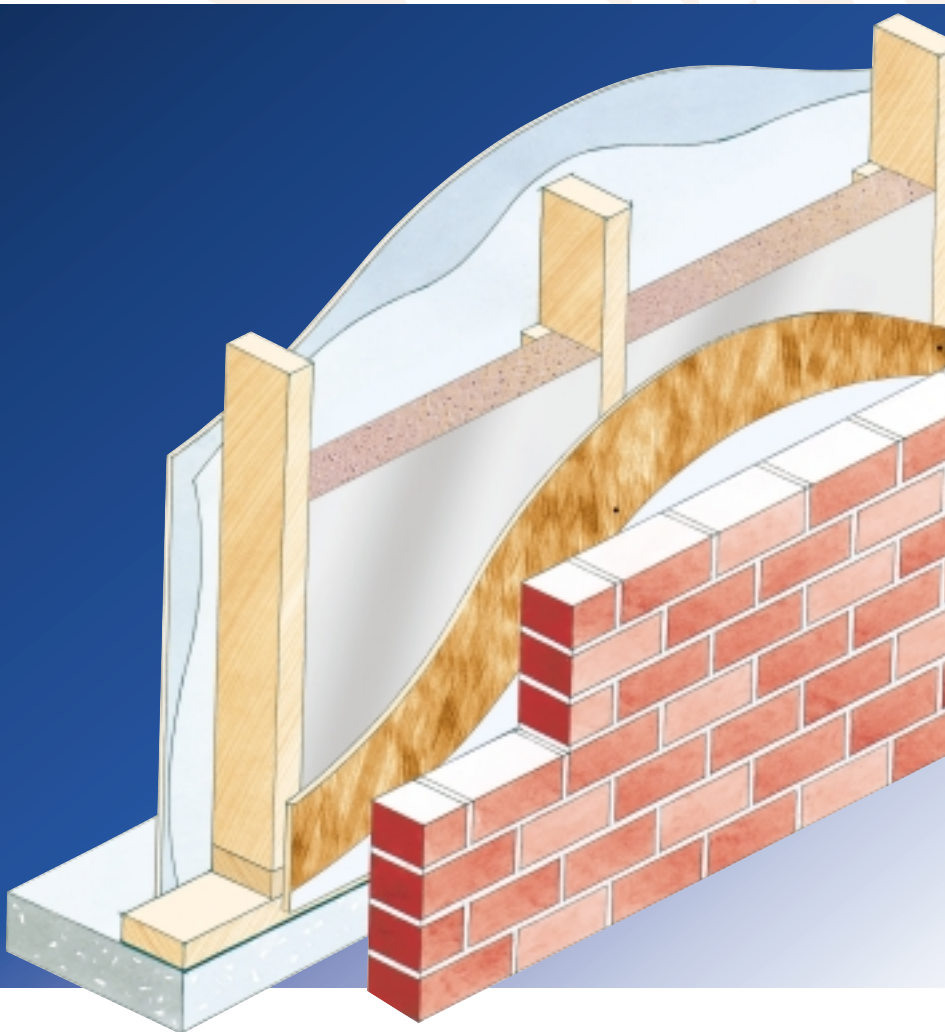


Kooltherm® K12 Framing Board

INSULATION FOR TIMBER
AND STEEL FRAMING SYSTEMS



- ▼ Premium performance rigid phenolic insulation – thermal conductivity 0.018 W/m.K
- ▼ Class O fire rating
- ▼ Negligible smoke emission
- ▼ Can be used between studs or as an insulating sheathing
- ▼ Suitable for use with timber frame and steel frame wall constructions
- ▼ Can eliminate cold bridging
- ▼ Unaffected by air movement
- ▼ Resistant to the passage of water vapour
- ▼ Easy to handle and install
- ▼ Ideal for newbuild or refurbishment
- ▼ CFC-free

