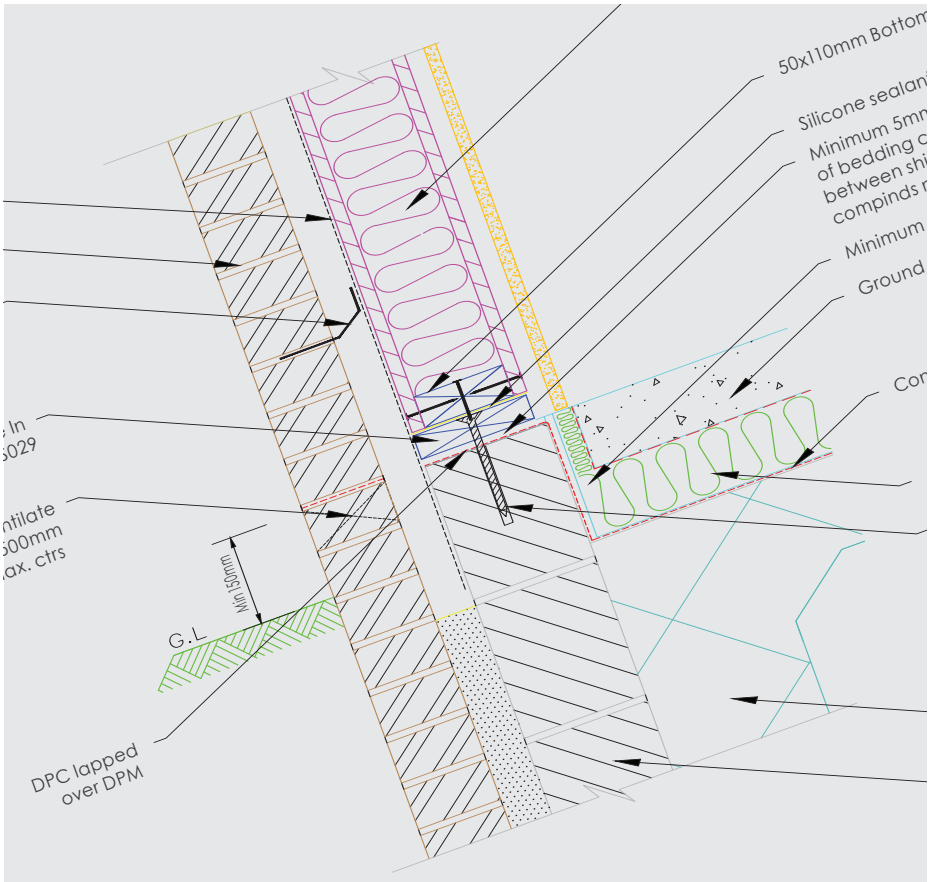
First Issue | 03/2024

Kingspan TEK® Building System

Technical note: indicative Ψ-values (psi-values) for 142mm structural insulated panel with masonry outer leaf



- Indicative Ψ-values for the majority of the most common junction types
- Temperature factors provided for each junction
- Ψ-values covering a variety of internal finish options
- Illustrative and temperature diagrams provided for each junction type
- Associated annotated details provided for ease of reference
- SAP evidence sheet for energy assessors
- List of material properties used in the modelling

Fibre-free Core

Kingspan®

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Introduction

Heat loss from junctions

Thermal bridging occurring at the junctions of a buildings planar elements (i.e. between roofs, walls, openings, and floors) can add significantly to a building's total fabric heat loss.

Higher heat flows occur at junctions due to complex geometries, or from the use of materials with a higher thermal conductivity than the adjacent materials. This can cause localised reductions in the internal surface temperatures, which can lead to surface condensation and mould growth problems. Good design detailing can help to avoid these issues. The details in this guidance have been developed with the aims of being buildable, achieving good thermal performance and minimal risk.

Linear thermal bridging describes the heat-loss occurring at junctions between elements e.g. between a wall and floor, or around openings e.g. at sills, lintels and jambs. A Ψ–value (psi-value) is the heat loss through a junction, which is additional to the heat flow through the adjoining plane elements and is expressed in W/mK.

Ψ–values are not taken into account in U–value calculations, but, instead, they are taken into account separately in the calculation methodologies e.g. the Standard Assessment Procedure (SAP), that are used to assess the operational CO_2 emissions and, where applicable, the fabric energy efficiency of buildings, primary energy or delivered energy rates.

Junctions & building compliance

There are four possibilities for specifying thermal bridging:

a. details conform to those of a reputable non-government database containing independently assessed thermal junction details, such as Local Authority Building Control's Construction Details library;

b. Ψ-values calculated by a person with suitable expertise and experience in accordance with BRE IP 1/06 (Assessing the effects of thermal bridging at junctions and around openings) and BR 497:2016 (Conventions for calculating linear thermal transmittance and temperature factors). In this case, use those calculated Ψ-values along with the length of each junction;

c. use the individual junction default values in the Standard Assessment Procedure, Table K1; or

d. use a global default value for overall heat losses in the energy calculation to take account of the heat loss due to thermal bridging (a value of 0.20 W/m^{2}K is added to overall elemental losses, making it harder to achieve compliance).

A combination of details can be used and where some details are missing, the Ψ-values from the 'default' column in Table K1 can be used.

The Ψ-values in this document have all been calculated by persons with suitable expertise and experience as per the second of the above options.

Where options (a) or (b), or a combination of them, are used appropriate consideration should be given to on-site audits, inspection and associated documentation to meet the evidentiary requirements necessary to claim the associated Ψ-values in the energy assessment.

Please note that there are potential restrictions placed upon this product which vary dependant on building type, height, construction and location in Great Britain. For guidance regarding the routes to compliance for meeting the fire safety requirements of the Building Regulations / Standards in Great Britain, refer to the relevant Technical Bulletins and links to Government websites at **www.kingspaninsulation.co.uk/fireregulations.**

Thermal modelling of junctions

Ψ-values have been created for the major junctions involving Kingspan TEK® Building System 142 mm panels following the guidelines in BR 497:2016.

All thermal modelling work was undertaken by competent thermal modellers through a third party consultancy on behalf of Kingspan Insulation Ltd. All of the calculated Ψ-values for the Kingspan junction details are better than the default Ψ-values given in Table K1 of SAP 10.

Kingspan Insulation thermal modelling

Critical temperature factors

Reasonable provision to avoid surface condensation, or mould growth occurring as a result of thermal bridges, is to demonstrate that the details achieve a temperature factor that is no worse than the performance set out in BRE IP 1/06.

The temperature factor is a property of the construction, surface resistance and internal and external temperatures. It is used to assess the risk of surface condensation or mould growth. This parameter has been provided for all of the junction variants.

Calculated values are higher than or equal to the critical factor for dwellings (fCRsi of 0.75) as given in BRE IP 1/06, which limits the risk of surface condensation or mould growth. Higher humidity condition buildings, for example swimming pools (fCRsi of 0.90), may require alternative details and constructions.

Unless otherwise noted the modelled Kingspan TEK® Building System 142 mm panel details achieve acceptable temperature factors.

Calculation methodology

The thermal modelling of Kingspan TEK® Building System 142 mm panel details was undertaken using Physibel's TRISCO, a steady state thermal modelling software which has been validated against BS EN ISO 10211:2017 (Thermal bridges in building construction - Heat flows and surface temperatures - Detailed calculations).

The modelled U-values and underfloor temperatures for suspended and beam and block floors were determined in accordance with Annex G of BS EN ISO 13370:2017 (Thermal performance of buildings - Heat transfer via the ground - Calculation methods).

Junctions were modelled using Kingspan TEK® Building System 142 mm panel, with a 12.5 mm plasterboard on 25 mm timber batten cavity on varying thicknesses of Kingspan Thermawall® TW55 on the internal. On the external the junctions were modelled with a 50mm clear cavity and a brickwork outer leaf. For Kingspan TEK® Building System product information please refer to the product literature.

How to use these details

The Ψ-values and temperature factors are provided for different thicknesses of Kingspan Thermawall® TW55 on the internal. Where a different thickness of Kingspan Thermawall® TW55 is used, performance may be inferred from the results of the poorer closest thickness of Kingspan Thermawall® TW55.

The Ψ-values cited may be used in calculations of building heat loss, where the principles of construction and key element specifications have been followed.

Limitations & applicability of modelling

Calculated Ψ-values can be used by energy assessors for buildings constructed in accordance with associated details for England, Scotland, Wales, and Northern Ireland.

Where proposed constructions differ from the enclosed details, or use alternative materials, these Ψ-values and temperature factors should not be used. In addition where the product differs or is substituted these details should not be used.

These details represent typical detailing to achieve a good level of thermal performance, however the details included in this document may not be suitable for use in all circumstances. Where there is any uncertainty, Building Control Body (BCB) requirements and advice should always be sought and followed. All other site requirements and relevant building regulations must be taken into consideration when implementing the details.

The details and thermal models contained within this document are indicative only, designed to provide a basis for Ψ-values calculations and thermal junction performance. The actual design and requirements of each project regarding (but not limited to) acoustics, fire, structure, moisture, etc, will need to be determined and checked by the designer, fire engineer and other relevant parties on the project. Although we have made every effort to provide accurate information, the company can accept no liability for any issues arising from its use.

Summary of linear thermal transmittance Ψ (W/mK) results

Junction details			Thickness of Kingspan Thermawall® TW55 (mm)			
SAP Ref No.	TEK Detail Ref		0	20	50	90
E2	W-16/W-17	Typical section at window head - brickwork external leaf. (50 x110 timber in lintel)	0.063	0.067	0.070	0.074
		Typical section at window head - brickwork external leaf. (100x110 timber in lintel)	0.090	0.091	0.095	0.099
		Typical section at window head - brickwork external leaf. (110x200 timber in lintel)	0.133	0.116	0.113	0.114
E3	W-14/W-15	Typical section at window cill - brickwork external leaf (standard cill)	0.047	0.051	0.054	0.058
		Typical section at window cill - brickwork external leaf (prefabricated concrete cill)	0.068	0.071	0.074	0.078
E4	W-12/W-13	Typical window detail - brickwork external leaf detail.	0.080	0.081	0.084	0.087
E5	W-5	Typical ground bearing floor slab detail with 140mm blockwork wall. TF70 floor insulation with lightweight (0.19 W/mK) blockwork	-*	0.057	0.051	0.049
		Typical ground bearing floor slab detail with 140mm blockwork wall. TF70 floor insulation with dense (1.13 W/mK) blockwork	-*	0.078	0.069	0.065
		Typical ground bearing floor slab detail with 140mm blockwork wall. K103 floor insulation with lightweight (0.19 W/mK) blockwork	0.090	0.058	0.052	0.050
		Typical ground bearing floor slab detail with 140mm blockwork wall. K103 floor insulation with dense (1.13 W/mK) blockwork	0.130	0.077	0.068	0.064
	W-8/W-9	Sectional elevation through beam and block floor support. TF70 floor insulation with lightweight (0.19 W/mK) blockwork	0.097	0.063	0.057	0.057
		Sectional elevation through beam and block floor support. TF70 floor insulation with dense (1.13 W/mK) blockwork	0.138	0.080	0.070	0.068
		Sectional elevation through beam and block floor support. K103 floor insulation with lightweight (0.19 W/mK) blockwork	0.101	0.066	0.061	0.059
		Sectional elevation through beam and block floor support. K103 floor insulation with dense (1.13 W/mK) blockwork	0.143	0.083	0.073	0.070
	W-6	Sectional elevation through soleplate fixing detail. Suspended reinforced concrete slab. TF70 floor insulation with lightweight (0.19 W/mK) blockwork	0.098	0.066	0.060	0.059
		Sectional elevation through soleplate fixing detail. Suspended reinforced concrete slab. TF70 floor insulation with dense (1.13 W/mK) blockwork	0.137	0.082	0.074	0.070
		Sectional elevation through soleplate fixing detail. Suspended reinforced concrete slab. K103 floor insulation with lightweight (0.19 W/mK) blockwork	0.098	0.065	0.059	0.058
		Sectional elevation through soleplate fixing detail. Suspended reinforced concrete slab. K103 floor insulation with dense (1.13 W/mK) blockwork	0.137	0.081	0.071	0.063
E6	F-2	Typical connection detail for engineered I-joist floor system.	0.023	0.026	0.029	0.032
	F-3	Typical connection detail for engineered POSI-joist floor system.	0.030	0.032	0.034	0.037
E7	F-1	Separating floor detail. Platform frame. Non-Robust detail pre completion test (pct) required	0.056	0.052	0.050	0.048
E10	R-10	Typical eaves detail vertical section with truss rafter pitched roof	0.055	0.048	0.042	0.034

NB See accompanying details in Appendix A for modelling clarification notes. *detail under review, results TBC.

