

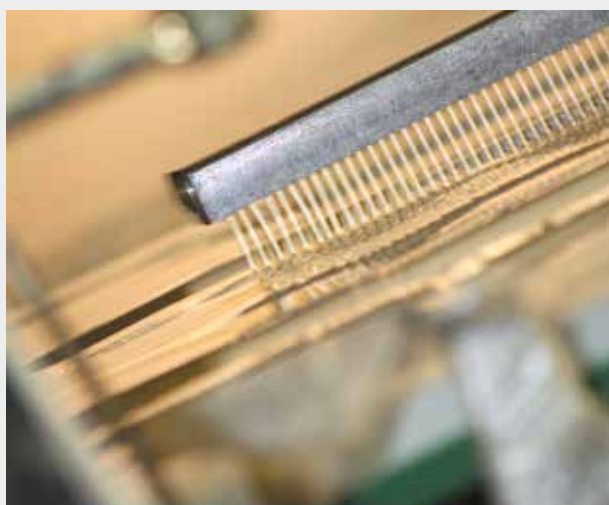


Insulated Roof & Wall Panels

INSULATED ROOF AND WALL PANELS

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This brochure describes the AS35 insulated panel manufactured by Steadmans for roofs and walls; it includes technical description and performance data for the systems, offers guidance for designers and includes sitework advice.

About AS35 and Steadmans

The AS35 insulated panel has now been manufactured by Steadmans, part of SIG plc, in Cumbria and has been supplying its roofing and cladding panels to the construction industry for over 16 years. Alongside the AS35 insulated panel Steadmans offers a complete range of roofing and cladding solutions, supplying panels, single and twin skin profiles, framing and ancillary components from sites in England, Scotland and Northern Ireland on its dedicated haulage fleet.

Steadmans has a programme of continuous investment and ongoing product development which ensures high quality products at competitive prices. We work closely with designers, specifiers and contractors, offering advice and design guidance to help create attractive and efficient buildings.

SIG plc is a FTSE 250 listed company and the UK's market leading specialist supplier to professionals in the building and construction industry. You can find out more by visiting the website – www.sigplc.com.

Insulated Panels

The AS35 insulated panel is a self-supporting composite panel for roofing and cladding. The external face of the panel has a clean sharp profile and is available in an extensive range of colours and finishes, enabling designers to create modern and visually-engaging buildings.

The attractive and durable properties of the AS35 insulated panel lends itself to projects across many market sectors, including industrial, retail, office, health, education, leisure and agricultural. The AS35 insulated panel is ideal for roofing and cladding steel framed buildings and can be fully integrated with both modern and traditional methods of construction.

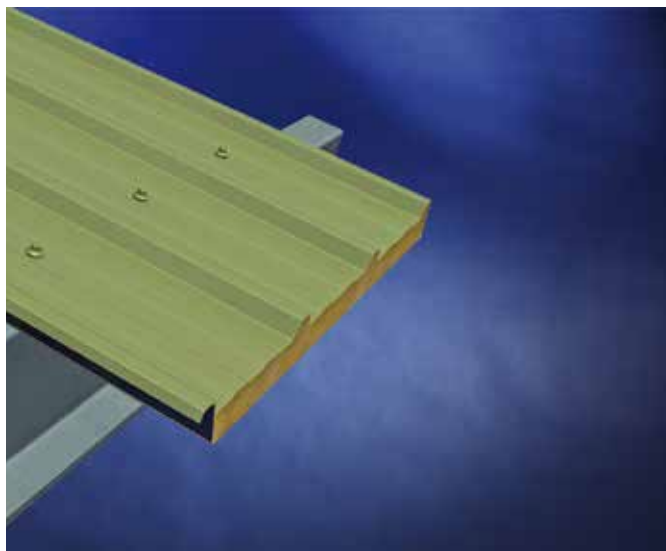
We can also supply and fabricate a comprehensive range of accessories and components such as rooflights, gutters and flashings to provide the finishing touches to any building.

Our panels consist of a core of polyisocyanurate (PIR) insulation sandwiched between an external weather sheet and an internal liner. The insulation bonds to the steel sheets during the manufacturing process; together, the core and facings form strong, rigid panels with excellent thermal performance. The PIR is produced with a non-ozone depleting blowing agent, which has low global warming potential. Its low thermal conductivity gives the panel a thermal performance which matches other materials, but in a reduced thickness. Equally, PIR can withstand higher temperatures than other foamed insulants and when in contact with flames forms a surface char which limits fire spread.

INSULATED ROOF AND WALL PANELS

AS35 Insulated roof & wall panel

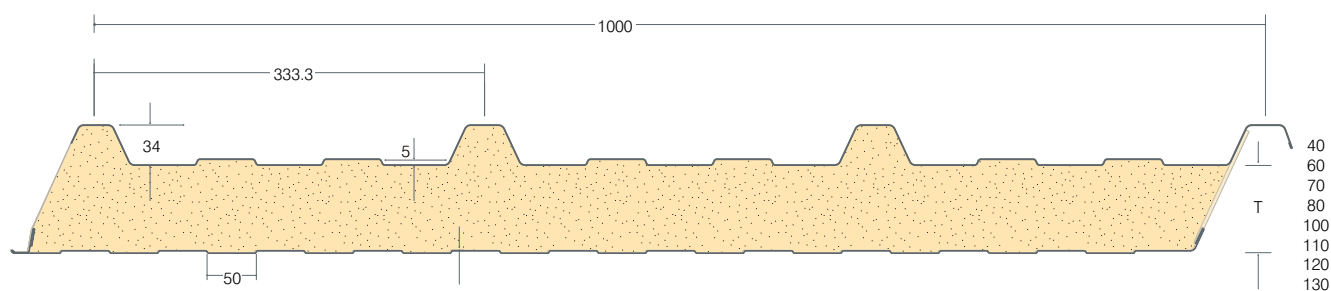
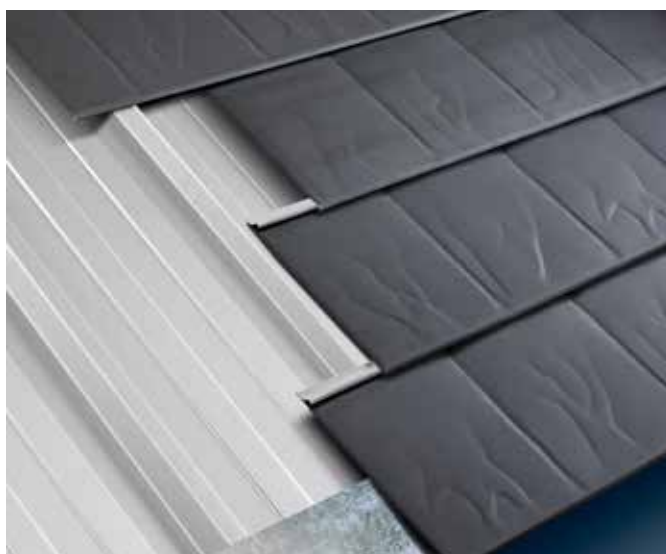
The AS35 insulated panel is a deep profile, composite panel for roofing and cladding. It combines a crisp appearance with high thermal performance. The trapezoidal profile of the AS35 panel imparts a regular rhythm to roofscapes and gives bands of deep shadowing when installed on walls. It is this profile that also gives the panel such great structural strength.



With panel thicknesses between 40mm – 130mm and with a 1000mm cover width, they are available from 2.0m up to 22m in length. For shorter lengths please contact our sales department.

Weatherproof panel joints are formed by lapping the extended weather sheet on one side of the panel (the 'female' side) over the final crown of the adjacent panel. The exposed edge of insulation is sealed with factory – applied tape to ensure optimum air leakage and thermal performance. Panels are supplied with the insulation cut back at one end to enable the formation of panel end laps on wide span roofs and drip edges at eaves and valley gutter details.

AS35 roofing panels are also component part of the Steadmans MetaSlatePlus System to create roofs which combine high thermal performance with the appearance of a traditional slate roof.



AS35 panel dimensions (mm, nominal)

ACCESSORIES

A wide range of manufactured and supplied components and accessories to complete insulated panel roofing and cladding projects, including top hat profiles, covers strips, gaskets, fillers, fasteners and sealants (see AS35 design details for information on these ancillary items).

Rooflights

A range of factory assembled industrial rooflights to match the AS35 roof panel are available. Providing high quality natural daylight, industrial rooflights reduce the need for artificial light, saving energy and reducing the carbon footprint of any industrial building.

Gutters

A complete range of gutters and accessories to meet the specifications of individual projects can be fabricated and supplied. Gutters are fabricated in lengths up to 10m, from a variety of materials including aluminium, pre-galvanised steel, pre-coated steel with a PVC finish, and membrane lined gutters. For greater thermal performance insulated gutters can be fabricated where required.

Flashings

A range of flashings in finishes to match AS35 panels and in lengths of up to 6m can be manufactured. Flashings can be supplied in a wide range of profiles: traditional profiles can be used to form basic weatherproof junctions; bullnose or bespoke curved and folded flashings will enhance the appearance of the building; while secret fix flashings will give a precise unbroken profile to the junction. Flashing finishes can be matched to wall and roof panels; or used to form complementary or contrasting features.

Fasteners, fillers & sealants

A range of butyl sealants, profiled fillers, gaskets and expanding foams to enable panels to be sealed to each other and to other building components are available, so avoiding thermal bridging and air leakage. Our fastener specifications are detailed on page 28 .



DESIGN CONSIDERATIONS

Fire

Insulated panels forming the external envelope of a building must comply with fire standards for several different aspects of performance, in order to preserve life.

Resistance to surface spread of flame. The linings of walls and ceilings must not propagate the spread of fire within the building. Building Regulations and Standards across the UK permit Class 0 (Euroclass B) materials to be used to form the internal surfaces of walls and ceilings without any restrictions or additional treatment.

The **fire resistance** of a building relating to non-load bearing elements is determined by:

- its integrity – resistance to fire penetration through the element (designated E in European classifications).
- its insulation capacity – to prevent the transfer of excessive heat from one side to another (designated I in European classifications).

Fire resistance is tested to BS 476-22 (national test) and BS EN 1364-1 (European test). Performance requirements for wall panels depend on the building's purpose group, its height and the presence or absence of sprinklers.

External walls must limit the spread of fire from one building to another. It may be necessary to make all or part of the external wall fire resisting to limit the heat radiation to an adjacent building or boundary.

The required performance depends on a number of factors:

- use of the building
- area of the wall
- distance of the wall from the boundary or adjacent buildings

The relevant boundary is usually the site boundary, however restrictions also apply in some circumstances for building on the same site.

The recommendations of the Approved Document B are summarised:

Walls within 1000mm of the boundary must provide:

- Class 0 or Euroclass B external surface.
- Fire resistance (Integrity and Insulation) to the same standard as required for the building structure.
- Restrictions to window openings.

In general terms the requirement is to provide 60 minutes integrity and insulation when tested from both sides of the wall.

Walls greater than 1000mm from the boundary may still be required to have all or part of the wall fire resisting and the requirements are determined by the purpose group of the building, the distance to the boundary and the area of the boundary wall.

Walls greater than 1000mm from the boundary must provide:

- Fire resistance integrity to the same standard as the other building elements and have an insulation value of 15 minutes.

In all cases the fire resistance is only specified from the inside of the building and the performance criteria for the wall will depend on whether or not the building has an automatic sprinkler system.

