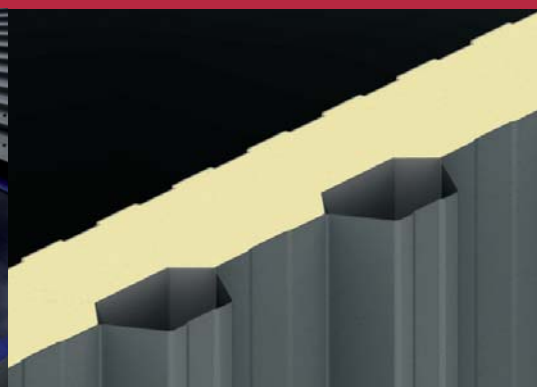
Insulated Panels

CI/SfB (4-) Rh2

September 2009

INSULATED **ROOF & WALL** SYSTEMS



Kingspan EnergiPanel™

Solar Air Heating Insulated Panel System

Approved to LPS 1181
Certificate No's. 186a & 260a

Kingspan®

Wal-Mart Distribution Centre, China

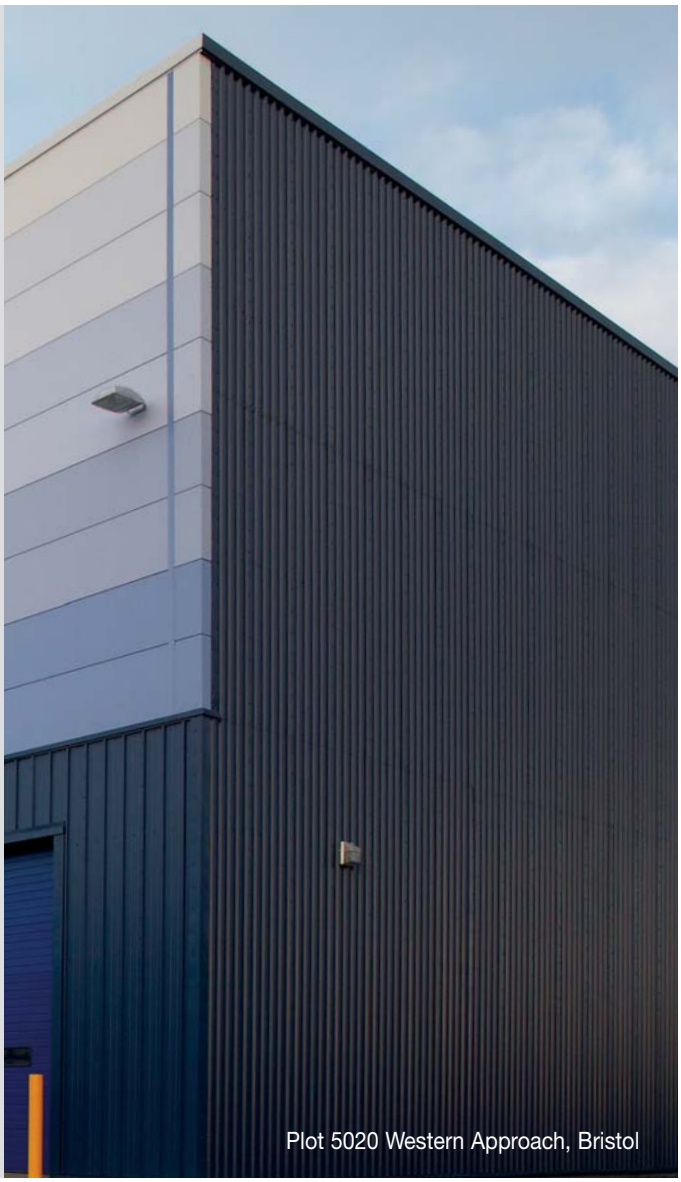
The paper we have printed on is from 80% post-consumer waste and the remaining 20% pulp is TCF (Totally Chlorine Free). This fibre is FSC certified (see fsc.org for details). In recognition, the range has been awarded both the NAPM and Eugropa recycled marks, two of the most prestigious and recognisable recycled certificates available. The ink we have used is vegetable based, allowing the document to be recycled.

Sustainable Forest

Recyclable

Vegetable Based

Contents



Plot 5020 Western Approach, Bristol

Chatterley Valley, North Staffordshire

Bottom image courtesy of Gazeley and Central Photography

Asda, Sutton Courtenay, Didcot

Introduction

At the forefront of innovation, Kingspan has created a revolutionary yet simple insulated panel system which not only provides the established high performance features of an insulated panel, but also generates renewable energy in the form of solar air heating.

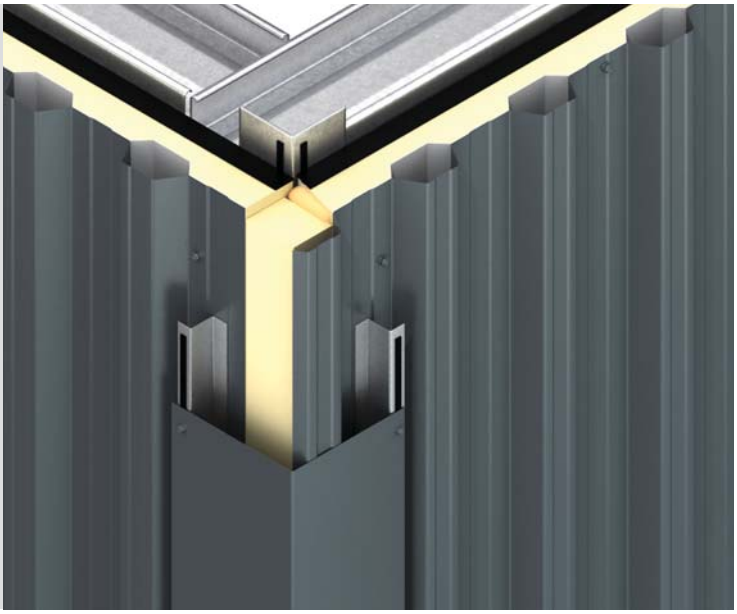
Kingspan EnergiPanel™ is an innovative insulated solar air heating system designed for roof and wall applications as a supplement to the main heating system.

Kingspan EnergiPanel™ is like no other insulated panel system. Solar energy is collected simply by using the outer steel skin as a solar energy absorber and incorporating hollowed crowns to facilitate air movement up through the panel.