Summary of linear thermal transmittance Ψ (W/mK) results

Junction details			Thickness of Kingspan Thermawall® TW55 (mm)			
SAP Ref No.	TEK Detail Ref		0	20	50	90
E11	R-1	Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - plasterboard only	0.080	0.043	0.035	0.029
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 20mm TP10 on roof	0.079	0.040	0.031	0.027
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 50mm TP10 on roof	0.073	0.038	0.028	0.024
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 90mm TP10 on roof	0.054	0.034	0.026	0.021
	R-2	Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - plasterboard only	0.077	0.042	0.033	0.027
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel- 20mm TP10 on roof	0.077	0.039	0.030	0.024
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - 50mm TP10 on roof	0.072	0.038	0.029	0.023
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - 90mm TP10 on roof	0.057	0.035	0.026	0.021
E12	R-11	Kingspan TEK Building System gable junction - truss rafter roof with insulation at ceiling level	0.031	0.031	0.030	0.029
E13	R-12	Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - plasterboard only	0.046	0.039	0.034	0.031
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 20mm TP10 on roof	0.040	0.032	0.028	0.025
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 50mm TP10 on roof	0.038	0.029	0.025	0.023
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 90mm TP10 on roof	0.031	0.027	0.023	0.021
E15	R-13	Kingspan TEK Building System external wall junction with warm deck flat roof - timber frame parapet wall	0.040	0.042	0.044	0.046
E16	W-11	Plan showing typical wall connection detail. Corner & T-junction.	0.052	0.031	0.024	0.019
E17	W-11	Plan showing typical wall connection detail. Corner & T-junction.	-0.031	-0.029	-0.030	-0.030
E18	W-26	Kingspan TEK Building System external (flanking) wall junction with timber separating walls to Robust Details E-WT-1 and E-WT-2	0.059*	0.050*	0.046*	0.042*
R1	R-7 (section A-A)	Typical rooflight detail.	0.026	0.014	0.009	0.006
R2	R-7 (section A-A)	Typical rooflight detail.	0.050	0.025	0.015	0.090
R3	R-7 (section B-B)	Typical rooflight detail.	0.026	0.014	0.009	0.006

NB See accompanying details in Appendix A for modelling clarification notes. *values already halved, so listed results apply to each dwelling.

Summary of temperature factor (*f*) results

Junction details			Thickness of Kingspan Thermawall® TW55 (mm)			
SAP Ref No.	TEK Detail Ref		0	20	50	90
E2	W-16/W-17	Typical section at window head - brickwork external leaf. (50 x110 timber in lintel)	0.865	0.862	0.861	0.860
		Typical section at window head - brickwork external leaf. (100x110 timber in lintel)	0.857	0.851	0.848	0.847
		Typical section at window head - brickwork external leaf. (110x200 timber in lintel)	0.859	0.849	0.846	0.844
E3	W-14/W-15	Typical section at window cill - brickwork external leaf (standard cill)	0.863	0.857	0.855	0.853
		Typical section at window cill - brickwork external leaf (prefabricated concrete cill)	0.818	0.813	0.811	0.809
E4	W-12/W-13	Typical window detail - brickwork external leaf detail.	0.832	0.824	0.822	0.820
E5	W-5	Typical ground bearing floor slab detail with 140mm blockwork wall. TF70 floor insulation with lightweight (0.19 W/mK) blockwork	-*	0.841	0.828	0.812
		Typical ground bearing floor slab detail with 140mm blockwork wall. TF70 floor insulation with dense (1.13 W/mK) blockwork	-*	0.818	0.807	0.792
		Typical ground bearing floor slab detail with 140mm blockwork wall. K103 floor insulation with lightweight (0.19 W/mK) blockwork	0.796	0.846	0.834	0.819
		Typical ground bearing floor slab detail with 140mm blockwork wall. K103 floor insulation with dense (1.13 W/mK) blockwork	0.750	0.823	0.813	0.799
	W-8/W-9	Sectional elevation through beam and block floor support. TF70 floor insulation with lightweight (0.19 W/mK) blockwork	0.800	0.840	0.850	0.840
		Sectional elevation through beam and block floor support. TF70 floor insulation with dense (1.13 W/mK) blockwork	0.750	0.820	0.830	0.830
		Sectional elevation through beam and block floor support. K103 floor insulation with lightweight (0.19 W/mK) blockwork	0.800	0.850	0.860	0.860
		Sectional elevation through beam and block floor support. K103 floor insulation with dense (1.13 W/mK) blockwork	0.750	0.820	0.840	0.830
	W-6	Sectional elevation through soleplate fixing detail. Suspended reinforced concrete slab. TF70 floor insulation with lightweight (0.19 W/mK) blockwork	0.790	0.840	0.850	0.810
		Sectional elevation through soleplate fixing detail. Suspended reinforced concrete slab. TF70 floor insulation with dense (1.13 W/mK) blockwork	0.750	0.820	0.810	0.790
		Sectional elevation through soleplate fixing detail. Suspended reinforced concrete slab. K103 floor insulation with lightweight (0.19 W/mK) blockwork	0.800	0.850	0.860	0.820
		Sectional elevation through soleplate fixing detail. Suspended reinforced concrete slab. K103 floor insulation with dense (1.13 W/mK) blockwork	0.750	0.820	0.810	0.800
E6	F-2	Typical connection detail for engineered I-joist floor system.	0.945	0.957	0.962	0.964
	F-3	Typical connection detail for engineered POSI-joist floor system.	0.935	0.950	0.956	0.959
E7	F-1	Separating floor detail. Platform frame. Non-Robust detail pre completion test (pct) required	0.939	0.925	0.939	0.944
E10	R-10	Typical eaves detail vertical section with truss rafter pitched roof	0.912	0.910	0.919	0.926

NB See accompanying details in Appendix A for modelling clarification notes. *detail under review, results TBC.

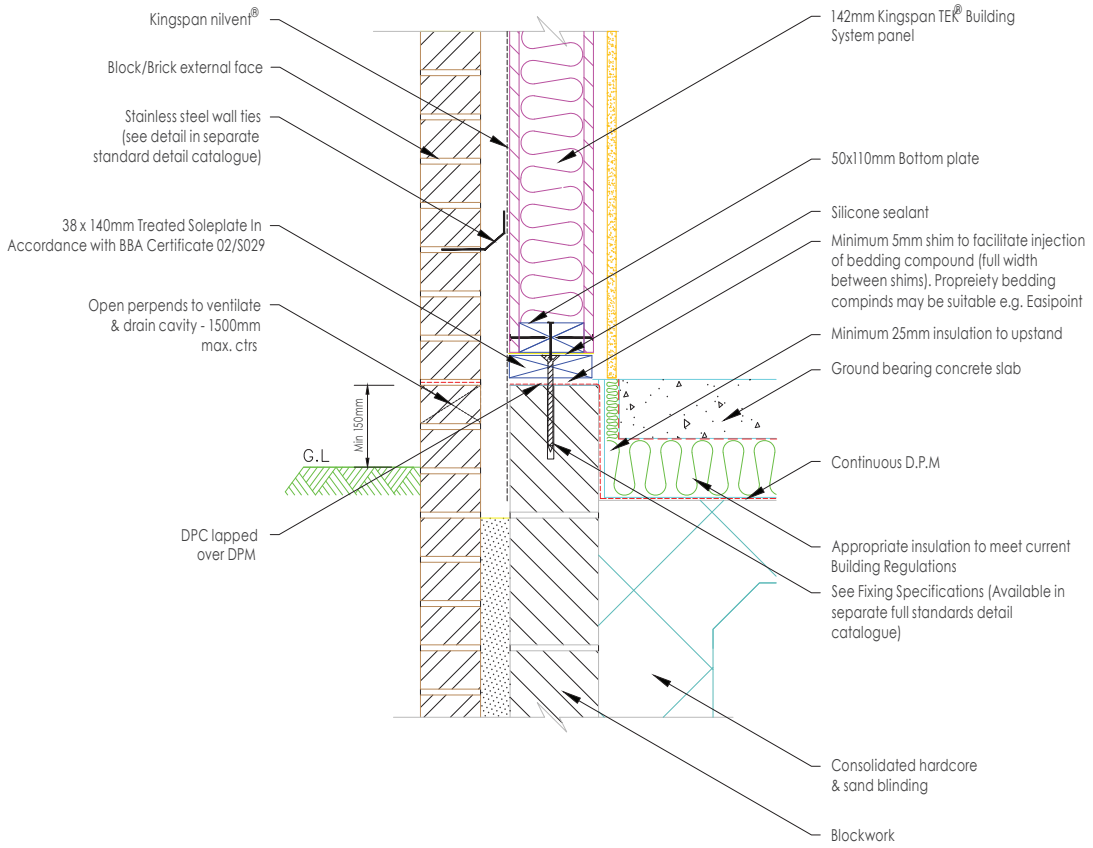
Summary of temperature factor (*f*) results

Junction details			Thickness of Kingspan Thermawall® TW55 (mm)			
SAP Ref No.	TEK Detail Ref		0	20	50	90
E11	R-1	Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - plasterboard only	0.928	0.957	0.961	0.964
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 20mm TP10 on roof	0.919	0.957	0.963	0.966
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 50mm TP10 on roof	0.914	0.957	0.966	0.970
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 90mm TP10 on roof	0.927	0.951	0.966	0.972
	R-2	Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - plasterboard only	0.930	0.961	0.965	0.968
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel- 20mm TP10 on roof	0.930	0.959	0.966	0.969
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - 50mm TP10 on roof	0.916	0.958	0.967	0.972
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - 90mm TP10 on roof	0.925	0.957	0.967	0.973
E12	R-11	Kingspan TEK Building System gable junction - truss rafter roof with insulation at ceiling level	0.934	0.932	0.935	0.939
E13	R-12	Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - plasterboard only	0.910	0.922	0.930	0.936
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 20mm TP10 on roof	0.917	0.931	0.940	0.946
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 50mm TP10 on roof	0.924	0.937	0.946	0.951
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 90mm TP10 on roof	0.936	0.944	0.952	0.957
E15	R-13	Kingspan TEK Building System external wall junction with warm deck flat roof - timber frame parapet wall	0.951	0.950	0.948	0.946
E16	W-11	Plan showing typical wall connection detail. Corner & T-junction.	0.896	0.929	0.994	0954
E17	W-11	Plan showing typical wall connection detail. Corner & T-junction.	0.965	0.978	0.984	0.987
E18	W-26	Kingspan TEK Building System external (flanking) wall junction with timber separating walls to Robust Details E-WT-1 and E-WT-2	0.918	0.931	0.943	0.953
R1	R-7 (section A-A)	Typical rooflight detail.	0.949	0.971	0.981	0.986
R2	R-7 (section A-A)	Typical rooflight detail.	0.939	0.967	0.978	0.985
R3	R-7 (section B-B)	Typical rooflight detail.	0.949	0.971	0.981	0.986

NB See accompanying details in Appendix A for modelling clarification notes. *detail under review, results TBC.

Appendix A: Associated details

Rev	Date	By	Description



Notes:

1. For further information regarding soleplate / combination soleplate and bottom plate fixings and the requirement for additional panel restraint see detail in separate standard detail catalogue

Shim Thickness	Shim Colour
2mm	Purple
3mm	Green
4mm	Yellow
5mm	Blue
6mm	Black

Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical ground bearing floor slab detail with 140mm blockwork wall

Date: 29/01/2024

Drawn by: J.L.

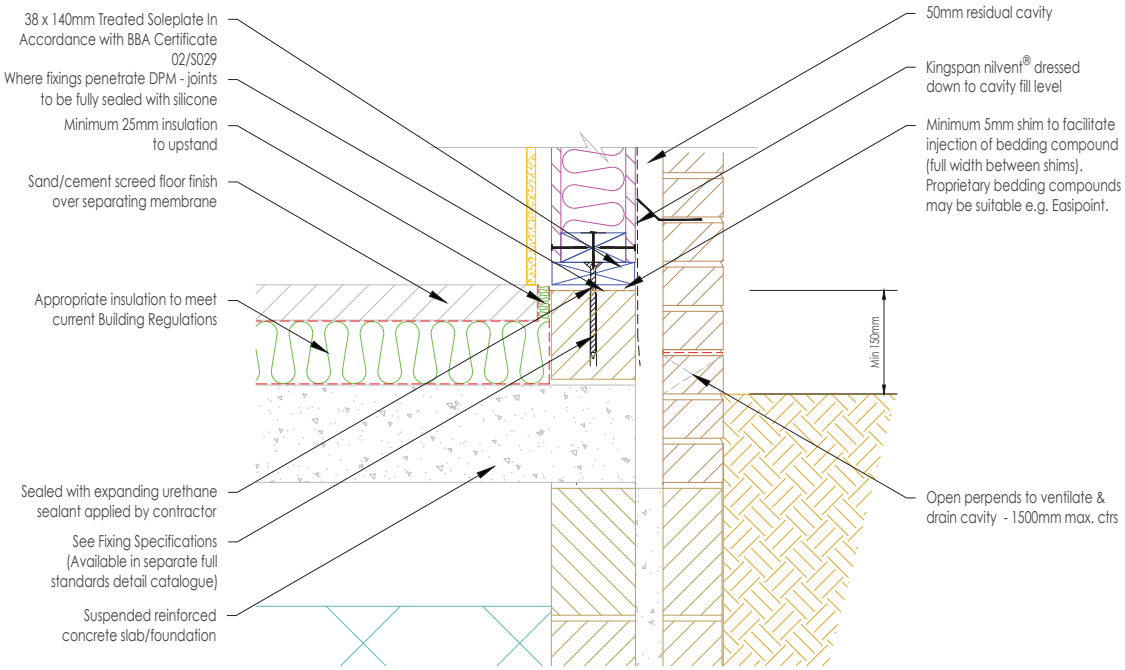
Scale: 1:10

W 5

NB See psi-value and temperature factor tables for blockwork and insulation specifications.

