10.5 JOINING ROOF SECTIONS AT THE RIDGE (NO RIDGE BEAM)

When *Kingspan* **TEK** Building System roof sections are joined at the ridge as illustrated in Figures 34a and 34b, two beads of silicone sealant should be applied to one face of the joint prior to bringing the two opposing roof sections together. The two roof sections should then be fixed together in accordance with the fixing specification in Table 1, section 2.6*.

*Refer to structural calculations for any variations in fixing centres.

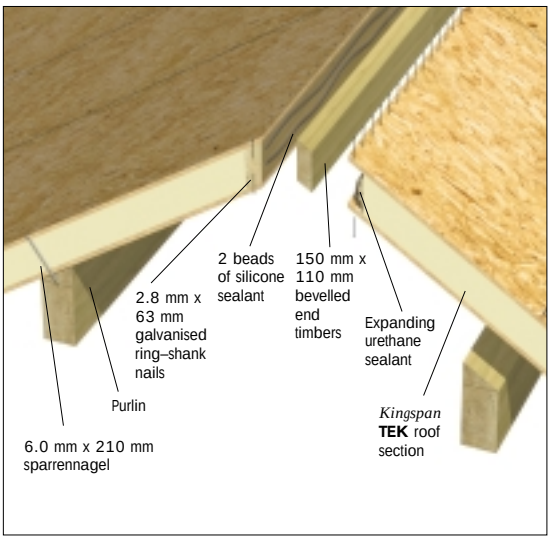

Figure 34a INSTALLATION OF ROOF SECTIONS WITH NO RIDGE BEAM

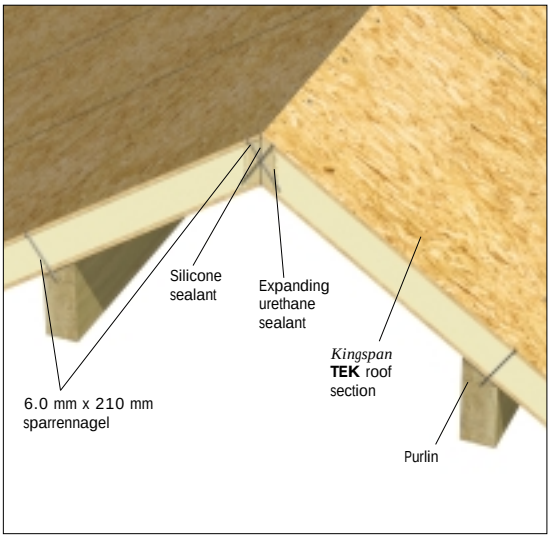

Figure 34b INSTALLATION OF ROOF SECTIONS WITH NO RIDGE BEAM

10.6 ROOF OPENINGS

Openings for roof windows and rooflights in *Kingspan* **TEK** Building System roof sections are preformed and incorporated into the panel layouts.

Openings are framed using 50 mm x 110 mm timbers or beams that have been fixed into suitable routs along the panel edges.

Penetrations for flues and vents are typically cut later, after the assembly of the *Kingspan* **TEK** Building System has been completed. Flues and vents should be isolated from the structure by a fire resistant isolating sleeve.

Additional openings should not be cut into *Kingspan* **TEK** Building System roof panels without first having sought approval from Kingspan Insulation Limited.

11 ATTACHING NON TENTING BREATHER MEMBRANE TO WALLS

Once all walls have been completed a non–tenting breather membrane e.g. *Kingspan* **nil*vent***™ should be attached according to the guidance given in the manufacturers installation instructions (see Appendix E). Care should be taken to ensure that laps are correctly formed and that the breather membrane is secure.

Hint: Non–tenting breather membrane e.g. *Kingspan* **nil*vent***™, should be draped over the top of the *Kingspan* **TEK** Building System wall panel to a depth of 150 mm. This enhances the weather tightness of the wall panel. This is illustrated in Figure 35.