System Benefits

The Kingspan EnergiPanel™ solar air heating system:

- Is a low cost and reliable renewable energy source which provides rapid payback on investment - Kingspan's large scale test facilities have shown that heating cost can be reduced by up to 20%.*
- Can significantly reduce the buildings carbon emissions.*
- Increases chance of achieving planning permission - hundreds of local authorities are expected to follow Merton's lead by adopting pro-renewables planning polices.
- Provides a low carbon footprint for system installation – no extra steel plate, support framework, extra fixings and transport costs.
- Increases stability of assets value by achieving a better Energy Performance of Building Directive (EPBD) certificate rating.
- Can help to deliver the following credits in BREEAM 2008:
  MW1 - Materials - up to 3 credits
  MW8 - Responsible Sourcing – up to 3 credits
  P1 Refrigerant GWP – up to 1 credit
  P4 (2006) / Mat 6 (2008) – insulation - up to 2 credits
  E1- CO_2 Reduction – up to 15 credits
  P11 Low / Zero Carbon Technologies – up to 3 credits
  P6 – NOx emissions – up to 1 credit
  HW11 – Ventilation rates – up to 3 credits
- Easily integrates with standard HVAC systems.
- Is a flexible system – for areas of the east/west/south wall that can't be connected back to the HVAC system, EnergiPanel™ can be utilised in a standalone heating capacity.
- Offers design flexibility - easily integrates with other Kingspan insulated panel systems.
- Is available in a wide range of colours.
- Provides Property & Business Protection - Loss Prevention Certification Board (LPCB) LPS 1181 certified insurer approved FIRESafe systems deliver certainty of performance and insurability.
- Has an ECOsafe, environmentally sustainable PIR insulation core, low GWP (Global Warming Potential) and non-deleterious.
- Is available with the Kingspan Total Guarantee, offering thermal and structural performance guarantee.



* To obtain computer modelled indicative data for your building, please contact Kingspan **enviro***care*® Technical Services on 0800 587 0090.

How It Works

Kingspan EnergiPanel™ is generally installed on the most southerly facing roof and / or wall elevations for optimum efficiency / heating performance.

The external profile of Kingspan EnergiPanel™, when in contact with the suns rays, heats up instantly and transfers this heat to the induced airflow travelling up through the hollow crowns. Optimal performance can be achieved by using darker external colours as they have a higher solar absorption rate.

Upon activation of the system, low energy fans or the HVAC system creates a suction pressure over the hollow crowns. This facilitates airflow up through the panel and over the internal (collector) surface of the hollow crown, heating the air.

At the top of the elevation, the heated air is drawn into a plenum (internal collection chamber) before being delivered into the building by one of the two systems:

1. Standalone Solar Air Heating System: Heated air is transferred from the collector directly into the building under pressure by a standalone fan unit.
2. Integrated Solar Air Heating System: Heated air is ducted from the collector back to the HVAC system and subsequently delivered into the building through a regulated high level ducting system.

Standalone Solar Air Heating System

The Standalone Solar Air Heating System consists of:

- A plenum which runs continuously along the full length of the installed elevation in-between the main steelwork and EnergiPanel™.
- Fan housing is fitted intermittently along the length of the collection chamber in-between the primary steel vertical columns. The fan spacing is dictated by the overall length of the installed Kingspan Energipanel™.
- The series of fans are collectively wired in parallel back to a main controller or controllers, depending on the number of fans installed.

The Standalone Solar Air Heating System works on a closed loop control system. A BMS (Building Management System), or an internally located thermostat, is connected to the fan controller to trigger a switch when the building temperature falls outside the preset range. A secondary air temperature sensor is located in the plenum, which checks if the temperature of the air in the hollow crown is suitable for functional heating. If both conditions are satisfied the fan is activated, otherwise the system remains off.

Once activated, the fan control system constantly varies the fan speed to optimise the heating delivered into the building. The fans continue to deliver heat until they are automatically deactivated either by the internal thermostat reaching the optimal preset range or reduced levels of solar radiation.

It is recommended that an optimised destratification / air movement system is used in conjunction with the Kingspan EnergiPanel™ system to ensure that the delivered heat is evenly distributed throughout the building.

Kingspan warehouse, North Wales

Standalone System installed on Kingspan warehouse, North Wales

Integrated System installed at Asda, Didcot

Integrated Solar Air Heating System

The Integrated Solar Air Heating System consists of:

- A plenum which runs continuously along the full length of the installed elevation in-between the main steelwork and EnergiPanel™.
- A series of outlet holes, for the attachment of ducting, are placed intermittently along the length of the plenum in-between the primary steel vertical columns. The outlet hole spacing is dictated by the volume flow rate required from the installed area of Kingspan EnergiPanel™.

For the Integrated Solar Air Heating System, the rate of airflow through the hollow crowns is dictated by the fresh air requirement of the building. The HVAC system is commissioned to pull this pre-requisite volume of air through the hollow crowns.

Kingspan Energipanel™ acts to temper the fresh air going into the HVAC system, reducing the overall temperature rise required from the heater. Heat is subsequently distributed into the building via a high level ducting system that propels air out into the building through high velocity jet nozzles.

For the summer time, a fresh air bypass can be fitted.

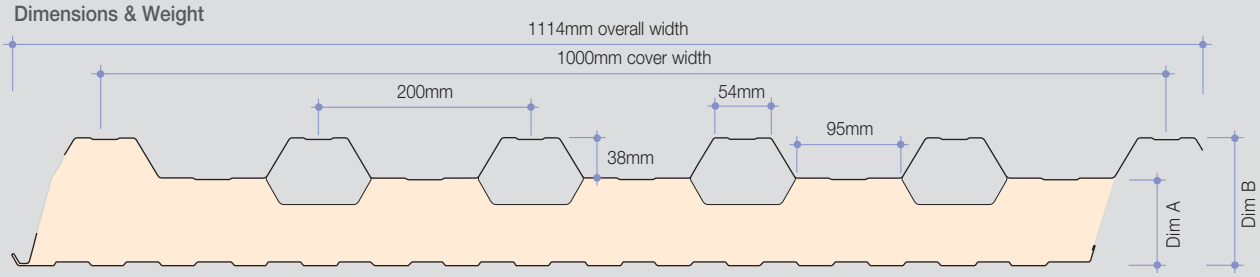
Product Data

Application

Kingspan KS1000 EP is a through fixed insulated roof and wall system which can be used for roof applications with roof pitches of 4° or more and vertically laid wall applications.

Product Reference	Application Description
KS1000 EP	KS1000 EP solar air heating insulated panel with Loss Prevention Certification Board (LPCB) approval for roof and wall applications.

Dimensions & Weight



Dimension A - core thickness nominal (mm)	68	80	100
Dimension B - overall dimension (mm)	106	118	138
Weight kg/m²	11.5	12.0	12.8

Product Tolerances

Cut to Length	-5mm	+5mm
Linear Sheet Length	-5mm	+5mm
Cover Width	-2mm	+2mm
Thickness	-2mm	+2mm
End Square	-3mm	+3mm

Panel End Cut Back

All panels are normally produced with a minimum cut back of 25mm. Cut backs up to 175mm can also be manufactured. If flush ended panels (no cut back) are required they can be manufactured with one end flush and a 25mm cut back on the opposite end, based on panels exceeding 1.8m in length. The recommended cut back for panel end lapping is 100mm for vertically laid wall applications and 150mm for roof applications. Panels less than 1.8m long, which require a cut back can be provided, but will be charged at full 1.8m price, plus cutting cost.

