

Insulated Panel Systems
UK & Republic of Ireland

Protected by



Slate & Tile Support Insulated Roof Panel System

Can Support Slate, Ceramic or Solar Tiles, using the Innovative Nulok Batten, Link Channel and Clip System



Slate & Tile Support Insulated Roof Panel System

High performance roofing system which can support slate, ceramic or solar tiles, using the innovative Nulok batten, link channel and clip system.



Kingspan KS1000 TS Slate & Tile Support roof panel, featuring innovative Nulok.

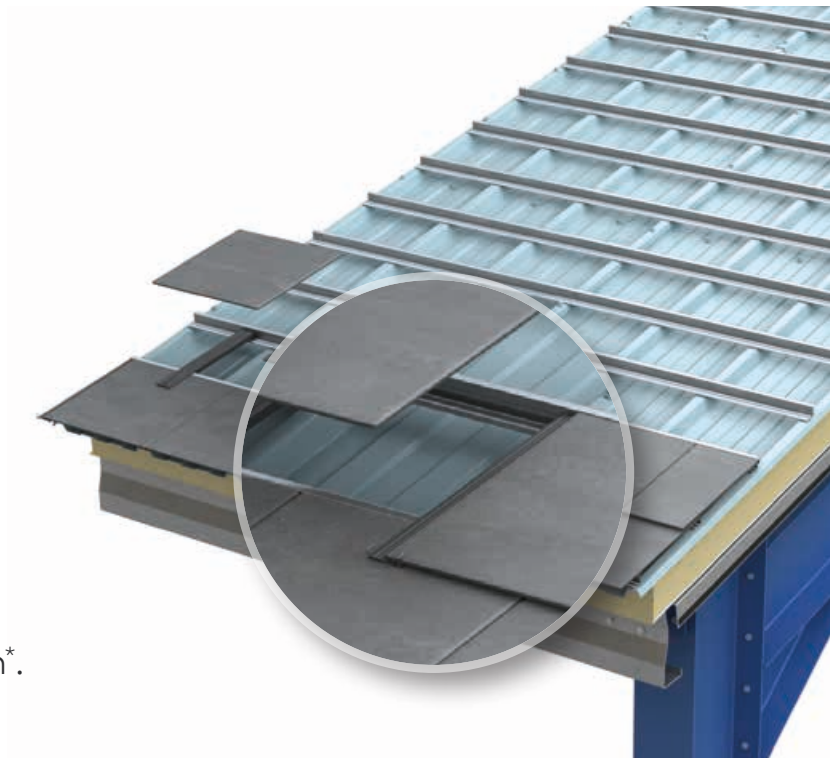
Slate & Tile Support is an advanced insulated roof panel system designed to support either slates or tiles. The system provides all of the advantages of insulated panel technology with the aesthetic appeal of a traditional vernacular roof finish.

The Nulok Fixing System offers a straightforward, efficient method of installing Natural Slate, Nulok Solar Inserts and Ceramic Tiles.



This system provides all of the advantages of insulated panel technology with the aesthetic appeal of a traditional vernacular roof finish.

The minimum pitch of the system is 4° after deflection*.



* Roof pitches 4° to 10° subject to technical review and / or testing.



A Modern Take on the Traditional Vernacular Roof

Advanced Roofing Technology

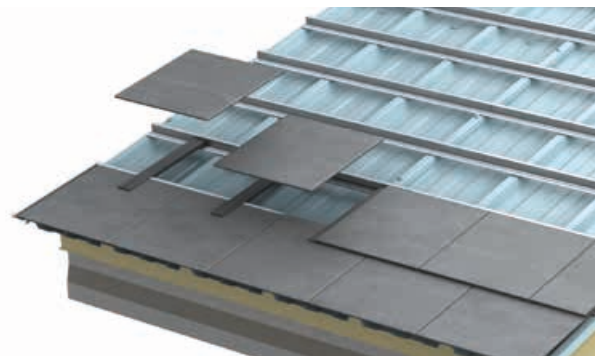
The Slate & Tile Support panel is an advanced insulated panel that has been designed to support either slate or tiles. The insulated panel provides U-Values as low as $0.14\text{W/m}^2\text{K}$ as a single component, factory-manufactured roof panel. The system combines the roof panel with the battens, channels and clip components for a swift and efficient fixing of slate, ceramic, or solar tiles to complete a more traditional, vernacular aesthetic.

Swift Weather-tight Envelope

Once installed the envelope is fully weather-tight, allowing internal fit-out to commence, and creates a ready platform for the chosen slate or tile system to be installed.

Cost & Time Efficient

This Slate & Tile Support panel has been demonstrated to save time and costs when compared to a traditional cold roof system (MMMF insulation at the joists, timber trusses, felt, battens and slate).



High Performance Roofing

Factory Engineered, Quality, Single Component Panel

Building with insulated sandwich panels instead of traditional building methods for the roof and facade has important advantages. The insulation core, consisting of high-quality rigid foam with a closed cell structure, is factory-foamed between two steel plates in an optimally controlled environment. These steel faces are finished both on the outside and the inside with a coating of your choice depending on the desired application of the building (climate, agricultural environments, etc.). The result is a simple and quick to place end product; directly finished on both the outside and inside of the building. The exterior face of the panel provides an ideal platform for the installation of the link channels and battens to create a tile or slate finish, without compromising the thermal or structural performance of the panel.

Thermal Performance

The insulated panels from Kingspan have a highly insulating closed cell structure within the foam core. The unique composition of the panels guarantees a superior thermal efficiency, both in warm and cold climates compared to traditional multi-layered constructions, build layer by layer on site. The panels are mounted on the outside of the building and form a thermal shell that not only reduces temperature loss from the inside, but also prevents temperature increase from the outside. The closed cell structure of the insulation material prevents the ingress of moisture.

Protected Performance

The KS1000TS Kingspan Slate & Tile Support Roof System can be protected for its thermal and structural performance for a period of up to 25 years – to find out more about this, please speak to your Area Sales Manager.



Supported by our end-to-end design and installation services

As the manufacturer of the complete roof system including all components, we're with you all the way with services to help save time and maximise project value and performance.



Technical Services

Our technical engineers are a key part of our design and development process, providing a wide range of technical support and working with customers on an individual project basis to ensure that the correct products are specified and ordered.

UK

Tel: +44 (0) 1944 712000

Email: safety@kingspanpanels.com

Ireland

Tel: +353 (0) 42 96 98529

Email: technicalkc@kingspan.net

Field Service & Training

We recognise that customer staff training is key to maximising the performance of our products, there we provide extensive installation training on each of our personal and collective fall protection systems.

Area Sales Managers

To find your nearest area sales manager, simply visit:
www.kingspanpanels.co.uk/asm

Quotes

To receive a quote and expected lead times for your project requirements, please call one of our team on:

UK

Tel: +44 (0) 1944 712444

Email: safety@kingspanpanels.com

Ireland

Tel: +353 (0) 42 96 98555

Email: quotationskc@kingspan.net



KS1000/2000 TS/Nulok

Product Data

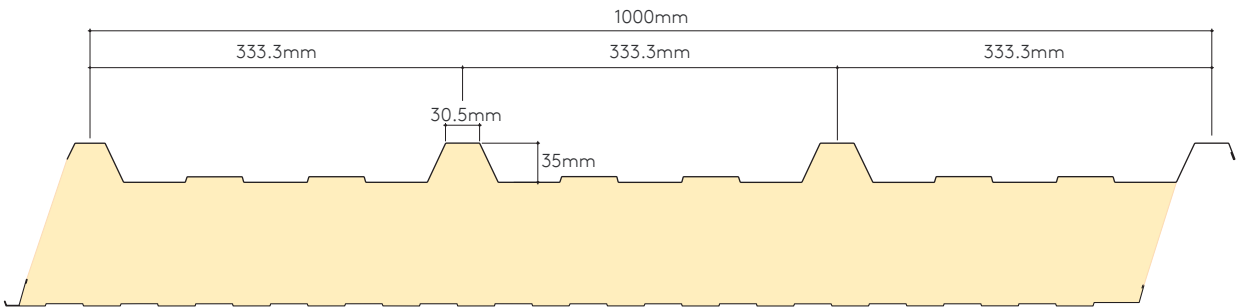
Applications

The KS1000/2000 TS is an advanced insulated roof panel roof that has been designed to work in conjunction with the Nulok tile roofing system. This system provides all of the advantages of insulated panel technology with the aesthetic appeal of a traditional vernacular roof finish. The minimum pitch of the system is 5.

