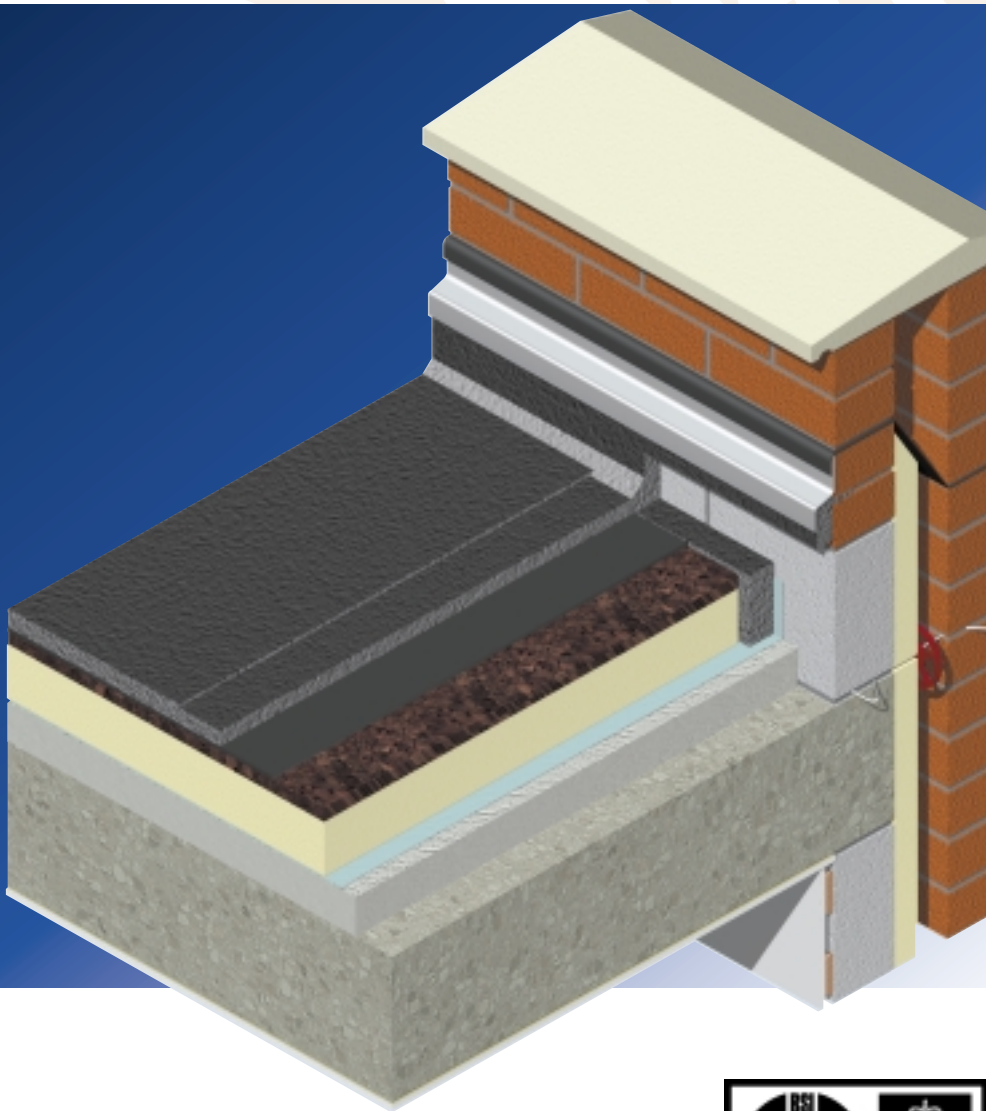




Thermataper zero ODP Systems

TAPERED INSULATION TO ENHANCE
WATER DRAINAGE FROM FLAT ROOFS



- ▼ High performance rigid urethane insulation – thermal conductivity 0.022–0.028 W/m.K
- ▼ Insulation and drainage in one system
- ▼ Solves water ponding
- ▼ Compatible with all weatherproofing systems
- ▼ Provides a practical alternative to screeding, structural falls or firrings
- ▼ No load bearing implications for the existing structure
- ▼ 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



I.S. EN ISO 9001: 2000
Registration No. 19.0633



zero o.d.p.

Kingspan **Thermataper** zero ODP Systems

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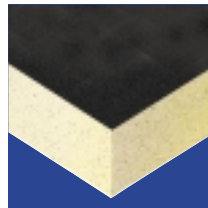
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Tapered insulation for use under partially bonded built-up felt waterproofing



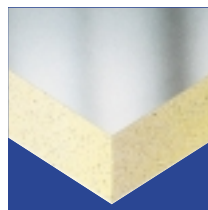
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Tapered insulation for use under fully bonded built-up felt and mastic asphalt waterproofing



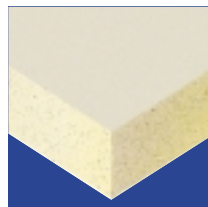
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Tapered insulation for use under single layer mechanically fixed waterproofing



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Tapered insulation for use under fully adhered single-ply waterproofing



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Drainage of localised roof areas



INTRODUCTION

INSULATION & DRAINAGE

There are many critical factors which must be taken into consideration when designing a flat roof construction. Two of these factors – insulation and rainwater run-off can be addressed with one product range: **Kingspan Thermataper zero ODP Systems** from Kingspan Insulation Limited.

Kingspan Thermataper zero ODP Systems are available in a range of facings which means they can be used under most waterproofing systems.

A SOLUTION TO WATER PONDING

A high proportion of flat roof failures can be traced to the inability of the roof to shed rainwater from the surface, leading to the formation of water ponds. Ponding of rainwater can seriously decrease the design life of the roof by subjecting the membrane to attack from many sources such as:

- thermal stress;
- alkaline formation; and
- mould growth.

Excessive ponding can also increase roof loading, causing further deflection of the deck, which only adds to the problem of drainage. Patching is not a practical option: the only effective solution is to eliminate the ponding by designing an adequate fall into the roof.

Kingspan Thermataper zero ODP Systems have been developed to solve these problems **Kingspan Thermataper zero ODP Systems** encompass a range of tapered insulation boards, which can be designed to provide adequate roof falls.

NEW FLAT ROOFS

On new roofs, the use of **Kingspan Thermataper zero ODP Systems** eliminate the need to incorporate a fall into the design of the structure, which can require complex structural supports (e.g. on metal roof decks or firrings).

