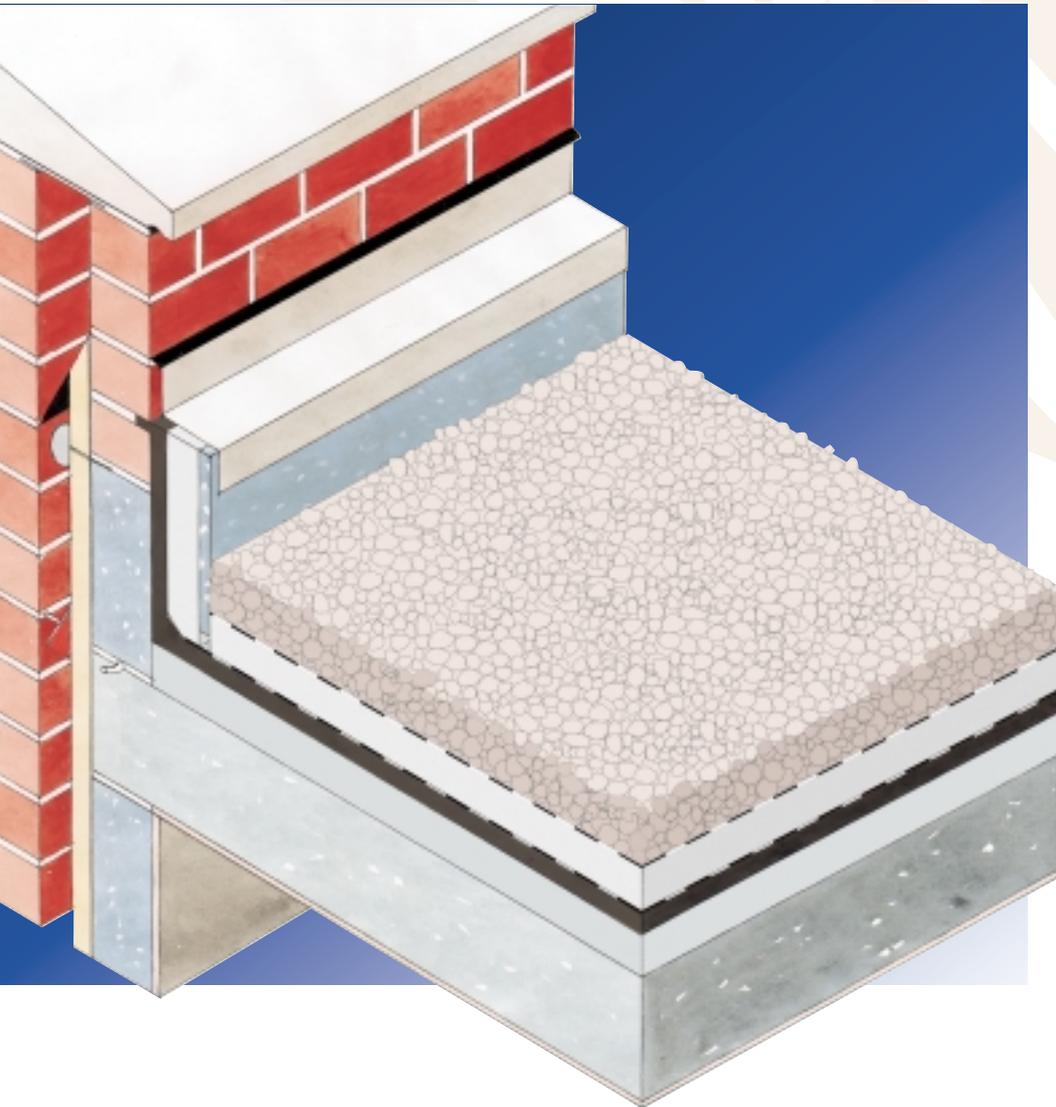




# Styrozone™ H 350/N 300

PROTECTED MEMBRANE FLAT ROOFS  
AND ROOF GARDENS



- ▼ High performance rigid extruded polystyrene insulation – thermal conductivity 0.028-0.037 W/m.K
- ▼ Protects waterproofing membrane
- ▼ Closed cell structure minimises water absorption
- ▼ High compressive strength
- ▼ Withstands freeze/thaw cycling
- ▼ Green roofs are environmentally beneficial
- ▼ 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)



