Insulation

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Building Regulations for the Conservation of Fuel and Power

NEW BUILD – DWELLINGS

PART L 2010 Health Check

Kingspan®

Low Energy –
Low Carbon Buildings

Contents

Introduction

The requirements for conservation of fuel and power, which includes thermal insulation, in buildings in England & Wales are detailed in Approved Documents (AD) L1A, L1B, L2A & L2B to the Building Regulations 2010.

This document is designed as a simple guide to the new 2010 Edition of Approved Document L1A (Conservation of fuel and power in new dwellings) to the Building Regulations 2010 (England & Wales), showing how to meet its requirements using solutions from Kingspan Insulation.

Details are given about the content of the new Approved Document L1A, the effects it will have on methods of roof, wall and floor construction and the thicknesses of Kingspan Insulation products required to achieve the new standards. The required thicknesses of other commonly used insulation materials are also shown for the purposes of comparison.

Should you require further information about any of the new Approved Documents (L1A, L1B, L2A & L2B) or how Kingspan Insulation products can be used to comply with the changing Regulations, please contact the Kingspan Insulation Technical Services Department (see rear cover).

Approved Document L1A – A Summary

Types of Work Covered

The new 2010 Edition of Approved Document L1A – Conservation of fuel and power in new dwellings (ADL1A) to the Building Regulations 2010 (England & Wales) came into effect on October 1, 2010 and, from that date, all plans submitted for Building Control approval need to comply with the new requirements.

The Approved Document provides guidance on how to, in ordinary circumstances, comply with the relevant Building Regulations when carrying out work on new dwellings.

There are certain types of work in relation to new dwellings where the ADL1A says that the use of either ADL2A (New Buildings Other Than Dwellings) or ADL1B (Existing Dwellings) is likely to be more appropriate.

These are:

- in mixed–use developments, ADL1A should be used for guidance relating to the works on the individual dwellings with ADL2A being used for guidance relating to the parts of the building that are not a dwelling such as heated common areas or any commercial or retail space;
- heated common areas in buildings containing multiple dwellings are not classified as dwellings, therefore they fall outside the scope of ADL1A – reasonable provision for these areas would be to follow the guidance in ADL2A;
- buildings containing rooms for residential purposes such as nursing homes, student accommodation and similar are not considered as dwellings, and in such cases ADL2A would apply; and
- where a dwelling is created as part of a material change of use i.e. If a building is being converted from commercial use to domestic, then ADL1B would apply.

If a building is to be used for commercial purposes but contains living accommodation, it should be treated as a dwelling if the commercial part of the building could revert to domestic use on change of ownership.

Any non–heated common areas of buildings containing multiple dwellings are not classified as dwellings, however, reasonable provision for these areas would be to meet the U–value standards laid out in Table 1. If these areas are heated, they should follow the guidance given in ADL2A.

Element	Area–Weighted Average U–value ($W/m^2 \cdot K$)
Roof	0.20
Wall	0.30
Floor	0.25
Party wall	0.20
Windows, roof windows, rooflights & doors	2.00

Table 1 Standards for Non–Heated Common Areas of Buildings Containing Multiple Dwellings

Complying with the Building Regulations

There is a need to show that the designed carbon dioxide (CO_2) emissions from the dwelling are as good as, if not better than a defined target and that, in so doing, limits to design flexibility for individual elements, e.g. wall U–value, floor U–value, fixed building services, are met. There is also a requirement to show that the quality of construction ensures that the dwelling, as built, achieves the intended performance standard. There are other requirements to which insulation has limited or no significance.

Approved Document L1A – A Summary

U–value Calculations

All U–values should be calculated using the methods and conventions set out in BR 443 (Conventions for U–value calculations) and should include allowances for any repeating thermal bridges.

Conservatories

If a conservatory is built as part of the new dwelling, its performance should be assessed as part of the dwelling. Its performance is no longer governed by ADL1B. The guidance in ADL1B should be followed in respect of the construction of a conservatory as an extension to an existing dwelling.