Available Lengths

Standard Lengths	1.8 – 14.5m
Longer Lengths (non-standard)	14.5 – 29.3m
Shorter Lengths (non-standard)	Below 1.8m

Note: Additional costs and transport restrictions may apply for non-standard lengths. All lengths may change for export (outside of the UK).
* Maximum length is 18.3m for a 2 metre panel.



Dimensions, Weight & Thermal Performance

Core Thickness (mm)	40	53	60	73	80	100	115	120	137	150
U-value (W/m²K)	0.46	0.38	0.35	0.28	0.25	0.20	0.18	0.16	0.15	0.14
Weight (kg/m²) 0.5/0.4 steel	9.9	10.4	10.7	11.2	11.5	12.3	12.8	13.1	13.7	14.2

The KS1000/2000 TS insulated roof panels have a Thermal Transmittance (U value), calculated using the method required by the Building Regulations Part L2 (England & Wales) and Building Standards Section 6 (Scotland).

Insulation Core

KS1000/2000 TS insulated roof panels are manufactured with an ECOsafe and FIREsafe polyisocyanurate (PIR) core.



Fire

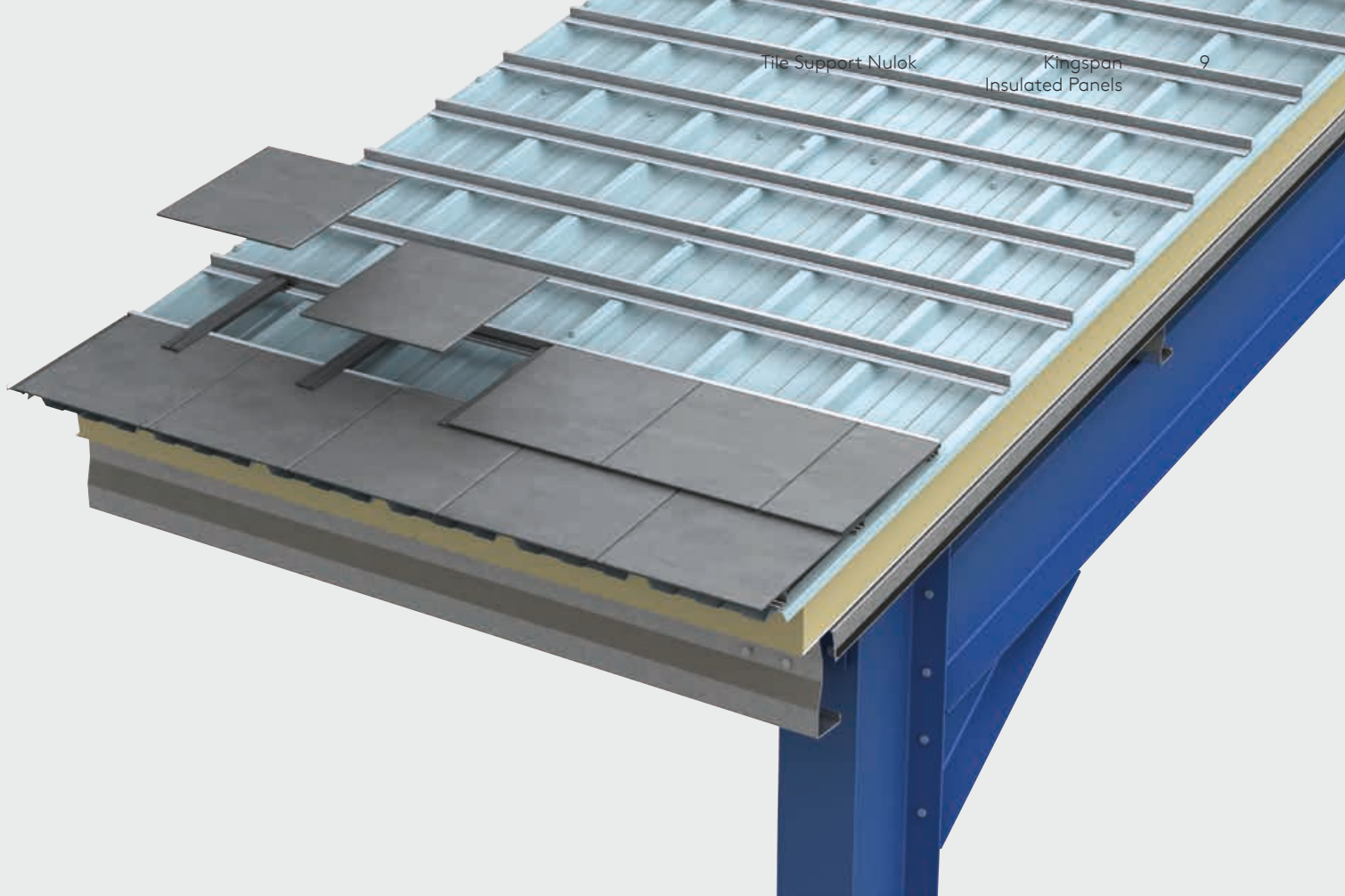
The external and internal faces of the panel to be Class 0 in accordance with the Building Regulations when tested to BS 476: Part 6: 2009 and Part 7: 1997. The panel is rated SAA when tested to BS 476: Part 3: 2004.

This FIREsafe system has passed all the requirements of LPS1181: 2014: Part 1: issue 1.2, Series of fire growth tests for LPCB approval and is certified to LPS1181 Grade EXT-B*. Reaction to fire classification according to BS EN 13501-1:2007+A1:2009: B-s1,d0.

* LPCB is limited to a maximum tile weight of 54 kg/m².



LPS 1181 : Issue 1.2
Cert No: 260a & 186a



Environmental

Kingspan Insulated Panels produced in the UK are certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Very Good'. Kingspan Insulated Panels directly contribute to BREEAM/LEED credits.

Air Leakage

An air leakage rate of $3\text{m}^3/\text{hr}/\text{m}^2$ at 50Pa or less can be achieved when using Kingspan insulated roof and wall panels.

Acoustic

Sound Reduction Index (SRI)

Hz*	63	125	250	500	1K	2K	4K	5K
SRI (dB)	24	21	27	41	48	50	63	68

* Frequency

The KS1000/2000 TS insulated roof panel with the Nulok system has a predicted single figure weighted sound reduction of $R_w = 41\text{dB}$

Biological

Kingspan panels are normally immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are not considered deleterious.

Materials

Substrate

- Kingspan XL Forté, Kingspan Spectrum, Kingspan AQUAsafe, Kingspan AQUAsafe 55 and Kingspan CLEANsafe: Metallic protected steel to BS EN 10346:2015, thickness 0.5mm.
- CLEANsafe 15: Metallic protected steel to BS EN10346:2015, thickness 0.4mm
- Stainless Steel: Austenitic Grade 316 stainless steel to BS EN 10088: Part 2: 2005, thickness 0.4mm.