Available Lengths

Standard lengths 1.8 to 12 metres, 12 to 29.3 metres can be supplied but may be subject to a transport surcharge.

In relation to KS1000 EP Solar Air Heating System performance, to ensure optimum output the recommended elevation size is between a minimum of 3.5m and a maximum of 13m. For heights in excess of 13m, please contact Kingspan **enviro***care*® Technical Services.

Material - Steel

Substrate

- Standard external and internal sheets are hot dipped S220GD + ZA zinc/aluminium coated metal to BS EN 10326: 2004 (Continuously hot-dip coated strip and sheet of structural steels. Technical delivery conditions).

Coatings – External Weather Sheet

- Kingspan XL Forté™: 200 micron thick high performance coating applied to the weather side of the panel. Designed to achieve high levels of durability and colour stability, the product is highly resistant to damage in transit and on-site. The darker the external colour of the panel the greater the solar absorption. Available standard colour is Anthracite RAL 7016, others available.
- Kingspan Spectrum™: Polyurethane semi-gloss coating.
- Reverse side of sheet coated with a light grey polyester coating.

Please note that each colour has a different absorption value.
Contact Kingspan **enviro***care*® Technical Services for further details.

Coatings – Internal Liner Sheet

- Bright White Polyester: Coating developed for use as the internal lining of insulated panels. Standard colour is 'bright white' with an easy clean surface.

Insulation Core

The core of KS1000 EP is an ECO*safe*, environmentally sustainable PIR insulation which is non-deleterious with zero Ozone Depletion Potential (zero ODP). A generic assessment of KS1000 EP by the BRE has indicated an A+ rating according to the 2008 Green Guide to Specification. The formal certification process is ongoing.

Performance

Thermal Insulation

Panel Thickness (mm)	U-value* (W/m²K)
68	0.35**
80	0.30**
100	0.25++

* Thermal transmittance W/m²K

** Recommended wall panel thickness to allow compliance with Building Regulations Approved Documents L2A & L2B (England & Wales), Technical Handbooks Domestic and Non-domestic Sections 6 (Scotland), Part F2 (Northern Ireland) and Part L (Republic of Ireland - based on the Overall Heat Loss Method).

++ Recommended roof panel thickness to allow compliance with Building Regulations Approved Documents L2A & L2B (England & Wales), Technical Handbooks Domestic and Non-domestic Sections 6 (Scotland), Part F2 (Northern Ireland) and Part L (Republic of Ireland - based on the Overall Heat Loss Method).

Biological

KS1000 EP insulated panels are resistant to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the manufacture of the panels.

Passive Solar Heating

KS1000 EP has the capacity to provide passive solar heating to a building upon which it is installed. This is made possible, due to the provision of hollow crowns, formed adjacent to the insulated panels solar absorbent, external steel skin. Air flows through the crowns, harvesting solar energy collected by the panel's external surface. This heated air can be delivered into the building providing an effective supplementary renewable energy heating system.

Fire

Steel inner and outer facings have a Class 1 surface spread of flame to BS 476-7: 1997 and SAA external exposure roof test to BS 476-3: 1975, and are Class 0 as defined by the Building Regulations.

KS1000 EP insulated panels are approved by the Loss Prevention Certification Board (LPCB) to LPS1181 Grade EXT-B for roof and wall applications. KS1000 EP insulated panels have a FIRESafe core which has been specially formulated to provide excellent performance in fire tests to deliver the following benefits:

Approved to LPS 1181
Certificate No's. 186a & 260a

- Stable protective char.
- No flash over.
- No flame spread.
- No flame propagation.

Acoustics

All KS1000 EP insulated panels have a predicted single figure weighted sound reduction Rw = 25dB.

Kingspan Support

Kingspan **enviro***care*® Technical Services offer technical advice and support throughout the design and construction process. From the undertaking of Energy Performance Calculations to the payback period. Kingspan **enviro***care*® Technical Services can help to ensure that your building is as efficient as possible.

Tel: 0800 587 0090 (UK) & +353 (0) 42 96 98529 (Ireland)

Email: envirocare@kingspanpanels.com

envirocare®
TECHNICAL SERVICES

Quality

KS1000 EP insulated panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, approved to BS EN ISO 9001: 2000 (Quality management systems. Requirements). Kingspan manufacturing plants are BS EN ISO 14001: 2004 (Environmental management systems. Requirements with guidance for use) and BS OHSAS 18001: 2007 (Occupational health and safety management systems. Requirements) accredited.

Guarantees

KS1000 EP insulated panels are available with the Kingspan Total Guarantee, offering thermal and structural performance guarantee.

Packing

Standard Packing

KS1000 EP insulated panels are stacked weather sheet to weather sheet (to minimise pack height).

Removable hot melt adhesive is laid between each panel. The top, bottom, sides and each end are protected with polystyrene and timber packing and the entire pack is wrapped in polythene.

The number of panels in each pack depends on the panel thickness, as shown in the table below. Typical pack height is 1100mm.*

Insulation core thickness (mm)	68	80	100
Panel per pack	10	10	9

Sea Freight

Fully timber crated packs are available on projects requiring delivery by sea freight shipping, at additional cost. Alternatively, steel containers can be used. Special loading charges apply.

Delivery

All deliveries (unless indicated otherwise) are road transport to project site. Off loading is the responsibility of the cladding contractor or installer. Panels are delivered to site with EPDM fillers and mesh inserts.

* Kingspan provide a number of ways to reduce waste on site, please contact Kingspan Customer Services for details.