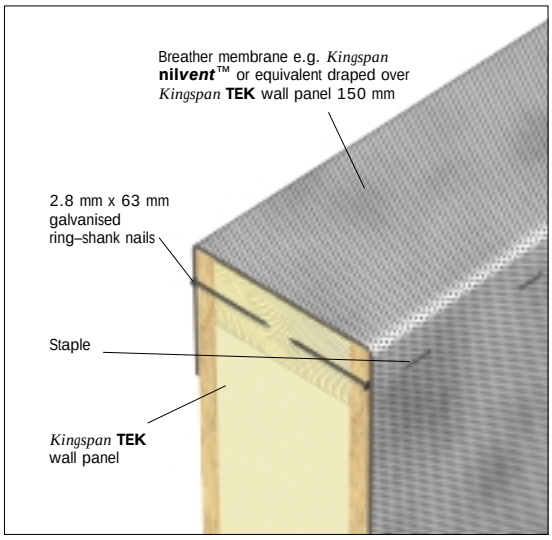

Figure 35 TEMPORARILY DRAPE BREATHER MEMBRANE OVER WALL PANEL TO ENHANCE WEATHER TIGHTNESS

12 MEMBRANE AND BATTENING OF THE ROOF

All safety systems should remain in place until the non–tenting breather membrane e.g. *Kingspan* **nil*vent***™ and battening has been applied. The breather membrane should be applied starting from the eaves and moving upwards towards the ridge. Minimum overlaps should apply in accordance with the manufacturer's instructions (see Appendix E). Counter battens should then be fixed over the membrane in accordance with the project specification.

Slate or tile battens are then fixed over the counter battens at centres to suit the chosen tile / slate type and size. The last batten on each length of breather membrane should not be fixed until the run of membrane layer is laid. This is to facilitate the lapping of subsequent layers.

13 FIXING THE KINGSPAN TEK BUILDING SYSTEM TO THE BOTTOMPLATE

The entire structure can now be nailed to bottomplate at ground floor level, in accordance with the fixing specification in Table 1, section 2.6. Soleplates to door openings can now be removed.

Temporary bracing can be removed once each floor level has been fully completed.

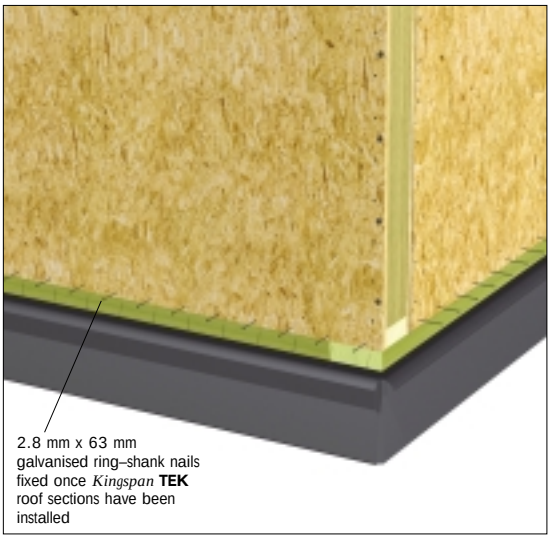

Figure 36 FIXING GROUND FLOOR WALL PANELS TO BOTTOMPLATE

Caution: Check engineers drawings to ensure all additional holding down strips are fixed.

14 FINISHING

14.1 GENERAL

The application of roof and wall finishes should only be commenced once all surfaces, joints, edges, openings (especially rooflights) and connections have been fully inspected and found to be in accordance with the design specification. All finishes should be applied in full accordance with any manufacturers instructions and, if any cracks or gaps are found, they should be sealed with either expanding urethane sealant or silicon sealant as appropriate.