The requirements for Scotland are more onerous than those for England, Wales and Northern Ireland. Walls more than 1000mm from the boundary generally require 30 minutes insulation rather than 15 minutes. Purpose groups which require Short duration must provide 30 minutes integrity and insulation. Purpose groups which require Medium duration must provide 60 minutes integrity and 30 minutes insulation. Assessment of the unprotected area is affected by the use of automatic fire suppression systems.

Roofs must meet performance standards for external fire exposure. The specification of roof coverings varies according to the distance of the building from the boundary. No restriction is placed on the use of roof coverings designated AA, AB or AC to BS476-3 or Euroclass B_{roof}(t₄) to EN13501-5 but lower ratings are acceptable if the building is 6 m or more from the boundary.

Thermal performance

Building Regulations across the UK require the carbon dioxide emissions resulting from the operation of buildings to be limited (England: Part L, 2013; Wales, Part L 2014; Scotland, Section 6, 2015, Northern Ireland Part F, 2012).

Compliance is established by comparing the emissions from the proposed building with those from a 'notional building' which has the same size and shape as the proposed building, but uses a standard set of performance values for the fabric and services (see Tables 1 and 2). Calculations are carried out using SBEM (Simplified Building Energy Model) or DSM (Dynamic Simulation Modelling) software.

Although the calculated emissions from the proposed building are affected by the building services solutions, the use of renewables and the choice of heating fuel, proper consideration of the building fabric is essential if the building is to meet regulatory emissions targets.

Designers are not obliged to follow the performance standards for the notional building, provided they meet the overall emissions target, but adopting a 'fabric first' strategy and equalling or improving on the fabric performance of the notional building is essential for creating energy efficient buildings.

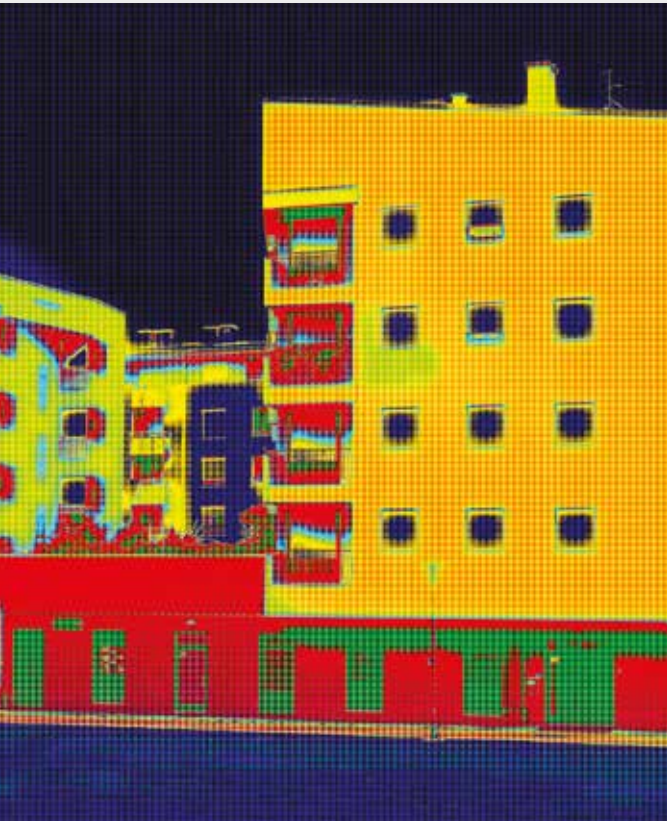
Air permeability: Wind and stack effects can produce air leakage through gaps and cracks in the external envelope resulting in substantial heat loss as conditioned air is drawn out of the building and replaced by cold outside air. Insulated panels minimise air infiltration and reduce heat loss:

- the large, steel-faced panels offer no route for infiltration;
- the design of panel-to-panel laps minimises air infiltration at those junctions.

Table 1: Notional building fabric standards (Part L 2013, England; Part L 2014, Wales)	
Exposed element	U-value (W/m²K)
Roofs	0.18
Walls	0.26
Rooflights	1.80

Heat loss through junctions: The junctions between building elements (such as floor to wall, or wall to roof) are also a source of heat loss, as a result of the geometry of junctions and discontinuities in the thermal insulation produced by structural requirements. The rate of additional heat loss through a junction is measured by its psi-value. Some junctions, such as ridges, allow continuity of insulation, so have very low psi values, while valley gutters, for example, have higher psi-values because of the difficulty of maintaining a continuous layer of insulation.

Table 2: Notional building airtightness standards		
Gross internal area	Air permeability (m³/m²h)	
	Side lit or unlit	Top lit
< 250m²	5	7
250m² < 3,500m²	3	7
3,500m² < 10,000m²	3	5
10,000 <	3	3



DESIGN CONSIDERATIONS

Control of condensation

The fabric of a building must be free from surface or interstitial condensation which could harm the building occupants or damage the building fabric (England and Wales: Part C of the Building Regulations; Scotland: section 3.15 of the Building Standards). To minimise the risk of condensation designers should arrange for moisture to be extracted at source, to prevent high moisture levels within buildings.

Surface condensation forms when the amount of moisture present exceeds that which the air can support at that temperature. It typically occurs when warm, moist air cools on contact with a cold surface.

Insulated panels are unlikely to be affected by surface condensation as the thermal insulation core will keep the surface temperature of the liner above dew point, and the U-values will be well in excess of that required by Regulations and Standards. There may be a risk of surface condensation at junctions, where there is significant discontinuity of insulation.

The risk should be evaluated using the methods in BRE IP 1/06 and the temperature factors (f-values) given in design details. The principles for obtaining high f-values are identical to those for obtaining low psi-values (see Thermal Performance). The f-value is an expression of the internal surface temperature at the junction. The lower the f-value, the lower the internal surface temperature and therefore the higher the risk of condensation.

Interstitial condensation occurs when the amount of moisture present within the construction exceeds that which can be supported as water vapour. Typically, that occurs when materials which are resistant to the passage of water vapour are installed on the cold side of thermal insulation.

Insulated panels present little risk of interstitial condensation as the high vapour resistance of the liner prevents water vapour reaching the panel core.

Drainage

Roofs with insulated roof panels need to allow water to run off and should be designed to a minimum slope of 4°. Gutters and downpipes should be designed to collect rain falling on the roof and discharge it safely. Drainage capacity should be determined according to BS EN 12056-3:2000.

The U-values of an insulated gutter should be slightly higher than that of the roof panels to ensure snow and ice melts first in the gutter.

Durability

Panel coatings should be selected to meet predicted service conditions. Designers should consider:

- service life: how long are the panels expected to be in place?
- service conditions: will panels be exposed to high temperatures or high levels of humidity? Will processes carried out in or around the building produce corrosive chemicals?
- exposure to degrading conditions: will the panels be exposed to high levels of UV radiation, rain, coastal conditions with salt sea spray, or atmospheric pollution?
- resistance to physical damage: do panels need to be resistant to scratching or indentation either during manufacture and installation or after installation?
- final appearance: what colour should the panel be? Should it be smooth or textured? Should the panel finish be gloss or matt?

PRODUCT PERFORMANCE

Manufacture

AS35 insulated roof and wall panels are manufactured in processes certified to ISO 9001:2015. The manufacturing tolerances AS35 panels set out in Table 4 comply with BS EN 14509.



CE Marking

Under the Construction Products Regulations 2011, which came into force on 1 July 2013, all construction products covered by a harmonised European Standard (hEN) must be CE marked before they can be marketed.

The AS35 insulated panels are CE marked to BS EN 14509:2013. Self-supporting double skin metal faced insulating panels. Factory made products. Specifications.

The required Declarations of Performance (DoP) for the AS35 insulated panels and other CE marked products are available at www.steadmans.co.uk. Steadmans also supply relevant DoPs with invoices.

Table 3: AS35 panel dimensions (mm, unless stated otherwise)

Weather sheet thickness	0.5
Liner sheet thickness	0.4
Cover	1000
Standard lengths	2.0m - 22m
Thickness	40, 60, 70, 80, 100, 110, 120, 130
Cut back - roof panel lap	150
Cut back - boundary & valley gutters	100
Cut back - external trimline gutters	75

Table 4: Manufacturing tolerances (mm)

Panel length	±5
Cover width	±2
Thickness	±2
Squareness	<3

PRODUCT PERFORMANCE

Coatings specification

AS35 panels are manufactured from pre-coated steel finished with one of the coatings listed in Table 5. More detailed information on coatings is available in the Steadmans Coatings & Colour Selector brochure.

All coatings receive a corrosion resistant pre-treatment coating to clean the surface and provide an enhanced primer bonding interface. The primer coat has a dry-film thickness of 4-6 μ m; and the backing coat is a polyester backer with a dry-film thickness of 10-12 μ m.

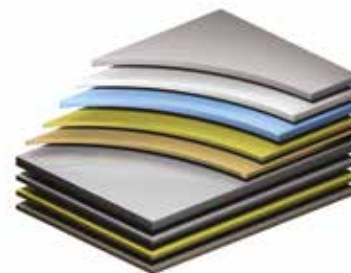


Table 5: Steel coatings

Coating	Thickness	Description	Applications
Colorcoat HPS200 Ultra® by Tata Steel	200 μ m	Colorcoat HPS200 Ultra® by Tata Steel combines outstanding performance with exceptional durability. It comes with the Scintilla® emboss and a high performance backing coat on the reverse side. Subjected to comprehensive natural and accelerated testing, it surpasses Ruv4 and RC5 as per EN 10169:2010 proving excellent colour and gloss retention and corrosion resistance. Confidex® Guaranteed for up to 40 years upon registration for the weatherside of buildings with no inspection or maintenance to maintain its validity.	Roofs and walls in all environments including severe industrial and coastal/marine.
Colorcoat Prisma® by Tata Steel	50 μ m	Colorcoat Prisma® pre-finished steel by Tata Steel is backed up with even more testing and real world data to combine outstanding aesthetics with long lasting performance. Surpassing requirements of Ruv4 and RC5 as per EN 10169: 2010 proving outstanding colour retention and corrosion resistance, it is Confidex® Guaranteed for up to 30 years upon registration.	Roofs and walls in all environments including coastal/marine, especially where metallic and matt colours are wanted.
Colorcoat® LG by Tata Steel	200 μ m	Colorcoat® LG by Tata Steel is a leathergrain textured plastisol suitable for roof and wall cladding applications where good performance is required at a competitive price. Colorcoat® LG has a 200 μ m durable and abrasion resistant topcoat on a galvanised substrate.	Roofs and walls where good and tough performance is required at a competitive price.
Leathergrain	200 μ m	A polyvinylchloride (PVC) Plastisol coated material offering robust and durable protection at a competitive price, even in the most adverse industrial environments. The weather face is finished with a leather-grain emboss and comes with a performance guarantee up to 30 years, including cut edge protection.	Roofs and walls where good and tough performance is required at a competitive price.
Polyester	25 μ m	A smooth and durable coating offering colour and economy.	Roofs and walls where colour, durability and competitive price are required.

Environment

Steadmans recognises the need to manage the impact that our business and processes have on the environment. We believe we have a responsibility to contribute to the well-being of the communities we live in and we are committed to providing a clean, safe environment.

Developing sustainable construction methods presents a challenge to the whole construction industry. Our main raw material, steel, is eminently recyclable: 85 - 90% of steel from demolition goes for re-use and 40% of steel used in new construction has been recycled.

By using modern machinery and upgrading our facilities we are continually reducing the impact of our products on the environment, and improving their contribution to the long-term performance of buildings.

