

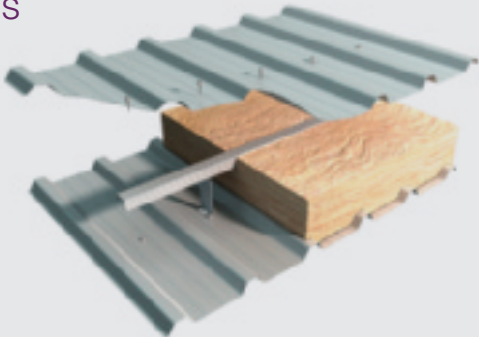
GemelloTM
TWIN SKIN SYSTEM

Gemello twin skin roofing and walling from SIG

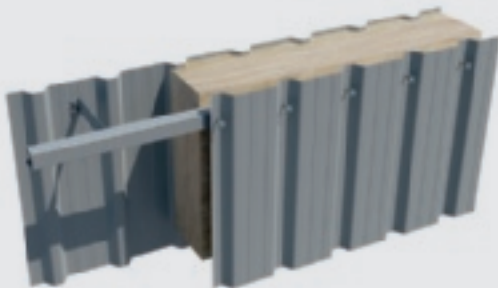
GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **QUICK REFERENCE**

Systems

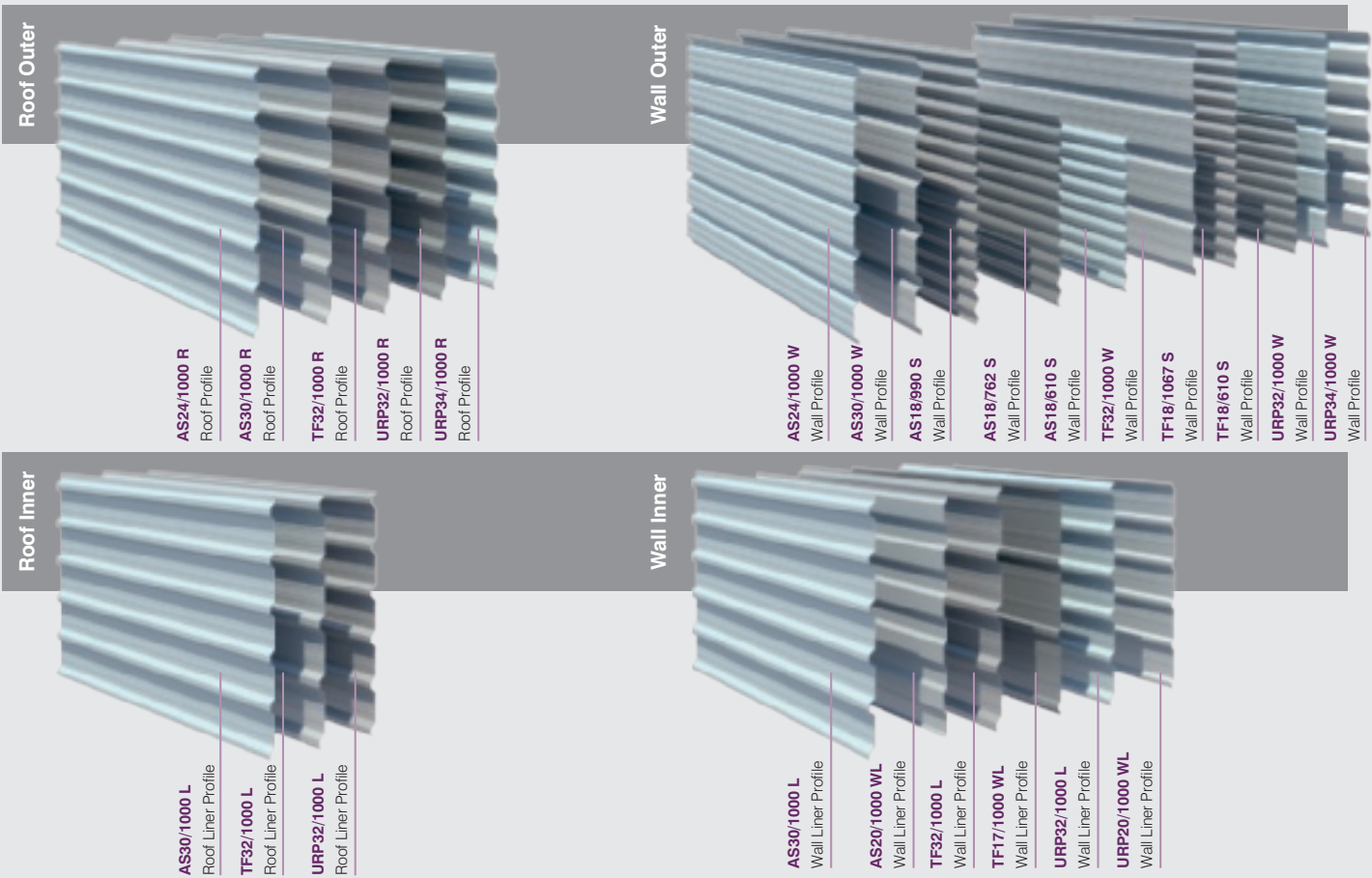
Roofing



Walling



Profiles



Materials

Coating	Thickness	Agrement	Applications
Colorcoat HPS200 Ultra®	200µm	BBA:91/2717:ps8	Roofs and walls in all environments including severe industrial and coastal/marine.
Colorcoat Prisma®	50µm	BBA:91/2717:ps2	Roofs and walls in all environments including severe industrial and coastal/marine, especially where metallic and other exclusive colours are wanted.
Leathergrain	200µm	N/A	Roofs and walls where good and tough performance is required at a competitive price.
Liner	15µm	N/A	Liner to roofs and walls in dry and unpolluted environments.