14.2 WATER INGRESS DURING CONSTRUCTION

Kingspan **TEK** Building System wall and roof panels should be protected from the elements as soon as possible once erected. *Kingspan* **nil*vent***™, a non-tenting breather membrane can be supplied with each project and used to wrap the System once erected. Further information on *Kingspan* **nil*vent***™ can be found in Appendix E.

14.3 FITTING WINDOW AND DOORS

Follow manufacturer's instructions when installing windows and doors.

14.5 INTERNAL DRY LINING

Plasterboard should be fixed to the *Kingspan* **TEK** Building System wall in accordance with manufacturers instructions.

Caution: If in doubt about fixing plasterboard and other components please contact Kingspan Insulation Technical Services on 0870 850 8555. Where services need to be installed on a *Kingspan* **TEK** Building System panel, sections 14.6 and 14.7 give a number of options.

14.6 PLUMBING

Plumbing can be installed in the same way as any other building system.

The *Kingspan* **TEK** Building System can use most common ground floor constructions. Therefore ground floor plumbing depends on the floor type.

At first floor level, engineered I-beams are supplied for use with the *Kingspan* **TEK** Building System. The I-beams have pre-cut holes which can be punched out for services, meaning that pipes can be installed in the same way as any other system.

When pipes have to be run up a wall, where possible run them through internal stud partition walls or box them in, in the corner of the room.

When pipes have to be run up a *Kingspan* **TEK** Building System wall panel or appliances such as radiators have to be fixed to the *Kingspan* **TEK** Building System wall panel there are two options:

OPTION 1 – SINGLE LAYER PLASTERBOARD FIXED DIRECTLY TO THE PANEL

Surface mounted pipework – pipe clips can be screw-fixed through the plasterboard and into the wall panel.

Surface mounted radiators – screw fix radiator support brackets through the plasterboard into the wall panel, varying quantity of fixings depending on size of radiator.

Fixing single layer plasterboard directly to the solid *Kingspan* **TEK** Building System wall panel means there are no restrictions on where radiators can be situated. Also there is no extra labour involved, unlike timber frame where noggins have to be installed for fixing units such as radiators.

OPTION 2 – SINGLE LAYER PLASTERBOARD ON TIMBER BATTENS

Surface mounted pipework – pipe clips can be screw-fixed through the plasterboard and timber battens and into the *Kingspan* **TEK** Building System wall panel. Where it is not possible to fix pipe clips through the timber battens, seek guidance on suitable fixings from the pipe clip manufacturer.

Caution: If in doubt about fixing plasterboard and other components to walls please contact Kingspan Insulation Technical Services on 0870 850 8555.

Surface mounted radiators – where ever the radiators are to be situated noggins will be required. However, consideration should be given to the location of wiring (See section 14.7 (Option 2)) prior to the installation of noggins to ensure they do not obstruct service voids up the face of the *Kingspan* **TEK** Building System wall. Guidance on radiator installation is given in section 14.6.

14.7 WIRING

Where possible run wiring through internal stud partition walls. However, if it is necessary to run wiring in *Kingspan* **TEK** Building System walls or roofs there are two possible methods:

OPTION 1 – DOUBLE LAYER PLASTERBOARD

Wiring should be surface mounted in the appropriate locations and protected using an IEE approved metal guard. 12.5 mm or 9.5 mm plasterboard should then be fixed up to the edge of wiring runs. The second layer should then be fixed over the first. Both layers should be fixed in accordance with manufacturers instructions.

OPTION 2 – SINGLE LAYER PLASTERBOARD ON TIMBER BATTENS

Fix 25 mm x 50 mm timber battens at 600 mm centres and install the wiring between them under an IEE approved metal guard. Then mechanically fix 9.5 mm or 12.5 mm plasterboard over the battens in accordance with manufacturers instructions.

Caution: If in doubt about fixing plasterboard and other components to *Kingspan* **TEK** Building System panels, contact Kingspan Insulation Technical Services on 0870 850 8555.