# Kingspan Styrozone™ H 350/N 300

## TYPICAL DESIGN DETAILS

Figure 1 GRAVEL BALLASTED PROTECTED MEMBRANE ROOF



Figure 2 PAVING SLAB BALLASTED PROTECTED MEMBRANE ROOF

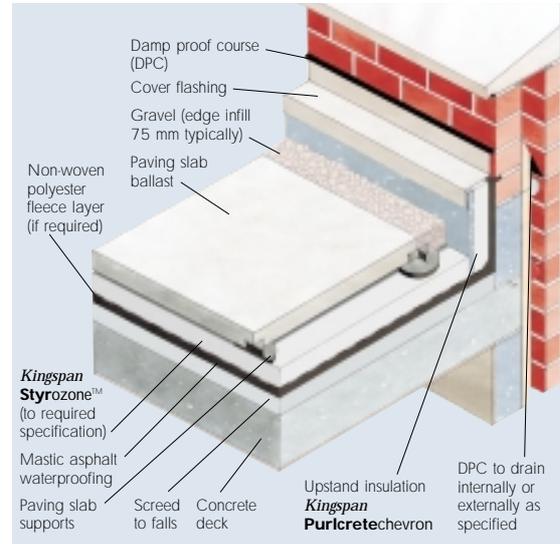


Figure 3 EXTENSIVE ROOF GARDEN

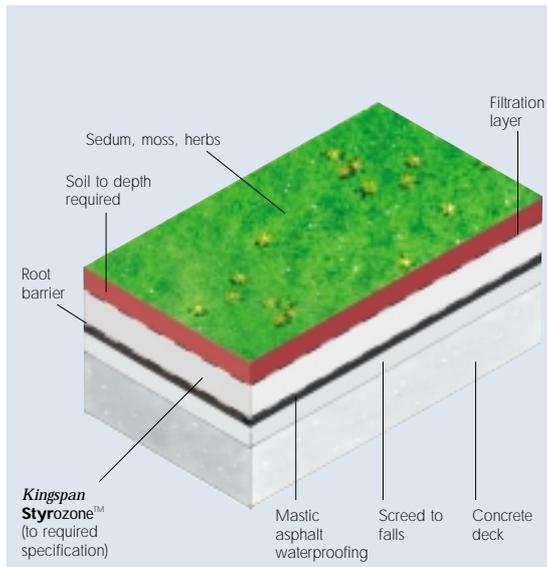
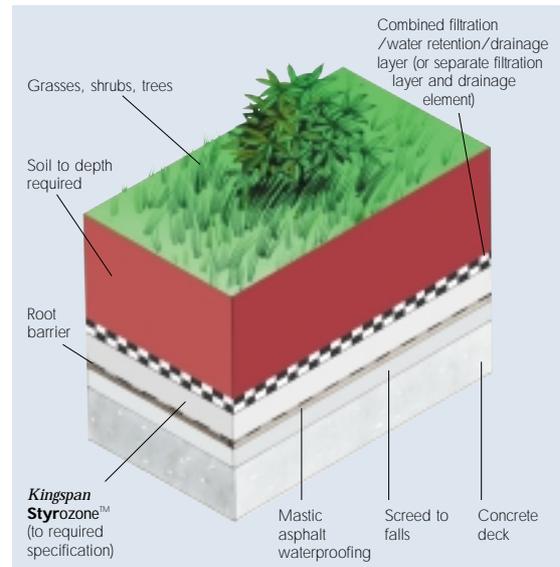


Figure 4 INTENSIVE ROOF GARDEN



## SPECIFICATION CLAUSE

**Kingspan Styrozone™** should be described in the specification as: -

The protected membrane roof insulation shall be **Kingspan Styrozone™** (insert grade) comprising \_\_\_\_\_ mm thick CFC/HCFC-free rigid extruded polystyrene insulation manufactured to EN ISO 9002: 1994 and shall be applied in accordance with the instructions issued by Kingspan Insulation Limited.

Details also available in NBS PLUS. NBS users should refer to clause(s): J21 150, J21 710, J41 150, J41 710, J42 120, J42 810 (Standard and Intermediate)



## PRODUCT SELECTION

**Kingspan Styrozone™** is available in two grades and with two different edge profiles for protected membrane flat roofing.

**Kingspan Styrozone™ H 350** uses an HFA blowing agent in compliance with the Montreal Protocol. It has zero Ozone Depletion Potential and a compressive strength typically exceeding 350 kPa at 10% compression.

**Kingspan Styrozone™ N 300** uses a carbon dioxide blowing agent in compliance with the Montreal Protocol. It has zero Ozone Depletion Potential and a compressive strength typically exceeding 300 kPa at 10% compression.

Both grades of **Kingspan Styrozone™** are available rebated or tongue and groove on all four edges.

BBA Certificate 02/3877 covers the use of both grades of **Kingspan Styrozone™** and both edge profiles in protected membrane flat roofing.

## DESIGN CONSIDERATIONS

### GENERAL

This brochure shows the use of **Kingspan Styrozone™** in a protected membrane roofing system using either a gravel or paving slab finish and as part of roof garden (or green roof) systems.

Protected membrane roofing systems place the insulation above the waterproofing layer and offer several advantages over traditional warm and cold flat roof details.

