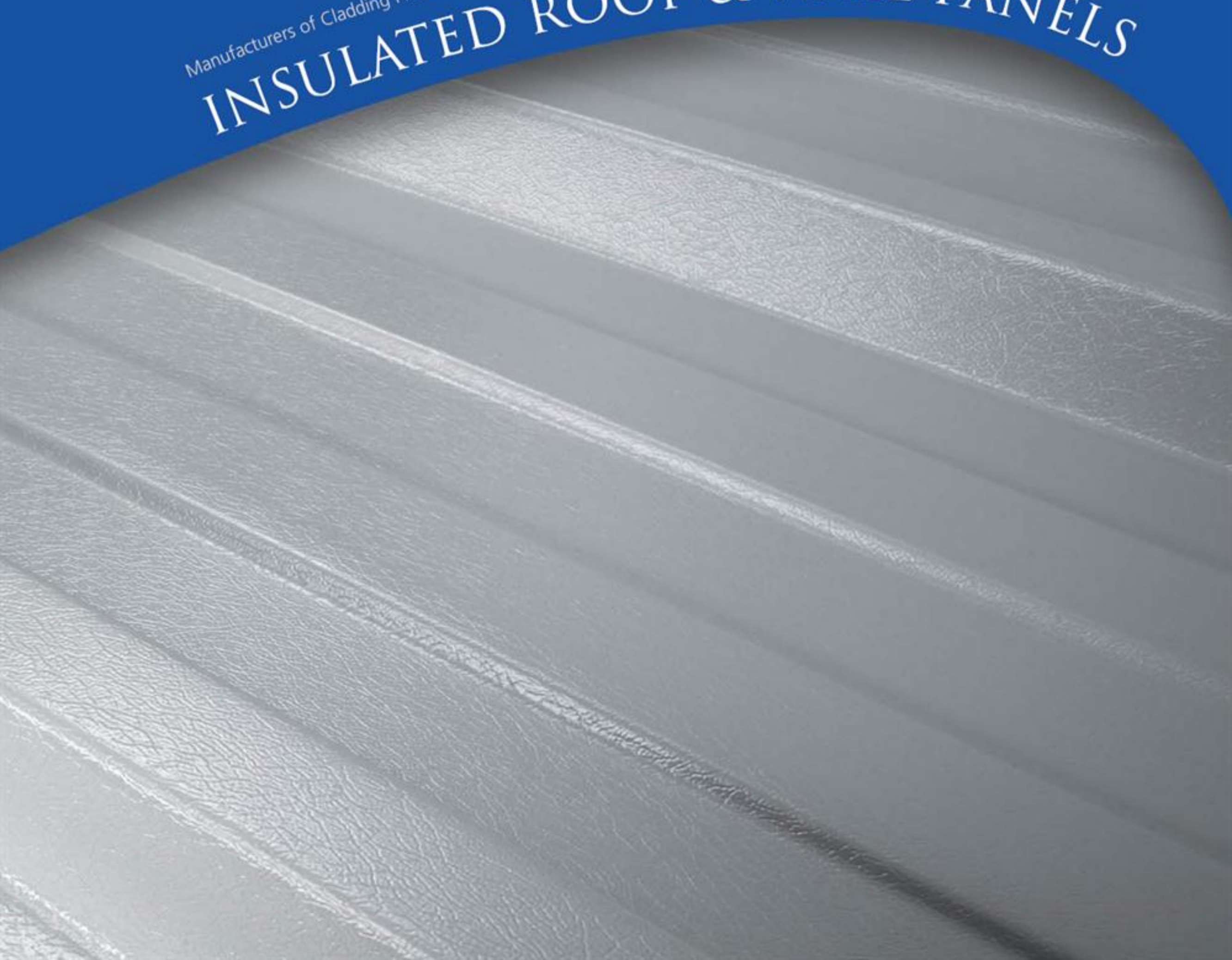




# AS35

Manufacturers of Cladding Products for the Construction Industry

## INSULATED ROOF & WALL PANELS



# AS35 INSULATED ROOF & WALL PANELS

## INTRODUCTION

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## ABOUT STEADMANS

A Steadman & Son Limited (usually known as Steadmans) are one of the UK's leading manufacturers of roofing and cladding, supplying high quality cladding materials from our sites in England, Scotland and Northern Ireland. We offer total cladding and roofing solutions which we deliver with our dedicated haulage fleet.

Our continuous investment programme and on-going product development ensures we can provide high quality products promptly and at competitive prices.



## THE AS35 PANEL

AS35 panels consist of two coated steel profiles bonded to a core of PIR insulation; they may be used to form roofs, down to a 4° pitch, and walls. The system includes a comprehensive range of guttering, flashings, sealants and rooflights.

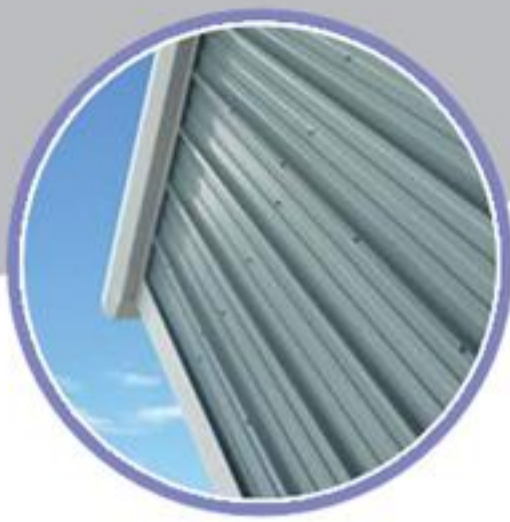
The AS35 system offers rapid coverage and swift completion of a weatherproof building envelope to give a high performance building.

## SPECIFICATION

NBS Plus is a library of technical product information written in NBS format, linked to NBS clauses and clause guidance. With NBS Plus, specifiers can select products quickly and accurately then drop the product information directly into a specification.



NBS clauses for AS35 insulated roof and wall panels and other Steadmans products are now available for NBS subscribers.



## REQUIREMENTS

AS35 roof and wall panels are manufactured in a process certified to ISO 9001:2008.

AS35 roof and wall panels have been tested by the Loss Prevention Certification Board and comply with the requirements of LPS 1181:2005. Part 1 Issue 1.1: Series of Fire Growth Tests for LPCB Approval and Listing of Construction Product Systems - Part 1: "Requirements and Tests for Built-Up Cladding and Sandwich Panel Systems for Use as the External Envelope of Buildings".

### Installation warranty

Steadmans offer an independent audit-based warranty for the AS35 insulated panel cladding system.

The QA+ warranty, from Auditing Workmanship & Materials Ltd, provides pre-site and on-site quality inspections and audits to ensure the high standards of construction and finishing which will maximise service life and reduce maintenance costs.

The QA+ warranty can be extended to a ten year insurance backed warranty covering defects arising from poor workmanship, defective materials and damage resulting from design defects. Contact Steadmans for more information about the warranties.



### Dimensions

Tables 01 and 02 set out the dimensions and manufacturing tolerances of AS35 panels.

## TECHNICAL DESCRIPTION

### Composition

AS35 insulated panels consist of a core of polyisocyanurate (PIR) insulation sandwiched between a heavily profiled external weather sheet and an internal shallow profiled liner. The PIR insulation bonds to the steel sheets during the manufacturing process, together the insulation and steel form strong, rigid panels with good thermal performance.

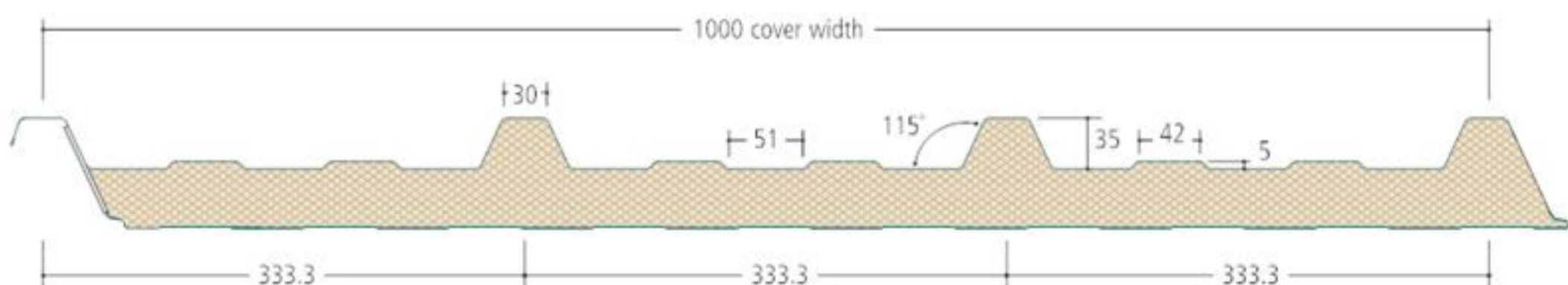
On one side of the panel (the 'female' side) the weather sheet extends beyond the insulation to permit lapping, on the other side (the 'male' side) the exposed edge of the insulation is sealed with factory applied anti-condensation tape. Panels can be supplied with the insulation cut back at one end to enable the formation of end laps on wide span roofs.

**Table 01: AS35 panel dimensions**

Cover	1m
Standard lengths	1.8 – 12m (others on request)
Thicknesses	40, 60, 70, 80, 90, 105, 115, 120 & 137mm
Standard cutbacks	25 – 250mm (also available without cutbacks)

**Table 02: AS35 panel manufacturing tolerances**

Cut to length	
L < 3m	+/- 5mm
L > 3m	+/- 10mm
Cover width	-0mm / +3mm
Thickness	-2mm / +2mm
End square	-3mm / +3mm



# AS35

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### TECHNICAL DESCRIPTION

#### Steel profiles

The standard external weather sheet is 0.5mm thick and the internal liner 0.4mm thick; other thickness can be supplied for special orders.

The steel is hot-dip galvanised to BS EN 10346:2009 or Aluzinc coated, then finished with one of the coatings listed in Table 03.

In order to maintain our high standards of customer service we may replace the steel listed here with that of similar quality from different suppliers.

#### PIR insulation

AS35 panels are formed with PIR insulation which is laid down between the weather sheet and liner on the production line.

The PIR expands to a high performance insulation core and bonds to the steel facings forming a strong rigid panel.

The PIR is produced with a non-ozone depleting blowing agent.

PIR has a low thermal conductivity: for a given U-value panels with PIR cores will be thinner than those with mineral wool or EPS cores. PIR can withstand higher temperatures than PUR and when in contact with fire forms a surface char which limits the spread of flame.

**Table 03: AS35 steel coatings**

Weather sheet	200LG 200 micron PVC Plastisol	A high performance pre-painted steel system on a hot dipped galvanised substrate. The outer face is finished with a leather-grain embossed PVC while the inner face is finished with a heat cured epoxy paint system.
	Dobel Nova	A 50 micron thick acrylic polymer coating which has high wear resistance, excellent colourfastness and good flexibility. The coating contains no PVC or Isocyanates and the material is wholly recyclable.
	Polyester	A polyester coating with a medium term life.
	Tata HPS200	A durable organic coating with Scintilla finish on a substrate treated with hot-dipped zinc-aluminium alloy.
	Tata & Dobel PVDF	A 27 micron thick stoved fluoro-carbon coating: excellent colour stability at temperatures as high as 120°C.
Liner sheet	White lining enamel	Single coat, 18 micron thick finish offers an easy to clean surface. Standard colour 'bright white'.
	200LG Plastisol	200 micron thick coating for areas with high internal humidity or a corrosive environment.
	Dobel Foodsafe	150 micron coating, suitable for the interiors of cold stores, food processing buildings and other hygiene applications.

## PERFORMANCE

### Loadings

Tables 04 and 05 give the allowable unfactored roof and wall loads for AS35 panels with 0.5mm weather sheet

and 0.4mm liner. Load tables for other steel thicknesses are available from Steadmans.

**Table 04: Unfactored roof loads for AS35 panels - medium and light coloured panels (kN/m<sup>2</sup>)**

	T (mm)	Span (m)	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00
Single span	40	Downward	2.24	1.92	1.67	1.47	1.30	1.16	1.04	0.85
		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	2.23	1.99	1.78	1.61	1.46
		Suction	-3.80	-3.32	-2.92	-2.58	-2.30	-1.94	-1.65	-1.41
	80	Downward	4.34	3.84	3.42	3.05	2.74	2.46	2.23	2.02
		Suction	-5.06	-4.47	-3.97	-3.54	-2.94	-2.47	-2.11	-1.82
100	Downward	5.47	4.88	4.36	3.91	3.52	3.18	2.88	2.62	
	Suction	-6.37	-5.67	-5.07	-4.30	-3.57	-3.01	-2.57	-2.22	
Double span	40	Downward	2.24	1.92	1.67	1.47	1.30	1.16	1.04	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	2.20	1.99	1.81	1.66	1.53	1.42
		Suction	-3.80	-3.32	-2.92	-2.58	-2.30	-1.94	-1.65	-1.41
	80	Downward	3.11	2.74	2.45	2.21	2.01	1.84	1.70	1.58
		Suction	-5.06	-4.47	-3.97	-3.54	-2.94	-2.47	-2.11	-1.82
100	Downward	3.44	3.03	2.70	2.44	2.21	2.03	1.87	1.73	
	Suction	-6.37	-5.67	-5.07	-4.30	-3.57	-3.01	-2.57	-2.22	

Calculated to ECCS document 115: 2001 with deflection limits: downward L/200, suction L/150 and tolerance of L/600 between purlin bearing planes (where L = purlin spacing). Temperature range: summer – external 65°C, internal 25°C; winter – external 0°C, internal 20°C

**Table 05: Unfactored wall loads for AS35 panels - dark coloured panels (kN/m<sup>2</sup>)**

	T (mm)	Span (m)	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00
Single span	40	Pressure	1.94	1.65	1.42	1.23	1.08	0.95	0.84	0.75
		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	1.96	1.74	1.55	1.38	1.24
		Suction	-3.51	-3.05	-2.67	-2.35	-2.08	-1.86	-1.66	-1.49
	80	Pressure	4.00	3.52	3.12	2.77	2.47	2.21	1.99	1.76
		Suction	-4.75	-4.19	-3.71	-3.29	-2.94	-2.55	-2.19	-1.90
100	Pressure	5.11	4.54	4.05	3.62	3.24	2.92	2.63	2.38	
	Suction	-6.04	-5.37	-4.79	-4.28	-3.65	-3.10	-2.66	-2.31	
Double span	40	Pressure	1.94	1.65	1.42	1.23	1.08	0.95	0.84	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	2.23	1.96	1.74	1.55	1.38	1.24
		Suction	-3.51	-3.05	-2.67	-2.35	-2.08	-1.86	-1.66	-1.49
	80	Pressure	3.11	2.76	2.48	2.25	2.07	1.91	1.77	1.65
		Suction	-4.75	-4.19	-3.71	-3.29	-2.94	-2.55	-2.19	-1.90
100	Pressure	3.44	3.04	2.73	2.47	2.26	2.09	1.94	1.81	
	Suction	-6.04	-5.37	-4.79	-4.28	-3.65	-3.10	-2.66	-2.31	

Calculated to ECCS document 115: 2001 with deflection limits: pressure L/150, suction L/150 and tolerance of L/600 between purlin bearing planes (where L = purlin spacing). Temperature range: summer – external 80°C, internal 25°C; winter – external -10°C, internal 20°C

# AS35

## INSULATED ROOF & WALL PANELS

### PERFORMANCE

#### Fire

AS35 panels have been tested by LPCB to LPS 1181:2005. Standard AS35 panels achieve grade EXT-B; AS35 Firefighter wall panels achieve grade EXT-A15; AS35 Firefighter Plus wall panels achieve grade EXT-A30. Table 06 shows the test results.

When tested to BS 476-7:1997 AS35 panels achieve Class 1 surface spread of flame (Euro Class B), equivalent to Class 0 surface spread of flame as described in Approved Document B. When tested to BS 476-3:2004 AS35 panels achieve an FAA/SAA rating.

**Table 06: Fire resistance results to LPS 1181:2005**

LPCB ref. no	Panel	Thickness (mm)	Fire resistance (minutes) integrity (BS 476-22:1987)	Fire resistance (minutes) insulation (BS 476-22:1987)	Grade	Core
635a/04	AS35/1000 Roof panels	40, 60, 70, 80, 90, 105, 115 & 120	N/A	N/A	EXT-B	HCFC-free PIR
635a/04	AS35/1000 Wall panels	40, 60, 70, 80, 90, 105, 115 & 120	N/A	N/A	EXT-B	HCFC-free PIR
635a/05	AS35/1000 Firefighter Wall panels	60, 70, 80, 90, 105, 115, & 120	120	15	EXT-A15	HCFC-free PIR
635a/05	AS35/1000 Firefighter Plus Wall panels	105, 115 & 120	120	30	EXT-A30	HCFC-free PIR

Wall panels covered by LPCB reference 635a/04 and 635a/05 must be laid vertically.

Wall panels require external side lap stitching at 300mm centres. Roof panels require external side lap stitching at 450mm centres.

Roof and wall panels covered by LPCB certificates 635a/04 and 635a/05 require a 6mm x 5mm NFRC Class A butyl tape to be used in the side lap joints.

Firefighter Plus panels require site applied graphite tape. Contact Steadmans Technical Department for further details.

#### Thermal

The PIR insulation within AS35 panels has a low thermal conductivity that gives the panels their good thermal performance (Table 07). The large panel dimensions and the edge lap seals give AS35 panel systems good resistance to air leakage.

#### Biological

AS35 panels are unaffected by mould, fungi or mildew. They do not support vermin.

#### Acoustic

Steadmans AS35 panels have a weighted sound reduction  $R_w$  of between 22db and 25db in accordance with BS EN ISO 140-3:1995.

**Table 07: U-values of AS35 panels**

Panel thickness	U-value* (W/m <sup>2</sup> K)
40	0.50
60	0.35
70	0.30
80	0.26
90	0.23
105	0.20
115	0.18
120	0.17
137	0.15

U values determined using finite element analysis to BS EN ISO 10211:2007. Due to changing regulatory requirements details and panel thickness's available may change. Contact Steadman Technical Service for further details.

## PERFORMANCE

### Durability

AS35 panels have a predicted service life of 40 years. Time to first maintenance depends upon the finish and the environmental conditions but can be as high as 30 years. Coatings will degrade more rapidly in industrial or marine air conditions and dark finishes will fade more rapidly than light ones. Table 08 gives the time to first repainting for panels finished with standard Plastisol colours.

Service life can be increased by treating cut edges with site applied touch up paint at the time of cutting and by following the guidance on inspection and maintenance on page 34 of this brochure.

Table 09 shows available standard colours. Special colours are also available, contact Steadmans for more details.

**Table 08: Life to first full repainting for plastisol coated profiles**

Colours	Wall profiles		Roof profiles		Table based on data from Dobel. Steel from other producers may have different durability values.
	Inland	Coastal*	Inland	Coastal*	
Group 1	30	25	25	20	
Group 2	25	20	20	15	

\*within 1.5 miles from lake or sea shoreline

Group 1: Bamboo, Buttermilk, Goosewing Grey, Ivory, Merlin Grey, Moorland Green, Mushroom, New Grey, Olive Green, Pigeon Grey, Wedgwood Blue, White, Willow.

Group 2: Black, Cornflower Blue, Country Green, Golden Glow, Golden Yellow, Forest Green, Jade, Juniper Green, Linden Green, New Red, Ocean Blue, Pacific Blue, Poppy Red, Saffron, Sage Green, Slate Blue, Tangerine Orange, Terracotta, Vandyke Brown.

Colours below include nearest BS ref for guidance only as the colours vary slightly from British Standard. Due to limitations in printing, colours are for guidance only - specification should be made from an actual sample, available from Steadmans.

**Table 09: Standard profile colours**

			
Goosewing Grey* 10A05	Ivory RAL9002	Merlin Grey* 18B25	Moorland Green 12B21
			
Mushroom 10B19	Olive Green 12B27	Juniper Green* 12B29	Ocean Blue 18C39
			
Slate Blue* 18B29	Terracotta* 04C39	Vandyke Brown* 08B29	White 00E55

\*Also available in Polyester coated finish

# AS35 INSULATED ROOF & WALL PANELS

## ACCESSORIES

### Rooflights

Steadmans offer a range of factory assembled in-plane rooflights to match the dimensions of AS35 panels (see table 10). Energysaver triple skin rooflights give a U-value of 1.9W/m<sup>2</sup>K\* and consist of two skins of GRP with a central membrane, hardpak spacers and foam end pieces. Double skin rooflights are available if a lower thermal performance is acceptable. Each rooflight has a metal underlap strip built into the crown of the male edge which enables the rooflights to be stitched with standard screws.

Rooflights can be supplied to meet project requirements for light transmission, durability, non-fragility rating, fire resistance and thermal performance: contact Steadmans' sales office for details.

**Table 10: Rooflights**

Property	Units	Value
Minimum slope	°	6
Maximum length	m	7
Width (centre-centre)	mm	1000
Thicknesses	mm	40, 60, 70, 80, 90, 105, 115, 120 & 137
U-value	W/m <sup>2</sup> K	
Standard		3.0*
Energysaver		1.9*
Low U-value Energysaver		1.0 – 1.9*

\* Figures supplied by Brett Martin Daylight Systems Ltd. Other manufacturer's figures may vary.

### Gutters

Steadmans manufacture and supply a range of gutters to match AS35 panels. Gutters are produced from a variety of materials including pre-galvanised steel (to BS EN 10143:2006) and pre-coated steel, either painted or PVC-coated on one or both sides: aluminium can be supplied to special order. Complete gutter systems and accessories can be manufactured to specification, up to 10m long and 3mm thick: contact Steadmans' sales office for details of sizing.

### Flashings

Steadmans manufacture a range of flashings to match AS35 panels in plastisol leathergrain, polyester, Nova, Scintilla, galvanised, or PVDF finishes. Flashings can be supplied in lengths up to 6m in traditional profiles, or can be shaped to meet special customer requirements.

### Sealants

Steadmans supply a range of NFRC Class A butyl sealants, profile foam fillers and expanding foams to enable AS35 panels to be sealed to each other and to other building components, so avoiding thermal bridging and air leakage.





## DESIGN GUIDANCE

### Structure

AS35 panels are designed to be supported by and fixed to steel or timber purlins. Steelwork for AS35 panels should be within the tolerances given in BS 5950-2:2001: 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 1.8m centres. Consult Steadmans Technical Department for guidance on using the panels on purlins at centres greater than 1.8m.

AS35 panels should be isolated from preservative treated timber purlins by PVC barrier tape applied to the bearing face of the purlins.

### Fixings

Fixings for AS35 roof panels provide restraint against wind uplift forces; those for AS35 wall panels provide restraint and support.

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

Fixings should be stainless steel or carbon-steel self drilling screws with a high thread to restrain the weather face of the panel and should have press-on or integral caps to match the finish of the panel. To prevent water penetration each fixing should have a 19mm diameter EPDM washer.

Fixings to light and heavy section steel should pass through the steel and leave 5mm of thread exposed on the underside of the section. Fixings to timber must achieve a minimum 40mm embedment.

For normal exposure conditions AS35 roof and wall panels should be fixed in each main valley at each purlin (see figure 02): consult Steadmans Technical Department for guidance on abnormal conditions.

