens and the wood fibre boards fitted over the top as if to a timber frame.

Refer to data sheet Warmshell information sheet N°06 for further information

Masonry types E & D - specify *LX Hammerset* fixing
Structural fixing for low aggregate concrete and aerated blocks.

Refer to data sheet Warmshell information sheet N°07 for further information
Only fix dry boards.
The first board is placed on the base profile and fastened with the appropriate fixing for the background.
Cut the Thermal Boards by hand or with a circular saw. Always cut out small pieces from a whole board.
The number of fixings is dependent on the type of masonry, the height of the building and the wind load.
The boards are placed in a lattice horizontally and pushed tight together. They should alternate down the corner. Vertical joints must be staggered. Each board will usually have a min of 5 fixings.
Cut pieces and staggers between boards must be at least 200 mm wide.
Corners are alternated

Additional gluing of the boards to the subsurface is not necessary. However on uneven masonry the background should be leveled to ±5mm per linear meter. This can be carried out with Lime Green Ultra, a thermally insulating render. Please consult us for further details.

Reveals
Window and door reveals should also be insulated to prevent cold spots. However, frequently there is insufficient space to use the Board, in which case 2 options can be used:

i) A 20mm or 40mm board is mechanically fixed and / or pushed in to a coat of Prepbond Render

ii) A 5mm coat of Prepbond, followed by a coat of LG Ultra insulating render (5 to 20mm depending on depth available), followed by a 5mm coat of FinishWP.

Eaves
The exact detail around the eaves will vary depending on the roof and overhang etc. The roof ventilation profile is often useful (see section). Sometimes it may be necessary to move the gutter and extend the tiles/slates if there is limited overhang.

Beneath DPC
Below the Baserail a different type of insulation and render system is used.
The insulation can be either XPS insulation or Foamglas. Render undercoat: Lime green Prepbond Q 10mm with glass fibre 660 mesh lime green Finish WP as the final coat at 5mm thick.

Behind flashing and in proximity to roofs
Do not use the wood fibre board behind lead flashing or ….. use XPS or Foamglas boards in place of the wood fibre. The lead flashing should be returned up (150mm) the XPS and back and under the woodfibre board see Dia…..

Rendering - preparation

The render system whether used on masonry or in timber frame construction relies upon a range of additional components that ensure the system performs correctly in its defense against the weather.

Gaps between the boards will be minimal due the innovative tongue and groove design. However if there are any gaps in the boards these should be filled with a combination of woodfibre and glue. Larger gaps should be filled with wedge shaped pieces of the board glued into place.

Frame seal
It is especially important to seal the junction between the system and other materials e.g window and door frames. This may be done in a number of ways but is easily achieved using our special frame seal must be used around window and door frames to ensure long lasting weather protection. This bead receives the render and acts as a means of mitigating crack formation. Product reference drawing No

Corner beads
Corner beads come with a glass fibre mesh incorporated into the design to help ensure continuous reinforcement across the system. Rounded corners are unlikely to be successfully formed using either coloured render or on square edged boards and should not be specified.

These should fitted by embedding them in a thin layer of Prepbond WP before the main undercoat is applied. The mesh wing of the corner bead and glass fibre mesh within the undercoat should overlap.

Drip bead for base rail
The base rail should have the drip bead with glass fibre mesh attached by ??? slip it on from above ensure that it is properly seated and using the Prepbond WP embed the mesh onto the boards before the main undercoat is applied.
The mesh wing of the drip bead and glass fibre mesh within the undercoat should overlap.

Movement Joints
It's not necessary to provide movement joints in the insulation system unless they are present in the background. If they are, a dedicated joint should be formed in the system with the correct horizontal, vertical render or full system movement joint. See Drawing ….

Other trims and flashings
Various other trims and flashings may be necessary, including enlarged window cills, expansion beads, copings, base profiles for corners etc. These often have to be made to a bespoke design for existing buildings, or may not be required at all on new build. Please consult us for further details.

Rendering
All the renders are made with Natural Hydraulic Lime, for excellent levels of breathability, durability and elasticity. Lime green Prepbond WP and Finish WP give a beautiful traditional look, avoiding the synthetic, appearance of many "modern" renders.

Lime Green Finish WP is available in a choice of colours and textures, reducing the cost of regular painting and the possibility of inappropriate coatings being used in the future. A further larger range of up to 300 colours are available when using the Beecks silicate mineral range. The final coat may be finished in a number of different ways; scraped, floated or cast. Advice on how to achieve different finishes and the techniques required is available from the system supplier.

We only recommend light colours for use with the thermal board; strong colours will heat up more quickly in direct sunlight causing greater thermal movement.