14.8 INTERNAL PARTITION WALLS

Standard timber framing practices are recommended. Internal stud walls are secured to the *Kingspan* **TEK** Building System wall panels using 2.8 mm x 63 mm galvanised ring-shank nails for end studs that are no greater than 38 mm thick.

14.9 CABINET AND BOILER ATTACHMENT

14.9.1 CABINETS

Cabinets can be fixed anywhere along the surface of *Kingspan* **TEK** Building System wall panels using suitable screw fixings. For optimal strength, cabinets should be hung before the wall panels have been lined with plasterboard. Where cabinets have to be screw fixed through either double layer plasterboard or single layer on battens (See sections 14.6 and 14.7) use fixings that will penetrate through the cabinet backs and fully penetrate the internal OSB3 facing of the wall panel. Where a single layer plasterboard has been installed on battens screw fixings should go through noggins into the wall panel.

14.9.2 BOILERS

Boilers can be fixed anywhere along the surface of an external *Kingspan* **TEK** Building System wall using appropriately sized fixings.

Caution: If in doubt about fixing cabinets or boilers to walls to *Kingspan* **TEK** Building System, please contact Kingspan Insulation Technical Services on 0870 850 8555.

APPENDIX A: CUTTING AND ROUTING PANELS

A.1 GENERAL

The *Kingspan* **TEK** Building System should arrive on site with all panels pre-cut and pre-routed for OSB3 splines, all timbers, beams and purlins. In the event that on-site modifications are made to the plans, or if other cuts or routed grooves are required, instructions for that work are presented below.

Caution: Always contact Kingspan Insulation before making alterations to *Kingspan* **TEK** Building System panels. Contact *Kingspan* **TEK** Building System drawing office on 0870 850 8555.

A.2 CUTTING

Kingspan **TEK** Building System panels can be cut with large diameter circular saws. However, a handsaw may be required for finishing some mitre cuts, corner cuts around windows and doors if a second pass of the blade from the opposite side is not possible.

Caution: Always contact Kingspan Insulation before making alterations to *Kingspan* **TEK** Building System panels. Contact *Kingspan* **TEK** Building System drawing office on 0870 850 8555.

A.3 ROUTING - GENERAL

All *Kingspan* **TEK** Building System System panels should arrive on site pre-routed. In the event that the panels need routing on site, it should be done in a clear area with plenty of room to manoeuvre using only the correct tools. Wear goggles and a dust mask for safety. Do not over rout the panels.

Caution: Always contact Kingspan Insulation before making alterations to *Kingspan* **TEK** Building System panels. Contact *Kingspan* **TEK** Building System drawing office on 0870 850 8555.

A.3.1 ROUTING – OSB3 SPLINE JOINTS

For a twin 15 mm x 100 mm OSB3 spline joint, two parallel 15 mm wide grooves are cut in the insulation core next to the *Kingspan* **TEK** Building System panel's internal and external OSB3 facings to a depth of 50mm. A notch in the insulation between the spline grooves is also cut to facilitate placing the expanding urethane sealant when the panels are joined together. Do not over rout the panels. For further information please contact *Kingspan* **TEK** Building System drawing office on 0870 850 8555.

A.3.2 ROUTING – SOLID TIMBER SPLINE JOINTS

A 100 mm x 110 mm timber post joint is made by making a full width rout 50 mm deep in both *Kingspan* **TEK** Building System panels to be joined. For further information please contact *Kingspan* **TEK** Building System drawing office on 0870 850 8555.

A.3.3 ROUTING – FULLY INSET TIMBERS

For a fully inset 50 mm x 110 mm timber (around door and window openings, at wall corners, etc.), 50 mm of insulation core is routed out from the panel edge. For further information please contact *Kingspan* **TEK** Building System drawing office on 0870 850 8555.