Appendix A: Associated details

Rev	Date	By	Description



Notes:

1. For further information regarding soleplate / combination soleplate and bottom plate fixings and the requirement for additional panel restraint see Fixing Specifications detail in separate standard detail catalogue
2. Slab should be levelled and shimmed along line of walls to create level platform for wall construction.

Shim Thickness	Shim Colour
2mm	Purple
3mm	Green
4mm	Yellow
5mm	Blue
6mm	Black

Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Sectional elevation through soleplate fixing detail.

Suspended reinforced concrete slab.

Date: 29/01/2024

Drawn by: J.L.

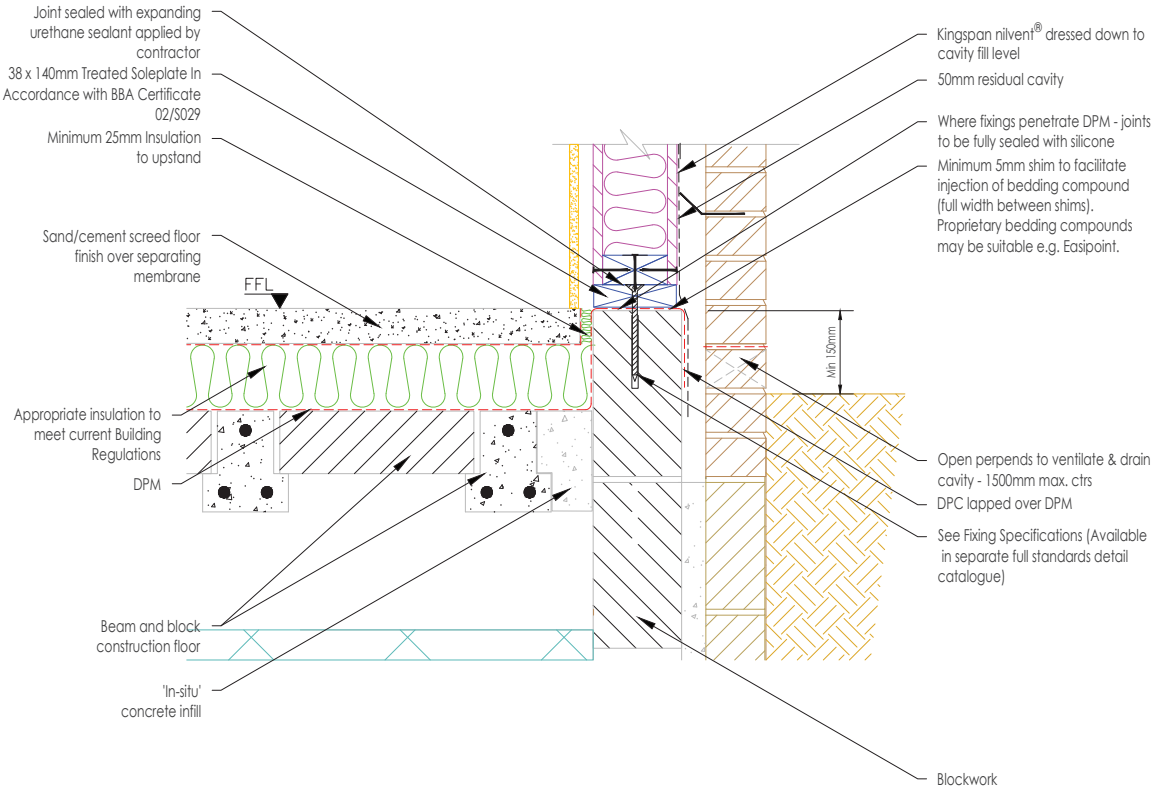
Scale: 1:10

W 6

NB See psi-value and temperature factor tables for blockwork and insulation specifications.

Appendix A: Associated details

Rev	Date	By	Description



Notes:

1. For further information regarding soleplate/combination soleplate and bottom plate fixings and the requirement for additional panel restraint see Fixing Specifications detail in separate standard detail catalogue

Shim Thickness	Shim Colour
2mm	Purple
3mm	Green
4mm	Yellow
5mm	Blue
6mm	Black

Kingspan® TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Sectional elevation through beam and block floor support.

Front view.

Date: 29/01/2024

Drawn by: J.L.

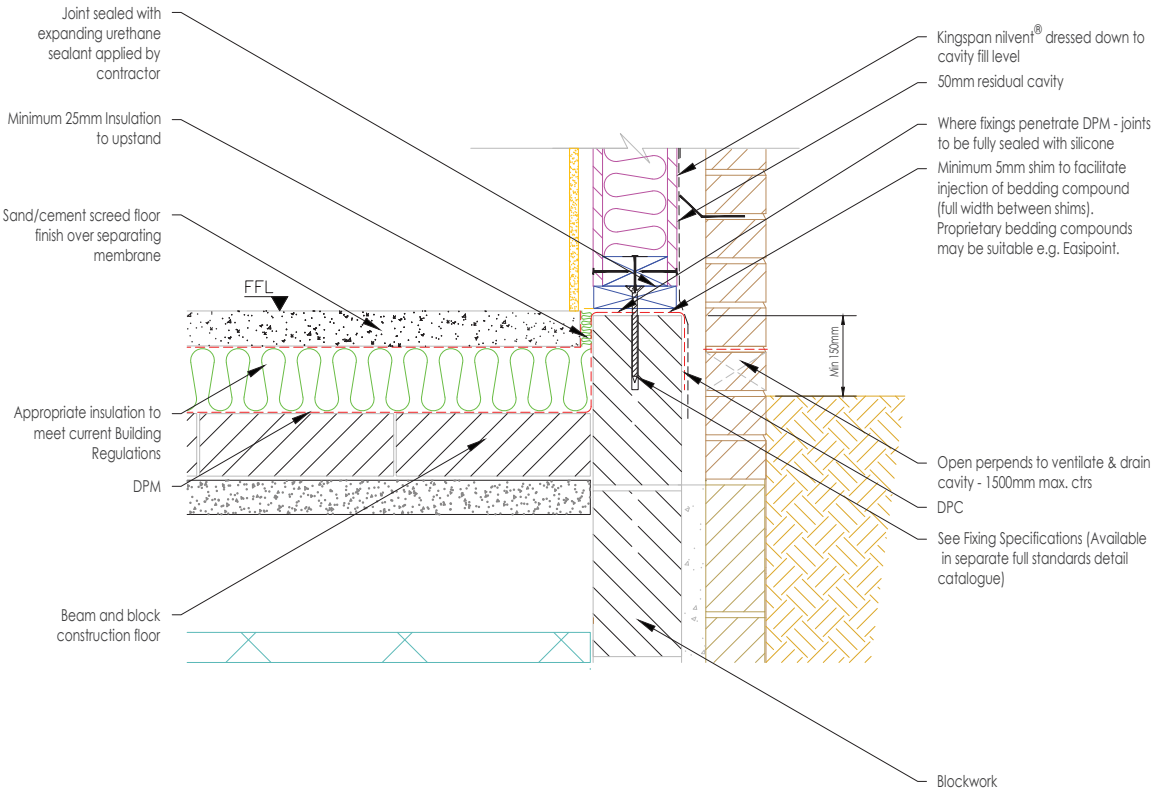
Scale: 1:10

W 8

NB See psi-value and temperature factor tables for blockwork and insulation specifications.

Appendix A: Associated details

Rev	Date	By	Description



Notes:

1. For further information regarding soleplate/combination soleplate and bottom plate fixings and the requirement for additional panel restraint see Fixing Specifications detail in separate standard detail catalogue

Shim Thickness	Shim Colour
2mm	Purple
3mm	Green
4mm	Yellow
5mm	Blue
6mm	Black

Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Sectional elevation through beam and block floor support.

Side view.

Date: 29/01/2024

Drawn by: J.L.

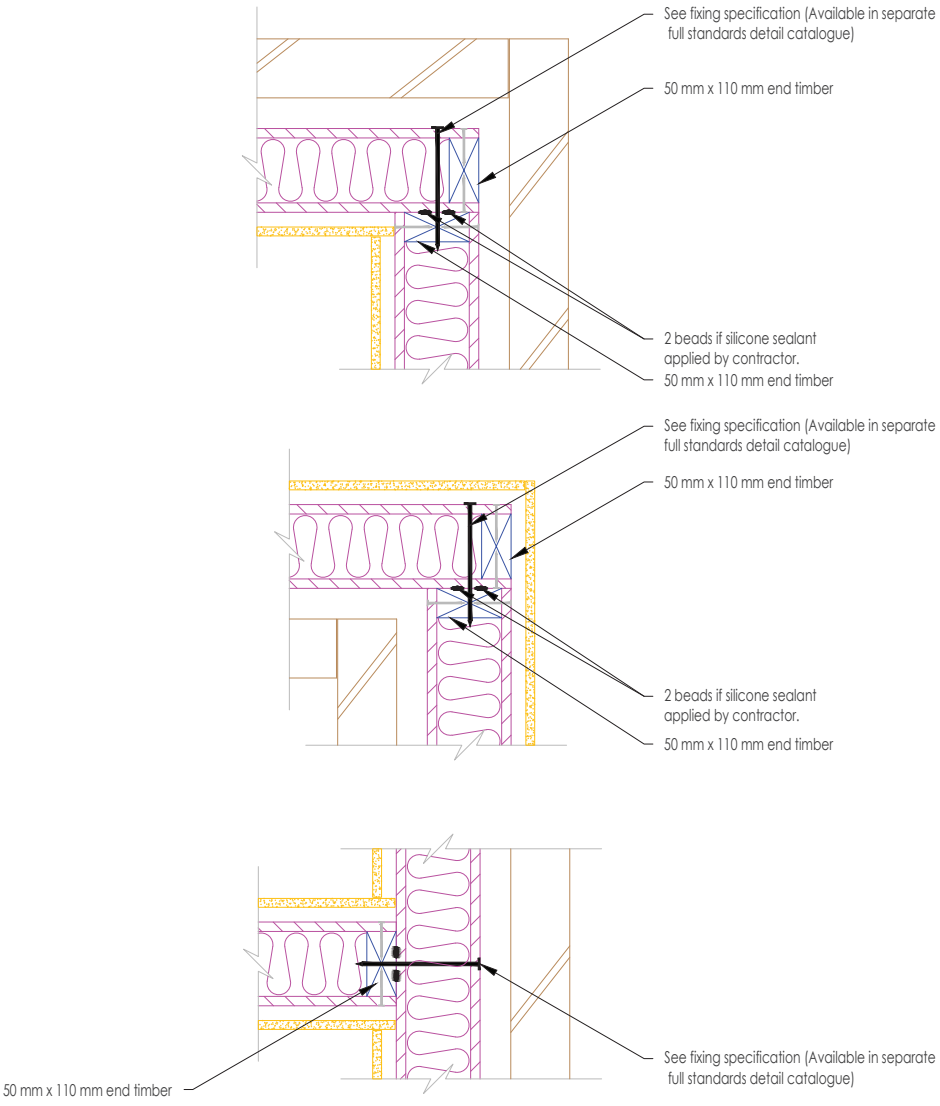
Scale: 1:10

W 9

NB See psi-value and temperature factor tables for blockwork and insulation specifications.

Appendix A: Associated details

Rev	Date	By	Description



Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Plan showing typical wall connection detail.

Corner & T-junction

Date: 29/01/2024

Drawn by: J.L.

