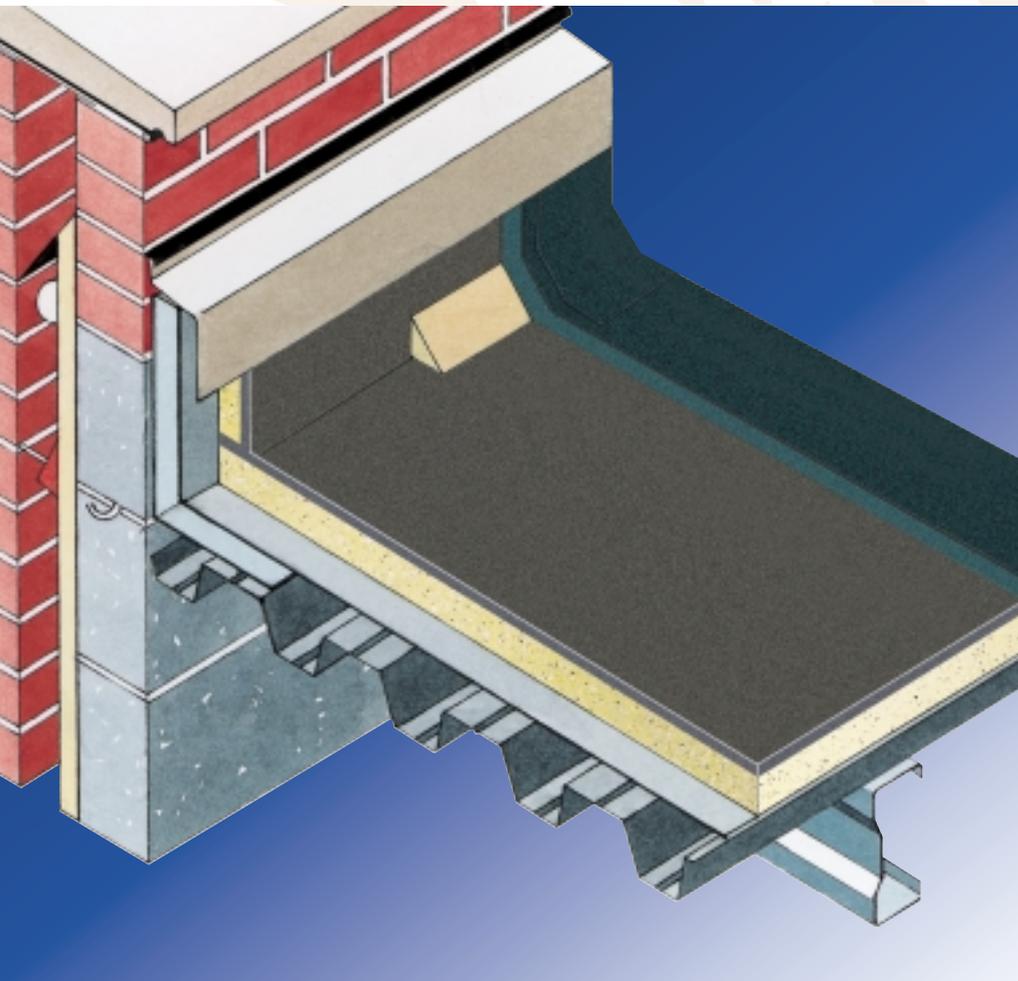


Thermarroof TR29 zero ODP

INSULATION BENEATH FULLY BONDED
TORCH APPLIED MULTI-LAYER
BITUMINOUS WATERPROOFING SYSTEMS



▼ High performance rigid urethane insulation - thermal conductivity 0.024-0.026 W/m.K

▼ Compatible with torch applied waterproofing systems

▼ No requirement for a 3G ventilating layer

▼ Offers good resistance to foot traffic

▼ Resistant to the passage of water vapour

▼ Easy to handle and install

▼ Ideal for newbuild or refurbishment

▼ CFC/HCFC-free with Zero Ozone Depletion Potential (ODP)