- The waterproofing system can be expected to have a life in excess of that obtained in an exposed situation as it is protected from mechanical damage, solar radiation and ultra violet degradation and temperature extremes (both daily and seasonal).
- The roof is safe from condensation risk.
- The roof achieves an EXT.FAA fire rating with protective finishes.
- Insulation can be lifted to allow inspection of the waterproofing system.
- Additional insulation can be added at a later date.
- The installation of the insulation is not weather dependant.

Rigid extruded polystyrene insulation with its closed cell structure and minimal water absorption is the only material suitable and approved for this application where it will be subject to freeze/thaw and wetting/drying cycles.

### DESIGN LOADS

The suitability of the structure under consideration to accept the design imposed loads including the increased dead load from the ballast layer plus snow loads and roof traffic should be verified in accordance with BS 6399: Part 3: 1988 (Code of practice for imposed roof loads).

The additional load from the ballast layer can be considerable.

Ballast Layer	Dead Load
50mm thick paving slabs	125 kg/m <sup>2</sup>
Gravel (16-32mm diameter)	16 kg/m <sup>2</sup> per 10 mm depth
Soil (intensive green roof)	500 - 1000 kg/m <sup>2</sup>
Soil (extensive green roof)	100 - 200 kg/m <sup>2</sup>

The ballast layer resists wind uplift, prevents floatation of the boards in heavy rains, prevents ultra violet degradation of the boards and gives the roof the required external fire performance.

### WIND LOADS

The resistance of the waterproofing system, insulation and ballast layer to wind uplift should be assessed in accordance with BS 6399: Part 2: 1997 (Code of practice for wind loads). Generally the self weight of the ballast layer (minimum 80 kg/m<sup>2</sup>) is sufficient to ensure that both the insulation boards and waterproofing system remain stable under the full design load. BRE Digest 295 gives specific design guidelines for loose-laid insulation systems that comply with the following clauses:

- the roof structure should be impermeable and should be able to withstand the imposed loads, increased dead load from the ballast system and the full wind load detailed in BS 6399: Part 2: 1997 (Code of practice for wind loads);
- the insulation boards should be laid onto, but not bonded to, the waterproofing layer;
- the top surface of each insulation board should be flush with adjacent boards;
- the area of each insulation board should not exceed 2 m<sup>2</sup>;
- any space between the bottom of the boards and the roof surface should be less than 5mm when averaged over the whole board;
- any gap between boards should not be less than 1mm when averaged along the joint length; and
- wind should be prevented from blowing under the insulation system by the use of upstands, parapets or an edge flashing.

Insulation systems that comply with all of these guidelines will experience a wind uplift force of only one third of that calculated in accordance with BS 6399: Part 2: 1997 (Code of practice for wind loads). (The internal pressure coefficient, C<sub>pi</sub>, is not applicable as the roof structure is impermeable and the waterproof system is stable in its own right. The force coefficient on any one board, C<sub>f</sub>, is taken as one third of the external pressure coefficient, C<sub>pe</sub>, applicable to the area in which the board lies.) If the system does not comply with these design parameters then the waterproofing and insulation system should be designed to resist the full wind load.