Steadmans is ISO14001 registered and we are signatories to the sustainability charter of EPIC (Engineered Panels In Construction).

Guarantees

When you specify the AS35 insulated panel you can be assured that your building will really perform. Strong substrates and state-of-the art coating technology lead to exceptionally long lifetimes, while exclusive finishes keep your building looking its best for many years - all backed up by one of the most comprehensive guarantees on the market.

Material guarantees of up to **forty** years, are available subject to coating, helping to protect your building across all installation types in all environments:

- Any roof pitch – the guarantee covers orientations down to 4°.
- Any orientation – positioning of the building does not affect the length of the guarantee.
- Subject to coating, factory cut edges are covered for the lifetime of the guarantee.
- Inland and coastal applications included.

Table 6: Coatings guarantee up to periods ^{a, c} - external applications

	Inland Roof	Inland Wall	Coastal Roof ^b	Coastal Wall ^b
Colorcoat HPS200 Ultra®	40 years	40 years	30 years (1km)	30 years (1km)
Colorcoat Prisma®	30 years	30 years	25 years (1km)	25 years (1km)
Colorcoat® LG	25 years	25 years	20 years (2km)	20 years (2km)
Leathergrain	25 years	30 years	20 years (2km)	25 years (2km)
Polyester	10 years	10 years	N/A	N/A (5km)

Note ^a: There may be a reduction in the roof and wall guarantee for certain colours. For more information please consult the Steadmans technical department.

Note ^b: The figure in () is the coastal zone distance to sea.

Note ^c: The "guarantee up to period" shown is the maximum material guarantee period and applies to the weather side only. The life expectancy of the material can exceed the guarantee period.

The full cover of the guarantee makes it easy to calculate the length of the guarantee period for your building as a whole, without the need for separate calculations for each orientation. The coating on your building will be in one of two colour groups, according to its performance.

Note that there are no reductions in the length of the guarantee depending on pitch or orientation.

Steadmans System Guarantee

Steadmans' products are designed to last for many years without the need for maintenance, so the building owner's obligations are few, being confined to registering the guarantee and generally treating the material in a responsible manner.

- The guarantee is issued to the building owner, who should register the guarantee with Steadmans. To register, visit www.steadmans.co.uk
- Should the ownership of the building change then the guarantee is automatically transferred with it. The new owner should notify Steadmans of the new ownership details in due course.
- Steadmans must be informed by the guarantee holder within 30 days of the discovery of any defect that indicates that the product will fail to meet its performance criteria as outlined, and in any event before 10% of the paint surface of any one plane is affected. Steadmans or its agents must be given reasonable opportunity to inspect the defect. Notification must include any details required by Steadmans or its agents to enable traceability of data relating to the materials involved.

Colorcoat HPS200 Ultra® and Colorcoat Prisma® come with the Confidex® Guarantee which does not require inspection or maintenance to maintain its validity.:

1. Confidex® from Tata Steel must be registered for online within 3 months of the building completion date for the guarantee to be valid.
2. The Confidex® Guarantee periods are applicable to Zone 1 areas.
3. Colorcoat Prisma® is for Metallic and Solid colours only.

Colorcoat, Colorcoat HPS200 Ultra, Colorcoat Prisma, Confidex, and Scintilla are trademarks of Tata Steel UK Limited.

PRODUCT PERFORMANCE

Thermal

The low thermal conductivity of the PIR insulation in the AS35 insulated panels ensures good thermal performance, with U-values as shown in Tables 7. The large size of the panels, combined with edge detailing, ensures good resistance to air leakage which contributes to the overall thermal performance of the building.

The AS35 insulated panels make a vital contribution to the implementation of a fabric first strategy, by addressing conduction heat loss, air tightness and heat loss through junctions.

Conduction heat loss: AS35 insulated panels contain high performance PIR insulation, and are effective in reducing conduction heat loss through walls and roofs. They offer a range of U-values, enabling designers to match the notional building wall and roof U-values (see Table 1) or substantially improve on them.

Extensive thermal analysis have been carried out of panel junctions and can provide a range of design details to minimise heat loss.

Table 7: U-values for AS35 panels

Panel thickness (mm)	U-value (W/m ² K)
40	0.50
60	0.35
70	0.30
80	0.25
100	0.20
110	0.18
120	0.16
130	0.15



Fire

AS35 panels achieve the following standards for regulatory fire performance:

- Surface spread of flame (BS 476-7:1997): Class 1.
Class 0 as defined by Approved Document B volume 2.
- Reaction to fire (BS EN 13501-1): Euroclass B-s2,d0
- External roof fire performance BS EN 13501-5
Euroclass B_{roof} (t₄)

- AS35 panels have passed the test requirements of LPS 1181:2005; the testing standard of the Loss Prevention Certification Board (LPCB) and carries Grade EXT-B & EXT-A approval.

Fire resistance to BS 476-22:1987: is achievable with stipulated fixing methods. Details of fire certification are given in Table 8.

Table 8: Fire performance to LPS 1181:2005

LPBC ref	Panel	Thickness (mm)	Orientation	Integrity (minutes)	Insulation (minutes)	LPS 1181 Grade	Core material
635a/08	AS35	40, 60, 70, 80, 100, 110, 120, 130	V	N/A	N/A	EXT-B	PIR
635a/09	AS35	60, 70, 80, 100, 110, 120, 130	V	120	15	EXT-A15	PIR

Biological

Steadmans insulated panels are unaffected by mould, fungi, mildew or vermin.

Acoustic

The acoustic performance of Steadmans panels has been predicted using software developed by the Department of Applied Acoustics, University of Salford, under a research contract funded by the Metal Cladding and Roofing. Acoustic solutions are available, please contact our technical department.

Manufacturers Association. The results below are based on an a 110mm AS35 panel.

Table 9: Acoustic performance - AS35

Frequency (Hz)	SRI Values (dB)*	Frequency (Hz)	SRI Values (dB)*
100	19.9	800	26.3
125	21.1	1000	32.0
160	22.3	1250	32.8
200	23.4	1600	36.5
250	24.0	2000	43.3
315	24.1	2500	46.9
400	23.1	3150	51.2
500	18.5	4000	55.4
630	19.5	5000	59.8

Water penetration

The product standard for insulated panels, BS EN 14509, advises water penetration is tested to EN12865. The standard advises the system should achieve water tightness for normal exposure conditions of 600 Pa (Class).

Air tightness

Air tightness primarily relates to the performance of the building envelope as built. It follows that greatest attention needs to be given with respect to the junction details and interface between different construction products as well as careful attention to ensure all air seals are correctly placed during construction.

The nature of the insulated panel is such that a practical rigid surface is provided to enable sealing to be successful. Additionally the joint design and factory applied seals of the insulated panel ensure air leakage is mitigated. BS EN 14509 refers to BS EN 12114 for testing air tightness of the cladding product.

PRODUCT PERFORMANCE

Structural

Steadmans AS35 insulated roof panels are self-supporting and capable of spanning purlins at 1.5- 3.0m centres.

Wider spacing's can be accommodated, subject to fixing constraints. AS35 wall panels are designed to be fixed to steel side rails or secondary steelwork using appropriate self drilling fasteners.

The span tables below have been created in accordance with BS EN 14509 based on 0.5mm external and 0.4mm internal liner facings.

Panel fixings must restrain panels against wind loading and snow loads. The actual wind uplift load resisted by the

panel is dependant on the number of fasteners used and the material of the supporting structure. Fastener calculations should be carried out in the appropriate manner.

The standard fixing patterns and locations noted in our construction details and site fixing instructions are appropriate for normal conditions.

Consult Steadmans Technical Service for advice on more exposed conditions where additional fasteners may be required.

Table 10: Unfactored roof loads for AS35 panels - Outer facing 0.5mm (steel), inner facing 0.4mm (steel)

	Th. (mm)	Load type (KN/m ²)	1.60m	1.80m	2.00m	2.20m	2.40m	2.60m	2.80m	3.00m
Single span	40	Downward	2.24	1.92	1.67	1.31	1.04	0.89	0.69	0.54
		Suction	2.62	2.24	1.94	1.70	1.50	1.33	1.19	1.02
	60	Downward	3.26	2.85	2.51	2.03	1.67	1.30	1.07	0.84
		Suction	3.80	3.32	2.92	2.58	2.30	1.94	1.65	1.41
	70	Downward	3.80	3.35	2.97	2.35	1.95	1.54	1.28	1.01
		Suction	4.43	3.90	3.45	3.06	2.62	2.21	1.88	1.62
	80	Downward	4.34	3.84	3.31	2.68	2.19	1.80	1.48	1.22
		Suction	5.06	4.47	3.97	3.54	2.94	2.47	2.11	1.82
	100	Downward	5.40	4.81	4.10	3.30	2.74	2.29	1.92	1.61
		Suction	6.37	5.67	5.07	4.30	3.57	3.01	2.57	2.22
	110	Downward	5.86	5.24	4.50	3.68	3.09	2.67	2.26	1.92
		Suction	6.76	6.01	5.45	4.61	3.84	3.24	2.77	2.39
	120	Downward	6.31	5.66	4.90	4.05	3.43	3.04	2.60	2.23
		Suction	7.14	6.35	5.82	4.92	4.10	3.46	2.96	2.56
	130	Downward	6.69	6.02	5.23	4.36	3.72	3.35	2.90	2.50
		Suction	7.14	6.36	5.91	5.16	4.30	3.63	3.11	2.69
Double span	40	Downward	2.24	1.92	1.67	1.47	1.30	1.14	1.00	0.85
		Suction	2.62	2.24	1.94	1.70	1.50	1.33	1.19	1.02
	60	Downward	2.79	2.46	2.13	1.81	1.56	1.36	1.20	1.06
		Suction	3.48	2.88	2.48	2.15	1.89	1.69	1.52	1.38
	70	Downward	2.95	2.60	2.27	1.93	1.67	1.45	1.28	1.14
		Suction	3.58	3.00	2.57	2.23	1.97	1.76	1.59	1.45
	80	Downward	3.11	2.74	2.40	2.05	1.77	1.55	1.37	1.22
		Suction	3.66	3.07	2.63	2.30	2.03	1.82	1.64	1.50
	100	Downward	3.44	3.03	2.67	2.28	1.98	1.74	1.54	1.38
		Suction	3.76	3.17	2.73	2.39	2.12	1.90	1.72	1.57
	110	Downward	3.60	3.17	2.79	2.39	2.08	1.83	1.62	1.45
		Suction	3.79	3.20	2.76	2.42	2.15	1.93	1.75	1.59
	120	Downward	3.76	3.31	2.91	2.50	2.17	1.91	1.70	1.52
		Suction	3.81	3.23	2.78	2.44	2.17	1.95	1.77	1.61
	130	Downward	3.90	3.48	3.02	2.59	2.26	1.99	1.77	1.58
		Suction	3.82	3.24	2.80	2.45	2.18	1.96	1.78	1.63

Table 11: Unfactored wall loads for AS35 panels - Outer facing 0.5mm (steel), inner facing 0.4mm (steel)