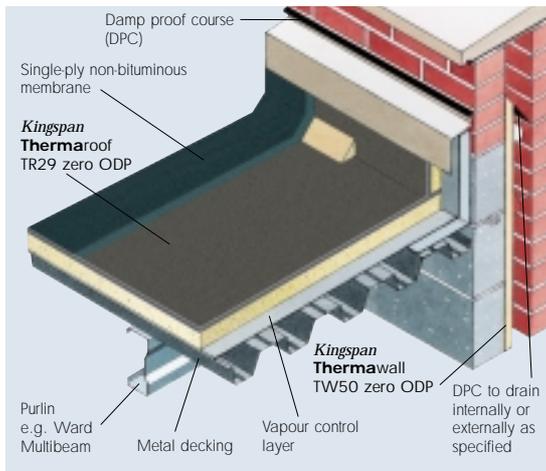
BS EN ISO 9002: 1994
Certificate No. FM 10697



zero o.d.p.

Kingspan **Therma**roof TR29 zero ODP

TYPICAL DESIGN DETAIL



SPECIFICATION CLAUSE

Kingspan Thermaroof TR29 zero ODP should be described in specifications as:-

The roof insulation shall be **Kingspan Therma**roof TR29 zero ODP comprising 15 mm bitumen coated perlite facing bonded to a ___ mm thick CFC/HCFC-free rigid urethane insulation core during manufacture to 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): J41 120, J41 130, J41 140, J41 454 (Standard and Intermediate)



DESIGN CONSIDERATIONS

WIND LOADING

Wind loadings should be assessed in accordance with BS 6399: Part 2: 1997 (Code of practice for wind loads).

ROOF WATERPROOFING

Kingspan Thermaroof TR29 zero ODP is designed for use with bitumen based torch-on waterproofing systems. The roof waterproofing should be applied as soon as possible after the laying of the boards. The roof waterproofing should be laid where applicable in accordance with BS 8217: 1994 (Code of practice for built-up felt roofing).

FALLS

The fall on a flat roof should be smooth and steep enough to prevent the formation of rainwater pools. To ensure adequate drainage, BS 6229: 1982, recommends uniform gradients of not less than 1 in 80. However, because of building settlement, it can be advisable to 'design in' even greater falls. These can be provided by the use of Kingspan Insulation's Tapered Roofing Systems (see below).

WATER VAPOUR CONTROL

The need for a separate vapour control layer with **Kingspan Therma**roof TR29 zero ODP in a warm roof construction should be assessed in accordance with BS 5250: 1989 (1995) and as defined in BS 6299: 1982. A minimum vapour control layer should consist of a coated roofing felt complying with BS 747: 2000 Type 3B, or any appropriate metal-cored vapour control layer. Allowance should be made for the adequate bonding of the vapour control layer to the deck so as to provide a suitable surface for **Kingspan Therma**roof TR29 zero ODP to be laid upon and sufficient resistance to wind up-lift (see 'Wind Loading').

Metal decks and concrete decks should be primed prior to the application of the hot bitumen used to bond the vapour control layer to the deck.

ROOF LOADING

Depending on the chosen waterproofing system, **Kingspan Therma**roof TR29 zero ODP is suitable for use on access roof decks subject to limited foot traffic. Where continuous or excessive loadings are liable to occur it is recommended that the roof surface be protected by promenade tiles. The roof should be adequately protected when building works are being carried out on or over the roof surface. This is best achieved by close boarding. The completed roof must not be used for the storage of heavy building components such as bricks or air condition equipment.

SPANNING ON METAL DECKS

The designer's attention is drawn to the requirement that insulation boards comply with the minimum thicknesses shown in the table below, when used over metal decks with trough openings as shown.

Trough Opening (mm)	Minimum Insulant Thickness (mm)
≤75	25
76-100	30
101-125	35
126-150	40
151-175	45
176-200	50

THERMAL PROPERTIES

The R-values and λ -values quoted in this document for rigid urethane insulation are based on the procedures for the determination of the aged values of thermal resistance and thermal conductivity, laid down in the harmonised European standard BS EN 13165, using so called 90:90 principles. Comparison with alternative products may not be appropriate unless the same procedures have been followed.