Coatings - External Weather Sheet

- Kingspan XL Forté: Consists of a multi-layer organic coating, embossed with a traditional leather-grain finish.
- Kingspan Spectrum: Consists of a coated semi-gloss finish with slight granular effect.

Coatings – Internal Liner Sheet

- Kingspan CLEANsafe 15: The coating has been developed for use as the internal lining of insulated panels. Standard colour is "bright white" with an easily cleaned surface.
- Kingspan AQUAsafe: The coating has been developed for use as the internal lining of insulated panels to suit high humidity internal environments.
- Kingspan AQUAsafe 55: The coating has been developed for use as the internal lining of insulated panels to swimming pool internal environments.
- Kingspan CLEANsafe 120: The coating has been developed for use as the internal lining of insulated panels where a high level of cleanliness and hygiene is required, and the panels are to be cleaned down on a regular basis.
- Stainless Steel: The stainless steel liner has been developed for use as the internal lining of insulated panels in buildings with a very aggressive/corrosive internal environment.

KS1000/2000 TS/Nulok

Product Data

Panel End Cut Back

Standard Cut Back Eaves	75mm
Standard Cut Back Endlap	150mm
Minimum Cut Back	20mm
Maximum Cut Back	300mm

Product Tolerance

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

Handing

The KS1000/2000 TS insulated roof panel can be manufactured in both left to right handed (LH) and right to left handed (RH).

Seals

Factory applied side & end lap weather seals.

Panel Quality & Durability

KS1000/2000 TS insulated roof panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with BS EN ISO 9001 standard, ensuring long term reliability and service life. The panels are also being manufactured under Environmental Management System Certification BS EN ISO 14001. Compliant to BS OHSAS 18001 Occupational Health and Safety.



Guarantee

The Kingspan Panel Protection Warranty covers the structural and thermal performance of the panels for up to 25 years. Additionally a 25-year System Warranty is available covering the integration of the panel, fixings, and Nulok components together.

Packing

KS1000 TS insulated roof panels are stacked weather sheet to weather sheet (to minimise pack height). The top, bottom, sides and ends are protected with foam and timber packing and the entire pack is wrapped in plastic.

Core Thickness (mm)	40	50	60	70-80	100-120	137-150
No. of Panels in Pack	17	15	13	11	7	6

Note: Applies to UK pack sizes. Please contact Kingspan Technical Services for export information.

Sea Freight

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

Delivery

All deliveries (unless indicated otherwise) are by road transport to project site. Off-loading is the responsibility of the client.

Site Installation Procedure

Site assembly instructions are available from Kingspan Technical Services.

Structural Tables

Unfactored load/span table (use unfactored calculated design wind load values).

Tile Weight: Up to 15kg/m² (0.15kN/m²)

Single Span

Core Thickness (mm)	Load Type	Uniformly Distributed Loads kN/m ² Span in metres							
		1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
40	Downwards	4.54	3.88	3.38	2.89	2.39	1.90	1.66	1.41
	Suction	5.17	4.59	4.26	3.98	3.67	3.36	3.13	2.90
50	Downwards	5.22	4.55	4.00	3.45	2.90	2.35	2.07	1.79
	Suction	5.92	5.32	4.99	4.67	4.34	4.01	3.72	3.42
60	Downwards	5.86	5.16	4.57	3.98	3.39	2.79	2.48	2.17
	Suction	6.63	6.02	5.67	5.33	4.98	4.64	4.29	3.95
70	Downwards	6.43	5.72	5.09	4.46	3.82	3.19	2.85	2.51
	Suction	7.32	6.71	6.35	5.99	5.64	5.28	4.88	4.48
80	Downwards	7.00	6.27	5.60	4.94	4.27	3.60	3.23	2.86
	Suction	7.98	7.36	6.99	6.63	6.26	5.89	5.44	5.00
100	Downwards	8.01	7.24	6.51	5.79	5.06	4.33	3.91	3.50
	Suction	8.96	8.35	7.86	7.38	6.89	6.41	6.02	5.63

Double Span

Core Thickness (mm)	Load Type	Uniformly Distributed Loads kN/m ² Span in metres							
		1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
40	Downwards	4.11	3.38	3.06	2.75	2.42	2.11	1.93	1.76
	Suction	4.69	3.96	3.64	3.32	3.00	2.68	2.51	2.34
50	Downwards	4.34	3.60	3.26	2.94	2.60	2.27	2.09	1.91
	Suction	4.96	4.22	3.88	3.56	3.25	2.89	2.71	2.53
60	Downwards	4.56	3.88	3.45	3.11	2.76	2.42	2.23	2.04
	Suction	5.20	4.44	4.10	3.77	3.42	3.08	2.89	2.70
70	Downwards	4.74	3.96	3.61	3.25	2.90	2.54	2.34	2.15
	Suction	5.44	4.67	4.32	3.97	3.62	3.27	3.07	2.88
80	Downwards	4.92	4.13	3.76	3.40	3.03	2.67	2.46	2.26
	Suction	5.60	4.87	4.51	4.15	3.79	3.43	3.23	3.03
100	Downwards	5.23	4.42	4.04	3.66	3.28	2.89	2.67	2.46
	Suction	5.75	4.96	4.59	4.23	3.86	3.50	3.29	3.09

Notes:

- Values have been calculated using the method described in BS EN 14509: 2013, for medium and light coloured panels.
- For each value individual and combined load cases with appropriate load factors and temperatures have been considered.
- The Table is for medium and light coloured panels, as recommended by Kingspan for roofs.
- The following deflection limits have been used: Downward loading L/200 – Suction loading L/150
- For intermediate values linear interpolation may be used.
- The actual wind suction load resisted by the panel is dependent on the number of fasteners used and the material of the purlin. The fastener calculation should be carried out in accordance with the appropriate standard. For further advice please contact Kingspan Technical Services.
- The allowable steelwork tolerance between bearing planes of adjacent purlins is ± 5 mm. For panel span for the 115mm, 120mm, 137mm and 150mm thick KS1000 TS insulated roof panels, please contact Kingspan Technical Services on 0800 587 0090.

KS1000/2000 TS/Nulok

Product Data

Structural Tables

Unfactored load/span table (use unfactored calculated design wind load values).

Tile Weight: Up to 45kg/m² (0.45kN/m²)

Single Span

Core Thickness (mm)	Load Type	Uniformly Distributed Loads kN/m ² Span in metres							
		1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
40	Downwards	3.91	3.23	2.65	2.09	1.62	1.16	0.89	0.61
	Suction	5.33	4.79	4.45	4.11	3.81	3.52	3.26	2.99
50	Downwards	4.54	3.81	3.18	2.56	2.04	1.52	1.29	0.89
	Suction	6.08	5.53	5.17	4.82	4.50	4.18	3.92	3.50
60	Downwards	5.13	4.37	3.69	3.02	2.45	1.88	1.53	1.18
	Suction	6.79	6.23	5.85	5.48	5.14	4.81	4.41	4.01
70	Downwards	5.66	4.87	4.15	3.43	2.82	2.21	1.82	1.44
	Suction	7.48	6.92	6.53	6.15	5.80	5.45	4.99	4.54
80	Downwards	6.19	5.38	4.61	3.85	3.20	2.56	2.14	1.73
	Suction	8.14	7.57	7.17	6.78	6.42	6.06	5.56	5.07
100	Downwards	7.14	6.27	5.44	4.60	3.89	3.18	2.71	2.25
	Suction	9.91	8.35	7.71	7.07	6.52	5.98	5.62	5.27

