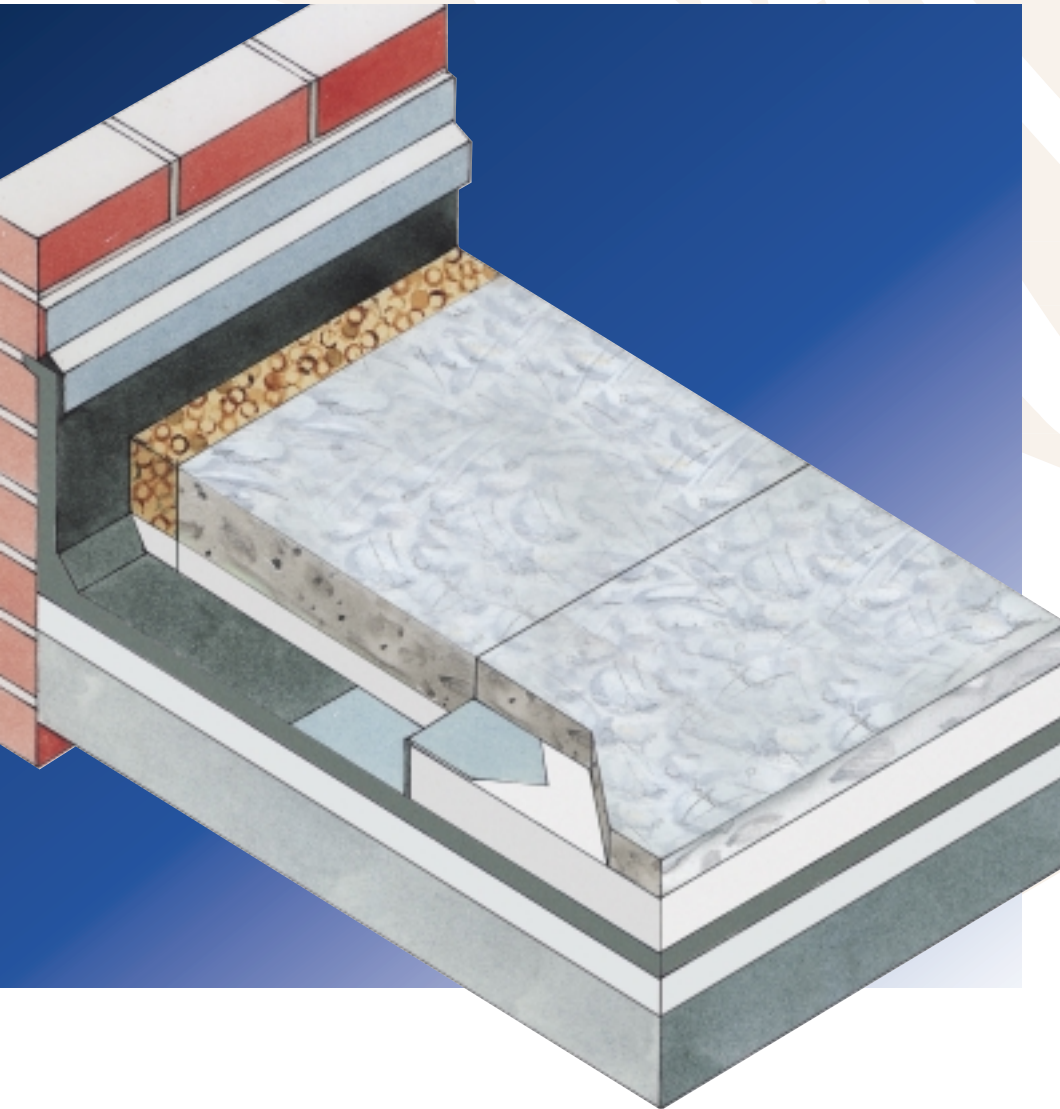




# Purlcretepromenade

LIGHTWEIGHT PROTECTED MEMBRANE  
INSULATION – PEDESTRIAN AREAS/TERRACES



- ▼ Cementitious topped high performance rigid extruded polystyrene insulation panels
- ▼ Additional dead loading is kept to a minimum
- ▼ Less than half the weight of paving slabs
- ▼ Excellent resistance to wind uplift
- ▼ Easy to handle and install – panels rebated on all four edges
- ▼ Ideal for newbuild and refurbishment
- ▼ CFC/HCFC-free with zero Ozone Depletion Potential (ODP)