# Kingspan Styrozone™ H 350/N 300

## PAVING SLAB BALLASTED PROTECTED MEMBRANE ROOF DETAILS

Figure 5 EAVE/KERB DETAIL

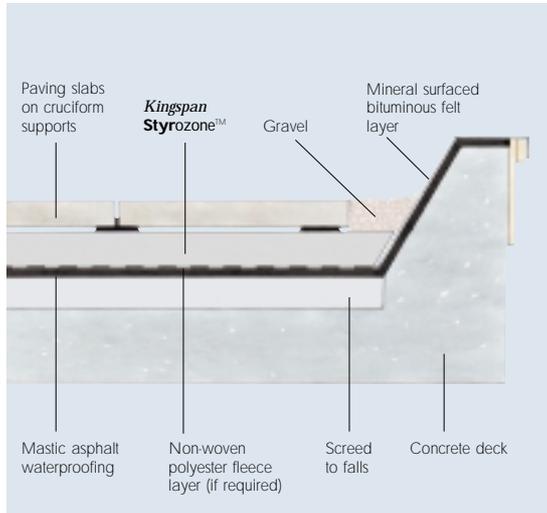


Figure 6 EAVE/GUTTER DETAIL

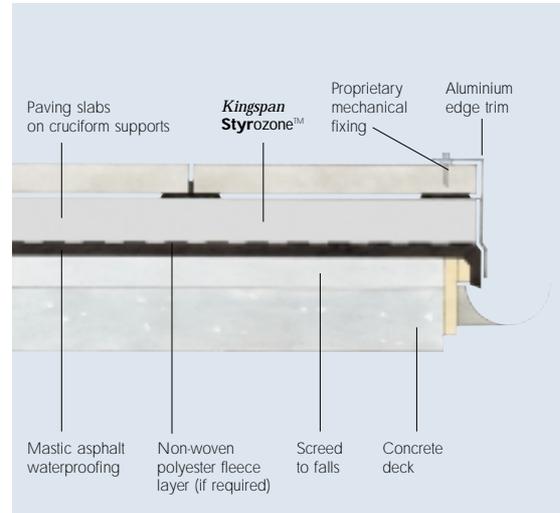


Figure 7 TWO LEVEL DRAINAGE

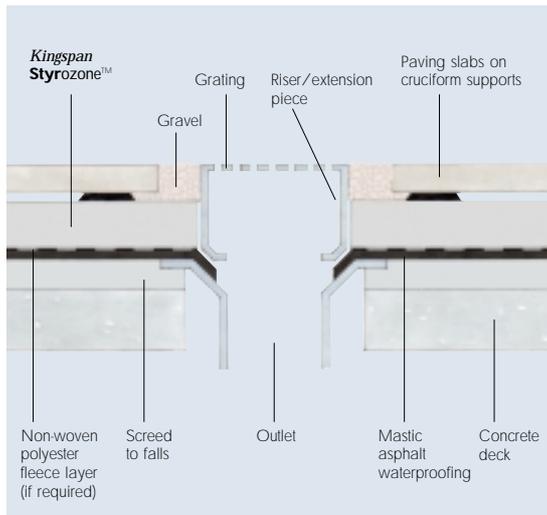


Figure 8 INTERNAL GUTTER

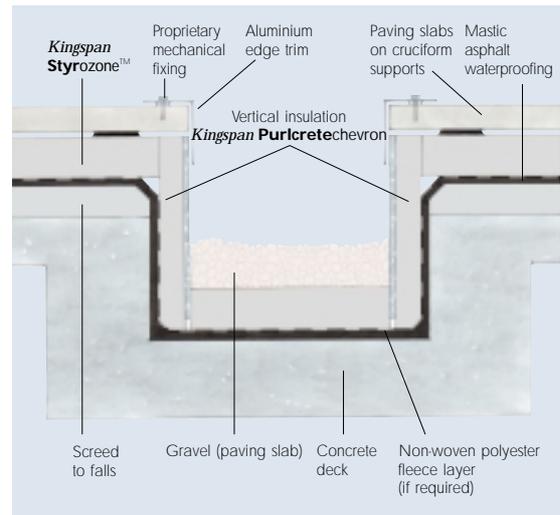


Figure 9 PARAPET ABUTMENT

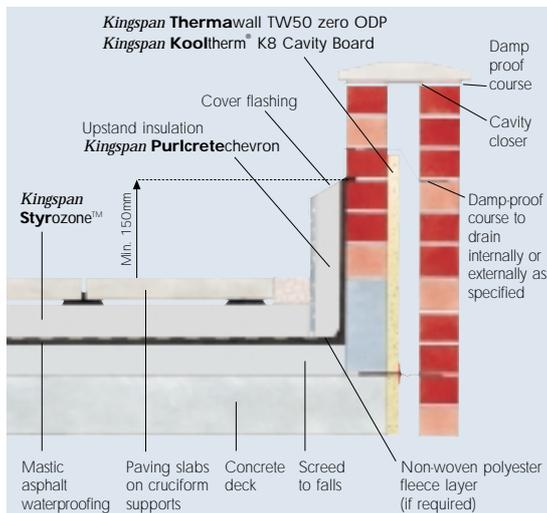
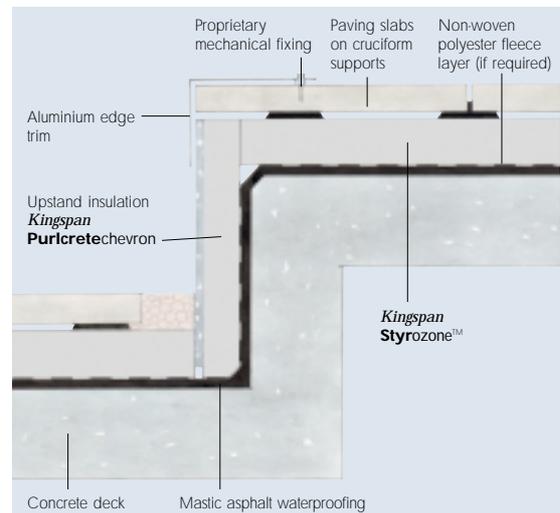


Figure 10 CHANGE IN LEVEL



#### DRAINAGE

The number and type of rainwater outlets should be assessed in accordance with BS EN 12056: Part 3: 2000 (Roof drainage, layout and calculation). The rainwater outlets should be double entry type to allow rainwater to be drained from the roof surface at both the membrane level and the upper surface level.