Double Span

Core Thickness (mm)	Load Type	Uniformly Distributed Loads kN/m ² Span in metres							
		1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
40	Downwards	3.62	2.97	2.62	2.27	1.97	1.67	1.48	1.92
	Suction	4.86	4.21	3.84	3.48	3.17	2.87	2.67	2.48
50	Downwards	3.84	3.17	2.80	2.44	2.12	1.81	1.61	1.42
	Suction	5.14	4.47	4.09	3.72	3.40	3.09	2.88	2.63
60	Downwards	4.04	3.35	2.97	2.59	2.26	1.94	1.73	1.53
	Suction	5.38	4.70	4.32	3.94	3.61	3.29	3.07	2.86
70	Downwards	4.21	3.51	3.11	2.72	2.38	2.05	1.83	1.62
	Suction	5.62	4.93	4.54	4.15	3.81	3.48	3.26	3.04
80	Downwards	4.38	3.66	3.26	2.85	2.51	2.16	1.94	1.72
	Suction	5.83	5.13	4.73	4.33	3.99	3.65	3.42	3.20
100	Downwards	4.67	3.93	3.51	3.09	2.72	2.36	2.12	1.88
	Suction	5.66	4.96	4.56	4.17	3.83	3.50	3.28	3.06

Notes:

1. Values have been calculated using the method described in BS EN 14509: 2013, for medium and light coloured panels.
2. For each value individual and combined load cases with appropriate load factors and temperatures have been considered.
3. The Table is for medium and light coloured panels, as recommended by Kingspan for roofs.
4. The following deflection limits have been used: Downward loading L/200 – Suction loading L/150
5. For intermediate values linear interpolation may be used.
6. The actual wind suction load resisted by the panel is dependent on the number of fasteners used and the material of the purlin. The fastener calculation should be carried out in accordance with the appropriate standard. For further advice please contact Kingspan Technical Services.
7. The allowable steelwork tolerance between bearing planes of adjacent purlins is $\pm 5\text{mm}$. For panel span for the 115mm, 120mm, 137mm and 150mm thick KS1000 TS insulated roof panels, please contact Kingspan Technical Services on 0800 587 0090.

Structural Tables

Unfactored load/span table (use unfactored calculated design wind load values).

Tile Weight: Up to 90kg/m² (0.90kN/m²)

Single Span

Core Thickness (mm)	Load Type	Uniformly Distributed Loads kN/m ² Span in metres							
		1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
40	Downwards	4.59	3.38	3.02	2.22	1.57	0.93	–	–
	Suction	6.47	5.76	5.27	4.79	4.43	4.07	–	–
50	Downwards	5.21	4.40	3.55	2.71	1.99	1.28	–	–
	Suction	7.25	6.53	6.03	5.53	5.15	4.78	–	–
60	Downwards	5.79	4.96	4.06	3.17	2.39	1.62	–	–
	Suction	7.98	7.25	6.74	6.23	5.84	5.45	–	–
70	Downwards	6.33	5.48	4.54	3.60	2.77	1.94	–	–
	Suction	8.68	7.95	7.43	6.92	6.52	6.12	–	–
80	Downwards	6.86	5.99	5.01	4.04	3.16	2.28	1.64	2.86
	Suction	9.34	8.61	8.09	7.57	7.16	6.75	6.40	5.00
100	Downwards	7.81	9.92	5.86	4.81	3.85	2.89	2.18	3.50
	Suction	10.09	9.38	8.86	8.35	7.66	6.98	6.48	5.63

Double Span

Core Thickness (mm)	Load Type	Uniformly Distributed Loads kN/m ² Span in metres							
		1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
40	Downwards	4.44	3.52	2.94	2.36	1.97	1.58	–	–
	Suction	6.27	5.36	4.78	4.24	3.82	3.43	–	–
50	Downwards	4.67	3.73	3.13	2.53	2.12	1.72	–	–
	Suction	6.58	5.65	5.06	4.47	4.07	3.67	–	–
60	Downwards	4.89	3.92	3.30	2.69	2.26	1.84	–	–
	Suction	6.85	5.90	5.30	4.70	4.29	3.88	–	–
70	Downwards	5.08	4.09	3.45	2.82	2.38	1.95	–	–
	Suction	7.10	6.15	5.54	4.93	4.51	4.09	–	–
80	Downwards	5.26	4.26	3.61	2.96	2.51	2.06	1.73	1.40
	Suction	7.33	6.36	5.74	5.13	4.70	4.27	3.96	3.65
100	Downwards	5.58	4.55	3.87	3.20	2.73	2.26	1.91	1.56
	Suction	7.16	6.20	5.58	4.96	4.54	4.12	3.81	3.50

Notes:

- Values have been calculated using the method described in BS EN 14509: 2013, for medium and light coloured panels.
- For each value individual and combined load cases with appropriate load factors and temperatures have been considered.
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- The allowable steelwork tolerance between bearing planes of adjacent purlins is ± 5 mm. For panel span for the 115mm, 120mm, 137mm and 150mm thick KS1000 TS insulated roof panels, please contact Kingspan Technical Services on 0800 587 0090.

Nulok

Component Specification

Nulok Vitrified Ceramic Slates

- I.S. EN 1304: 1998 Clay Roofing Tiles for discontinuous laying – Product definitions and specification and Class B1 to I.S. EN 87: 1991 Ceramic floor and wall tiles – Definitions, classification, characteristics and marking
- Dimensions 400 mm long x 400 mm wide x 8.5mm thick
- Water absorption <0.05 % I.S. EN 99: 1992 Ceramic tiles – Determination of water absorption
- Bending strength > 45n/mm² I.S. EN 100: 1992 Ceramic tiles – Determination of modulus of rupture
- Weight/slate 3 Kg
- Total Installed Weight – 27.5 Kg/m²
- Colour Grey (other colours can be provided on request)

Tests performed on Nulok Ceramic tiles

- BS EN 538 1994 – Flexural Strength Test
- BS EN 539 1994 – Physical Characteristic Permeability Test
- BS EN 539/2 1998 – Frost Resistance Test
- BS EN 1024 1997 Geometric Test
- BS EN 1304 1998 Product Definition and Specification Test
- Water Absorption
- Resistance to indirect traction by means of bending
- Resistance to indirect traction by means of bending after freezing
- Resistance to alterations caused by weather
- External Fire Exposure
- BS 476: Part 3 1958
- Wind Classification upto and including C2 (cyclonic wind test).

Nulok Natural Slate Range

For full slate and tile options, including solar panels, please contact Kingspan Technical Services on technical@kingspanpanels.com or 0800 587 0090

Nulok Fixing System

Nulok Metal Batten

- Hot dipped galvanised mild steel; DX51D+ Z275 to I.S. EN 10327:2004: Continuously hot-dip coated strip and sheet of low carbon steels for cold forming.
- Thickness 1.2 mm
- Width 48.1 mm
- Depth 24.3 mm
- Length 5400 mm

Nulok Link Channel

- AZ55 Galvalume™ steel to ASTM A792/A792M – 03 Standard Specification for steel sheet, 55% aluminium-zinc alloy – coated by the hot dip process, with 0.01 mm to 0.02 mm thick black automotive e-coating, post applied after cutting and pressing.
- Length 395 mm
- Thickness 0.8 mm

Nulok Stainless Steel Wire Spring Clip

- 1.6 mm diameter, cold drawn, chemically blackened, 316S42 stainless steel to I.S. EN 10270-3:2001 Steel wire for mechanical springs. Part 3 Stainless spring steel wire
- Tensile strength 1460 n/mm² to 1700 n/mm²

Nulok Stainless Steel Universal Spring Clip

- 2.03 mm thick, cold drawn, 316S42 stainless steel to I.S. EN 10270-3:2001
- Steel wire for mechanical springs. Part 3 Stainless spring steel wire