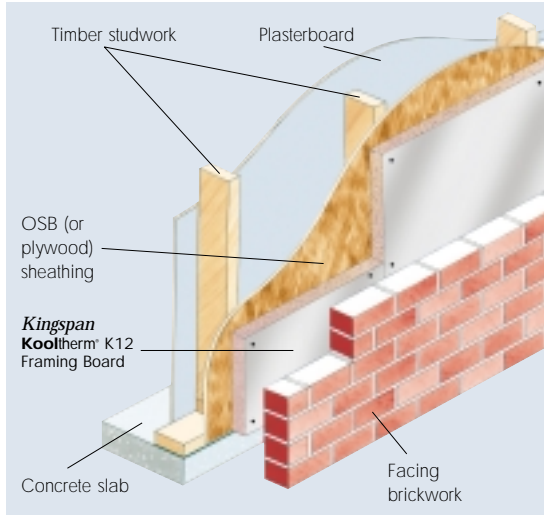


Kingspan **Kooltherm**® K12 Framing Board

TYPICAL DESIGN DETAIL

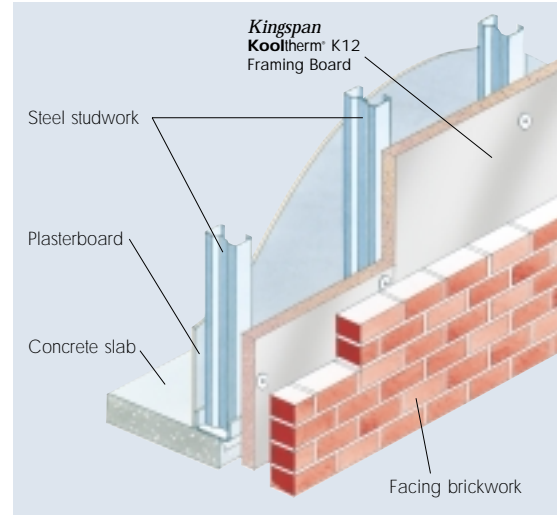
BRICK FACED TIMBER FRAME WALL
(insulating sheathing)

Figure 1



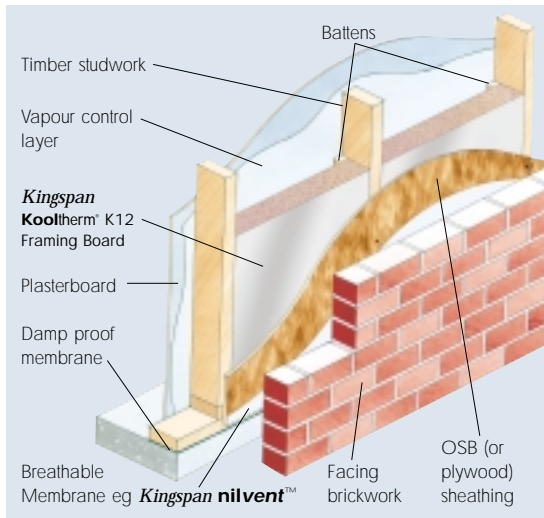
BRICK FACED STEEL FRAME WALL
(insulating sheathing)

Figure 2



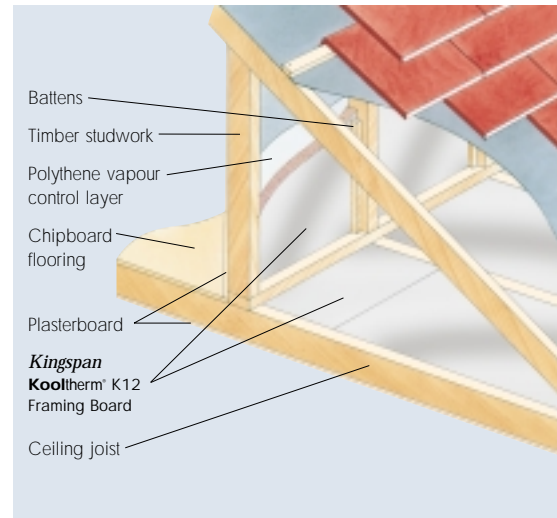
BRICK FACED TIMBER FRAME WALL
(insulation between studs)

Figure 3



DWARF WALLS
(insulation between studs)

Figure 4



SPECIFICATION CLAUSE

Kingspan Kooltherm® K12 Framing Board should be described in specifications as:-

The stud wall insulation shall be **Kingspan Kooltherm**® K12 Framing Board ___mm thick comprising a CFC-free rigid phenolic insulation core with composite foil facings on both sides manufactured in accordance with the requirements of BS EN ISO 9002: 1994 by Kingspan Insulation Limited and shall be applied in accordance with the instructions issued by them.