Using **Kingspan Thermataper zero ODP Systems** to achieve the requirements of the new Building Regulations/Standards could yield a saving of at least 21% over the cost of using alternative methods to create a fall in a flat roof for drainage purposes.

Kingspan Thermataper zero ODP Systems are also a simpler alternative to screeding as they do not present the risk of an overloaded structure due to excessive screed depths, avoids a wet trade and avoids the need for the drying out of screeds.

Kingspan Thermataper zero ODP Systems are estimated to be as little as 1% of the weight of a solution using screed to falls with a flat insulation board.

Because **Kingspan Thermataper zero ODP Systems** do not need time to dry out, they save time in the scheduling of a construction project. A recent analysis of screed to falls systems shows that, in the examples analysed, they may require between 100 and 200 days to dry.

REFURBISHMENT OF EXISTING FLAT ROOFS

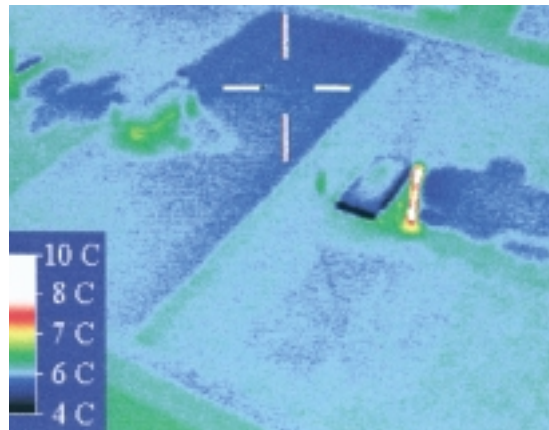
On existing roofs, **Kingspan Thermataper zero ODP System** and a new waterproofing system can be laid on top of the original waterproofing. This eliminates the need for stripping down the roof to deck level, and the provision of a vapour check is not required.

The existing insulation/substrate and waterproofing must be sound to provide a satisfactory surface for the **Kingspan Thermataper zero ODP System**. In all cases, the risk of interstitial condensation must be fully assessed (please see 'Heat Loss/Condensation Risk' on page 8).

THE BENEFITS OF KINGSPAN THERMATAPER ZERO ODP SYSTEMS



No water ponding



Reduced heat loss

Prestige Projects



Project: Captain Cook Shopping Centre, Middlesbrough
Client: Norwich Union
Specifier: Leach Rhodes Walker
Contractor: Shepherd Construction
Roofing Contractor: Pitchmastic
Product: Kingspan Thermataper TT46

Project: Stag Brewery, Mort Lake, London
Client: Budweiser Stag Brewing Company
Specifier: Baarco (a consortium of Midland Roofing and
M & J Roofing)
Product: Kingspan Thermataper TT42



Project: Dunsoughlin Civic Centre
Client: Meath County Council
Specifier: Grafton Architects
Contractor: John Sisk and Son Ltd
Product: Kingspan Thermataper TT46



Prestige Projects



Project: Bristol Myers Squibb Pharmaceutical Co., Chester
Client: Bristol Myers Squibb Business Services Ltd
Specifier: Halliday Meecham Architects Ltd
Contractor: Birse Construction Ltd
Roofing Contractor: Integrated Polymer Systems UK Ltd
Product: Kingspan Thermataper TT46

Project: Trafford Centre, Manchester
Client: The Trafford Centre Ltd
Implementation Architects: Leach Rhodes Walker
Contractor: Bovis Construction Ltd
Roofing Contractor: Pitchmastic plc
Product: Kingspan Thermataper TT46



Project: Parris Wood Leisure Centre
Client: MWB Leisure Fund IIA
Specifier: Edmund Kirby
Contractor: Ballast Wiltshier
Roofing Contractor: Northern Cladding
Product: Kingspan Thermataper TT46



Kingspan **Thermataper** zero ODP Systems

FROM CONCEPT TO COMPLETION IN 3 SIMPLE STEPS

Kingspan Thermataper zero ODP Systems come with a first class design package, which is available from initial concept design through to the completion of the project.

This ensures that the most cost-effective solution for any problem is identified and that the end result is a roof, which meets your specification for rainwater run-off and insulation requirements.

ROOF SURVEY

The design of a successful **Kingspan Thermataper** zero ODP System must take several factors into account:

- the position of the roof outlets;
- the extent of water run-off required;
- the dimensions of the roof;
- the presence of any existing falls or steps on the roof; and
- the location and dimensions of permanent projections such as roof lights, vents etc., and perimeter restrictions.

Normally, an architects drawing should suffice for new roofs. Any additional information required would be requested by our Tapered Roofing Division before design commences.

On existing roofs, a free survey of the roof will be carried out by one of our experienced surveyors to collect the required information.

DESIGN CONSIDERATIONS

Utilising our CAD system, even the most complex tapered system can be designed quickly and effectively, ready for client approval. The design will illustrate the required direction of drainage and will also take into account U-value, condensation risk analysis and wind uplift requirements, as well as minimum/maximum rise restrictions. Amendments or revisions can be easily incorporated.

HEAT LOSS/CONDENSATION RISK

Included in the design service is the calculation of condensation risk in accordance with BS 5250: 1989 (1995) (Code of practice for control of condensation in buildings) and as defined in BS 6229: 1982 (Code of practice for flat roofs with continuously supported coverings), based on the psychometric conditions for a given occupancy/building use.

It is possible to design for minimum or average U-values dependent on the client's requirements. However, the completed scheme ensures that any dew point is predicted above the vapour control layer at the minimum board thickness, whilst also ensuring any condensation risk is within the safe limits of tolerance of the insulation and the guidelines of BS 6229: 1982 (Code of practice for flat roofs with continuously supported coverings).