	Th. (mm)	Load type (KN/m ²)	1.60m	1.80m	2.00m	2.20m	2.40m	2.60m	2.80m	3.00m
Single span	40	Pressure	1.94	1.65	1.42	1.10	0.86	0.73	0.56	0.48
		Suction	2.35	2.00	1.72	1.49	1.31	1.15	1.02	0.91
	60	Pressure	2.93	2.55	2.23	1.78	1.46	1.13	0.92	0.71
		Suction	3.51	3.05	2.67	2.35	2.08	1.86	1.66	1.49
	70	Pressure	3.46	3.01	2.67	2.09	1.72	1.36	1.11	0.87
		Suction	4.12	3.62	3.17	2.82	2.44	2.09	1.89	1.66
	80	Pressure	4.00	3.52	3.02	2.43	1.97	1.62	1.32	1.06
		Suction	4.75	4.19	3.71	3.29	2.94	2.55	2.19	1.90
	100	Pressure	5.04	4.47	3.81	3.06	2.52	2.10	1.75	1.46
		Suction	6.04	5.37	4.79	4.28	3.65	3.10	2.66	2.31
	110	Pressure	5.47	4.87	4.18	3.40	2.84	2.45	2.06	1.74
		Suction	6.41	5.69	5.14	4.59	3.87	3.27	2.82	2.44
	120	Pressure	5.89	5.27	4.55	3.75	3.16	2.79	2.37	2.03
		Suction	6.77	6.01	5.50	4.90	4.14	3.49	3.02	2.61
Double span	40	Pressure	1.94	1.65	1.42	1.23	1.08	0.93	0.81	0.75
		Suction	2.35	2.00	1.72	1.49	1.31	1.15	1.02	0.91
	60	Pressure	2.80	2.49	2.16	1.78	1.50	1.27	1.08	0.93
		Suction	3.21	2.65	2.27	1.96	1.71	1.62	1.53	1.46
	70	Pressure	2.96	2.63	2.30	1.91	1.64	1.38	1.22	1.03
		Suction	3.33	2.79	2.36	2.05	1.83	1.72	1.62	1.52
	80	Pressure	3.11	2.76	2.43	2.09	1.82	1.61	1.43	1.27
		Suction	3.44	2.88	2.46	2.14	2.03	1.88	1.70	1.57
	100	Pressure	3.44	3.04	2.70	2.31	2.02	1.79	1.60	1.44
		Suction	3.57	3.00	2.58	2.38	2.17	1.96	1.78	1.63
	110	Pressure	3.60	3.18	2.82	2.42	2.12	1.86	1.67	1.49
		Suction	3.59	3.03	2.60	2.40	2.19	1.98	1.80	1.64
	120	Pressure	3.76	3.32	2.94	2.53	2.22	1.95	1.75	1.57
		Suction	3.61	3.06	2.63	2.43	2.22	2.01	1.82	1.66
	130	Pressure	3.90	3.49	3.05	2.62	2.31	2.02	1.82	1.63
		Suction	3.62	3.07	2.64	2.44	2.23	2.02	1.83	1.67

DESIGN DETAILS - AS35 roof and wall panels

Supports

AS35 panels are designed to be supported by and fixed to steel purlins. Steelwork for AS35 panels should be within the tolerances given in BS EN 1090-2:2008 +A1:2011: Fixing planes on adjacent purlins should be less than $L/600$ apart (where L is the purlin spacing).

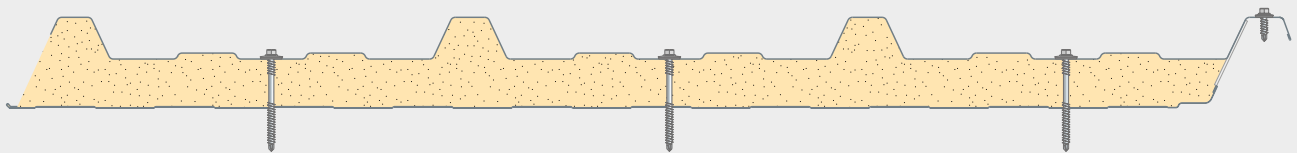
All AS35 panels are suitable for spanning purlins at 1.5 - 3.0m centres. Consult Steadmans for guidance on using the panels on purlins at centres greater than 3.0m.

Fixing

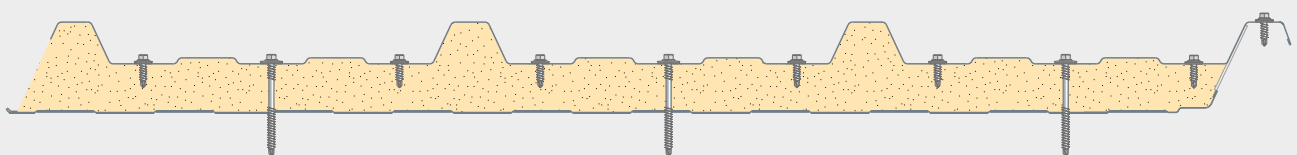
Whilst panels may be fixed through valleys or crowns, Steadmans recommend valley fixing: accurate fixing is easier to achieve; loads on the fasteners are smaller; the fasteners are less likely to distort the weather sheet; and better compression of the sealant is achieved at end laps.

Panels should be fixed with self drilling fasteners with a high thread to restrain the weather face of the panel, and press-on or integral caps to match the finish of the panel. To prevent water penetration each fastener should have a 19mm diameter EPDM washer. Fasteners to light and heavy section steel should pass through the steel and leave 5mm of thread exposed on the underside of the section. Recommended fasteners are detailed on page 28.

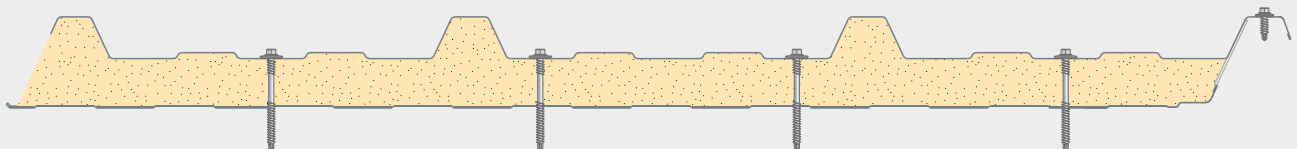
Standard fixing positions (roof and wall panels)



End lap fixing positions - showing positions of tail stitchers (roof panels)



Eaves fixing positions (roof panels)



Drawing 1: Fixing details for roof and wall panels

Roof panel - end and lap fixing

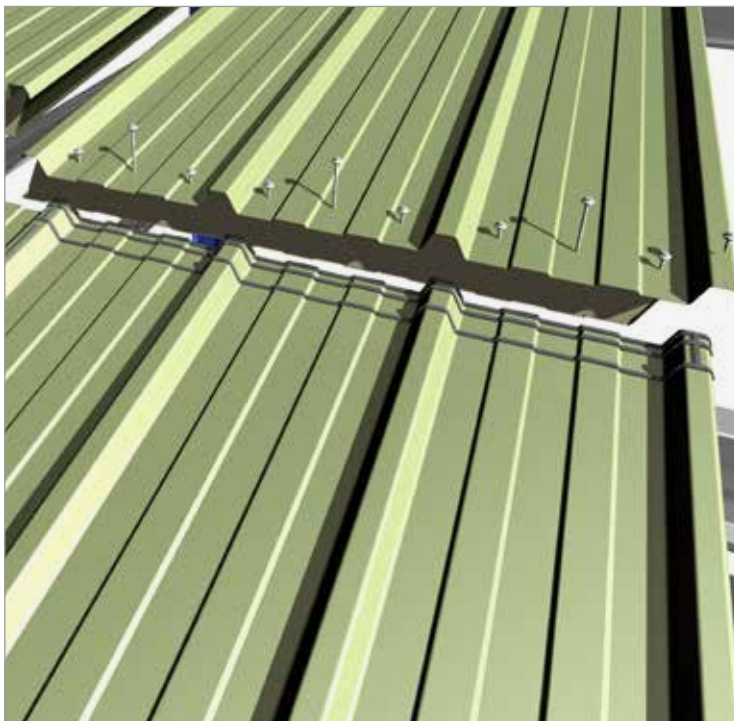


Figure 1: Roof panel - end and lap fixing

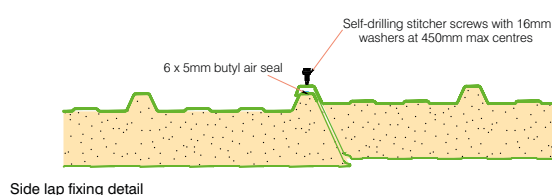
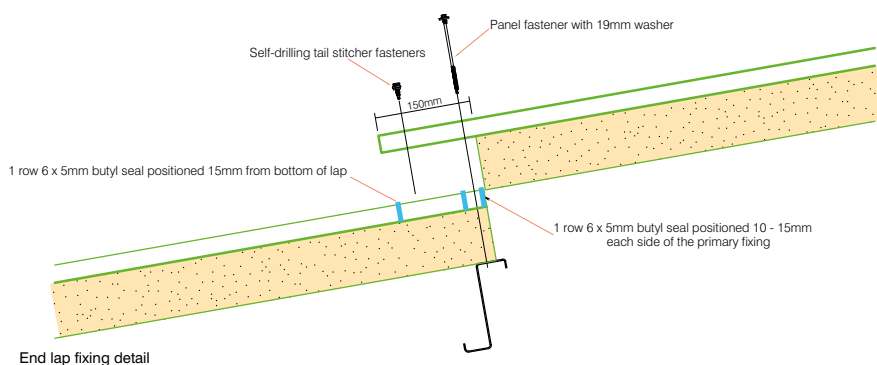
Panel end laps are achieved using a panel end lap of 150mm. The laps are sealed with three lines of 6 x 5mm butyl sealant strip. The first and second runs of sealant should be sited 10 - 15mm upslope and downslope of the main panel fasteners. The third run is required to be positioned as close to the panel end as practical, thus mitigating trapped water and potential premature corrosion. In practical terms the seal is positioned no greater than 15mm from the panel end.

Where four panels overlap, additional runs of sealant are required between male and female crowns of all four panels to prevent ingress.

In addition to the main panel fasteners, the endlaps are tail stitched in the pans of the main corrugations.

Side laps are sealed with a 6x5mm butyl mastic and fixed with stitching fasteners at 450mm maximum centres.

Wall panel laps are treated in a similar manner with a 150mm overlap. However a carefully applied gun grade mastic may be used to provide easier compression of the joints during installation in this orientation. Wall panels are sidelap stitched at 300mm centres and sealed with 6 x 5mm butyl sealant.