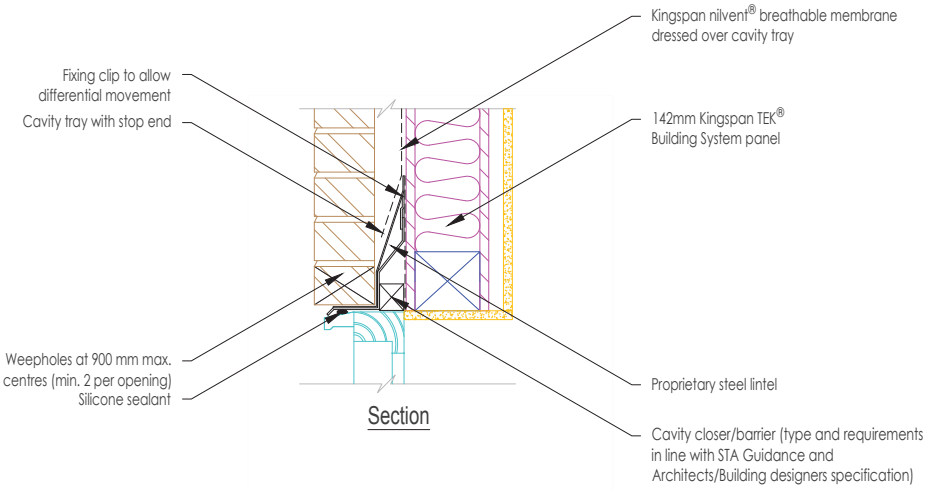
Scale: 1:10

W 11

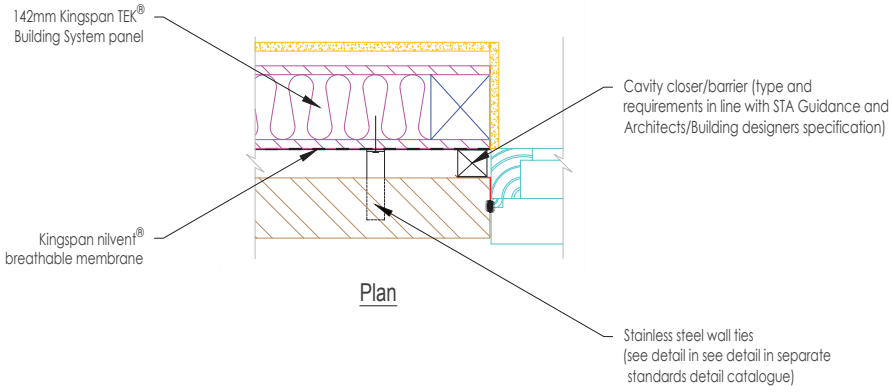
NB See psi-value and temperature factor tables for blockwork and insulation specifications.

Appendix A: Associated details

Rev	Date	By	Description



NB Restraint clips typically required @ 600 mm cts. along top edge of lintel.
Fixings to be used in accordance with lintel manufacturer's recommendations.



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Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical window detail
- brickwork external leaf detail.

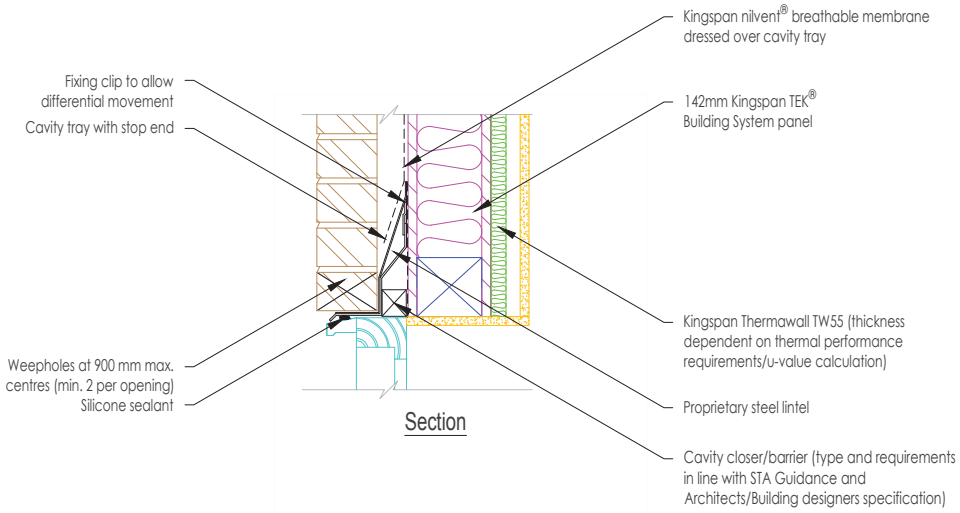
Date: 29/01/2024
Drawn by: J.L.
Scale: 1:10

W 12

NB Calculation modelled with full overlap.

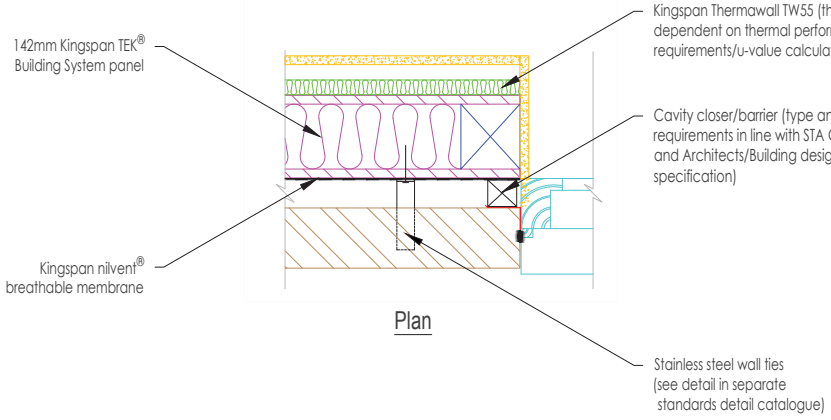
Appendix A: Associated details

Rev	Date	By	Description



Section

NB Restraint clips typically required @ 600 mm cts. along top edge of lintel.
Fixings to be used in accordance with lintel manufacturer's recommendations.



Plan

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Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical window detail
- brickwork external leaf detail.

Date: 29/01/2024

Drawn by: J.L.

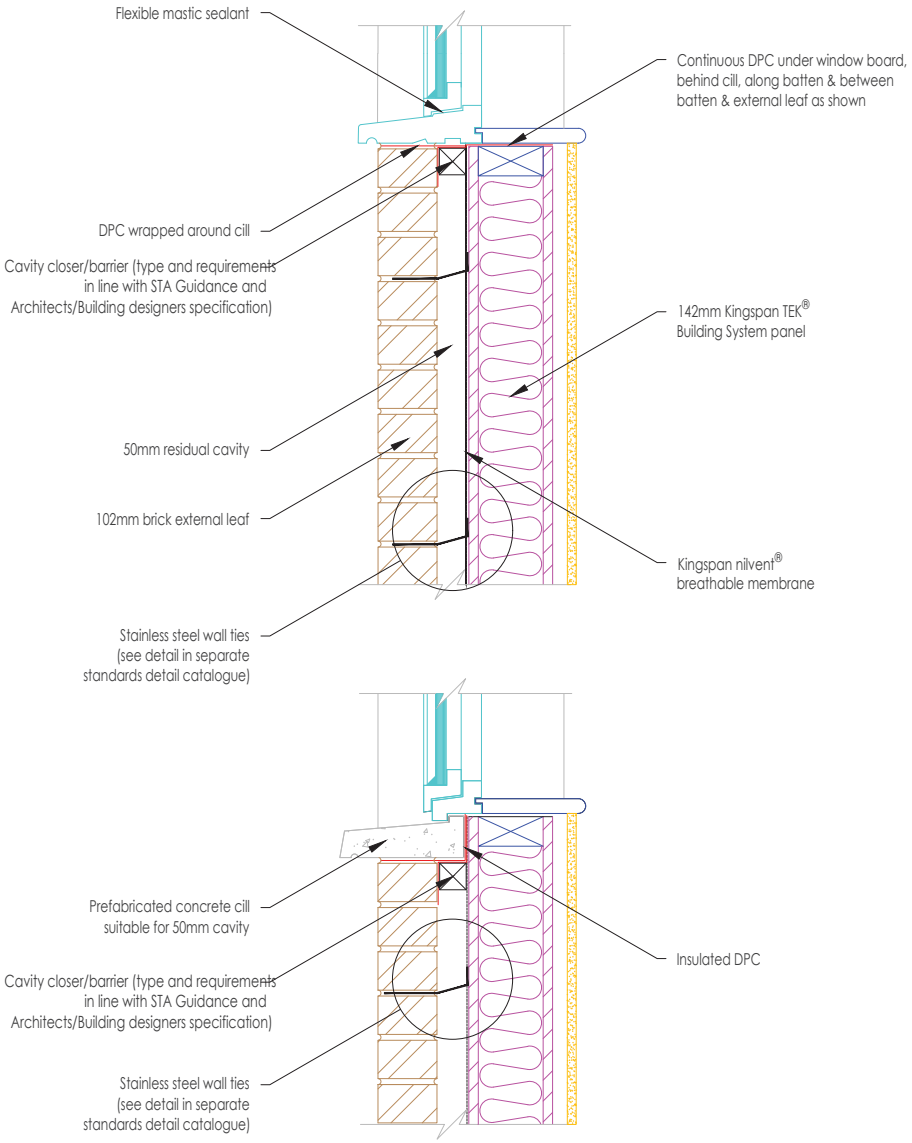
Scale: 1:10

W 13

NB Calculation modelled with full overlap.

Appendix A: Associated details

Rev	Date	By	Description



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Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical section at window cill - brickwork external leaf

Date: 29/01/2024

Drawn by: J.L.

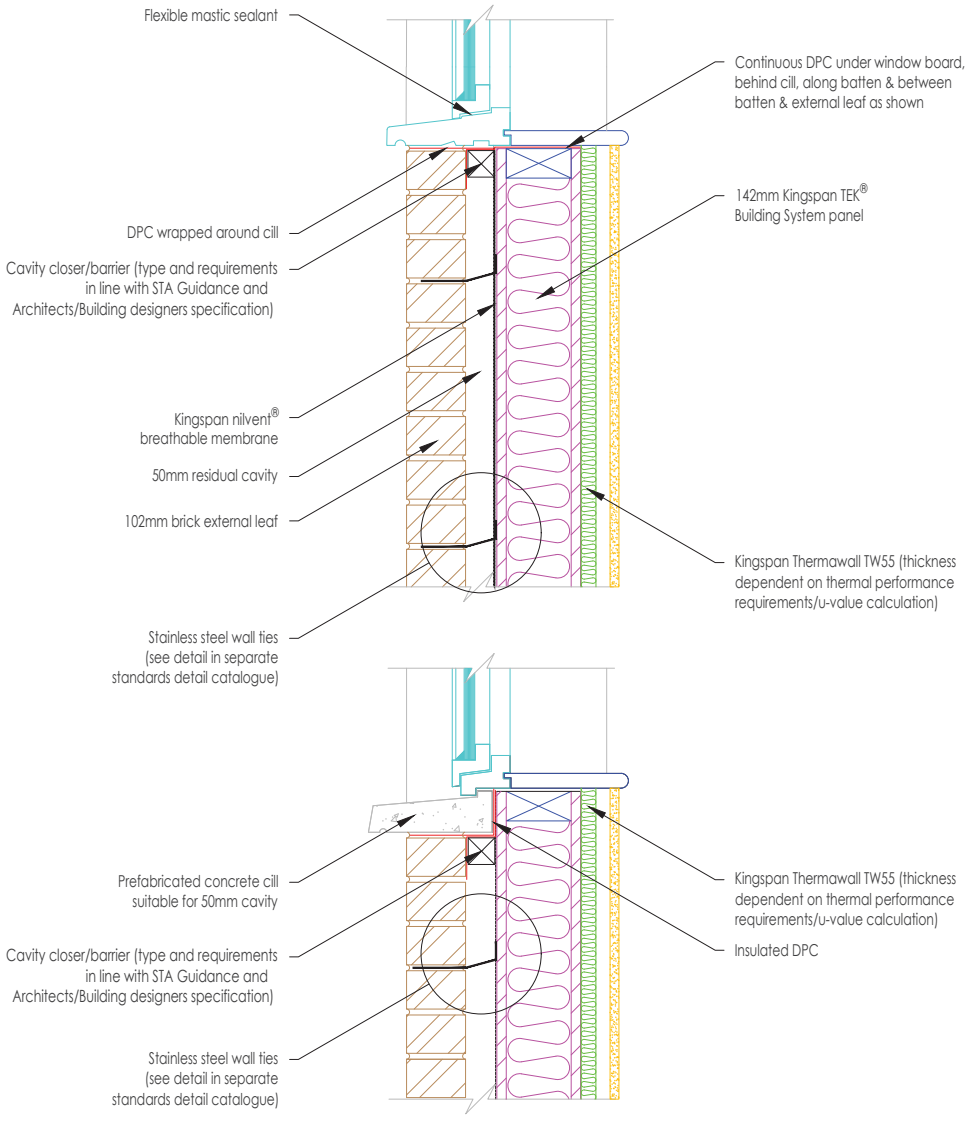
Scale: 1:10

W 14

NB Calculation modelled with full overlap.

Appendix A: Associated details

Rev	Date	By	Description



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Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical section at window cill - brickwork external leaf

Date: 29/01/2024

Drawn by: J.L.