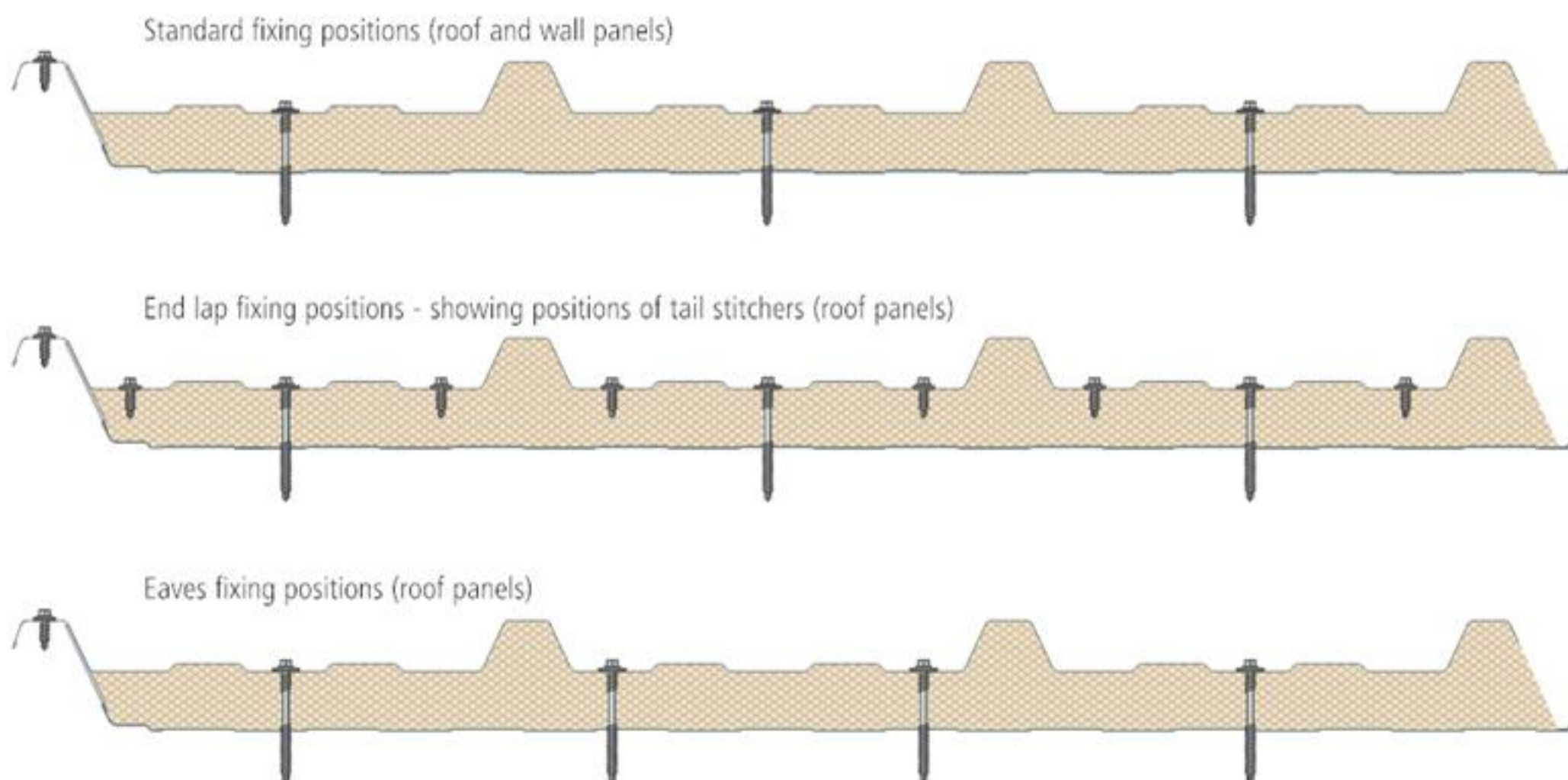


Figure 02: Fixing details for roof and wall panels

# AS35 INSULATED ROOF & WALL PANELS

## DESIGN GUIDANCE

### Laps

Side laps between panels are formed by lapping the extended weather sheet of the female side of one panel over the male crown of the adjacent panel. The exposed edge of the lap should face away from the prevailing wind. The lap should be sealed with butyl sealant strip 6mm wide by 5mm high and the two weather sheets stitched with 23mm long self-drilling screws. AS35 roof panels should be stitched at 450mm centres, AS35 wall panels should be stitched at 300mm centres.

End laps are required on large span roofs and high walls with two or more tiers of AS35 panels. Roof panel end laps are formed by lapping the weather sheet of the upper panel 150mm over the lower panel. End laps are sealed with three runs of butyl sealant 6mm wide by 5mm high. The first run should be sited 10 - 15mm upslope of the primary fixings, the second run 10 - 15mm downslope of the primary fixings and the third run 15mm from the bottom of the lap. Wall panel end laps are formed by lapping the weather sheet of the upper panel 100 mm over the lower panel. End laps are sealed with two runs of butyl sealant 6mm wide by 5mm high. The first run should be sited 10 - 15mm upwards of the primary fixings, the second run 15mm from the bottom of the lap (see fig 27 on page 25).

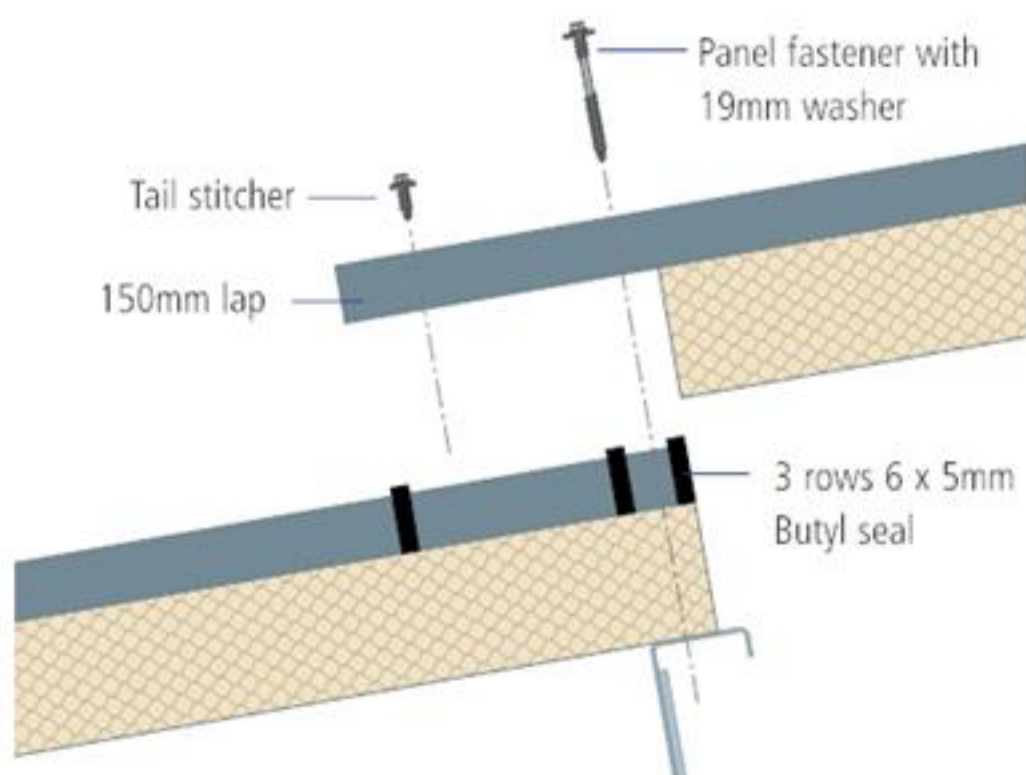


Figure 03: End lap fixing details - roof panels

Where four panels overlap additional runs of butyl sealant are required between the male and female crowns of all four panels to prevent air leakage.

### Fire

AS35 panels provide class 0 resistance to surface spread of flame and can be used to form roof and wall linings without any additional treatment.

AS35 roof panels achieve an AA rating against external spread of fire and may be used at any location on the roof. AS35 wall panels achieve LPCB grade EXT-B and, in England and Wales, and Northern Ireland, may be used without restriction on walls at least 1m from a boundary (see AD B section 13 for details of boundary conditions). Walls within 1m of a boundary should be clad with AS35 Firefighter panels which achieve LPCB grade EXT-A15 and will provide 120 minutes of integrity and 15 minutes of insulation. To achieve the ratings panels must be fixed at every valley and have laps stitched at 450mm centres (roofs) and 300mm centres (walls).

In Scotland AS35 firefighter panels may be used on walls at least 1m from a boundary; AS35 firefighter plus panels should be used on walls within 1m of a boundary - these achieve LPCB grade EXT-A30 and provide 120 minutes integrity and 30 minutes of insulation. See Scottish Building Standards Technical Handbook Section 2 for details of boundary conditions.

Hot flues which penetrate the panels must be separated from the panel cores by 25mm and the gap packed with nonflammable material: pre-formed collars are available.

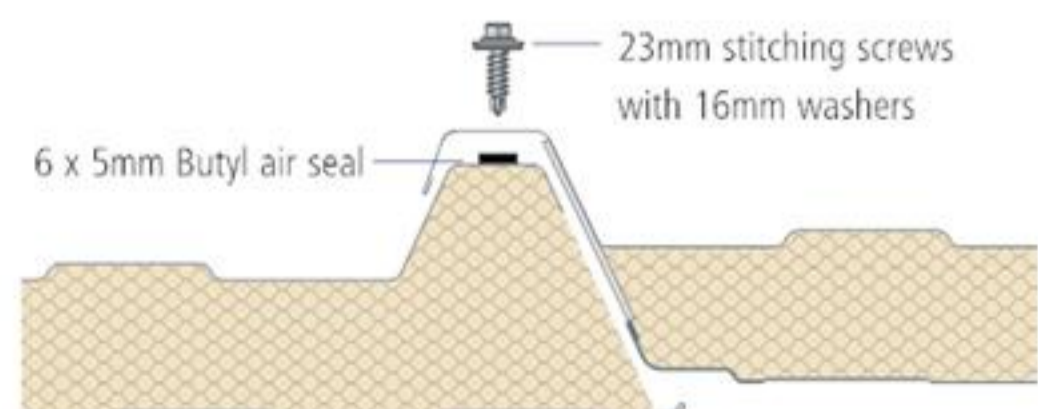


Figure 04: Side lap fixing details - roof and wall panels

## DESIGN GUIDANCE

### Thermal performance

Carbon emissions from non-domestic buildings must now be an aggregate 25% lower than those predicted for a comparable building which would have met the requirements of Part L 2006. Energy use and emissions must be calculated using the Simplified Building Energy Model (SBEM), either by using iSBEM (a free software tool available from the DCLG) or by using an accredited simulation tool.

Whilst designers will now have to consider building form, efficiency of services and the use of low or zero carbon energy generation they will still have to address fabric heat losses:

**Conduction losses:** Part L no longer uses elemental U-values for assessing compliance. The low U-values provided by AS35 panels give designers a way of addressing fabric heat loss.

**Thermal bridging:** SBEM takes account of heat losses at junctions between building elements using linear thermal transmittance (psi values). Psi values for junctions and perimeters in the AS35 panel system are shown in table 11.

**Air leakage:** whilst the regulations set an air leakage limit of 10m<sup>3</sup>/m<sup>2</sup>/hr @ 50Pa, designers may choose to base their SBEM calculations upon lower rates. When correctly detailed and installed the AS35 panel system will contribute to achieving a low air leakage rate.

Work which involves increasing the capacity of building services in existing buildings (described in Approved Document L2B) may require improvements to the thermal performance of building elements. One means of achieving that would be to replace existing roof or wall panels with an AS35 panel system.

### Control of condensation

Part C2 of the Building Regulations requires designers to prevent harmful condensation forming on or within building elements. To minimise the risk of condensation designers should arrange for the extraction at source of moisture generated by activities and processes within the building and adopt forms of construction which will not trap moisture within elements. Designers should observe the guidance in BS 5250:2002.

AS35 panels are unlikely to be affected by surface condensation as the high performance core will keep the temperature of the liner sheet above dewpoint. Designers should assess the risk of surface condensation at linear thermal bridges using the method in BRE IP 17/01 and the temperature factors (f-values) shown in table 11.

The high vapour resistance of the liner sheet and the factory applied edge seal will inhibit interstitial condensation.

**Table 11 Psi & f-values for panel junctions and perimeters**

Junction	Psi value (W/mK)	f-value
Eaves (fig 05)	0.23	0.83
Ridge (fig 09)	0.01	0.97
Verge (fig 11)	0.19	0.76
Valley gutter* (fig 15)	0.62	0.73
Parapet gutter (fig 17)	1.20	0.71
Parapet (fig 19)	0.37	0.65
Wall - drip (fig 29)	0.30	0.76
Wall - int corner (fig 30)	0.23	0.76
Wall - ext corner (fig 31)	0.26	0.76
Door/window jamb (fig 34)	0.49	0.59
Door/window head (fig 35)	0.50	0.58
Window cill (fig 36)	0.49	0.60
Industrial door head	0.87	0.67
Industrial door jamb	0.41	0.74

\* use twice the value for a full gutter  
 Note that values are only applicable to the components on the detail.  
 Changes to the detail will alter values

# AS35

## INSULATED ROOF & WALL PANELS

### DESIGN GUIDANCE

#### Drainage

AS35 panels are intended for roofs with a minimum slope of 4°: if the roof includes rooflights the minimum slope is 6°. Gutters and downpipes should be designed to collect rain and snow 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.

#### Rooflights

**Illuminance:** the area of rooflights required to illuminate the building interior depends upon the type of activities taking place. BS 8206-2:2008 Code of practice for daylighting gives guidance. Table 12 shows how to achieve the recommended levels.

**Thermal performance:** with the adoption of the whole building compliance method in Part L there is no maximum permitted area for rooflights: designers must assess the performance of rooflights as part of the SBEM evaluation. The only limit on rooflights is that their area weighted U-value must not exceed 2.2W/m<sup>2</sup>K and no rooflight may have a U-value worse than 3.3W/m<sup>2</sup>K.

**Solar gain:** Part L requires designers to ensure solar gains in summer will not be excessive. TM37 contains guidance and calculations methods.

**Safety:** rooflights must provide safety levels appropriate to the frequency of roof access. All Steadmans rooflights offer a non-fragility rating of class B on installation. However, for standard 2.4 kg gauge rooflights that level of non-fragility may not be maintained over their 25 year service life. Where rooflights must be non-fragile throughout their service life Steadmans recommend the use of 3.0 kg gauge rooflights. Consult Steadmans for further guidance.

**Table 12: Rooflight areas**

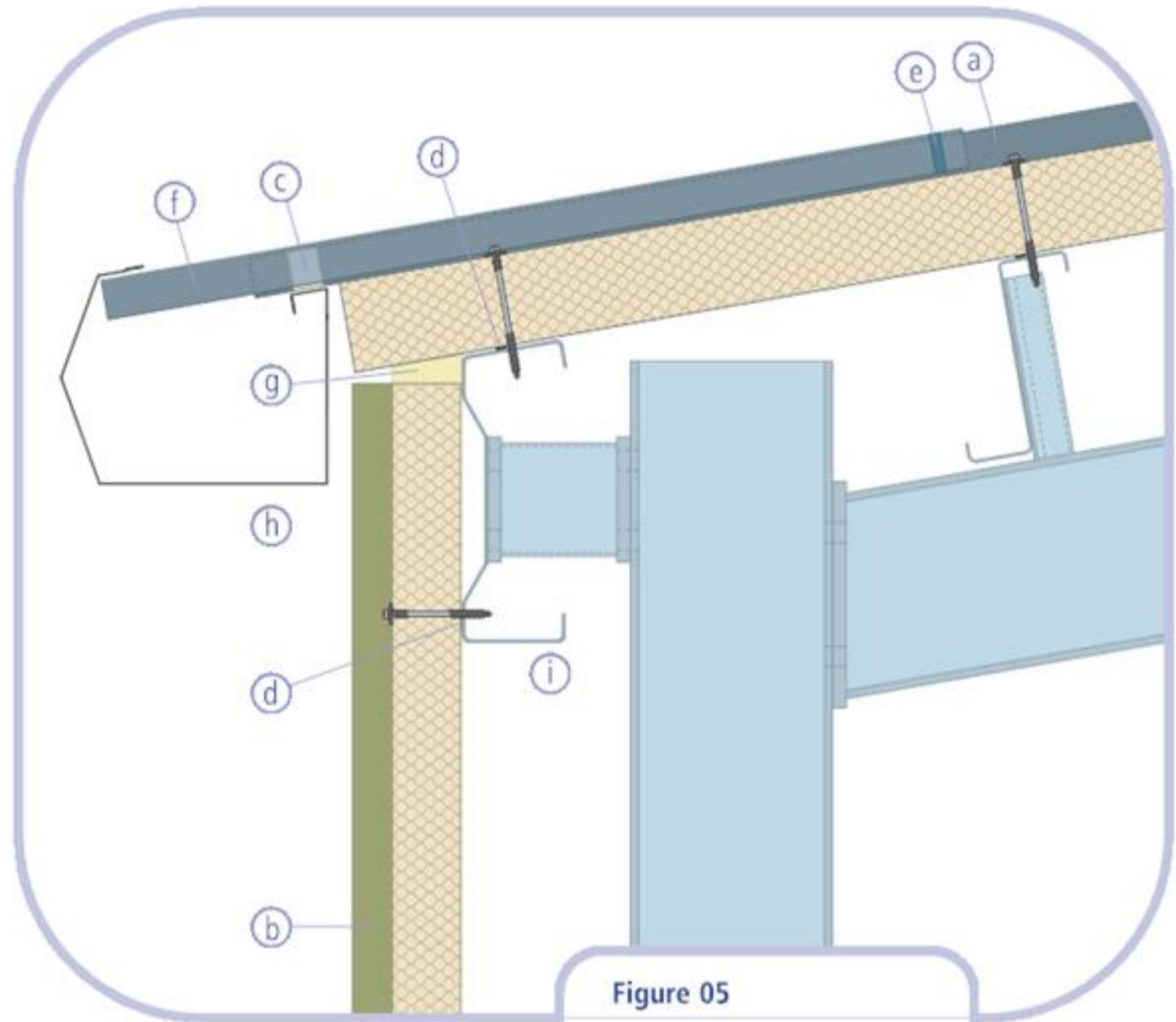
Characteristics of activity / interior	Level of illuminance req. (lux)	Recommended min. rooflight area (% of floor area)
Interiors used occasionally, with visual tasks confined to movement and limited perception of detail e.g. bulk stores	100	10%
Continuously occupied interiors, with visual tasks not requiring perception of detail e.g. loading bays, plant rooms	200	10%
Moderately difficult visual tasks, colour judgement may be required e.g. sports and assembly halls, packing, general offices, engine assembly, retail shops	300 - 500	13% - 15%
Difficult visual tasks, accurate colour judgement required e.g. drawing offices, inspection, electronic assembly	750 - 1000	17% - 20%

\* Table based on research by Institute of Energy and Sustainable Development, De Montford University for illuminance in the horizontal plane - rooflight area should be greater where illumination is needed in the vertical plane e.g. where vertical racking is used.

\*\* Figures for the level of illuminance required are taken from CIBSE Guide A (table 1.12)

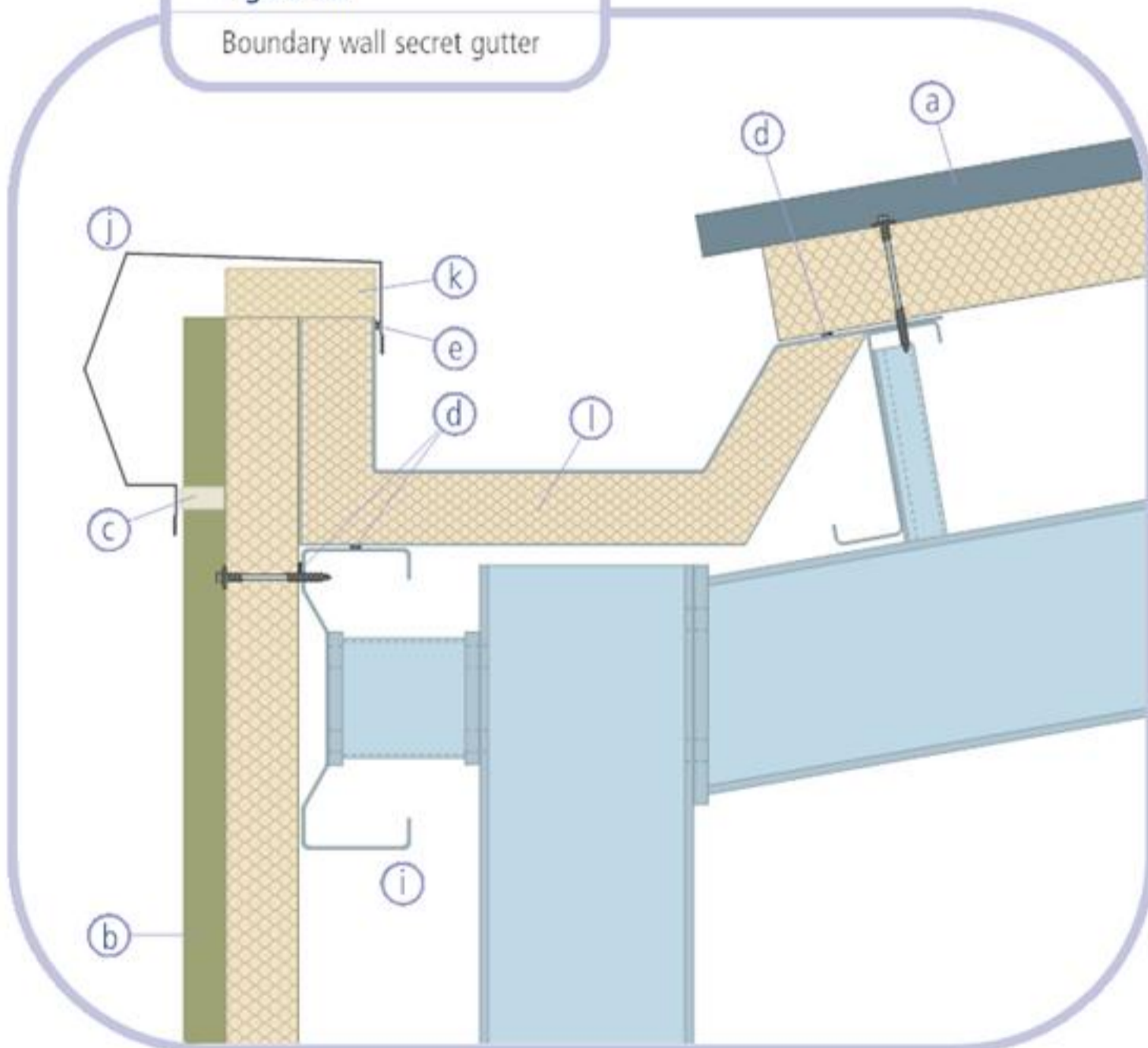
## DESIGN DETAILS

This section sets out common details for AS35 panels. All the details here are available in CAD format from the Steadmans web site.