Refer to Materials section, p27

Guarantees

Twin Skin Systems – Guarantee Identification Matrix					
		Material maximum coating guarantee period (conditions apply)			
		40 Years	30 Years	25 Years	15 Years
Coatings	Colorcoat HPS200 Ultra® Confidex	✓	✓	✓	✓
	Colorcoat Prisma® Confidex		✓	✓	✓
	Leathergrain			✓	✓
SIG System Integrity Guarantee	Gemello 30	Gemello 30/40	Gemello 30/30	Gemello 30/25	Gemello 30/15
	Gemello 25	Gemello 25/40	Gemello 25/30	Gemello 25/25	Gemello 25/15
	Gemello 12	Gemello 12/40	Gemello 12/30	Gemello 12/25	Gemello 12/15

NBS Guarantee reference, the first part is the Gemello Integrity Guarantee period and the second is material Guarantee period. Refer to the Durability and Guarantee section p26.

U values – roofs

U Values – Roof Systems				
U W/m²K	λ0.040 W/mK Nett insulation depth mm	λ0.037 W/mK Nett insulation depth mm	λ0.035 W/mK Nett insulation depth mm	λ0.032 W/mK Nett insulation depth mm
0.25	180	170	160	150
0.20	230	210	200	190
0.18	250	240	230	210
0.16	290	270	250	240
0.15	n/a	290	270	250
0.14	n/a	n/a	290	270

U values – walls

U Values – Wall Systems				
U W/m²K	λ0.040 W/mK Nett insulation depth mm	λ0.037 W/mK Nett insulation depth mm	λ0.035 W/mK Nett insulation depth mm	λ0.032 W/mK Nett insulation depth mm
0.25	180	170	160	150
0.20	230	220	210	190
0.18	260	240	230	220
0.16	290	280	260	240
0.15	n/a	290	280	260
0.14	n/a	n/a	300	280

Notes: Spacer depth = nett insulation depth.
Insulation roll should be +10% for compression.
Overall depth = nett insulation depth + depth of outer profile
For comprehensive U value tables and notes, refer to the Thermal performance section p23.

- Cladding material life expectancy exceeds the SIG Gemello Integrity Guarantee period. Standard inspection & maintenance regimes apply.
- Cladding material life expectancy matches or exceeds the SIG Gemello Integrity Guarantee period. Standard inspection & maintenance regimes apply.
- Cladding material life expectancy is less than the SIG Gemello Integrity Guarantee period. Cladding may require re-painting to maintain the aesthetics and durability of the outer sheet. Standard inspection & maintenance regimes apply.

Acoustics

Sound insulation performance, Rw dB			
Top sheet	Nett insulation thickness mm	Liner	Rw dB
Roof, 0.7mm steel, 24mm to 34mm profile depth	180	0.7mm steel, 30mm to 32mm liner profile depth	36
Roof, 0.7mm steel, 24mm to 34mm profile depth	290	0.7mm steel, 30mm to 32mm liner profile depth	38
Wall, 0.5mm steel, 24mm to 34mm profile depth	180	0.4mm steel, 17mm to 20mm liner profile depth	34
Wall, 0.5mm steel, 24mm to 34mm profile depth	290	0.4mm steel, 17mm to 20mm liner profile depth	38

Insulation is λ0.040W/mK glass quilt
Rw values are indicative for the range of profile depths
Rw values by MCRMA/Salford University SRIPT software modelling
Solid (non-perforated) liner, 1.5m spans.
For comprehensive acoustic performance tables and notes, refer to the Acoustic performance section p29.

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **INTRODUCTION**

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This brochure describes the high performance of the Gemello twin skin roof and wall systems manufactured by SIG Trading Limited Companies.

It includes full descriptions of system features and performance design data for the building owner, designer and installer.

The data included is applicable to all steel profiles manufactured by SIG Trading companies, located at production units around the UK.

About SIG and Gemello™

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 www.sigplc.com.

Gemello insulated roof and wall systems are manufactured and supplied by Steadmans, Trimform Products and United Roofing Products – URP; all SIG Trading Limited companies.

Production sites are strategically located around the UK to provide local supply of complete cladding systems including fasteners, rooflights, flashings, rainwater goods etc.

SIG has a programme of continuous investment and ongoing product development which ensures high quality products at competitive prices. The manufacturing companies work closely with designers, specifiers and installers, offering advice and design guidance to help a user select the most appropriate, efficient and value for money roof and wall systems.

For more information on our production sites please visit the following websites:

www.steadmans.co.uk

www.trimformfabs.co.uk

www.unitedroofingproducts.com

Gemello roof and wall systems

Gemello by SIG, a comprehensive roof and wall solution from one source.

Gemello systems are self-supporting twin skin systems for roofing and cladding. The external profiles have clean, sharp lines and are available in an extensive range of finishes and colours enabling designers to create modern, visually-engaging buildings.

The attractive and durable properties of the Gemello systems make Gemello suitable for projects across many market sectors including industrial, retail, office, health, education, leisure and agricultural. The Gemello systems are ideal for roofing and cladding steel framed buildings and can be fully integrated with both modern and traditional methods of construction.

Gemello systems consist of profiled steel inner and outer sheet with non-combustible mineral/rock fibre insulation between to provide excellent properties:-

Acoustics - Thermal - Structural - Fire

System integrity is backed by the Gemello guarantee.

In addition to the roof and wall profiles, SIG companies manufacture and supply a comprehensive range of accessories and components such as rooflights, gutters, flashings and fabrications to provide the complete cladding system.



GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **OVERVIEW**

Gemello roof and wall systems combine intrinsic structural strength with design flexibility. Gemello systems can be tailored to suit the aesthetic, acoustic, thermal, fire and loading requirements of a building application.

Gemello Systems

Gemello trapezoidal roof and wall systems include 5 roof, 5 wall and 6 liner profile options with 1000mm cover widths. All roof profiles are non-fragile to ACR[M]001 Class B. In addition 5 sinusoidal feature-cladding wall profiles are available.

Systems provide U-values down to 0.14W/m²K and will self-span to 1.8m.