Test Performed on Nulok Fixing System

- AS 2050 1989 Weather Effectiveness of Roofing System Structural
 - Upwards to ultimate
 - Upwards to serviceability
 - Downwards to ultimate
 - Downwards to serviceability

Perlight Solar

Component Specification

PLM-50M-14 Series

Monocrystalline Silicon Solar Modules

- 18.6-22.3% cell efficiency
- High output and efficiency even under low light conditions
- 0-3% power tolerance
- Durable and reliable, quality tested and TUV certified
- 3 years product warranty (materials and workmanship)
- Performance warranties – 25 years 80% power output
– 12 years 90% power output

Electrical Performance

Module type		PLM-50M-14		
Power output		45	50	55
Power output tolerances	ΔP_{max} %		0-3	
Voltage at P_{max}	V_{mpp} V	7.36	7.59	7.70
Current at P_{max}	I_{mpp} A	6.12	6.59	7.15
Open-circuit voltage	V_{oc} V	9.30	9.45	9.65
Short-circuit current	I_{sc} A	6.35	6.91	7.31

STC: 1000 W/m² irradiance, 25°C cell temperature, AM 1.5g spectrum according to EN60904-3.

Thermal Characteristics

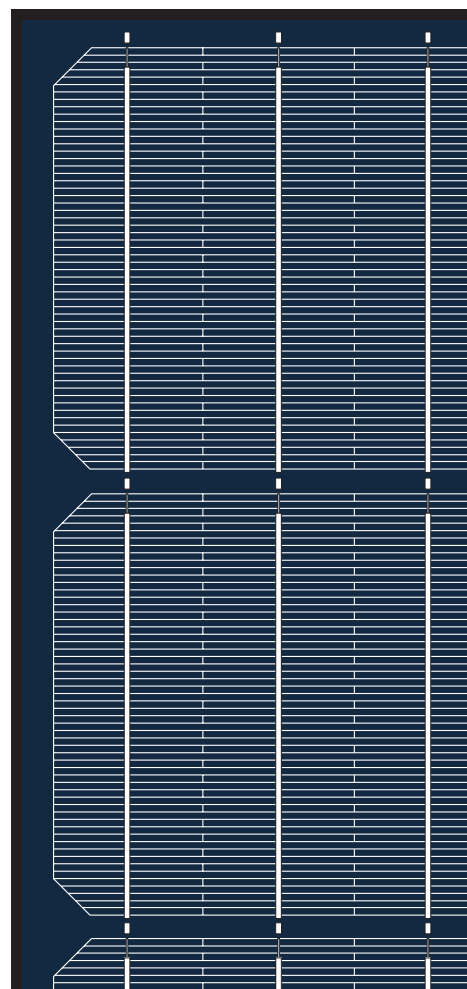
Nominal operating cell temperature	NOCT	°C	45 ±2
Temperature coefficient of P_{max}	?	% / °C	-0.45
Temperature coefficient of V_{oc}	βV_{oc}	% / °C	-0.34
Temperature coefficient of I_{sc}	αI_{sc}	% / °C	0.06
Temperature coefficient of V_{mpp}	βV_{mpp}	% / °C	-0.40

Operating Conditions

Max. System voltage	1000V _{DC}
Limiting reverse current	15A
Operating temperature range	-40°C to 85°C
Max. Static load front (e.g., snow)	5400Pa
Max. Static load back (e.g., wind)	2400Pa
Max. Hailstone impact (diameter / velocity)	25mm/23m/s

Operating Conditions

Front cover (material / thickness)	Low-iron tempered glass / 3.2mm
Backsheet (color)	Black
Cell (quantity / material / dimensions)	14 / monocrystalline silicon / 156x156mm
Frame (material / color)	None
Junction box (protection degree)	≥IP67
Cables	900mm / 4mm ² / IP67
Plug connectors	Zhejiang Jiaming Tianheyuan Photovoltaic Co., Ltd PV-JM601; Rated voltage=1000VDC; Rated current=16A; IP67
Module Dimensions (L / W / H)	1200mm x 400mm x 5.1mm
Module Weight	4.5kg



Packing Details

Container	20'GP	40'GP
Pieces per wooden case	38	38
Wooden cases per container	24	54
Pieces per container	912	2052



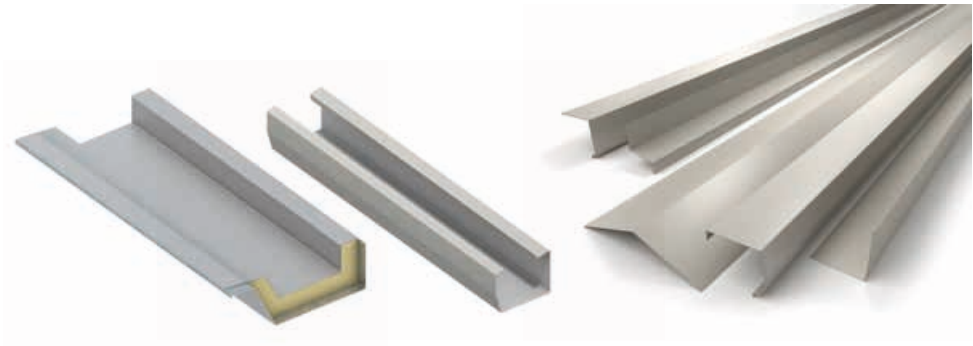
KS1000/2000 TS/Nulok

Product Compatibility

KS1000/2000 TS/Nulok is compatible with the following Kingspan products.

Product Group	Product	KS1000/2000 TS/Nulok
Fabrications	Membrane Lined Insulated Gutters	✓
	Highline Gutters	✓
	Flashings	✓
Fall Protection Systems	SafePro2	✓
	SafeSide	✓
Kingspan Energy	Photovoltaic Roof Tiles	✓
Daylighting	Day-Lite Vault	✓
	Day-Lite Kapture	✓