**Figure 05**  
External trimline gutter

**Figure 06**  
Boundary wall secret gutter



### Key to figures 05 & 06

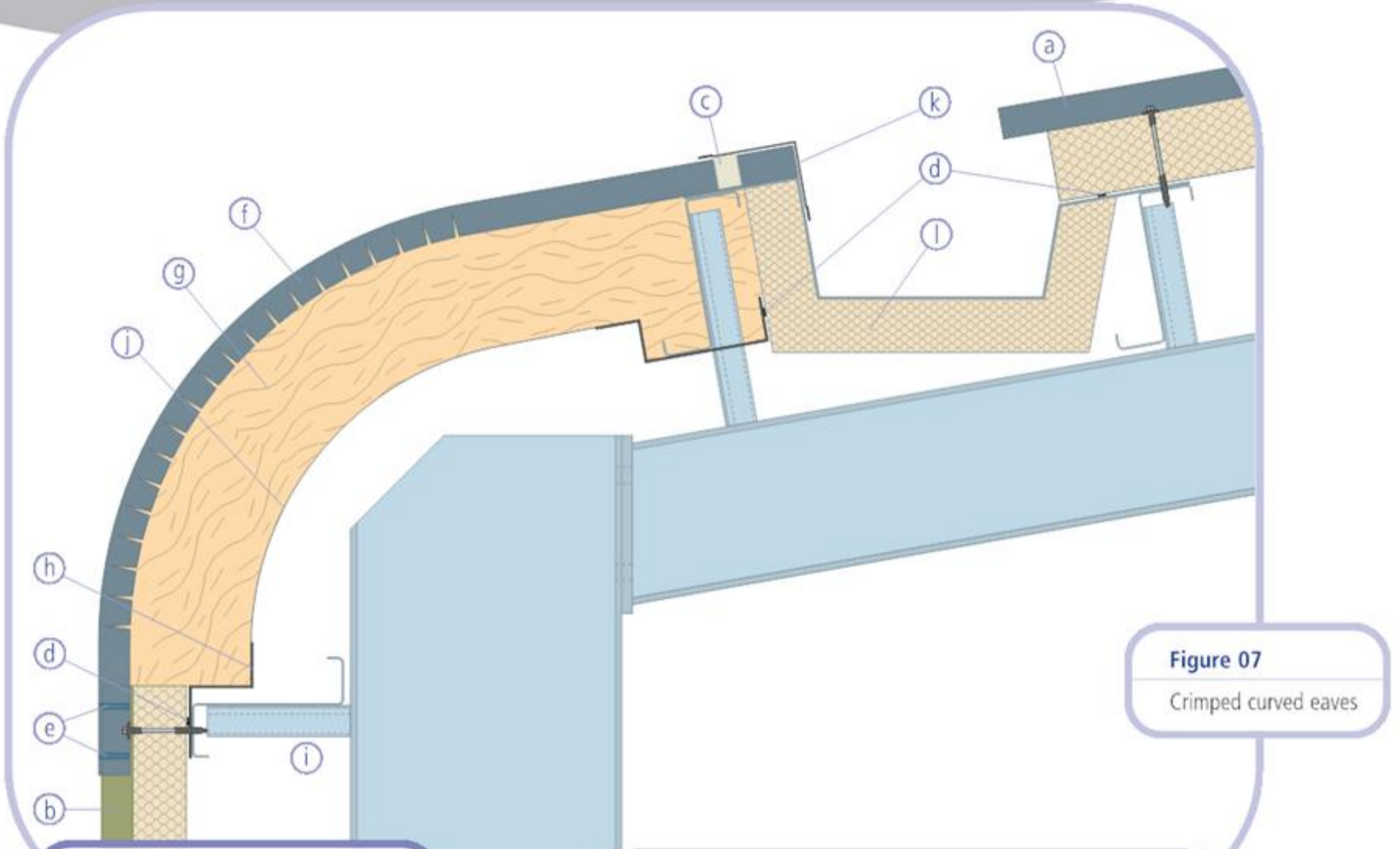
- a** AS35 insulated roof panel
- b** AS35 insulated wall panel
- c** Profiled foam filler sealed with gun grade mastic
- d** Air seal - 8mm Butyl rubber
- e** Seal - 6 x 5mm Butyl rubber
- f** Gutter support arm @ 1000mm max. centres stitched to roof panel @ max. 200mm centres
- g** Site applied fire rated canister insulation
- h** Plastisol external eaves gutter
- i** Eaves beam
- j** Eaves flashing
- k** PIR insulation board
- l** Insulated gutter

### Notes

- Factory formed insulated gutter, PIR board insulation gives U-values of 0.25 or 0.35W/m<sup>2</sup>K

# AS35 INSULATED ROOF & WALL PANELS

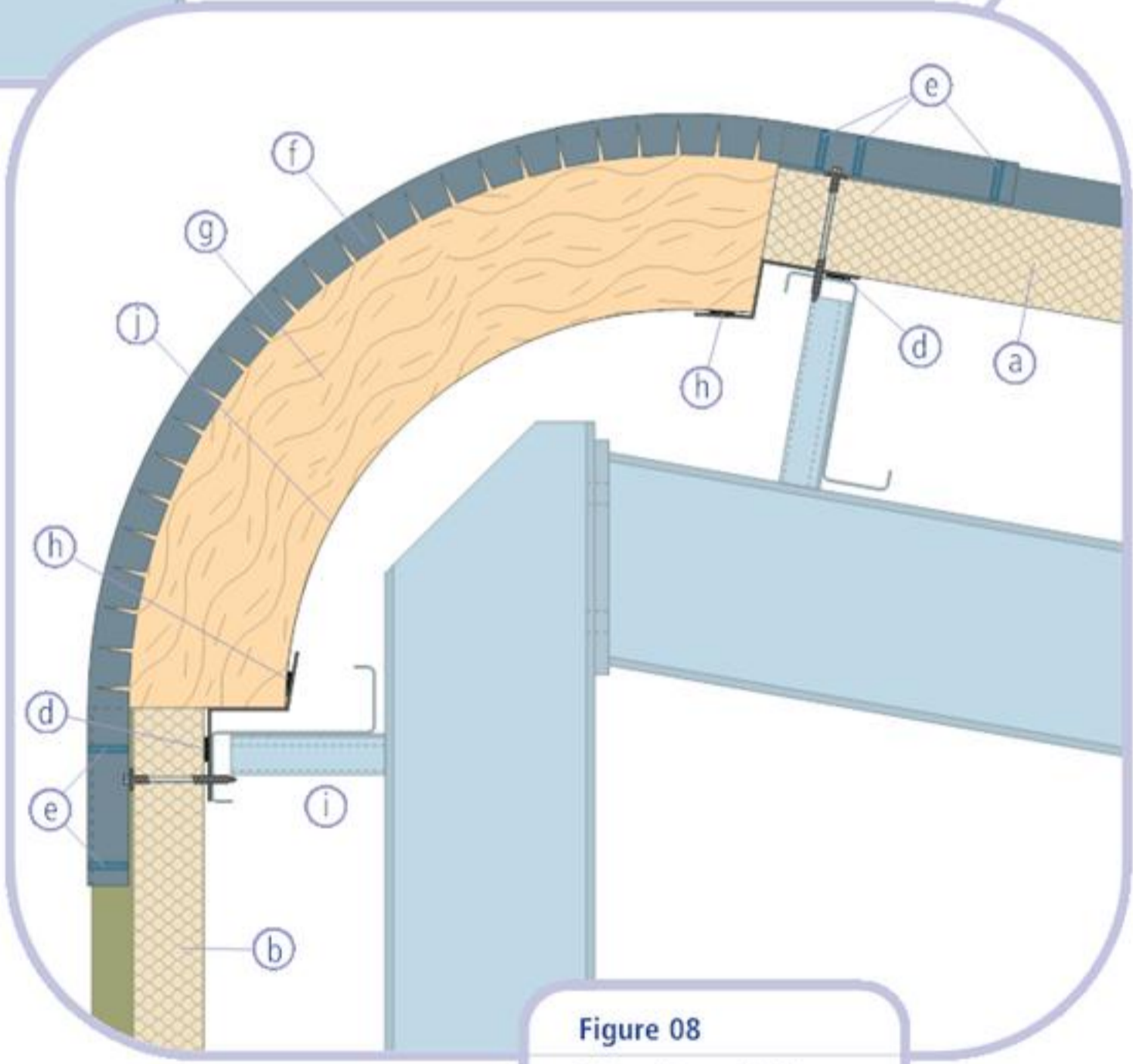
## DESIGN DETAILS



**Figure 07**  
Crimped curved eaves

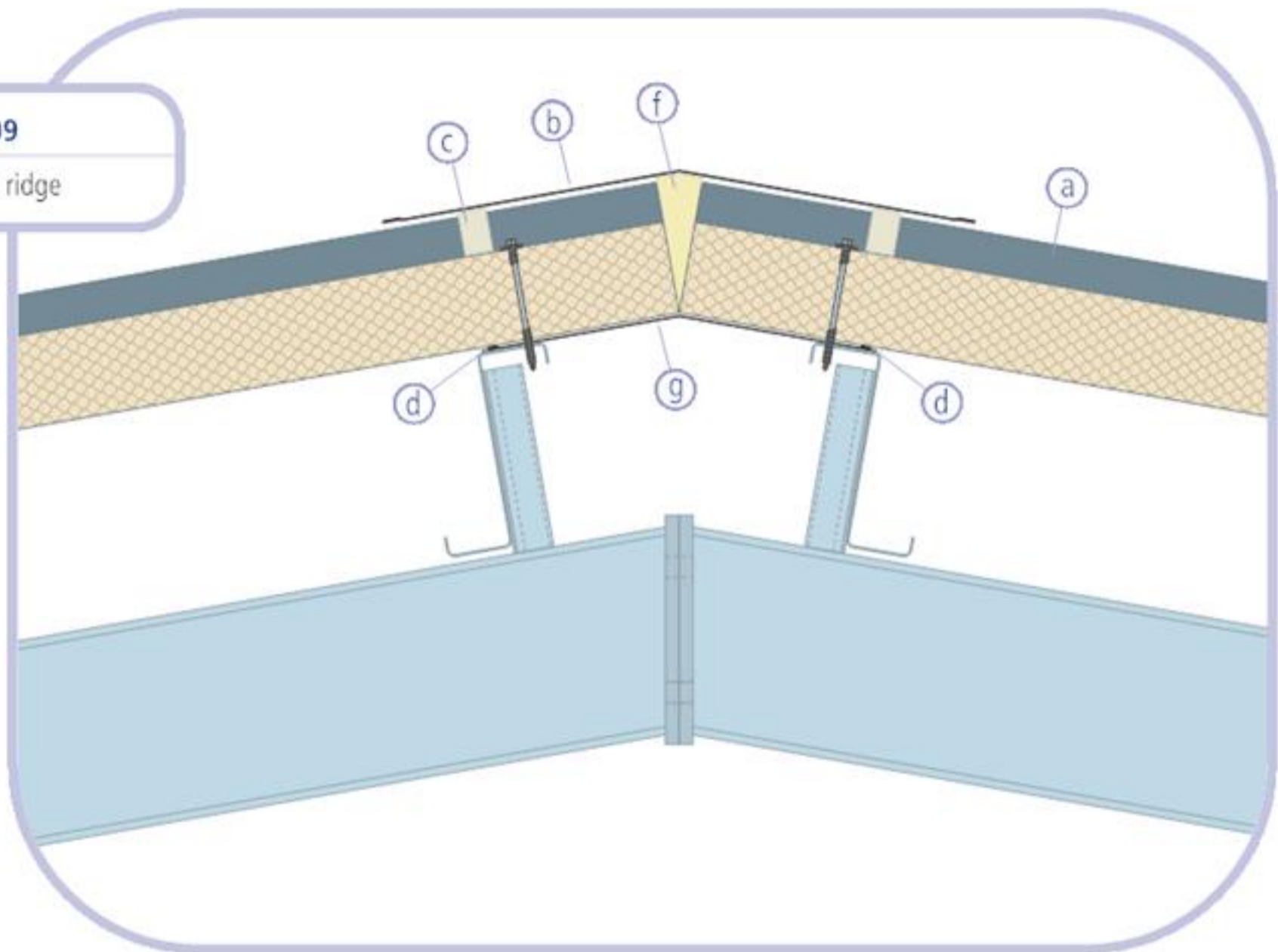
- Key to figures 07 & 08**
- a AS35 insulated roof panel
  - b AS35 insulated wall panel
  - c Profiled foam filler sealed with gun grade mastic
  - d Air seal - 8mm Butyl rubber
  - e Seal - 6 x 5mm Butyl rubber
  - f Curved single skin sheet
  - g Rockwool insulation to achieve required U-value
  - h Galvanised support for liner sheet
  - i Side rail
  - j 0.7mm site curved flat sheet, min 75mm sealed lap joints
  - k Closure flashing
  - l insulated gutter

- Notes**
- Factory formed insulated gutter, PIR board insulation gives U-values of 0.25 or 0.35W/m<sup>2</sup>K
  - Minimum outside radius of curved eaves sheet = 450mm

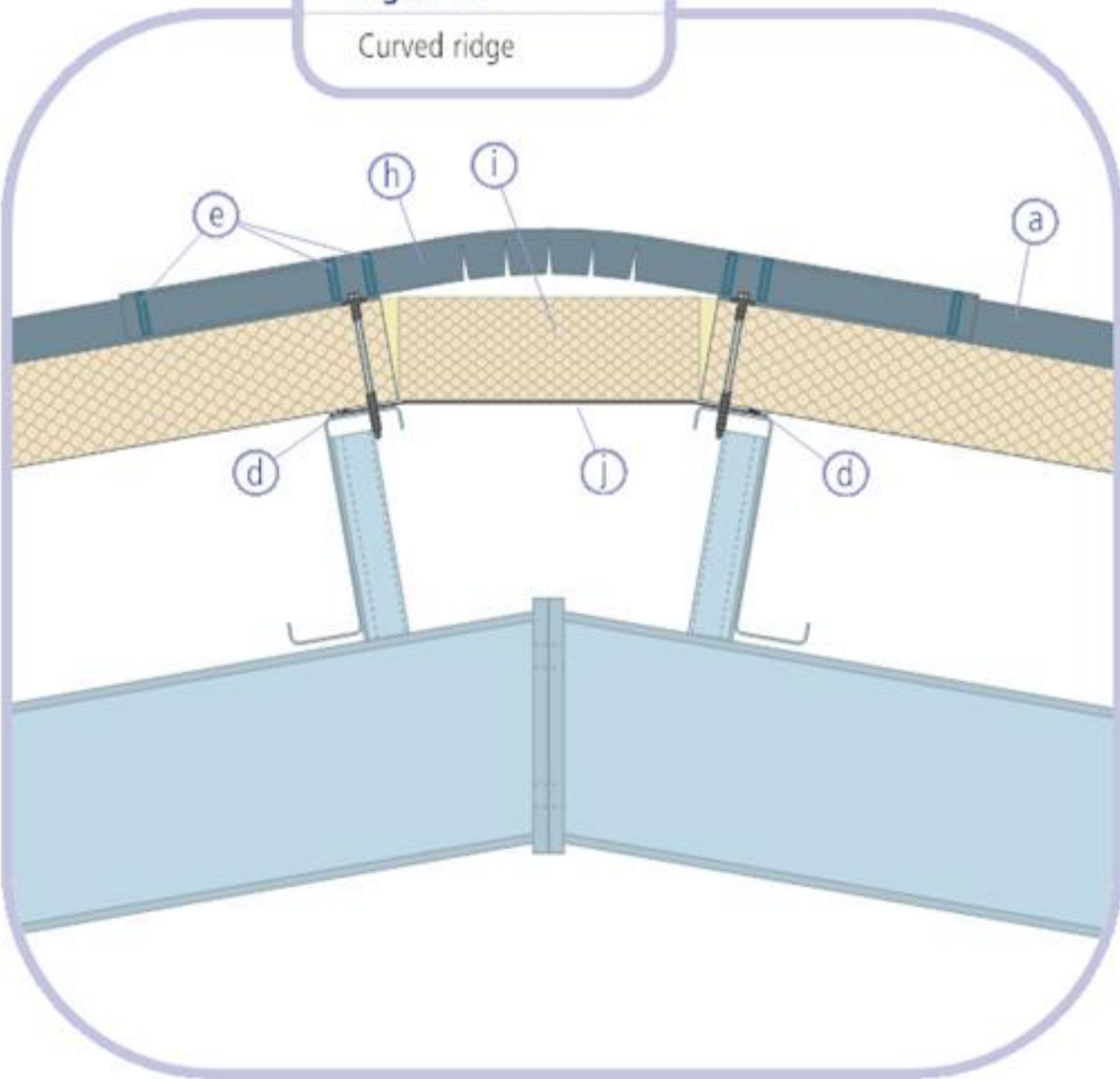


**Figure 08**  
Crimped curved ridge

**Figure 09**  
Standard ridge



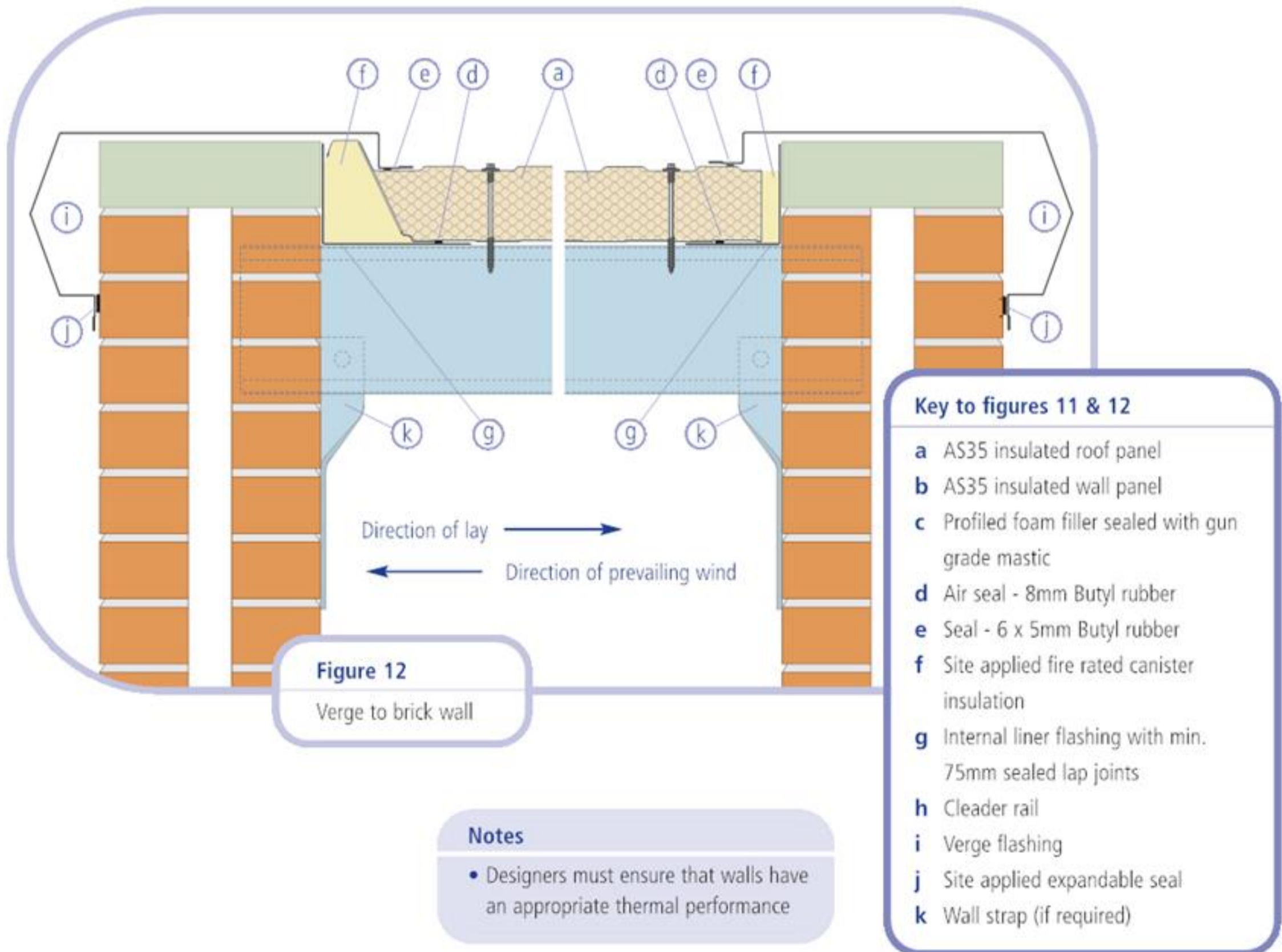
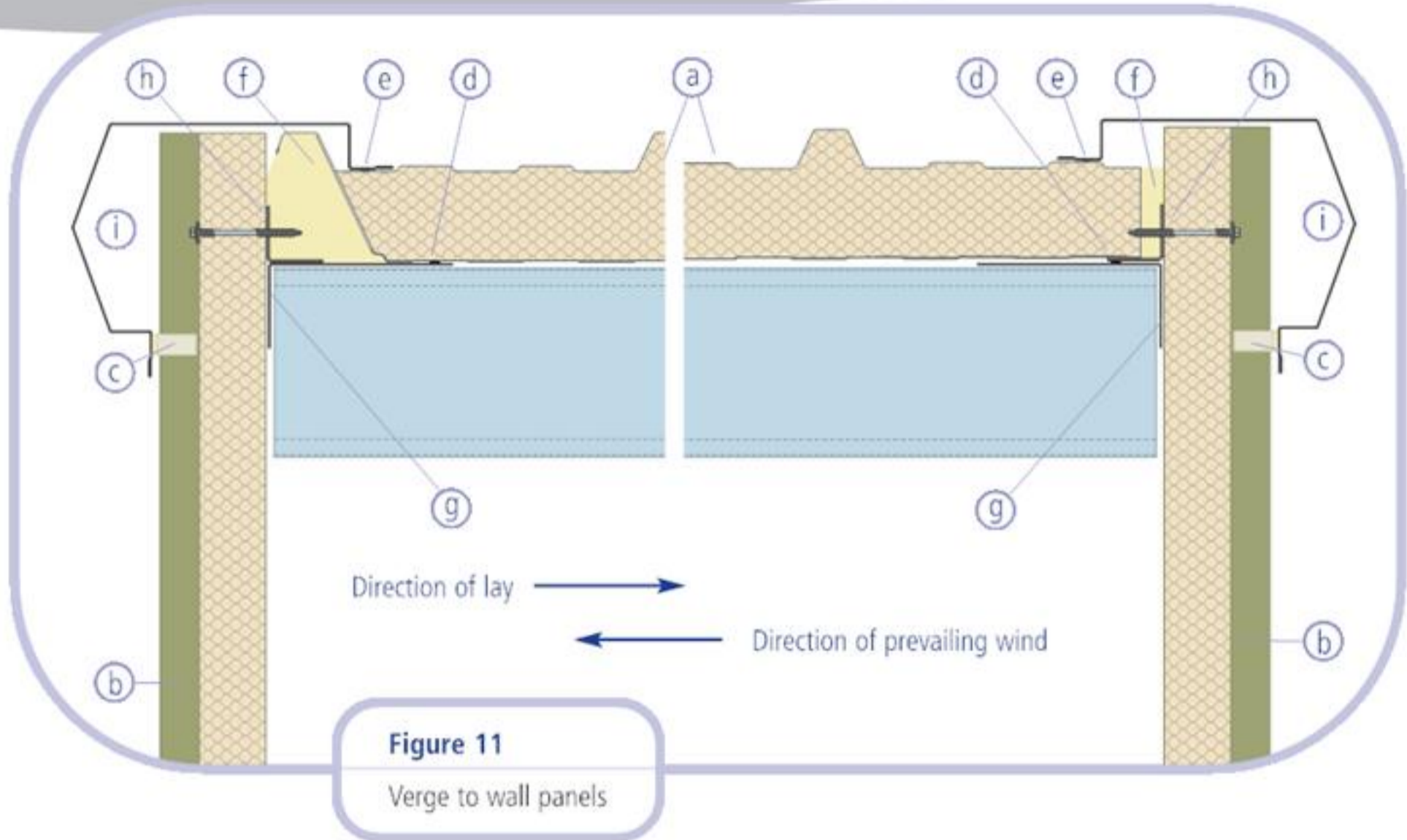
**Figure 10**  
Curved ridge



- Key to figures 09 & 10**
- a** AS35 insulated roof panel
  - b** Ridge flashing with min. 150mm sealed lap joints
  - c** Profiled foam filler sealed with gun grade mastic
  - d** Air seal - 8mm Butyl rubber
  - e** Seal - 6 x 5mm Butyl rubber
  - f** Site applied fire rated canister insulation
  - g** Internal liner flashing with min 75mm sealed lap joints
  - h** Cranked single skin ridge sheet
  - i** PIR insulation board with site applied fire rated canister insulation
  - j** Internal flashing with min. 75mm sealed lap joints

# AS35 INSULATED ROOF & WALL PANELS

## DESIGN DETAILS



### Key to figures 11 & 12

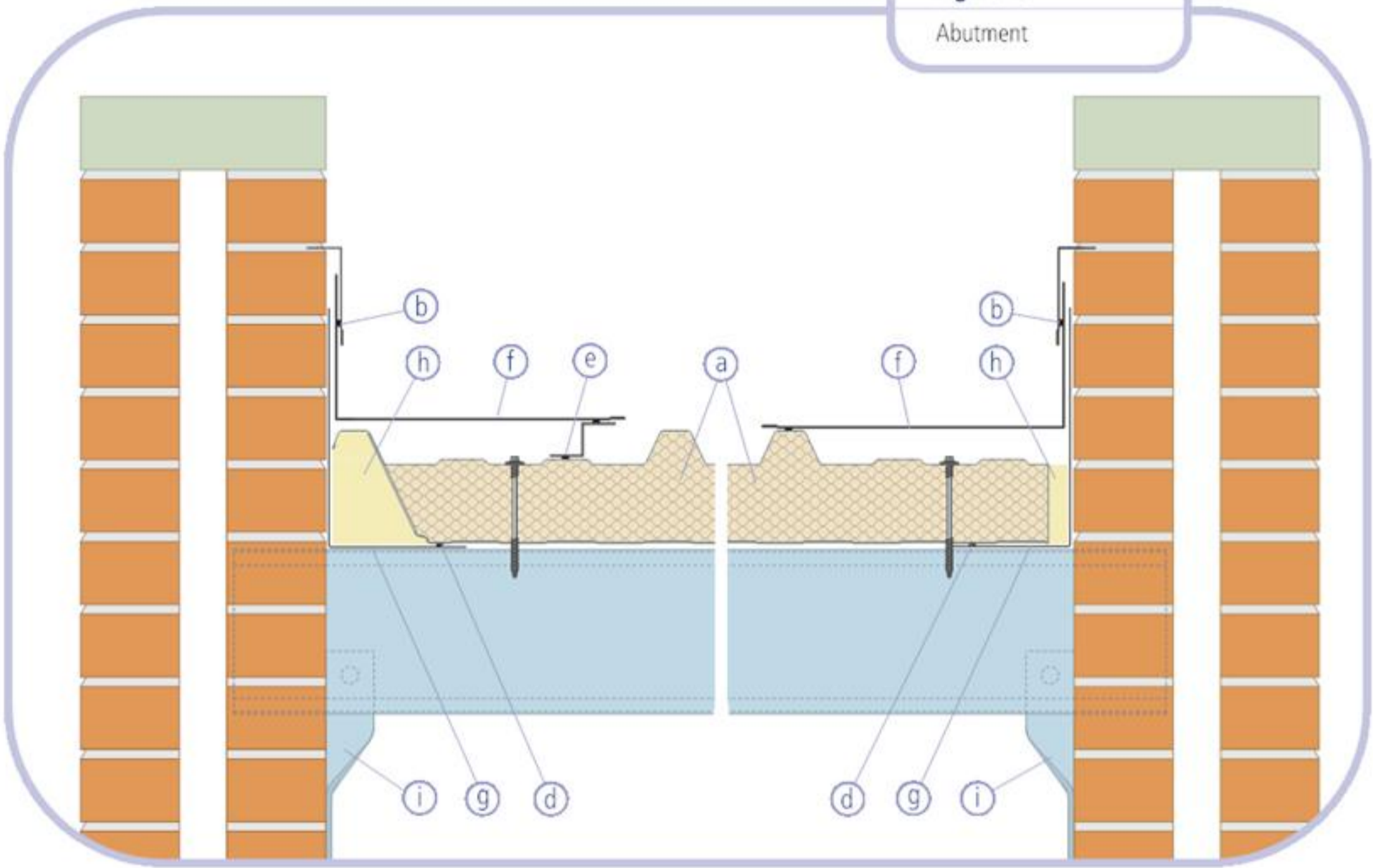
- a** AS35 insulated roof panel
- b** AS35 insulated wall panel
- c** Profiled foam filler sealed with gun grade mastic
- d** Air seal - 8mm Butyl rubber
- e** Seal - 6 x 5mm Butyl rubber
- f** Site applied fire rated canister insulation
- g** Internal liner flashing with min. 75mm sealed lap joints
- h** Cleader rail
- i** Verge flashing
- j** Site applied expandable seal
- k** Wall strap (if required)