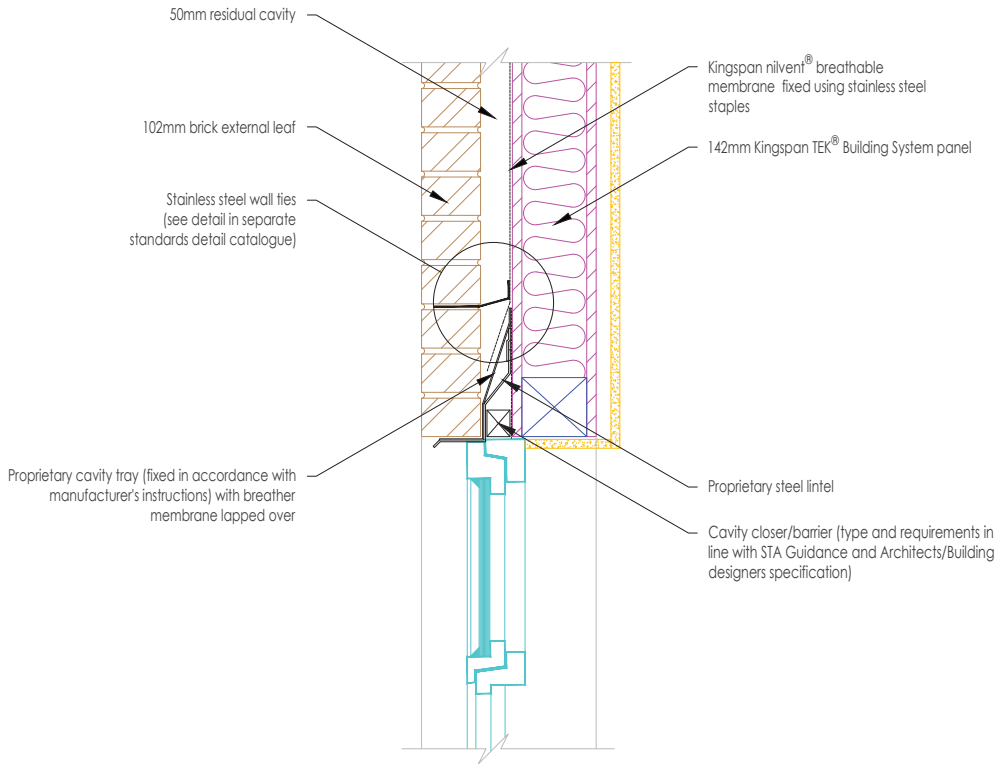
Scale: 1:10

W 15

NB Calculation modelled with full overlap.

Appendix A: Associated details

Rev	Date	By	Description



Notes:
1. Restraint clips typically required @ 600 mm cts. along top edge of lintel. Fixings to be used in accordance with lintel manufacturer's recommendations.

Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical section at window head - brickwork external leaf.

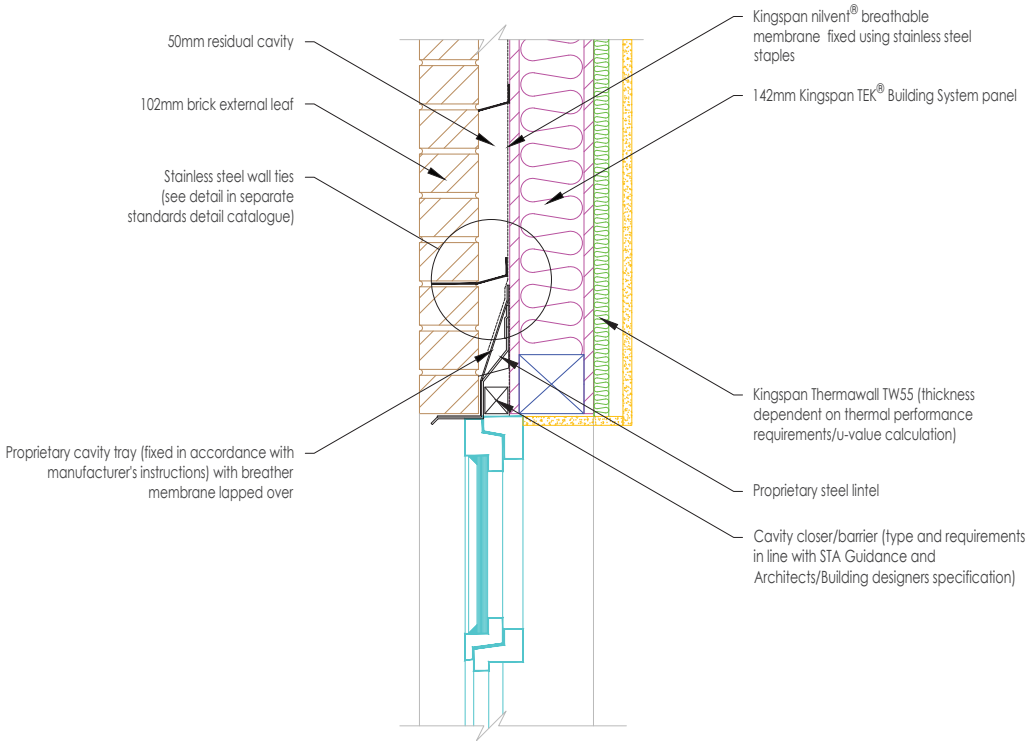
Date: 29/01/2024
Drawn by: J.L.
Scale: 1:10

W 16

NB Calculation modelled with full overlap.

Appendix A: Associated details

Rev	Date	By	Description



Notes:
1. Restraint clips typically required @ 600 mm cts. along top edge of lintel. Fixings to be used in accordance with lintel manufacturer's recommendations.

Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical section at window head - brickwork external leaf.

Date: 29/01/2024

Drawn by: J.L.

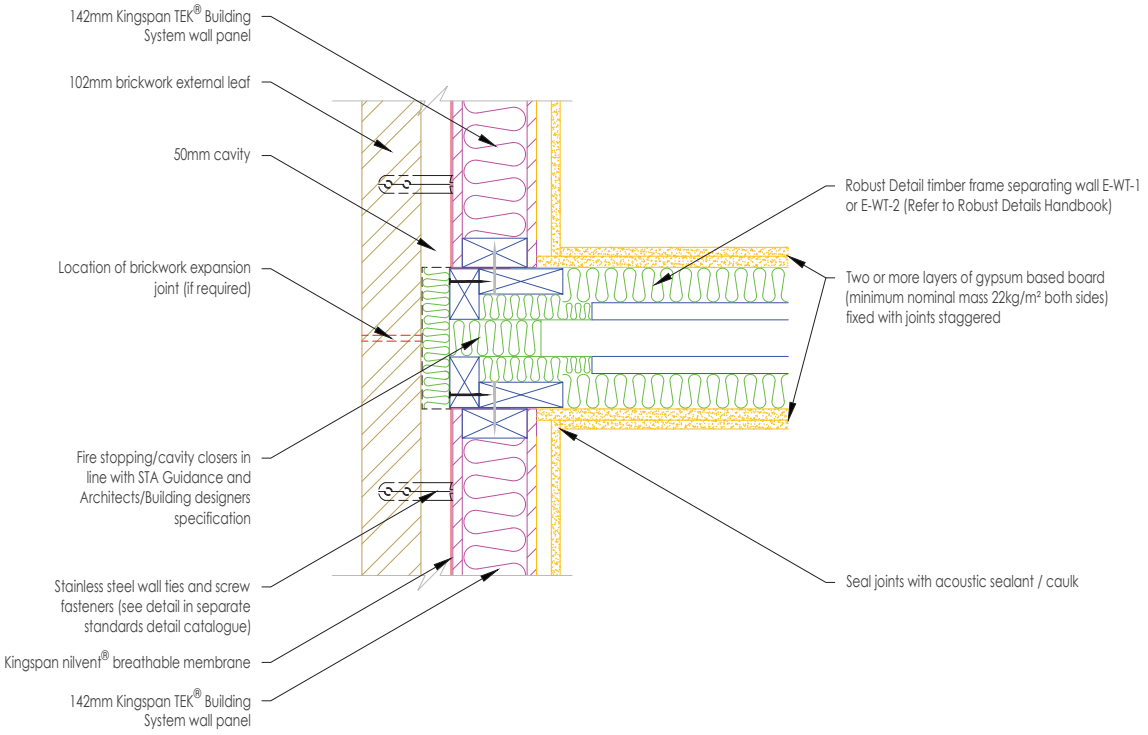
Scale: 1:10

W 17

NB Calculation modelled with full overlap.

Appendix A: Associated details

Rev	Date	By	Description



Notes:
1. All joints/gaps to be sealed with tape or acoustic sealant / caulk

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Kingspan TEK® Building System external (flanking) wall junction with timber separating walls to Robust Details E-WT-1 and E-WT-2

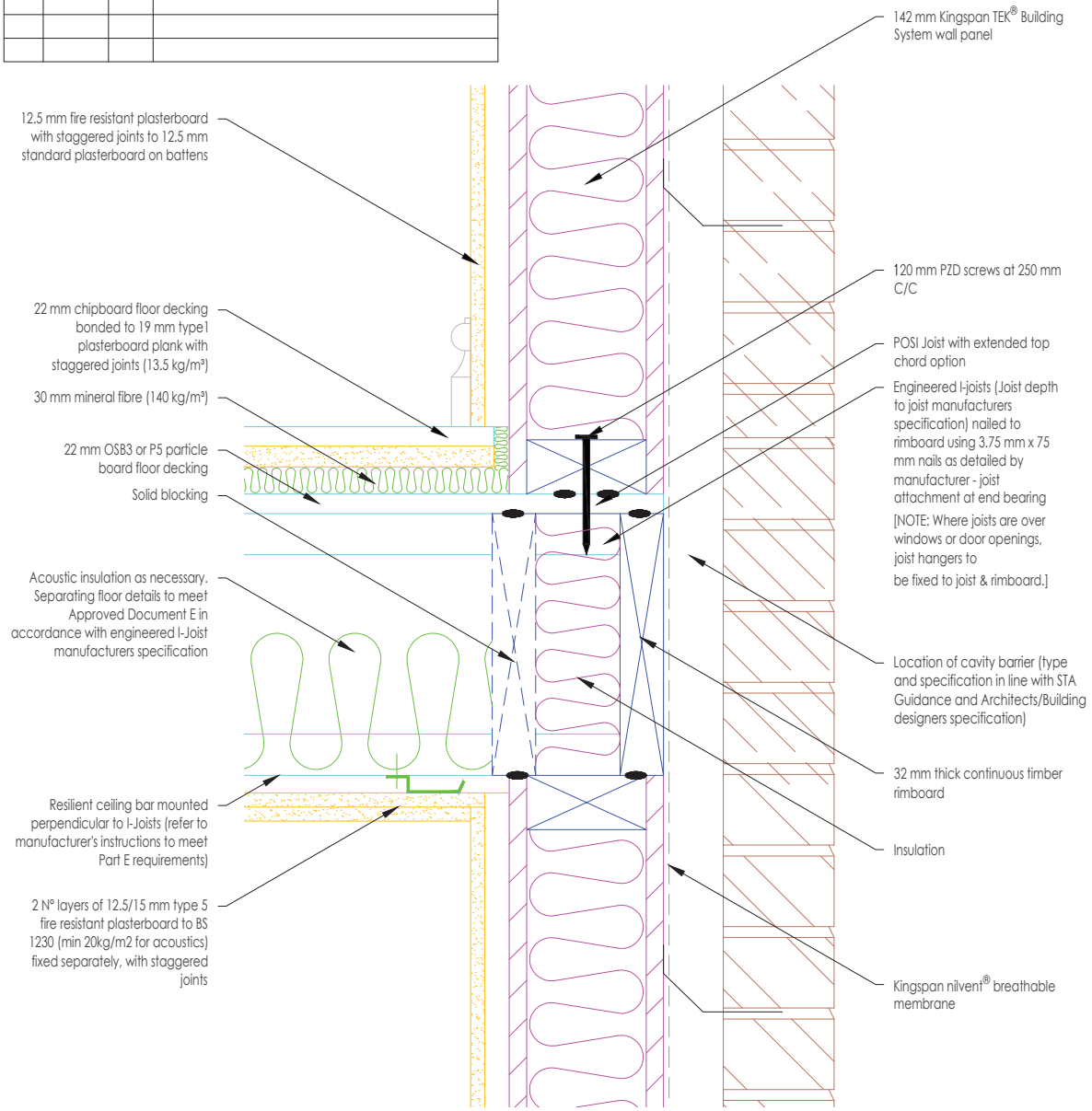
Date: 29/01/2024
Drawn by: J.L.
Scale: 1:10

W 26

NB Ψ–value applies for each dwelling. Mineral wool taken as 0.044 W/mK.

Appendix A: Associated details

Rev	Date	By	Description



Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
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Separating floor detail. Platform frame. Non-Robust detail pre-completion test (pct) required.

Date: 29/01/2024

Drawn by: J.L.