Swimming Pool Basins

Where a swimming pool basin is constructed as part of a new dwelling, the basin should have a U–value no worse than 0.25 $W/m^2 \cdot K$, calculated according to BS EN ISO 13370. The CO_2 emissions of the dwelling should be assessed as if the basin were not there although the pool hall should be included. The floor area covered by the basin should be assumed to have a U–value equivalent to that of the pool surround for the purposes of calculating the CO_2 emissions of the dwelling.

Carbon Dioxide Emissions

The new ADL1A is based on a whole building approach to CO_2 emissions. All dwellings must be designed and built such that their Dwelling CO_2 Emissions Rate (DER) is no worse than a defined Target CO_2 Emissions Rate (TER).

The DER and TER are expressed in mass of CO_2 in kilograms per square metre of floor area per year ($kg/m^2/yr$). They are calculated using the Government's Standard Assessment Procedure (SAP) 2009, which considers the space heating, hot water, ventilation and internal fixed lighting requirements for a standardised household.

The TER is calculated in two stages: The first stage is to calculate the CO_2 emissions from a notional building of the same size and shape as the actual building using the reference values set out in Appendix R of SAP 2009. These reference values relate to the 2002 ADL1A notional building.

The second stage is to calculate the TER using the formula:

$$TER_{2010} = ((C_H \times FF \times EFA_H) + (C_L \times EFA_L)) \times (1 - 0.2) \times (1 - 0.25)$$

where:

- C_H is the CO_2 emissions from the proposed heating and hot water systems (including the energy used by pumps and fans) measured in $kg/m^2/yr$;
- C_L is the CO_2 emissions from the proposed internal fixed lighting system measured in $kg/m^2/yr$;
- FF is the fuel factor taken from Table 2 (below);
- EFA (Emission Factor Adjustment) is the ratio of the CO_2 emission factor for the relevant fuel at 2010 divided by the value used in the 2006 edition of ADL1A;
- the value 0.2 is the improvement factor required by the 2006 Edition of ADL1A over the TER required by the 2002 Edition of ADL1A; and
- the value 0.25 is the improvement factor required by the 2010 Edition of ADL1A over the TER required by the 2006 Edition of ADL1A.

Heating	Fuel Factor
Mains gas	1.00
LPG	1.10
Oil	1.17
B30K	1.00
Grid electricity	1.47
Solid mineral fuel	1.28
Any fuel with a CO_2 emission factor less than that of mains gas	1.00
Solid multi fuel	1.00

Table 2 Fuel Factors

A pre–construction design DER calculation should be carried out and provided to the building control body along with a list of specifications, so as to indicate that the design is compliant and to generate a list of features critical to compliance.

The final DER is calculated using the performance standards of the actual building. The final calculation of DER for the purposes of demonstrating compliance must be based on the building as constructed and include any changes to the performance specification made during construction and the assessed air permeability.

The assessed air permeability is determined as follows:

- where the dwelling has been pressure tested, the assessed air permeability is the measured air permeability;
- where the dwelling has not been tested, the assessed air permeability is the average test result obtained from other dwellings of the same dwelling type on the development increased by a margin of +2.0 $m^3/hour/m^2$ at 50 Pa;
- on small developments (2 or less units), where the builder has opted to avoid testing, the assessed air permeability is taken as 15 $m^3/hour/m^2$ at 50 Pa.

For buildings containing multiple dwellings, such as a terrace or a block of flats an average TER can be calculated for all dwellings in the building. Where this is done then the average TER is the floor area weighted average of all the individual TERs and is calculated using the formula:

$$\frac{(TER_1 \times Floorarea_1) + (TER_2 \times Floorarea_2) + (TER_3 \times Floorarea_3)}{(Floorarea_1 + Floorarea_2 + Floorarea_3)}$$

For buildings containing multiple dwellings, compliance is achieved if either every individual dwelling has a DER that is no greater than its corresponding TER or the average DER is no greater than the average TER. The average DER is the floor area weighted average of all the individual DERs and is calculated using the formula:

$$\frac{(DER_1 \times Floorarea_1) + (DER_2 \times Floorarea_2) + (DER_3 \times Floorarea_3)}{(Floorarea_1 + Floorarea_2 + Floorarea_3)}$$

Approved Document L1A – A Summary

Limits to Design Flexibility

ADL1A sets limiting U–value standards for the envelope of a dwelling, in order to ensure a reasonable minimum envelope performance.

