

04

## Insulated Render Systems Refurbishment





## What is an Insulated Render System?

Did you know that over a third of the energy required to heat a property escapes through the external walls?

An Insulated Render System (also known as External Wall Insulation) is the perfect solution to this problem.

The system involves the mechanical or adhesive fixing of insulation boards to the outside of a building, that is covered with a mesh reinforcement, a base coat and a final decorative finish. This layered method encases the property and helps prevent heat from escaping unnecessarily, containing it within the property.

Wetherby have an impressive portfolio of systems allowing architects to confidently specify a flexible building solution that not only conforms to current building regulations and energy standards, but offers a wide choice of final finishes to fully meet the client's aesthetic expectations.

### The Energy Efficient Choice

The external appearance of a building is truly an important aspect, especially to its residents, yet increasingly, with the rapid depletion of the world's energy resources, high profile environmental issues, such as climate change, are beginning to take precedence over aesthetic preferences and stringent legislation demands that the thermal performance of any building is strictly governed.

External Wall Insulation was introduced to Britain in the 1960's, yet it would be fair to say that it has taken time to establish itself. However, over the last ten years, the Decent Homes Standards and Part 'L' of the Building Regulations have significantly increased insulation standards and the demand for more innovative solutions for renovating properties, increasing thermal performance and reducing carbon emissions.





“Creating sustainable communities for tomorrow doesn’t mean we have to clear away decent neighbourhoods today”.

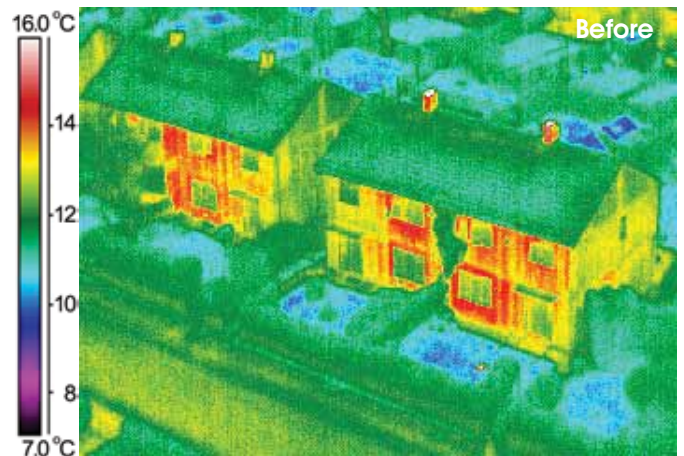
## What are the benefits?

Insulated Render Systems not only improve insulation values, but also help to reduce heating bills and carbon emissions.

For properties in need of refurbishment, they are a flexible, cost-effective alternative to demolition. In addition, because all WBS systems are designed to be strong and weatherproof, water ingress and damp are eradicated.

### WBS Insulated Render Systems

- Are a cost effective alternative to demolition & rebuild.
- Reduce condensation, heat loss & CO<sub>2</sub> emissions.
- Help to reduce occupants heating bills.
- No need to decant occupants during works.
- Protect and prolong the property’s external fabric.
- Do not reduce the property’s footprint.
- Have a positive effect on the environment.
- Improve the attractiveness of a local area.



# Insulant Types

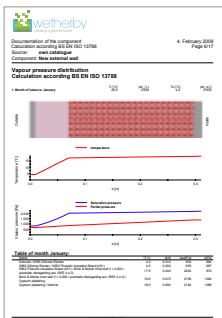
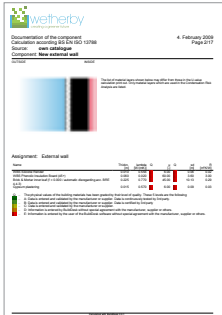
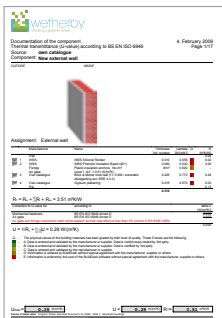
**New Build:** Current building regulations require new insulated buildings to have a 'U' value below 0.35 W/m<sup>2</sup>K.

**Refurbishment:** The building regulations will change once again on 1st October 2010 where the required U-value of any refurbishment project will be lowered from 0.35 W/m<sup>2</sup>K to 0.30 W/m<sup>2</sup>K.