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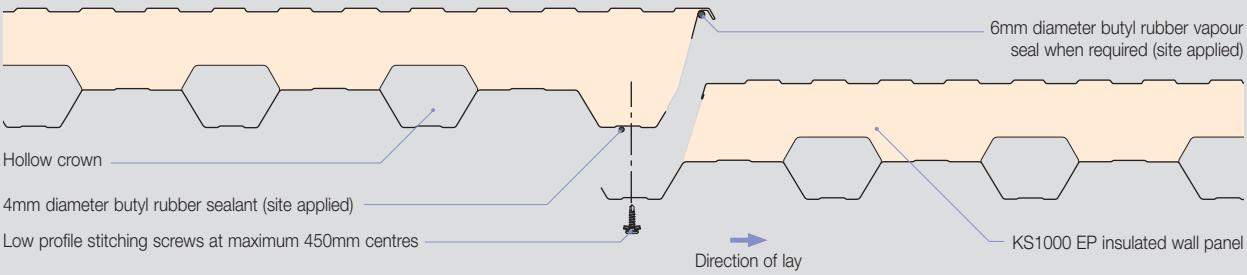
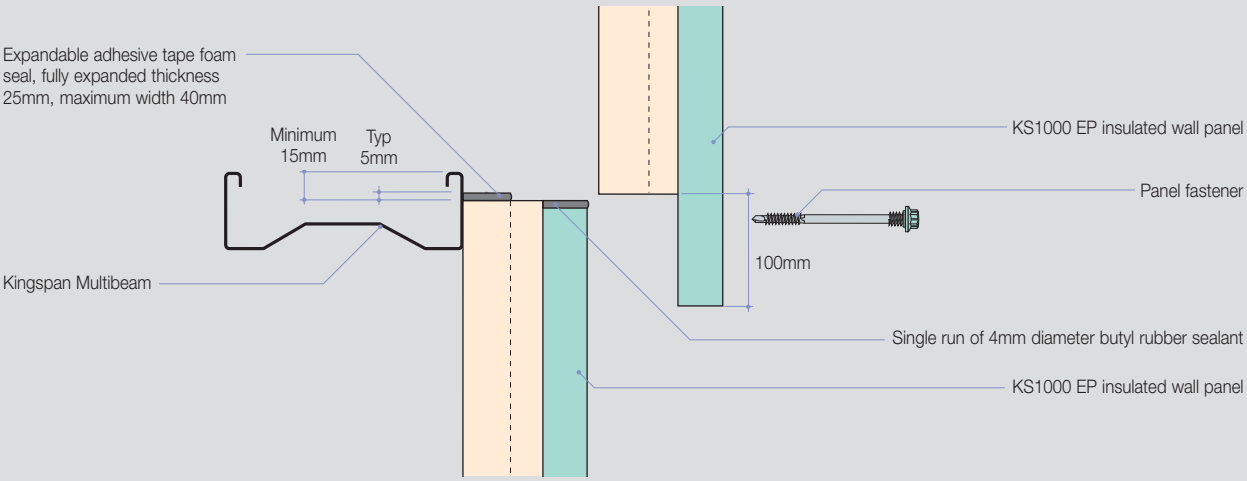
Construction Details

Side Lap Detail



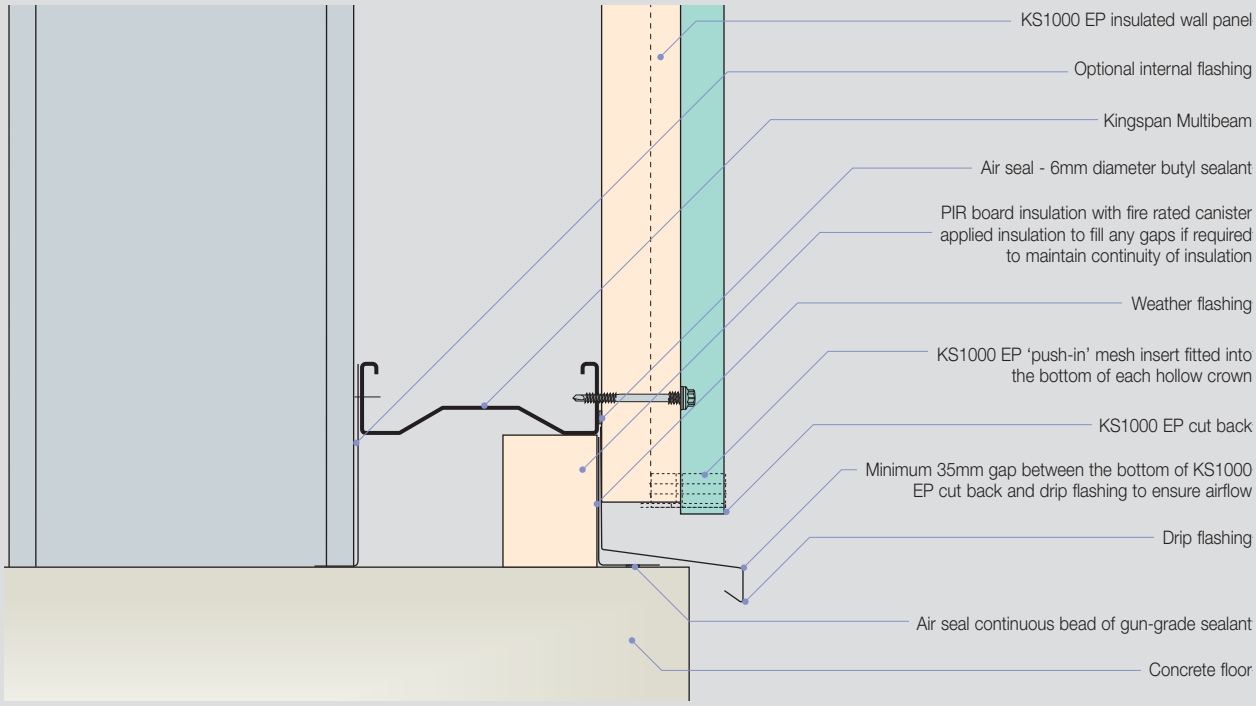
Note: To ensure correct panel installation side wall panel rails must be correctly aligned prior to insertion of fixings.

End Lap Detail

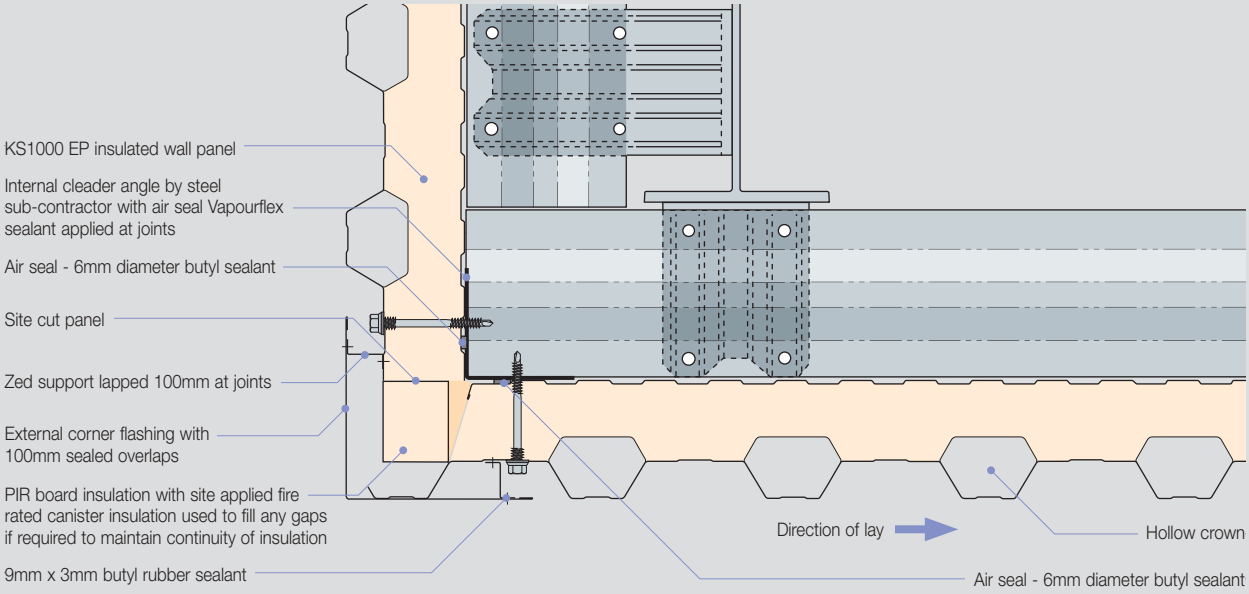


Note: Project specific construction details must be used. Please contact Kingspan **enviro***care*® Technical Services for further information.