This provision is included to make dwelling designs robust for future changes in heating system, e.g. if a renewable energy system is installed it may not be replaced upon failure and it would be inappropriate to allow the cost of the system to be compensated for with poor envelope performance.

It is of note that the use of these limiting U–values will almost certainly result in the dwelling failing to achieve the required TER.

A limiting value of 10 m^3/hour/m^2 at 50 Pa is also set for air permeability and limits are also given for the performance of the building services of the dwelling.

Linear Thermal Bridging

The building fabric should be constructed so that there are no reasonably avoidable thermal bridges in the insulation layers caused by gaps within the various elements, at the joints between elements, and at the edges of elements such as those around window and door openings.

Reasonable provision would be:

- to adopt a quality–assured approved accredited construction details scheme, in which case the calculated linear thermal transmittance (ψ) value can be used directly in the DER calculation;
- to use details that are not part of a quality–assured approved accredited construction details scheme, but that have ψ–values calculated by a person with suitable expertise and experience, in which case the calculated ψ–values for use in the DER calculation are increased by 0.02 W/m·K or 25% whichever is greater;
- to use unaccredited details, with no specific ψ–value quantification, in which case a conservative default y–value of 0.15 must be used in the DER calculation.

ψ–values and temperature factors should be calculated following the guidance set out in BR 497, with temperature factors no worse than the performance set out in BRE IP 1/06 and, for the first two approaches, the builder must demonstrate that an appropriate system of site inspection is in place to give confidence that the construction procedures achieve the required standards of consistency.

NB At the time of publication no accredited construction details schemes had been approved. Until such time that accredited construction details schemes are approved, the calculated value of linear transmittance may be used in SAP without any performance penalty being added, where this has been calculated by a suitably experienced and qualified person, and the builder has provided information about the way the detail is to be constructed to building control.

Air Permeability Testing

On each development, an air pressure test should be carried out on three units of each dwelling type or 50% of all dwellings of each type, whichever is the less.

A block of flats should be treated as a separate development irrespective of the number of blocks on the site.

The dwelling(s) to be tested should be taken from the first completed batch of units of each dwelling type.

The specific dwellings making up the test sample should be selected by the building control body in consultation with the pressure tester. They should be selected so that about half of the scheduled tests for each dwelling type are carried out during construction of the first 25% of each dwelling type. All tests on dwellings in the sample shall be reported to the building control body, including any test failure.

Compliance with the requirements would be demonstrated if:

- the measured air permeability is not worse than the limit value of 10 $m^3/hour/m^2$ at 50 Pa; and
- the DER calculated using the measured air permeability is not worse than the TER.

This means that if a design adopted a low (i.e. better) design air permeability in order to achieve a performance better than the TER, it would not fail to comply if the pressure test achieved the limit value and the TER was achieved.

If satisfactory performance is not achieved, then remedial measures should be carried out on the dwelling and a new test carried out until the dwelling achieves the criteria set out above. In addition, a further dwelling of the same dwelling type should be tested, thereby increasing the overall sample size.

In addition to the remedial work on a dwelling that failed the initial test, other dwellings of the same dwelling type that have not been tested should be examined and, where appropriate, similar remedial measures applied.

If a development has no more than two dwellings then the developer can either demonstrate that during the previous twelve months has passed an air pressure test on the same dwelling type or, can avoid the need to pressure test by using a value of 15 $m^3/hour/m^2$ at 50 Pa when calculating the DER.

Other Requirements

The Approved Document also contains requirements for the avoidance of overheating caused by excessive solar gains, the commissioning of heating and hot water systems and the provision of operating and maintenance instructions.

Simplifying the Complex

The Pitfalls in the Approach & What U-Values Should be Adopted

The new ADL1A is here at last, and although many would argue that the latest changes could have been more stringent given the imperative of climate change, they are here for the next three years and the focus now has to be on how the new demands are going to be met.

Whilst there is flexibility in the method, a certain amount of caution needs to be exercised in the complicated task of achieving compliance, in order to avoid leaving a dwelling vulnerable to either failure on completion or deterioration in the future.

