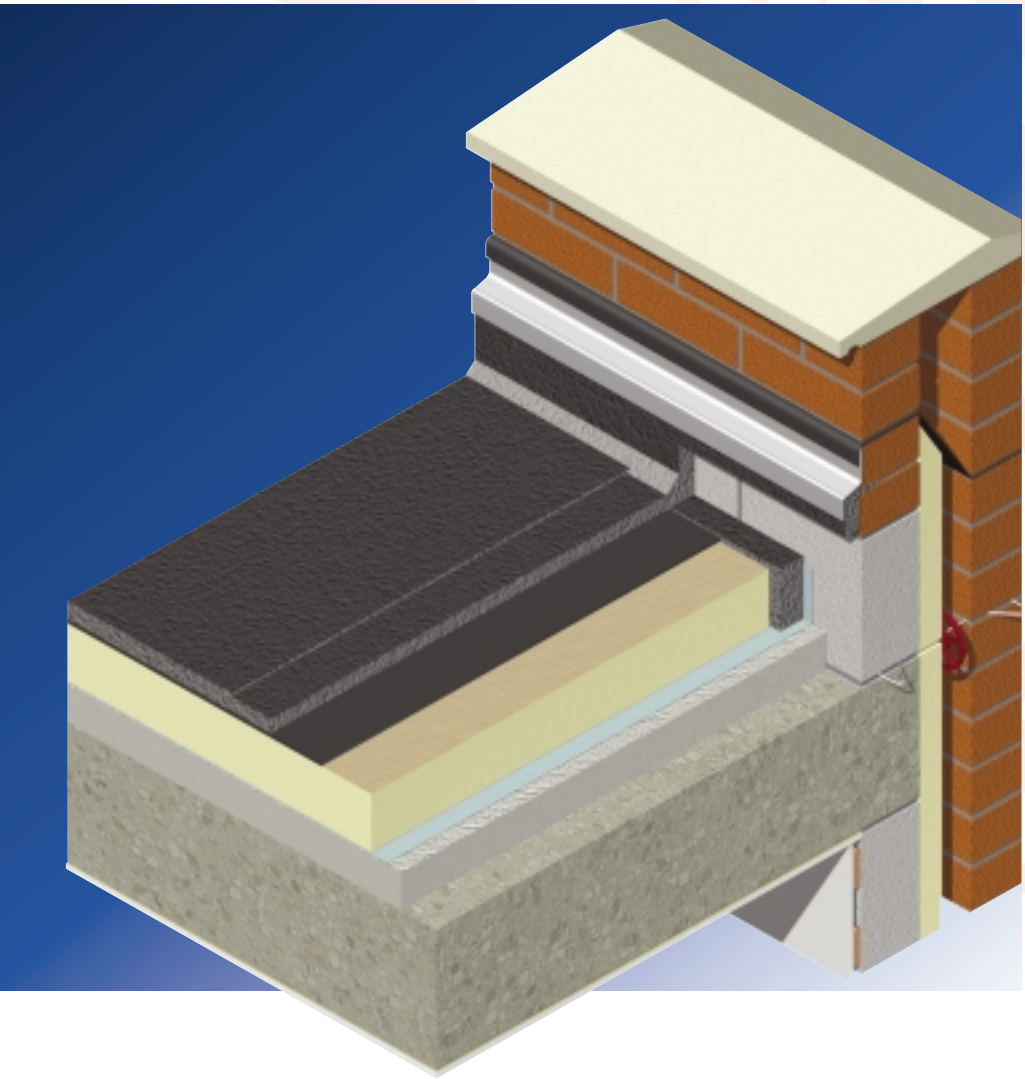
CI/Sfb (27.9) Rn7 M2
Third Issue March 2003

# Thermaroof TR24 zero ODP

## INSULATION BENEATH POLYMER MODIFIED MASTIC ASPHALT

*OTHER THAN INSULATED BALCONIES WATERPROOFED WITH MASTIC ASPHALT WITH A POROUS PROMENADE TILE OVERLAY*



- High performance rigid urethane insulation – thermal conductivity 0.026–0.028 W/m.K
- Can be bonded to existing deck/vapour control layer or mechanically fixed
- Unaffected by temperatures associated with mastic asphalt
- Fibreboard overlay is not required
- System guarantees available
- Resistant to the passage of water vapour
- Easy to handle and install
- Ideal for newbuild and refurbishment
- CFC/HCFC–free with zero Ozone Depletion Potential (ODP)