History suggests that improvements will continue to be made during the next five years with the aim of achieving zero carbon homes by the year 2016 and below, you will find the most currently specified insulants along with their current 'K' values.

INSULANT	THICKNESS	'K' VALUE
Polystyrene SD/FRA Grade	10mm - 160mm	0.036 - 0.038 W/mK
Polyisocyanurate (PIR)	0mm - 79mm	0.028 W/mK
Polyisocyanurate (PIR)	80mm - 119mm	0.027 W/mK
Mineral Wool	20mm - 180mm	0.036 - 0.038 W/mK
Lamella	20mm - 140mm	0.040 W/mK
Phenolic	0mm - 24mm	0.023 W/mK
Phenolic	25mm - 44mm	0.021 W/mK
Phenolic	45mm - 140mm	0.020 W/mK

All values correct at time of going to print



## U-Values explained

In simple terms, a U-Value is the measurement of the rate of heat loss through a structure by calculating the thermal properties of each component of the building. Therefore, in all aspects of property design it makes perfect sense that the lower the U-value achieved - the less energy is required to keep the building warm and dry. Take the following calculations as an example:

Typical Uninsulated Property	Thickness [m]	Thermal Resistance [m <sup>2</sup> K/W]	Lambda [W/(mK)]
Outside surface resistance	-	0.040	-
External brickwork	0.225	0.290	0.770
Internal plaster	0.570	0.030	0.570
Inside surface resistance	-	0.130	-
U-value, proportional area method		<b>2.05 W/m<sup>2</sup>K</b>	

Typical Uninsulated Property	Thickness [m]	Thermal Resistance [m <sup>2</sup> K/W]	Lambda [W/(mK)]
Outside surface resistance	-	0.040	-
Wetherby silicone render	0.010	0.020	0.556
Phenolic insulation	0.060	3.000	0.020
Plastic insulation anchors	8/m <sup>2</sup>		0.500
External brickwork	0.225	0.290	0.770
Internal plaster	0.570	0.030	0.570
Inside surface resistance	-	0.130	-
U-value, proportional area method		<b>0.29 W/m<sup>2</sup>K</b>	



# Domestic Refurbishment



Twenty years ago, the use of external insulation and render on buildings in the UK was almost non-existent. Thousands of homes were built in the last century with no regard given to their insulation value, an error which is now making them difficult and expensive to heat. The gradual onset of damp and condensation has since led to internal and external deterioration and has had a direct effect on a multitude of health issues affecting residents.

Today, more and more Local Authorities, Housing Associations and private customers are choosing external wall insulation as a cost-effective and flexible method of renovating social housing that is in desperate need of thermal and aesthetical upgrading, with an aim to reducing CO<sub>2</sub> emissions, unnecessarily wasted energy and the adverse effects these issues are having on the environment.

External wall insulation can be applied to a wide variety of domestic refurbishment types including:

- Single skin brickwork / blockwork
- Solid concrete
- Steel, concrete or timber frame (see our [epsitec](#) system)
- Traditional housing
- Non traditional housing & PRC Properties

Wetherby have a wide range of systems suitable for domestic housing refurbishment including [epsicon](#), [thermaloc](#), [epsitec](#) and [epsiwall](#).

## Solid Wall Properties

Single skin blockwork or properties constructed with a cavity too narrow to be insulated, now fail to meet current building regulations. With this in mind, Wetherby have developed the [epsiwall](#) system.

The [epsiwall](#) system incorporates a layer of Kingspan Kooltherm Phenolic Insulation which is fixed directly to the brick or blockwork substrate using mechanical and/or adhesive fixing methods.

The Kooltherm insulation board, available in a range of thicknesses, offers a K value as low as 0.021 W/mK in comparison to standard external insulations of 0.036 W/mK therefore allowing a significant improvement in the building's overall U-value to be achieved.

Once the insulation has been fixed to the blockwork, a wide variety of render finishes or brick façades can be installed to give modern, seamless finishes or to replicate traditional construction without the cost or reliance of skilled labour.

The [epsiwall](#) system has been fully tested for fire resistance and due to the Class 'O' fire rating properties of the Kooltherm insulant, [epsiwall](#) can be specified for high rise buildings without the need for additional safety features such as fire breaks.