APPENDIX B: KINGSPAN TEK BUILDING SYSTEM ANCILLARIES LIST

Timbers	Specification
Soleplate	140 mm x 40 mm pre-treated with preservative
End timber, headplate, bottomplate, edge timber	50 mm x 110 mm timber C24 grade
Timber post	100 mm x 110 mm timber C24 grade (unless stated otherwise)
OSB3 spline	100 mm x 15 mm OSB3
Beams	Specification
I-beam	As specified by structural engineer
Floor beam	As specified by structural engineer
Purlin	As specified by structural engineer
Ridge beam	As specified by structural engineer
Panel Fasteners	Size
Galvanised rink shank nails (Paslode)	2.8 mm x 63 mm, 3.1 mm x 90 mm,
Galvanised twist shank nails	3.75 mm x 32 mm
Round wire nails	3.35 mm x 65 mm, 3.75 mm x 75 mm
Sparrennagel	6.0 mm x 210 mm, 6.0 mm x 225 mm, 6.0 mm x 250 mm
Building Fixings	Specification
Joist hangers	As specified by structural engineer
Scabs	As specified by structural engineer
Sealants	Pack size
Expanding urethane sealant	750 ml cans in boxes of 12
Silicone sealant	600 ml tubes
Other ancillary items	Specification
Rimboard	32 mm – 60 mm thick engineered timber beam
Shims	2 mm, 3 mm, 4 mm, 5 mm, 6 mm

The Kingspan TEK Building System Construction Manual

APPENDIX C: RISK ASSESSMENT

Designer:		*Kingspan* **TEK** Building System	Project:			
Job No.			Date:			
Ref. No.	Activity / Element	Potential Hazards	Risk Rating L	S	R	Action taken at design stage
1	Site - general	Unauthorised access to site.	1	2	2	None
		Slips and trips	2	2	4	None
2	Working spaces and working platforms	Working at height - risk of falling	3	3	9	The System is designed to incorporate floor decking at the earliest possible time and is weather resistant.
		Collapse of temporary structures	2	3	6	None
3	Materials / substances	Manual handling / musculo-skeletal injuries	2	2	4	Design to allow mechanical handling wherever possible. Ensure unit weights and sizes of materials are reduced to acceptable levels where manual handling is unavoidable. Provide adequate information re. Weights etc.
		Carcinogenic materials	1	1	1	Cutting of components is undertaken in a controlled factory environment to minimise any risk from prolonged exposure to wood dust.
		Respiratory injuries	1	1	1	Cutting of components is undertaken in a controlled factory environment to minimise any risk from prolonged exposure to wood dust. Assembly of panels uses mechanical fasteners and adhesives only.
4	Erecting, constructing structures and wall / roof sections	Collapse - temporary instability.	2	3	6	Minimise risk of temporary instability during construction. Agree erection sequences and the details of temporary support measures where critical
		Collapse - temporary loadings during construction.	2	3	6	Maximum construction loadings shown on drawings where appropriate.
		Falls from height.	3	3	9	The System is designed to incorporate floor decking at the earliest possible time and is weather resistant.
		Handling major components	2	3	6	Consider access, storage, erection procedures and lifting details for large components
5	Future maintenance, repair, alteration, dismantling and / or demolition	Unfamiliar construction	2	2	4	Provide adequate information regarding design parameters, construction details, design loadings and specific alteration and demolition hazards for inclusion in the health and safety file.
		Hazardous materials and substances.	1	1	1	Provide adequate information regarding design parameters, construction details, design loadings and specific alteration and demolition hazards for inclusion in the health and safety file.
		Fire	1	3	3	Design to current Building Regulation requirements.