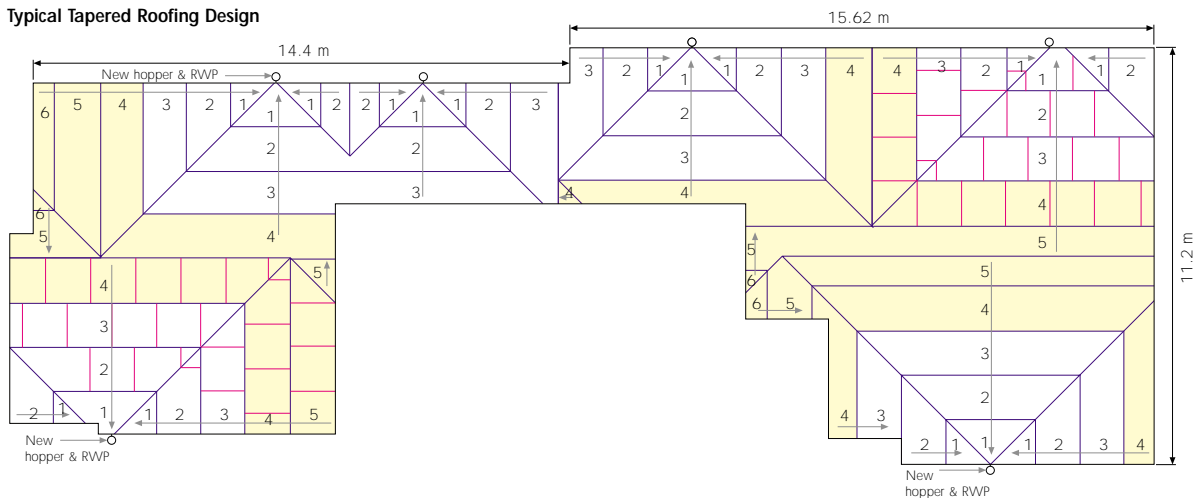
THE TAPERED ROOFING DRAWING SERVICE

Kingspan Insulation's Tapered Roofing Department offers a drawing service that allows existing plans to have the **Kingspan Thermataper** zero ODP System incorporated quickly and effectively. Designs can be supplied in the following ways:

- by *e-mail to tapered.uk@insulation.kingspan.com ;
- on a *computer disk/CD ROM; or
- on a drawing.

*Supplying plans electronically allows them to be customised by carrying the individual company logo.

Typical Tapered Roofing Design

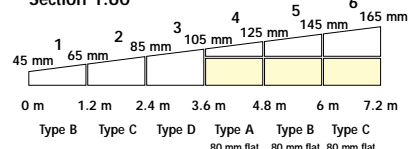


Components 1:60

TAPERED BOARDS				FLAT BOARDS
TYPE A 1200 x 1200 mm	TYPE B 1200 x 1200 mm	TYPE C 1200 x 1200 mm	TYPE D 1200 x 1200 mm	80 mm flat board 1200 x 600 mm
25 mm	45 mm	65 mm	85 mm	80 mm
Kingspan Thermataper TT40 zero ODP				Kingspan Thermaflat TR21 zero ODP

Kingspan Thermataper TT40 zero ODP roof insulation for use under most types of part bonded systems

Section 1:60



WIND LOADING

The requirement for mechanical fixing is also determined in accordance with the requirements of BS 6399: Part 2: 1997 (Code of practice for wind loads) taking into account:-

- length/width/height of the building;
- orientation of the building;
- wind speed;
- aspect (i.e. on a hill side); and
- topographical value of the surrounding area.

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

COMPLETION

Once the final design has been accepted by the client and the **Kingspan Thermataper zero ODP System** is ordered, a working drawing will be produced. This drawing will clearly set out the fall and direction of pitch and fixing of each board type. Installation of **Kingspan Thermataper zero ODP Systems** is simple using these easy to follow drawings and to facilitate laying each board type is packed separately in labelled shrink wrapped packs.

The boards are lightweight but strong, and are easy to handle and cut on site using a fine toothed saw. Our Product Managers will be pleased to provide any additional assistance at fixing stage if required. Please contact our Tapered Roofing Division.

GENERAL INFORMATION

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 Thermataper zero ODP

Systems 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 Thermataper zero ODP Systems** and a copy is available from Kingspan Insulation, see rear cover. Kingspan Insulation Limited is the first insulation manufacturer to publish openly such information.



AVAILABILITY

Kingspan Thermataper zero ODP System 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. The labels show product name, board size, type and quantity. Each pack contains one board type which facilitates the laying of the system.

STORAGE

The packaging of **Kingspan Thermataper zero ODP System** 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).

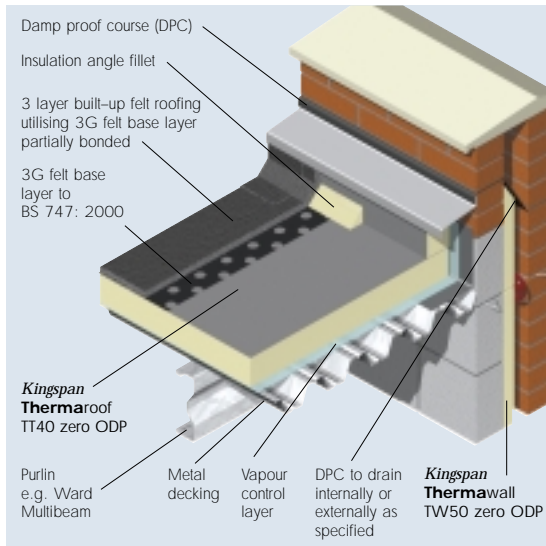
Warning – do not stand on or otherwise support your weight on these boards unless they are fully supported by a load-bearing surface.

Kingspan Thermataper TT46 zero ODP Only:

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.

Kingspan **Thermataper** TT40 zero ODP Systems

TYPICAL DESIGN DETAIL



SPECIFICATION CLAUSE

Kingspan Thermataper TT40 zero ODP should be described in specifications as:-

The roof insulation shall be *Kingspan Thermataper* TT40 zero ODP ____mm thick comprising a CFC/HCFC-free rigid urethane core with bitumen impregnated 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):
J41 130, J41 140 and J41 454
(Standard and Intermediate)
J41 10 (Minor Works)



DESIGN CONSIDERATIONS

Kingspan Thermataper TT40 zero ODP is tapered insulation designed for use under partially bonded built-up felt roofing systems.

ROOF WATERPROOFING

Kingspan Thermataper TT40 zero ODP is suitable for use with most bitumen based waterproofing systems including high performance types which incorporate and are compatible with a Type 3G perforated base layer to BS 747: 2000 (Specification for Roofing Felts). The 3G felt layer is laid dry and loose, mineral face down. The roof waterproofing should be applied as soon as possible after the laying of the boards. The built-up roof specification should be laid where applicable in accordance with BS 8217: 1994 (Code of practice for built-up felt roofing). Certain approved single ply membranes are also compatible.

Please Note: *Kingspan Thermataper* TT40 zero ODP is unsuitable for use with mastic asphalt waterproofing.

WATER VAPOUR CONTROL

The need for a separate vapour control layer with *Kingspan Thermataper* TT40 zero ODP in a warm roof construction should be assessed in accordance with BS 5250: 1989 (1995) and as defined in BS 6229: 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 onto which the *Kingspan Thermataper* TT40 zero ODP is to be laid and to provide a sufficient resistance to wind up-lift (see 'Wind Loading' page 9).