THERMAL CONDUCTIVITY

The thermal conductivity of the insulation core of **Kingspan Thermaroof TR29 zero ODP** is 0.026 W/m.K (insulant thicknesses < 80 mm), 0.025 W/m.K (insulant thicknesses from 80 mm to < 120 mm) and 0.024 W/m.K (insulant thicknesses \geq 120 mm).

THERMAL RESISTANCES

Thermal resistance (R-value) varies with the thickness of each component. It is calculated by dividing the thickness of each component (expressed in metres) by its thermal conductivity and adding the resultant figures together.

*Product Thickness (mm)	Thermal Resistance (m ² .K/W)
50	1.646
55	1.838
60	2.031
65	2.223
70	2.415
75	2.608
85	2.992
90	3.185
95	3.500
100	3.700
105	3.900
110	4.100
115	4.300
125	4.700
135	5.300
140	5.508
145	5.717
150	5.925

*Product thickness = insulant thickness + 15 mm perlite

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 examples are based on the use of **Kingspan Thermaroof TR29 zero ODP** waterproofed with 2 layer, torch applied waterproofing membrane, finished with 10mm mineral chippings. The board is laid over a bitumen based vapour control layer, which has been fully bonded to the type of deck stated for each application. The suspended ceiling, where shown, is taken to be 12.5 mm plasterboard with a cavity between it and the underside of the deck. 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.

Kingspan **Therma**roof TR29 zero ODP

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

METAL DECK WITH NO CEILING

Product Thickness* (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method)
60	0.43	0.43
65	0.40	0.40
75	0.35	0.35
85	0.31	0.31
90	0.29	0.29
95	0.26	0.26
100	0.25	0.25
105	0.24	0.24
115	0.22	0.22
125	0.20	0.20
135	0.18	0.18
140	0.17	0.17
145	0.17	0.17
150	0.16	0.16

*Product thickness = insulant thickness + 15 mm perlite

DENSE CONCRETE DECK WITH SUSPENDED PLASTERBOARD CEILING

Product Thickness* (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method)
55	0.43	0.42
65	0.37	0.36
70	0.34	0.34
75	0.32	0.32
85	0.29	0.28
90	0.27	0.27
95	0.25	0.25
105	0.23	0.22
110	0.22	0.22
115	0.21	0.21
125	0.19	0.19
135	0.17	0.17
140	0.17	0.17
145	0.16	0.16

*Product thickness = insulant thickness + 15 mm perlite

TIMBER DECK WITH PLASTERBOARD CEILING

Product Thickness* (mm)	U-value (W/m ² .K)	
	Combined Method	Proportional Area Method)
50	0.45	0.45
55	0.42	0.41
65	0.36	0.36
70	0.34	0.33
75	0.32	0.31
85	0.28	0.28
90	0.27	0.27
95	0.25	0.25
105	0.22	0.22
110	0.22	0.21
115	0.21	0.21
125	0.19	0.19
135	0.17	0.17
140	0.17	0.16
145	0.16	0.16

*Product thickness = insulant thickness + 15 mm perlite

SITWORK

VAPOUR CONTROL LAYER

Metal decks and concrete decks should be primed prior to the application of the hot bitumen used to bond the vapour control layer to the deck. To provide an effective vapour control layer, the roofing felt should be bonded in hot bitumen to the supporting substrate with all joints lapped at least 50 mm and bonded. At all edges, abutments and penetrations the felt should be turned up and sealed with the roof covering to form an envelope. Reference should be made to BS 8217: 1994 (Code of practice for built-up felt roofing). Where verge/eaves details exist, the vapour control layer should be dressed accordingly to a minimum of 150 mm.