Drawing 2: Roof panel - end and lap fixing

DESIGN DETAILS - AS35 roof and wall panels

Eaves trimline gutter

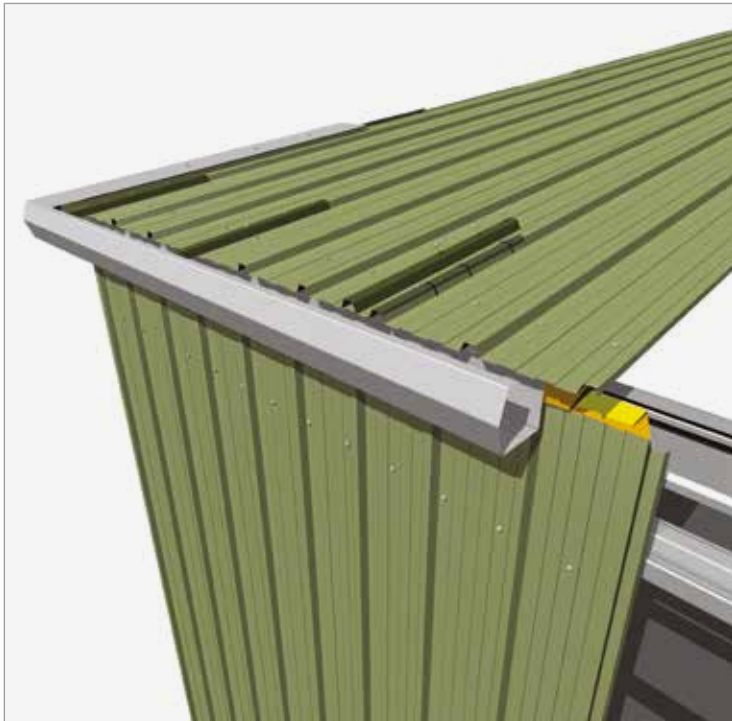


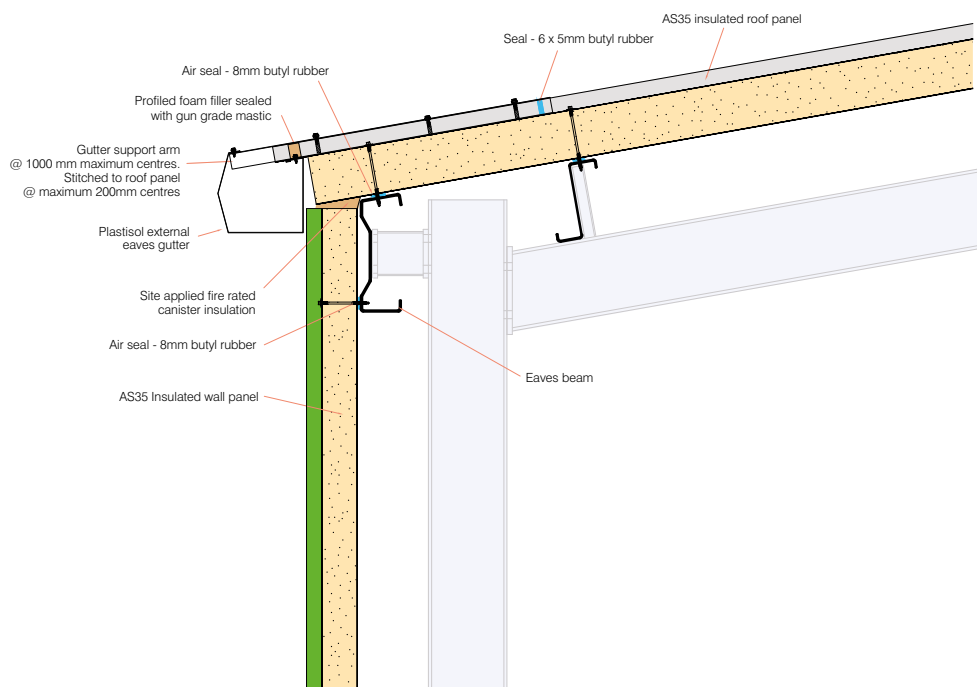
Figure 2: Eaves trimline gutter

A cold formed eaves beam forms the junction between AS35 roof and wall panels. The liner skin of the panel forms the air barrier and the beam provides the bearing surface for the air seals at this junction.

Ensure that all structural joints in the beam are taped prior to panel installation to ensure continuity of the air sealing. Continuity of the insulation is maintained by detailing the wall panel to form a close joint with the underside of the roof panel. A site applied canister foam or a compressible seal is used at this junction.

The trimline range of external gutters are supported from the roof cladding by means of brackets at 1000mm centres. The gutter section integrates with the verge flashing to provide an unbroken shadow line around the roof and wall junction.

The AS35 roof panel is made with a 75mm cut back to allow a drip edge into the trimline gutter.



Drawing 3: Eaves trimline gutter

Apex detail

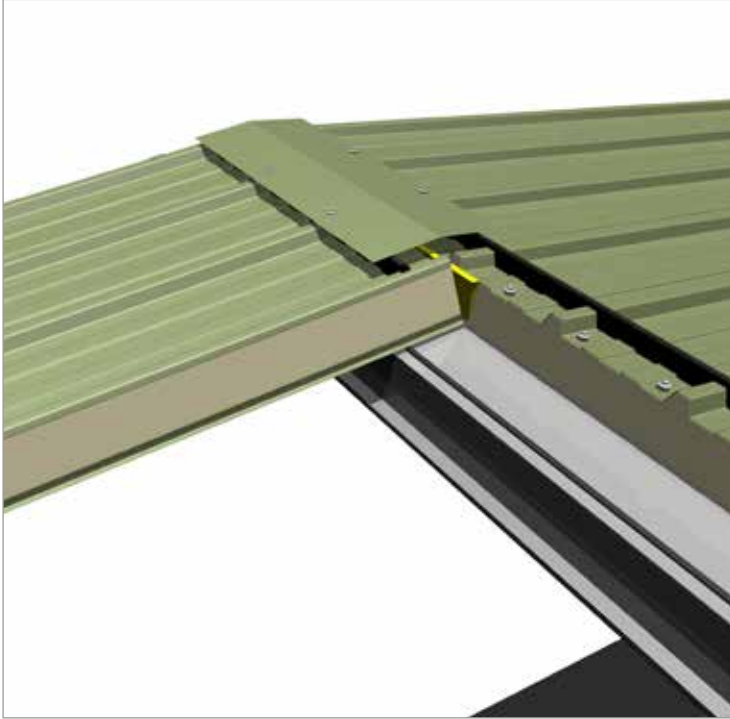


Figure 3: Apex detail

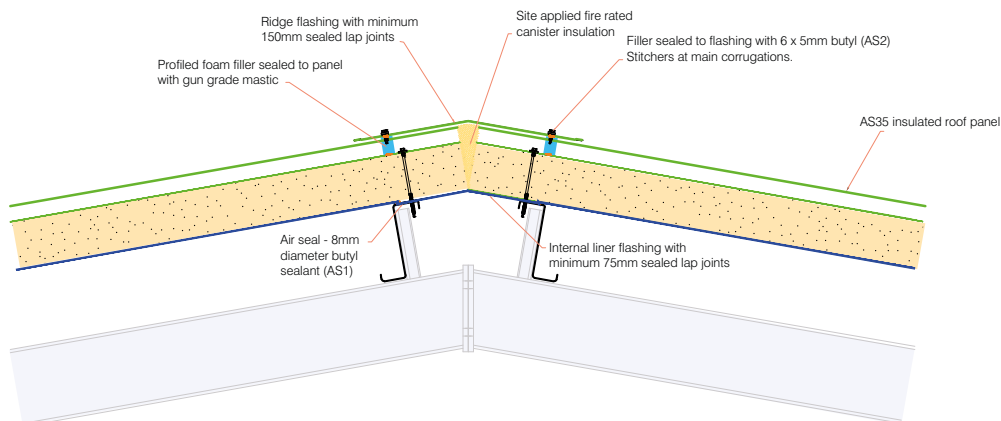
AS35 panels form a close jointed apex junction that provides good insulation and air sealing.

The internal liner flashing forms the basis of the air barrier; butyl seals between the panel liner and the flashing provide the continuity of the air seal between the roof slopes.

The panel junction is site filled with canister insulation to provide insulation integrity.

An external apex flashing, in combination with a sealed profiled filler, provides protection from ingress. The filler is positioned and sealed to the panel with butyl mastic. The apex flashing is provided in 3000mm lengths and its overlap ends are sealed. The apex flashing is sealed to the top face of the filler, the filler and flashing being held in place by stitching fasteners fixed through to the crowns of the AS35 panel.

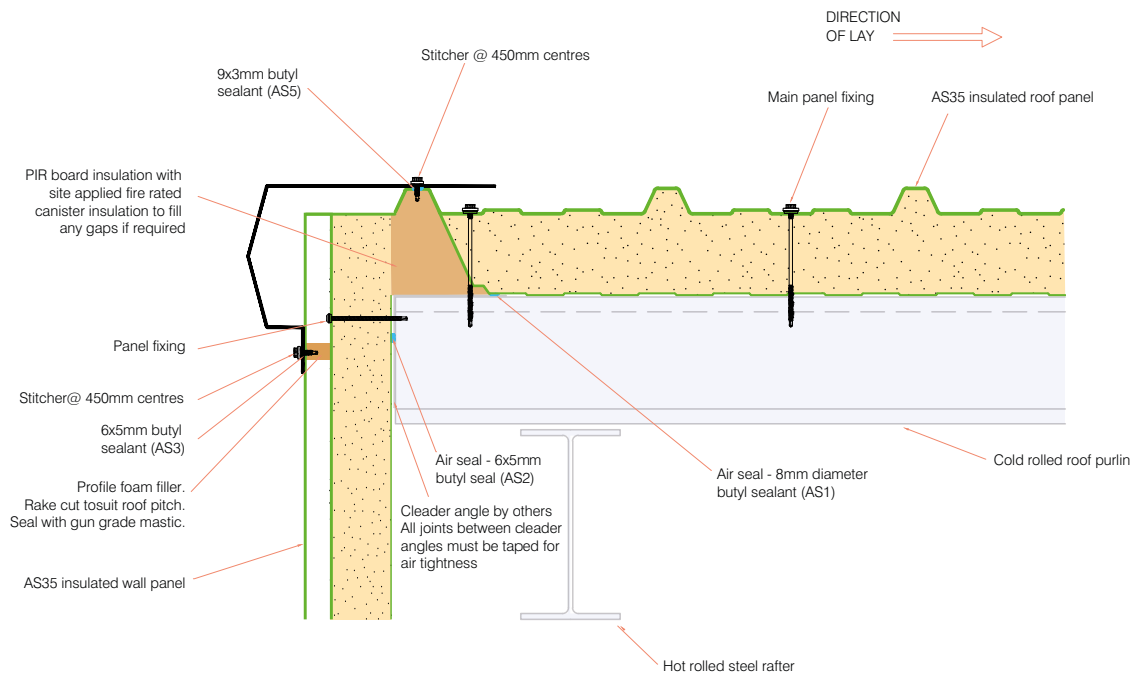
Ensure the profiled filler is positioned upslope from the edge of the flashing such to provide a drip edge, good weather resistance and sufficient protection from bird damage. A 70mm minimum overhang is recommended.