TYPICAL U-VALUES

Kingspan Thermataper TT40 zero ODP can easily meet all U-values required for compliance with Building Regulations/Standards revised after the year 2000. 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).

SITWORK

LAYING PATTERN

The Kingspan Insulation working drawings will indicate the area of the roof to be covered, the minimum insulation level, fall direction and pitch of the tapered system. The location of each board type will be indicated clearly on the drawing and each pack will contain one board type only.

Ridges, hips and valleys will be marked on the drawings, together with the setting out, commencement points for laying of the boards. The flat packer boards used to raise the height of the tapered system should be laid so that where possible they are staggered with respect to the tapered boards on top. The packer boards should preferably be bonded in hot bitumen (or see 'Mechanical Fixings').

FIXING OVER METAL DECKS

On metal decks *Kingspan Thermataper* TT40 zero ODP should be laid into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer which has been bonded to the deck crowns. Alternatively the boards can be secured using mechanical fixing systems. The *Kingspan Thermataper* TT40 zero ODP boards should be laid break-bonded with all joints lightly butted, and with their 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. Taping of the joints is not required.

FIXING OVER CONCRETE DECKS

Concrete decks should be clean, dry, without large projections, steps or gaps. 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 Thermataper TT40 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. The boards should be laid break-bonded with all joints lightly butted.

FIXING OVER PLYWOOD DECKS

The **Kingspan Thermataper TT40 zero ODP** should be fully bedded in hot bitumen over a continuous vapour control layer which has been nailed or fully bonded to the deck with laps at the side and ends sealed with hot bitumen. Alternatively the boards can be secured using mechanical fixing systems. 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 the **Kingspan Thermataper TT40 zero ODP**, the nail heads will become sealed in hot bitumen to the vapour control layer by the subsequent bonding of the roof boards. The **Kingspan Thermataper TT40 zero ODP** system is then applied as described under plywood decks.

MECHANICAL FIXINGS

The number of mechanical fixings required to fix the **Kingspan Thermataper TT40 zero ODP** boards 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 5 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 3.47 fixings per square metre (1200 x 1200 mm boards). Packer boards (if required) should be secured using a single fixing prior to the overlay of the **Kingspan Thermataper zero ODP System**.

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 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.

PRODUCT DESCRIPTION

Kingspan Thermataper TT40 zero ODP is the tapered version of **Kingspan Thermaroof TR20 zero ODP**.

THE FACINGS

Kingspan Thermataper TT40 zero ODP is faced on both sides with bitumen impregnated glass fibre tissue autohesively bonded to the insulation core during manufacture.

THE CORE

The core of **Kingspan Thermataper TT40 zero ODP** is a high performance CFC/HCFC-free rigid urethane insulant of typical density 32 kg/m³.

CFC/HCFC-FREE

Kingspan Thermataper TT40 zero ODP is manufactured without the use of CFCs/HCFCs and has zero Ozone Depletion Potential (ODP).



Kingspan **Thermataper** TT40 zero ODP Systems

PRODUCT DATA

STANDARDS AND APPROVALS

Kingspan Thermataper TT40 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 Thermataper TT40 zero ODP is available in the following standard sizes and thicknesses:

Nominal Dimension	Availability
Length (m)	1.2
Width (m)	1.2
Insulant Thickness (mm)	25 minimum* Unlimited maximum†

*On systems with a 1:120 fall the minimum thickness is 30 mm.
†Packer boards will be required above a specific thickness.

TAPER GRADIENTS

Kingspan Thermataper TT40 zero ODP is available ex stock in falls of 1:60, 1:80 and 1:120.

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 Thermataper** TT40 zero ODP should always be installed over a separate felt vapour control layer as detailed in 'Water Vapour Control' (see page 10).

DURABILITY

If correctly applied, **Kingspan Thermataper** TT40 zero ODP has an indefinite life. Its durability depends on the supporting structure, waterproofing and the conditions of its use.

FIRE PERFORMANCE

Flat roofs insulated with **Kingspan Thermataper** TT40 zero ODP when subjected to British Standard fire tests achieve the following typical results, when waterproofed with 3 layer built-up felt and a loading coat of 10 mm chippings. For specifications without the chippings please consult the manufacturer of the mineral surfaced cap sheet for their fire classification details.

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 the 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) of 0.028 W/m.K.

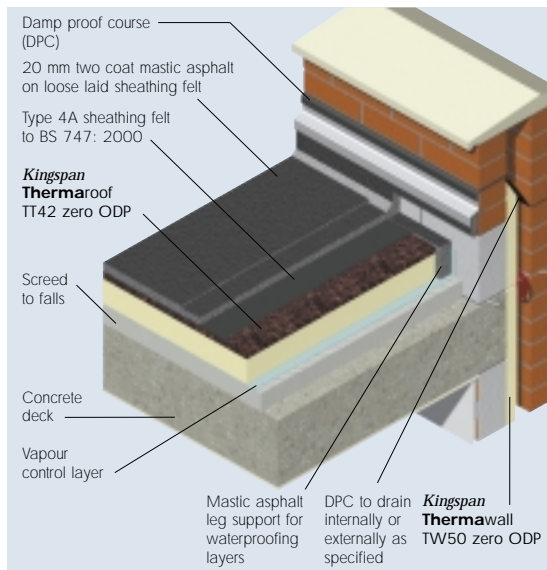
THERMAL RESISTANCES

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)
50	1.75
60	2.10
70	2.50
75	2.65
80	2.95
90	3.30
100	3.70

Kingspan **Thermataper** TT42 zero ODP Systems

TYPICAL DESIGN DETAIL



SPECIFICATION CLAUSE

The roof insulation shall be **Kingspan Thermataper TT42 zero ODP** comprising ____mm thick CFC/HCFc-free rigid urethane and 20 mm thick cork facing autohesively bonded to the insulation core with armature 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): J21 130, J21 140 and J21 513 J41 130, J41 140 and J41 454 (Standard and Intermediate) J41 10 (Minor Works)



DESIGN CONSIDERATIONS

Kingspan Thermataper TT42 zero ODP is tapered insulation designed for use under fully bonded built-up felt and mastic asphalt roofing systems.

The board allows full bonding of the waterproofing layer to the cork surface, providing maximum resistance to uplift.