For lower U-values, contact SIG technical

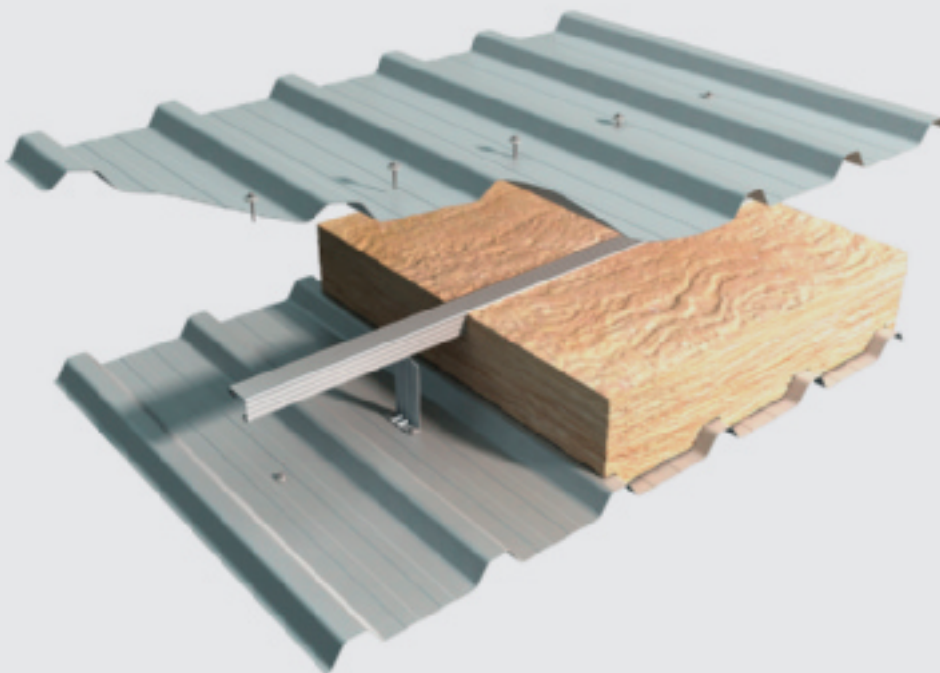
The vapour and air barriers are formed by sealing the profiled steel liner at laps, perimeters and at all penetrations.

The insulation cavity is formed by an engineered bar and bracket spacer system and filled using non-combustible mineral fibre insulation under 10% compression.

Weatherproof joints in the external skin are formed by sealing the lapped edges using flexible and durable butyl rubber seals.

Long term structural integrity of the systems is ensured by the use of stainless steel fasteners with bonded rubber sealing washers.

The Gemello system guarantee is available for the complete Gemello system.

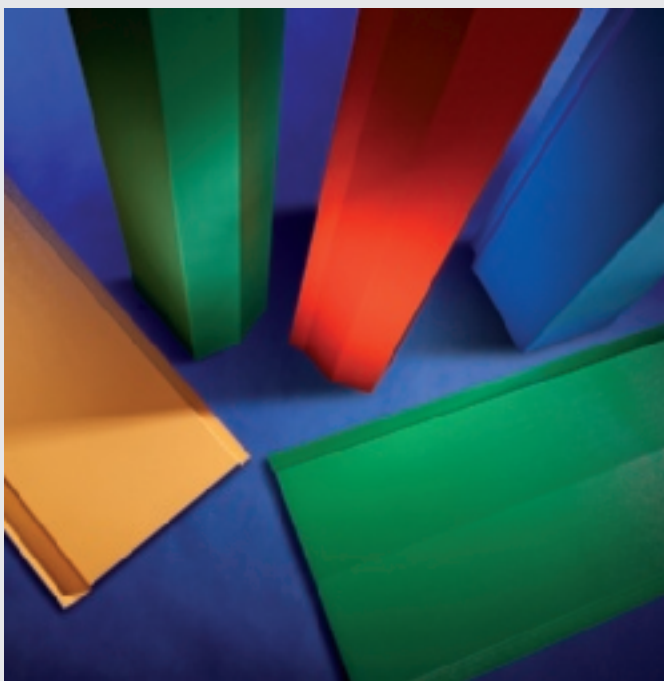


Roof system assembly:

- 0.7mm steel top sheet.
- Spacer system.
- Mineral wool insulation with 10% compression.
- 0.7mm steel liner, sealed as vcl and air barrier.

A wide range of accessories are manufactured and supplied to complete a Gemello roofing and cladding project.

Accessories are the smaller but essential components needed for the long term performance of a system and are supplied as a part of a one-stop-shop.



Rooflights

Site assembled in-plane rooflights to match the Gemello roof systems are available providing high quality natural daylighting.

Rooflights reduce the need for artificial light, saving energy and reducing the carbon footprint of an industrial building.

Gutters

A complete range of gutters and rain water goods are manufactured and supplied to order to meet the specific requirements of individual projects. Gutters are fabricated in a variety of materials including aluminium, pre-galvanised steel, pre-coated steel with a PVC finish, and membrane lined gutters, to suit the designer's needs. Insulated membrane lined gutters are available for designs where gutters form part of the insulated building envelope and the integrity and durability of fully sealed joints is required. The steel backed membrane is textured for slip resistance where the gutter forms an access way on a roof.

Flashings

Flashings are manufactured to a customer's design in finishes to either match the roof / wall cladding or to form a contrasting feature on the building.

Fabrications

Aluminium fabrications to create more architectural building features such as bullnoses, fascias and cappings with concealed or secret fix methods of attachment are made to order and polyester powder coated to the specified RAL colour.

Fasteners, fillers & sealants

Sealants, profiled fillers, fasteners and spacer systems are supplied by SIG companies (and must be used for Gemello Guarantee systems).

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **FEATURES**

The roofs and walls of a building have to multi-task!

We expect them to:-

- Keep heat in
- Keep noise out
- Keep us dry
- Prevent draughts
- Prevent fire spread
- Carry snow loads and roof plant
- Remain secure in the worst of winds
- Keep intruders out
- Look good
- Respect the environment
- Be safe to build
- Provide longevity

Gemello roof and wall systems provide all of the above

Water tightness

The essential feature of any roof or wall system – to keep the weather out.

Gemello roof and wall systems have to multi-task, they are environmental filters; they keep heat in, draughts out, noise out, intruders out etc; but most important, they keep the building dry.

Water tightness is a key necessity and Gemello roof and wall systems do this by using, amongst other factors – first quality components, sensible roof pitches, durable fasteners and seamless membrane insulated gutters.