Details also available in NBS PLUS.
NBS users should refer to clause(s):
F30 151 (Standard and Intermediate)
F30 12 (Minor works)



DESIGN CONSIDERATIONS

TYPICAL APPLICATIONS

Kingspan Kooltherm® K12 Framing Board may be installed either between or outside timber studwork. The insulation boards are easily cut to individual studwork spacings. Once installed, **Kingspan Kooltherm**® K12 Framing Board can exceed Building Regulations/Standards requirements for these applications.

COLD BRIDGING

When installed between timber studwork, the effects of cold bridging must be taken into account. In most cases this can represent up to 20% of the external surface area of the building which will significantly affect the overall U-value.

This problem is avoided when insulating outside the studwork. By insulating the entire building envelope, the problem of cold bridging can be eliminated completely.

WATER VAPOUR CONTROL

Surface Condensation

Surface condensation can be controlled by the selection of the correct thickness of insulation, the heating and ventilation system being designed with condensation in mind, and subsequently the combination of heating and ventilation being used correctly.

Interstitial Condensation

The Kingspan Insulation Technical Services Department can provide a condensation risk analysis of your proposed design (see rear cover). Alternatively the designer can undertake an independent assessment by following the procedures set out in BS 5250: 1989 (1995) (Code of practice for the control of condensation in buildings).

The vapour resistance of the wall lining can be increased by the use of a vapour check plasterboard or by the application of two coats of Gyproc Drywall Sealer if required.

FIRE STOPS

Current Building Regulations/Standards should be considered with regard to the requirements for and/or provision of fire stops.

THERMAL PROPERTIES

THERMAL CONDUCTIVITY

The boards achieve a thermal conductivity (λ -value) of 0.018 W/m.K.

THERMAL RESISTANCES

Thermal resistance (R-value) varies with thickness and is calculated by dividing the thickness of the board (expressed in metres) by its thermal conductivity.

Insulant Thickness (mm)	Thermal Resistance (m ² .K/W)
20	1.111
25	1.388
30	1.579
35	1.944
40	2.105
45	2.500
50	2.777
60	3.333
65	3.611
70	3.888

TYPICAL U-VALUES

The following examples have been calculated using both the combined method and the proportional area method. The combined method is required for compliance with Building Regulations / Standards revised after the year 2000. These values are based upon a construction comprising a 15 mm plasterboard lining, timber studwork and 9 mm OSB sheathing or steel studwork, both with facing brick outer leaf. The thermal conductivity of the timber studs is taken as 0.12 W/m.K. If your construction is any different, please consult our Technical Services Department.

Combined Method – U-values were calculated using the method which has been adopted to bring National standards in line with the European Standard calculation method, BS / IS EN ISO 6946: 1997 (Building components and building elements. Thermal resistance and thermal transmittance. Calculation method).

Proportional Area Method – the U-values shown below were calculated using the proportional area method as detailed in The Chartered Institute of Building Services Engineers (CIBSE) Guide A3 (Thermal Properties of Building Structures).

NB when calculating U-values using the combined method as detailed in BS / IS EN ISO 6946: 1997, the type of mechanical fixing used may change the thickness of insulation required. The effect of fixings has been ignored for the purposes of these calculations. Please contact the Kingspan Insulation Technical Services Department (see rear cover) for project calculations.

NB 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.

These figures below are for guidance only. A detailed U-value calculation, together with a condensation risk analysis should be completed for each individual project. Please call our Technical Services Department for assistance (see rear cover).

Kingspan **Kooltherm**® K12 Framing Board

BRICK FACED TIMBER FRAME WALL

(**Kingspan Kooltherm**® K12 Framing Board as an insulating sheathing)

Insulant Thickness (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method
20	0.46	0.48
25	0.41	0.42
30	0.37	0.38
35	0.33	0.34
40	0.30	0.31
45	0.28	0.29
50	0.26	0.27

NB combined method calculation accounts for the effect of using a stainless steel fixing of 6.0 mm diameter, giving a cross sectional area of 7.45 mm², fasteners per square metre 4.4 off.