The use of an overall CO_2 emissions method of calculating compliance is now well established in people's consciousness. What is also fairly widely understood is the much broader scope that is allowed by the overall carbon dioxide emissions method, e.g. the ability to consider, amongst other things, air leakage rates and site installed renewable energy supply. However, there needs to be a clear caveat to these approaches.

As a fundamental principle of energy saving, the primary focus should always be on ensuring that the building fabric is intrinsically thermally efficient. It makes no sense to have excessive and heavy outlay on expensive renewable supply, without first reducing energy demand. Renewables are a valuable way to build on the reduction in CO_2 emissions when the building envelope provides robust and low energy consumption, but if they are put in at the expense of the building fabric thermal efficiency they represent an overly capital intensive investment.

Low air leakage rates again should be treated with caution. They are a desirable feature of low CO_2 emission dwellings, but the construction industry today has so far failed to prove that it can ubiquitously deliver air–leakage rates of 7 $m^3/hour/m^2$ at 50 Pa or less with traditional building technologies. There may be potentially heavy remedial costs involved if a dwelling reliant on a low air leakage rate to meet the requirements of ADL1A fails its pressure test, costs exacerbated by delay whilst remedial work is carried out. Adopting the minimum required value of 10 $m^3/hour/m^2$ at 50 Pa would be much more prudent.

The answer to all of these issues lies in the building fabric. The new ADL1A contains minimum fallback U–values for the building fabric but much tighter standards will be required for most dwellings to hit their CO_2 emissions target. The actual U–value required will depend on the design of the building, orientation, heating system etc. etc. etc. There is massive flexibility…….. and complexity. It is estimated that specifiers may have to go through 10–20 iterations of SAP in order to get their design to comply with the new requirements.

However, analysis to date is showing that, for buildings with no low– or zero–carbon heating or power technologies installed, the U–values in Table 3 are at or around the best starting point for specifiers to work from in getting their design to comply with ADL1A. They will be almost exactly what is required for some dwellings and short of what is required for others, but at least will cut some of the iterations out of the design process. The gap between what these U–values provide and the target emissions rate can be made up by any other the other variables in SAP.

Element	U–value ($W/m^2{\cdot}K$)
All roofs	0.13
Walls	0.18
Floors	0.13

Table 3 Recommended Starting Point U–values

Solutions

Constructions & U-Values

Set out in the following pages, are constructions, using Kingspan Insulation products, which are designed to meet the U–values shown in Table 3. These U–values are valid for the constructions shown in the details immediately above.

Also shown, is a range of alternative solutions that other insulation manufacturers might offer.

The constructions shown do not comprise an exhaustive list of Kingspan Insulation solutions. Please contact the Kingspan Insulation Technical Service Department (see rear cover), if you require similar calculations for other constructions.

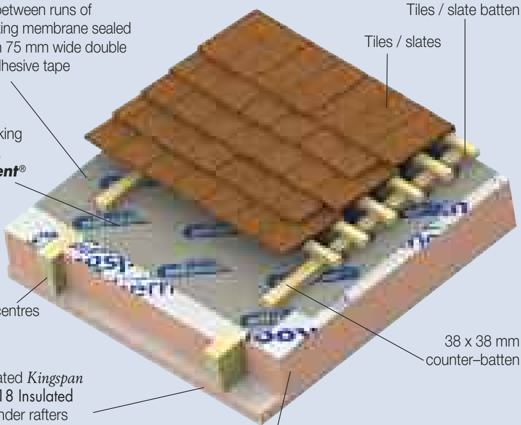
U–values have been calculated using the methods detailed in BS EN ISO 6946: 2007 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation method), BS EN ISO 13370: 1998 (Thermal performance of buildings. Heat transfer via the ground. Calculation methods), and using the conventions set out in BR443 (Conventions for U–value calculations).

For the purposes of these calculations, the standard of workmanship has been assumed good and, therefore, the correction factor for air gaps has been ignored.

The figures quoted are for guidance only. A detailed U–value calculation and a condensation risk analysis should be completed for each project. Please contact the Kingspan Insulation Technical Service Department (see rear cover).