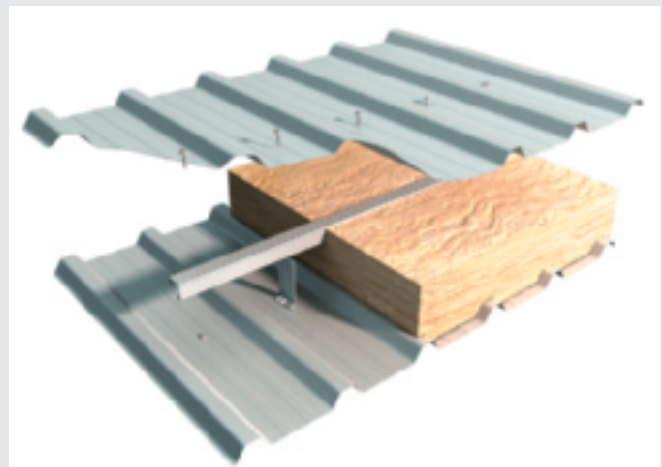
Fire

When a fire occurs within a building the preservation of life is the main focus of any fire prevention measures, including the building envelope.

In addition, from a business point of view the recovery after the fire will take time and may result in loss of business.

All Gemello twin skin systems use glass or rock based mineral fibre insulation. Besides being integral to the thermal and acoustic performances of a system, mineral wool insulation achieves a Class A1 to BS EN 13501-1 i.e. the highest Euroclass fire rating.

Gemello twin skin systems are also tested and assessed to BS476:Pt22 to provide fire barrier performance of 120minutes integrity and 35 minutes insulation.



Acoustics

A strong benefit of Gemello twin skin roof and wall systems is the inherent acoustic performance potential in terms of sound insulation, sound absorption and rain noise.

Due to the two steel skins and the flexible mineral fibre insulation material, twin skin constructions can provide an excellent acoustic performance in relation to their light weight.

Using software developed by the MCRMA and Salford University, SIG technical are able to model the predicted acoustic performance of a specific construction to assess its performance relative to a customer's needs.



WATER TIGHTNESS



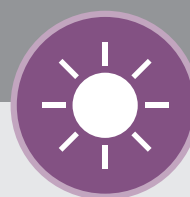
FIRE



ACOUSTIC



STRUCTURAL



THERMAL

Sound Insulation: The control of noise levels within a building space to suit the external environment and the activity taking place within ...theatres, educational buildings, sports facilities etc. The sound reduction through the construction is achieved by the thickness and density of the insulation quilt and the use of a sealed solid liner.

Sound Absorption: The removal of reverberation from an internal building space to suit the activity taking place... theatre, teaching, sports etc. The typical method to provide sound absorption is to use a pan-perforated liner panel with acoustic batts and a robust vapour control layer/ air barrier.

Rain noise: Heavy rain causes an impact on a roof surface and the best way to control this is by the use of an absorbent flexible insulation material. The fibrous nature of the insulation absorbs sound energy emanating from rain impact on the external skin, reducing the sound reaching the inside of the building.



Structural

SIG steel profiles are inherently strong and resist the loadings that a typical roof and wall will experience during its lifetime.

Comprehensive load/span tables are in the Design Data section of this document. These are calculated to BS EN 1993-1-3 by the Steel Construction Institute (SCI)

Typically the loads that a profile will need to resist are:-

- Wind (BS EN (NA) 1991-1-4, variable load)
- Imposed (BS EN (NA) 1991-1-1, variable load)
- Snow (BS EN (NA) 1991-1-3, variable load)
- Snow drifting (BS EN (NA) 1991-1-3, accidental load)
- Construction loads (people, variable load)
- Plant maintenance/inspection traffic (people, variable load)
- Self weights (permanent load)
- PVs or other plant carried by the roof (permanent load)

Non-Fragility

SIG profiles are tested to ACR[M]001 for non-fragility. 0.7mm profiles that have a depth of 30mm or greater as used in the Gemello system can be defined as a walkable platform when fully fixed and sealed.



Thermal

Thermal performance is primarily achieved by insulation and air tightness.

Insulation: Gemello twin skin systems provide excellent U-values (thermal resistances) from 0.25W/m²K to 0.14W/m²K with overall construction depths up to 330mm.

The glass and rock fibre insulation materials achieve a Class A1 to BS EN 13501-1 and contributes to the excellent acoustic performance.

Air permeability: An air tight building is a key component in complying with the Building Regs Part L. A poorly sealed building will fail the compulsory air tightness testing resulting in difficult and expensive remedial works.

Gemello twin skin roof and wall systems have the benefit of consisting of an impermeable steel inner liner that can be effectively and robustly sealed. Lapped joints with flexible and durable sealants are the most effective method of creating a vapour control layer (vcl) and the air barrier.

The steel liner is tolerant of variations in the structure, flexing to the structure position and ensuring a good seal.

The air barrier is continued at ridges, hips, boundaries and any penetrations. Sealing a steel liner vcl is also less weather and damage dependant than a membrane vcl.



GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **FEATURES**



Asset protection

A building represents a big investment and is an important working asset to a company or organisation. It deserves to be protected as an asset. The last thing stakeholders need is a compromised roof reducing the value and integrity of the asset.

The SIG Gemello guarantee applies to SIG supplied roof and wall systems and ensures you of its integrity and the use of the best materials.

SIG has developed its twin skin roof and wall systems to be practical, efficient, good value and durable to give the building owner a performance that lasts. This is backed by the SIG Gemello guarantee.

The Gemello guarantee is direct between the building owner and SIG Trading Limited, a part of FTSE 250 listed company SIG plc. It assures the building owner of the integrity of the Gemello roof and/or wall for the specified period.



Depending on the materials used, the correctly specified Gemello cladding system can offer up to a 30 year integrity warranty with a 40 year coating warranty for the outer sheet.

The desire for a guaranteed roof and wall for your asset, backed by a FTSE250 company, should make Gemello your first choice system.



Durability

Gemello profile paint finishes should be selected to meet predicted service conditions. Designers should consider:

- Service life: how long are the Gemello systems expected to be in place?
- Service conditions: will the roofs or walls 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 profiles be exposed to high levels of UV radiation, rain, coastal conditions with salt sea spray, or atmospheric pollution?