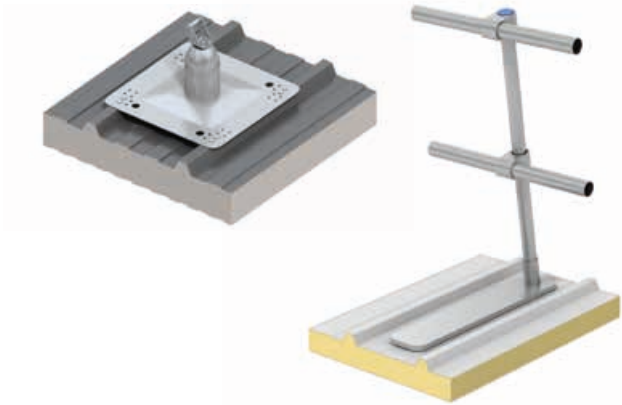
Fabrications



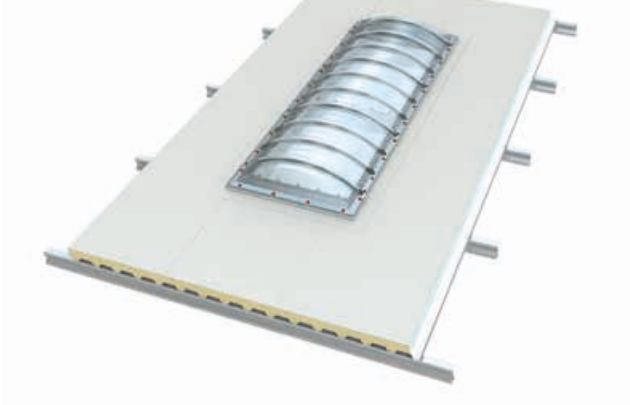
Kingspan Energy



Fall Protection Systems



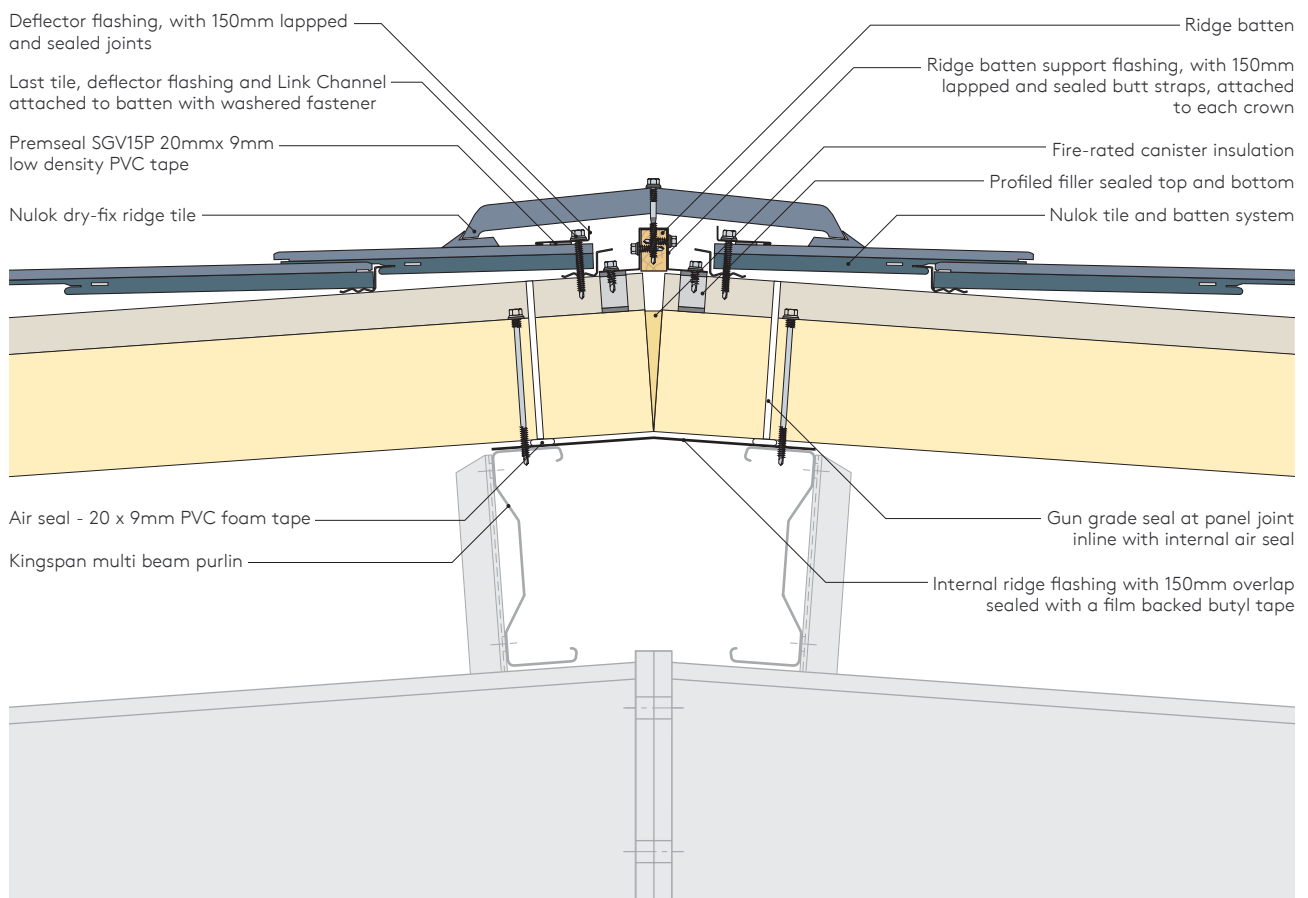
Daylighting



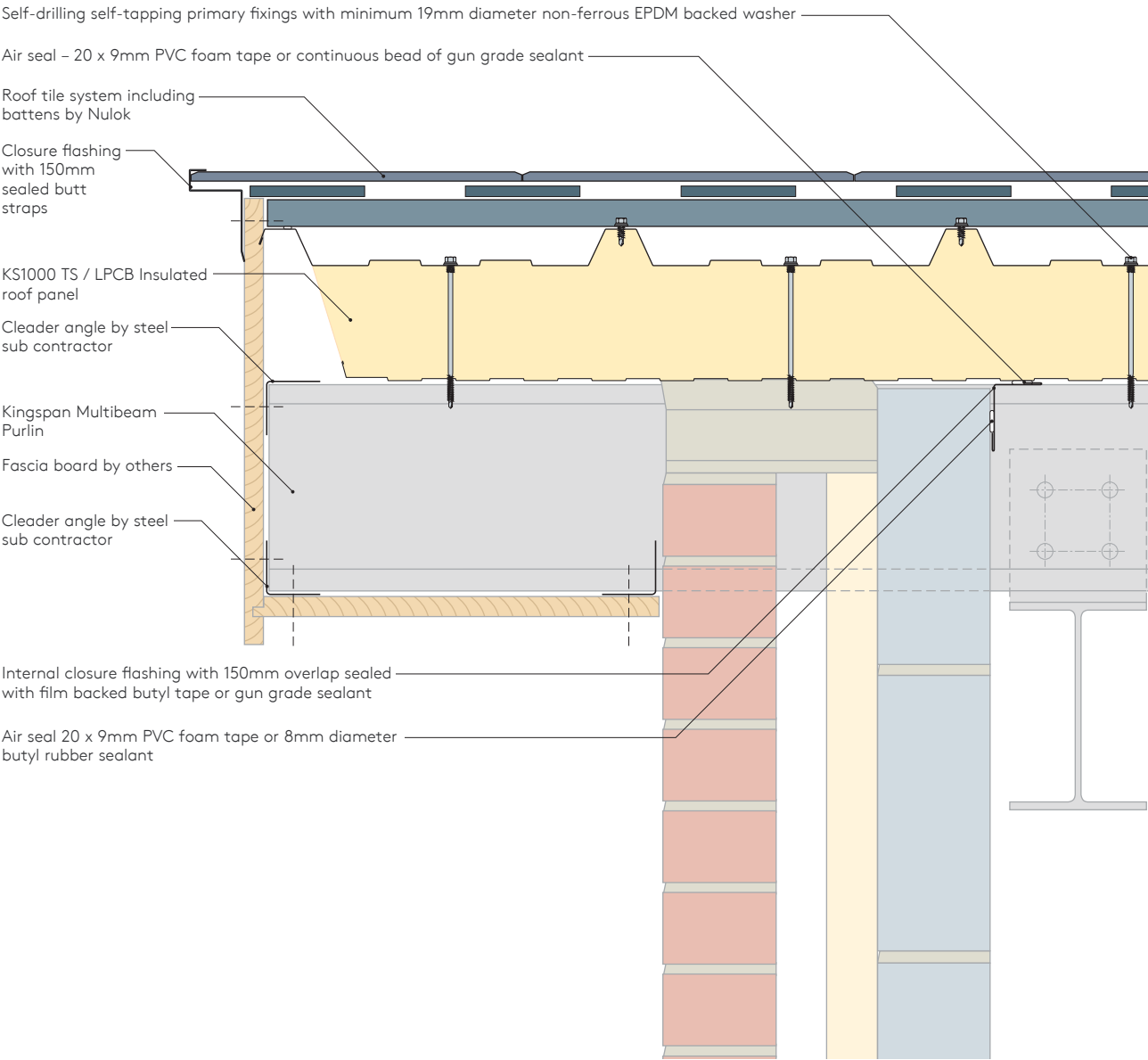