Falls should be at least 1:80 after allowing for tolerances, sitework and possible deflection of the roof structure - this may mean designing a fall of 1:60 or even 1:40 in the absence of detailed calculations. Protected membrane roofing systems incorporating **Kingspan Styrozone™** can be laid on roofs with a finished fall of less than 1:80 but the waterproofing system must be to a tanking specification. Generally the design of roofs with no or minimum falls should be avoided. When using paving slabs as ballast they must be laid on supports in order to aid drainage.

The drainage of green roofs should be carefully considered especially in the case of intensive systems which may require a moisture retention layer to ensure adequate moisture levels for the system but still allow the rapid drainage of excess rainwater. Dam type rainwater outlets that hold water in the system are not recommended as the depth of water may create a moisture vapour impermeable layer above the insulation.

#### WATERPROOFING MEMBRANE

Protected membrane roofing systems are compatible with all waterproofing membranes. The waterproofing should meet the requirements of BS 8217: 1994 (Code of practice for built-up felt roofing), BS 8218: 1998 (Code of practice for mastic asphalt roofing) or be covered by independent certification such as from the British Board of Agrément. Advice should be sought from manufacturers of single ply systems for the correct choice of cushion layers above the membrane and filter membranes above the insulation.

Waterproofing systems containing solvents should be allowed to fully cure before applying **Kingspan Styrozone™** insulation. Both single-ply membranes and tanking specification waterproofing systems require a separation layer positioned between the membrane and the insulation.

#### FILTER/SEPARATION MEMBRANES

When using gravel ballast and in conjunction with roof gardens a filtration membrane of non-woven polyester fleece (see figures 1, 3 and 4) should be installed over the insulation. This prevents silt from the gravel or the soil being washed down below the insulation where it may abrade the waterproof layer (especially important with single ply membranes) or block rainwater outlets. Mastic asphalt should be overlaid with a polyester fleece layer, 130-140 g/m<sup>2</sup>, with an overlap of 250-300 mm. This drainage aid should be adopted irrespective of the ballast system as it aids removal of the boards to inspect the asphalt.

#### CONDENSATION

Protected membrane roofs are inherently safe in respect of condensation risk. The position of the waterproof membrane, of high moisture vapour resistance, below the insulation creates a very effective vapour control layer and the roof structure is maintained at a temperature close to that of the inside of the building. The roof design can be assessed for risk of interstitial condensation occurring using BS 5250: 1989(1995) (Code of practice for control of condensation in buildings) or BS 6229: 1982 (Code of practice for flat roofs with continuously supported coverings).

When using paving slabs as ballast they must be laid on supports to prevent rainwater being trapped by capillary action above the insulation, similarly gravel filtration layers and polyester fleece filtration membranes should be used to aid diffusion of moisture vapour from the top of the insulation.

# Kingspan Styrozone™ H 350/N 300

## ROOF GARDENS

Roof gardens, or green roofs, are an alternative to the standard protected membrane roof that offer many advantages but require precise design and detailing.

Specifically they offer the following advantages.

- reduce dust levels and improve humidity;
- reduce carbon dioxide levels and increase oxygen levels;
- provide a habitat for wildlife;
- create usable areas for recreational activities;
- retain rainfall thus prevent water surges into the drainage system;
- improve sound insulation;
- improve existing protected membrane roofs with gravel or paving slab ballast.

There are two types of roof garden system.

Extensive roof gardens comprise a relatively shallow growing medium and low maintenance vegetation such as grass. They are lightweight, simple to design, construct and maintain but should not be considered suitable for regular traffic or recreational activities. Extensive systems are especially useful in creating green areas for both ecological and aesthetic reasons.

Intensive roof gardens have a much deeper growing medium and a wider variety of flora including grass, shrubs and smaller trees. They are more comparable to a normal garden in respect of maintenance and can be used for recreation activities. The self weight of the system can be very high due to the increased soil depth.

Careful design and detailing of both roof types is important and includes the following elements.

## GROWING MEDIUM

In its simplest form this is normal soil. Specialist mixtures are available incorporating expanded clay and lava rock which form the growing medium and have filtration, drainage and moisture retention functions.

## DRAINAGE LAYER

Either a layer of washed gravel 8/16, expanded clay or a specialist 'egg carton' or castellated plastic (HDPE) sheeting overlaid with a filtration membrane. The drainage layer allows the rapid removal of excess rainwater from the roof thus avoiding saturation of the soil and the associated increase in weight.

## MOISTURE RETENTION LAYER

The limited depth of soil especially in the extensive type of roof may require the use of a moisture retention layer to ensure sufficient water is available for the vegetation.