ASSET PROTECTION



DURABILITY



ENVIRONMENT



SAFE WORKING



ACCREDITATION



Environment

Gemello roof and wall systems are efficient in terms of minimising haulage and road congestion.

SIG factories are strategically located around the UK enabling shorter delivery distances from local production plants.

Profiled metal sheets stack well making the most of vehicle capacity. Typically a single vehicle can carry up to 1800m² of liner and topsheet in a single delivery.

Both of these factors help to limit vehicle fuel use, emissions and road congestion.

The mineral fibre insulation used within Gemello systems is non-combustible, provides good sound insulation reducing sound pollution, has a generic class A+ Green Guide rating and has zero ozone depletion and global warming potential (ODP and GWP).

Gemello systems provide excellent thermal insulation and lower air permeability boosting the energy efficiency potential of a building.

At the end of life, Gemello system materials can be re-claimed through normal processes without particular specialised environmental precautions.



Safe working:

The 0.7mm liner profiles which are 30mm or deeper are more than just non-fragile liners, they can act as a walkable platforms that also ensures a quick initial weather proofing. This allows other trades to work within the building and in the dry while the roof is being installed - Subject to the purlin design and onsite health and safety assessments by the main contractor.

SIG profiles are tested to ACR[M]001 for non-fragility. 0.7mm profiles that have a depth of 30mm or greater as used in the Gemello system can be defined as a walkable platform when fully fixed and sealed.

Individual sheets may be moved and installed by hand, however consideration must be made of the weight of the sheets, a 0.7mm sheet weighs 6.7kg/m² -A 2.9m sheet will weigh just under 20kg per sheet.

ZEROHARM



Accreditation

Accreditation held by SIG companies includes:

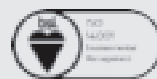
CE: Gemello profiles are CE marked to BS EN 14782. Self-supporting metal sheet for roofing, external cladding and internal lining.

The required Declarations of Performance (DoP) for the Gemello profiles and other CE marked products are available on request and relevant DoPs are provided with invoices.

ISO 9001: Quality management systems.

ISO 14001: Environmental management systems.

ISO 18001: BS OHSAS 18001:2007. Occupational health and safety management systems



GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

Profiles

The designer has a range of profiles to select from when deciding on a system to use.

Selection involves deciding on application, appearance and strength required (spans/ loads)

The choice involves choosing:-

- Profile depth (deeper is stronger and better for load carrying)
- Profile rib spacing (pitch)
- Profile gauge
 - Roof: 0.7mm steel
 - Roof liner: 0.7mm steel
 - Wall: 0.7mm or 0.5mm steel
 - Wall liner: 0.7mm or 0.4mm steel

- Application (roof, wall, external sheet or liner)
- Production plant (for delivery efficiency, use AS, TF or URP external and liner profiles together).

The profile designation shows:-

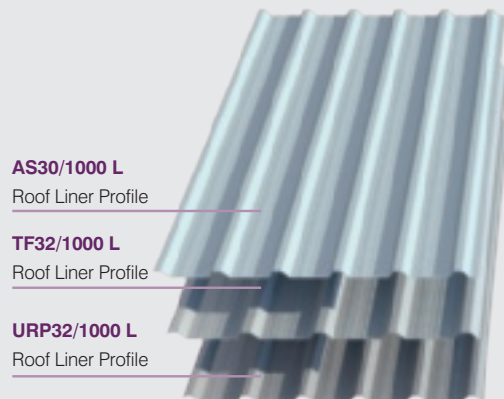
AS, TF, URP	Production plant
17...34	Profile depth
610...1000	Profile cover width
R, W, L, S, WL	R = roof (colour to narrow flat) W = wall (colour to broad flat) L = liner S = sinusoidal (wall only) WL = wall liner only

Profile	Thickness mm	Cover width mm	Pitch mm	Depth mm	Weight Kg/m ²	Minimum sheet length m	Maximum sheet length m	Applications
AS24/1000 R	0.7	1000	167	24	6.7	1.10	9.00	Roof and wall
AS24/1000 W	0.7	1000	167	24	6.7	1.10	9.00	Wall
AS24/1000 W	0.5	1000	167	24	4.8	1.10	9.00	Wall
AS30/1000 R	0.7	1000	200	30	6.7	1.10	12.50	Roof and wall
AS30/1000 W	0.7	1000	200	30	6.7	1.10	12.50	Wall
AS30/1000 W	0.5	1000	200	30	4.8	1.10	12.50	Wall
AS30/1000 L	0.7	1000	200	30	6.7	1.10	12.50	Liner
AS20/1000 WL	0.4	1000	200	20	3.5	1.10	8.00	Liner (wall only)
AS18/990 S	0.7	990	76	18	6.7	1.10	8.00	Wall
AS18/762 S	0.7	762	76	18	6.7	1.10	8.00	Wall
AS18/610 S	0.7	610	76	18	6.7	1.10	8.00	Wall
AS18/990 S	0.5	990	76	18	4.8	1.10	8.00	Wall
AS18/762 S	0.5	762	76	18	4.8	1.10	8.00	Wall
AS18/610 S	0.5	610	76	18	4.8	1.10	8.00	Wall
TF32/1000 R	0.7	1000	250	32	6.7	0.20	10.00	Roof and wall
TF32/1000 W	0.7	1000	250	32	6.7	0.20	10.00	Wall
TF32/1000 W	0.5	1000	250	32	4.8	0.20	10.00	Wall
TF32/1000 L	0.7	1000	250	32	6.7	0.20	10.00	Liner
TF17/1000 WL	0.4	1000	333	17	3.5	0.20	5.50	Liner (wall only)
TF18/1067 S	0.5	1067	76	18	4.8	0.20	6.50	Wall
TF18/1067 S	0.7	1067	76	18	6.7	0.20	6.50	Wall
TF18/610 S	0.5	610	76	18	4.8	0.20	6.50	Wall
URP32/1000 R	0.7	1000	200	32	6.7	0.30	10.00	Roof and wall
URP32/1000 W	0.7	1000	200	32	6.7	0.30	10.00	Wall
URP32/1000 W	0.5	1000	200	32	4.8	0.30	10.00	Wall
URP32/1000 L	0.7	1000	200	32	6.7	0.30	10.00	Liner
URP34/1000 R	0.7	1000	166	34	6.7	0.30	10.00	Roof and wall
URP34/1000 W	0.7	1000	166	34	6.7	0.30	10.00	Wall
URP34/1000 W	0.5	1000	166	34	4.8	0.30	10.00	Wall
URP20/1000 WL	0.4	1000	200	20	3.5	0.30	6.00	Liner (wall only)