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Approximate Product Requirements for 1 m² installed			
Main components	**Product**	**Thickness/Dimension mm**	**1m2 installed**
Insulation board	System	20 -100mm	1.298 boards
Fixings for masonry	Integrated washer plastic nail	As required	6.49 pieces
Undercoat render	Lime green Prepbond WP	Approx 8-10mm	10-12kg
Re-enforcement	Lime green glass fibre mesh 660	Standard	1,10 m²
Finish coat	Lime green Finish WP	Approx 5-7mm	8-11kg
Other principal components			
Base rail	The perimeter of the boards	2.5m lengths	As required
Base rail fixings	ZH fixing	Approx. 9 fixings per 2.5m length	
Render beads	Base rail drip bead	2.5m lengths	As required
	LK Corner bead	2.5m	As required
Joint between render and frames	Frame seal	2.4 m lengths	As required
No allowance for wastage has been made ? or for other minor components.			

Aftercare and Maintenance

Cleaning
The renders are designed for low maintenance, and are unlikely to need painting for decades. Dirt and lichen can be removed with gentle scrubbing using a Beecks Fungicide. Downspouts and gutters should be checked on a regular basis to ensure water is not leaking on to the render.

Painting
If at some point the owner wishes to change the colour of the render, it is possible to paint it. The recommended and correct paint to use is Beecks Renosil silicate mineral paint to prevent the buildup of moisture beneath. Do not apply masonry paint or other film forming paints with a high vapour resistance.

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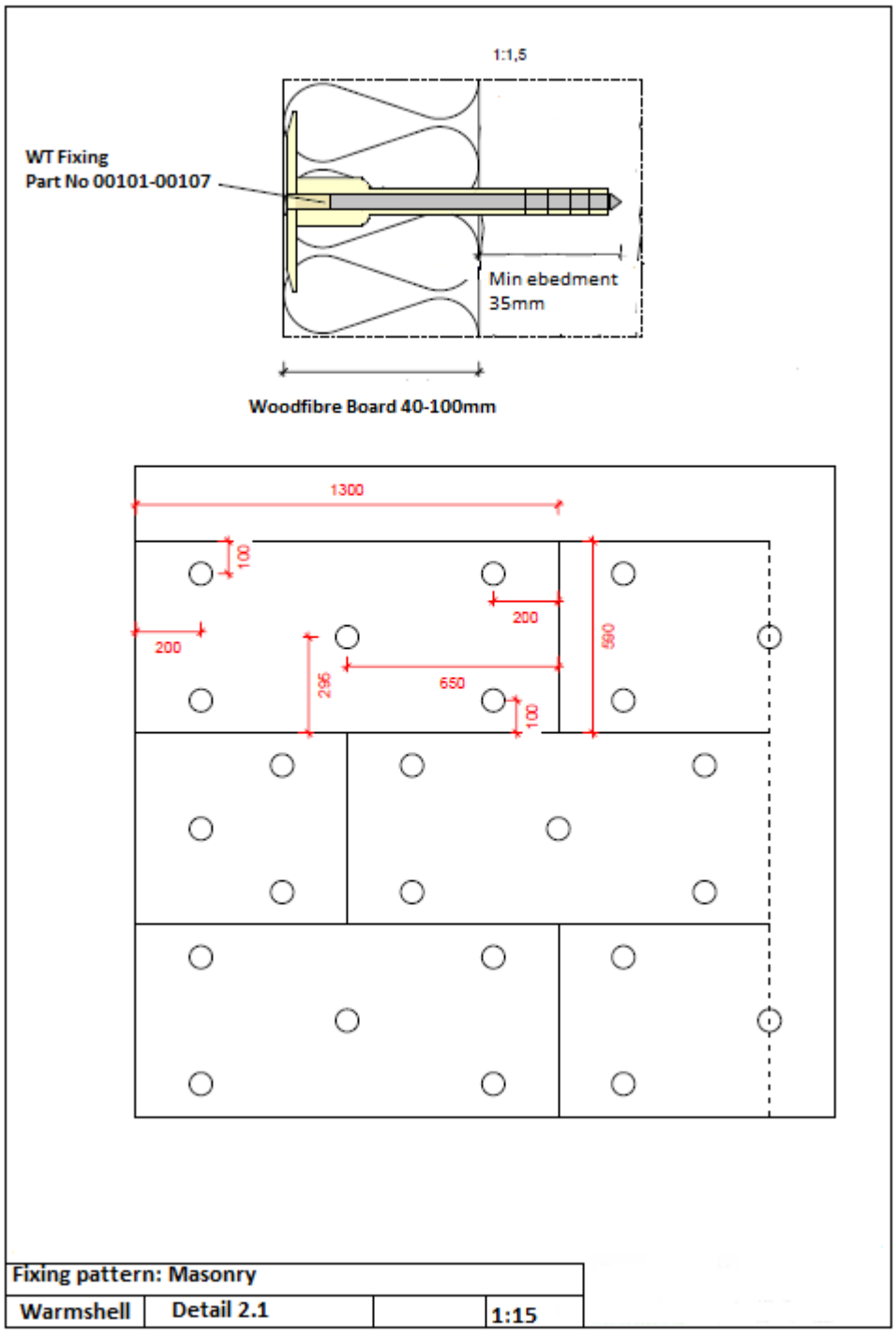