## ROOT BARRIER

The roots of growing plants can seriously damage the waterproof layer by growing into any small cracks, lap joints or other discontinuities. A root barrier may be formed by the waterproof system itself or by a separate cap sheet of bitumen or polyethylene incorporating a thin copper film. The cap sheet is either adhered or loose laid onto the waterproof layer with all joints sealed by bonding or welding and must be continued up vertical faces of upstands.

## THERMAL PROPERTIES

The R-values and  $\lambda$ -values quoted in this document are based on the procedures for the determination of the aged values of thermal resistance and thermal conductivity, laid down in the harmonised European standard BS EN 13164, 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 ( $\lambda$ -value) of **Kingspan Styrozone™ H 350** is 0.028 W/m.K. The thermal conductivity ( $\lambda$ -value) of **Kingspan Styrozone™ N 300** is 0.035 W/m.K for thicknesses  $\leq 60$  mm and 0.037 W/m.K for thicknesses  $> 60$  mm.

### THERMAL RESISTANCES

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

Additionally, an allowance of 20% of the calculated resistance is made to compensate for saturated roofs during long periods of rain in accordance with BS 5250: 1989 (1995) (Code of practice for control of condensation in buildings). The following table of design resistance values takes this allowance into account.

Insulant Thickness (mm)	Thermal Resistance (m <sup>2</sup> .K/W)	
	H 350	N 300
60	1.786	–
70	2.083	–
75	2.232	1.689
80	2.381	1.802
85	–	1.914
90	2.679	2.027
100	2.976	2.252
105	–	2.365
110	3.274	2.477
115	–	2.590
120	3.571	2.703
125	3.720	2.815
130	3.869	2.928
140	4.167	3.153
145	4.315	–
150	–	3.378
160	–	3.604
170	–	3.829
175	–	3.941
180	–	4.054
190	–	4.279

## 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 150 mm concrete deck, 50 mm screed and mastic asphalt waterproofing. In applications with plasterboard ceiling, it 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 or you need Hazardous to Health Regulations 1988 (COSHH) information, please consult our Technical Services Department.

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

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

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

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

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).

# Kingspan Styrozone™ H 350/N 300

## DENSE CONCRETE DECK WITH PLASTERBOARD CEILING

### Kingspan Styrozone™ H 350

Insulant Thickness (mm)	U-value (W/m <sup>2</sup> .K)	
	Combined Method	Proportional Area Method
60	0.44	0.43
70	0.39	0.38
75	0.37	0.36
80	0.35	0.34
90	0.32	0.31
100	0.29	0.29
110	0.27	0.26
120	0.25	0.25
125	0.24	0.24
130	0.23	0.23
140	0.22	0.21

NB at greater thicknesses it may prove more cost effective to use a double layer system of thinner boards.

## DENSE CONCRETE DECK

### Kingspan Styrozone™ H 350

Insulant Thickness (mm)	U-value (W/m <sup>2</sup> .K)	
	Combined Method	Proportional Area Method
70	0.42	0.42
75	0.40	0.40
80	0.38	0.38
90	0.34	0.33
100	0.31	0.31
110	0.28	0.28
120	0.26	0.26
125	0.25	0.25
130	0.24	0.24
140	0.23	0.23
145	0.22	0.22

NB at greater thicknesses it may prove more cost effective to use a double layer system of thinner boards.

## DENSE CONCRETE DECK WITH PLASTERBOARD CEILING

### Kingspan Styrozone™ N 300

Insulant Thickness (mm)	U-value (W/m <sup>2</sup> .K)	
	Combined Method	Proportional Area Method
75	0.45	0.44
80	0.43	0.42
90	0.39	0.38
100	0.36	0.35
105	0.34	0.34
110	0.33	0.33
120	0.31	0.31
125	0.30	0.29
130	0.29	0.29
140	0.27	0.27
150	0.25	0.25
160	0.24	0.24
170	0.23	0.23
175	0.22	0.22

NB at greater thicknesses it may prove more cost effective to use a double layer system of thinner boards.

## DENSE CONCRETE DECK

### Kingspan Styrozone™ N 300

Insulant Thickness (mm)	U-value (W/m <sup>2</sup> .K)	
	Combined Method	Proportional Area Method
85	0.45	0.45
90	0.43	0.43
100	0.39	0.39
110	0.36	0.36
115	0.35	0.34
120	0.33	0.33
125	0.32	0.32
130	0.31	0.31
140	0.29	0.29
150	0.27	0.27
160	0.25	0.25
170	0.24	0.24
175	0.23	0.23
180	0.23	0.23
190	0.22	0.22

NB at greater thicknesses it may prove more cost effective to use a double layer system of thinner boards.

## SITework

### GENERAL

Prior to installing the insulation it is essential to ensure that the waterproofing system has been installed correctly and that the roof is watertight and clean. Single-ply membranes in particular need careful attention to ensure that there has been no damage from following trades and that puncturing from below the membrane (from nail heads or debris) cannot occur. Existing roofs should be swept clean and any loose gravel chippings removed, if the chippings are bonded a foamed polyethylene cushion layer should be used prior to laying the insulation.