### Notes

- Designers must ensure that walls have an appropriate thermal performance

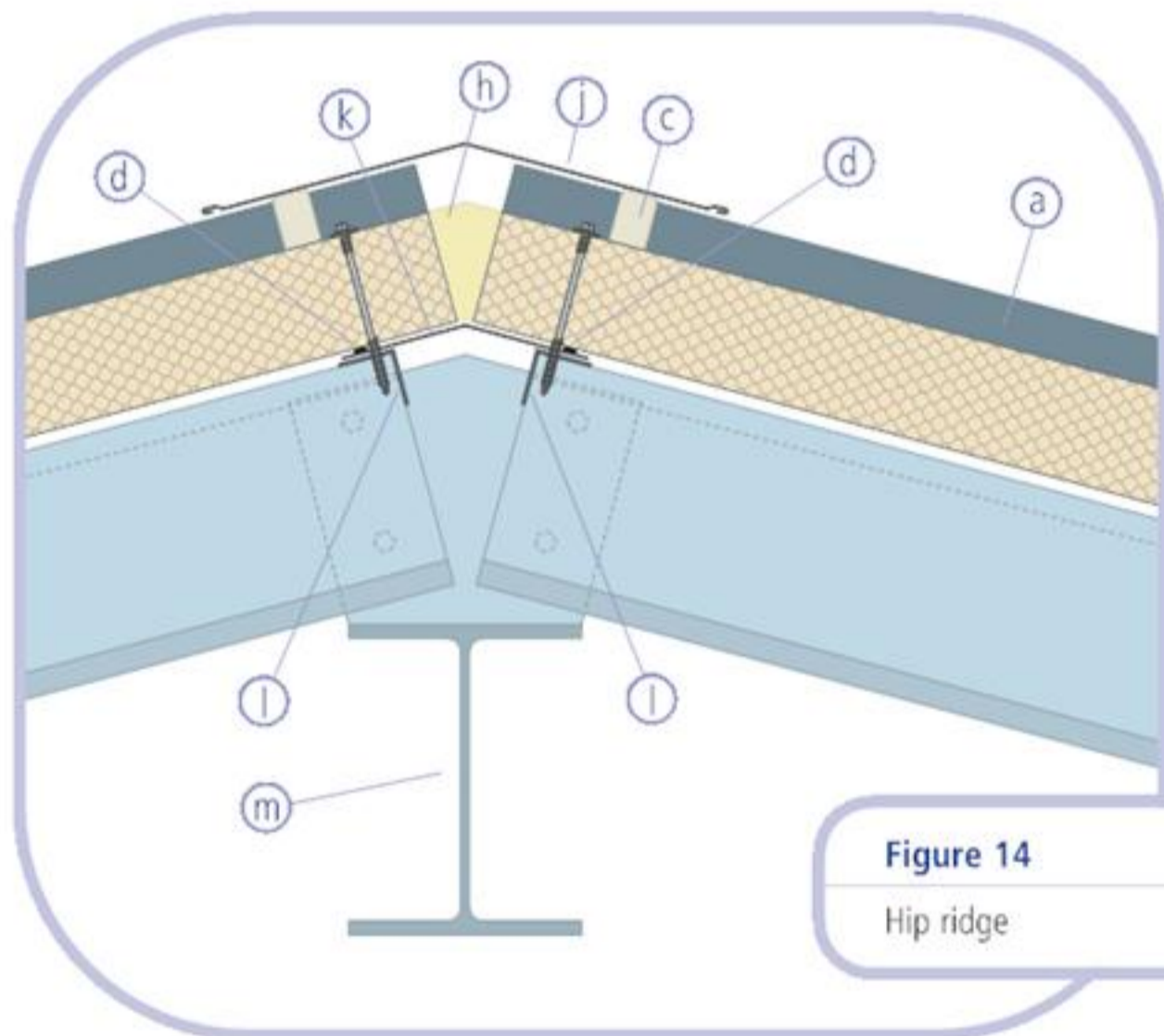


**Figure 13**  
Abutment



**Key to figures 13 & 14**

- a** AS35 insulated roof panel
- b** Flashing chased into brickwork, sealed with 6 x 5mm Butyl rubber
- c** Profiled foam filler sealed with gun grade mastic
- d** Air seal - 8mm Butyl rubber
- e** Support zed sealed top and bottom with 6 x 5mm Butyl rubber seal
- f** Apron flashing sealed with 6 x 5mm Butyl rubber seal
- g** Internal liner flashing sealed to wall with expandable seal
- h** Site applied fire rated canister insulation
- i** Wall strap (if required)
- j** Hip flashing with min. 150mm sealed lap joints or butt straps
- k** Internal liner flashing with min. 75mm sealed lap joints
- l** Cleader rail
- m** Hip rafter



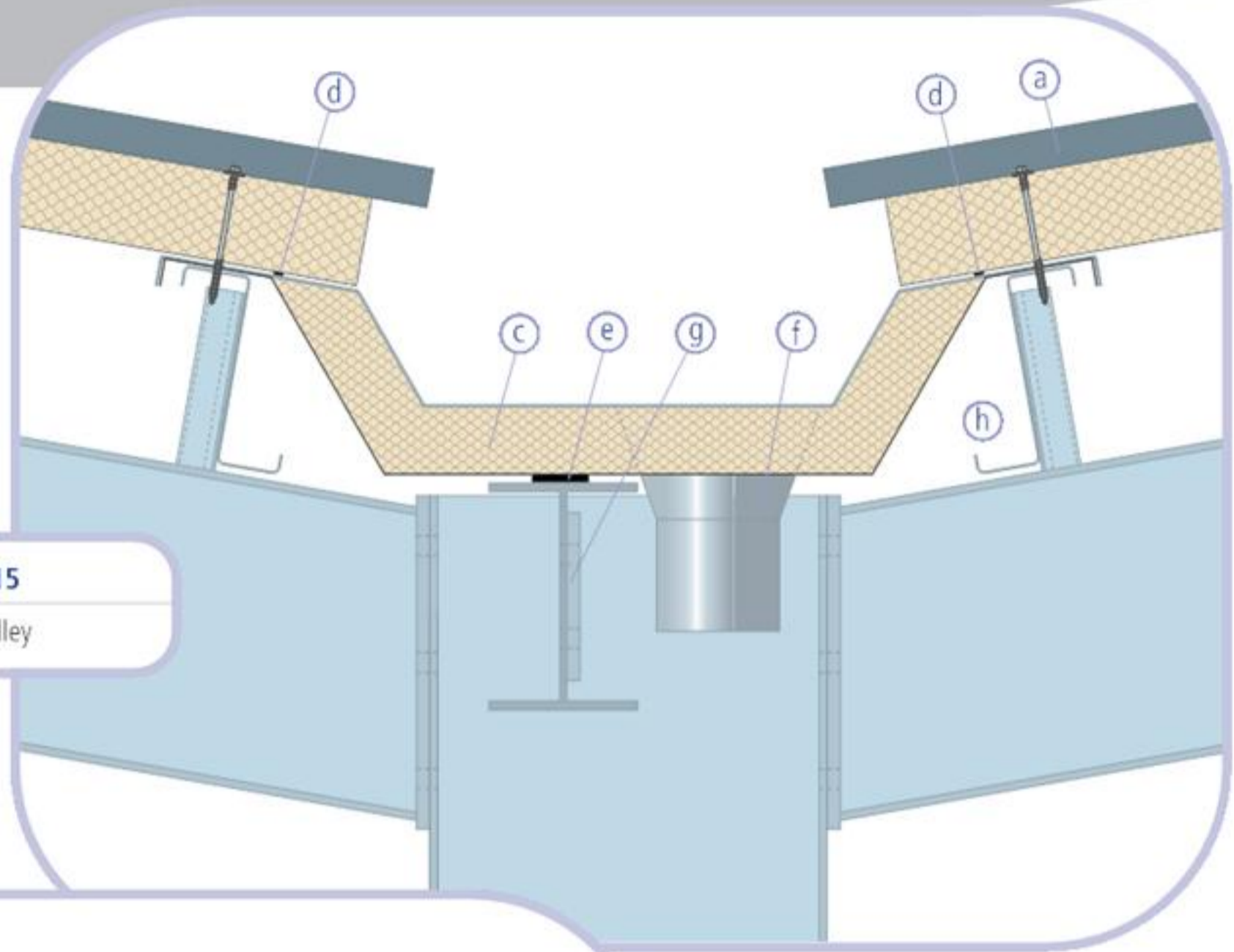
**Figure 14**  
Hip ridge

**Notes**

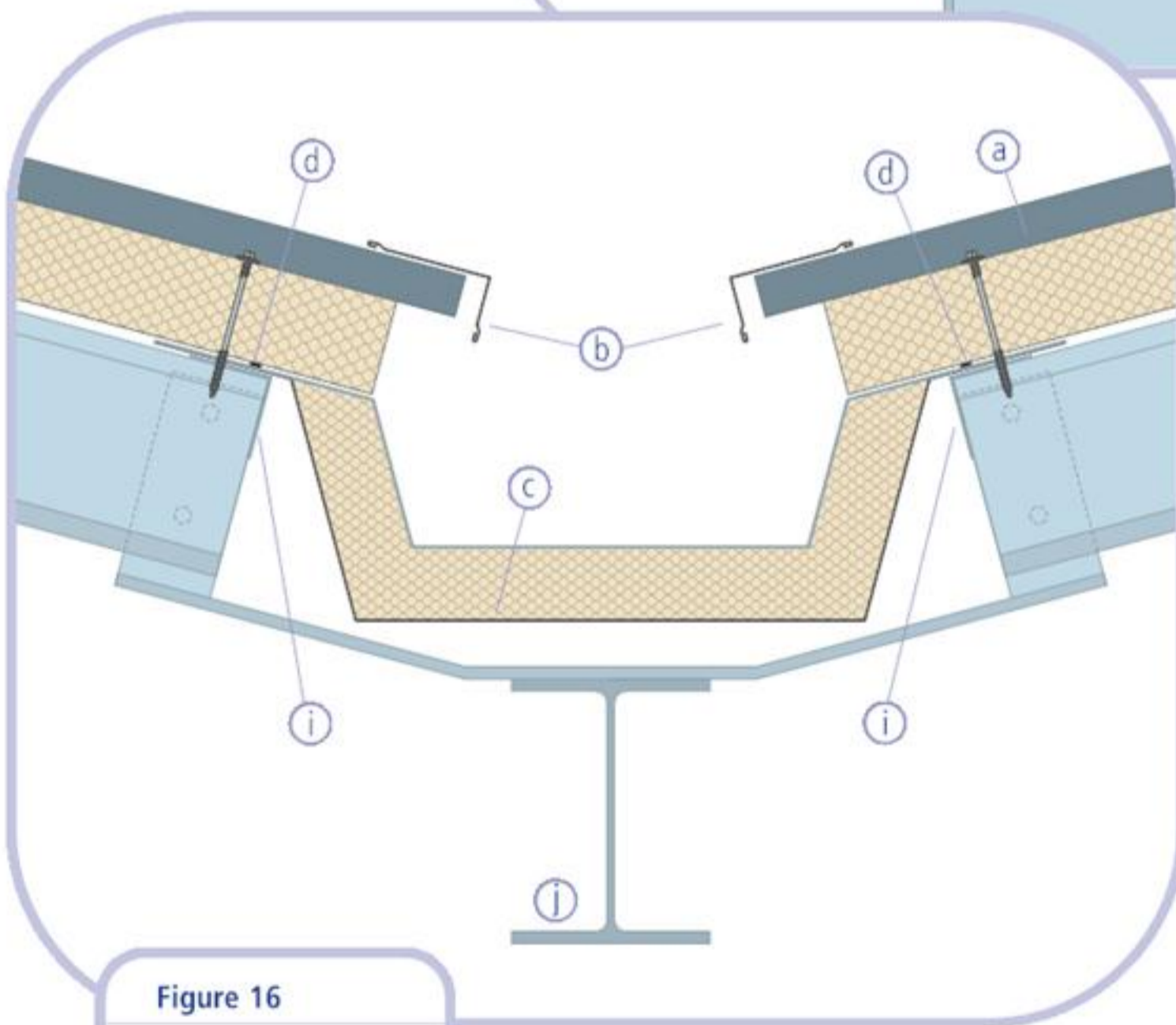
- Designers must ensure that walls have an appropriate thermal performance
- Panels and profiled foam filler skew-cut to suit hip rake angle
- Cleader rail by steel sub-contractor

# AS35 INSULATED ROOF & WALL PANELS

## DESIGN DETAILS



**Figure 15**  
Eaves valley



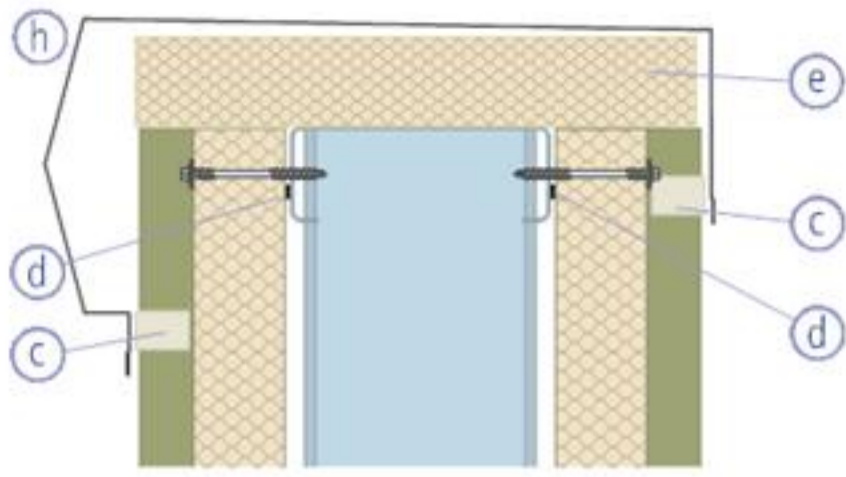
**Figure 16**  
Hip valley

### Key to figures 15 & 16

- a** AS35 insulated roof panel
- b** Double sided plastisol flashing (optional)
- c** Insulated gutter
- d** Air seal - 8mm Butyl rubber
- e** Seal - 50 x 6mm Butyl rubber
- f** Gutter outlet
- g** Eaves beam
- h** Purlin
- i** Cleader rail
- j** Hip rafter

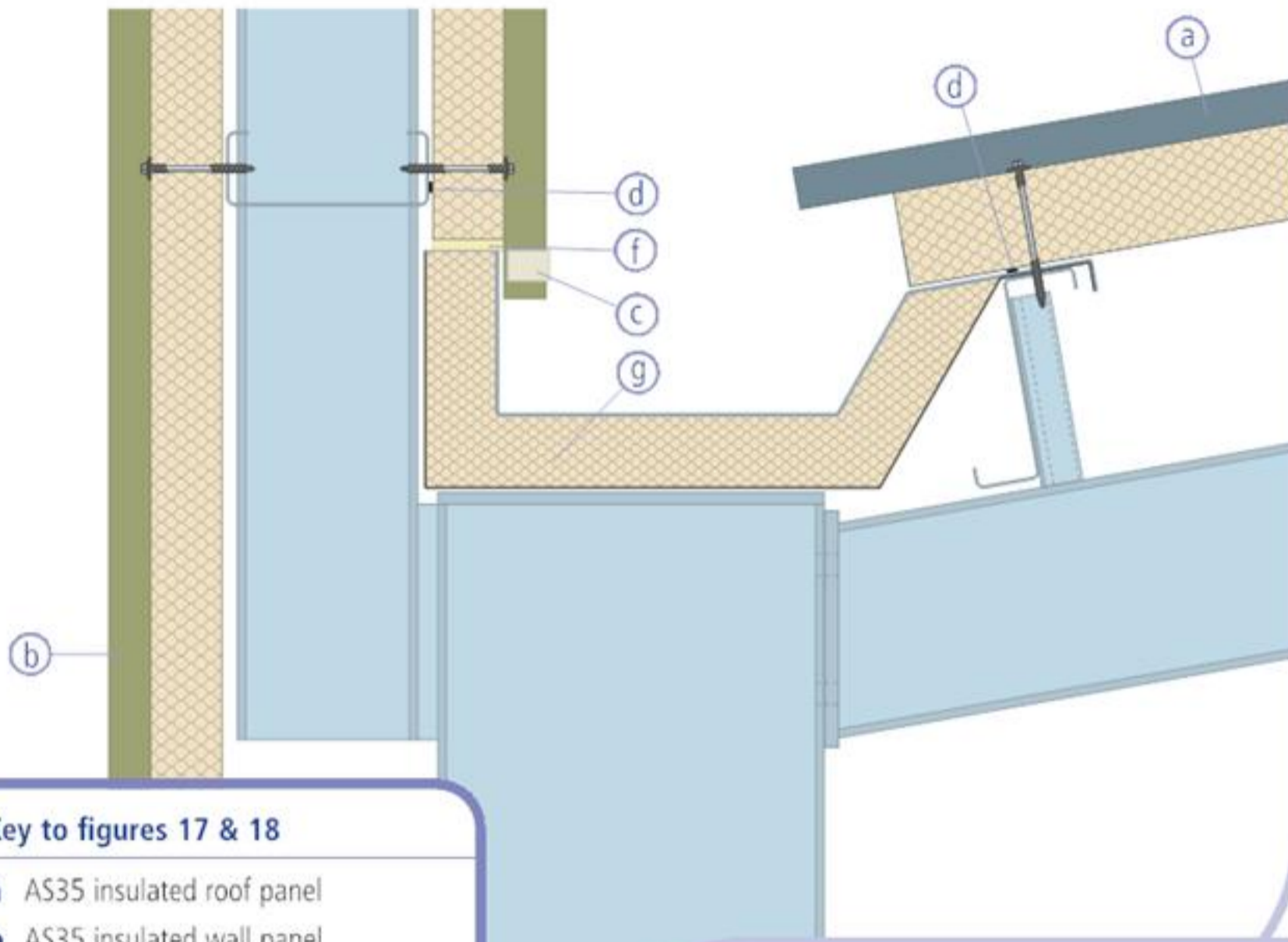
### Notes

- Factory formed insulated gutter, PIR board insulation gives U-values of 0.25 or 0.35W/m<sup>2</sup>K
- Edge protection lacquer can be applied to panels cut on site to suit rake angle
- Gutter outlet offset to miss eaves beam
- Cleader rail by steel sub-contractor



**Figure 17**

Boundary wall secret gutter

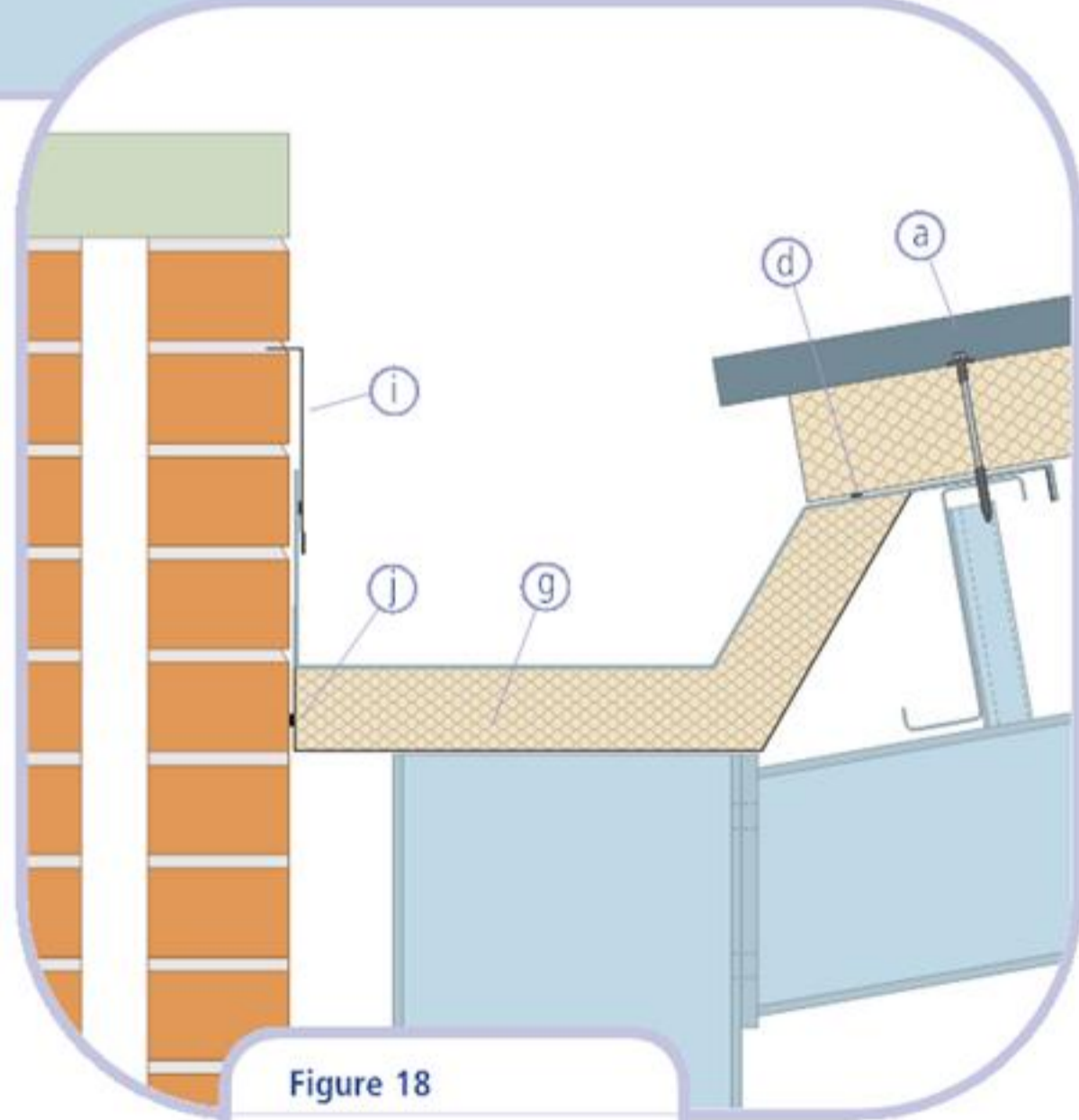


**Key to figures 17 & 18**

- a** AS35 insulated roof panel
- b** AS35 insulated wall panel
- c** Profiled foam filler sealed with gun grade mastic
- d** Air seal - 8mm Butyl rubber
- e** PIR insulation board sealed with site applied fire rated canister insulation
- f** Site applied fire rated canister insulation
- g** Insulated gutter
- h** Cap flashing
- i** Metal flashing set into brickwork, sealed with gun grade silicone mastic
- j** Gutter sealed to wall with 8mm Butyl rubber seal

**Notes**

- Factory formed insulated gutter, PIR board insulation gives U-values of 0.25 or 0.35W/m<sup>2</sup>K
- Designers must ensure that walls have an appropriate thermal performance