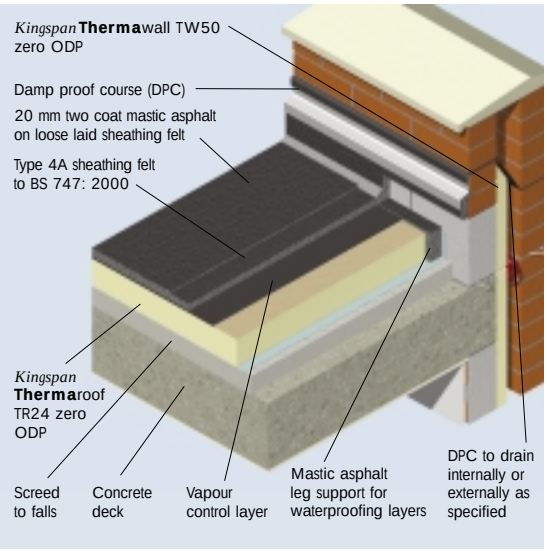
BS EN ISO 9002 : 1994
Certificate No. FM 10697

Mastic Asphalt Council

zero O.D.P

# *Kingspan* **Therma**roof TR24 zero ODP

## TYPICAL DESIGN DETAIL




## SPECIFICATION CLAUSE

*Kingspan* **Therma**roof TR24 zero ODP should be described in specifications as:–

The roof insulation shall be *Kingspan* **Therma**roof TR24 zero ODP ____mm thick comprising a CFC / HCFC–free rigid urethane insulation core with plain glass fibre tissue facings on both sides manufactured 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): J21 130, J21 140, J21 513 (Standard and Intermediate)

## DESIGN CONSIDERATIONS

SUSTAINABILITY

It is widely recognised that there are four main global environmental sustainability issues: global warming, non–renewable resource depletion, toxic pollution and ozone depletion, and that these global issues far outweigh any local sustainability issues in their need for immediate attention and potential impact from inaction.

Recent studies have shown that the first three issues are essentially one. The extraction and consumption (burning) of fossil fuels is by far the most significant contributor to global warming, non–renewable resource depletion and toxic pollution.

Therefore, saving energy by specifying the lowest U–value possible and using zero ODP insulation materials are the best actions to take when considering sustainability for the insulation requirements of a building.

*Kingspan* **Therma**roof TR24 zero ODP is manufactured without the use of CFCs / HCFCs and has zero Ozone Depletion Potential (ODP).

In the past, erroneously, the relative sustainability of insulation materials has been compared on the basis of embodied energy. It is now known that the embodied energy of insulation materials is insignificant compared with the energy saved by insulation over the lifetime of a building in which it is used and so is of limited importance. However, it is a matter of social responsibility to state the environmental impact in the manufacture of a product, and a full Life Cycle Analysis (LCA) rather than embodied energy is recognised as the preferred tool to achieve this.

An LCA, independently certified by the BRE, has been carried out for UK produced *Kingspan* **Therma**roof TR24 zero ODP and a copy is available from Kingspan Insulation, see rear cover. Kingspan Insulation Limited is the first insulation manufacturer to publish openly such information.

WIND LOADING

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

ROOF WATERPROOFING

*Kingspan* **Therma**roof TR24 zero ODP is designed for use with mastic asphalt. Mastic asphalt should always be laid over an isolating layer of Type 4A sheathing felt to BS 747: 2000 (Specification for Roofing Felts). Consideration should be given to the recommendations of BS 8218: 1998 (Code of practice for mastic asphalt 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).

TAPERED ROOFING

Further details on the *Kingspan* **Therma**taper zero ODP range and a complete design service are available from our Tapered Roofing Department who should be consulted as early as possible in the process of roof design in order that they may offer the benefit of their considerable experience to the design team.

## WATER VAPOUR CONTROL

The need for a separate vapour control layer with *Kingspan* **Therma**roof TR24 zero ODP in a warm roof construction should be assessed in accordance with BS 5250: 1989 (1995) and as defined in BS 6229: 2003. 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 TR24 zero ODP to be laid upon, and sufficient resistance to wind up–lift (see 'Wind Loading').

## ROOF LOADING

Depending on the chosen waterproofing system, *Kingspan* **Therma**roof TR24 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 is 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 storage of heavy building components such as bricks or air conditioning 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 |

# 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* **Therma**roof TR24 zero ODP waterproofed using 2 layers of mastic asphalt with the surface covered with 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 / I.S. 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 / I.S. 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.