BRICK FACED STEEL FRAME WALL

(**Kingspan Kooltherm**® K12 Framing Board as an insulating sheathing)

Insulant Thickness (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method
20	0.43	0.46
25	0.39	0.40
30	0.35	0.36
40	0.30	0.30
45	0.28	0.28

NB combined method calculation accounts for the effect of using galvanised fixing screws for fixing the channel through the insulation. Fasteners per square metre 4.5 off. Fasteners cross sectional area 12.32 mm².

BRICK FACED TIMBER FRAME WALL

(**Kingspan Kooltherm**® K12 Framing Board between 89 mm deep timber studs - 15% thermal bridging)

Insulant Thickness (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method
20	0.55	0.54
25	0.51	0.49
30	0.46	0.45
35	0.43	0.42
40	0.40	0.39
50	0.35	0.34
60	0.32	0.31

60 mm is the maximum practical thickness of **Kingspan Kooltherm**® K12 Framing Board for installation between 89 mm deep timber studs whilst maintaining a minimum 25 mm service void.

For U-values below 0.32/0.31 W/m².K. there are three options:

OPTION 1

BRICK FACED TIMBER FRAME WALL

(60 mm **Kingspan Kooltherm**® K12 Framing Board between 89 mm deep timber studs - 15% thermal bridging - in conjunction with the following thicknesses of **Kingspan Thermawall** TW56 zero ODP in lieu of 15 mm plasterboard lining)

*Product Thickness (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method
32.5	0.24	0.22

*Product thickness = insulant thickness + 12.5 mm plasterboard.

OPTION 2

BRICK FACED TIMBER FRAME WALL

(**Kingspan Kooltherm**® K12 Framing Board between 89 mm deep timber studs - 15% thermal bridging - and **Kingspan Kooltherm**® K12 Framing Board as an insulating sheathing)

Insulant Thickness (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method
20+20	0.31	0.31
20+25	0.29	0.29
25+25	0.27	0.27

NB first thickness refers to thickness between studs, second thickness sheathing.

NB the thermal resistance of the sheathing must be ≥ that of the insulation between the studs so as to avoid condensation.

OPTION 3

BRICK FACED TIMBER FRAME WALL

(**Kingspan Kooltherm**® K12 Framing Board between timber studs - 15% thermal bridging - timber studs deep enough to allow 25 mm minimum service void)

Insulant Thickness (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method
65	0.30	0.29
70	0.29	0.28
40+35*	0.27	0.27

*Multiple layers required as maximum thickness exceeded.

NB first thickness refers to outer layer, second thickness inner.

NB the thermal resistance of the outer layer must be ≥ that of the inner so as to avoid condensation.

SITework

INSULATING SHEATHING TIMBER FRAME WALL

Kingspan Kooltherm® K12 Framing Board should be fixed to the external surface of the timber frame structure (outside of any OSB or plywood sheathing) and restrained using temporary fixing in the form of large headed galvanised clout nails prior to being tied into the brickwork with an appropriate timber frame wall tie. Ensure that **Kingspan Kooltherm® K12 Framing Boards** are tightly butted and that any requirements of the timber frame manufacturer are met. Please contact our Technical Services Department for further information (see rear cover).

The use of a self adhesive foil tape is not recommended for this application. No separate vapour control layer is required when adopting **Kingspan Kooltherm® K12 Framing Board** outside of studwork. The insulation boards themselves will act as an efficient vapour check.

INSULATING SHEATHING STEEL FRAME WALL

Similarly fixed as for 'Timber Frame', **Kingspan Kooltherm® K12 Framing Board** should be restrained to the outside of the steel frame construction ensuring vertical board joints coincide with a vertical member. Fixings should be in accordance with the steel frame manufacturers recommendations. Please contact our Technical Services Department for further information.

INSULATION BETWEEN STUDS DWARF WALL/ TIMBER FRAME WALL

To restrain insulation boards from moving within the timber stud cavity, side nail battens to the stud to provide a 'stop'. (This should coincide with board thickness, allowing the **Kingspan Kooltherm® K12 Framing Board** to finish flush with the inside surface of the timbers).