ROOF WATERPROOFING

Kingspan Thermataper TT42 zero ODP is designed for use with most bitumen based waterproofing systems, including high performance types which incorporate 2 layer fully bonded felts. It is also suited to mastic asphalt waterproofing systems. The roof waterproofing should be applied as soon as possible after the laying of the boards. The built-up roof specification should be laid where applicable in accordance with BS 8217: 1994 (Code of practice for built-up felt roofing) and BS 8218: 1998 (Code of practice for mastic asphalt roofing). Mastic asphalt should always be laid over an isolating layer of Type 4A sheathing felt to BS 747: 2000 (Specification for Roofing Felts).

Certain approved single ply membranes are also compatible.

WATER VAPOUR CONTROL

The need for a separate vapour control layer with **Kingspan Thermataper TT42 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 onto which the **Kingspan Thermataper TT42 zero ODP** is to be laid and to provide a sufficient resistance to wind up-lift (see 'Wind Loading' page 9).

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 either turned back at least 150 mm onto the insulation and sealed down or turned up and sealed with the roof covering to form an envelope. This will be dependant upon whether built up felt or mastic asphalt. Reference should be made to BS 8217: 1994 (Code of practice for built-up felt roofing) and/or the Mastic Asphalt Council Roofing Handbook. Where verges/eaves details exist, the vapour control layer should be dressed accordingly to a minimum of 150 mm.

TYPICAL U-VALUES

Kingspan Thermataper TT42 zero ODP can easily meet all U-values required for compliance with Building Regulations/Standards revised after the year 2000. 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).

SITework

LAYING PATTERN

The Kingspan Insulation working drawings will indicate the area of the roof to be covered, the minimum insulation level, fall direction and pitch of the tapered system. The location of each board type will be indicated clearly on the drawing and each pack will contain one board type only.

Kingspan **Thermataper** TT42 zero ODP Systems

Ridges, hips and valleys will be marked on the drawings, together with the setting out, commencement points for laying of the boards. The flat packer boards used to raise the height of the tapered system should be laid so that where possible they are staggered with respect to the tapered boards on top. The packer boards should preferably be bonded in hot bitumen (or see 'Mechanical Fixing').

FIXING OVER METAL DECKS

On metal decks **Kingspan Thermataper** TT42 zero ODP should be laid into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer which has been bonded to the deck crowns. Alternatively the boards can be secured using mechanical fixing systems. The **Kingspan Thermataper** TT42 zero ODP boards should be laid break-bonded with all joints lightly butted, and with their 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. Taping of the joints is not required.

FIXING OVER CONCRETE DECKS

Concrete decks should be clean, dry, without large projections, steps or gaps. 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 Thermataper** TT42 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. The boards should be laid break-bonded with all joints lightly butted.

FIXING OVER PLYWOOD DECKS

The **Kingspan Thermataper** TT42 zero ODP should be fully bedded in hot bitumen over a continuous vapour control layer which has been nailed or fully bonded to the deck with laps at the side and ends sealed with hot bitumen. Alternatively the boards can be secured using mechanical fixing systems. 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 the **Kingspan Thermataper** TT42 zero ODP, the nail heads will become sealed in hot bitumen to the vapour control layer by the subsequent bonding of the roof boards. The **Kingspan Thermataper** TT42 zero ODP system is then applied as described under plywood decks.

MECHANICAL FIXINGS

The number of mechanical fixings required to fix the **Kingspan Thermataper** TT42 zero ODP boards 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). Packer boards (if required) should be secured using a single fixing prior to the overlay of the **Kingspan Thermataper** zero ODP System.

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

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 Thermataper TT42 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.

PRODUCT DESCRIPTION

Kingspan Thermataper TT42 zero ODP is the tapered version of **Kingspan Thermarook** TR22 zero ODP.

THE UPPER FACING

The upper facing of **Kingspan Thermataper** TT42 zero ODP is an autohesively bonded cork roofboard of typical density 120 kg/m³, manufactured from pure Portuguese granulated cork, compressed, steam baked and held together by the natural cork gum.

THE CORE

The core of **Kingspan Thermataper** TT42 zero ODP is a high performance CFC/HCFC-free rigid urethane insulant of typical density 32 kg/m³, which incorporates a patented glass tissue armature.

THE LOWER FACING

The lower facing of **Kingspan Thermataper** TT42 zero ODP is a glass reinforced perforated cellulose which is compatible with most forms of bitumen bonding.

CFC/HCFC-FREE

Kingspan Thermataper TT42 zero ODP is manufactured without the use of CFCs/HCFCs and has zero Ozone Depletion Potential (ODP).



PRODUCT DATA

STANDARDS AND APPROVALS

Kingspan Thermataper TT42 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 Thermataper TT42 zero ODP is available in the following standard sizes and thicknesses:

Nominal Dimension	Availability
Length (m)	1.2
Width (m)	0.6
Cork Thickness (mm)	20*
Overall Thickness (mm)	30 minimum Unlimited maximum†

*Cork thickness is 10 mm on the thinnest tapered board in a system.
†Packer boards will be required above a specific thickness.

TAPER GRADIENTS

Kingspan Thermataper TT42 zero ODP is available ex stock in falls of 1:60, 1:80.

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 Thermataper TT42 zero ODP** should always be installed over a separate felt vapour control layer as detailed in 'Water Vapour Control' (see page 13).

DURABILITY

If correctly applied, **Kingspan Thermataper TT42 zero ODP** has an indefinite life. Its durability depends on the supporting structure, waterproofing and the conditions of its use.

FIRE PERFORMANCE

Flat roofs insulated with **Kingspan Thermataper TT42 zero ODP** when subjected to British Standard fire tests achieve the following typical results, when waterproofed with 2 layer built-up felt or using 2 layers of mastic asphalt, either finished with 10 mm 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.

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 the 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 thermal conductivity (λ -value) of the cork component of **Kingspan Thermataper TT42 zero ODP** is 0.043 W/m.K. That of the insulation core of **Kingspan Thermataper TT42 zero ODP** is 0.027 W/m.K.