Solutions

Pitched Roofs – Insulation Between and Under Rafters



Kingspan **Kool**therm® Solution to Achieve a U–Value of 0.13 W/m²·K
100 mm deep rafters with 100 mm *Kingspan* **Kool**therm® K7 Pitched Roof Board between, and 82.5 mm *Kingspan* **Kool**therm® K18 Insulated Plasterboard under rafters

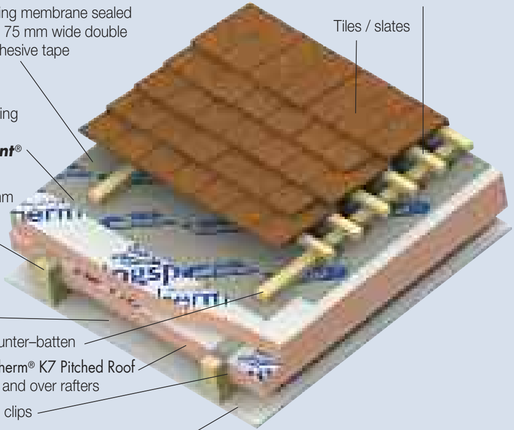
What Solution(s) Other Insulation Manufacturers Might Offer
125 mm deep rafters with 125 mm glass mineral fibre (0.037 W/m·K) between, and 152.5 mm extruded polystyrene (0.030 W/m·K) insulated plasterboard under rafters
100 mm deep rafters with 100 mm glass mineral fibre (0.037 W/m·K) between, and 172.5 mm extruded polystyrene (0.030 W/m·K) insulated plasterboard under rafters
Assumes construction as illustrated above, but with different types and thicknesses of insulation material, and a different rafter depth (in one case).

Using Kingspan Kooltherm® can result in a thinner overall construction, regardless of rafter depth, and is less likely to have a prohibitive effect on headroom. There may be severe practicality issues with fixing a 152.5 or 172.5 mm insulated plasterboard product.

NB All insulated plasterboard thicknesses include 12.5 mm plasterboard.

NB When calculating U–values to BS EN ISO 6946: 2007, the type of mechanical fixing used may change the thickness of insulation required. These calculations assume that insulated plasterboard is fixed using carbon steel fixings with a cross sectional area 4.00 mm², with 16.7 per m². The effect of fixings for Kingspan **Kool**therm® K18 Insulated Plasterboard *is insignificant as the insulation layer penetrated is not the main insulation layer.*

Pitched Roofs – Insulation Between and Over Rafters



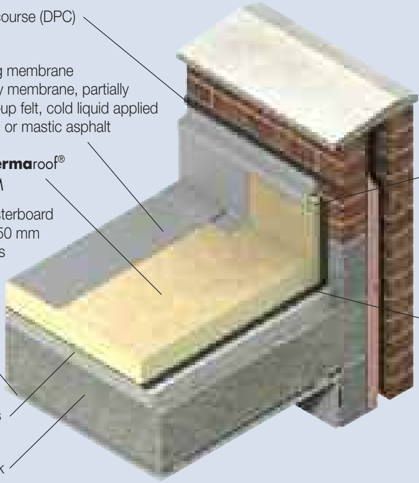
Kingspan **Kool**therm® Solution to Achieve a U–Value of 0.13 W/m²·K
100 mm deep rafters with 75 mm *Kingspan* **Kool**therm® K7 Pitched Roof Board between, and 80 mm *Kingspan* **Kool**therm® K7 Pitched Roof Board over rafters

What Solution(s) Other Insulation Manufacturers Might Offer
220 mm deep rafters with 220 mm rock mineral fibre (0.038 W/m·K) between, and 80 mm rock mineral fibre (0.036 W/m·K) over rafters
100 mm deep rafters with 100 mm extruded polystyrene (0.030 W/m·K) between, and 130 mm extruded polystyrene (0.029 W/m·K) over rafters
Assumes construction as illustrated above, but with different types and thicknesses of insulation material, and a different rafter depth (in one case).

Using Kingspan Kooltherm® can result in a thinner overall construction, regardless of rafter depth, and is less likely to have a prohibitive aesthetic effect on bargeboard / fascia board depth. There may be cost issues with the rafter depth required for some solutions.