Whether multi-storey, low rise or traditional two storey dwellings, the Client is offered unlimited scope to incorporate curved elevations, features, contrasting textures and colours to give their properties a unique look and feel.



Before



During



After



## Non Traditional Housing & PRC Properties

The term 'non traditional housing' is used to describe the various methods of domestic construction that moved away from traditional 'bricks and mortar'. The majority of these systems were adopted between the First and Second World Wars and used up until the 1960's, mainly to alleviate acute housing shortages. Many different systems were developed over this time span, using materials such as precast and in-situ concrete, steel frame, timber frame and occasionally cast iron.

In the early 1980's many defects in design and construction were discovered in a number of these house types and these designs were designated as defective under the 1984 Housing Defects Legislation (now incorporated into the Housing Act 1985). Although they only form a relatively small proportion of the UK's non traditional housing stock, Local Authorities and private landlords are required to bring these property types in line with current regulations in an aim to sustain local communities, improve tenant quality of living and reduce the need for potential demolition.

These designs were designated as defective under the housing defects legislation and although they only form a relatively small proportion of the UK's non traditional housing stock, Local Authorities and private landlords are required to bring these property types in line with current regulations in an aim to sustain local communities, improve tenant quality of living and reduce the need for potential demolition.

WBS systems have successfully been used on many of these housing types including:

- |            |                     |                        |
|------------|---------------------|------------------------|
| ■ Airey    | ■ Dyke              | ■ Spooner              |
| ■ Arcal    | ■ Hawksley BL8      | ■ Swedish Timber Frame |
| ■ Atholl   | ■ Hawthorne-Leslie  | ■ Tarran Bungalows     |
| ■ BISF     | ■ Kenkast Bungalows | ■ Tarran Newland       |
| ■ Boswell  | ■ Laing Easiform    | ■ Unity                |
| ■ Cornish  | ■ Myton             | ■ Wates                |
| ■ Cussins  | ■ Orlit             | ■ Wimpey No Fines      |
| ■ Dorlonco | ■ Reema             | ■ Woolaway             |
| ■ Dorran   | ■ Stent             |                        |



**AIREY**



**CORNISH**



**UNITY**



**ORLIT**



**TARRAN NEWLAND**



**BISF**



**WATES**



**WOOLAWAY**





## High Rise & Multi Storey Refurbishment

Due to the nature of their construction, with extra stress being placed on the buildings due to wind loads etc. great care has to be taken when designing a system suitable for high rise properties.

In the past, the external maintenance of high rise properties has proven to be a particularly difficult, expensive and time consuming process, which has posed many problems for local authorities, housing associations and private landlords. This in turn has led to many of these properties devolving into such a state of disrepair that demolition is the only viable solution.

Traditionally constructed from pre-cast concrete, post-war high rise accommodation has the reputation of being cold, damp and difficult to heat, resulting in a reduced quality of living for tenants.

In much the same way as low rise refurbishment, high rise and multi storey properties can also benefit from the application of an External Wall Insulation System. WBS systems are ideal for these types of applications and great care and consideration is taken when assessing the many additional technical factors of taller structures, including greater structural movement and increases in wind loads.

On an individual project basis, WBS carry out a detailed survey to ensure that the structure is suitably sound and that the system specified ensures that all weight and wind loading requirements are met. Pull out tests are carried out to gauge the effect of increased wind suction and U-value / dew point calculations are made to ensure that the correct type and thickness of insulation is specified.

Detailed drawings covering all aspects of the system are prepared and every detail of the application, including fire resistance and interfacing the system with new / existing windows, doors and the roof, are considered.

Colour schemes and texture samples can also be prepared for client and tenant consultations.

In close collaboration with the approved installer, WBS monitor the application very carefully from start to finish.

Full guarantee and insurance bonds are also available to give clients and specifiers added reassurance that the system is fully covered against any eventuality.

The benefits of adopting these systems are numerous, yet include an increase in the buildings thermal performance, a reduction of CO<sub>2</sub> emissions, a reduction in condensation and damp and moreover the revitalisation of the external fabric of the building. For the tenant this means lower heating costs and an increased quality of living.



# EWI Technical System Build Up



**Rainwater pipes are removed during the works and short lengths of temporary pipe are fixed and taken over the scaffold away from the wall. Replacement downpipes are fitted on completion via sleeved fixings through the EWI system. An extra thickness of insulation board may be fixed around openings to create features.**

**1.** The base of the system is reinforced with the use of a full depth base profile made of aluminium or stainless steel and finished with a plastic or metal nosing available in various thicknesses. Line of base is usually set at DPC level.