Drip Detail



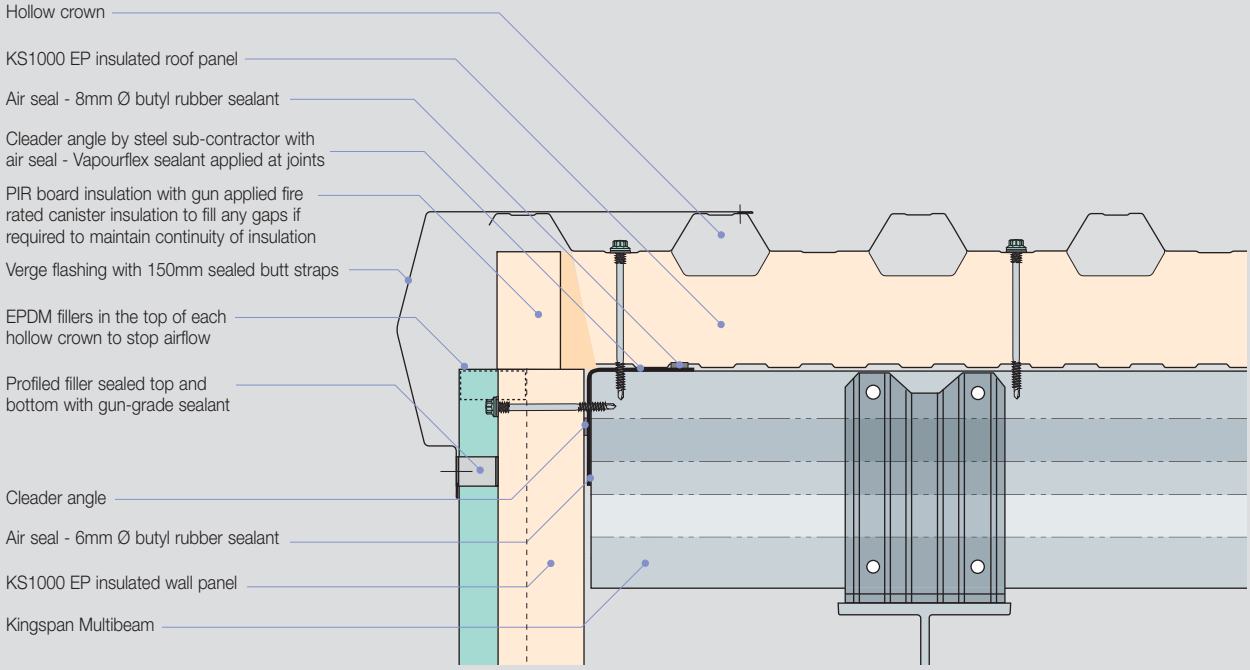
Corner Detail



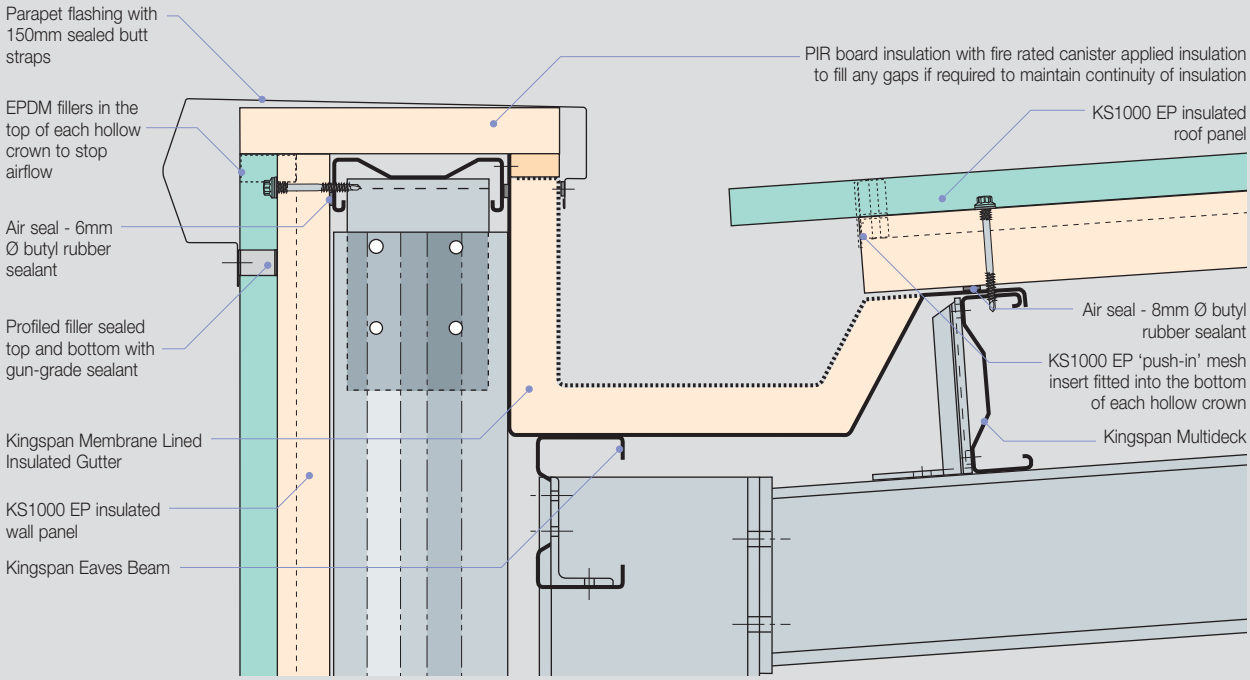
Note: Project specific construction details must be used. Please contact Kingspan **enviro***care*® Technical Services for further information.