Insulation boards that have been individually cut to fit the stud spacings may be temporarily held to the battens with large headed clout nails. An additional restraint to the boards will be provided by a plasterboard lining fixed to the inside face of the timbers. When utilising **Kingspan Kooltherm® K12 Framing Board** between studwork, the plasterboard lining should be of the vapour check type or a separate polythene vapour control layer used.

Ensure there is a tight fit between **Kingspan Kooltherm® K12 Framing Board** and the adjoining structure. Fill all gaps with expanding urethane sealant.

WALL TIES/TIMBER FRAME WALL

The outer leaf of brickwork may be constructed in the conventional manner using appropriate wall ties to restrain the two wall skins together. The ties should be inserted whilst constructing the outer leaf ensuring a slight offset is achieved, sloping the tie downwards towards the outer leaf.

WALL TIES/STEEL FRAME WALL

Advice should be sought from the appropriate steel frame manufacturer for recommendations of a suitable wall tie specification.

TILE HANGING

Where the intended external cladding is to be wall tiling, preservative treated softwood counter battens should be fixed vertically to coincide with the timber studs utilising appropriate fasteners.

Tile hanging should be secured in accordance with the tile manufacturers recommendations.

CUTTING

Cutting should be carried out using a fine toothed saw, or by scoring with a sharp knife and snapping the board over a straight edge and cutting the facing on the other side. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

AVAILABILITY

Kingspan Kooltherm® K12 Framing Board is available through specialist insulation distributors and selected Builders Merchants throughout the UK, Ireland and Europe.

PACKAGING

The boards are supplied in labelled packs shrinkwrapped in polythene.

STORAGE

The packaging of **Kingspan Kooltherm® K12 Framing Board** should not be considered adequate for long term outside protection. Ideally boards should be stored inside a building. If however, outside storage cannot be avoided the boards should be stacked clear of the ground and covered with a polythene sheet or weatherproof tarpaulin. Boards that have been allowed to get wet should not be used.

HEALTH AND SAFETY

Kingspan Insulation products are chemically inert and safe to use. A leaflet on this topic which satisfies the requirements set out in the Control of Substances Hazardous to Health Regulations 1988 (COSHH) is available from our Technical Services Department (see rear cover).

Please note that the reflective surface on this product is designed to enhance its thermal performance. As such, it will reflect light as well as heat, including ultraviolet light. Therefore, if this board is being installed during very bright or sunny weather, it is advisable to wear UV protective sunglasses or goggles, and if the skin is exposed for a significant period of time, to protect the bare skin with a UV block sun cream.

Warning – do not stand on or otherwise support your weight on this board unless it is fully supported by a load bearing surface.

Kingspan **Kooltherm**® K12 Framing Board

PRODUCT DESCRIPTION

THE FACINGS

Kingspan Kooltherm® K12 Framing Board is faced on both sides with a low emissivity composite foil facing which is highly resistance to the transmission of water vapour. This reflective, low emissivity surface effectively doubles the thermal resistance of the cavity in which the board is placed.

THE CORE

The core of **Kingspan Kooltherm**® K12 Framing Board is a CFC-free rigid phenolic insulant of typical density 45 kg/m³.

CFC-FREE*

Kingspan Kooltherm® K12 Framing Board is produced using alternative blowing agents in compliance with the Montreal Protocol.

* **Kingspan Kooltherm**® K12 Framing Board is also available CFC/HCFC-free subject to enquiry.

PRODUCT DATA

STANDARDS AND APPROVALS

Kingspan Kooltherm® K12 Framing Board is manufactured to the highest standards under a quality control system approved to BS EN ISO 9002: 1994 (Quality systems. Model for quality assurance in production, installation and servicing).



STANDARD DIMENSIONS

Kingspan Kooltherm® K12 Framing Board is available in the following standard size and thicknesses:

Nominal Dimension	Availability
Length (m)	2.4
Width* (m)	1.2***
Insulant Thickness** (mm)	20, 25, 30, 35, 40, 50, 60, 65, 70

* **Kingspan Kooltherm**® K12 Framing Board is available in other widths subject to quantity. Extended lead times and price premiums will apply.