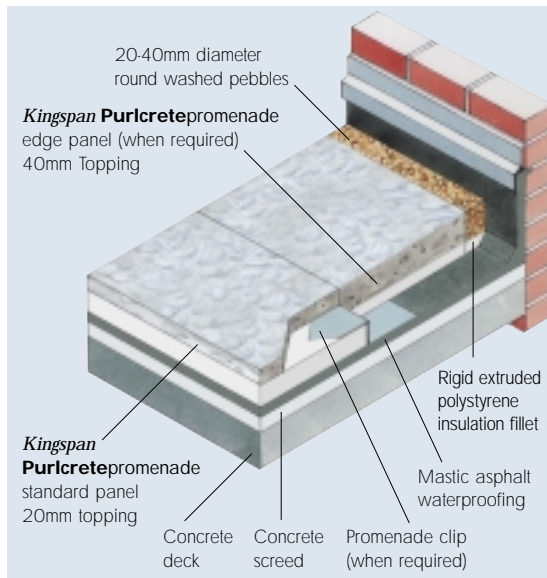
BS EN ISO 9002: 1994  
Certificate No. FM 10697



# Kingspan Purlcretepromenade

## TYPICAL DESIGN DETAIL

Figure 1



## SPECIFICATION CLAUSE

**Kingspan Purlcretepromenade** should be described in specifications as:-

The protected membrane roof insulation shall be **Kingspan Purlcretepromenade** comprising \_\_\_\_mm thick rigid extruded polystyrene insulation with 20mm thick polymer reinforced hydraulic cement facing with exposed aggregate finish, manufactured to BS EN ISO 9002: 1994 by Kingspan Insulation Limited and shall be applied in accordance with the instructions issued by them.

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



## DESIGN CONSIDERATIONS

### WIND UPLIFT CALCULATIONS

A full wind uplift calculation should be produced to verify the fixing specification of the **Kingspan Purlcretepromenade** over the roof. This service is available free of charge from our Technical Services Department (see rear cover).

### DESIGN LOADS

The suitability of the structure under consideration to accept or withstand the design imposed loads including the increased dead load of the **Kingspan Purlcretepromenade** system plus any necessary ballast and design snow loads should be verified according to BS 6399: Part 3: 1988 (Code of practice for imposed roof loads) (ISO 4355: 1981).

### WIND LOADINGS

Wind loadings should be assessed in accordance with BS 6399: Part 2: 1997 (Code of practice for wind loads). BRE Digest 346 Parts 1-8 can also be referenced for wind loading.

### DESIGN DYNAMIC PRESSURE

The design dynamic pressure  $q$  should be calculated in accordance with BS 6399: Part 2: 1997 (Code of practice for wind loads).

### EXTERNAL PRESSURE CO-EFFICIENT

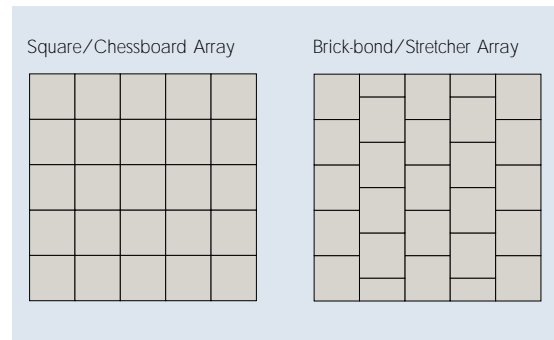
The external pressure co-efficient,  $C_{pe}$ , should be applied in accordance with BS 6399: Part 2: 1997 (Code of practice for wind loads). This figure is subject to a reduction as stated in the following section.

### REDUCTION OF EXTERNAL PRESSURE CO-EFFICIENT VALUE

It is recommended in BRE Digest No. 295 (Stability under Wind Load of Loose-Laid External Roof Insulation Boards) that the uplift force co-efficient on a single loose laid insulation board,  $C_f$ , is taken as one-third of the external pressure co-efficient,  $C_{pe}$ , applicable to the area in which the insulation board lies.

### DESIGN RESTRAINT

The design restraint of the **Kingspan Purlcretepromenade** system when interlocked into a square/chessboard array should be taken as one and a half times self weight. Panels with a free edge (not interlocked into the array) should be taken as self weight only. When locked into a brick/stretcher bond array the design restraint may be taken as twice self weight.



The laying array is normally chessboard. However, the **Kingspan Purlcretepromenade** system should be laid so that the rebate interlock is always maintained whatever pattern is chosen. The panels should be shown to be stable in these areas bearing in mind the proposed design for mechanical restraint at the perimeter detail. Where design restraint of twice self-weight is required, lay to a brick/stretcher bond array.