**Figure 18**

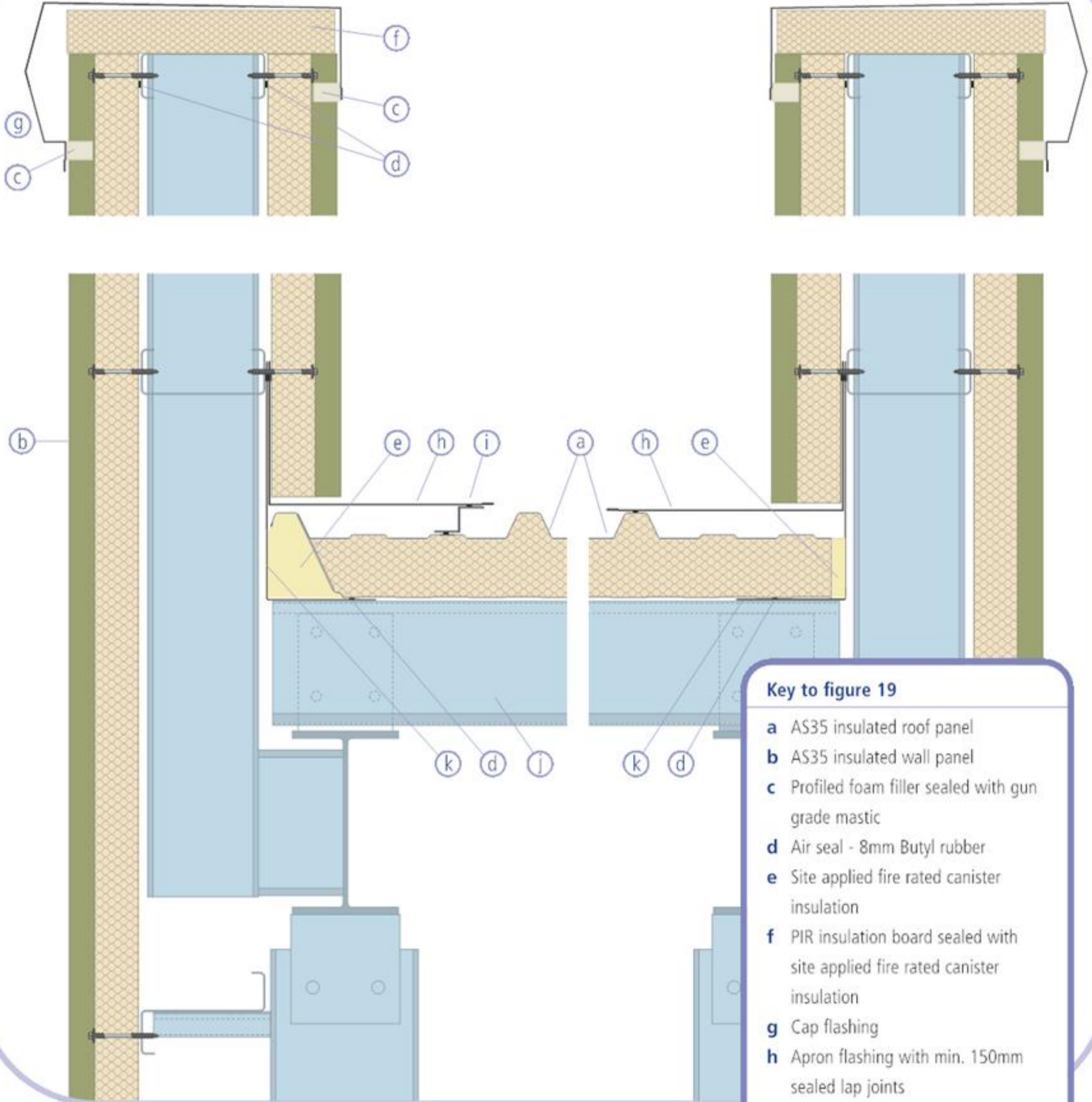
Parapet with secret gutter

# AS35 INSULATED ROOF & WALL PANELS

## DESIGN DETAILS

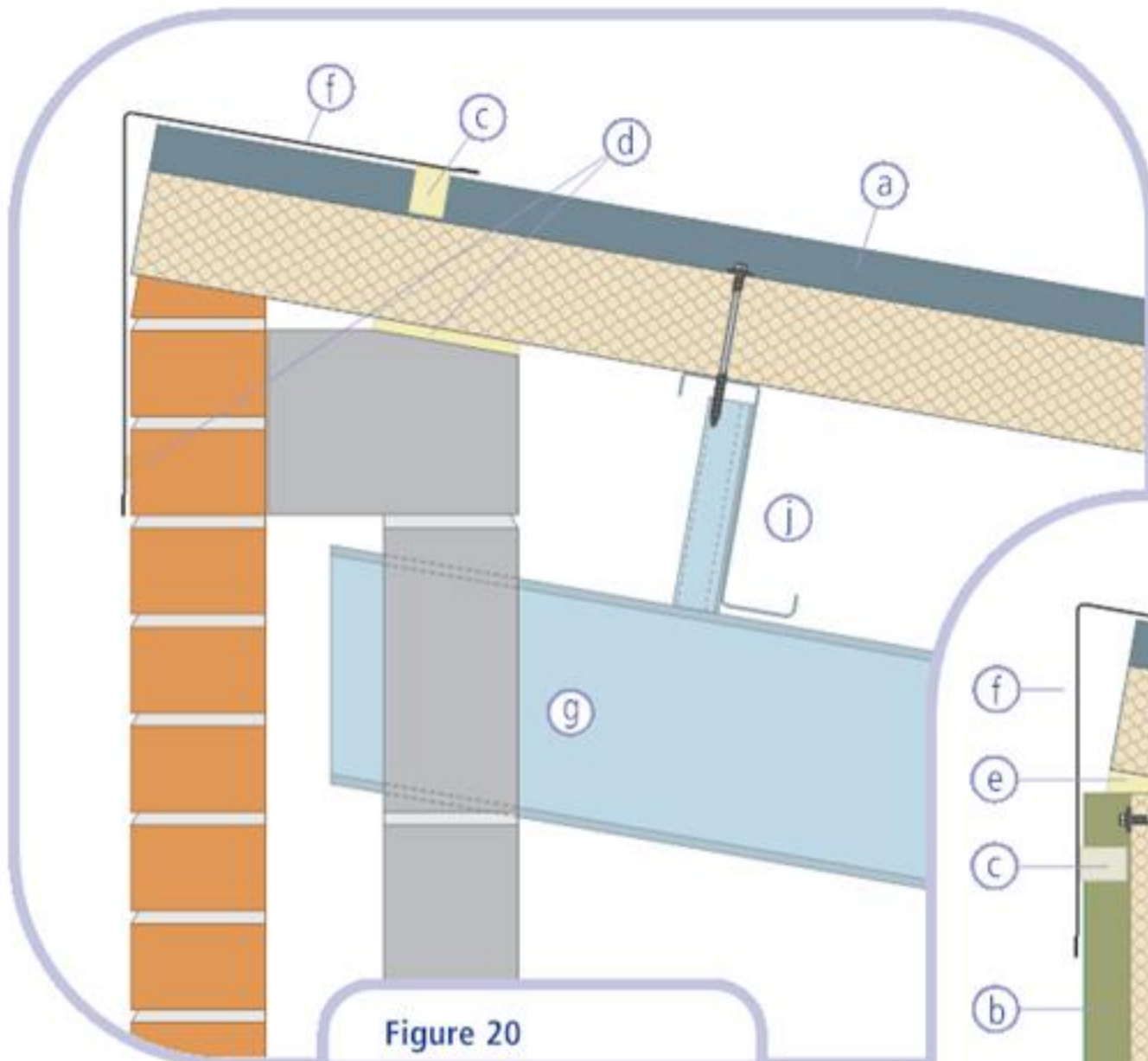
**Figure 19**

Abutment to parapet

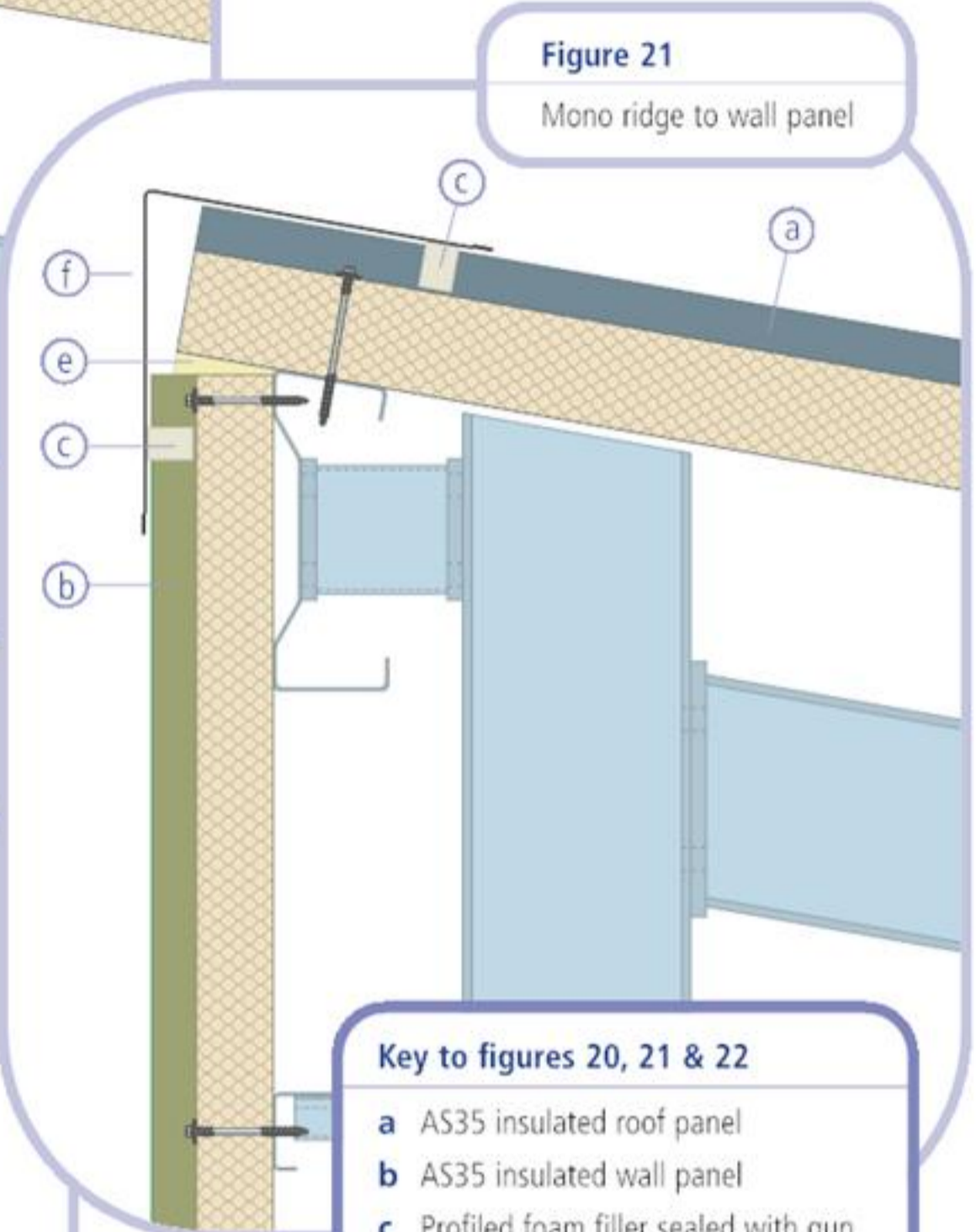


**Key to figure 19**

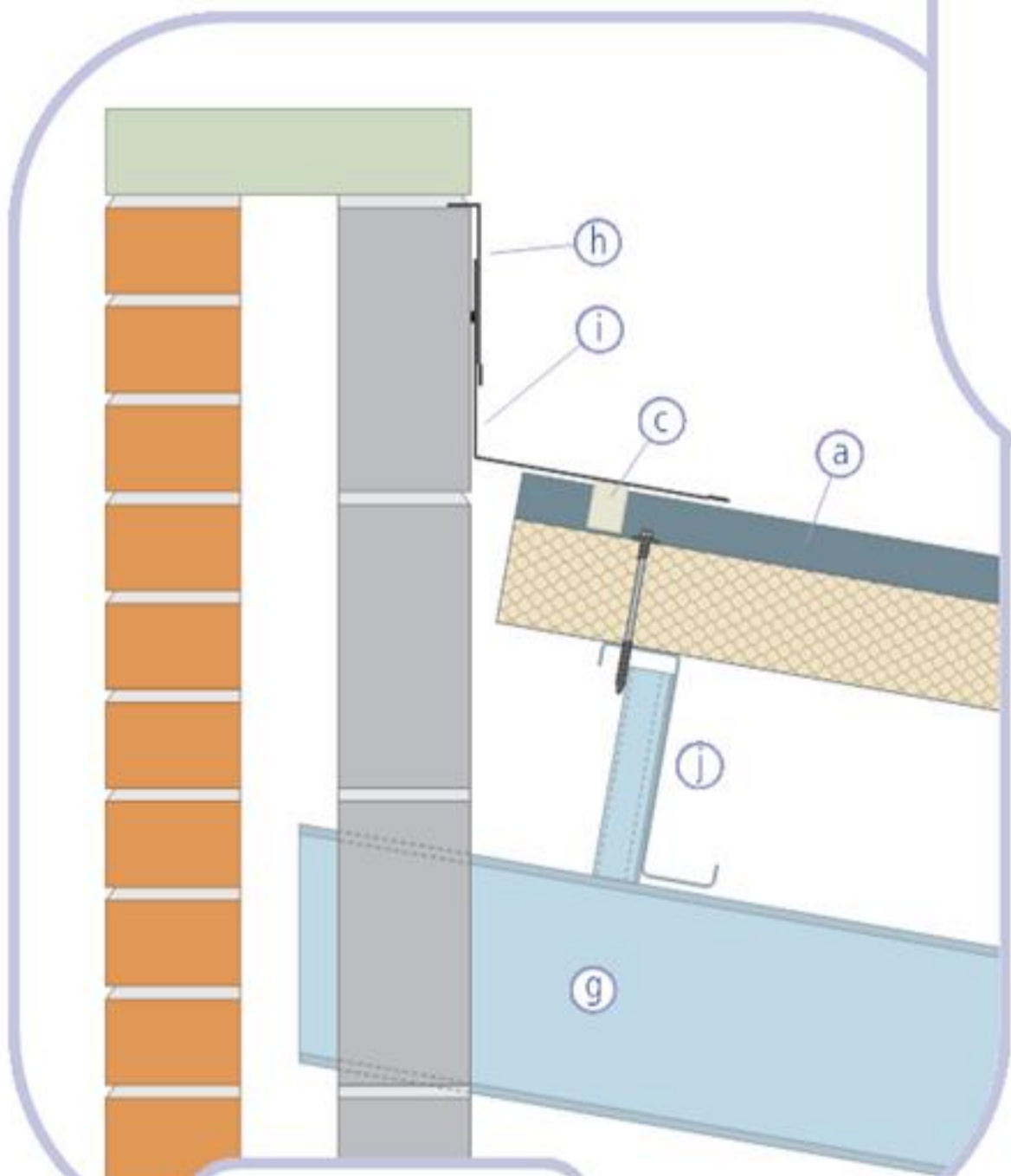
- a** AS35 insulated roof panel
- b** AS35 insulated wall panel
- c** Profiled foam filler sealed with gun grade mastic
- d** Air seal - 8mm Butyl rubber
- e** Site applied fire rated canister insulation
- f** PIR insulation board sealed with site applied fire rated canister insulation
- g** Cap flashing
- h** Apron flashing with min. 150mm sealed lap joints
- i** Support zed sealed top and bottom with 6 x 5mm Butyl rubber seal
- j** Purlin
- k** Internal liner flashing with min. 75mm sealed lap joints



**Figure 20**  
Mono ridge to brickwork



**Figure 21**  
Mono ridge to wall panel



**Figure 22**  
Lean-to roof

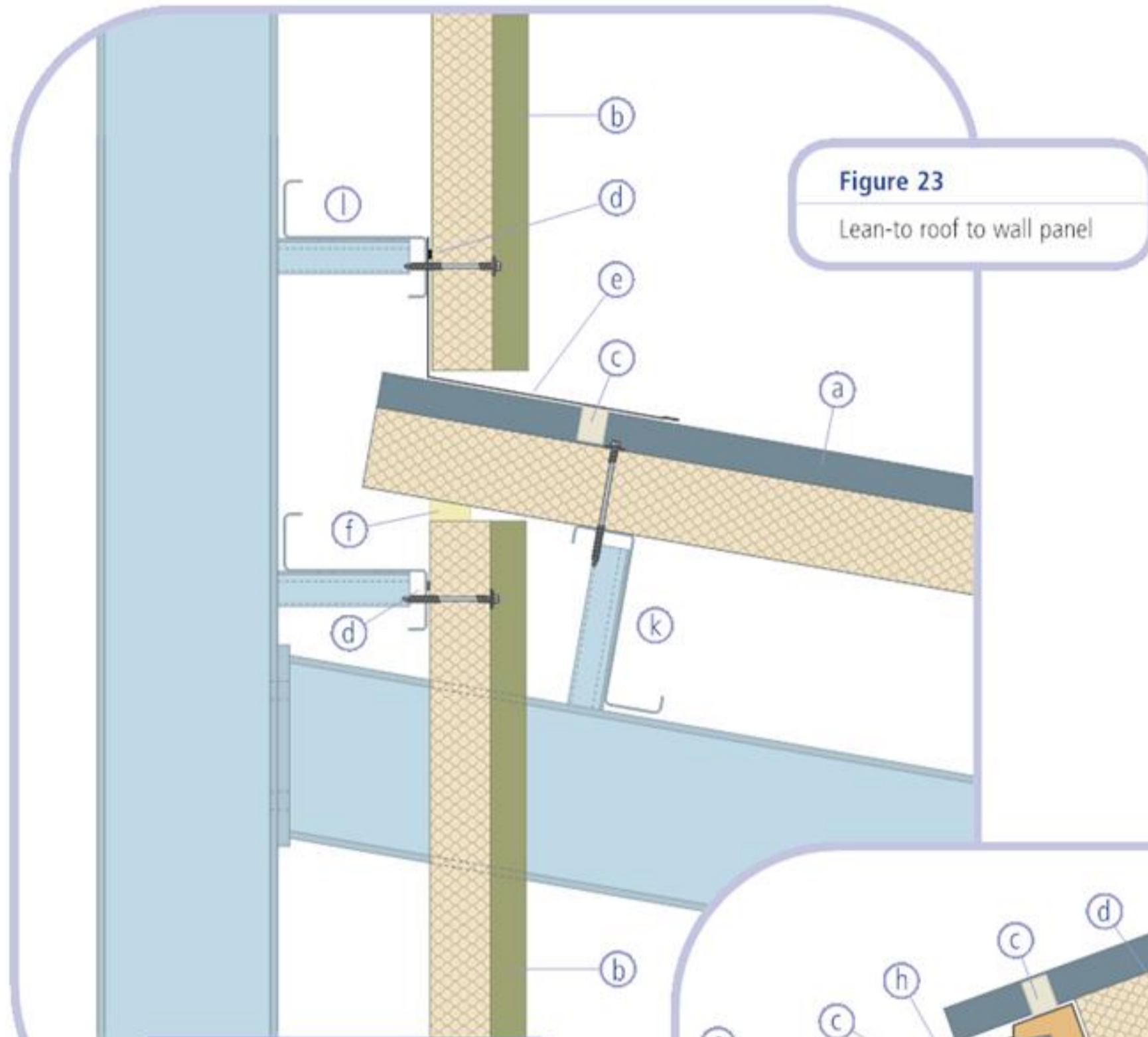
- Key to figures 20, 21 & 22**
- a** AS35 insulated roof panel
  - b** AS35 insulated wall panel
  - c** Profiled foam filler sealed with gun grade mastic
  - d** Site applied expandable seal
  - e** Site applied fire rated canister insulation
  - f** Mono ridge flashing with min. 150mm sealed lap joints
  - g** Rafter built into wall
  - h** Metal flashing chased into masonry, sealed with gun grade mastic
  - i** Apron flashing with min. 150mm sealed lap joints
  - j** Purlin

**Notes**

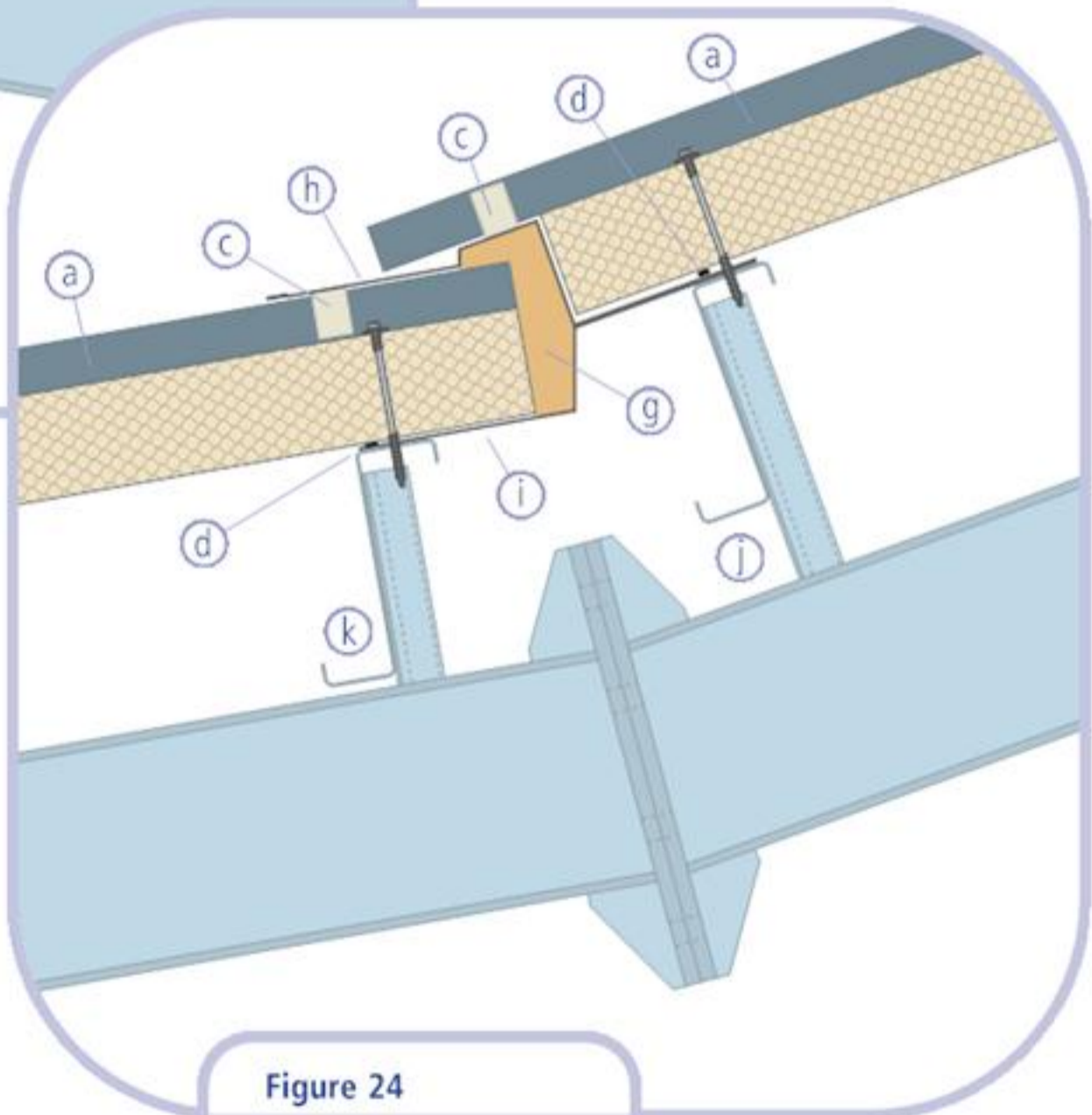
- Designers must ensure that walls have an appropriate thermal performance

# AS35 INSULATED ROOF & WALL PANELS

## DESIGN DETAILS



**Figure 23**  
Lean-to roof to wall panel



**Figure 24**  
Change in roof slope

- Key to figures 23 & 24**
- a** AS35 insulated roof panel
  - b** AS35 insulated wall panel
  - c** Profiled foam filler sealed with gun grade mastic
  - d** Air seal - 8mm Butyl rubber
  - e** Apron flashing with min. 150mm sealed lap joints
  - f** Expanding foam sealant
  - g** Site applied mineral fibre insulation
  - h** External flashing with min. 150mm sealed lap joints
  - i** Internal liner flashing with min. 75mm sealed lap joints
  - j** Purlin on extended cleats (if req.)
  - k** Purlin
  - l** Side rail