FIXING OVER METAL DECKS

On metal decks, **Kingspan Therma**roof TR29 zero ODP should be laid into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer. Alternatively the boards can be secured using mechanical fixing systems (see Figure 1). **Kingspan Therma**roof TR29 zero ODP should be laid break-bonded with its long edges at right angles to the trough openings, or alternatively, diagonally across the corrugation line. Whichever system is chosen, care must be taken to ensure that the deck supports all joints. The joints should be lightly butted. Taping of the joints is not required.

FIXING OVER CONCRETE DECKS

Concrete decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets. To ensure an adequate bond between the vapour control layer and the concrete deck, the concrete or screeded surface should be suitably primed, in accordance with the specified manufacturer's instructions. The vapour control layer should be fully bonded to the deck and similarly the **Kingspan Therma**roof TR29 zero ODP to the vapour control layer by laying into hot bitumen mopped or poured over the vapour control layer. Alternatively the boards can be secured using mechanical fixing systems (see Figure 1). The boards should be laid break-bonded with all joints lightly butted.

FIXING OVER PLYWOOD DECKS

Kingspan Thermaroof TR29 zero ODP should be fully bedded in hot bitumen over a continuous vapour control layer, which has been nailed or bonded to the deck with laps at the side and end sealed with hot bitumen. Alternatively the boards can be secured using mechanical fixing systems (see Figure 1). The joints should be break-bonded and the boards laid at right angles to the edge of the roof or diagonally across the roof. All joints should be lightly butted.

FIXING OVER TONGUE & GROOVE DECKS

On timber tongue and groove decks, the vapour control layer should be nailed. During the laying of **Kingspan Thermaroof TR29 zero ODP** the nail heads will become sealed in hot bitumen to the vapour control layer by the subsequent bonding of the roofboard. The **Kingspan Thermaroof TR29 zero ODP** is then applied as described under plywood decks.

FIXING OVER WOODWOOL DECKS

On woodwool slab decks, **Kingspan Thermaroof TR29 zero ODP** should be fully bedded in hot bitumen over a continuous vapour control layer. Boards should be laid with their long edges at right angles to the slabs, or preferably diagonally across the roof. Alternatively boards can be secured using specialist mechanical fixing systems (see Figure 1). Board joints should not coincide with those of the slabs. The roof boards should be laid break-bonded, with all joints lightly butted.

PITCHED OR SLOPING ROOFS

Any provision for mechanical fixing of the waterproofing layer or layers, to prevent slippage of the cap sheet, should be made prior to the application of **Kingspan Thermaroof TR29 zero ODP**.

MECHANICAL FIXINGS

The number of mechanical fixings required to fix **Kingspan Thermaroof TR29 zero ODP** will vary with the geographical location of the building, the topographical data, and the height and width of the roof concerned.

Each fixing should incorporate a square or circular plate washer (70 mm x 70 mm or 75 mm diameter).

A minimum 4 No. fixings should be placed within the individual board area and be sited >50 mm and <150 mm from the edges and corners of the board giving a minimum fixing rate of 5.55 fixings per square metre: (1200 x 600 mm boards).

The requirement for additional fixings should be assessed in accordance with BS 6399: Part 2: 1997 (Code of practice for wind loads) (see Figure 1).

PERIMETER MECHANICAL FIXINGS

Where perimeter mechanical fixings are specified, the minimum number and distribution should be as stated for full mechanical fixing. The extent of the perimeter mechanical fixing will depend on the design and location of the roof concerned. The fixings should cover a distance of not less than two metres from the edge of the roof. The area to be mechanically fixed should extend around the complete perimeter of the roof.

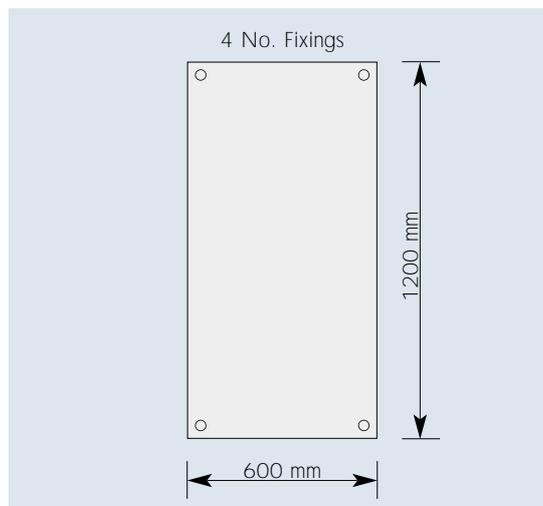


Figure 1 TYPICAL MECHANICAL FIXING PATTERN

DAILY WORKING PRACTICE

At the completion of each day's work, or whenever work is interrupted, a night joint must be made in order to prevent water penetration of the roof construction.