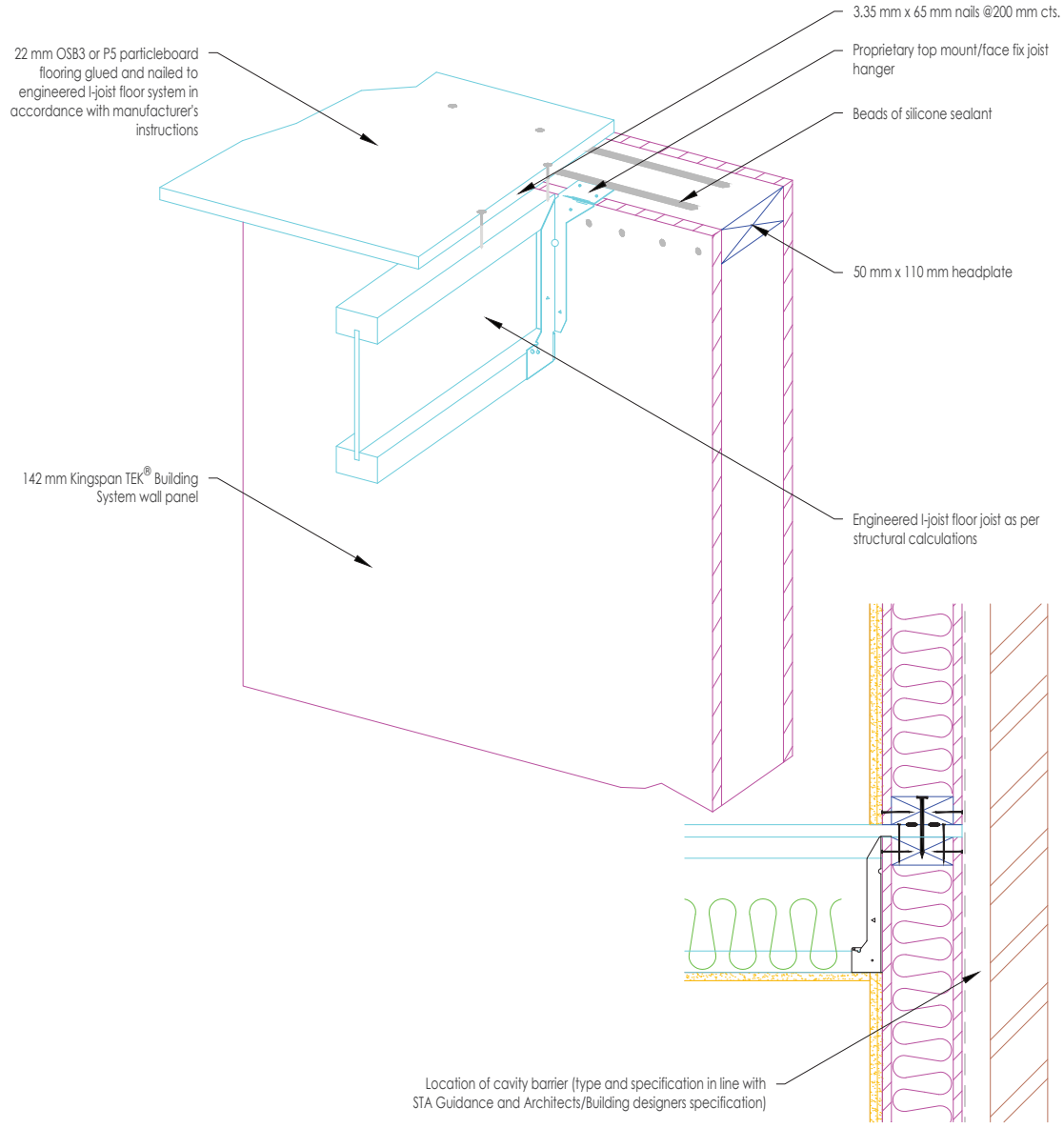
Scale: 1:5

F 1

NB 100mm flexible insulation in floor construction (0.044 W/mK), 30mm insulation and upstand taken as 0.034 W/mK. Blocking insulation present in junction taken as 0.044 W/mK.

Appendix A: Associated details

Rev	Date	By	Description



Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical connection detail for engineered I-joist floor system.

Date: 29/01/2024

Drawn by: J.L.

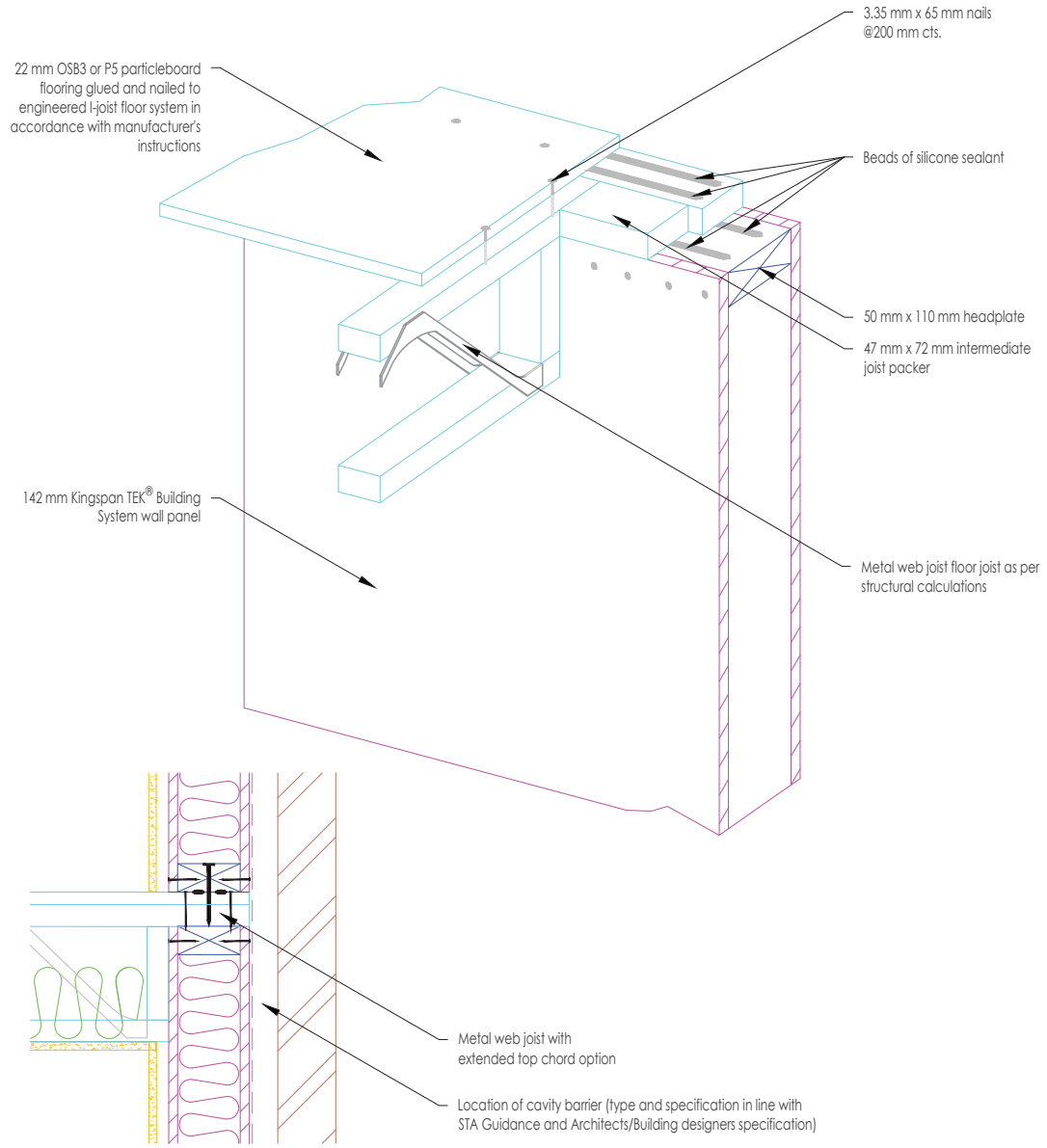
Scale: 1:10

F 2

NB No insulation present in intermediary floor element thermal modelling

Appendix A: Associated details

Rev	Date	By	Description



Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Metal web extended top cord

Date: 29/01/2024

Drawn by: J.L.

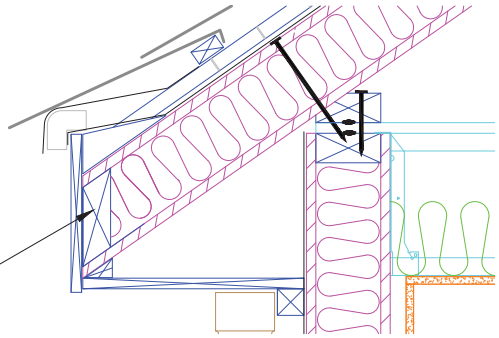
Scale: 1:10

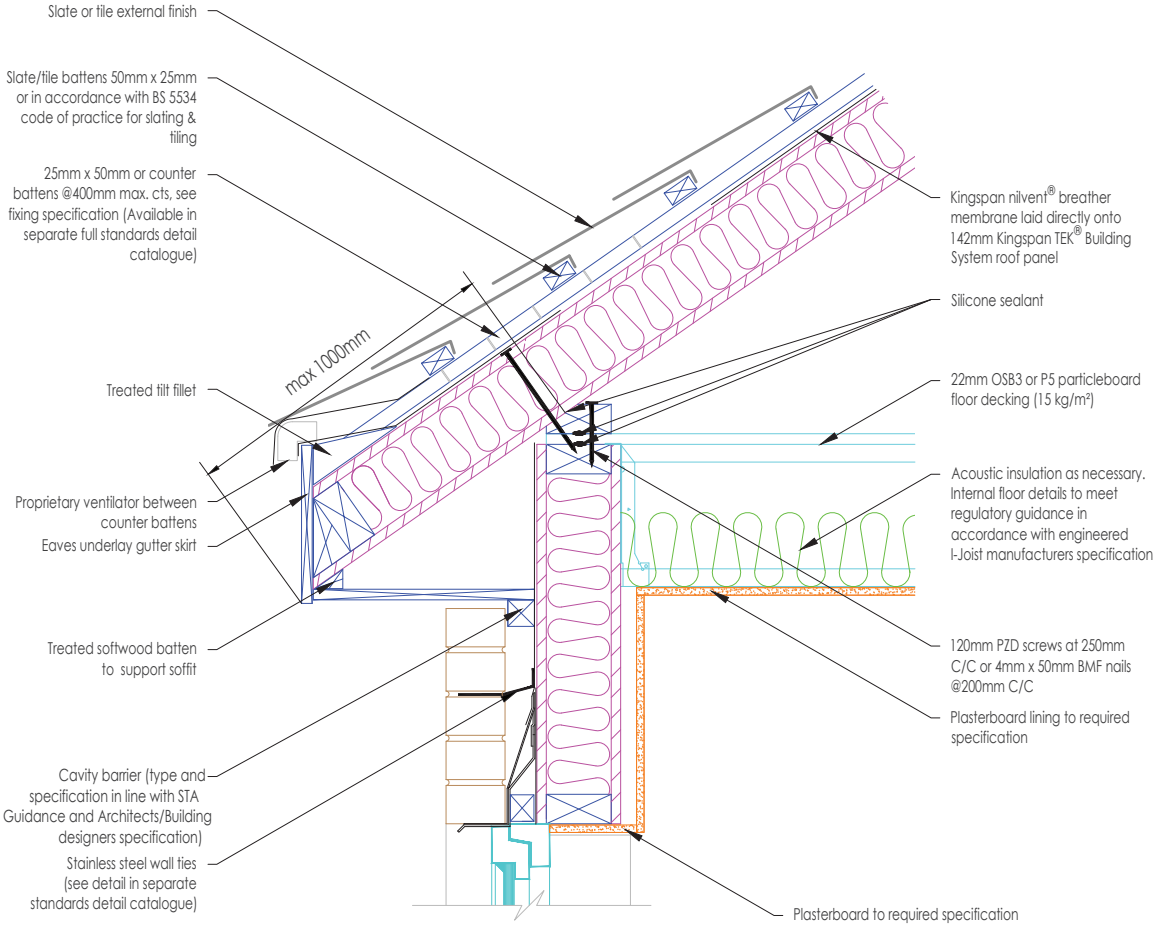
F 3

NB No insulation present in intermediary floor element thermal modelling

Appendix A: Associated details

Rev	Date	By	Description





Kingspan TEK® Building System

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
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Typical eaves detail vertical section with 142mm Kingspan TEK® Building System pitched roof panel.

Date: 29/01/2024

Drawn by: J.L.