NB When calculating U–values to BS EN ISO 6946: 2007, the type of mechanical fixing used may change the thickness of insulation required. These calculations assume that over rafter layers of insulation are fixed using stainless steel fixings with a cross sectional area 7.45 mm², with 8.3 per m² (insulant thickness 61–80 mm) and 10.0 per m² (insulant thickness > 80 mm).

Flat Roofs - Concrete Deck



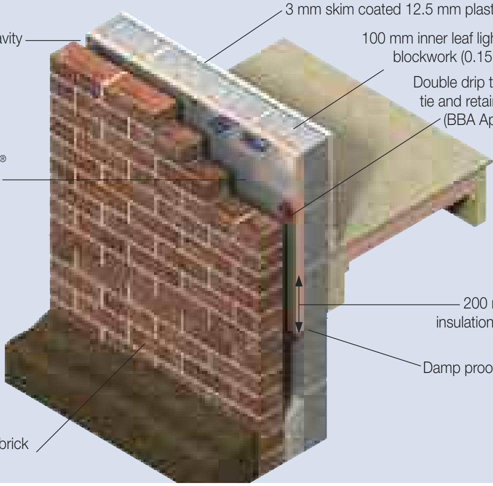
Kingspan **Therma**roof® Solution to Achieve a U–Value of 0.13 W/m²·K
175 mm *Kingspan* **Therma**roof® TR27 LPC/FM in two layers (85 & 90 mm)

What Solution(s) Other Insulation Manufacturers Might Offer
270 mm rock mineral fibre (0.038 W/m·K) in two layers (135 & 135 mm)
Assumes construction as illustrated above, but with a different type and thickness of insulation material.

Using Kingspan Thermaroof® can result in thinner insulation, which may allow lower parapets and shorter fixings. Furthermore, the weight of the insulation in the rock mineral fibre solution, shown above, will be over 7 times that in the Kingspan Thermaroof® solution. The manual handling and roof loading implications of this weight should be carefully considered.

NB These calculations assume that insulation boards are fully bonded to the vapour control layer.

Cavity Walls – Cavity Insulation Only



Kingspan **Kool**therm® Solution to Achieve a U–Value of 0.18 W/m²·K
75 mm partial fill *Kingspan* **Kool**therm® K8 Cavity Board in an overall 125 mm wide cavity

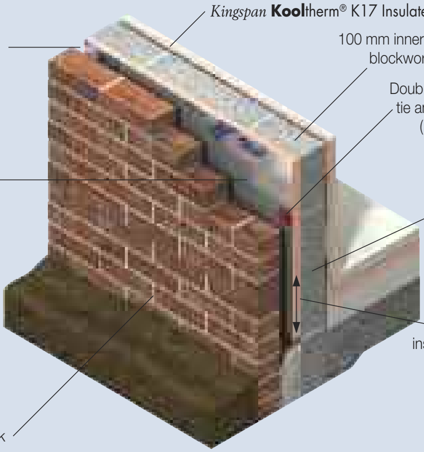
What Solution(s) Other Insulation Manufacturers Might Offer
175 mm full fill glass mineral fibre (0.037 W/m·K) in an overall 175 mm wide cavity
Assumes construction as illustrated above, but with a different type and thickness of insulation material. The insulation fully, rather than partially, fills the cavity and, so, the wall tie specification will differ and no retaining clips will be present.

A cavity of just 125 mm can be used with the *Kingspan* **Kool**therm® K8 Cavity Board ***solution, reducing total wall width by 50 mm, compared with the glass mineral fibre full fill alternative shown above. A 175 mm wide cavity may require a much more onerous wall tie specification, which will increase thermal bridging, and may not be compatible with Part E Robust Standard Details.***

NB When calculating U–values to BS EN ISO 6946: 2007, the type of wall tie used may change the thickness of insulation required. For 125 mm cavity widths, calculations assume a stainless steel flexible tie with 2.5 ties per m² and a cross–sectional area of 12.50 mm². For 175 mm full fill cavity widths, calculations assume a stainless steel flexible tie with 2.5 ties per m² and a cross–sectional area of 30.00 mm².