The skirting of the waterproofing layer must be at least 150 mm above the finished roof level at upstands, parapets, around rooflights etc.

Filtration and cushioning membranes should be installed in accordance with recommendations given in the 'Design Considerations' section of this document depending upon the insulation and ballast system used.

The boards should be laid tightly butted and there must be no gaps where they meet upstands, rooflights etc. The boards are easily cut and shaped using a fine toothed saw, or sharp knife.

Start laying the boards from the point of access to the roof and as soon as possible apply the ballast layer. This ensures that the waterproofing membrane is always protected and excessive heat build up or high winds do not damage boards.

Ensure that ballast awaiting laying is not concentrated in one area where it may overload the roof structure.

**Kingspan Styrozone™** insulation boards can be laid in any weather but, due to the light weight of the boards, care must be taken in windy conditions.

### GRAVEL BALLAST

Washed, rounded gravel, nominal 16-32 mm diameter, minimum depth 50 mm, is laid on a non-woven polyester fleece layer laid on the insulation boards. The depth of gravel applied is normally the same as the thickness of insulation used up to 100-120 mm. The diameter of the gravel is important as this size has been found to be the most resistant to wind scour, BRE Digest 311 gives advice. On high buildings in more exposed areas however wind scour may be a problem and paving slab ballast should be considered.

### PAVING SLAB BALLAST

Paving slabs should be a minimum of 40 mm thick for insulation less than 50 mm and 50 mm thick for greater thicknesses of insulation. The slabs are laid on proprietary paving slab supports of minimum diameter 175 mm (or equivalent base area) in order to maintain drainage below the slabs and to ensure that moisture vapour can escape. Alternatively the slabs can be laid on a 20 mm deep gravel (4-8 mm diameter) bed laid on a polyester filtration layer.

### ROOF GARDENS

Having chosen the type of planting system and correctly detailed the various filter layers, moisture retention layers and growing medium, the application, especially of extensive systems, is quick and simple.

### EXTENSIVE ROOF GARDENS

A root barrier (unless provided by the waterproofing layer) is loose laid on or bonded to the waterproofing membrane with all the laps sealed followed by the **Kingspan Styrozone™** insulation. A filtration layer or combined filtration layer/moisture retention mat is then loose laid with 100 mm laps. The growing medium, generally 50 - 200 mm deep is then applied, specialist spray systems are available which allow the application of growing medium and grass/plant seed to be applied in one operation.

### INTENSIVE ROOF GARDENS

A root barrier (unless provided by the waterproofing layer) is loose laid on or bonded to the waterproofing membrane with all laps sealed followed by the **Kingspan Styrozone™**.

### SITE PROTECTION

Where the roof deck is to be used by other trades as a working platform after the **Kingspan Styrozone™** has been laid, the roof should be close-boarded to prevent any damage to the completed deck.

### SITE PRACTICE

On completion the roof should be swept clean and all contractual equipment or debris removed.

### AVAILABILITY

**Kingspan Styrozone™** is available through specialist insulation distributors and selected builders merchants throughout Britain and Ireland.

### PACKAGING

The panels are supplied in labelled packs shrinkwrapped in polythene.

### STORAGE

The packaging of **Kingspan Styrozone™** should not be considered adequate for long term outside protection.

**Kingspan Styrozone™** should be stored flat in a ventilated area and protected generally from accidental damage, contact with volatile solvents, flames and extended exposure to UV and sunlight. If it is stored outside for more than a few weeks, it must be covered with a pale pigmented plastic sheet.

**Kingspan Styrozone™** should not be left in the sun covered by either a transparent or a dark plastic sheet, since in both cases, board temperatures can build up to a level hot enough to appreciably alter their dimensions or warp them.

### 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.

# Kingspan Styrozone™ H 350/N 300

## PRODUCT DESCRIPTION

### COMPOSITION

**Kingspan Styrozone™** H 350 and N 300 are high performance rigid extruded polystyrene insulants of typical density 35 kg/m<sup>3</sup>, with a smooth, dense skin on both faces.

### CFC/HCFC-FREE

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



### THERMAL EXPANSION

The linear thermal expansion coefficient of **Kingspan Styrozone™** is 0.07 mm/m.K when tested to BS 4370: Part 3: 1988 (1996) (Methods of test for rigid cellular materials).

### WATER VAPOUR RESISTANCE

The boards achieve a resistance greater than 350 MN.s/g when tested in accordance with BS 3837: Part 2: 1990 (1996) (Specification for extruded boards).

## PRODUCT DATA

### STANDARDS AND APPROVALS

**Kingspan Styrozone™** is manufactured to the highest quality standards under a quality control system approved to EN ISO 9002: 1994 (Quality systems, Model for quality assurance in production, installation and servicing). Its use in protected membrane roofing is covered by BBA Certificate 02/3877.