THERMAL RESISTANCES

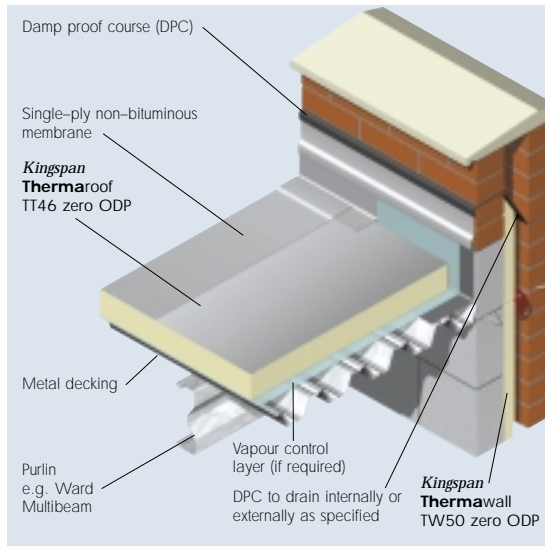
Thermal resistance (R-value), varies with the thickness of each component. It is calculated by dividing the thickness of each component (expressed in metres) by its thermal conductivity and adding the resultant figures together.

*Product Thickness (mm)	Thermal Resistance (m ² .K/W)
70	2.30
80	2.65
90	3.05
95	3.10
100	3.30
110	3.65
120	4.00

*Product thickness = insulant thickness + 20 mm cork

Kingspan Thermataper TT46 zero ODP Systems

TYPICAL DESIGN DETAIL



SPECIFICATION CLAUSE

Kingspan Thermataper TT46 zero ODP should be described in specifications as:-

The roof insulation shall be *Kingspan Thermataper TT46 zero ODP* ____mm thick comprising a CFC/HCFC-free rigid urethane core with low emissivity composite foil facings on both sides manufactured to BS EN ISO 9002: 1994/I.S. EN ISO 9001: 2000 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): J42 454 and J42 110 (Standard and Intermediate)



DESIGN CONSIDERATIONS

Kingspan Thermataper TT46 zero ODP is tapered insulation designed for use under PVC and EPDM single-ply mechanically fixed roofing systems.

ROOF WATERPROOFING

Kingspan Thermataper TT46 zero ODP is suitable for use with most mechanically fixed PVC or EPDM waterproofing membranes.

Please note: *Kingspan Thermataper TT46 zero ODP* is not suitable for use with bitumen based built-up roofing systems or mastic asphalt.

WATER VAPOUR CONTROL

The need for a separate vapour control layer with *Kingspan Thermataper TT46 zero ODP* in a warm roof construction may be assessed in accordance with BS 5250: 1989 (1995) (Code of practice for control of condensation in buildings). Warm roofs are described in greater detail in BS 6229: 1982 (Code of practice for flat roofs with continuously supported coverings). A minimum vapour control layer should consist of a 1000 gauge polythene membrane.

The specified vapour control layer should have a minimum 150 mm side and end laps which should be adequately sealed. The membrane should also be turned up, but not sealed, to all vertical surfaces which abut the roof, to a minimum height of 250 mm and should overhang the verge or gutter by the same amount. Before applying the roof finish, the projecting 250 mm of the vapour control layer should be turned over the insulation and sealed down to form an envelope.

TYPICAL U-VALUES

Kingspan Thermataper TT46 zero ODP can easily meet all U-values required for compliance with Building Regulations/Standards revised after the year 2000. 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).

SITWORK

LAYING PATTERN

The Kingspan Insulation working drawings will indicate the area of the roof to be covered, the minimum insulation level, fall direction and pitch of the tapered system. The location of each board type will be indicated clearly on the drawing and each pack will contain one board type only.

Ridges, hips and valleys will be marked on the drawings, together with the setting out, commencement points for laying of the boards. The flat packer boards used to raise the height of the tapered system should be laid so that where possible they are staggered with respect to the tapered boards on top.

FIXING OVER METAL DECKS

On metal decks *Kingspan Thermataper TT46 zero ODP* should be laid over the vapour control layer. The boards are normally secured using mechanical fixings appropriate to the substrate. The *Kingspan Thermataper TT46 zero ODP* boards should be laid break-bonded with all joints lightly butted, and with their 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. Taping is not required.

FIXING OVER CONCRETE DECKS

Concrete decks should be clean, dry, without large projections, steps or gaps. The boards are normally laid over the vapour control layer and all secured using mechanical fixings and washers. The boards should be laid break-bonded with all joints lightly butted. The boards can also be restrained through the use of ballast.

FIXING OVER TIMBER DECKS

Timber decks should be clean and free of large projections, steps or gaps. On timber decks, **Kingspan Thermataper TT46 zero ODP** should be laid over a vapour control layer, the side ends and laps of which have been sealed. The board are normally secured using mechanical fixing systems and washers. The boards should be laid break-bonded with all joints lightly butted.

MECHANICAL FIXINGS

The number of mechanical fixings required to fix the **Kingspan Thermataper TT46 zero ODP** boards 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 washer (70 mm x 70 mm or 75 mm diameter). The requirements for securing the waterproofing membrane should be considered separately.

A minimum 5 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 and be placed within the individual board area giving a minimum fixing rate of 3.47 fixings per square metre (1200 x 1200 mm boards). Packer boards (if required) should be secured using a single fixing prior to the overlay of the **Kingspan Thermataper TT46 zero ODP** system.

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

Where alternative mechanical fixing systems that not rely on large washers are specified, such as bar fixing systems, the specified system must give similar restraint to the board as would be attained by the use of conventional washer and washer systems.

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 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.

PRODUCT DESCRIPTION

Kingspan Thermataper TT46 zero ODP is the tapered version of **Kingspan Thermaroof TR26 zero ODP**.

THE FACINGS

Kingspan Thermataper TT46 zero ODP is faced on both sides with a low emissivity composite foil autohesively bonded to the insulation core during manufacture. The foil facing is highly resistant to the transmission of water vapour.

THE CORE

The core of **Kingspan Thermataper TT46 zero ODP** is a high performance CFC/HCFC-free rigid urethane insulant of typical density 32 kg/m³.

CFC/HCFC-FREE

Kingspan Thermataper TT46 zero ODP is manufactured without the use of CFCs/HCFCs and has zero Ozone Depletion Potential (ODP).



PRODUCT DATA

STANDARDS AND APPROVALS

Kingspan Thermataper TT46 zero ODP is manufactured to the highest standards under quality control systems approved to BS EN ISO 9002: 1994 (Quality systems. Model for quality assurance in production, installation and servicing)/I.S. EN ISO 9001: 2000 (Quality management systems – Requirements).



BS EN ISO 9002 : 1994
Certificate No. FM 10697



I.S. EN ISO 9001: 2000
Registration No. 19.0633

STANDARD DIMENSIONS

Kingspan Thermataper TT46 zero ODP is available in the following standard sizes and thicknesses:

Nominal Dimension	Availability
Length (m)	1.2
Width (m)	1.2
Insulant Thickness (mm)	25 minimum* Unlimited maximum†

*On systems with a 1:120 fall the minimum thickness is 30 mm.