Key: L = Likelihood, S = Severity, R = Risk = LxS
1 = Low, 2 = Medium, 3 = High

Common Operations	
	Possible control Options (Contractor)
Y	Fit hoarding to scaffold.
Y	Ensure all components are correctly stored and site is organised and tidy.
Y	Follow accepted practice for guarding against falling by protecting edges and openings in floors.
Y	Provide adequate bracing to ensure temporary stability structures of walls. Ensure working platforms and scaffold are properly designed and erected.
Y	Follow accepted practice for manoeuvring large objects in accordance with contractors standard method statements that cover craneage, personal protective equipment PPE and trained staff.
Y	Provide PPE as per COSHH assessment sheets where necessary.
Y	Provide PPE as per COSHH assessment sheets where necessary.
N	Contractor to write SPECIFIC method statement defining the erection sequence to minimise risk of instability. Use only experienced staff familiar with procedures.
Y	Contractor to familiarise himself with drawings and specifications contained in health and safety plan.
Y	Contractor should maximise the amount of preassembly of components in safe areas prior to lifting and assembly. Follow contractors standard method statement / recommendations for protecting against falling.
Y	Plan for manoeuvring large objects following guidance in contractors standard method statements that cover craneage, PPE and trained staff.
Y	Ensure all project information is compiled in health and safety file.
Y	Ensure all project information is compiled in health and safety file.
Y	Ensure all project information is compiled in health and safety file.

APPENDIX D: KINGSPAN TEK BUILDING SYSTEM ESSENTIAL TOOL LIST

Item	Suitable Specification	Quantity per scheme
Müba steel wall braces		Min. 20 pieces in size 1 Min. 5 pieces in size 2
Surveyors Level and tripod		1
Measuring staff in mm		1
Air Nailer	Bostitch Coil Nailer model N80 / N100 (coil nails) or Paslode Strip Nailer (strip nails)	2
Air compressor	400 lt per min. loading capacity	1
Rubber air hoses		50 m
Silicon dispenser for 750 ml foil tubes		2
Foam Gun		2
Chain Hoist		2
Lifting belts		50 per kit (made from car safety belt)
1 Ton lifting belts	1.8 m long	4 per scheme
Rucki Zucki Nick Nack		3
Lorry straps	8 m long and 15 m long without hooks	2 of each
Hammer stapler	Bostitch model H2B Duofast	1
8-foot stepladder	Industrial grade	2
20-foot extension ladder	Industrial grade	2
Hotbox for expanding urethane sealant (permits maximum sealant yield, needed in cool to cold weather, also when foam has reached expiration date)		1

NB. This equipment is required over and above a normal kit of standard carpentry handtools (manual and powered)

APPENDIX E:
OTHER MANUFACTURERS LITERATURE

CUSTOMER SERVICE

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

UK
- Telephone: +44 (0) 1544 387275
- Fax: +44 (0) 870 850 8666
- email (quotations / enquiries): quotations@tek.kingspan.com

Ireland
- Telephone: +353 (0) 42 97 95000
- Fax: +353 (0) 42 97 46129
- email (quotations / enquiries): quotations@tek.kingspan.com

TECHNICAL ADVICE/DESIGN

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

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

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

The *Kingspan* **TEK** Building System incorporates a comprehensive Design Service. Give us your detailed architectural plans in hard copy or via email (see below) and we will engineer a *Kingspan* **TEK** Building System scheme to match your design. This scheme lays out in detail the way in which the System's panels are to be joined on site to create your building. We will consult you on all aspects of design throughout this process.

Please contact our Technical Services Department on the numbers below:

TECHLINE

UK
- Telephone: +44 (0) 870 850 8555
- Fax: +44 (0) 1544 387278
- email (technical advice): techline.uk@tek.kingspan.com
- email (plans): design@tek.kingspan.com

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- Fax: +353 (0) 42 97 46129
- email (technical advice): techline.ie@tek.kingspan.com
- email (plans): design@tek.kingspan.com

LITERATURE AND SAMPLES

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

Kingspan Insulation technical literature is an essential specification tool. For copies please contact our Marketing Department on the numbers below:

UK
- Telephone: +44 (0) 1544 387 210
- Fax: +44 (0) 1544 387 299
- email: literature.uk@tek.kingspan.com

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GENERAL ENQUIRIES

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

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