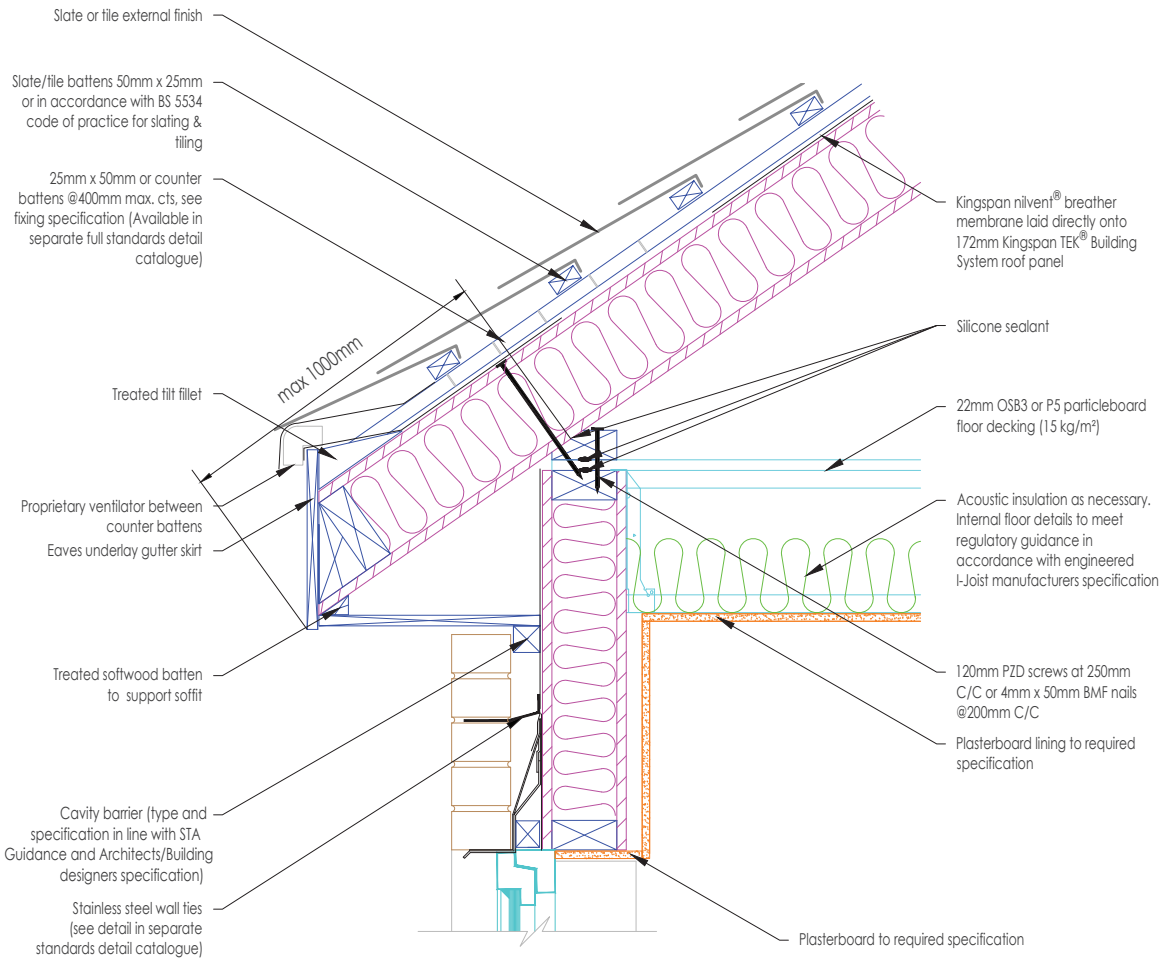
Scale: 1:10

R 1

NB For modelled constructions of the flanking element in the roof please refer to the psi-value and temperature factor tables

Appendix A: Associated details

Rev	Date	By	Description



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Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

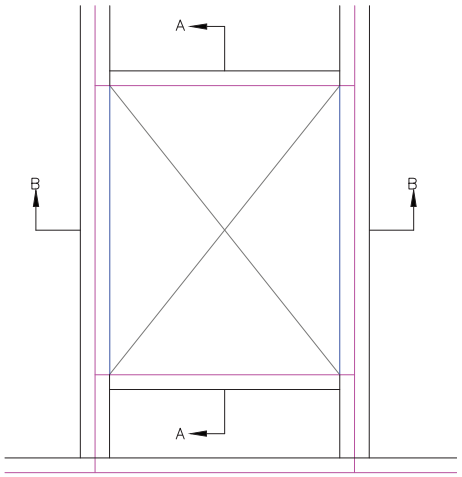
Typical eaves detail vertical section
142mm Kingspan TEK®
Building System wall panel
to 172mm Kingspan TEK®
Building System pitched roof panel

Date:		
29/01/2024		
Drawn by: J.L.	Scale: 1:10	R 2

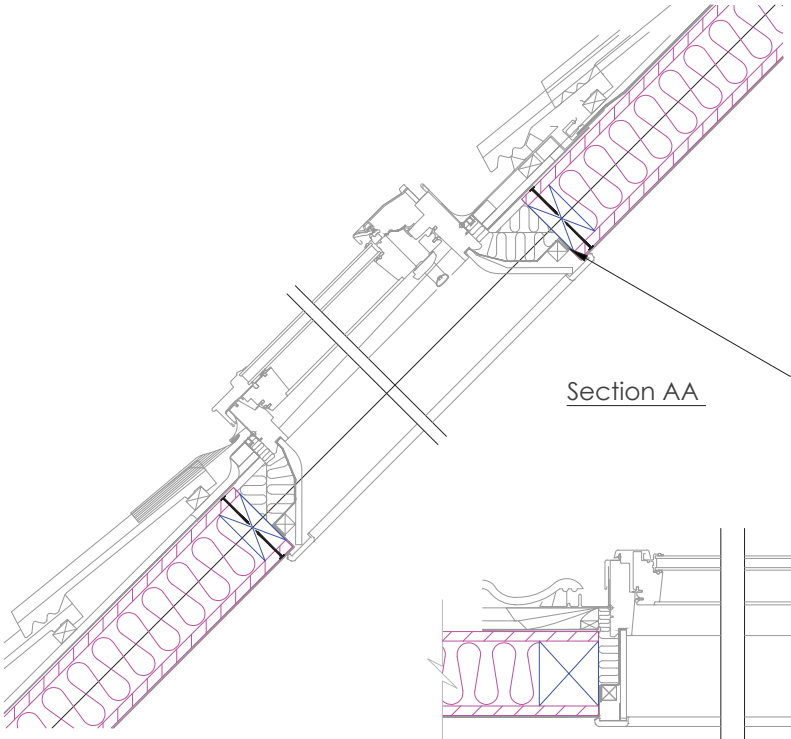
NB For modelled constructions of the flanking element in the roof please refer to the psi-value and temperature factor tables

Appendix A: Associated details

Rev	Date	By	Description



Panel elevation showing opening for rooflight - 1:20



Section AA

Section BB

Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Typical rooflight detail.

Date: 29/01/2024

Drawn by: J.L.

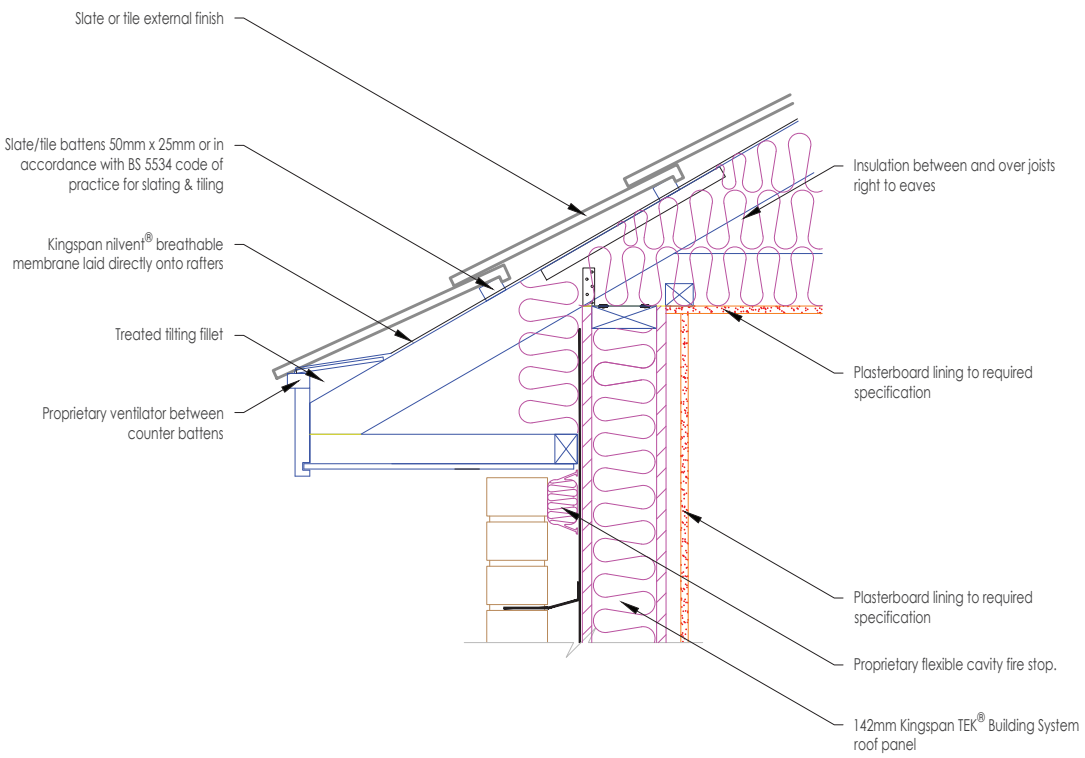
Scale: 1:10

R 7

NB Thermal modelling assumes roof window encompasses opening with proprietary insulated installation kit, specification of roof window should be checked to ensure listed psi-values are not overly favourable

Appendix A: Associated details

Rev	Date	By	Description



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Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

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Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
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Typical eaves detail vertical section with truss rafter pitched roof.

Date: 29/01/2024

Drawn by: J.L.

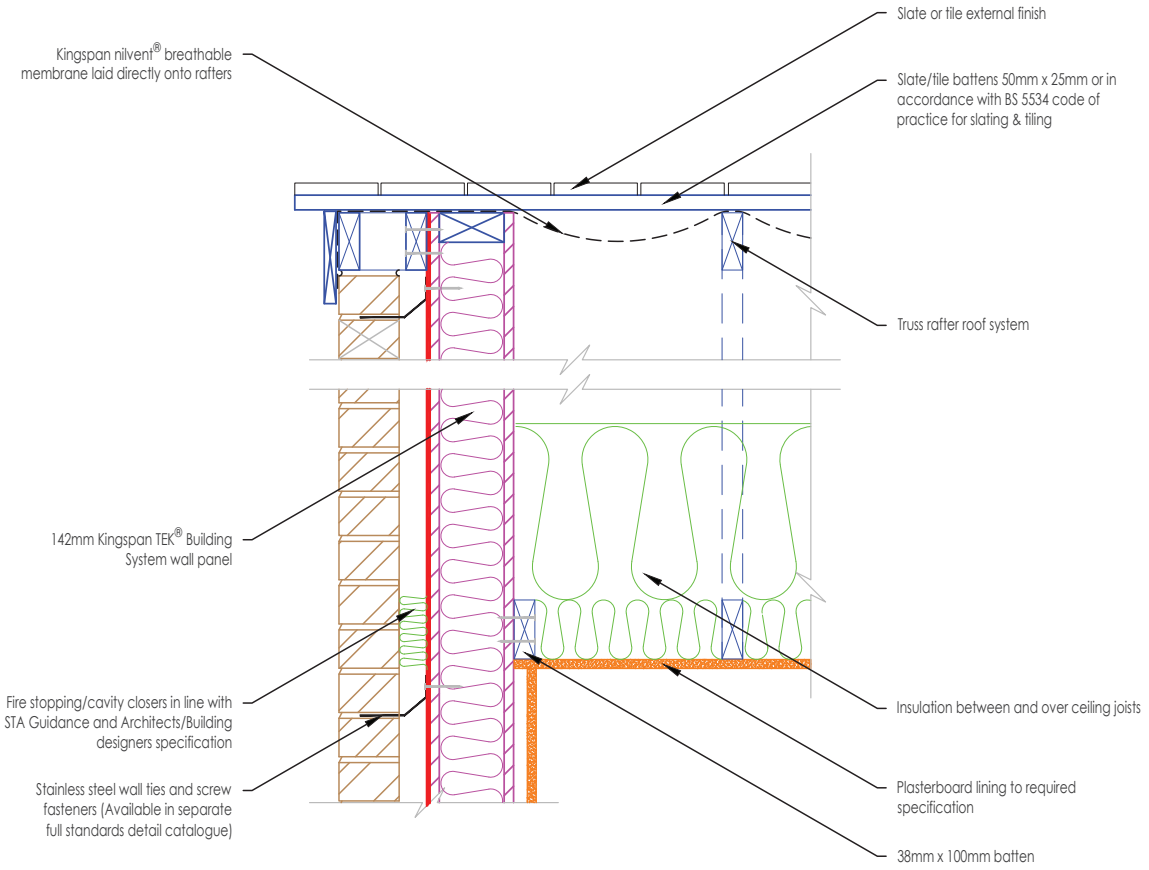
Scale: 1:10

R 10

NB Calculations based on a ceiling with 100 mm mineral wool (0.044 W/mK) between joists and 300 mm mineral wool (0.044 W/mK) above joists.