†Packer boards will be required above a specific thickness.

Kingspan **Thermataper** TT46 zero ODP Systems

TAPER GRADIENTS

Kingspan Thermataper TT46 zero ODP is available ex stock in falls of 1:60, 1:80 and 1:120.

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

Modified to include board facings, the boards achieve a resistance greater than 100 MN.s/g when tested in accordance with BS 4370: Part 2: 1993.

Kingspan Thermataper TT46 zero ODP should be installed over a minimum 1000 gauge polythene vapour control layer (see 'Water Vapour Control' page 16).

DURABILITY

If correctly applied, **Kingspan Thermataper** TT46 zero ODP has an indefinite life. Its durability depends on the supporting structure, waterproofing and the conditions of its use.

FIRE PERFORMANCE

When subjected to British Standard fire tests the results are dependent on the roofing system adopted, however FAB is generally achieved.

Test	Result
BS 476: Part 3: 1975 (External fire exposure roof test)	Dependant on single ply membrane adopted
BS 476: Part 7: 1997 (Surface Spread of Flame Test)	Class 1 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) of 0.023 W/m.K

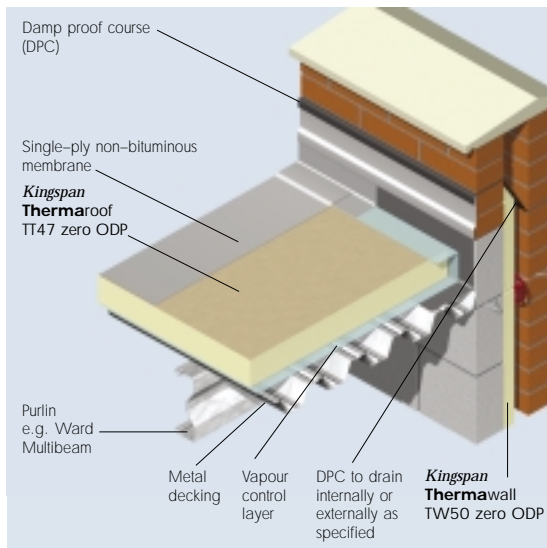
THERMAL RESISTANCES

Thermal resistance (R-value), varies with thickness of the board 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	2.15
60	2.60
70	3.00
75	3.25
80	3.45
90	3.90
100	4.30

Kingspan Thermataper TT47 zero ODP Systems

TYPICAL DESIGN DETAIL



The specified vapour control layer should have a minimum 150 mm side and end laps which should be adequately sealed. The membrane should also be turned up, but not sealed, to all vertical surfaces which abut the roof, to a minimum height of 250 mm and should overhang the verge or gutter by the same amount. Before applying the roof finish, the projecting 250 mm of the vapour control layer should be turned over the insulation and sealed down to form an envelope.

TYPICAL U-VALUES

Can easily meet all U-values required for compliance with Building Regulations/Standards revised after the year 2000. 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).

SPECIFICATION CLAUSE

Kingspan Thermataper TT47 zero ODP should be described in specifications as:-

The roof insulation shall be **Kingspan Thermataper TT47 zero ODP** ____mm thick comprising a CFC/HCFC-free rigid urethane core with wet lay coated glass fibre 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):

J42 454 and J42 110 (Standard and Intermediate)



DESIGN CONSIDERATIONS

Kingspan Thermataper TT47 zero ODP is tapered insulation designed for use under fully adhered single-ply waterproofing using solvent based adhesives.

ROOF WATERPROOFING

Kingspan Thermataper TT47 zero ODP is suitable for use with most fully adhered single-ply waterproofing membranes.

WATER VAPOUR CONTROL

The need for a separate vapour control layer with **Kingspan Thermataper TT47 zero ODP** in a warm roof construction may be assessed in accordance with BS 5250: 1989 (1995) (Code of practice for control of condensation in buildings). Warm roofs are described in greater detail in BS 6229: 1982 (Code of practice for flat roofs with continuously supported coverings). A minimum vapour control layer should consist of a 1000 gauge polythene membrane.

SITework

LAYING PATTERN

The Kingspan Insulation working drawings will indicate the area of the roof to be covered, the minimum insulation level, fall direction and pitch of the tapered system. The location of each board type will be indicated clearly on the drawing and each pack will contain one board type only.

Ridges, hips and valleys will be marked on the drawings, together with the setting out, commencement points for laying of the boards. The flat packer boards used to raise the height of the tapered system should be laid so that where possible they are staggered with respect to the tapered boards on top. The packer boards should preferably be bonded in hot bitumen (or see 'Mechanical Fixing').

FIXING OVER METAL DECKS

On metal decks **Kingspan Thermataper TT47 zero ODP** should be laid into hot bitumen (max. temperature 240°C) mopped or poured over the vapour control layer which has been bonded to the deck crowns. Alternatively the boards can be secured using mechanical fixing systems. The **Kingspan Thermataper TT47 zero ODP** boards should be laid break-bonded with all joints lightly butted, and with their 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. Taping of the joints is not required.

Kingspan **Thermataper** TT47 zero ODP Systems

FIXING OVER CONCRETE DECKS

Concrete decks should be clean, dry, without large projections, steps or gaps. 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 Thermataper TT47 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. The boards should be laid break-bonded with all joints lightly butted.

FIXING OVER PLYWOOD DECKS

The **Kingspan Thermataper TT47 zero ODP** should be fully bedded in hot bitumen over a continuous vapour control layer which has been nailed or fully bonded to the deck with laps at the side and ends sealed with hot bitumen. Alternatively the boards can be secured using mechanical fixing systems. 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 the **Kingspan Thermataper TT47 zero ODP**, the nail heads will become sealed in hot bitumen to the vapour control layer by the subsequent bonding of the roof boards. The **Kingspan Thermataper TT47 zero ODP** system is then applied as described under plywood decks.

MECHANICAL FIXINGS

The number of mechanical fixings required to fix the **Kingspan Thermataper TT47 zero ODP** boards 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 5 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 3.47 fixings per square metre (1200 x 1200 mm boards). Packer boards (if required) should be secured using a single fixing prior to the overlay of the **Kingspan Thermataper zero ODP System**.

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 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.

PRODUCT DESCRIPTION

Kingspan Thermataper TT47 zero ODP is the tapered version of **Kingspan Thermarroof TR27 zero ODP**.

THE FACINGS

Kingspan Thermataper TT47 zero ODP is faced on both sides with a wet lay coated glass fibre tissue autohesively bonded to the insulation core during manufacture.