Drawing 4: Apex detail

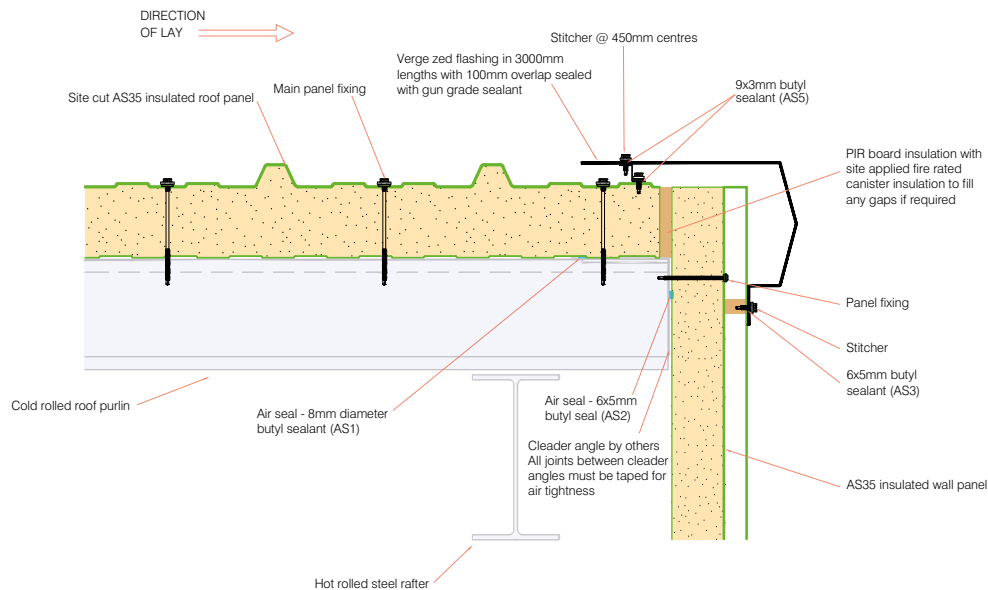
DESIGN DETAILS - AS35 roof and wall panels

Verge detail - start end



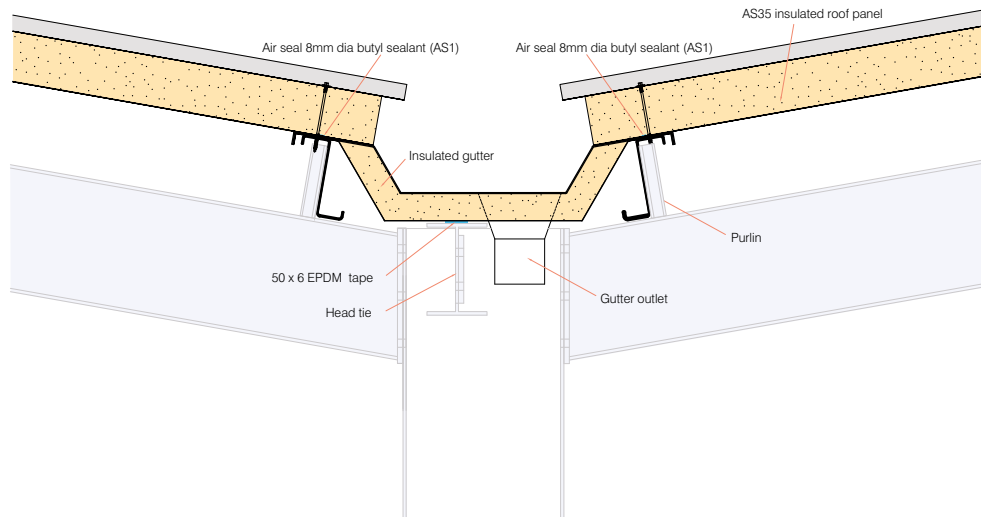
Drawing 5: Verge detail - start end

Verge wall detail - finish end



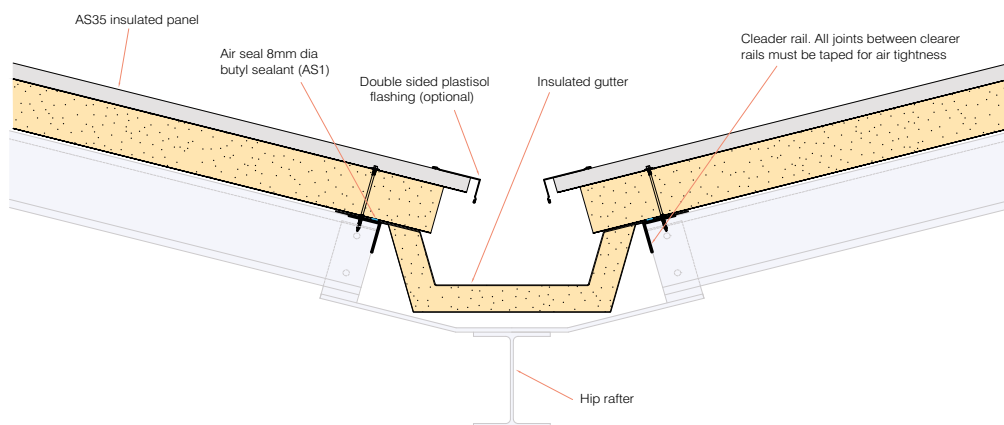
Drawing 6: Verge wall detail - finish end

Valley gutter



Drawing 7: Valley gutter

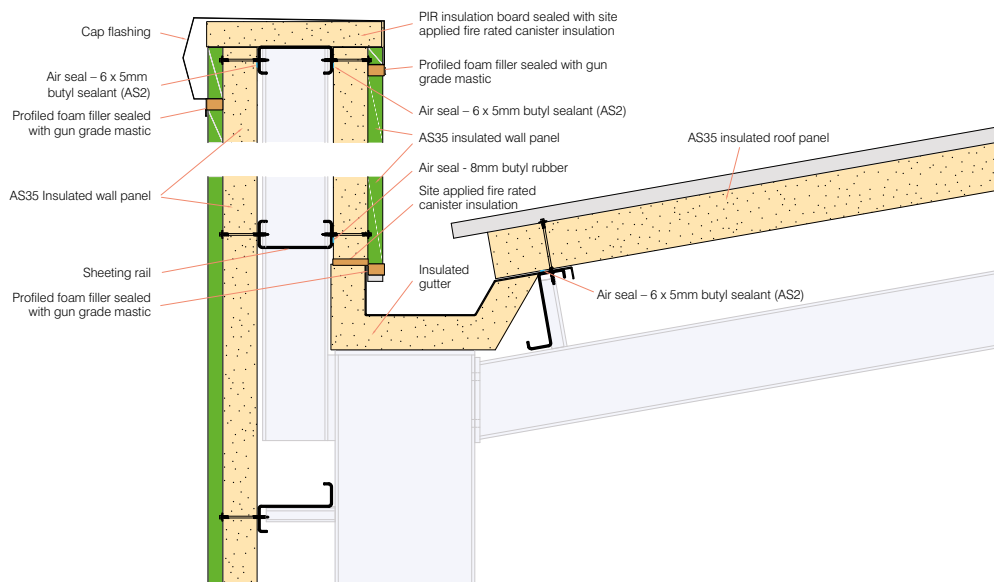
Hip valley gutter



Drawing 8: Hip valley gutter

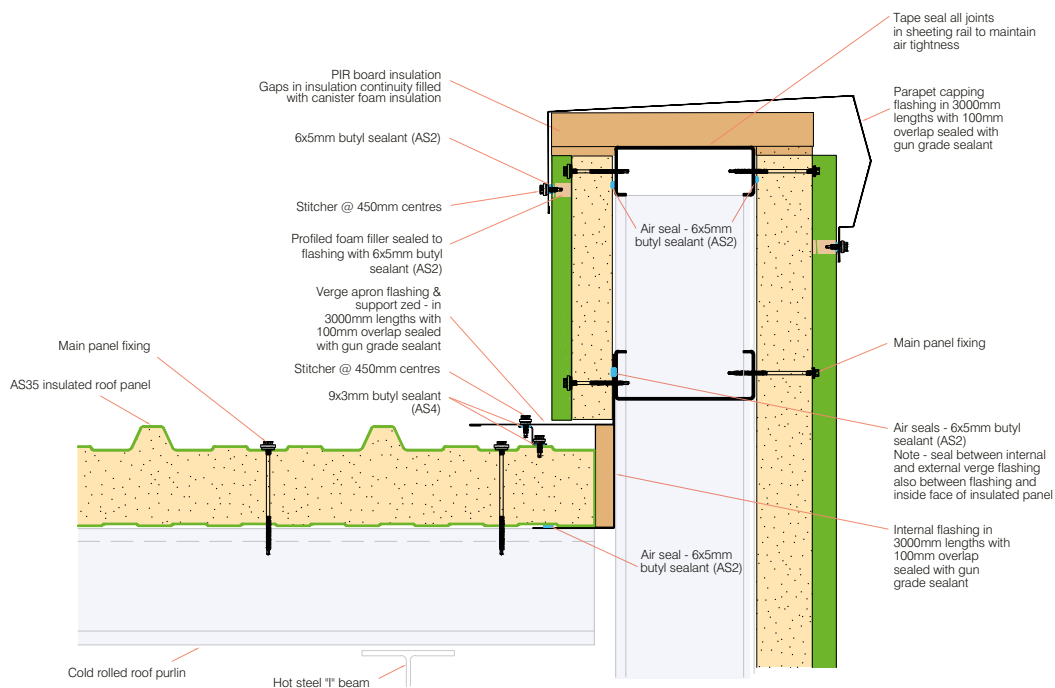
DESIGN DETAILS - AS35 roof and wall panels

Boundary wall gutter - parapet



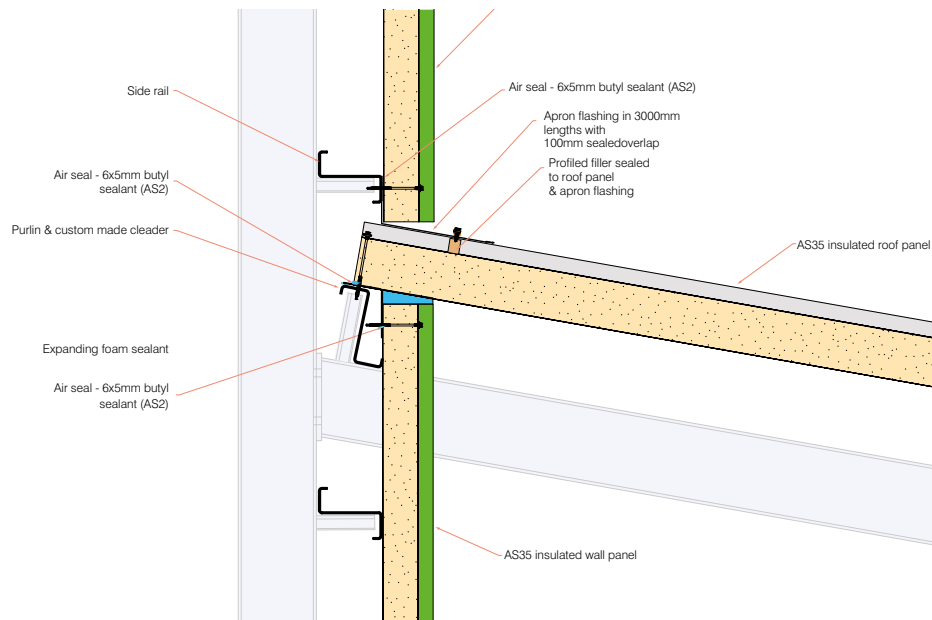
Drawing 9: Boundary wall gutter - parapet