Solutions

Cavity Walls – Cavity Insulation and Insulated Lining



Kingspan **Kool**therm® Solution to Achieve a U–Value of 0.18 W/m²·K
50 mm partial fill *Kingspan* **Kool**therm® K8 Cavity Board in an overall 100 mm wide cavity, and a wall lining of 37.5 mm *Kingspan* **Kool**therm® K17 Insulated Plasterboard on dabs

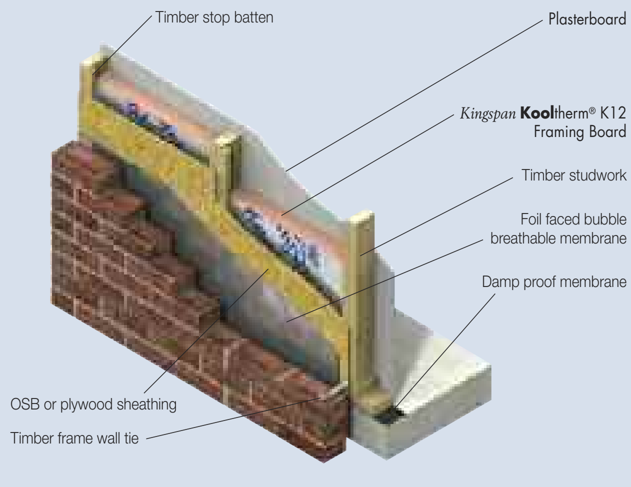
What Solution(s) Other Insulation Manufacturers Might Offer
100 mm full fill glass mineral fibre (0.037 W/m·K) in an overall 100 mm wide cavity, and a wall lining of 62.5 mm extruded polystyrene (0.030 W/m·K) insulated plasterboard on dabs
Assumes construction as illustrated above, but with different types and thicknesses of insulation materials. The insulation fully, rather than partially, fills the cavity and, so, the wall tie specification will differ and no retaining clips will be present.

Using *Kingspan* Kooltherm® can result in a thinner overall construction.

NB All insulated plasterboard thicknesses include 12.5 mm plasterboard.

NB When calculating U–values to BS EN ISO 6946: 2007, the type of wall tie used may change the thickness of insulation required. For 100 mm cavity widths, calculations assume a stainless steel flexible tie with 2.5 ties per m² and a cross–sectional area of 12.50 mm².

Timber Frame Walls



Kingspan **Kool**therm® Solution to Achieve a U–Value of 0.18 W/m²·K
120 mm *Kingspan* **Kool**therm® K12 Framing Board between 140 mm deep studs

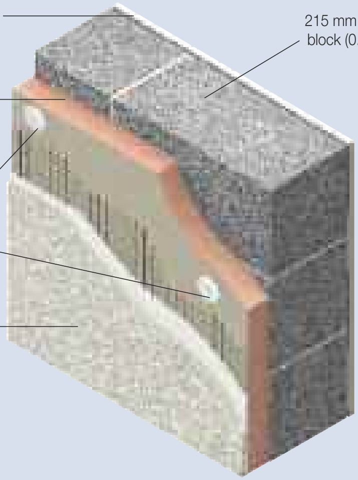
What Solution(s) Other Insulation Manufacturers Might Offer
140 mm glass mineral fibre (0.035 W/m·K) between 140 mm deep studs, and 47.5 mm extruded polystyrene (0.030 W/m·K) insulated plasterboard lining the studs
185 mm of glass mineral fibre (0.035 W/m·K) between 210 mm deep studs
Assumes construction as illustrated above, but with different types and thicknesses of insulation materials, different stud depths (in one case), no timber stop battens, and a different lining specification (in one case). In one case, the insulation fully, rather than partially, fills the stud cavity.

Using Kingspan Kooltherm® can result in a thinner overall construction. The glass mineral fibre solutions shown above require either an additional insulated plasterboard lining, or considerably deeper studwork to accommodate the required thickness of insulation.