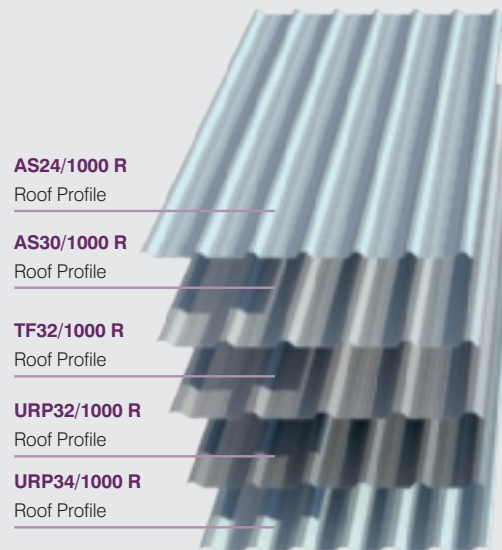
Refer to the Non-Fragility section on p 16

Profiles

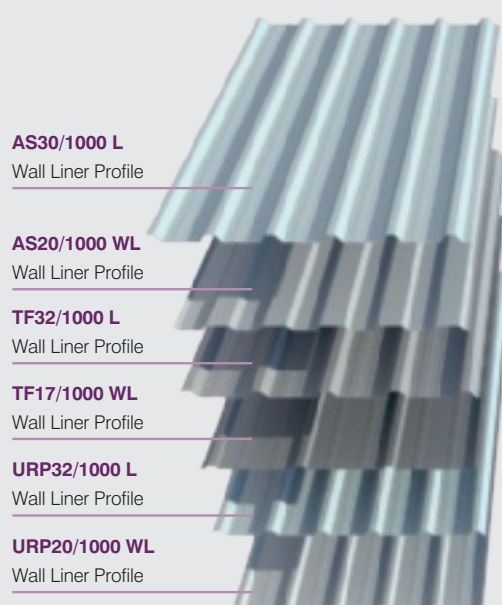
Roof Inner



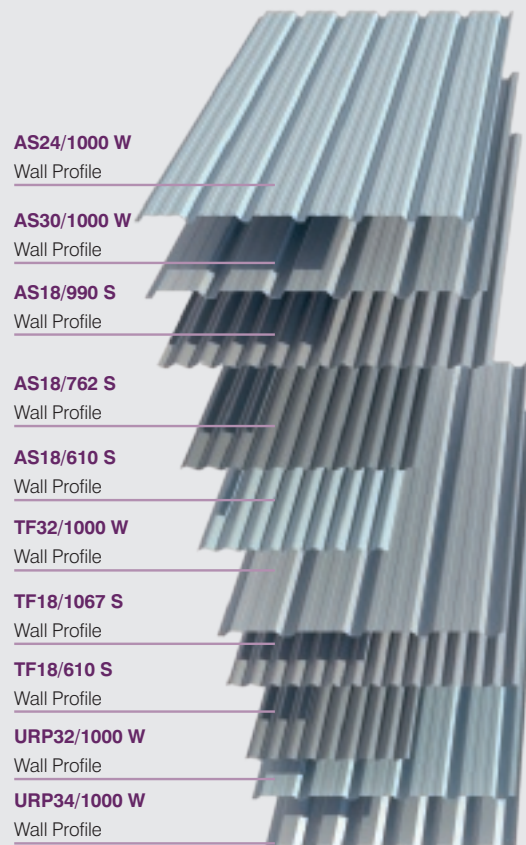
Roof Outer



Wall Inner

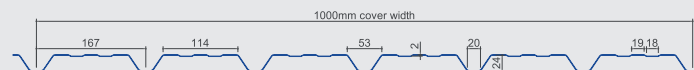


Wall Outer

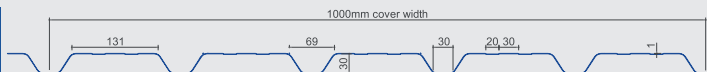


Wall profiles

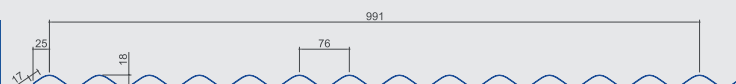
AS24 / 1000 W



AS30 / 1000 W



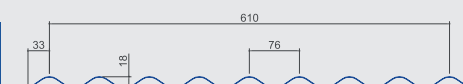
AS18 / 990 S



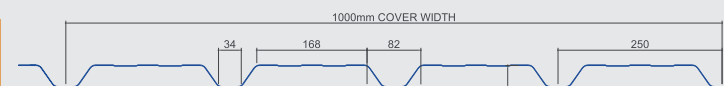
AS18 / 762 S



AS18 / 610 S



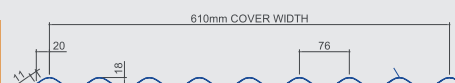
TF32 / 1000 W



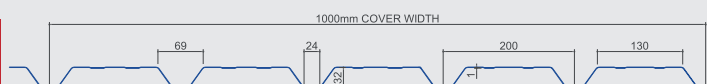
TF18 / 1067 S



TF18 / 610 S



URP32 / 1000 W



URP34 / 1000 W

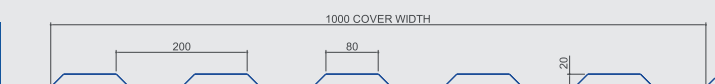


Wall liner profiles

AS30 / 1000 L



AS20 / 1000 WL



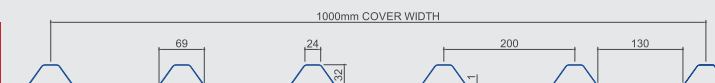
TF32 / 1000 L



TF17 / 1000 WL



URP32 / 1000 L



URP20 / 1000 WL



GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

Structural

Load/span tables are calculated to BS EN 1993-1-3 by the Steel Construction Institute (SCI) for each profile.