Verge Detail

Wall Cladding (Start of Roof Panel)



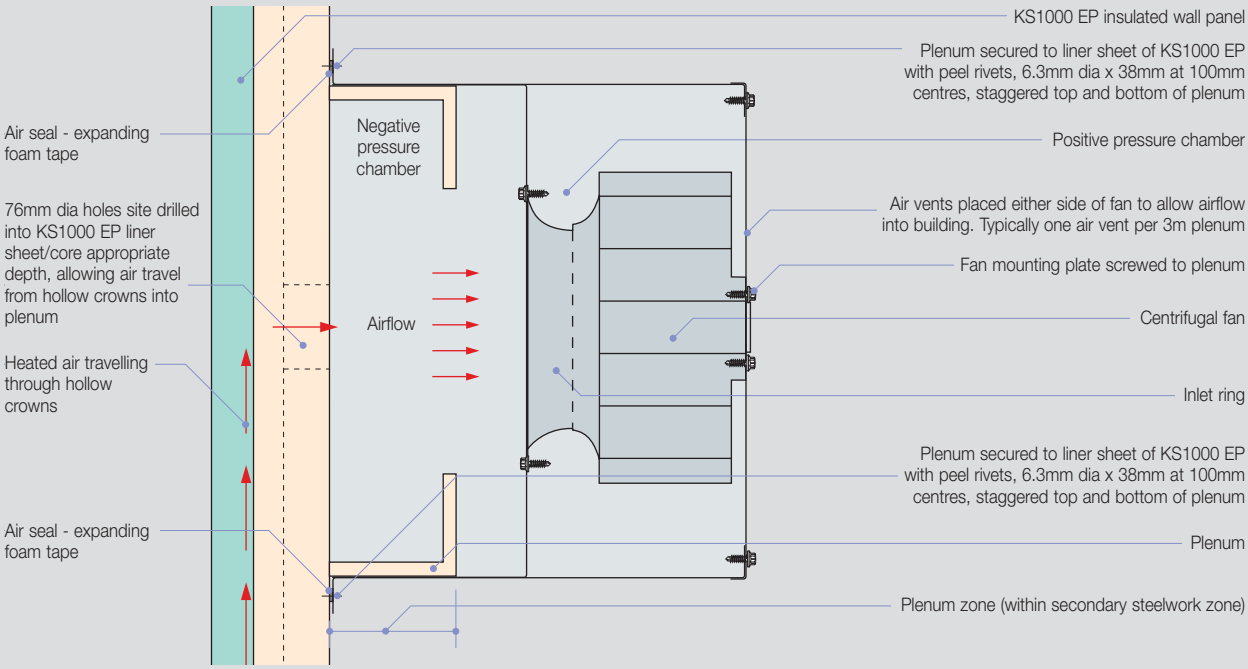
Boundary Wall Gutter Detail



Note: Project specific construction details must be used. Please contact Kingspan **enviro***care*® Technical Services for further information.

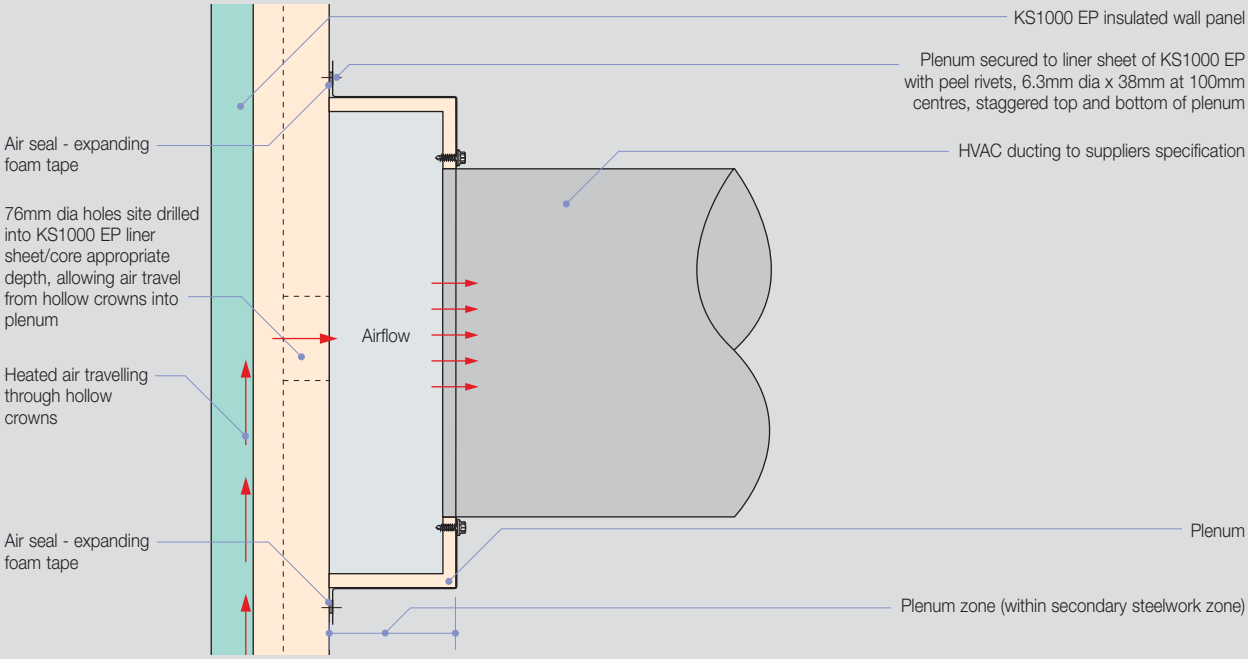
Plenum Details

Standalone Solar Air Heating System



Note: Plenum depth within purlin zone with suitable clearance from rafter face. Also positioning of struts to be considered with respect to plenum location