NB When calculating U–values to BS EN ISO 6946: 2007, the type of mechanical fixing used may change the thickness of insulation required. The effect of fixings for insulated plasterboard has been ignored in these calculations as the insulation layer penetrated is not the main insulation layer. A 15% bridging factor has been assumed for the timber stud. The thermal conductivity of the timber has been assumed to be 0.12 W/m·K. Calculations assume that a 4 mm foil faced bubble breather membrane yields a combined product and airspace thermal resistance of 0.79 m²·K/W.

Solutions

Solid Walls



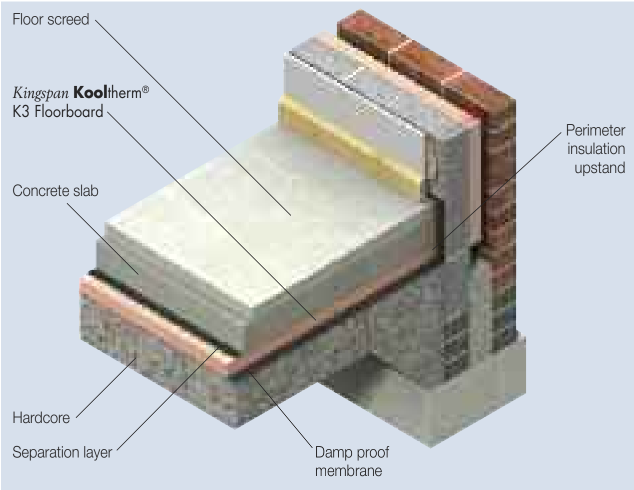
Kingspan **Kool**therm® Solution to Achieve a U–Value of 0.18 W/m²·K
75 mm Kingspan *Kingspan* **Kool**therm® K5 External Wall Board

What Solution(s) Other Insulation Manufacturers Might Offer
145 mm of rock mineral fibre (0.038 W/m·K) or expanded polystyrene (0.038 W/m·K)
Assumes construction as illustrated above, but with different types and thicknesses of insulation materials.

Using Kingspan Kooltherm® can give a wall width, excluding lining, of just 300 mm compared with the alternatives shown above, which require a 70 mm wider wall.

NB When calculating U–values to BS EN ISO 6946: 2007, the type of mechanical fixing used may change the thickness of insulation required. These calculations assume telescopic tube fasteners with a thermal conductivity of 1.00 W/m·K or less, the effect of which is insignificant.

Ground Floors – Solid Concrete



Kingspan **Kool**therm® Solution to Achieve a U–Value of 0.13 W/m²·K
125 mm *Kingspan* **Kool**therm® K3 Floorboard under slab or under screed with floor P/A ratio of 0.5

What Solution(s) Other Insulation Manufacturers Might Offer
225 mm of expanded polystyrene (0.038 W/m·K) under slab or under screed with floor P/A ratio of 0.5
Assumes construction as illustrated above, but with a different type and thickness of insulation material.

Using Kingspan Kooltherm® rather than extruded polystyrene, in the floor shown above, can result in having to dig out, and dispose of, 100 mm less soil to make the space to accommodate the insulation. Furthermore, if you were using 125 mm expanded polystyrene in floors under the old regulations, simply swapping the insulant to 125 mm Kingspan Kooltherm® K3 Floorboard will mean that you will not need to alter your drawings or levels.

NB For the purposes of these calculations, using the method as detailed in BS EN ISO 13370: 1998, the soil has been assumed to be clay or silt, and the wall insulation is assumed to overlap the floor insulation by minimum 150 mm.

Sales and Customer Service

Tel: +44 (0) 1544 388 601
Fax: +44 (0) 1544 388 888
email: customerservice@kingspaninsulation.co.uk

Technical Advice

Tel: +44 (0) 1544 387 382
Fax: +44 (0) 1544 387 482
email: technical@kingspaninsulation.co.uk

Literature and Samples

Tel: +44 (0) 1544 387 384
Fax: +44 (0) 1544 387 484
email: literature@kingspaninsulation.co.uk
Downloads: www.kingspaninsulation.co.uk/literature

General Enquiries

Tel: +44 (0) 1544 388 601
Fax: +44 (0) 1544 388 888
email: info@kingspaninsulation.co.uk

Kingspan®

Kingspan Insulation Ltd
Pembridge, Leominster, Herefordshire HR6 9LA, UK

www.kingspaninsulation.co.uk