**Figure 25**

Mansard - gable end of run

**Key to figure 25**

- a** AS35 insulated roof panel
- b** AS35 insulated wall panel
- c** Profiled foam filler sealed with gun grade mastic
- d** Air seal - 8mm Butyl rubber
- e** Site applied fire rated canister insulation
- f** PIR insulation board with site applied fire rated canister insulation
- g** Cap flashing with min. 150mm sealed lap joint
- h** Apron flashing with min. 150mm sealed lap joints
- i** Support zed sealed top and bottom with 6 x 5mm Butyl rubber seal
- j** Drip flashing
- k** Soffit flashing sealed with site applied fire rated canister insulation
- l** Corner flashing
- m** Internal liner flashing with min. 75mm sealed lap joints

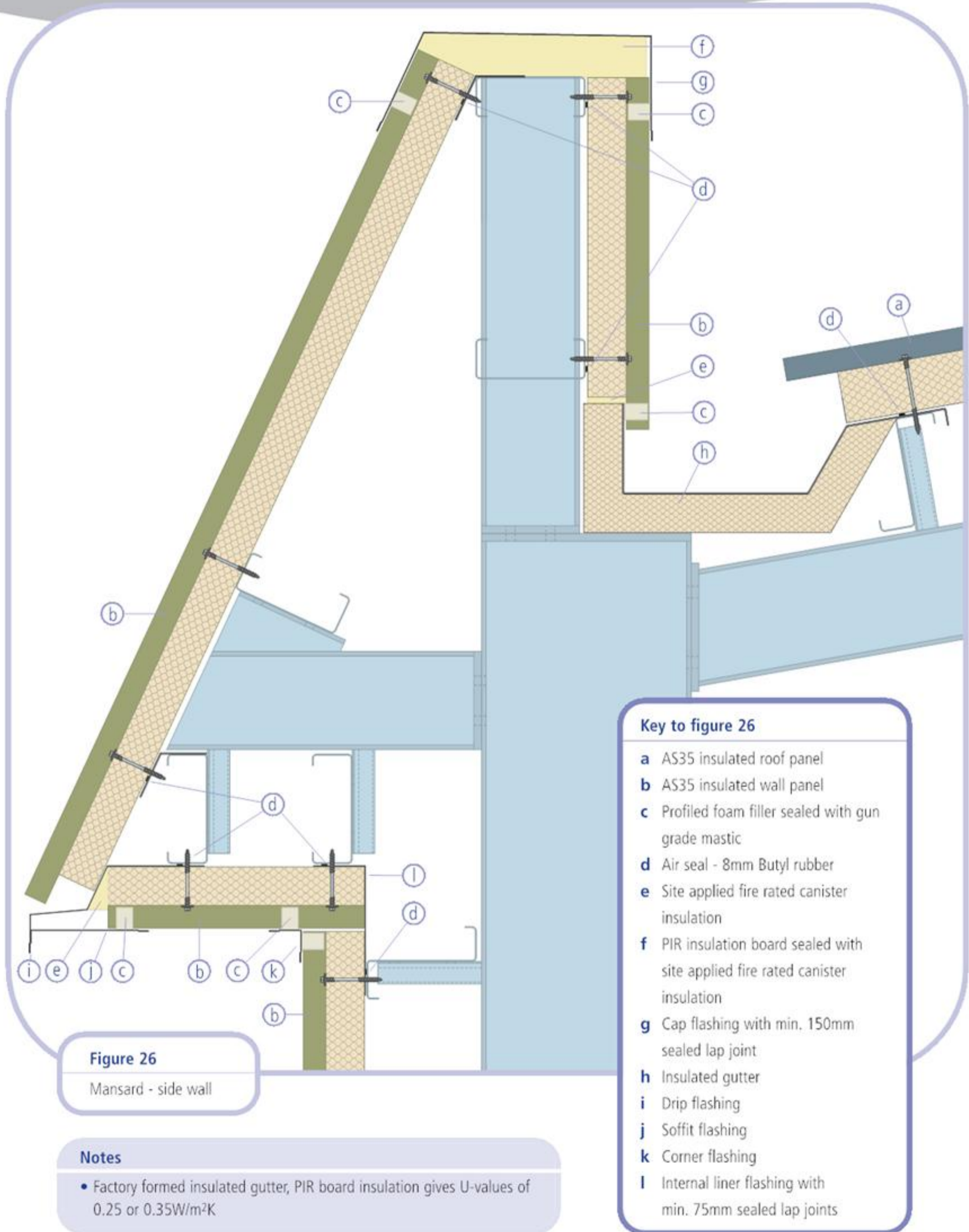
**Figure 25**

Mansard - gable start of run



# AS35 INSULATED ROOF & WALL PANELS

## DESIGN DETAILS



**Figure 26**  
Mansard - side wall

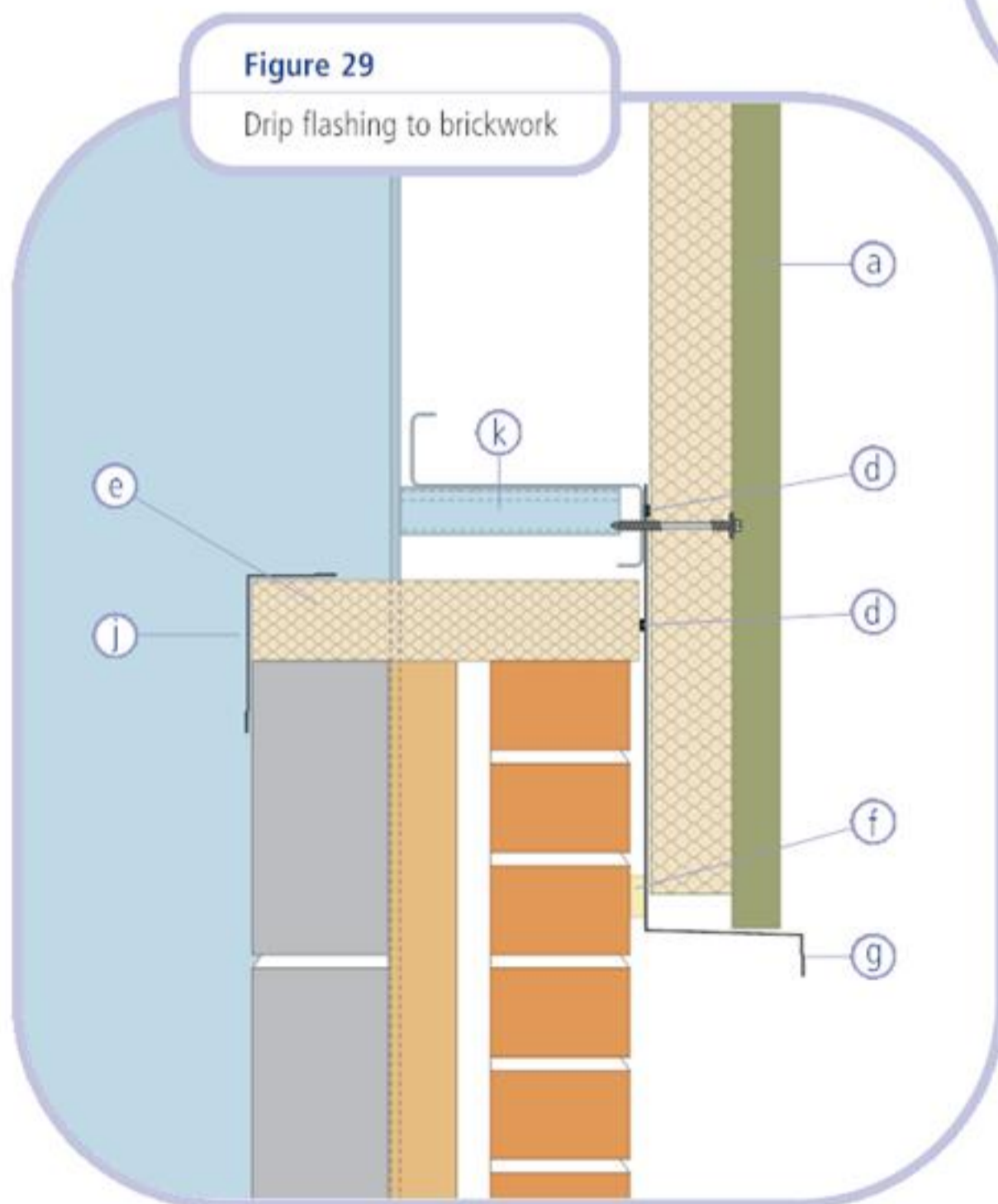
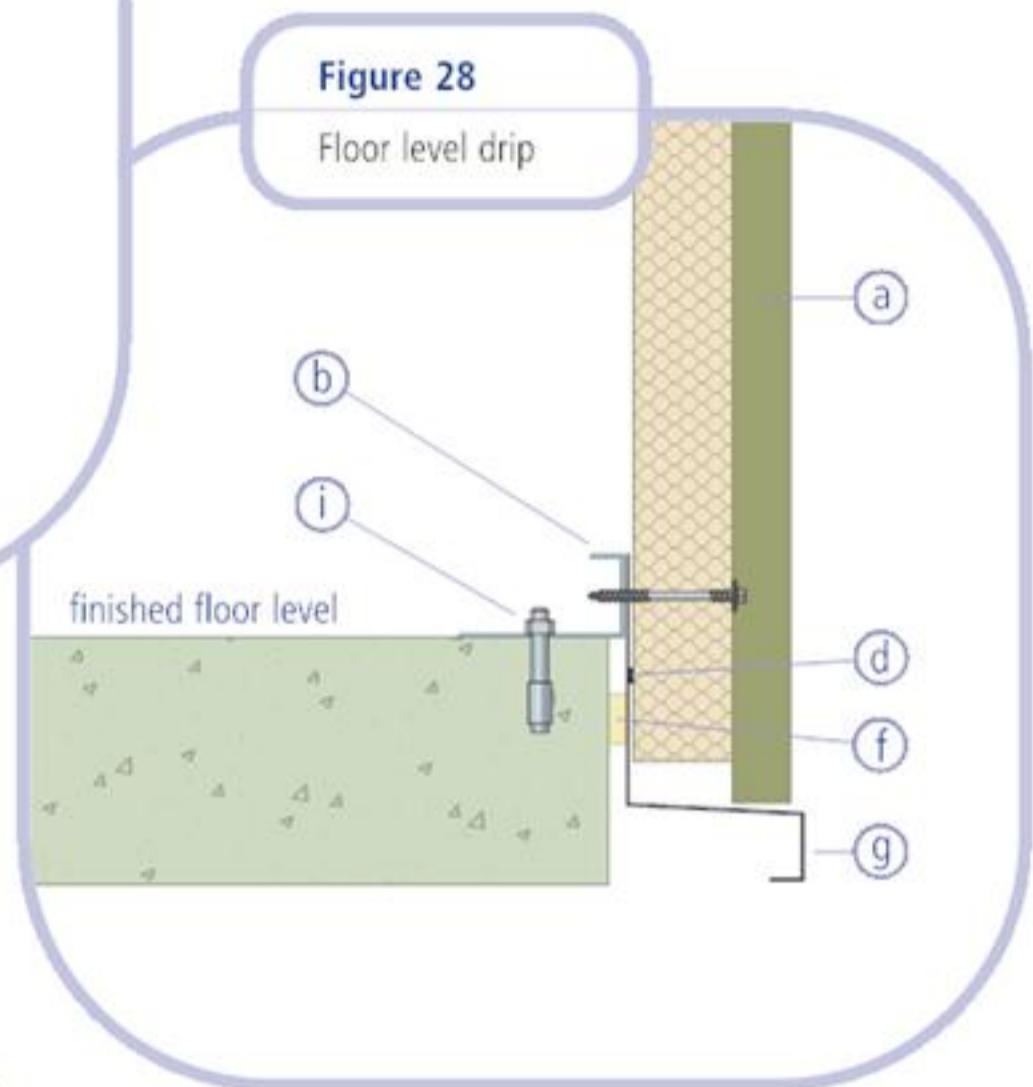
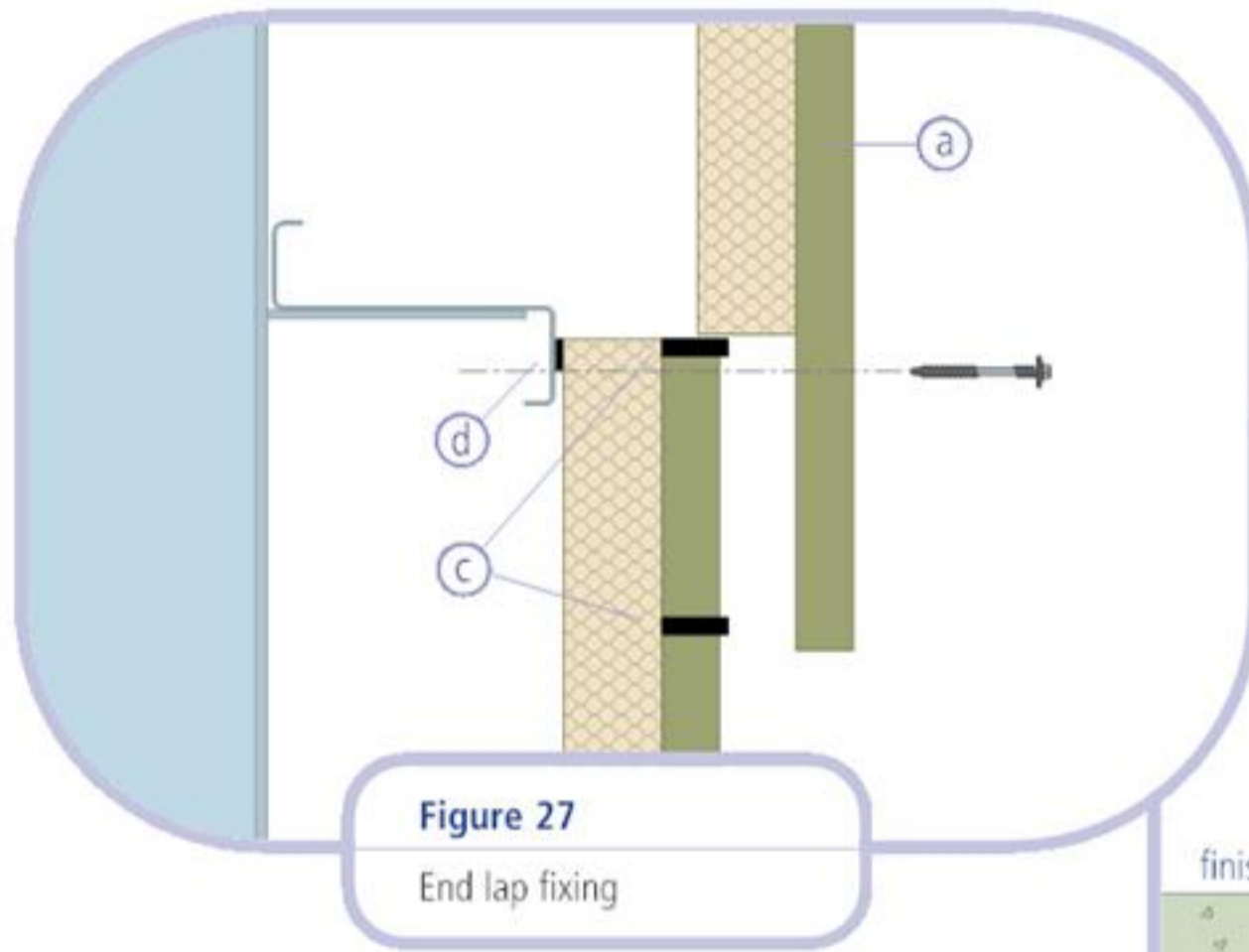
**Notes**

- Factory formed insulated gutter, PIR board insulation gives U-values of 0.25 or 0.35W/m<sup>2</sup>K

**Key to figure 26**

- a** AS35 insulated roof panel
- b** AS35 insulated wall panel
- c** Profiled foam filler sealed with gun grade mastic
- d** Air seal - 8mm Butyl rubber
- e** Site applied fire rated canister insulation
- f** PIR insulation board sealed with site applied fire rated canister insulation
- g** Cap flashing with min. 150mm sealed lap joint
- h** Insulated gutter
- i** Drip flashing
- j** Soffit flashing
- k** Corner flashing
- l** Internal liner flashing with min. 75mm sealed lap joints

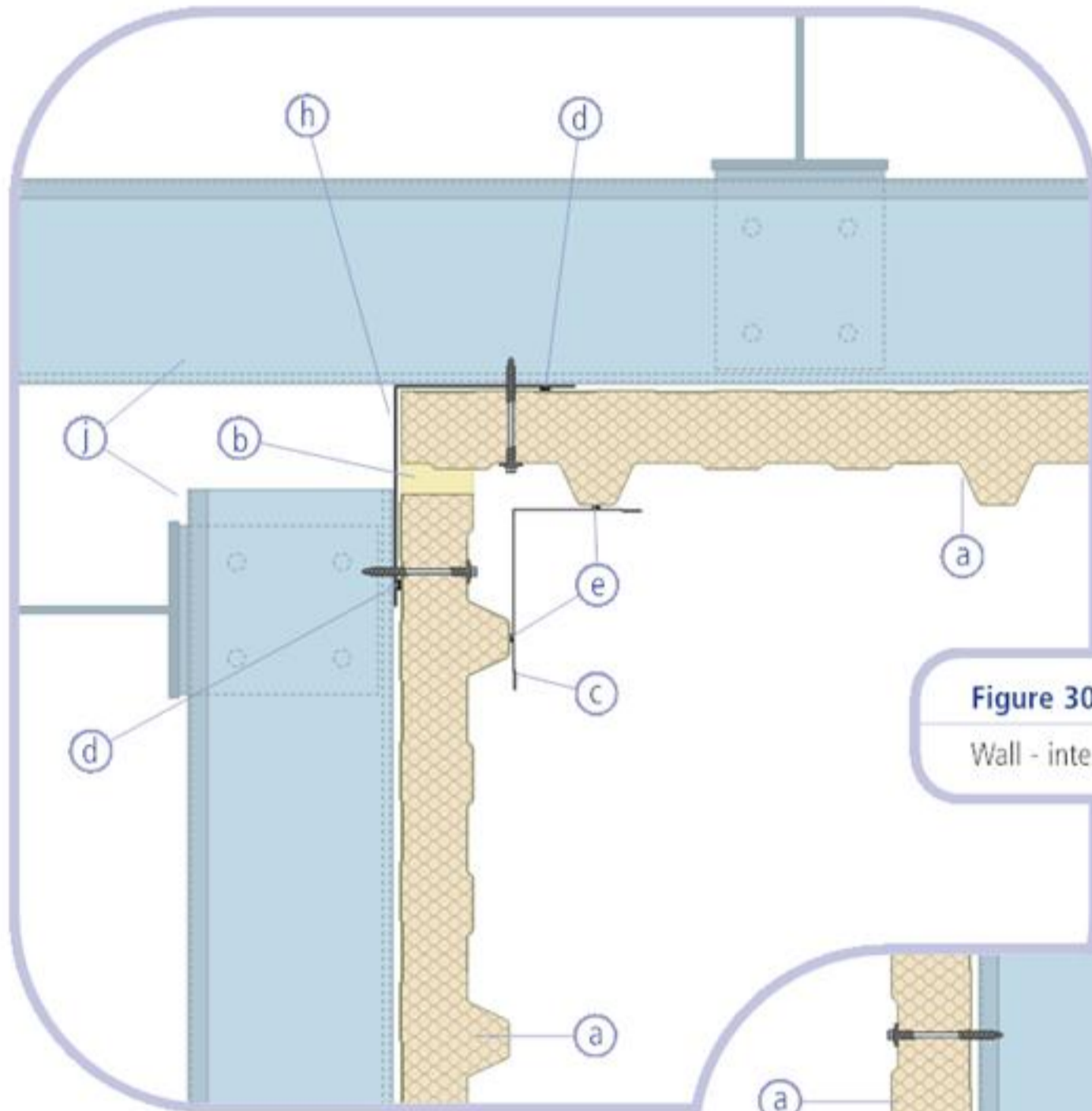




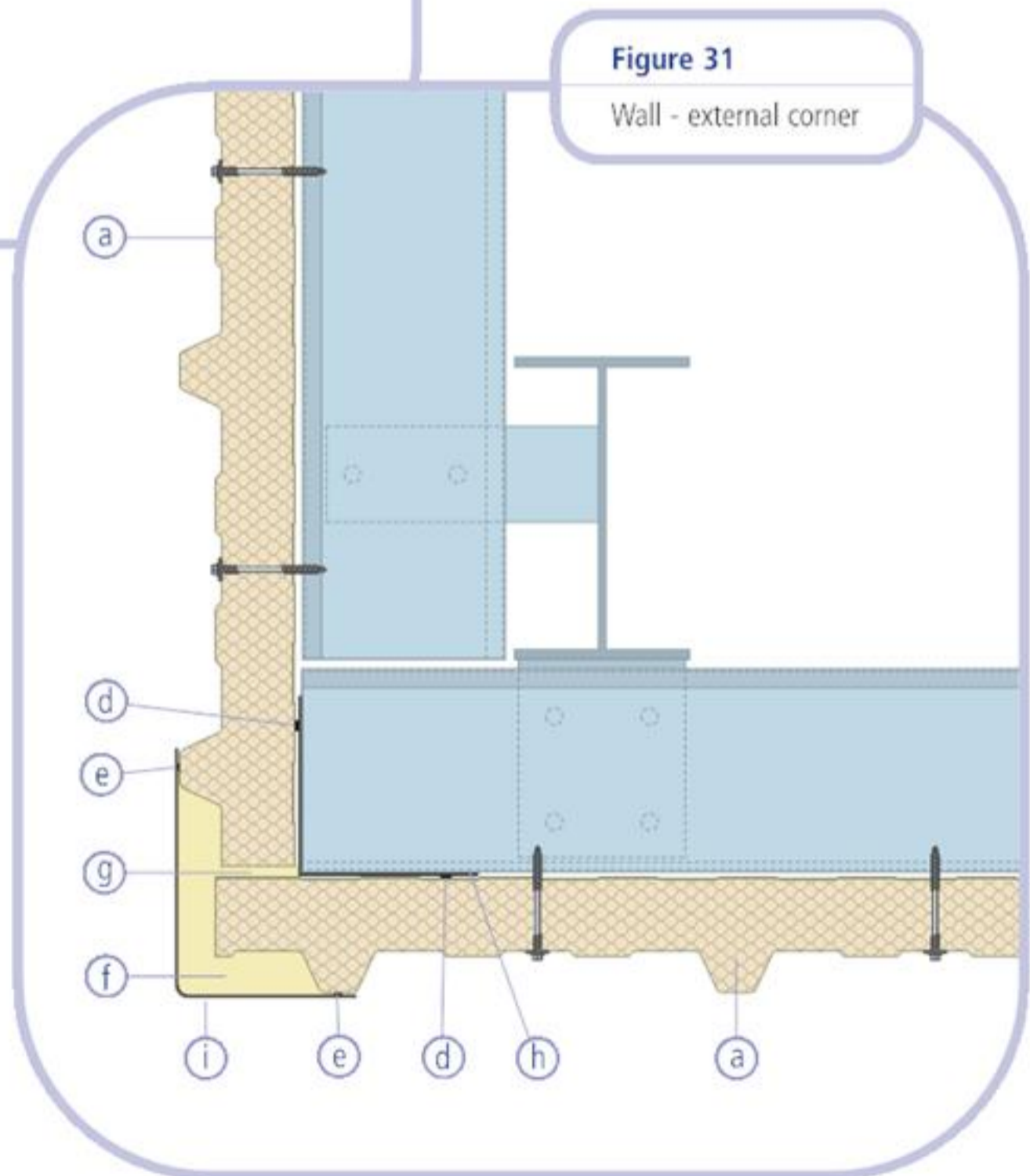
- Key to figures 27, 28 & 29**
- a** AS35 insulated wall panel
  - b** Galvanised floor angle
  - c** Seal - 6 x 5mm Butyl rubber
  - d** Air seal - 8mm Butyl rubber
  - e** PIR insulation board sealed with site applied fire rated canister insulation
  - f** Expanding foam seal
  - g** Drip flashing
  - h** Folded floor cleader rail
  - i** Expanding type fixing
  - j** Flashing sealed with 6 x 5mm Butyl rubber seal
  - k** Side rail