The load/span tables are available for each Gemello profile and show permissible load at specified spans under the following categories:-

- **Material thickness**
- **Application (Roof or wall)**
- **Load type**
 - Negative/wind uplift (Roof)
 - Positive/imposed downward (Roof)
 - Positive/snow drift loads (Roof)
 - Negative/wind suction (Wall)
 - Positive/wind pressure (Wall)
- **Span condition - Single, Double or Multi**

Load/span tables: Structural notes:

- The loads shown in the following load span tables are safe working loads. All loads are in kN/m².
- The designer must separately check fastener capacity under negative loads (wind uplift/suction).
- Minimum bearing width 40mm.
- "Single" = spanning over 2 purlins, "double" = 3 purlins, "multi" = 4 or more purlins.
- Avoid single spans wherever possible.
- Consider crawl boards or additional protection in all cases where the sheets are single spanning.
- For spans exceeding 1.8m refer to SIG technical.
- "R" denotes profile narrow rib outermost (roof or wall).
- "W" denotes profile broad rib outermost (wall).
- "S" denotes a sinusoidal profile (wall).



BS EN 1991-1-4:

Appendix C.5.6.4: Partial safety factors for limit state design. Load factors included within the load/span tables:

- Variable loads factor 1.5
- Permanent load factor 1.35
- Accidental load factor 1.0
- Serviceability load factor 1.0

Table 10: Deflection

- Roofs – imposed loads – L/200
- Roofs – wind L/90
- Walls – wind L/90

Typically, the loads to apply to the load/span tables:

- Wind (BS EN (na) 1991-1-4, variable load) – usually negative/uplift loads for roofs and positive and negative loads for walls.

Take into account local effects and consider components as small for size effect.

If a walkable 0.7mm sealed liner is used the internal pressure coefficient can be taken as zero.

- Imposed (BS EN (na) 1991-1-1, variable load)
 - Typical value 0.6kN/m² unless specified otherwise
- Snow (BS EN (na) 1991-1-3, variable load)
- Exceptional loads due to snow drifting (BS EN (na) 1991-1-3, accidental load)
- PVs or other plant carried by the roof (permanent load)

Non-Fragility and walkability:

SIG profiles are tested to ACR[M]001 for non-fragility. 0.7mm profiles that have a depth of 30mm or greater as used in the Gemello system can be defined as a walkable platform when fully fixed and sealed.

All 0.7mm steel SIG roof profiles achieve Class B non-fragility.

0.7mm steel roof profiles are walkable but note that excessive loading can damage ribs. Profiles with a WL designation (0.4mm steel) are classed as fragile and are restricted to wall applications only.



AS24/1000 R – Load/span table

AS24/1000 R								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	16.22		0.695	5.546	0.695	5.546
	0.5	4.8	5.01		0.653	5.490	0.582	5.866
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Roof application Positive/imposed downward	Single	2.57	2.04	1.63	1.33	1.09	0.91	0.77
	Double	2.37	2.06	1.81	1.60	1.43	1.28	1.14
	Multi	2.89	2.52	2.21	1.96	1.75	1.52	1.28
0.7mm steel Roof application Negative/wind uplift	Single	2.57	2.19	1.89	1.65	1.45	1.28	1.14
	Double	2.37	2.06	1.81	1.60	1.43	1.28	1.14
	Multi	2.89	2.52	2.21	1.96	1.75	1.57	1.42
0.7mm steel Roof application Positive/snow drift loads	Single	3.68	3.13	2.70	2.35	2.07	1.83	1.63
	Double	3.39	2.95	2.59	2.29	2.04	1.83	1.63
	Multi	4.13	3.59	3.16	2.80	2.50	2.24	2.02
0.7mm steel Wall application Positive/wind pressure	Single	2.57	2.19	1.89	1.65	1.45	1.28	1.14
	Double	2.37	2.06	1.81	1.60	1.43	1.28	1.14
	Multi	2.89	2.52	2.21	1.96	1.75	1.57	1.42
0.7mm steel Wall application Negative/wind suction	Single	2.57	2.19	1.89	1.65	1.45	1.28	1.14
	Double	2.37	2.06	1.81	1.60	1.43	1.28	1.14
	Multi	2.89	2.52	2.21	1.96	1.75	1.57	1.42
0.5mm steel Wall application Positive/wind pressure	Single	1.69	1.44	1.24	1.08	0.95	0.84	0.75
	Double	1.46	1.28	1.12	1.00	0.89	0.80	0.73
	Multi	1.77	1.55	1.37	1.22	1.09	0.98	0.89
0.5mm steel Wall application Negative/wind suction	Single	2.42	2.06	1.78	1.55	1.36	1.21	1.07
	Double	1.37	1.21	1.08	0.97	0.88	0.80	0.73
	Multi	1.63	1.45	1.29	1.16	1.05	0.96	0.88

AS24/1000 W – Load/span table

AS24/1000 W								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	16.22		0.695	5.546	0.695	5.546
	0.5	4.8	8.007		0.469	3.661	0.457	3.673
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Wall application Positive/wind pressure	Single	2.57	2.19	1.89	1.65	1.45	1.28	1.14
	Double	2.37	2.06	1.81	1.60	1.43	1.28	1.14
	Multi	2.89	2.52	2.21	1.96	1.75	1.57	1.42
0.7mm steel Wall application Negative/wind suction	Single	2.57	2.19	1.89	1.65	1.45	1.28	1.14
	Double	2.37	2.06	1.81	1.60	1.43	1.28	1.14
	Multi	2.89	2.52	2.21	1.96	1.75	1.57	1.42
0.5mm steel Wall application Positive/wind pressure	Single	1.74	1.48	1.28	1.11	0.98	0.87	0.77
	Double	1.43	1.25	1.10	0.98	0.88	0.79	0.71
	Multi	1.74	1.52	1.34	1.19	1.07	0.96	0.87
0.5mm steel Wall application Negative/wind suction	Single	1.69	1.44	1.24	1.08	0.95	0.84	0.75
	Double	1.46	1.28	1.12	1.00	0.89	0.80	0.73
	Multi	1.77	1.55	1.37	1.22	1.09	0.98	0.89