Integrated Solar Air Heating System

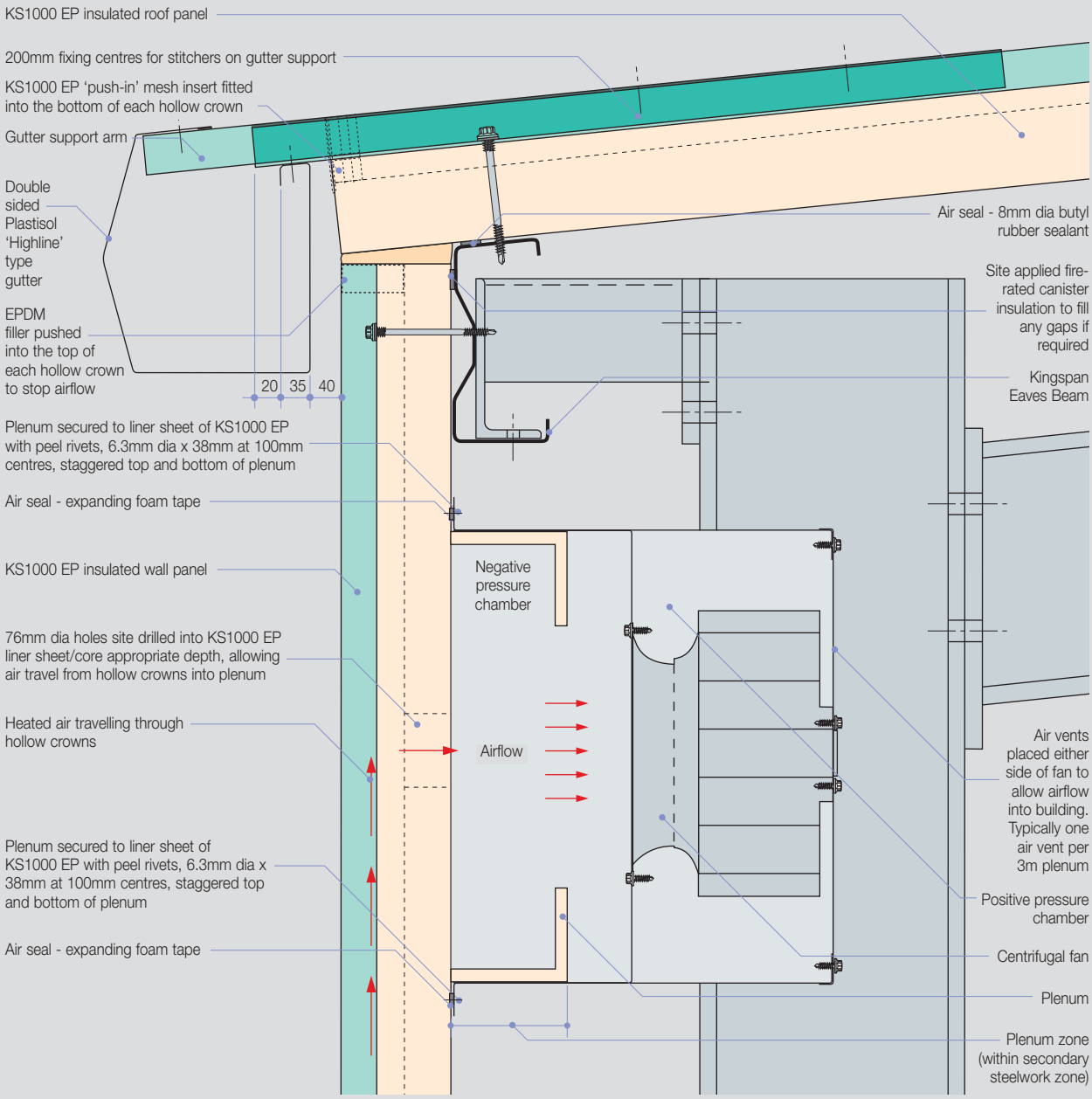


Note: Plenum depth within purlin zone with suitable clearance from rafter face. Also positioning of struts to be considered with respect to plenum location

Note: Project specific construction details must be used. Please contact Kingspan **enviro***care*® Technical Services for further information.

Eaves Detail

External Gutter

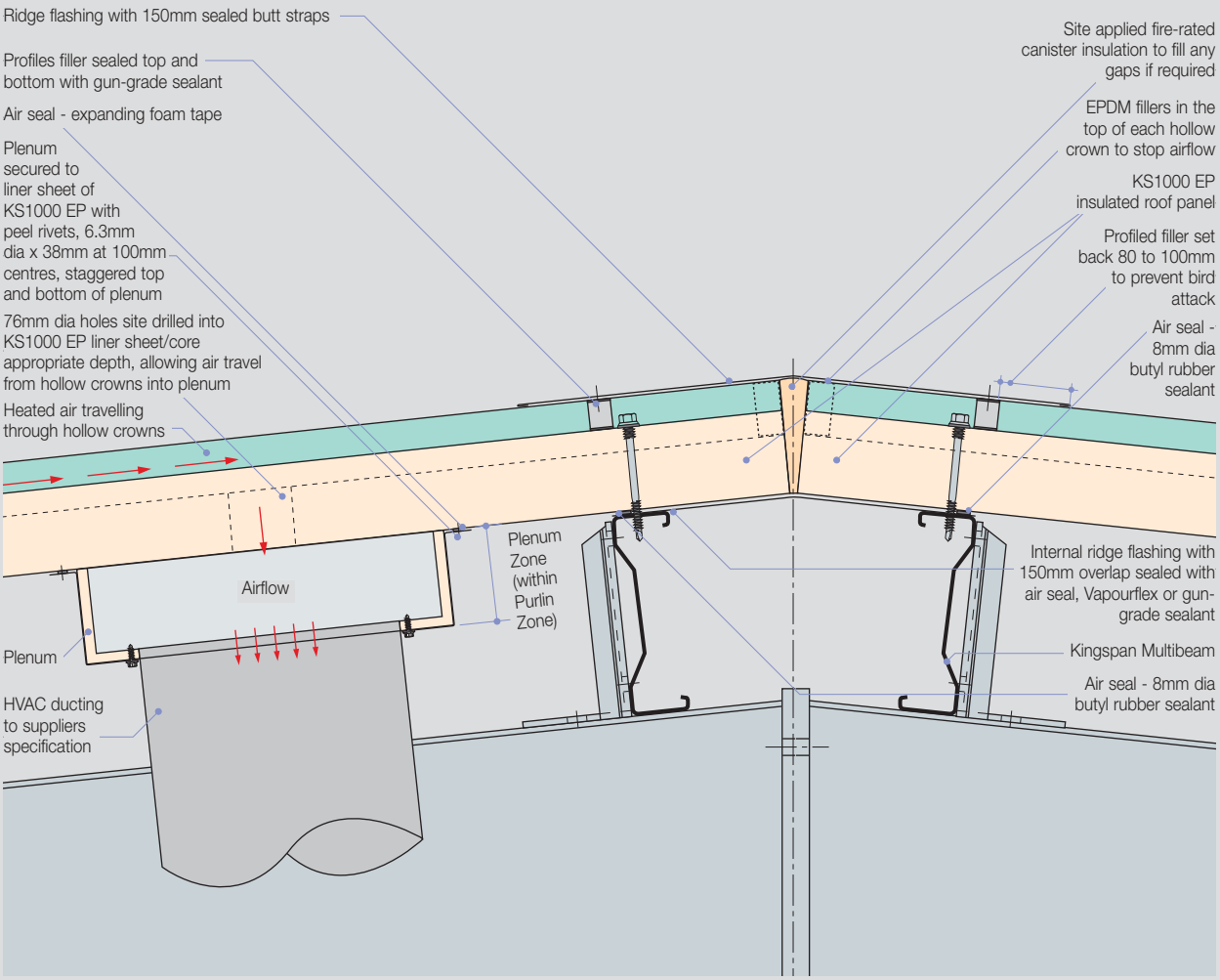


Note: Detail shown with Standalone Solar Air Heating System option.