Verge parapet



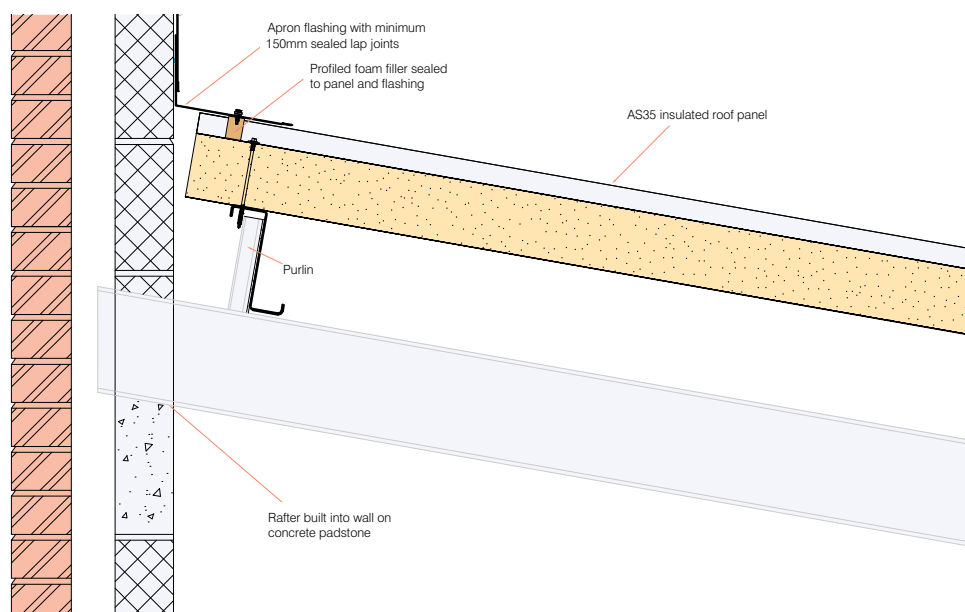
Drawing 10: Verge parapet

Lean-to roof - wall panel



Drawing 11: Lean-to roof - wall panel

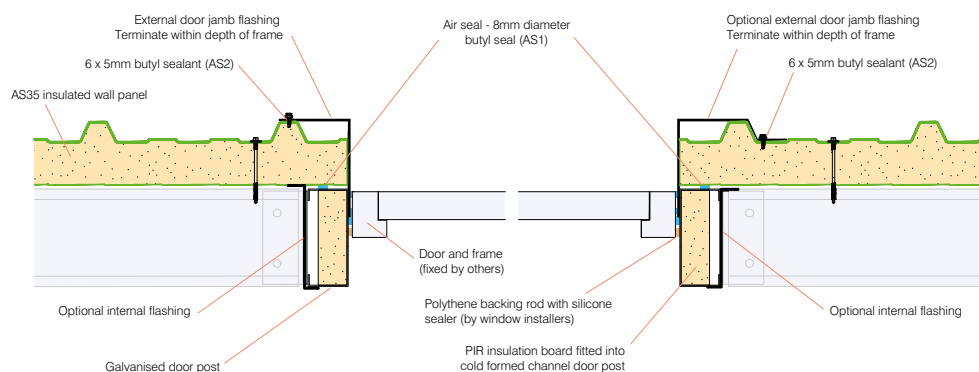
Lean-to roof - masonry



Drawing 12: Lean-to roof - masonry

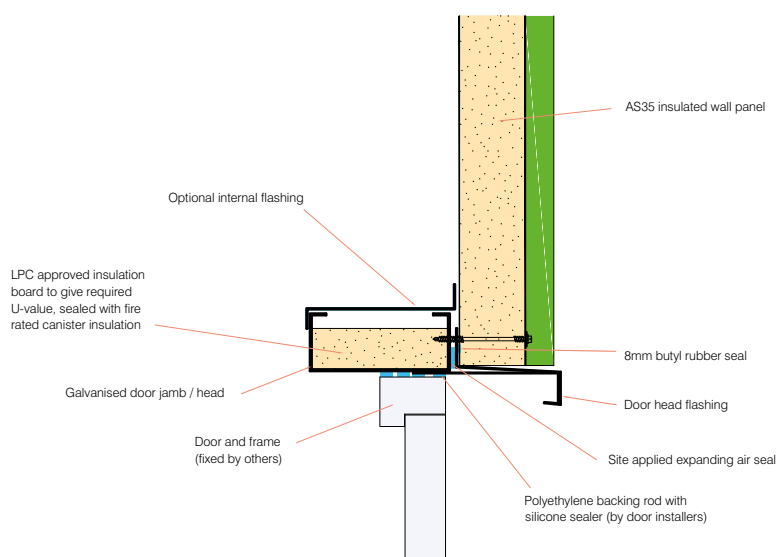
DESIGN DETAILS - AS35 roof and wall panels

Personnel door jamb



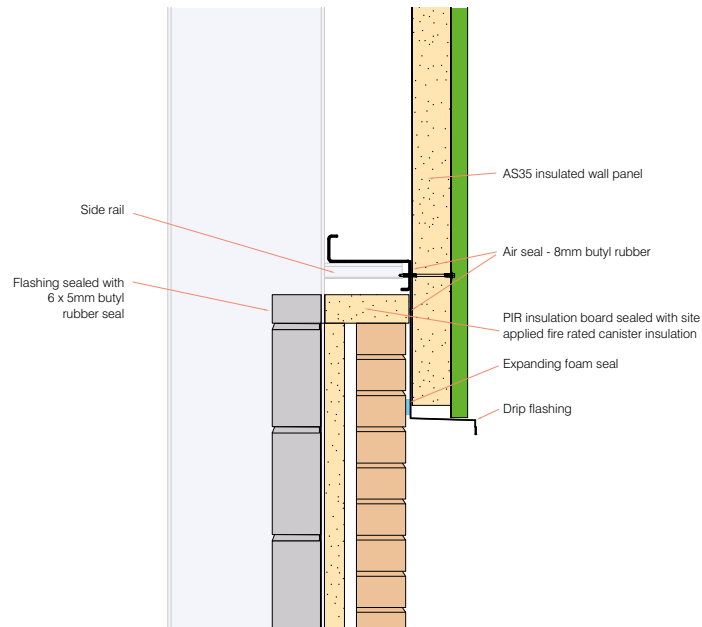
Drawing 13: Personnel door jamb

Personnel door head



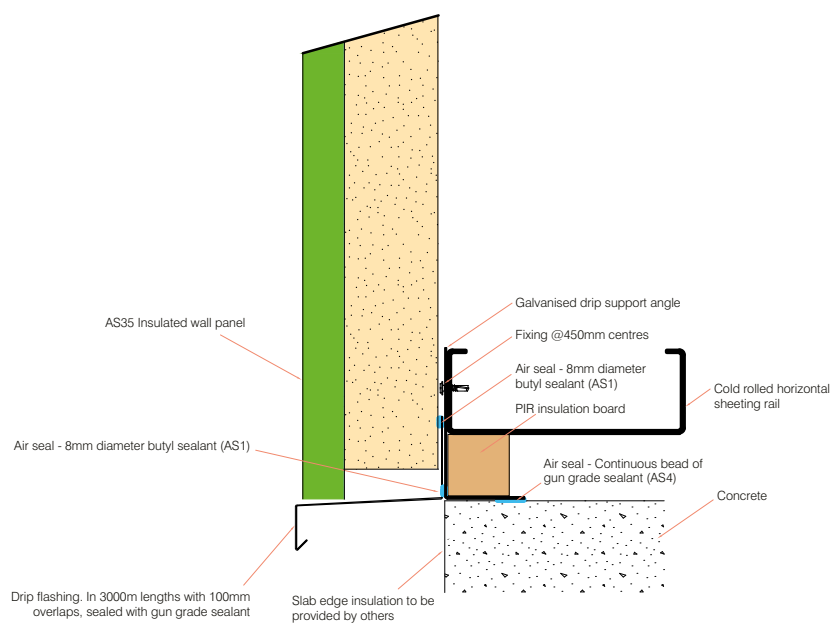
Drawing 14: Personnel door head

Drip detail - dado wall



Drawing 15: Drip detail - dado wall

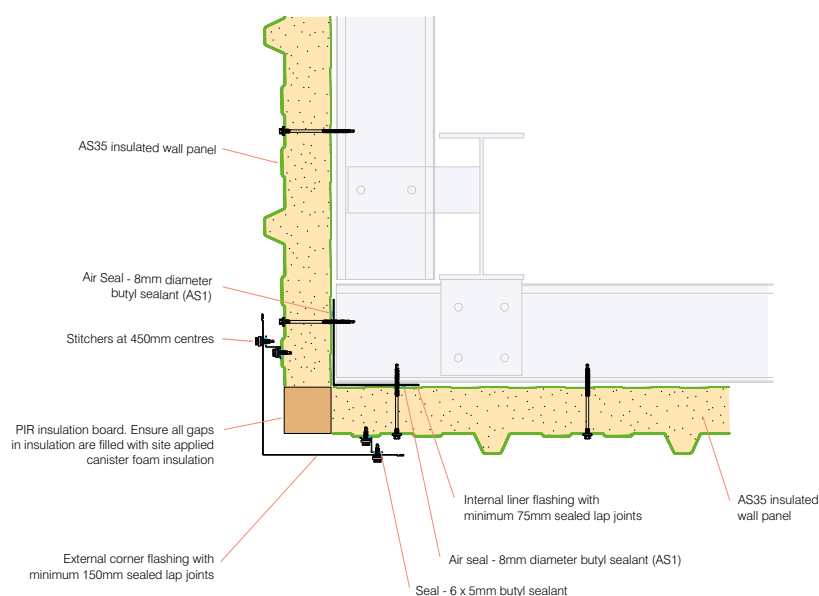
Drip detail - slab level



Drawing 16: Drip detail - slab level

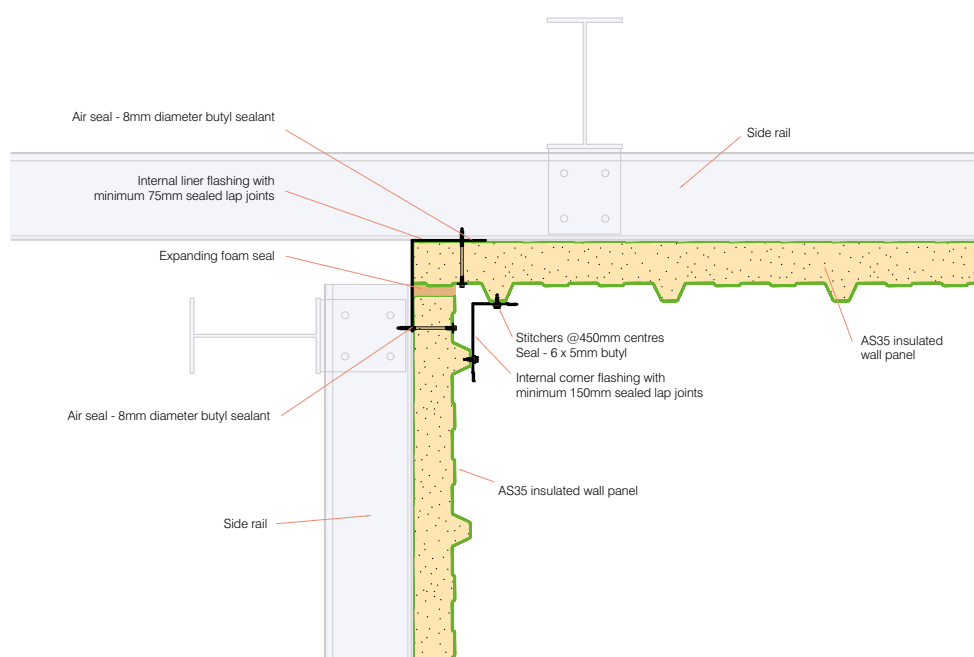
DESIGN DETAILS - AS35 Roof And Wall Panels