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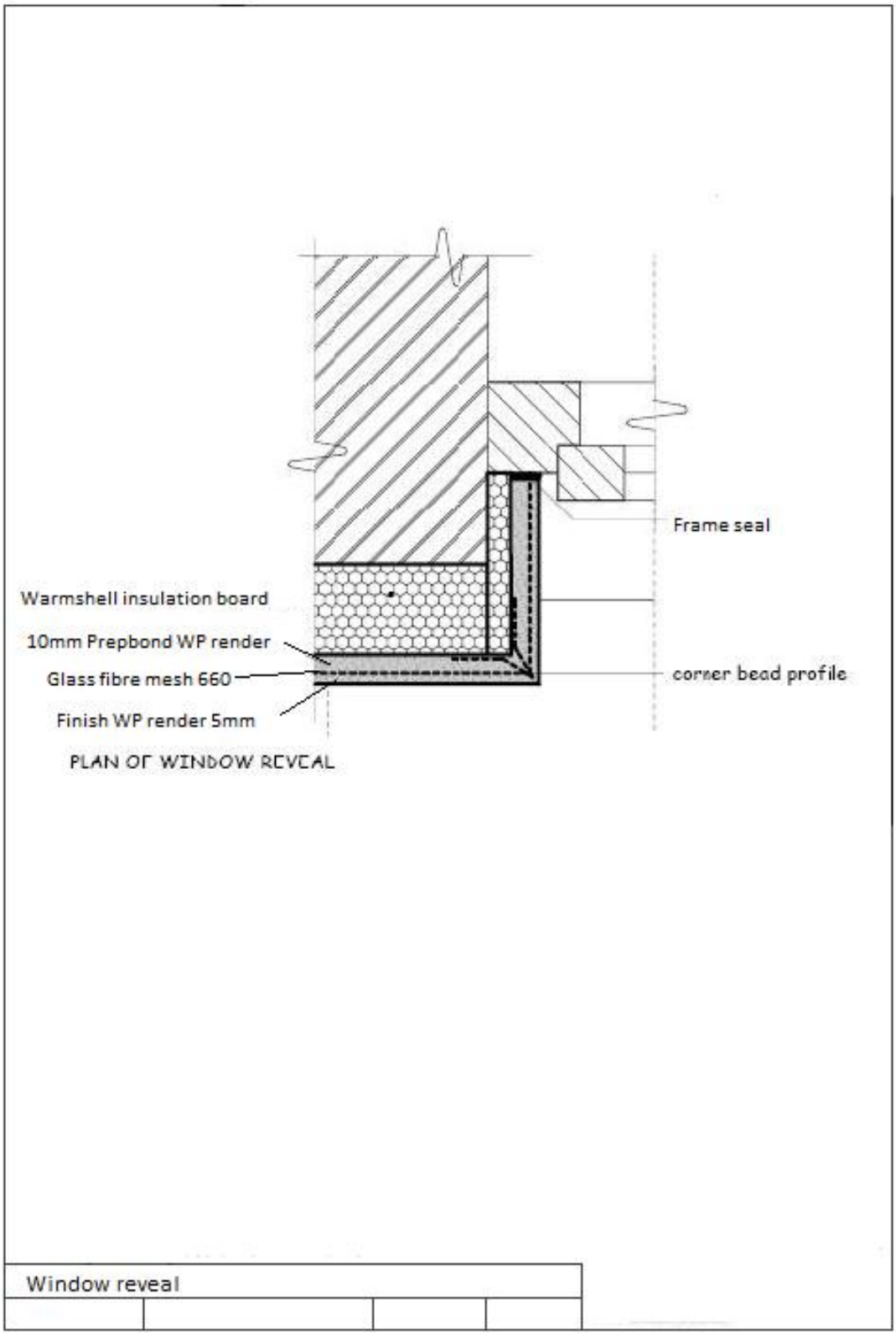