** Other thicknesses are available subject to quantity.

*** 1.16 m for insulant thicknesses over 50 mm.

INSULATION COMPRESSIVE STRENGTH

Typically exceeds 125 kPa at 10% compression when tested to BS 4370: Part 1: 1988 (1996) (Methods of test for rigid cellular materials).

WATER VAPOUR RESISTANCE

Modified to include board facings, the boards achieve a resistance far greater than 100 MN.s/g, when tested in accordance with BS 4370: Part 2: 1993. Where additional vapour control is required an appropriate surface treatment should be applied over the completed insulated wall area (refer to 'Water Vapour Control, page 3).

DURABILITY

If correctly applied, **Kingspan Kooltherm**® K12 Framing Board has an indefinite life. Its durability depends on the supporting structure and the conditions of its use.

RESISTANCE TO SOLVENTS, FUNGI & RODENTS

The insulation core is resistant to dilute acids, alkalis, mineral oil and petrol. It is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl ketone. Adhesives containing such solvents should not be used in association with **Kingspan Kooltherm**® K12 Framing Board. Boards which have been in contact with harsh solvents, petrol, mineral oil or acids, or boards that have been damaged in any way should not be used.

The insulation core and facings used in the manufacture of **Kingspan Kooltherm**® K12 Framing Board resist attack by mould and microbial growth and do not provide any food value to vermin.

FIRE PERFORMANCE

The rigid phenolic insulation core of **Kingspan Kooltherm**® K12 Framing Board will achieve the results given below which enables it to be classified by the Building Regulations as being Class O rated.

Kingspan Kooltherm® K12 Framing Board, when subjected to British Standard fire tests, achieves the following results. Further details of the fire performance of Kingspan Insulation products may be obtained from our Technical Services Department (see rear cover).

Test	Result
BS 476: Part 6: 1989 (Fire Propagation Test)	Index of performance (I) not exceeding 12 and sub-index (i ₁) not exceeding 6 (for rigid phenolic insulation core)
BS 476: Part 7: 1997 (Surface Spread of Flame Test)	Class 1 rating for rigid phenolic insulation core and facings
BS 5111: Part 1: 1974 (Smoke Obscuration)	< 5%

KINGSPAN INSULATION

Kingspan Insulation offers an extensive range of premium and high performance insulation products, breathable membranes and pre-fabricated / pre-insulated systems for the construction industry. Following an extensive investment programme, Kingspan Insulation is continuing to lead the insulation industry by manufacturing the majority of its insulation products with zero Ozone Depletion Potential (ODP) and quoting thermal performance data in accordance with the new harmonised European Standard.

Kingspan Insulation Limited specialise in the solution of insulation problems. Our range of insulation products which meet the exacting requirements of the construction industry are produced to the highest standards, including BS EN ISO 9002: 1994 and IS EN ISO 9002: 1994. Each product has been designed to fulfil a specific need and has been manufactured to precise standards and tolerances.

INSULATION FOR:

- PITCHED ROOFS
- FLAT ROOFS
- CAVITY WALLS
- TIMBER AND STEEL FRAMING
- EXTERNALLY INSULATED CLADDING SYSTEMS
- FLOORS
- SOFFITS

INSULATED DRY LINING

TAPERED ROOFING SYSTEMS

Kingspan KoolDuct® PRE-INSULATED DUCTING

Kingspan nilvent™ BREATHABLE MEMBRANES

Kingspan TEK Haus™ BUILDING SYSTEM

THE KINGSPAN INSULATION PRODUCT RANGE

THE KINGSPAN KOOLTHERM® K-RANGE

- With a thermal conductivity of 0.018 W/m.K rigid phenolic insulation is the most thermally efficient insulation product commonly available.
- Utilises the thinnest possible insulation board to achieve required U-values.
- Fire performance can be equivalent to mineral fibre.
- Achieves a Class O fire rating to the Building Regulations.
- Achieves the best possible rating of <5% smoke emission when tested to BS 5111: Part 1: 1974.
- CFC-free / available CFC/HCFC-free with zero Ozone Depletion Potential subject to enquiry.