**2.** Capping profiles are available in a range of sizes to suit the various insulation slab thicknesses.

**3.** Undercill or overcill extenders can be supplied in 1.2 – 3.0mm thick polyester coated aluminium with matching push fit end caps for site fabrication. Undercills and overcills are also available prefabricated with welded end caps.

**4.** Full depth system stop beads are available for abutting gas mains and adjoining properties. N.B. Where the adjoining property is also being treated, allow for fitting of WBS expansion joint bead.

**5.** Insulation slabs [1200mm x 600mm x required thickness] are mechanically fixed using approved fixings. N.B. Fixing types are selected subject to substrate and site pull out tests.

**6.** Insulation slabs overlap alternately at corners and are mechanically fixed 150mm in from arris and at 300mm centres vertically.

**7.** Where possible, a reduced thickness of insulation slab may be returned at opening reveals and heads dependent on window or door frame thickness. External angles are reinforced with PVC pre-scrimmed reinforced angle beads. Where frames are too small, mesh and render alone may be used.

**8.** Extra mechanical fixings are used around all wall openings at 300mm centres max.

**9.** Walls should be dubbed out to achieve true line and level and alkali resistant reinforcing mesh can be bedded into an adhesive render coat and allowed to cure for a minimum of 12 hours but not exceeding 24 hours. A second basecoat should then be applied and left smooth to receive the final finish.

**10.** Additional mesh is applied diagonally to all window and door openings.

**11.** All external building corners are reinforced with PVC pre-scrimmed reinforced angle beads to give maximum impact resistance.

**12.** A durable finish is then applied to encapsulate the system and make it watertight. This may be a WBS Silicone thin-coat finish, WBS Polymer Modified Render, WBS Dry Dash Finish, WBS Brick Effect Render or a WBS Brick Slip System. Please see our alternative brochures for further details on available finishes.

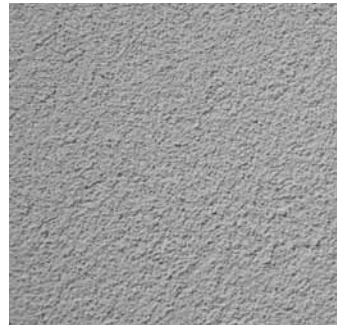
**13.** The chimney may be treated to match the finish on the main walls.

**14.** The plinth below DPC level of the existing wall may also be insulated or painted with silicone paint.

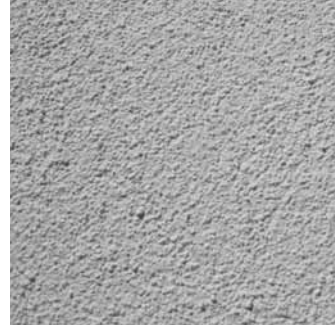


## System Finishes

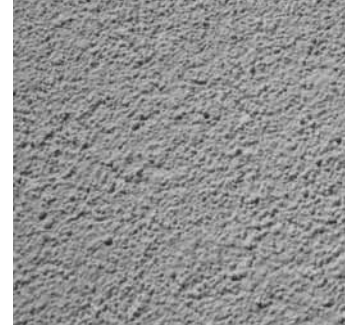
For further information on the full range of WBS External Renders please refer to either the **Silicone & Acrylic Finishes** or **Polymer Modified Renders & Specialist Finishes** brochures.



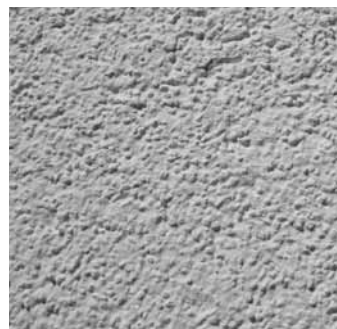
1.0mm 'K'



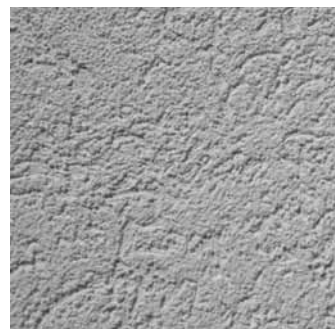
1.5mm 'K'