Note: Project specific construction details must be used. Please contact Kingspan **enviro***care*® Technical Services for further information.

Ridge Detail

Standard Ridge



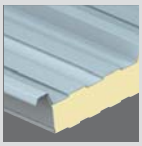
Note: Plenum depth within purlin zone with suitable clearance from rafter face. Also positioning of struts to be considered with respect to plenum location. Detail shown with Integrated Solar Air Heating System option.

Note: Project specific construction details must be used. Please contact Kingspan **enviro***care*® Technical Services for further information.

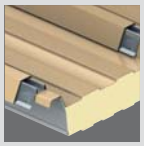
Kingspan Insulated Roof, Wall & Façade Systems

Roof Systems

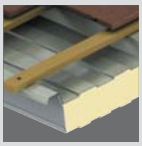
KS1000/2000 RW Trapezoidal



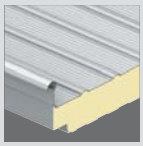
KS1000 SF Secret Fix



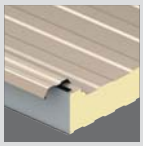
KS1000 TS Slate & Tile Support



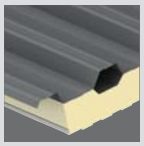
KS500/1000 ZIP Kingzip® Standing Seam



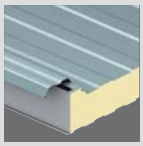
KS1000 LP Lo-Pitch



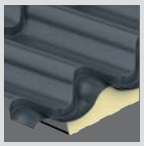
Kingspan EnergiPanel™



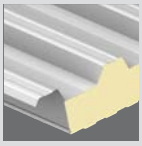
KS1000 CR Curved Roof



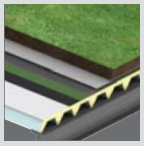
Kingspan Roof Tile



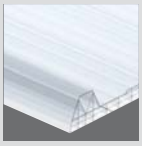
KS1000 FC Box Profile



Kingspan Envirodek®

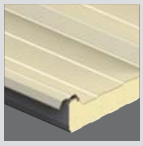


Kingspan Polycarb Rooflight

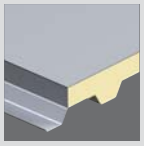


Kingspan Upstand Rooflight

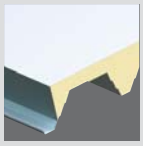
KS1000 DR/DRC Trapezoidal



KS1000 TD Topdek

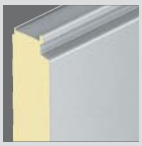


KS1000 Topspan

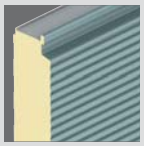


Wall & Façade Systems

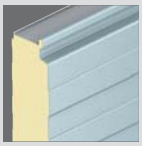
KS600, 900 & 1000 Optimo™



KS600, 900 & 1000 MR Micro-Rib

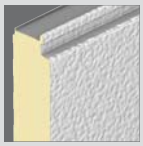


KS600, 900 & 1000 EB Euro-Box

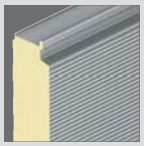


KS600, 900 & 1000 FL Flat

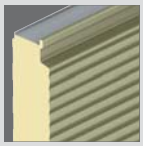
KS600, 900 & 1000 FL-S Stucco



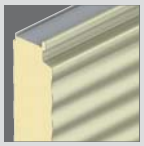
KS600, 900 & 1000 MM Mini-Micro



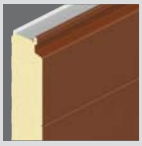
KS600, 900 & 1000 CX Convex



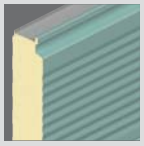
KS600, 900 & 1000 WV Wave



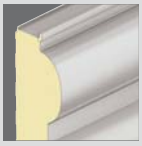
KS600, 900 & 1000 PL Plank



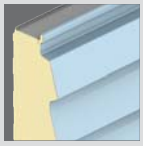
KS1000 TL Tramline



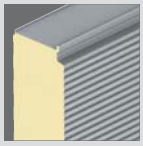
KS1000 CW CurveWall



KS1000 LV Louvre

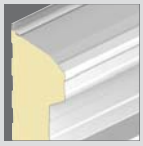


KS600, 900 & 1000 LS Longspan™

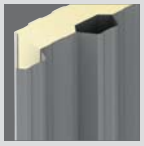


KS1000/2000 RW Trapezoidal

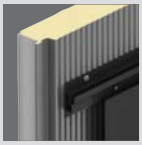
KS1000 FC Box Profile



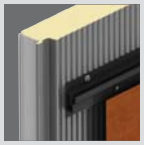
Kingspan EnergiPanel™



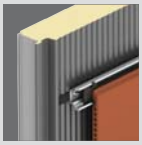
Kingspan Thermastone



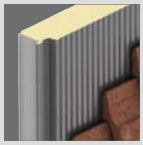
Kingspan WoodTherm®



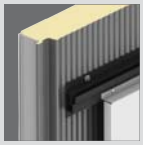
Kingspan Thermatile



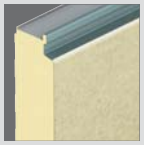
Kingspan Thermabrick™



Kingspan Thermatallic™

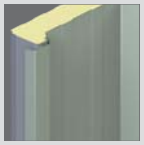


Kingspan Render Panel



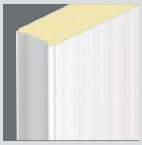
Kingspan Wall-Lite

KS1000 DR Trapezoidal

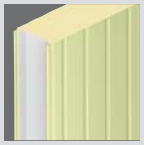


Controlled Environment Systems

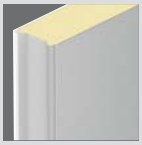
KS1100 CS Equi-Bead



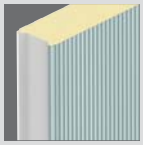
KS1100 CS Mini-Bead



KS1100 CS Flat

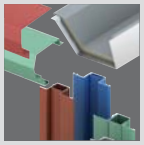


KS1100 CS Micro-Rib



Ancillaries

Gutters, Tophats & Flashings



Kingspan Limited

UK: Telephone: +44 (0) 1352 716100 Fax: +44 (0) 1352 710161 Email: info@kingspanpanels.com
Ireland: Telephone: +353 (0) 42 96 98500 Fax: +353 (0) 42 96 98572 Email: sales.ire@kingspanpanels.com

Details for the following countries; Australia, Belgium, Czech Republic, France, Germany, Hungary, Netherlands, New Zealand, Norway, Poland, Romania, Slovakia & Sweden can be found by visiting our website **www.kingspanpanels.com** or our group website **www.kingspan.com**