# AS35 INSULATED ROOF & WALL PANELS

## DESIGN DETAILS



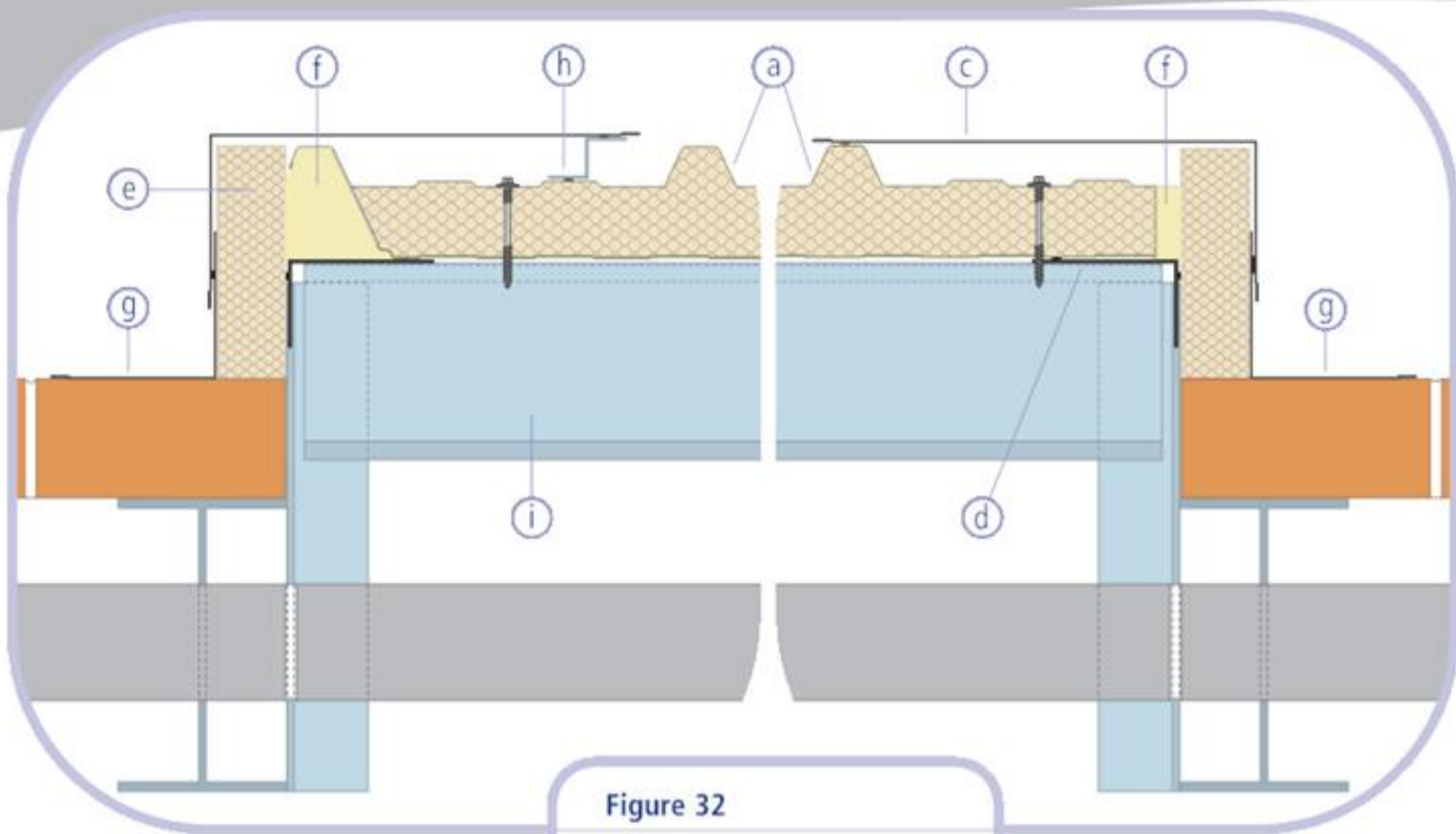
**Figure 30**  
Wall - internal corner



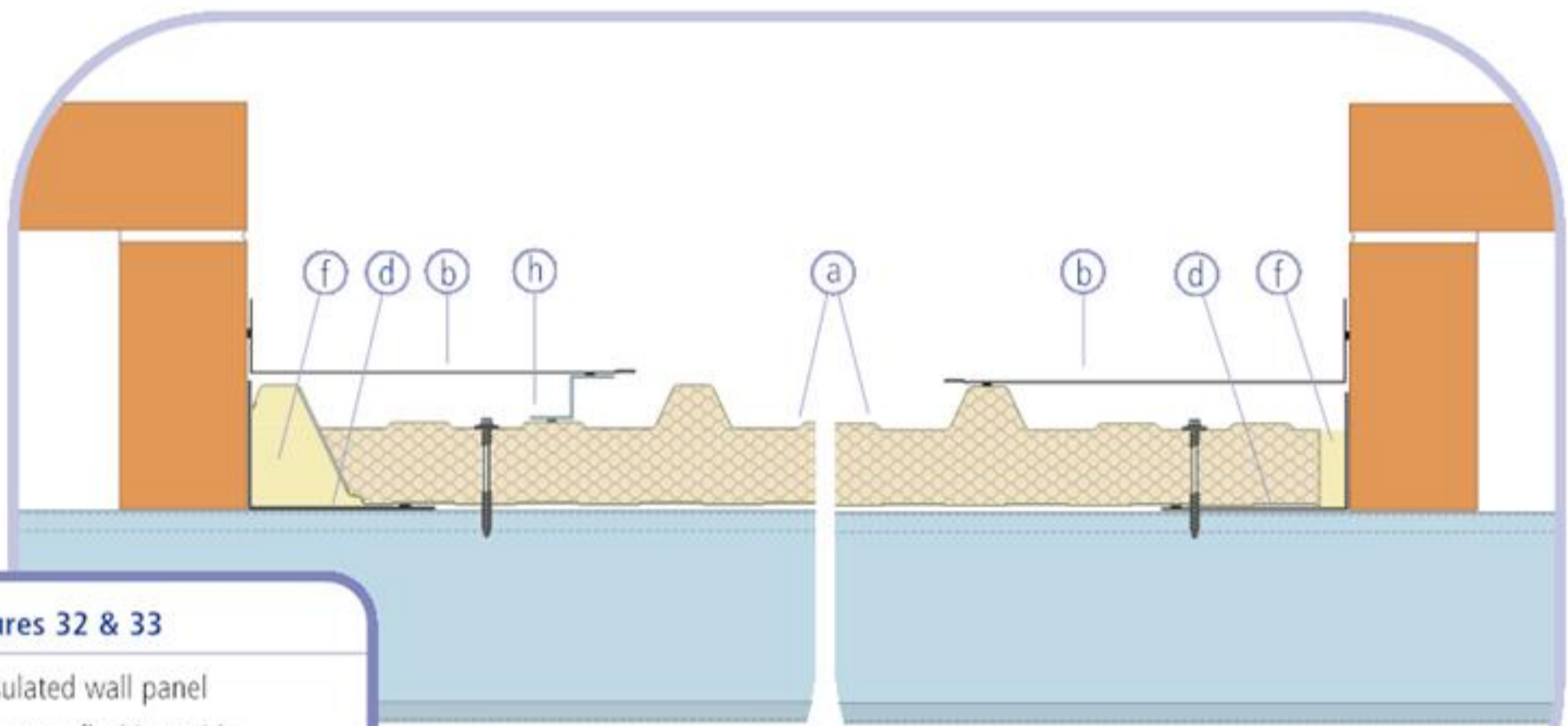
**Figure 31**  
Wall - external corner

### Key to figures 30 & 31

- a** AS35 insulated wall panel
- b** Expanding foam seal
- c** Internal corner flashing with min. 150mm sealed lap joints
- d** Air seal - 8mm Butyl rubber
- e** Seal - 6 x 5mm Butyl rubber
- f** Profiled filler to close off top and bottom of external corner flashing
- g** Site applied foam insulation
- h** Internal liner flashing with min. 75mm sealed lap joints
- i** External corner flashing with min. 150mm sealed lap joints
- j** Side rail



**Figure 32**  
Wall panel to recessed brickwork



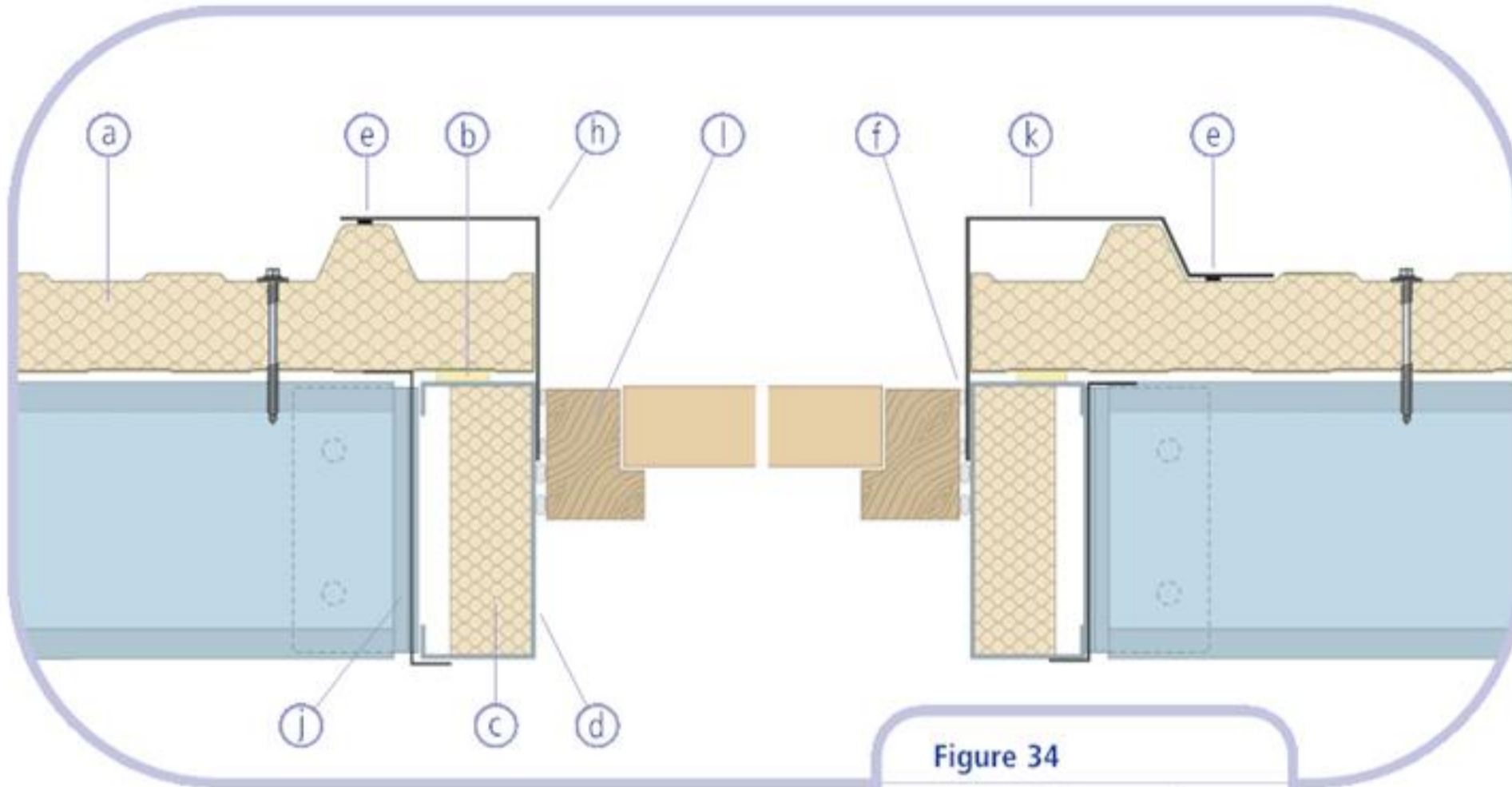
**Figure 33**  
Recessed wall panels

**Key to figures 32 & 33**

- a** AS35 insulated wall panel
- b** Internal corner flashing with expanding foam seal to brickwork and 6 x 5mm Butyl rubber seal to panel
- c** External corner flashing sealed to panel with 6 x 5mm Butyl rubber seal
- d** Galvanised support sealed with 8mm Butyl rubber air seal
- e** PIR insulation board sealed with site applied fire rated canister insulation
- f** Site applied fire rated canister insulation
- g** Internal corner flashing sealed to brickwork with expanding foam seal
- h** Support zed sealed to panel with 6 x 5mm Butyl rubber seal
- i** Side rail

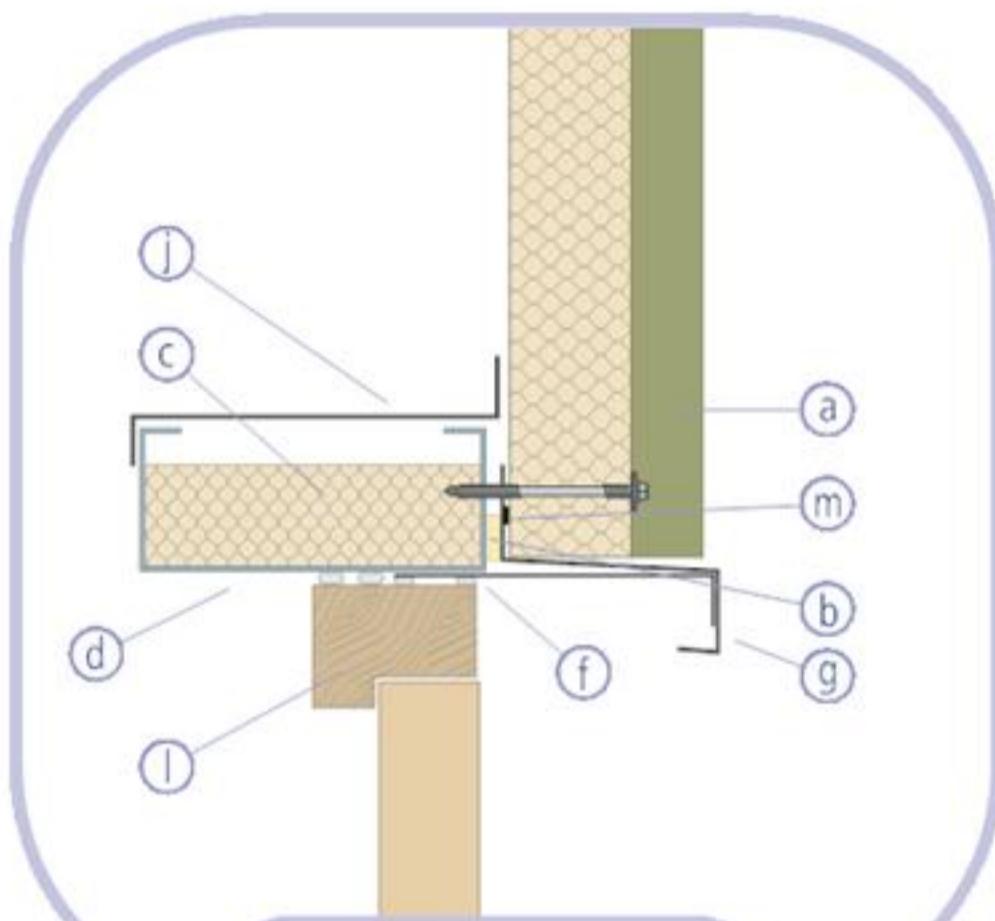
# AS35 INSULATED ROOF & WALL PANELS

## DESIGN DETAILS



**Figure 34**

Personnel door - jamb

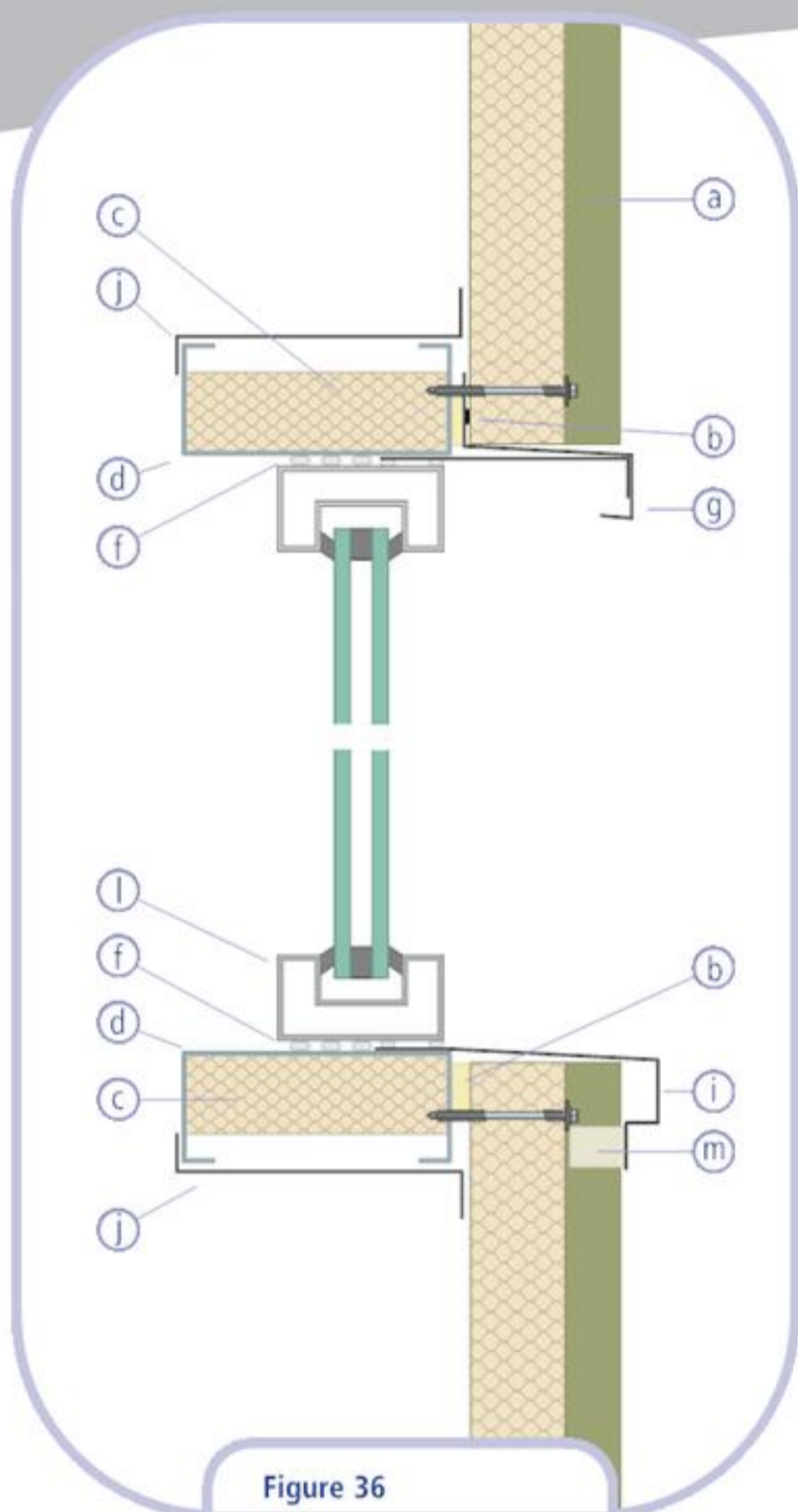


**Figure 35**

Personnel door - head

### Key to figures 34 & 35

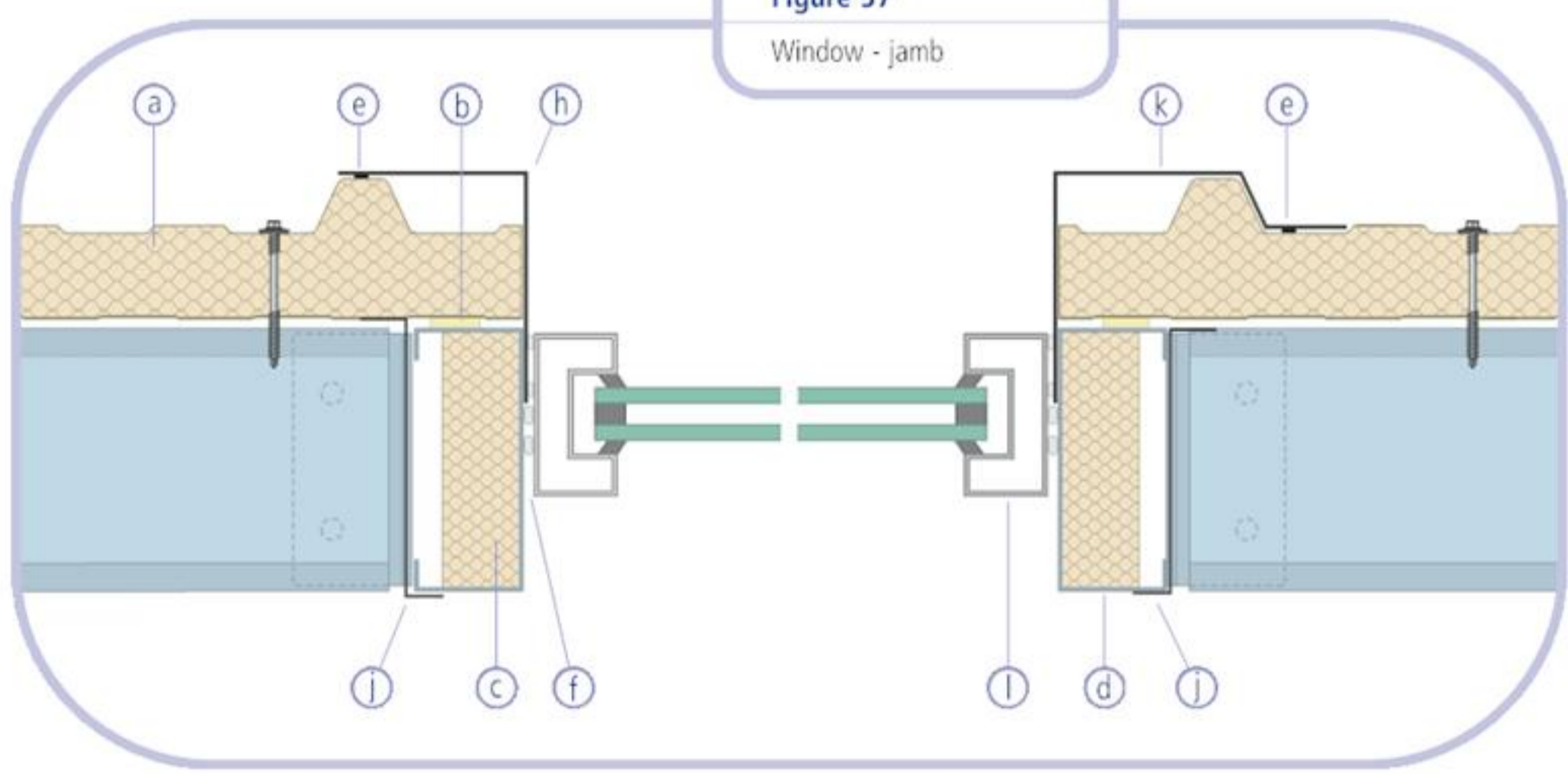
- a** AS35 insulated wall panel
- b** Site applied expanding air seal
- c** LPC approved insulation board to give required U-value, sealed with fire rated canister insulation
- d** Galvanised door jamb / head
- e** 6 x 5mm Butyl rubber seal
- f** Polyethylene backing rod with silicone sealer (by door installers)
- g** Door head flashing
- h** External door jamb flashing with no connection to internal
- i** Optional external soffit flashing with no connection to internal
- j** Optional internal flashing
- k** Optional external door jamb flashing with no connection to internal
- l** Door and frame (fixed by others)
- m** 8mm Butyl rubber seal