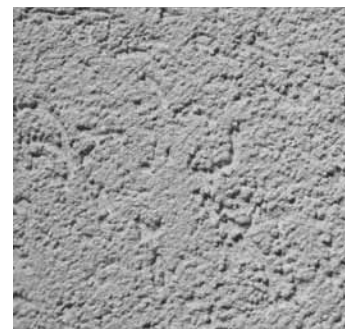
2.0mm 'K'



3.0mm 'K'



1.5mm 'R'



2.0mm 'R'



WBS Brick Slip System



WBS Dry Dash Finish



WBS Brick Effect Render

## Ancillary Products & Components

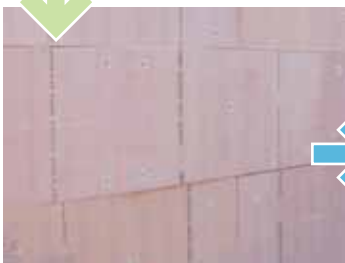
WBS supply a comprehensive range of ancillary products. Full technical details are available on request.



- Beads, trims & flashings
- Mechanical fixings
- Fungicidal treatments
- Stabilising solutions
- Bonding agents
- Sealers & water-proofers
- Anti-graffiti treatments
- GRP canopies & architectural features
- Hand & power tools
- Safety equipment

## Application Guide

Applied to existing brickwork, incorporating phenolic insulation and a dry dash finish.



### Surface Preparation:

Pull out tests must firstly be carried out to determine the appropriate fixings.

If required, the substrate must be brushed down to remove any friable material, algae or lichen and fungicidal wash applied.

(For wet fix and render only applications, stabilising solution may also be applied if required to help improve adhesion and offer uniform suction).

Attach base rails & surface profiles.

Install all beads and trims using approved WBS fixings at a maximum of 300mm centres (depending on the substrate – please consult WBS Technical Department for assistance).

Place first insulation board onto base rail and secure with approved WBS mechanical fixings. Continue with additional boards ensuring that a staggered laying pattern is adhered to.

Mix scrim adhesive to a pliable consistency and trowel apply initial coat to insulation boards at a thickness of 4-5mm.





...continued from previous page

Bed in alkali resistant reinforcing mesh into top third of scrim adhesive, ensuring that an overlap of 75mm is achieved.

Apply corner reinforcements and bed in additional stress patches (using 200mm x 200mm off-cuts of mesh) positioned at 45° to window and door openings.

Apply corner beads, stop beads and movement joints where required, using appropriate fixings.

Using very light horizontal strokes, gently run a plasterer's scarifier (or similar) over the surface of the scrim adhesive to provide a suitable key for the dashing mortar coat.

Tidy up base rails and profiles with a damp paint brush or similar to ensure a professional finish.

Apply WBS Dashing Mortar, available in a variety of colours, to a depth to suit the size of the finishing aggregate (generally 8-10mm).

Whilst still wet, throw a complimentary coloured aggregate into the mortar, in an upward motion, ensuring an even distribution of chippings.

**Note:** Please note that these images are provided for illustrative purposes only. Health & Safety Regulations must always be adhered to and PPE should be worn in accordance with product data requirements and site conditions.

For further details, please contact **WBS TECHNICAL SUPPORT** on **08458 382380**.

## Case Study: Refurbishment

<b>Project Type:</b>	Residential Refurbishment – BISF Properties
<b>Project Name:</b>	Bayswater Road & surrounding, Headington, Oxford
<b>Client:</b>	Oxford City Homes
<b>Specifier:</b>	Oxford City Homes
<b>Main Contractor:</b>	SERS (South Wales) Ltd
<b>System Installer:</b>	SERS (South Wales) Ltd
<b>System Used:</b>	WBS Insulated Render System incorporating 60mm & 30mm Mineral Wool Insulation
<b>Finish:</b>	WBS Dry Dash & Brick Effect Render



In the early 1980's many defects in design and construction were discovered in a number of non traditional house types that were designed and built before the 1960's.

These designs were designated as defective under the housing defects legislation and although they only form a relatively small proportion of the UK's non-traditional housing stock, Local Authorities and private landlords are now being forced to bring these properties in line with current building regulations in an aim to sustain local communities, improve tenant quality of living and reduce the need for potential demolition.