### PURLCRETE PROMENADE EDGE TILES

The **Kingspan Purlcretepromenade** edge panels are twice the weight of the standard panels and can therefore, be considered as being at least equal to that of the standard panels locked into the array.

#### MECHANICAL RESTRAINT – PERIMETER DETAIL

Mechanical restraint systems can be used in some circumstances in place of or in conjunction with ballast. Suitable trims which allow anchorage to the vertical face of perimeter walls etc. may be incorporated into the design. On roofs without a parapet a trim or flashing should be specified to prevent wind blowing under the perimeter panels. This will also apply to the free edge of the **Kingspan Purlcretepromenade** wherever the continuity of the insulation is interrupted.

#### BONDED SYSTEMS

Only partially bonded systems can be considered for such applications in order to allow drainage of rainwater from the roof. The specified adhesive system must ensure that the drainage plain between the insulant and the roof waterproofing membrane is always maintained.

Both the specified waterproofing and adhesive manufacturers advice should be sought as to the suitability of their material or system to adequately bond the **Kingspan Purlcretepromenade** to the specified substrate bearing in mind the nature of the substrate, the rigid extruded polystyrene insulation backing of **Kingspan Purlcretepromenade**, the percentage bond area, and the distribution pattern. On ponded roofs an appropriate allowance should be made for flotation forces which may be applicable. In any case the full wind uplift resistance should be calculated in accordance with BS 6399: Part 2: 1997 (Code of practice for wind loads).

#### LOOSE LAID SYSTEMS

Stability against wind-induced uplift can normally be achieved by loose laying standard **Kingspan Purlcretepromenade** edge panel system, together with (or in place of) additional mechanical restraint. In all cases the requirement (or otherwise) for restraint should be confirmed by calculation.

The use of the **Kingspan Purlcretepromenade** system should take into account the recommendations given in BRE Digest No. 295, from which the following extracts have been taken.

- a. The existing roof on which the system should be laid is impermeable and should itself be able to withstand the design imposed loads, namely the increased dead load due to the weight of the insulation system, and the design snow load as detailed in BS 6399: Part 3: 1988 (Code of practice for imposed roof loads).
- b. The insulation boards should be laid directly on, but not bonded to, the surface of the roof. Bonded systems should be designed to withstand the full loads given by BS 6399: Part 2: 1997 (Code of practice for wind loads).

- c. The top surface of each insulation board should be flush with its neighbours.
- d. The area of each individual board should not exceed 2 m<sup>2</sup>.
- e. Any space remaining between the bottom of the insulation and the roof surface should be less than 5 mm high, when averaged over the whole area of the board.
- f. The gap between each board and its neighbours should not be less than 1 mm when averaged over the length of the joint.
- g. Wind should be prevented from blowing under the boards at the perimeter of the roof, or at any uninsulated area of the roof, either by means of an eaves trim or flashing, or by a parapet. The height of the parapet, measured from the top of the insulation system, should be greater than the thickness of the insulation system and also greater than the distance between the rear face of the parapet and the edge of the first board (eg the width of any gutter).

#### RAINWATER OUTLETS

Double entry rainwater or gully outlets should be specified to allow rainwater to be drained from the roof surface at both the membrane level and at the upper surface level.

#### SURFACE TREATMENT

The panels have a pre-finished, durable, aggregate upper surface and no further treatment is necessary.

#### COLOUR AVAILABILITY

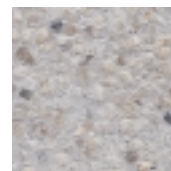
**Kingspan Purlcretepromenade** is available in the following range of colours subject to quantity. Please contact Kingspan Insulation for further information.

The colour may vary due to the natural colouring of the aggregate used and its dispersion in the mix. Colour matching, therefore, cannot be guaranteed.

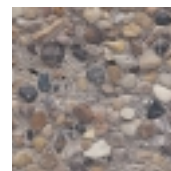
Harden Red



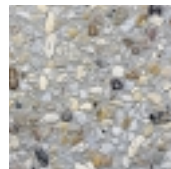
Chablis



Sheriden



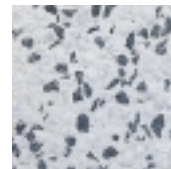
Champagne



Rosé



Checker



# Kingspan Purlcretepromenade

## 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 the extruded polystyrene component of the panels is 0.028 W/m.K and that of the aggregate-filled polymer fibre reinforced cement facing is 1.4 W/m.K.

### THERMAL RESISTANCES

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

Additionally, an allowance of 20% of the calculated insulation thermal 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.