**Figure 36**  
Window - head and cill

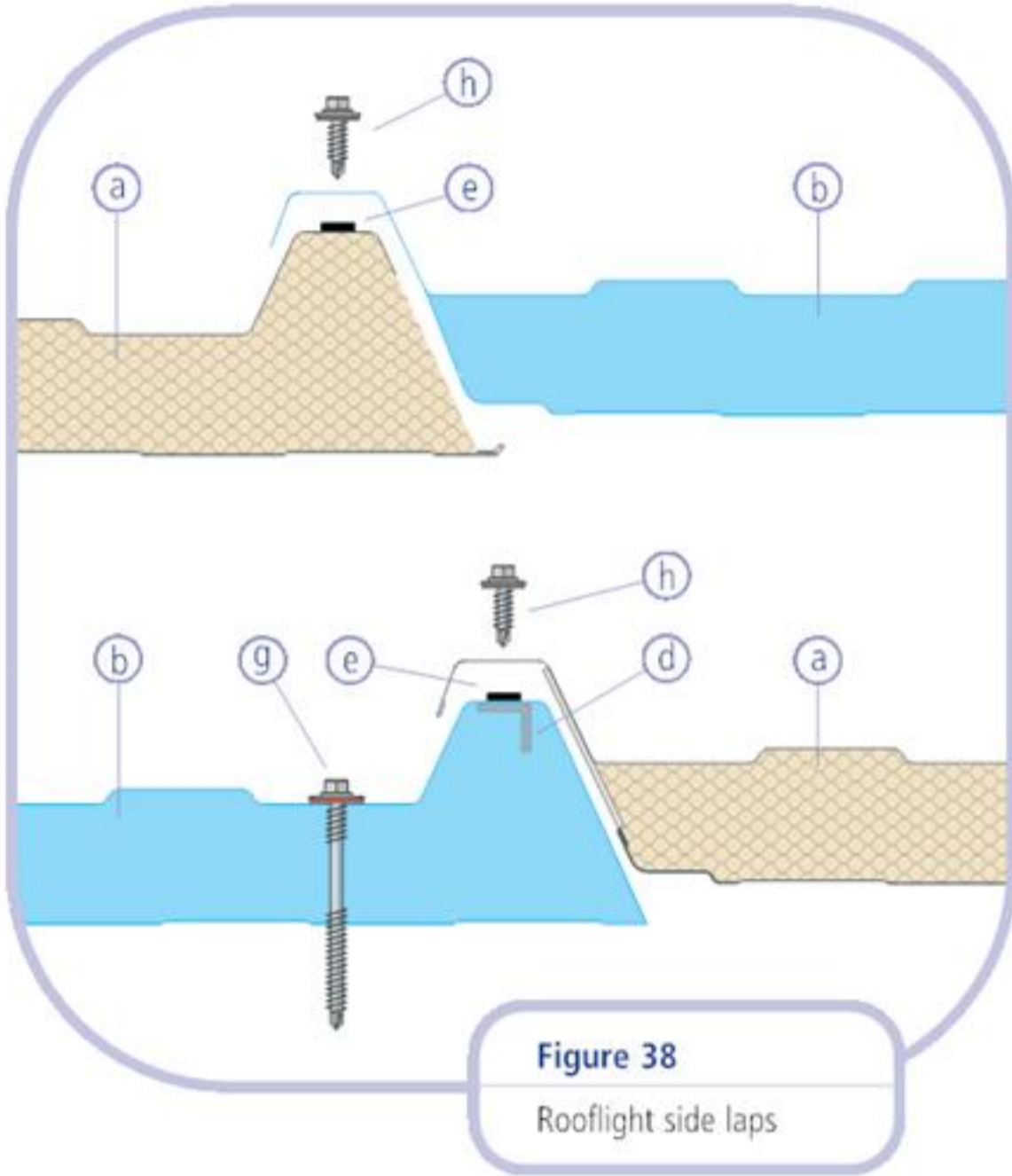
- Key to figures 36 & 37**
- a** AS35 insulated wall panel
  - b** Site applied expanding air seal
  - c** LPC approved insulation board to give required U-value, sealed with fire rated canister insulation
  - d** Galvanised window jamb / head
  - e** 6 x 5mm Butyl rubber seal
  - f** Polyethylene backing rod with silicone sealer (by window installers)
  - g** Window head flashing
  - h** External window jamb flashing with no connection to internal
  - i** Cill flashing with 3° fall to allow for drainage, no connection to internal
  - j** Optional internal flashing
  - k** Optional external window jamb flashing with no connection to internal
  - l** Window unit fixed to galvanised window jamb (by others)
  - m** Profiled foam filler sealed top and bottom with gun grade mastic

**Figure 37**  
Window - jamb

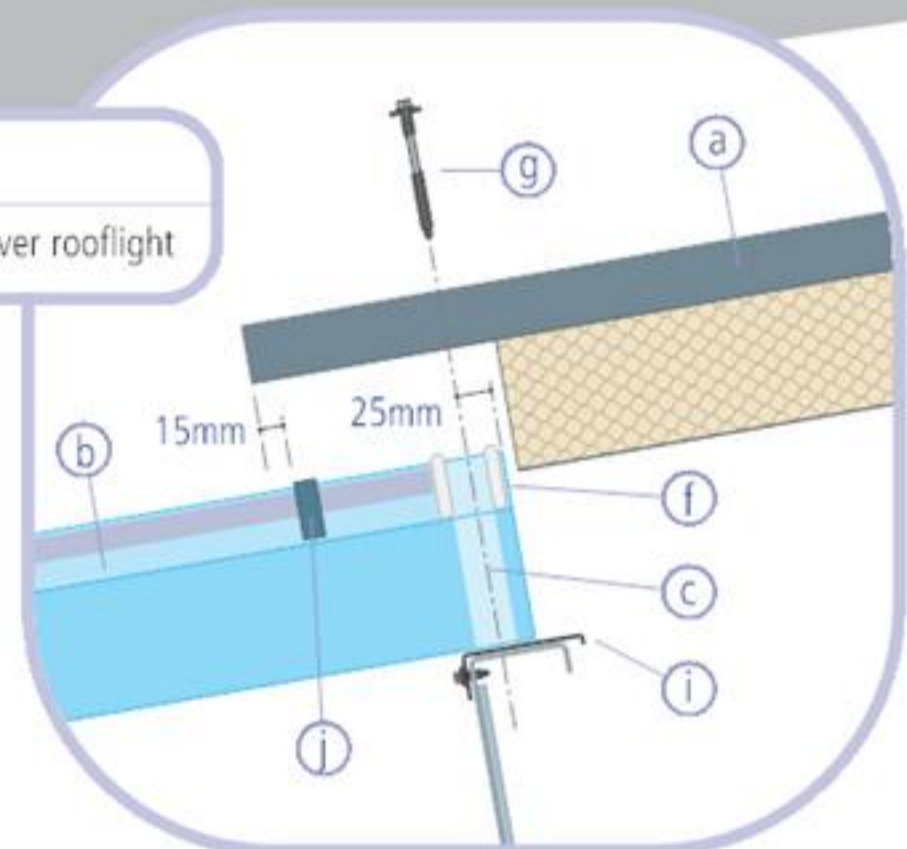


# AS35 INSULATED ROOF & WALL PANELS

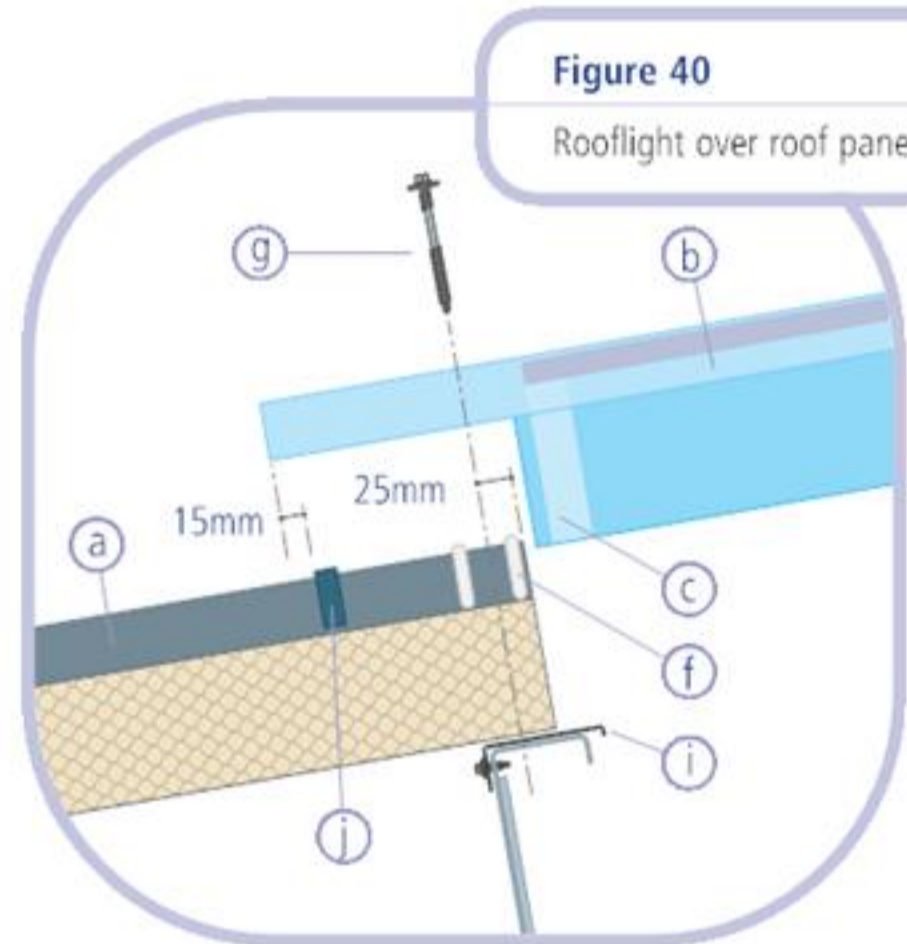
## DESIGN DETAILS



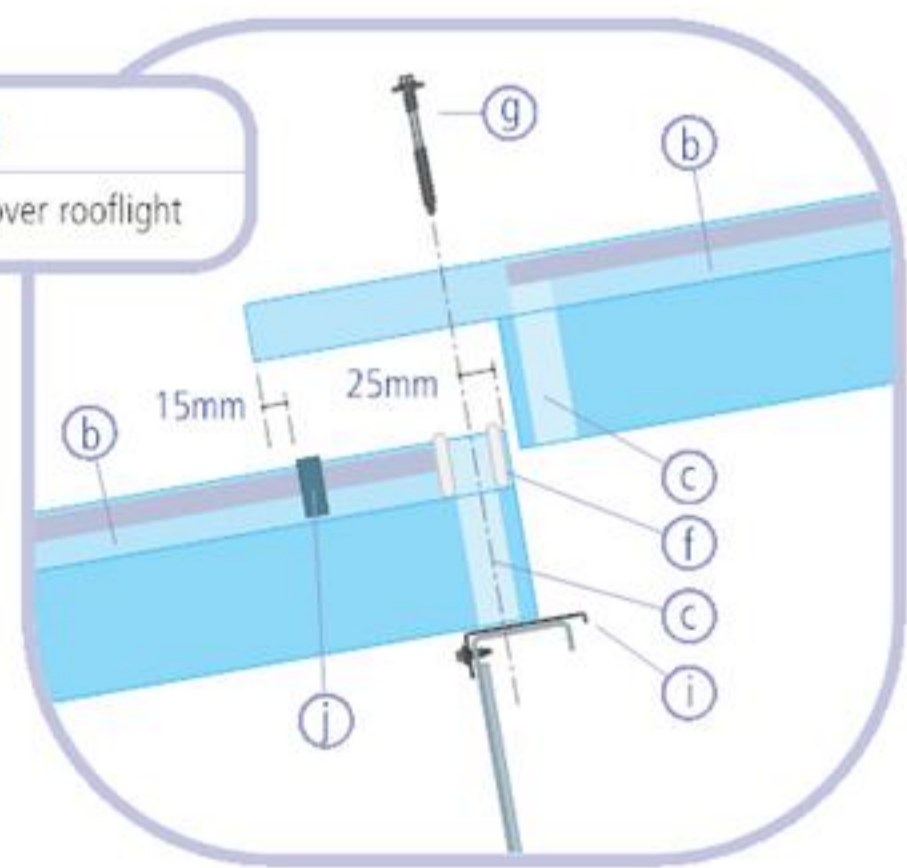
**Figure 39**  
Roof panel over rooflight



**Figure 40**  
Rooflight over roof panel



**Figure 41**  
Rooflight over rooflight



- Key to figures 38 to 41**
- a** AS35 insulated roof panel
  - b** Factory assembled rooflight
  - c** Factory fitted polyethylene filler
  - d** Underlap strip
  - e** 6 x 5mm Butyl rubber sidelap seal
  - f** 6 x 5mm endlap sealant
  - g** Fastener (through valley positions only)
  - h** Stitching screw
  - i** Purlin and extension plate
  - j** Gun applied silicon sealant (ISO-11600-F-25LM) 15mm from bottom of lap

## SITWORK

### Handling and storage

AS35 panels are delivered to site in plastic wrapped packs with end and side protection. The panels are packed with weather faces together to reduce pack height. The height of a pack and the number of panels it contains depends upon the thickness of the panels (see table 13).

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.

Handle AS35 panels carefully to avoid marking the weather sheet or liner. Lift panels from the pack - do not drag them. Carry panels by the male (filled) edge - do not lift panels by the female edge or just the top sheet. See table 13 for the weight of panels.

Observe site health and safety procedures and the results of manual handling and other assessments.

### Preparation

Before fixing any panels check the squareness and accuracy of the steelwork. Determine the direction of the prevailing wind. Check panels for damage before fixing and remove any excess insulation from side and end laps.

### Installation

These installation sequences describe the general methods for laying and fixing AS35 roof and wall panels.

#### Single tier roof

1. Lay the first panel with the female edge to the gable, away from the prevailing wind. Use a string line to lay the panel straight and true. Fix the panel.
2. Apply 6 x 5mm butyl sealant along the top of the male crown. The surfaces receiving the sealant must be dry: joints in the sealant must be lapped by 25mm not butted.
3. Lay the second panel with its female crown over the male crown of the first panel. Fix the panel.
4. Stitch the lap with self drilling fixings.
5. Continue to lay panels along the roof, checking the alignment of the cladding and correcting any deviations.
6. Fix flashings. Use foam filler pieces and butyl sealant to form weathertight junctions.

**Table 13 Handling data for AS35 roof and wall panel**

Panel core thickness	40mm	60mm	70mm	80mm	90mm	105mm	115mm	120mm	137mm
Weight (kg/m)									
0.5/0.4 steel	9.6	10.4	10.8	11.3	11.7	12.3	12.7	12.9	13.6
0.7/0.4 steel	11.3	12.1	12.5	12.9	13.3	13.9	14.3	14.5	15.2
Panels per pack (max.)	14	10	10	8	8	8	6	6	6

# AS35

## INSULATED ROOF & WALL PANELS

### SITWORK

#### Double tier roof

On a two tier roof lay the panels in the order shown in figure 45.

1. Lay panel one with the female edge to the gable, away from the prevailing wind. Use a string line to lay the panel straight and true. Fix the panel at every purlin except the top one.
2. Apply three runs of 6 x 5mm butyl sealant to the head of panel one, one on each side of the fixing line and one 15mm from the end of the lap.
3. Apply a run of 6 x 5mm butyl sealant to the male crown of panel one for the length of the lap (figure 42).
4. Lay panel two with the female edge to the gable and the tail lapping panel one. Fix the panel with one fixing in each main valley at every purlin.
5. Tail stitch the end lap.
6. Apply a run of 6 x 5mm butyl sealant to the male crown of panels one and two (figure 43).
7. Lay panel three with its female crown lapping the male crown of panel one. Fix the panel at every purlin except the top one.
8. Stitch the side lap with self drilling fixings at 450mm centres.
9. Apply three runs of 6 x 5mm butyl sealant to the head of the panel (as panel one).
10. Apply additional runs of 6 x 5mm butyl sealant along the male and female crowns of panel three for the length of the lap (figure 44).
11. Lay panel four with its female crown lapping the male crown of panel two and its end lapping the head of panel three. Fix the panel with one fixing in each main valley at every purlin.
12. Stitch the side lap with self drilling fixings at 450mm centres.
13. Tail stitch the end lap.
14. Continue to lay panels along the roof, checking the alignment of the cladding and correcting any deviations.
15. Fix flashings. Use foam filler pieces and butyl sealant to form weathertight junctions.

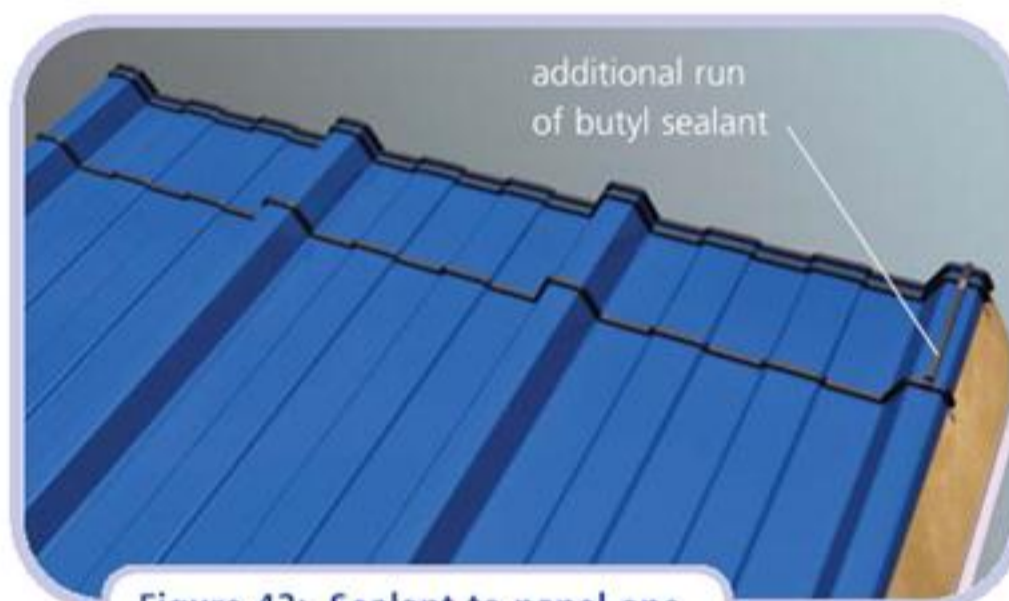


Figure 42: Sealant to panel one



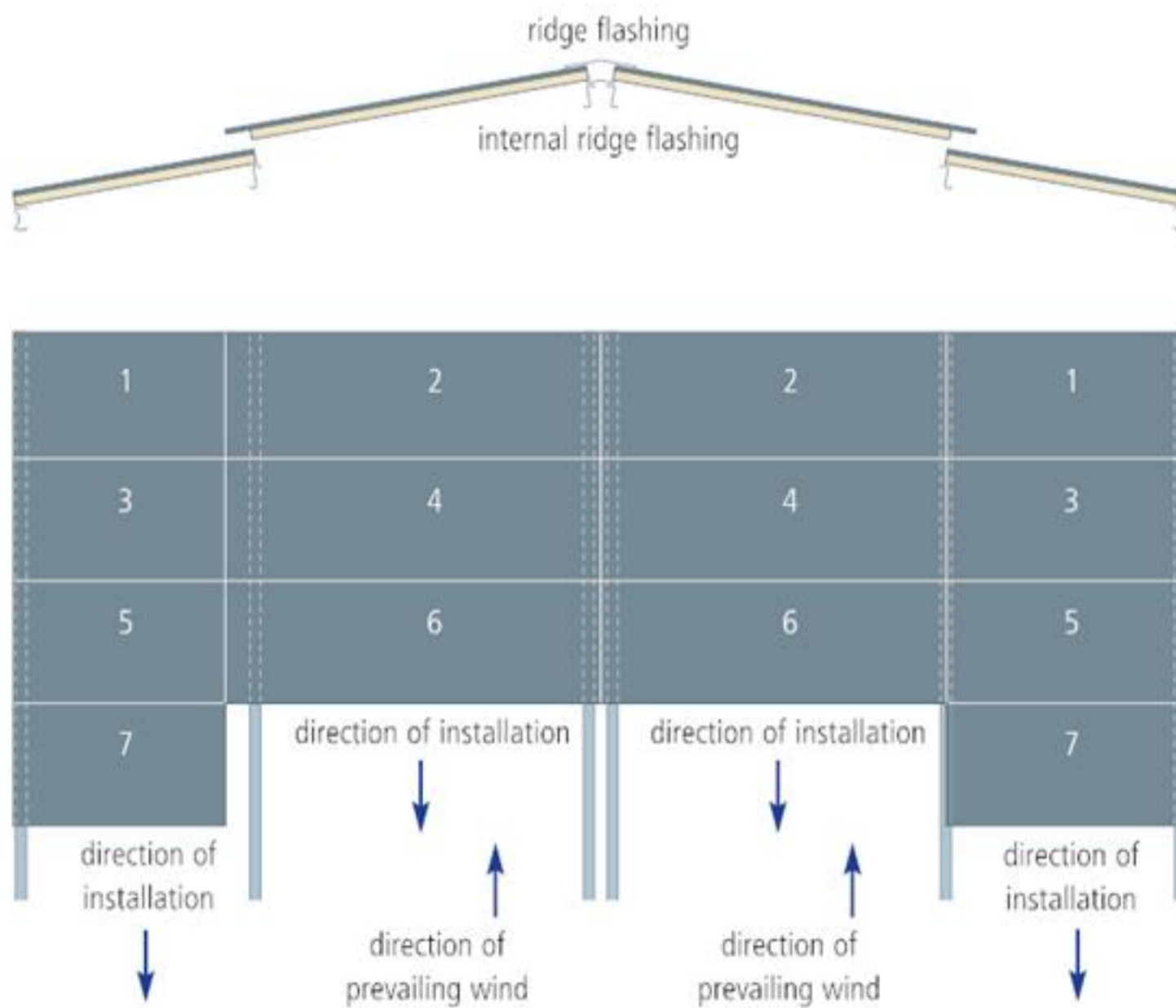
Figure 43: Sealant over panels one & two



Figure 44: Sealant to panel three



## SITWORK



**Figure 45: Roof panel laying sequence**

### Wall panels

1. Set the first panel upright against the framing at the corner of the building with the female edge to the corner. Make sure the panel is vertical.
2. Fix with one fixing in each main valley at each side rail.
3. Apply a run of 6 x 5mm butyl sealant along the male crown.
4. Set the second panel upright with its female edge lapping the male edge of panel one.
5. Fix with one fixing in each main valley at each side rail.
6. Stitch the lap with self drilling fixings at 300mm centres.
7. Continue to lay panels along the wall, checking the alignment of the cladding and correcting any deviations.
8. Fix flashings. Use foam filler pieces and butyl sealant to form weathertight junctions.

### 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.

### Completion

When all the AS35 panels have been installed check:

- All fixings are correctly fitted and tightened;
- The fixings do not distort the panels;
- All fixing caps are fitted;
- Minor scratches have been treated;
- The surface of the roof is clean and free of any swarf or debris.

# AS35 INSULATED ROOF & WALL PANELS

## MAINTENANCE

### Annual inspection

It is good practice to carry out annual inspection of the building exterior and to carry out any remedial work identified during the inspection, see table 14.

### Touch-up

Minor scuffing to the colour coating should not be treated. Deeper scratches which reach the substrate should be repaired with touch-up paint. The touch-up paint should only be applied to the original scratch using a fine paint brush. As touch-up paint will dry to a slightly different colour than the original coating the area which is touched up should be kept as small as possible.

## SUPPLY AND DELIVERY

AS35 panels are available directly from Steadmans. AS35 panels are supplied in plastic wrapped packs: fully timber crated packs are available for sea freight shipping at additional cost.

AS35 panels are usually delivered to site. Off loading is the responsibility of the customer. Delivery by self off-load vehicles can be arranged.

**Table 14 Checklist for annual inspection**

Check for:	Remedial action:
Blocked gutters, which may cause overflow into the building.	Clean gutters and wash out any blockage.
Build-up of debris, which can retain water and cause corrosion.	Remove debris.
Dirt retention on areas not washed by rainwater: that affects the appearance of the building and, if left untreated, could cause the coating to breakdown.	Wash down with fresh water using a hose and soft bristle brush. Heavy deposits can be removed with a solution of water and household detergent or proprietary cleaner.
Mould growth, which is rare, but can affect the appearance of the building.	Wash down, then apply a cleansing solution: consult Steadmans Technical Department for guidance.
Local damage - breakthrough of the panel coating could result in corrosion of the substrate.	Assess the extent of the damage and either touch up (see opposite) or over-paint the affected area or replace damaged sheets.
Drilling swarf and fixing debris.	Remove debris.
Condition of fixings - faulty fixings can cause leaks or rust staining on the surface of the panels.	Replace faulty fixings and missing clips.
Corrosion of cut edges.	Cut or abrade edges back to clean bright metal and repaint: consult Steadmans Technical Department for guidance.

## TECHNICAL SUPPORT

Steadmans offers comprehensive technical support to designers and contractors working with AS35 panels, including:

- technical brochures and data sheets for all Steadmans products
- CAD details
- copies of test certificates
- loading calculations
- design and installation guidance

Our web site offers full product and application information and downloads of construction details in AutoCAD and PDF formats.

[www.steadmans.co.uk](http://www.steadmans.co.uk)

To contact our Technical Department:

- telephone: 01697 478 277
- fax: 01697 478 530
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## REFERENCES

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**ENVIRONMENTAL CREDENTIALS**

We recognise the need to manage the impact which 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.

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.

[www.steadmans.co.uk](http://www.steadmans.co.uk)