Appendix A: Associated details

Rev	Date	By	Description



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Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
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web: www.kingspantek.co.uk

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Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
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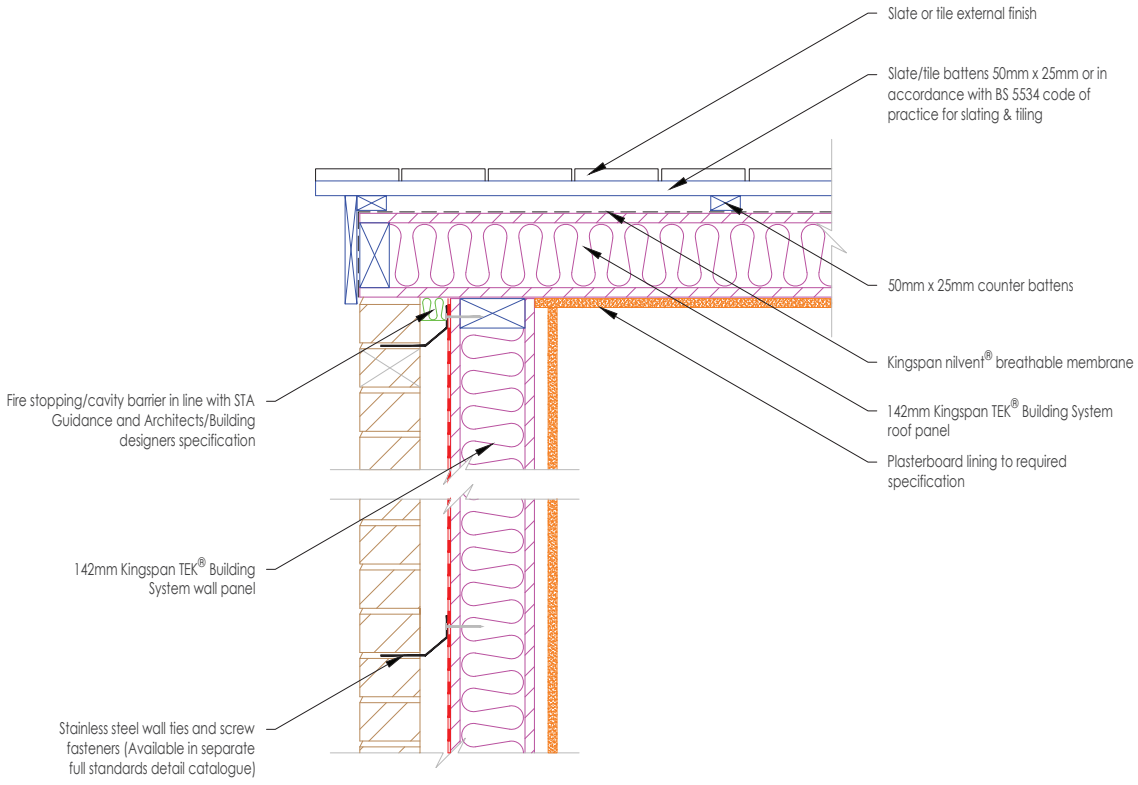
Kingspan TEK® Building System gable junction - truss rafter roof with insulation at ceiling level.

Date: 29/01/2024
Drawn by: J.L.
Scale: 1:10
R 11

NB Calculations based on a ceiling with 100 mm mineral wool (0.044 W/mK) between joists and 300 mm mineral wool (0.044 W/mK) above joists.

Appendix A: Associated details

Rev	Date	By	Description



Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

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Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Kingspan TEK® Building System gable junction - Kingspan TEK® Building System roof panel.

Date: 29/01/2024

Drawn by: J.L.

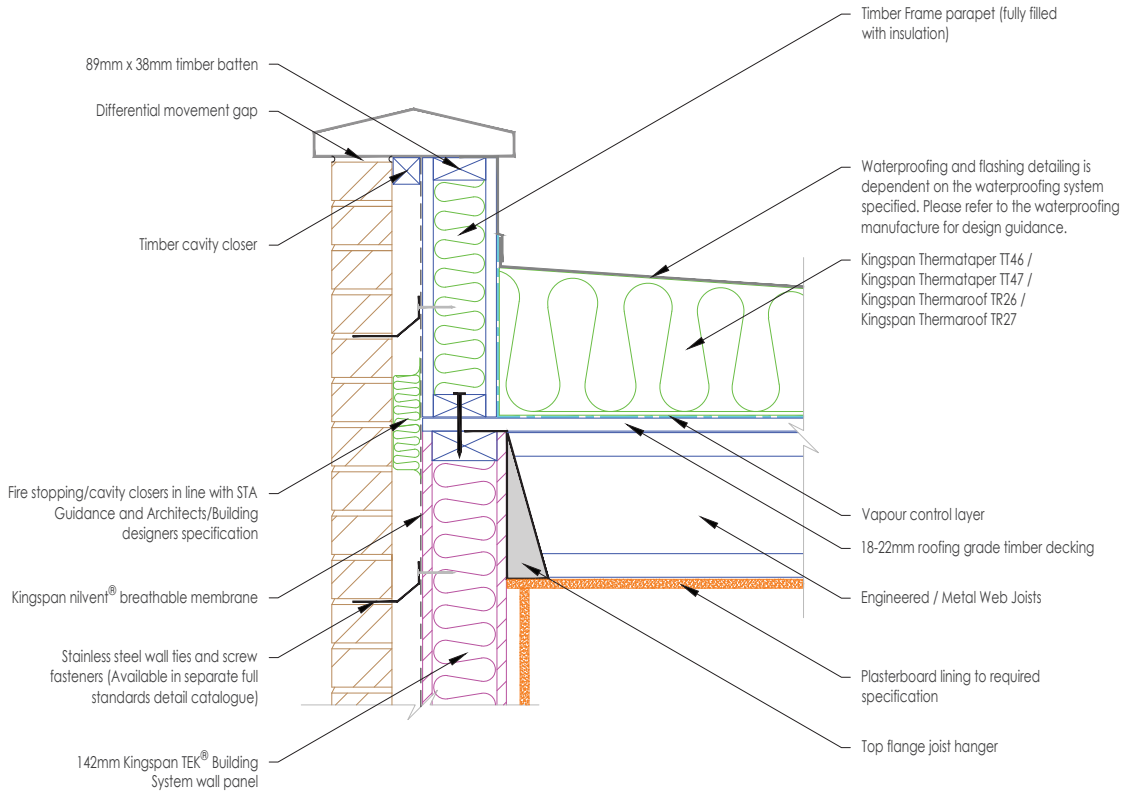
Scale: 1:10

R 12

NB For modelled constructions of the flanking element in the roof please refer to the psi-value and temperature factor tables

Appendix A: Associated details

Rev	Date	By	Description



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Kingspan Insulation Limited
Pembridge, Leominster,
Herefordshire, HR6 9LA.
Tel: +44(0)1544 388 601
E-mail: info@kingspantek.co.uk
web: www.kingspantek.co.uk

Kingspan Insulation Limited
Castleblaney,
Co. Monaghan, Ireland
Tel: +353(0)42 979 5000
E-mail: info@kingspantek.ie
web: www.kingspantek.ie

Kingspan TEK® Building System external wall junction with warm deck flat roof - timber frame parapet wall.

Date: 29/01/2024

Drawn by: J.L.

Scale: 1:10

R 13

NB Calculations based on 160 mm Kingspan Thermaroof® TR27 for the flat roof. If Kingspan Thermataper® T47 is used, a minimum thickness of 160 mm would need to be accommodated at the edge of the roof. This would allow the above Ψ-values to be used (TR27 for TT47).

Appendix B: SAP evidence sheet

The evidentiary requirements of an energy assessment are a key part of the process. These documents provide proof that what was constructed matches what was specified and enables assessors to supply information for audit purposes to their accreditation body if required. Please tick (✓) the following columns for the details used on your project and then sign the declaration below.

Junction details			Detail followed (✓)	Comments
E2	W-16/W-17	Typical section at window head - brickwork external leaf. (50 x110 timber in lintel)	☐	
		Typical section at window head - brickwork external leaf. (100x110 timber in lintel)	☐	
		Typical section at window head - brickwork external leaf. (110x200 timber in lintel)	☐	
E3	W-14/W-15	Typical section at window cill - brickwork external leaf (standard cill)	☐	
		Typical section at window cill - brickwork external leaf (prefabricated concrete cill)	☐	
		Independent steel lintel externally and independent concrete lintel internally (normal overlap)	☐	
E4	W-12/W-13	Typical window detail - brickwork external leaf detail.	☐	
E5	W-5	Typical ground bearing floor slab detail with 140mm blockwork wall. TF70 floor insulation with lightweight (0.19 W/mK) blockwork	☐	
		Typical ground bearing floor slab detail with 140mm blockwork wall. TF70 floor insulation with dense (1.13 W/mK) blockwork	☐	
		Typical ground bearing floor slab detail with 140mm blockwork wall. K103 floor insulation with lightweight (0.19 W/mK) blockwork	☐	
		Typical ground bearing floor slab detail with 140mm blockwork wall. K103 floor insulation with dense (1.13 W/mK) blockwork	☐	
	W-8/W-9	Sectional elevation through beam and block floor support. TF70 floor insulation with lightweight (0.19 W/mK) blockwork	☐	
		Sectional elevation through beam and block floor support. TF70 floor insulation with dense (1.13 W/mK) blockwork	☐	
		Sectional elevation through beam and block floor support. K103 floor insulation with lightweight (0.19 W/mK) blockwork	☐	
		Sectional elevation through beam and block floor support. K103 floor insulation with dense (1.13 W/mK) blockwork	☐	
E6	F-2	Typical connection detail for engineered I-joist floor system.	☐	
	F-3	Typical connection detail for engineered POSI-joist floor system.	☐	
E7	F-1	Separating floor detail. Platform frame. Non-Robust detail pre completion test (pct) required	☐	
E10	R-10	Typical eaves detail vertical section with truss rafter pitched roof	☐	
E11	R-1	Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - plasterboard only	☐	
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 20mm TP10 on roof	☐	
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 50mm TP10 on roof	☐	
		Typical eaves detail vertical section with Kingspan TEK Building System 142 mm pitched roof panel - 90mm TP10 on roof	☐	
	R-2	Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - plasterboard only	☐	
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel- 20mm TP10 on roof	☐	
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - 50mm TP10 on roof	☐	
		Typical eaves detail vertical section with Kingspan TEK Building System 172 mm pitched roof panel - 90mm TP10 on roof	☐	

Appendix B: SAP evidence sheet

Junction details			Detail followed (✓)	Comments
E12	R-11	Kingspan TEK Building System gable junction - truss rafter roof with insulation at ceiling level	☐	
E13	R-12	Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - plasterboard only	☐	
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 20mm TP10 on roof	☐	
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 50mm TP10 on roof	☐	
		Kingspan TEK Building System gable junction - Kingspan TEK Building System roof panel - 90mm TP10 on roof	☐	
E15	R-13	Kingspan TEK Building System external wall junction with warm deck flat roof - timber frame parapet wall	☐	
E16	W-11	Plan showing typical wall connection detail. Corner & T-junction.	☐	
E17	W-11	Plan showing typical wall connection detail. Corner & T-junction.	☐	
E18	W-26	Kingspan TEK Building System external (flanking) wall junction with timber separating walls to Robust Details E-WT-1 and E-WT-2	☐	
R1	R-7 (section A-A)	Typical rooflight detail.	☐	
R2	R-7 (section A-A)	Typical rooflight detail.	☐	
R3	R-7 (section B-B)	Typical rooflight detail.	☐	

I, as site manager/supervisor (or other suitable project staff member), certify that the selected details (above) have been constructed on site following the corresponding general construction sequence and material properties to allow the relevant Ψ-values to be claimed and therefore used in the energy assessment process. I have read and understood the accompanying guidance including the limits and applicability of modelling.

Name:	
Site name:	
Plot no.	
Signed:	
Date:	

Appendix C: List of material properties

The thermal modelling contained within this document utilises the following material characteristics, derived from relevant standards, manufacturer declaration, industry guidance or other available industry information.

Material name	Thermal conductivity (W/mK)	Notes
Aerated blockwork	0.19	
Brickwork	0.77	
Compacted hardcore	2	
Concrete	1.4	
Concrete beams	2	
Dense blockwork	1.13	
Flexible roof/ceiling/party wall insulation	0.044	
Foundations	2	
Ground/soil	2	Default soil conductivity from BS EN ISO 13370:2017
Kingspan Kooltherm® K103	0.019	
Kingspan TEK Building System core	0.024	
Kingspan TEK Building System OSB facing	0.13	
Kingspan Thermafloor® TF70	0.022	
Kingspan Thermapitch® TP10	0.022	
Kingspan Thermaroof® TR27	0.027	(insulant thickness < 80 mm)
	0.025	(insulant thickness 80 - 119 mm)
	0.024	(insulant thickness ≥ 120 mm)
Kingspan Thermawall® TW55	0.022	
Mortar	0.94	Present only to adjust the thermal conductivity of the blockwork not present in the actual models
Plasterboard	0.19	
Posi-joist metal web	50	
Proprietary insulated fire stop	0.035	
Reinforced concrete	2.5	Present in suspended concrete floor
Screed	1.4	
Solid Timber	0.12	
Timber (inc. plyboard, skirting and soffit board)	0.13	
Trench block	0.24	

Contact details

Great Britain

Kingspan Insulation Ltd
Pembridge | Leominster
Herefordshire | HR6 9LA

T: +44 (0) 1544 388 601
E: info@kingspantek.co.uk
www.kingspantek.co.uk

For individual department contact details please visit
www.kingspantek.co.uk/contact

Ireland

Kingspan Insulation Ltd
Castleblayney | County Monaghan

T: +353 (0) 42 979 5000
E: info@kingspantek.ie
www.kingspantek.ie

For individual department contact details please visit
www.kingspaninsulation.ie/contact

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