This particular scheme involved over 130 BISF properties that were in a terrible state of repair and Oxford City Homes set about transforming these properties to make them visually more attractive and thermally efficient.

At the first floor the existing steel was removed to expose the steel frame which was then repaired as necessary. New insulation was placed within the cavity and a sheathing board applied to support the WBS Insulated Render System incorporating 30mm of Mineral Wool Insulation. At ground floor level, the existing render finish was retained and a layer of 60mm Mineral Wool mechanically fixed directly to the substrate to achieve the desired U-values (0.35 W/m<sup>2</sup>K on the first floor and 0.21 W/m<sup>2</sup>K on the ground floor respectively).

The system was finished using a WBS basecoat, an alkali resistant reinforcing mesh and a combination of WBS Dry Dash and Brick Effect Render.



## Case Study: Refurbishment

<b>Project Type:</b>	Residential Refurbishment – High Rise
<b>Location:</b>	Thompson Gardens, Manor Road, Smethwick, Birmingham
<b>Client:</b>	Sandwell Homes
<b>Specifier:</b>	BM3 Architecture Ltd
<b>Main Contractor:</b>	Connaught Partnerships Ltd
<b>System Installer:</b>	MPG Group Ltd
<b>System Used:</b>	WBS Insulated Render System incorporating 80mm Mineral Wool Insulation
<b>Finish:</b>	WBS 1.5mm Silicone 'K'



This tired high rise block of 89 flats, based in a prominent position on high ground in Smethwick, has recently undergone an amazing transformation, after a WBS Insulated Render System was installed by MPG Group Ltd.

BM3 Architecture, who acted on behalf of the client Sandwell Homes, required a system that would offer not only an aesthetically pleasing solution to the flats but moreover a system that would ultimately offer a sustainable, insulated, weatherproof coating with a guaranteed lifespan of 30 years. These flats were originally built of traditional brick and block with cavity walls and were notoriously difficult to heat.

80mm Mineral Wool Insulation was used on this particular project, which not only offered sufficient thermal properties to reduce the buildings U-value to 0.35 W/m<sup>2</sup>K, but which also offered the building increased protection in the event of a fire.

Basecoat, primer and a 1.5mm silicone texture, in two striking colours, was then applied to the face of the insulation to encapsulate the insulation and provide a crisp, clean finish.

Many of the residents have commented on how pleasing the block now is to live in and are very enthusiastic at how warm the flats have become, as they have been able to turn their heating down, and in some cases off, much earlier than they have been able to in past years.

## Case Study: Refurbishment

<b>Project Type:</b>	Residential Refurbishment – High Rise
<b>Location:</b>	Mountford House, Glover Street, Birmingham
<b>Client:</b>	Sandwell High Rise Decent Homes Team
<b>Architect:</b>	Rider Levett Bucknall
<b>Main Contractor:</b>	Lovell
<b>System Installer:</b>	MIB Façades Ltd
<b>System Used:</b>	WBS Insulated Render System incorporating 100mm Mineral Wool Insulation
<b>Finish:</b>	WBS 1.5mm Silicone 'K'



For those who regularly use the Midlands motorway network, this image will be a familiar sight.

Until recently, this depressing highrise block cast a gloomy shadow from its elevated section of the M5. However, as part of a new redevelopment project to refurbish a number of blocks in the area, Sandwell High Rise Decent Homes Team have been left delighted with the amazing transformation of Mountford House.

Working in conjunction with Lovell and MIB Façades, a Wetherby Insulated Render System was used incorporating 100mm Mineral Wool and a WBS 1.5mm Silicone 'K' texture in two contrasting shades of blue.

The visual results speak for themselves and in addition to its striking appearance, the thermal performance of the block was greatly increased and U-value reduced from 1.7 W/m<sup>2</sup>K to 0.29W/m<sup>2</sup>K, meaning that the tenants should see a reduction in the amount of energy they must use to heat their homes.





## WBS Design & Specifications Advisory Service

In addition to our continuing success in supplying high quality materials at cost effective rates, Wetherby offer a complete **Design & Specifications Advisory Service**, enabling you to gain sound technical advice based on years of practical on-site experience.

Located across the UK, our technical personnel can advise on all aspects of the suitability of materials and systems, providing details, designs and specifications for the application of the products and also U-value calculations, condensation risk calculations and physical display samples for client consultation purposes.