THE CORE

The core of **Kingspan Thermataper TT47 zero ODP** is a high performance CFC/HCFC-free rigid urethane insulant of typical density 32 kg/m³.

CFC/HCFC-FREE

Kingspan Thermataper TT47 zero ODP is manufactured without the use of CFCs/HCFCs and has zero Ozone Depletion Potential (ODP).



PRODUCT DATA

STANDARDS AND APPROVALS

Kingspan Thermataper TT47 zero ODP is manufactured to the highest standards under quality control systems approved to BS EN ISO 9002: 1994 (Quality systems. Model for quality assurance in production, installation and servicing)/I.S. EN ISO 9001: 2000 (Quality management systems – Requirements).



BS EN ISO 9002 : 1994
Certificate No. FM 10697



I.S. EN ISO 9001: 2000
Registration No. 19.0633

STANDARD DIMENSIONS

Kingspan Thermataper TT47 zero ODP is available in the following standard sizes and thicknesses:

Nominal Dimension	Availability
Length (m)	1.2
Width (m)	1.2
Insulant Thickness (mm)	25 minimum Unlimited maximum†

†Packer boards will be required above a specific thickness.

TAPER GRADIENTS

Kingspan Thermataper TT47 zero ODP is available ex stock in falls of 1:60 and 1:80.

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 Thermataper TT47 zero ODP** should be installed over a minimum 1000 gauge polythene vapour control layer (see 'Water Vapour Control' page 19).

DURABILITY

If correctly applied, **Kingspan Thermataper TT47 zero ODP** has an indefinite life. Its durability depends on the supporting structure, waterproofing and the conditions of its use.

FIRE PERFORMANCE

When subjected to British Standard fire tests the results are dependent on the roofing system adopted, however FAB is generally achieved.

Test	Result
BS 476: Part 3: 1975 (External fire exposure roof test)	Dependant on single ply membrane adopted

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) of 0.027 W/m.K

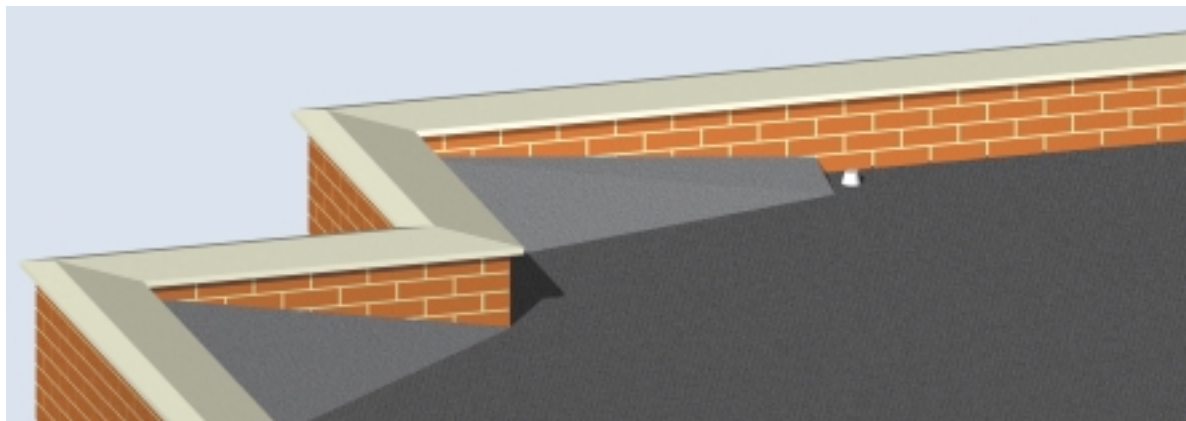
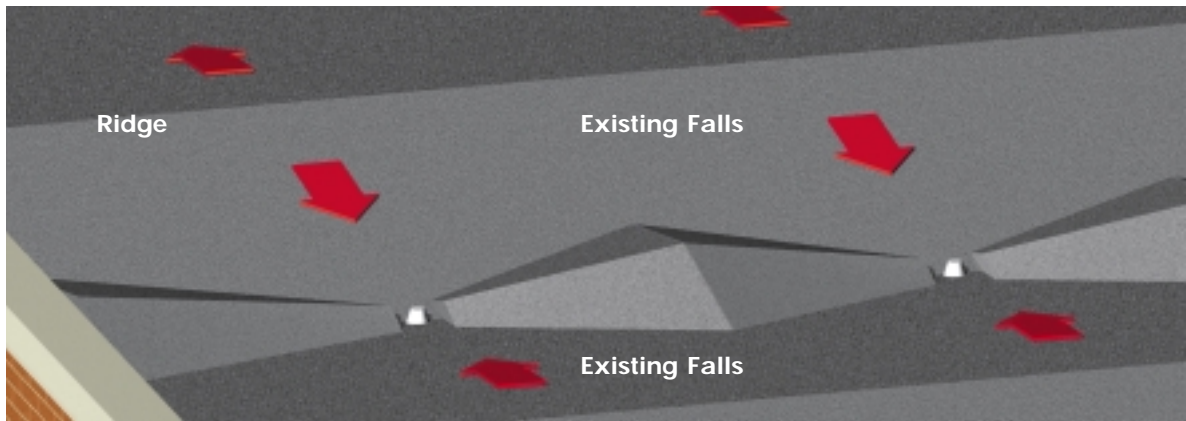
THERMAL RESISTANCES

Thermal resistance (R-value), varies with thickness of the board 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	1.85
60	2.20
70	2.55
75	2.75
80	3.05
90	3.45
100	3.80

Kingspan **Thermac**ricricket zero ODP Systems

TYPICAL DESIGN DETAILS



DESIGN CONSIDERATIONS

USE

*Kingspan Thermac*ricricket Systems (i.e. backfall systems) are available in the full range and can be installed to provide effective and economical drainage of localised roof areas. When correctly applied, *Kingspan Thermac*ricricket Systems will improve existing crossfalls or may be designed into a new construction in place of secret valley gutters.

SITWORK

FIXING

*Kingspan Thermac*ricricket Systems can be mechanically fixed or bedded in a layer of hot bitumen applied direct to the existing roof, or to the vapour control layer and between layers in the system.

*Kingspan Thermac*ricricket Systems have to be cut on site by the contractor. The boards are easy to cut and shape using a panel saw.

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 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 0.022–0.024 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 and low risk rating for the Technical Standards in Scotland.
- 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:



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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:

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