External corner



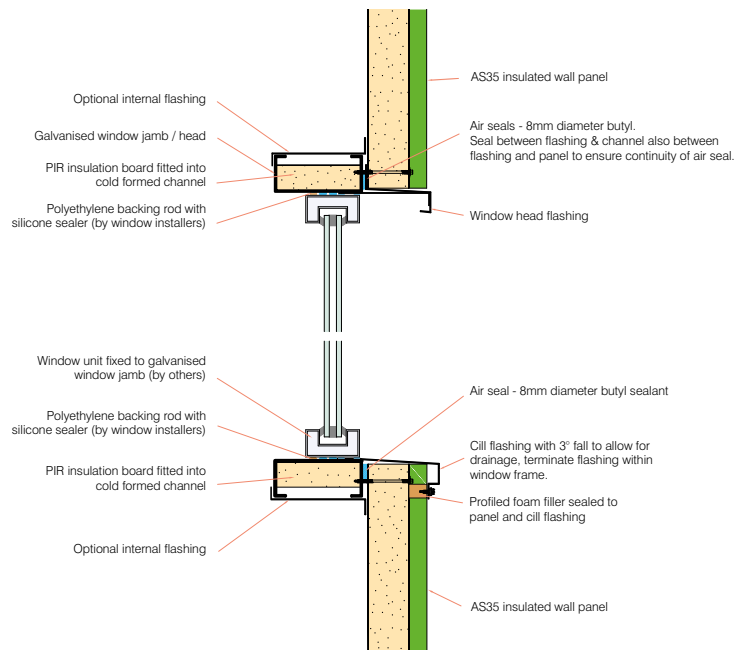
Drawing 17: External corner

Internal corner



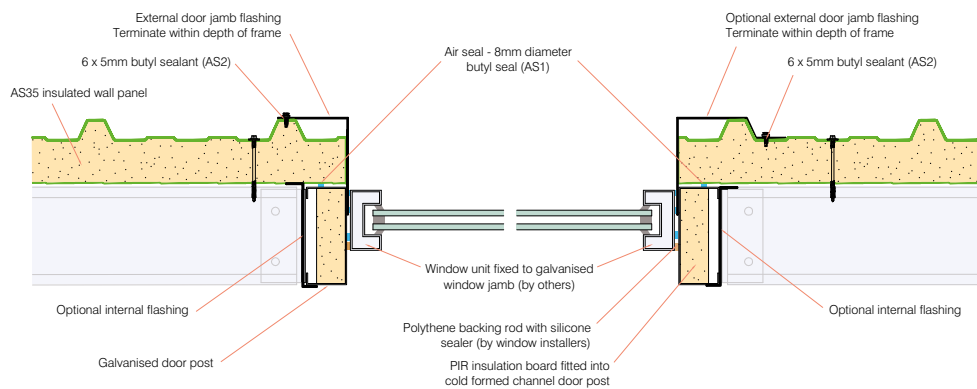
Drawing 18: Internal corner

Window head & cill



Drawing 19: Window head & cill

Window jamb



Drawing 20: Window jamb

DESIGN DETAILS - Fasteners

Fastener selection tables

The correct selection of fasteners is critical to the performance of a building. Fasteners are responsible for the retention of the cladding and roofing panels on the structure and its associated components. The fasteners used must have the strength to withstand the applied loads, the durability to endure the effects of weather without corrosion and the ability to effectively seal the holes which they inevitably pass through. Use stainless steel fixings in order to comply with the terms and conditions of the product guarantee.

Table 12: AS35 roof panel into light steel

Panel - mm	EJOT		SFS	
	Carbon fixing	Stainless steel fixing	Carbon fixing	Stainless steel fixing
40	CF19 JT2-D6H 5.5/6.3 x 82	CF19 JT3-D6H 5.5/6.3 x 67	SDC5-A19-5,5x75	SXC5-S19-5.5x75 A4
60	CF19 JT2-D6H 5.5/6.3 x 102	CF19 JT3-D6H 5.5/6.3 x 107	SDC5-A19-5,5x90	SXC5-S19-5.5x95 A4
70	CF19 JT2-D6H 5.5/6.3 x 102	CF19 JT3-D6H 5.5/6.3 x 107	SDC5-A19-5,5x105	SXC5-S19-5.5x115 A4
80	CF19 JT2-D6H 5.5/6.3 x 122	CF19 JT3-D6H 5.5/6.3 x 127	SDC5-A19-5,5x120	SXC5-S19-5.5x115 A4
100	CF19 JT2-D6H 5.5/6.3 x 122	CF19 JT3-D6H 5.5/6.3 x 147	SDC5-A19-5,5x135	SXC5-S19-5.5x135 A4
110	CF19 JT2-D6H 5.5/6.3 x 152	CF19 JT3-D6H 5.5/6.3 x 147	SDC5-A19-5,5x145	SXC5-S19-5.5x160 A4
120	CF19 JT2-D6H 5.5/6.3 x 172	CF19 JT3-D6H 5.5/6.3 x 167	SDC5-A19-5,5x180	SXC5-S19-5.5x160 A4
130	CF19 JT2-D6H 5.5/6.3 x 172	CF19 JT3-D6H 5.5/6.3 x 167	SDC5-A19-5,5x180	SXC5-S19-5.5x185 A4

Table 13: AS35 wall panel into light steel

40	CF15 JT2-D6H 5.5/6.3 x 82	CF15 JT3-D6H 5.5/6.3 x 67	SDC5-A16-5,5x75	SXC5-S16-5.5x75 A4
60	CF15 JT2-D6H 5.5/6.3 x 102	CF15 JT3-D6H 5.5/6.3 x 107	SDC5-A16-5,5x90	SXC5-S16-5.5x95 A4
70	CF15 JT2-D6H 5.5/6.3 x 102	CF15 JT3-D6H 5.5/6.3 x 107	SDC5-A16-5,5x105	SXC5-S16-5.5x115 A4
80	CF15 JT2-D6H 5.5/6.3 x 122	CF15 JT3-D6H 5.5/6.3 x 127	SDC5-A16-5,5x120	SXC5-S16-5.5x115 A4
100	CF15 JT2-D6H 5.5/6.3 x 122	CF15 JT3-D6H 5.5/6.3 x 147	SDC5-A16-5,5x135	SXC5-S16-5.5x135 A4
110	CF15 JT2-D6H 5.5/6.3 x 152	CF15 JT3-D6H 5.5/6.3 x 147	SDC5-A16-5,5x145	SXC5-S16-5.5x160 A4
120	CF15 JT2-D6H 5.5/6.3 x 172	CF15 JT3-D6H 5.5/6.3 x 167	SDC5-A16-5,5x180	SXC5-S16-5.5x160 A4
130	CF15 JT2-D6H 5.5/6.3 x 172	CF15 JT3-D6H 5.5/6.3 x 167	SDC5-A16-5,5x180	SXC5-S16-5.5x185 A4

Table 14: Stitcher screws

	LS 5.5 x 2CF15 SF 6.3 x 25	CF15 JF3-2-5.5 x 25	SL2-A14-4.8x20	SL2-S-S14-5.5x25 A4
Low Profile		JT3-FR-2H PLUS 5.5 x 25 S12	SL2-A14-4.8x20 (Irius)	SL2-S-S14-5.5x25 A4 (Irius)

Table 15: AS35 insulated GRP rooflights to light steel

40	CF29 JT2-D6H 5.5/6.3 x 82	CF29 JT3-D6H 5.5/6.3 x 67	SDC5-A29-5,5x75	SXC5-S29-5.5x75 A4
60	CF29 JT2-D6H 5.5/6.3 x 102	CF29 JT3-D6H 5.5/6.3 x 107	SDC5-A29-5,5x90	SXC5-S29-5.5x95 A4
70	CF29 JT2-D6H 5.5/6.3 x 102	CF29 JT3-D6H 5.5/6.3 x 107	SDC5-A29-5,5x105	SXC5-S29-5.5x115 A4
80	CF29 JT2-D6H 5.5/6.3 x 122	CF29 JT3-D6H 5.5/6.3 x 127	SDC5-A29-5,5x120	SXC5-S29-5.5x115 A4
100	CF29 JT2-D6H 5.5/6.3 x 122	CF29 JT3-D6H 5.5/6.3 x 147	SDC5-A29-5,5x135	SXC5-S29-5.5x135 A4
110	CF29 JT2-D6H 5.5/6.3 x 152	CF29 JT3-D6H 5.5/6.3 x 147	SDC5-A29-5,5x145	SXC5-S29-5.5x160 A4
120	CF29 JT2-D6H 5.5/6.3 x 172	CF29 JT3-D6H 5.5/6.3 x 167	SDC5-A29-5,5x180	SXC5-S29-5.5x160 A4
130	CF29 JT2-D6H 5.5/6.3 x 172	CF29 JT3-D6H 5.5/6.3 x 167	SDC5-A29-5,5x180	SXC5-S29-5.5x185 A4

*All visible rooflight fasteners in poppy red

SITE GUIDANCE

Packaging

Steadmans insulated panels are delivered to site in plastic wrapped packs with end and side protection. The height of a pack and the number of panels it contains depends upon the thickness of the panels. Typically, panels are packed in stacks up to 1100mm high.

The standard method of packing AS35 panels is weather faces together. This minimises the pack height and provides a stable pack. Panels packed weather face up can be provided where panel length and site handling equipment must be catered for. The panel thickness determines the pack dimensions and the number of panels per pack.

Table 16 gives details of pack dimensions and number of panels per pack.

Handling

Handle panels carefully to avoid marking the weather sheet or liner. Lift panels from the pack - do not drag them. Carry AS35 panels by the male (filled) edge - do not lift panels by the female edge or just the top sheet. Observe site health and safety procedures and the results of manual handling and other assessments.



Table 16: Handling data for AS35 panels

Panel core thickness	40mm	60mm	70mm	80mm	100mm	110mm	120mm	130mm
Weight (kg/m)	10.06	10.74	11.10	11.62	12.38	12.86	13.34	13.66
Max panels per pack (Up to 12m long)	15	11	11	9	7	7	6	6

Delivery of materials to site

The packs can be off-loaded directly to the roof, or to a storage area, which should be dry and well away from traffic. Packs may be stacked up to 2.5m high with wooden bearers every 2m: bearers should be placed above each other. Off-loading is the responsibility of the customer. Delivery by self-off-load vehicles can be arranged.

Two methods of off-loading are recommended.

A forklift or telehandler can be used for off-loading packs up to 6m long. Forks should be opened fully before lifting and must pass through a pallet. Care must be taken when driving on uneven surfaces to avoid any damage to the panels and to prevent packs from tipping.

For panels over 6m in length a crane and slings should be used. Precautions should be taken when using slings to prevent any damage to the panel edges. Edge protection can be used under the sling to prevent localised damage to the panels. Chains should not be used. A spreader bar and a sufficient number of slings should be used in order to spread the load over the whole pack.

No more than 1 pack should be lifted at one time.

Preparation

Before fixing panels check the squareness and accuracy of the steelwork: primary and secondary steelwork must be within specified tolerances. Purlins must be accurately positioned to ensure panels are properly supported and fixed at laps. This is particularly important on long slopes, where cumulative variations in steelwork and panels can result in panel ends having inadequate bearing and fixing positions not being achievable.

Determine the direction of the prevailing wind. Check panels for damage and remove any excess insulation from end and side laps to ensure a good fit.

Cutting panels

Where panels have to be cut on site:

- Use a powered reciprocating or circular saw. Do not use an abrasive cutting wheel.
- Support the panel along the line of the cut.
- Protect the pre-coated finishes of the panel.
- Clean any swarf or debris from the pre-coated finish of the panel immediately.

Installation

The installation of AS35 panels is covered separately in our range of Installation Guides.

Please visit www.steadmans.co.uk to download electronic copies in pdf format; or contact the Steadmans Sales Dept.

Repair and maintenance

Regular inspections are recommended in order to maintain the appearance and performance of panels. Refer to our Coatings & Colour Selector literature for full details of recommended maintenance regimes.





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