### ABSORPTION OF MOISTURE

**Kingspan Styrozone™** is not sensitive to moisture of any kind. Its surface is water-repellent and there is no capillary suction. The material is also not hygroscopic. Over a 28 day cycle with temperature fluctuating 20/40°C its water absorption is <0.5% when tested to BS 3837: Part 2: 1990 (1996) (Specification for extruded boards).

### DURABILITY

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

### RESISTANCE TO SOLVENTS, FUNGI & RODENTS

**Kingspan Styrozone™** is resistant to most dilute acids and alkalis. It may not be resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl ketone. Adhesives containing such solvents should not be allowed to come into contact with the product. Edible oils, white oil, petroleum jelly and fuel oil should also be avoided. Organic solvents, petrol, petroleum solvents, and solvent based cold bitumen and or mastic will have a detrimental effect if allowed to come into contact with the boards. In the event of the boards coming into contact with harsh solvents, petrol, mineral oil or acids or being damaged in any other way, they should not be used. If already fixed, they should be replaced.

**Kingspan Styrozone™** resists attack by mould and microbial growth.

**Kingspan Styrozone™** does not provide any food value to vermin and they are not normally attractive to them.

### STANDARD DIMENSIONS

**Kingspan Styrozone™** H 350 R and H 350 T are available in the following standard sizes and thicknesses:

Nominal Dimension	Availability
Length (m)	1.25 (R Grade) 2.5 (T Grade)
Width (m)	0.6
Thickness* (mm)	60, 70, 75, 80, 90, 100, 110 120, 125, 130, 140, 145
Edge Profile	Rebated to all four edges (R Grade) Tongue and groove to all four edges (T Grade)

**Kingspan Styrozone™** N 300 R and N 300 T are available in the following standard sizes and thicknesses:

Nominal Dimension	Availability
Length (m)	1.25 (R Grade) 2.5 (T Grade)
Width (m)	0.6
Thickness* (mm)	75, 80, 85, 90, 100, 105, 110, 115, 120, 125, 130, 140, 150, 160, 170, 175, 180, 190
Edge Profile	Rebated to all four edges (R Grade) Tongue and groove to all four edges (T Grade)

\* Other thicknesses are available subject to enquiry

### INSULATION COMPRESSIVE STRENGTH

The compressive strengths of **Kingspan Styrozone™** H 350 and N 300 typically exceed 350 and 300 kPa respectively at 10% compression when tested to BS 4370: Part 1: 1988(1996) (Methods of test for rigid cellular materials).

### FIRE PERFORMANCE

Flat roofs incorporating **Kingspan Styrozone™** protected membrane roof insulation and waterproofed using built-up felt or mastic asphalt, when subjected to British Standard fire tests, achieve the results given below. Further details on the fire performance of extruded polystyrene can be obtained from our Technical Services Department (see rear cover).

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

### MAXIMUM SERVICE TEMPERATURE

**Kingspan Styrozone™** should not be brought into direct contact with high temperature heat sources. The maximum service temperature of **Kingspan Styrozone™** is 75°C.

NB Styrozone will be delivered in packaging bearing the Uralita Batifoam or Poliglas Glascofoam names.

## KINGSPAN INSULATION

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

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

### INSULATION FOR:

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

### INSULATED DRY LINING

### TAPERED ROOFING SYSTEMS

*Kingspan KoolDuct*® PRE-INSULATED DUCTING

*Kingspan nilvent*™ BREATHABLE MEMBRANES

*Kingspan TEK* Haus™ BUILDING SYSTEM

## THE KINGSPAN INSULATION PRODUCT RANGE

### THE KINGSPAN KOOLTHERM® K-RANGE

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

### THE KINGSPAN THERMA ZERO ODP RANGE

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

### THE KINGSPAN STYROZONE™ & PURLCRETE ZERO ODP RANGES

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

### ALL PRODUCTS

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

## CUSTOMER SERVICE

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

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

## TECHNICAL ADVICE

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

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

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

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



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

## LITERATURE AND SAMPLES

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

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

UK – Telephone: +44 (0) 1544 387 210  
– Fax: +44 (0) 1544 387 299  
– email: [literature.uk@insulation.kingspan.com](mailto:literature.uk@insulation.kingspan.com)  
Ireland – Telephone: +353 (0) 42 97 95038  
– Fax: +353 (0) 42 97 46129  
– email: [literature.ie@insulation.kingspan.com](mailto: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  
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Ireland – Telephone: +353 (0) 42 97 95000  
– Fax: +353 (0) 42 97 46129  
– email: [info.ie@insulation.kingspan.com](mailto:info.ie@insulation.kingspan.com)

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



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