- Comprehensive specifications
- Thermal calculations
- Full colour technical drawings in \*.DWG or \*.PDF format
- On site inspections and professional advice
- Tenant awareness presentations & regular liaison meetings
- Physical product samples
- Accurate budget costs supplied via our network of approved contractors



Specifications provided in NBS Format

## Guarantees

All WBS systems are guaranteed to perform to pre-determined standards and are supplied with a standard 10 year materials and labour warranty.

For clients who require additional or extended protection, longer periods of latent defects insurance can be arranged, with time periods, terms and conditions determined at the design stage.



## Approved Contractors

WBS are product distributors and do not directly carry out any installation works.

However, to enable us to enforce and maintain the highest standards in the use of our products and systems, we have developed a substantial UK wide network of installers, who receive ongoing training and monitoring in the application of WBS products and systems.

For further details, please contact  
**WBS TECHNICAL SUPPORT** on **08458 382380**.



wetherby  
creating a greener future



## Certification & Accreditation



### ■ epsitec External Wall Insulation Systems

B.B.A. Certificate No 09/4625 PS1

For use on sheathed lightweight steel-framed structures. The system incorporates phenolic insulation, specific reinforced renders and provides a 15mm wide drainage cavity. Minimum life expectancy 30 years.



### ■ epsiwall External Wall Insulation Systems

B.B.A. Certificate No 09/4625 PS2

For use on walls of solid masonry construction. The system incorporates phenolic insulation and silicone/acrylic reinforced renders. Minimum life expectancy 30 years.



### ■ epsicon External Wall Insulation Systems

B.B.A. Certificate No: 03/4058 PS1, PS2, PS3

For use on walls of solid masonry or concrete construction. The system incorporates a variety of insulants, reinforcements and decorative render finishes. Minimum life expectancy 30 years. expectancy 30 years.



### ■ thermaloc External Wall Insulation Systems

B.B.A. Certificate Nos: 97/3428 and 99/3564.

Incorporates a variety of insulations and covers standard dash receivers, flat renders and brick effect renders. Min. life expectancy 30 years



### Wetherby Silicone & Acrylic Systems

Covered DIBT European Technical Approval which is an EEC wide accepted equivalent to BBA standard.

Certificate Nos: 14-8.04.04-10/02, 14-8.04.04-12/02, 14-8.04.04-105/04



Wetherby Renders are manufactured and certified to ISO9002 - Certificate No 2478 and ISO9001 / ISO-14001 - Certificate No 12 100/1004 16976/2.



### ISO9001 / ISO14001

Wetherby Building Systems are certified to Quality Standard ISO-9001 and Environmental Standard ISO-14001, Joint Certificate No UK9000006.



### Energy Saving Recommended / Ofgem Approved

Many of our insulated systems are approved by the Energy Saving Recommended Scheme & Ofgem. Please visit our website for further details.



### Industry Associations

Full members of the Insulated Render and Cladding Association and the National Insulation Association.

For further details, please contact  
**WBS TECHNICAL SUPPORT** on **08458 382380**



01

**Insulated Render Systems**  
// New Build



02

**Flexible Silicone & Acrylic Finishes**



03

**WBS Brick Slip Cladding Systems**



04

**Insulated Render Systems**  
// Refurbishment



05

**Polymer Modified Renders  
& Specialist Finishes**



06

**GRP Canopies &  
Architectural Mouldings**



**head office**

1 kid glove road  
golborne enterprise park  
golborne  
greater manchester  
wa3 3gs

tel: 01942 717100  
fax: 01942 717101

**scotland**

block 14  
unit a11 coltness lane  
queenslie industrial estate  
glasgow  
g33 4dr

tel: 0141 766 1767  
fax: 0141 766 1768

**kidderminster**

unit 17a  
hartlebury trading estate  
kidderminster  
worcestershire  
dy10 4jb

tel: 01299 251666  
fax: 01299 251003

**south wales**

unit 6  
heol ty gwyn industrial estate  
maesteg  
mid glamorgan  
cf34 0bq

tel: 08450 946397  
fax: 08450 946398



[www.wbs-ltd.co.uk](http://www.wbs-ltd.co.uk)  
[info@wbs-ltd.co.uk](mailto:info@wbs-ltd.co.uk)