KS1000/2000 TS/Nulok

Construction Details

TS/Nulok Ridge



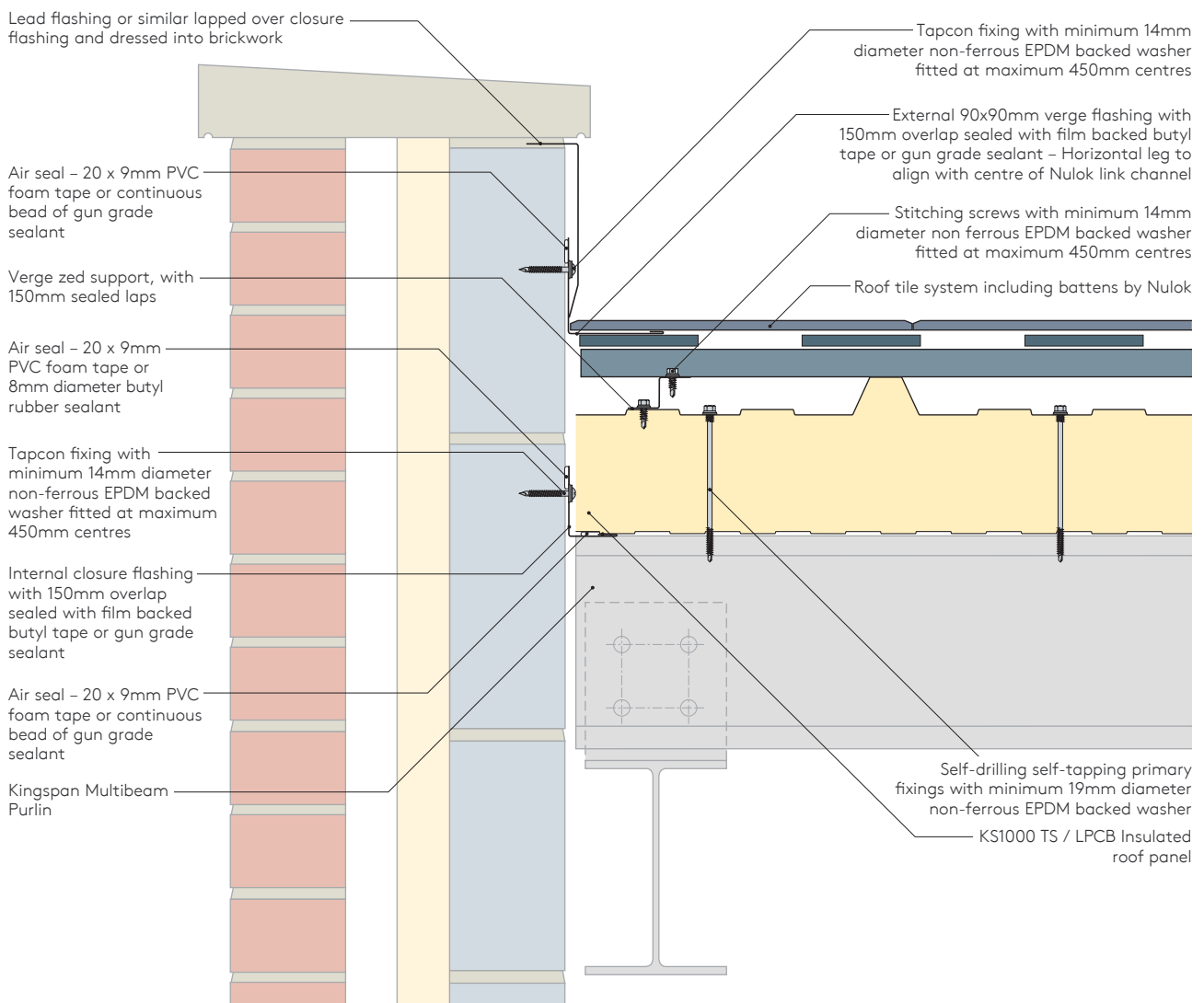
TS/Nulok Verge



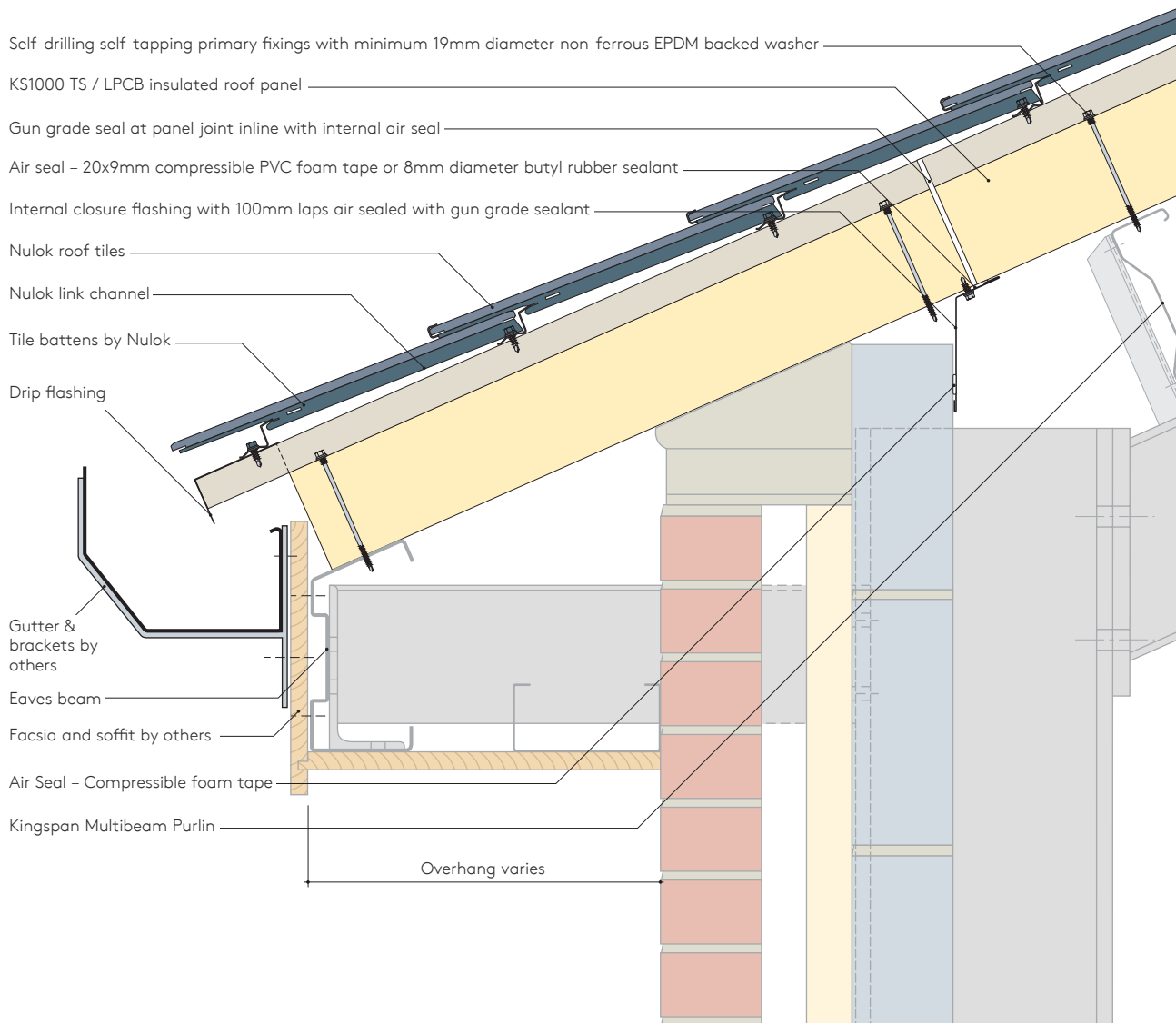
KS1000/2000 TS/Nulok

Construction Details

TS/Nulok Parapet Verge