THE KINGSPAN THERMA ZERO ODP RANGE

- With a thermal conductivity of 0.022-0.026 W/m.K zero ODP rigid urethane insulation is one of the most thermally efficient insulation products commonly available.
- Easily achieves required U-values with minimum board thickness.
- Achieves the required fire performance for the intended application.
- CFC/HCFC-free with zero Ozone Depletion Potential (ODP).

THE KINGSPAN STYROZONE™ & PURLCRETE ZERO ODP RANGES

- Rigid extruded polystyrene insulation (XPS) has the highest compressive strength of any commonly available insulant.
- Ideal for specialist applications such as inverted roofing and heavy-duty flooring.
- Easily achieves required U-values with minimum board thickness.
- Achieves the required fire performance for the intended application.
- CFC/HCFC-free with zero Ozone Depletion Potential (ODP).

ALL PRODUCTS

- Their closed cell structure resists both moisture and water vapour ingress – problems which can be associated with open cell materials such as mineral fibre and which can result in reduced thermal performance.
- Unaffected by air movement – problems that can be experienced with mineral fibre and which can reduce thermal performance.
- Safe and easy to install – masks are not required, as Kingspan Insulation products do not produce loose dust or irritant fibres.
- Provide reliable long term thermal performance over the lifetime of the building.

CUSTOMER SERVICE

For quotations, order placement and details of despatches please contact our Building Fabric Insulation Customer Services Department on the numbers below:

UK – Telephone: +44 (0) 870 850 8555
– Fax: +44 (0) 870 850 8666
– email: commercial.uk@insulation.kingspan.com
Ireland – Telephone: +353 (0) 42 97 95000
– Fax: +353 (0) 42 97 46129
– email: commercial.ie@insulation.kingspan.com

TECHNICAL ADVICE

Kingspan Insulation Ltd support all of their products with a comprehensive Technical Advisory Service for specifiers, stockists and contractors.

This includes a free computer-aided service designed to give fast, accurate technical advice. Simply phone our **TECHLINE** with your project specification and we can run calculations to provide U-values, condensation/dew point risk, required insulation thicknesses etc... Thereafter we can run any number of permutations to help you achieve your desired targets.

We can also give general application advice and advice on design detailing and fixing etc... Site surveys are also undertaken as appropriate.

Please contact our Building Fabric Insulation Technical Services Department on the **TECHLINE** numbers below:



UK: – Telephone: +44 (0) 870 850 8555
– Fax: +44 (0) 1544 387 278
– email: techline.uk@insulation.kingspan.com
Ireland: – Telephone: +353 (0) 42 97 95032
– Fax: +353 (0) 42 97 46129
– email: techline.ie@insulation.kingspan.com

LITERATURE AND SAMPLES

Kingspan Insulation produces a comprehensive range of technical literature for specifiers, contractors, stockists and end users. The literature contains clear 'user friendly' advice on typical design; design considerations; thermal properties; sitework and product data.

Available as a complete Design Manual, on CD-ROM or as individual product brochures, Kingspan Insulation technical literature is an essential specification tool. For copies please contact our Marketing Department on the numbers below:

UK – Telephone: +44 (0) 1544 387 210
– Fax: +44 (0) 1544 387 299
– email: literature.uk@insulation.kingspan.com
Ireland – Telephone: +353 (0) 42 97 95038
– Fax: +353 (0) 42 97 46129
– email: literature.ie@insulation.kingspan.com

GENERAL ENQUIRIES

For all other enquiries contact Kingspan Insulation on the numbers below:

UK – Telephone: +44 (0) 870 850 8555
– Fax: +44 (0) 870 850 8666
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– Fax: +353 (0) 42 97 46129
– email: info.ie@insulation.kingspan.com

Kingspan Insulation reserve the right to amend product specifications without prior notice. The information, technical details and fixing instructions etc. included in this literature are given in good faith and apply to uses described. Recommendations for use should be verified as to the suitability and compliance with actual requirements, specifications and any applicable laws and regulations. For other applications or conditions of use, Kingspan Insulation offers a free Technical Advisory Service (see left) whose advice should be sought for uses of Kingspan Insulation products that are not specifically described herein. Please check that your copy of the literature is current by contacting our Marketing Department (see above).



Kingspan Insulation

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