Product Thickness* (mm)	Thermal Resistance (m <sup>2</sup> .K/W)
80	1.779
85	1.926
90	2.073
95	2.220
100	2.367
105	2.514
110	2.661
120	2.955
130	3.249
140	3.543
145	3.690
150	3.838
155	3.985
160	4.132
165	4.279

\*Product Thickness = Insulant thickness + 20 mm polymer fibre reinforced cement topping

## 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 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).

### DENSE CONCRETE DECK

Product Thickness* (mm)	U-value (W/m <sup>2</sup> .K)	
	Combined Method	Proportional Area Method
85	0.45	0.45
90	0.42	0.41
95	0.39	0.39
100	0.37	0.37
105	0.35	0.35
110	0.34	0.33
120	0.31	0.31
130	0.28	0.28
140	0.26	0.26
145	0.25	0.25
150	0.24	0.24
160	0.23	0.23
165	0.22	0.22

\*Product Thickness = Insulant thickness + 20 mm polymer fibre reinforced cement topping

### DENSE CONCRETE DECK WITH PLASTERBOARD CEILING

Product Thickness* (mm)	U-value (W/m <sup>2</sup> .K)	
	Combined Method	Proportional Area Method
80	0.43	0.42
90	0.38	0.38
95	0.36	0.36
100	0.34	0.34
110	0.31	0.31
120	0.29	0.29
130	0.26	0.26
140	0.25	0.23
145	0.24	0.24
150	0.23	0.23
155	0.22	0.22

\*Product Thickness = Insulant thickness + 20 mm polymer fibre reinforced cement topping.

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

## SITework

### STANDARD LOOSE LAID SPECIFICATION

Before any work commences, the roof waterproofing should be finished and the roof made completely watertight. The roof should be graded to allow the correct falls to all roof rainwater outlets and the surface should be smooth without large projections steps or gaps. Where gaps are unavoidable, the maximum un-supported span of the **Kingspan Purlcretepromenade** panels should be 100 mm. Panels must not be cantilevered over open gullies etc.

### LAYING PROCEDURE

Where calculation has revealed the requirement for **Kingspan Purlcretepromenade** edge panels, begin by laying standard panels to a line 600 mm inside the intended final line of the insulated array. Work should start at the most windward corner of the roof and progress towards the leeward corner or side. (In the UK and Ireland the prevailing wind is usually South Westerly or Westerly).

**Note:** any exposed tongue on the outer edge of this line of standard panels should be removed.

The pointed end of a promenade clip should be fully inserted into the plain edge of the standard panel immediately below the topping with the exposed rectangular blade of the clip lying flat on the upper surface of the roof. From the original starting point lay **Kingspan Purlcretepromenade** edge panels as a border to the **Kingspan Purlcretepromenade** standard panels with each edge panel resting on the protruding rectangular blade of the promenade clip in order to restrain the outermost row of **Kingspan Purlcretepromenade** standard panels.

Continue laying standard panels across the full length or width of the roof row by row ensuring that the panels fit snugly and are flush with the adjacent panels. Gaps between panels should not be less than 1 mm, averaged over the length of the panel (a promenade clip can be used as a gauge). Stop 600 mm from the intended final line on the opposite side of the roof. Cut the last row of standard panels if necessary, insert promenade clips into the exposed edge as before and finish with a row of edge panels (see diagram on page 2).

# Kingspan Purlcretepromenade

When the edge of the system is exposed i.e. on a balcony or roof with hand rails, a returned edge panel is recommended, in which the topping extends down the vertical side or sides of the panel.

Where the edge detail does not include a parapet temporarily ballast all edge panels to prevent wind uplift prior to the application of the specified edge trim or mechanical fixing detail. Each standard panel should be fully interlocked with the adjacent standard panels. At rainwater outlets or gullies it is essential to ensure that rainwater can be drained from the roof surface at both the membrane level and at the upper surface level. This can be achieved by the use of double entry gully outlets.

Where the panels are laid over a roof surface that has a change in roof slope to facilitate rainwater drainage, the topping should be cut with a masonry saw along the line of the change in plane. This will reduce the risk of the panels cracking along this line. The saw cut should be left open. Use cross clipping to restore interlock if the insulant has been cut right through, eg. at sharp changes in angle, for instance, at hips or valleys.

Where the panelled surface is perforated to allow pipes or other roof projections to pass through, the holes should be cut cleanly using a masonry saw. A minimum 5 mm gap should be allowed between the panel and the projecting object. Where these holes may effect the stability of the roof, as regards wind up-lift, additional restraint of the panels should be provided.