CUTTING

Kingspan Thermaroof TR29 zero ODP can be cut easily and cleanly using a fine toothed saw or a sharp knife, to fit roof openings and fixtures. Do not attempt to snap the board. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

AVAILABILITY

Kingspan Thermaroof TR29 zero ODP is available through specialist insulation distributors and selected roofing merchants throughout the UK, Ireland and Europe.

PACKAGING

The boards are supplied palletised in labelled packs shrinkwrapped in polythene.

STORAGE

The packaging of **Kingspan Thermaroof TR29 zero ODP** should not be considered adequate for outside protection. Ideally, boards should be stored inside a building. However, storage outside is permissible provided the boards are stacked clear of the ground and covered with a securely anchored polyethylene sheet.

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.

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

Kingspan **Therma**roof TR29 zero ODP

PRODUCT DESCRIPTION

THE UPPER FACING

The top facing of **Kingspan Therma**roof TR29 zero ODP is a bonded bitumen coated perlite board manufactured from expanded, milled volcanic perlite rock particles formed into a board and treated during manufacture with a bitumen emulsion, autohesively bonded to the insulation during manufacture.

THE CORE

The core of **Kingspan Therma**roof TR29 zero ODP is a high performance CFC/HCFC-free rigid urethane insulant of typical density 32 kg/m³.

THE LOWER FACING

The lower facing of **Kingspan Therma**roof TR29 zero ODP consists of a perforated glass reinforced cellulose facing which is compatible with most forms of bonding bitumen.

CFC/HCFC-FREE

Kingspan Thermaroof TR29 is zero ODP manufactured without the use of CFCs/HCFCs and has zero Ozone Depletion Potential (ODP).



PRODUCT DATA

STANDARDS AND APPROVALS

Kingspan Thermaroof TR29 zero ODP 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).



BS EN ISO 9002: 1994
Certificate No. 10697

STANDARD DIMENSIONS

Kingspan Thermaroof TR29 zero ODP is available in the following standard size and thicknesses:

Nominal Dimension	Availability
Length (m)	1.2
Width (m)	0.6
Perlite Thickness (mm)	15
Insulant Thickness* (mm)	35, 40, 45, 50, 55, 60, 70, 75, 80, 85, 90, 95, 100, 110, 120, 125, 130, 135

INSULATION COMPRESSIVE STRENGTH

Typically exceeds 150 kPa at 10% compression when tested to British Standard 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 15 MN.s/g when tested in accordance with BS 4370: Part 2: 1993.

DURABILITY

If correctly applied, **Kingspan Therma**roof TR29 zero ODP 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 Therma**roof TR29 zero ODP. 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 **Kingspan Therma**roof TR29 zero ODP resist attack by mould and microbial growth and do not provide any food value to vermin.

FIRE PERFORMANCE

Flat roofs insulated with **Kingspan Therma**roof TR29 zero ODP when subjected to British Standard fire tests achieve the following typical results, when waterproofed with 2 layer, torch applied waterproofing membrane, finished with 10mm mineral chippings For specifications without the chippings on built-up felt please consult the manufacturer of the mineral surfaced cap sheet for their fire classification details. Further details on the fire performance of Kingspan Insulation products may be obtained from the Technical Services Department (see rear cover).

Test	Result
BS 476: Part 3: 1975 (External fire exposure roof test)	FAA rating

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
– email: info.uk@insulation.kingspan.com
Ireland – Telephone: +353 (0) 42 97 95000
– 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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