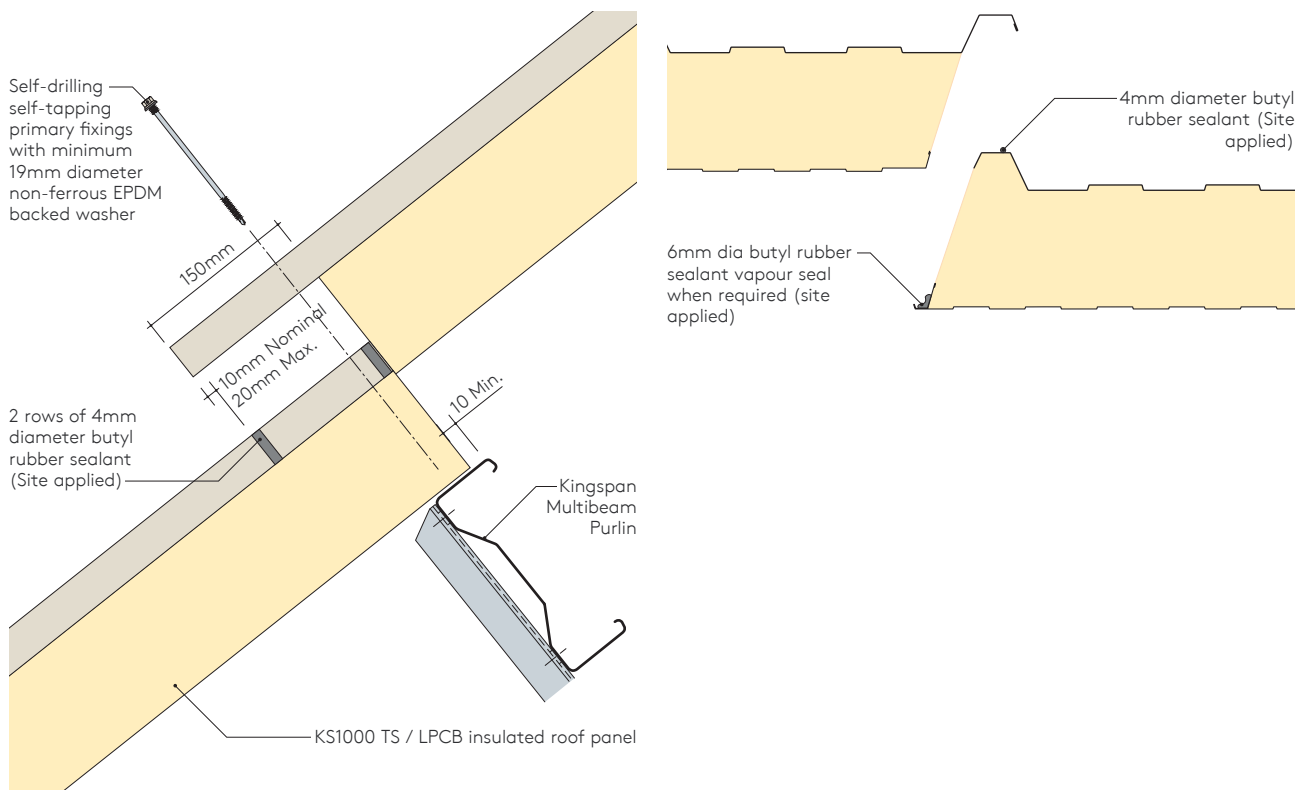
TS/Nulok Eaves



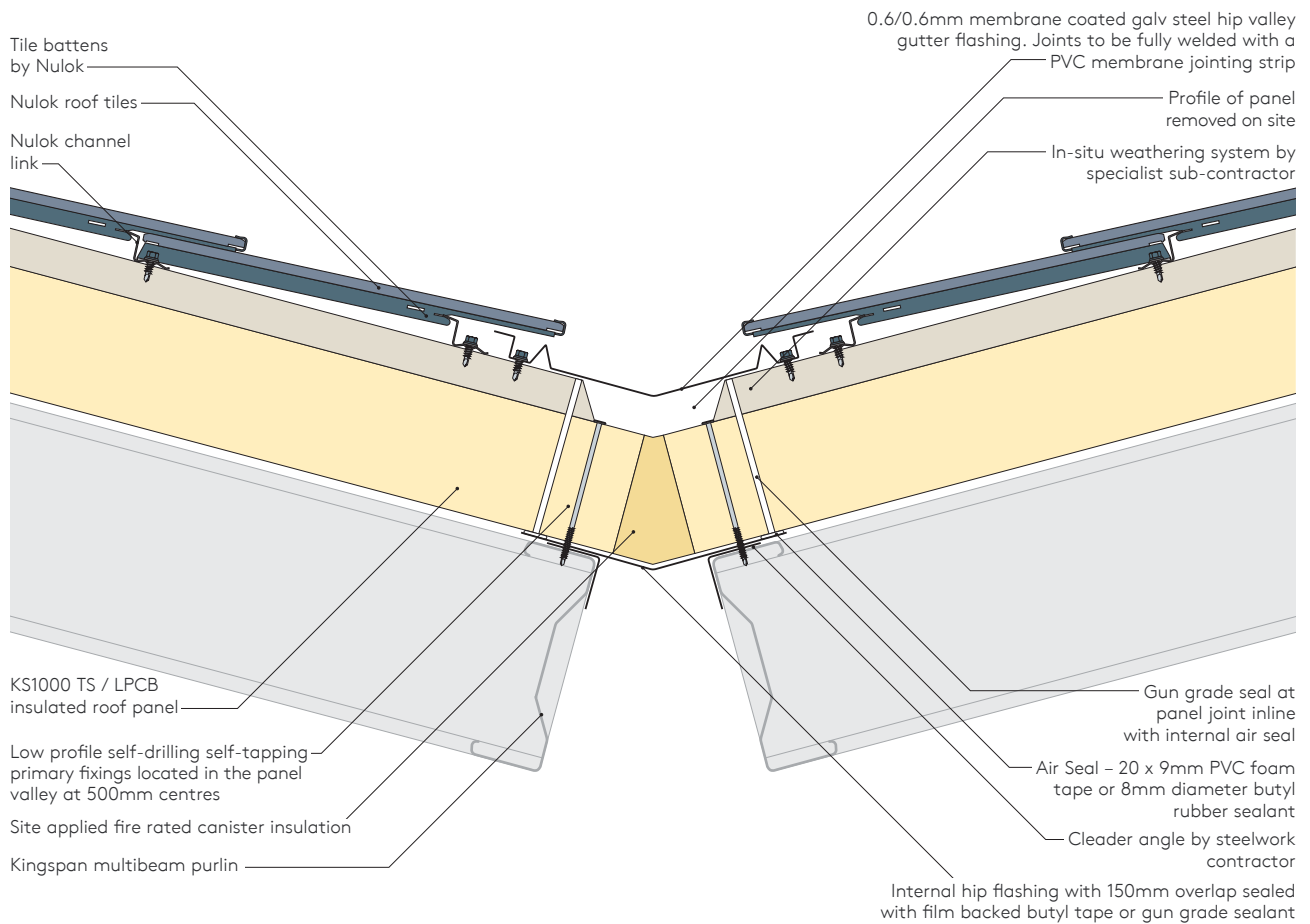
KS1000/2000 TS/Nulok

Construction Details

TS/Nulok Side and End Lap



TS/Nulok Hip Valley



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