## SITE PROTECTION

Where the roof deck is to be used by other trades as a working platform after the **Kingspan Purlcrete promenade** system 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.

## CLEANING AND MAINTENANCE

The **Kingspan Purlcretepromenade** protected membrane roofing system requires little or no maintenance. Periodic clearance of gutter and rainwater outlets or gullies is good roofing practice. Additionally, any build up of vegetation on the surface between or under the tiles should be removed.

## DAILY WORKING PRACTICES

Whenever work is interrupted the leading edge of the panels that are not yet interlocked into the array of panels should be temporarily ballasted to avoid wind uplift of the partially completed roof area.

## AVAILABILITY

**Kingspan Purlcretepromenade** is available through specialist insulation distributors and selected roofing merchants throughout Britain, Ireland and Europe.

## PACKAGING

The panels are supplied wrapped and packed in bundles according to thickness.

## STORAGE

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

**Kingspan Purlcretepromenade** 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 pale pigment plastic sheet.

**Kingspan Purlcretepromenade** 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.

## PRODUCT DESCRIPTION

### THE UPPER FACING

The upper facing of **Kingspan Purlcretepromenade** is a 20 mm polymer reinforced hydraulic cement of typical density 2,000 kg/m<sup>3</sup> with specially selected aggregate finish.

### THE CORE

The core of **Kingspan Purlcretepromenade** is a high performance rigid extruded polystyrene insulation of typical density 35 kg/m<sup>3</sup>. The tile is rebated on all four edges to allow an interlock with surrounding tiles, to provide additional self weight restraint.

### CFC/HCFC-FREE

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



## PRODUCT DATA

### STANDARDS AND APPROVALS

**Kingspan Purlcretepromenade** is manufactured to the highest quality 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 Purlcretepromenade** is available in the following standard sizes and thicknesses:

Nominal Dimension	Availability	
<b>Standard Panels</b>		
Length (m)	0.6	
Width (m)	0.6	
Topping Thickness* (mm)	20	
Insulant Thickness* (mm)	60, 65, 70, 75, 80, 85, 90, 100, 110, 120, 125, 130, 135, 140, 145	
<b>Edge Panels</b>		
Length (m)	0.6	
Width (m)	0.6	
Topping Thickness* (mm)	40	
Insulant Thickness* (mm)	40, 45, 50, 55, 60, 65, 70, 80, 90, 100, 105, 110, 115, 120, 125	

\*Other thicknesses are available subject to quantity

### INSULATION COMPRESSIVE STRENGTH

Typically exceeds 350 kPa at 10% compression when tested to BS 4370: Part 1: 1988 (1996) (Methods of test for rigid cellular materials).

### THERMAL EXPANSION

The linear thermal expansion coefficient of the rigid extruded polystyrene insulation element of **Kingspan Purlcretepromenade** 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

Modified to include board facings, 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).

### ABSORPTION OF MOISTURE

The rigid extruded polystyrene insulation element of **Kingspan Purlcretepromenade** 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 Purlcretepromenade** has an indefinite life. Its durability depends on the supporting structure, waterproofing and the conditions of its use.

### RESISTANCE TO SOLVENTS, FUNGI & RODENTS

The rigid extruded polystyrene insulation element of **Kingspan Purlcretepromenade** 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 rigid extruded polystyrene insulation backing of **Kingspan Purlcretepromenade**. 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 rigid extruded polystyrene insulation backing of **Kingspan Purlcretepromenade**. In the event of the panels 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.

The rigid extruded polystyrene insulation element used in the manufacture of **Kingspan Purlcretepromenade** resists attack by mould and microbial growth.

Neither the facing nor rigid extruded polystyrene insulation element of **Kingspan Purlcretepromenade** provide any food value to vermin and they are not normally attractive to them.

### FIRE PERFORMANCE

Flat roofs incorporating a **Kingspan Purlcretepromenade** protected membrane roof insulation system 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 rigid extruded polystyrene insulation 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

The rigid extruded polystyrene insulation element of **Kingspan Purlcretepromenade** should not be brought into direct contact with high temperature heat sources. The maximum service temperature of the rigid extruded polystyrene insulation element of **Kingspan Purlcretepromenade** is 75°C.

## 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  
– Fax: +44 (0) 870 850 8666  
– email: [info.uk@insulation.kingspan.com](mailto:info.uk@insulation.kingspan.com)  
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).*



**Kingspan Insulation**

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Castleblayney, County Monaghan, Ireland

[www.insulation.kingspan.com](http://www.insulation.kingspan.com)