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

| Insulant Thickness (mm) | U–value (W / m².K) | |
|---|---|---|
| | Combined Method | *Proportional Area Method* |
| 55 | 0.44 | *0.44* |
| 60 | 0.41 | *0.41* |
| 70 | 0.36 | *0.36* |
| 75 | 0.33 | *0.33* |
| 80 | 0.31 | *0.31* |
| 90 | 0.27 | *0.27* |
| 100 | 0.25 | *0.25* |
| 110 | 0.23 | *0.23* |
| 115 | 0.22 | *0.22* |
| 120 | 0.20 | *0.20* |
| 125 | 0.20 | *0.20* |
| 130 | 0.19 | *0.19* |
| 140 | 0.18 | *0.18* |
| 150 | 0.16 | *0.16* |

## DENSE CONCRETE DECK WITH SUSPENDED CEILING

| Insulant Thickness (mm) | U–value (W / m².K) | |
|---|---|---|
| | Combined Method | *Proportional Area Method* |
| 50 | 0.43 | *0.43* |
| 60 | 0.37 | *0.37* |
| 65 | 0.35 | *0.35* |
| 70 | 0.33 | *0.33* |
| 75 | 0.31 | *0.31* |
| 80 | 0.28 | *0.28* |
| 90 | 0.26 | *0.26* |
| 95 | 0.25 | *0.25* |
| 100 | 0.23 | *0.23* |
| 105 | 0.22 | *0.22* |
| 110 | 0.21 | *0.21* |
| 120 | 0.19 | *0.19* |
| 125 | 0.19 | *0.19* |
| 130 | 0.18 | *0.18* |
| 140 | 0.17 | *0.17* |
| 145 | 0.16 | *0.16* |

TIMBER DECK WITH PLASTERBOARD CEILING

| Insulant Thickness (mm) | U–value (W / m².K) | |
|---|---|---|
| | Combined Method | *Proportional Area Method* |
| 50 | 0.42 | *0.42* |
| 60 | 0.37 | *0.37* |
| 65 | 0.34 | *0.34* |
| 70 | 0.32 | *0.32* |
| 75 | 0.31 | *0.31* |
| 80 | 0.28 | *0.28* |
| 90 | 0.26 | *0.26* |
| 95 | 0.24 | *0.24* |
| 100 | 0.23 | *0.23* |
| 105 | 0.22 | *0.22* |
| 110 | 0.21 | *0.21* |
| 120 | 0.19 | *0.19* |
| 125 | 0.19 | *0.19* |
| 130 | 0.18 | *0.18* |
| 140 | 0.17 | *0.17* |
| 145 | 0.16 | *0.16* |

## SITEWORK

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 the Mastic Asphalt Council Roofing handbook. 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 TR24 zero ODP should be laid into hot bitumen (maximum 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 TR24 zero ODP should be laid break–bonded with the 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 all joints are supported by the deck. 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 TR24 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* **Therma**roof TR24 zero ODP should be fully bedded in hot bitumen over a continuous vapour control layer which has been nailed 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 AND GROOVE DECKS

On timber tongue & groove decks, the vapour control layer should be nailed. During the laying of *Kingspan* **Therma**roof TR24 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* **Therma**roof TR24 zero ODP is then applied as described under plywood decks.

FIXING OVER WOODWOOL DECKS

On woodwool slab decks, *Kingspan* **Therma**roof TR24 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.

MECHANICAL FIXINGS

The number of mechanical fixings required to fix *Kingspan* **Therma**roof TR24 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: (1.2 x 0.6 m 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).

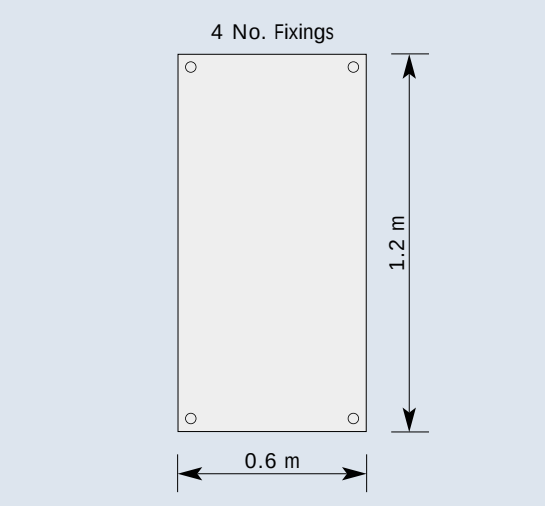



**Figure 1** TYPICAL MECHANICAL FIXING PATTERN

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.

REFLECTIVE COATINGS
Mastic asphalt waterproofing systems laid over *Kingspan* **Therma**roof TR24 zero ODP should always incorporate a solar reflective layer such as chippings or specialist coatings.

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
Cutting should be carried out using a fine toothed saw, or by scoring with a knife 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* **Therma**roof TR24 zero ODP is available through specialist insulation distributors and selected roofing merchants throughout the UK, Ireland and Europe.