Window reveal

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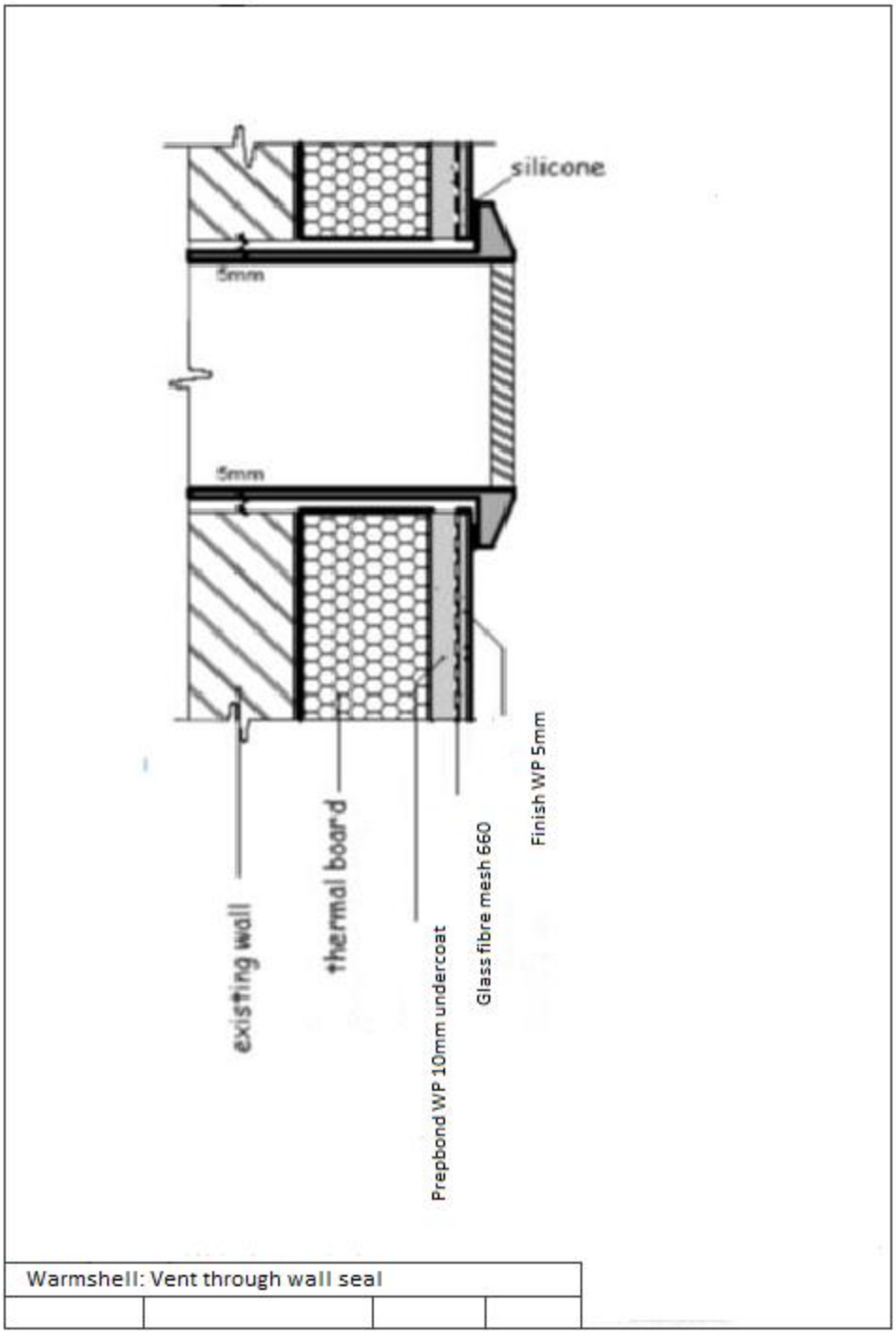

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The Warmshell system has been tested against and meets ETAG004 external wall insulation and is certified with a CE mark. It is also undergoing BBA assessment.
It is therefore vitally important that the correct components are used and are those specified by Lime green. Lime green is unfortunately unable to help with problems that arise when system components are substituted or omitted.
It is a requirement of your house building warranty provider and insurer that the system is used and installed is compliant with lime green's technical approvals, doing so will ensure a durable, robust system requiring minimal maintenance.

To make sure you get the most from your Warmshell system, Lime Green offers an in-depth technical support service that covers all aspects of your build, from pre-planning right through to completion.

Prior to the start of building, Lime Green will evaluate your project to make sure that all design and build requirements are in place for the Warmshell system.
For product comparison, and any necessary sign-off by local authorities, samples of all relevant materials can be provided, together with sample drawings for architects, planners and building control, trades people and other construction professionals. Lime Green also supplies thermal calculations and a condensation risk analysis to ensure compliance with all relevant regulations, together with costings for the project.

Once on site, Lime Green provides all the technical and installation advice required to ensure that your project runs smoothly to budget, brief and deadline.
For further information about the Warmshell system, call us on 01952 728611

Since its formation in 2002, Lime Green has established itself as the UK's foremost manufacturer of hydraulic lime mortars, renders and plasters.
And by working with other companies and organisations, as well as through ongoing research and development in key areas such as product chemistry, environmental assessment and historic building maintenance, we continue to make our products even better.