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

STORAGE
The packaging of *Kingspan* **Therma**roof TR24 zero ODP 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).

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

## PRODUCT DESCRIPTION

THE FACINGS
*Kingspan* **Therma**roof TR24 zero ODP is faced on both sides with plain glass fibre tissue autohesively bonded to the insulation core during manufacture.

THE CORE
The core of *Kingspan* **Therma**roof TR24 zero ODP is a high performance CFC / HCFC–free rigid urethane insulant of typical density 32 kg / m$^3$.

CFC / HCFC FREE
*Kingspan* **Therma**roof TR24 zero ODP is manufactured without the use of CFCs / HCFCs and has zero Ozone Depletion Potential (ODP).

zero O.D.P

## PRODUCT DATA

STANDARDS AND APPROVALS
*Kingspan* **Therma**roof TR24 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. FM 10697

STANDARD DIMENSIONS

*Kingspan* **Therma**roof TR24 zero ODP is available in the following standard sizes and thicknesses:

| Nominal Dimension | | Availability |
|---|---|---|
| Length | (m) | 1.2 |
| Width | (m) | 0.6 |
| Insulant Thickness* | (mm) | 50, 55, 60, 65, 70, 75, 80, 90, 95, 100, 105, 110, 115, 120, 125, 130, 140, 145, 150 |

*Other thicknesses are available subject to availability

INSULATION COMPRESSIVE STRENGTH

Typically exceeds 150 kPa at 10% compression when tested to BS EN 826: 1996 (Thermal insulating products for building applications. Determination of compression behaviour).

WATER VAPOUR RESISTANCE

The boards achieve a resistance greater than 15 MN.s/g, when tested in accordance with BS 4370: Part 2: 1993. *Kingspan* **Therma**roof TR24 zero ODP should always be installed over a separate felt vapour control layer as detailed in 'Water Vapour Control' page 2.

DURABILITY

If correctly applied, *Kingspan* **Therma**roof TR24 zero ODP has an indefinite life. Its durability depends on the supporting structure, waterproofing 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 TR24 zero ODP. Boards which have been in contact with harsh solvents, petrol, mineral oil or acids, or boards that have been damaged in any other way should not be used.

The insulation core and facings used in the manufacture of *Kingspan* **Therma**roof TR24 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 TR24 zero ODP, waterproofed using 2 layers of mastic asphalt, finished with mineral chippings and subjected to British Standard fire tests, achieve the result given below.

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

Further details on the fire performance of Kingspan Insulation products may be obtained from our Technical Services Department (see rear cover).

## THERMAL PROPERTIES

The λ–values and R–values quoted are in accordance with the Harmonised European Standard BS EN 13165: 2001 (Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products – Specification) using so called 90/90 principles. Comparison with alternative products may not be appropriate unless the same procedures have been followed.

THERMAL CONDUCTIVITY

The boards achieve a thermal conductivity (λ–value) 0.028 W/m.K for thicknesses < 80 mm, 0.027 W/m.K for thicknesses from 80 mm to < 120 mm, and 0.026 W/m.K for thicknesses ≥ 120 mm.

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) |
|---|---|
| 50 | 1.75 |
| 55 | 1.85 |
| 60 | 2.10 |
| 65 | 2.40 |
| 70 | 2.50 |
| 75 | 2.65 |
| 80 | 2.95 |
| 85 | 3.10 |
| 90 | 3.30 |
| 95 | 3.50 |
| 100 | 3.70 |
| 105 | 3.85 |
| 110 | 4.05 |
| 120 | 4.60 |
| 125 | 4.80 |
| 130 | 5.00 |
| 135 | 5.15 |
| 140 | 5.35 |
| 145 | 5.55 |
| 150 | 5.75 |

## 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 / I.S. 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

**SOLUTIONS:**

- INSULATED DRY LINING
- TAPERED ROOFING SYSTEMS
- *Kingspan* **Kool**Duct® PRE–INSULATED DUCTING
- *Kingspan* **nil*vent***™ BREATHABLE MEMBRANES
- *Kingspan* **TEK** Haus™ BUILDING SYSTEM

## THE KINGSPAN INSULATION PRODUCT RANGE

THE KINGSPAN KOOLTHERM® K–RANGE

- With a thermal conductivity of 0.022–0.024 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 0.022–0.028 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 – non–fibrous
- 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:

TECHLINE

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 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. Product thicknesses shown in this document should not be taken as being available ex-stock and reference should be made to the current Kingspan Insulation price-list or advice sought from Kingspan Insulation Sales department. 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

**Kingspan Insulation**
Pembridge, Leominster, Herefordshire HR6 9LA, UK
Castleblayney, County Monaghan, Ireland

www.insulation.kingspan.com