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

AS30/1000 R – Load/span table

AS30/1000 R								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	10.97		0.986	8.956	0.970	9.521
	0.5	4.8	5.013		0.653	5.49	0.582	5.866
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Roof application Positive/imposed downward	Single	3.59	3.06	2.64	2.30	1.89	1.58	1.33
	Double	2.61	2.30	2.04	1.83	1.64	1.49	1.35
	Multi	3.13	2.76	2.46	2.20	1.98	1.80	1.64
0.7mm steel Roof application Negative/wind uplift	Single	3.65	3.11	2.68	2.34	2.05	1.82	1.62
	Double	2.59	2.28	2.02	1.81	1.63	1.47	1.34
	Multi	3.10	2.74	2.43	2.18	1.96	1.78	1.62
0.7mm steel Roof application Positive/snow drift loads	Single	5.39	4.59	3.96	3.45	3.03	2.69	2.40
	Double	3.91	3.45	3.06	2.74	2.47	2.23	2.03
	Multi	4.69	4.14	3.68	3.30	2.98	2.70	2.45
0.7mm steel Wall application Positive/wind pressure	Single	4.27	3.64	3.13	2.73	2.40	2.13	1.90
	Double	3.41	2.99	2.65	2.36	2.12	1.91	1.73
	Multi	4.11	3.61	3.20	2.86	2.57	2.32	2.11
0.7mm steel Wall application Negative/wind suction	Single	4.38	3.73	3.22	2.80	2.46	2.18	1.95
	Double	3.36	2.94	2.60	2.32	2.08	1.88	1.70
	Multi	4.05	3.56	3.15	2.81	2.52	2.28	2.07
0.5mm steel Wall application Positive/wind pressure	Single	2.55	2.17	1.87	1.63	1.43	1.27	1.13
	Double	2.00	1.77	1.57	1.41	1.27	1.15	1.05
	Multi	2.39	2.12	1.89	1.69	1.53	1.38	1.26
0.5mm steel Wall application Negative/wind suction	Single	2.42	2.06	1.78	1.55	1.36	1.21	1.07
	Double	1.37	1.21	1.08	0.97	0.88	0.80	0.73
	Multi	1.63	1.45	1.29	1.16	1.05	0.96	0.88

AS30/1000 W – Load/span table

AS30/1000 W								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	16.31		1.182	10.71	1.152	11.34
	0.5	4.8	8.054		0.782	6.555	0.688	6.955
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Wall application Positive/wind pressure	Single	4.38	3.73	3.22	2.80	2.46	2.18	1.95
	Double	3.36	2.94	2.60	2.32	2.08	1.88	1.70
	Multi	4.05	3.56	3.15	2.81	2.52	2.28	2.07
0.7mm steel Wall application Negative/wind suction	Single	4.27	3.64	3.13	2.73	2.40	2.13	1.90
	Double	3.41	2.99	2.65	2.36	2.12	1.91	1.73
	Multi	4.11	3.61	3.20	2.86	2.57	2.32	2.11
0.5mm steel Wall application Positive/wind pressure	Single	2.90	2.47	2.13	1.85	1.63	1.44	1.29
	Double	1.86	1.64	1.45	1.30	1.17	1.06	0.96
	Multi	2.23	1.97	1.75	1.57	1.41	1.28	1.16
0.5mm steel Wall application Negative/wind suction	Single	2.55	2.17	1.87	1.63	1.43	1.27	1.13
	Double	2.00	1.77	1.57	1.41	1.27	1.15	1.05
	Multi	2.39	2.12	1.89	1.69	1.53	1.38	1.26

TF32/1000 R – Load/span table

TF32/1000 R								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	8.786		0.980	9.811	0.925	10.326
	0.5	4.8	4.036		0.649	6.019	0.552	6.317
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Roof application Positive/imposed downward	Single	3.43	2.92	2.52	2.19	1.93	1.71	1.46
	Double	2.35	2.08	1.86	1.67	1.50	1.37	1.24
	Multi	2.80	2.49	2.22	2.00	1.81	1.64	1.50
0.7mm steel Roof application Negative/wind uplift	Single	3.63	3.09	2.67	2.32	2.04	1.81	1.61
	Double	2.28	2.02	1.80	1.61	1.45	1.32	1.20
	Multi	2.72	2.41	2.15	1.93	1.75	1.59	1.45
0.7mm steel Roof application Positive/snow drift loads	Single	5.14	4.38	3.78	3.29	2.89	2.56	2.28
	Double	3.53	3.12	2.78	2.50	2.26	2.05	1.87
	Multi	4.21	3.73	3.33	2.99	2.71	2.46	2.25
0.7mm steel Wall application Positive/wind pressure	Single	3.43	2.92	2.52	2.19	1.93	1.71	1.52
	Double	2.35	2.08	1.85	1.66	1.50	1.36	1.24
	Multi	2.80	2.48	2.22	2.00	1.80	1.64	1.50
0.7mm steel Wall application Negative/wind suction	Single	3.63	3.09	2.67	2.32	2.04	1.81	1.61
	Double	2.28	2.02	1.80	1.61	1.45	1.32	1.20
	Multi	2.72	2.41	2.15	1.93	1.75	1.59	1.45
0.5mm steel Wall application Positive/wind pressure	Single	2.04	1.74	1.50	1.31	1.15	1.02	0.91
	Double	1.28	1.14	1.03	0.93	0.84	0.77	0.70
	Multi	1.52	1.35	1.22	1.10	1.00	0.92	0.84
0.5mm steel Wall application Negative/wind suction	Single	2.40	2.05	1.77	1.54	1.35	1.20	1.07
	Double	1.19	1.06	0.95	0.86	0.78	0.71	0.65
	Multi	1.42	1.26	1.13	1.02	0.93	0.84	0.77

TF32/1000 W – Load/span table

TF32/1000 W								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	8.785		0.979	9.81	0.925	10.33
	0.5	4.8	4.036		0.648	6.018	0.552	6.317
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Wall application Positive/wind pressure	Single	3.63	3.09	2.66	2.32	2.04	1.81	1.61
	Double	2.28	2.02	1.80	1.61	1.45	1.32	1.20
	Multi	2.72	2.41	2.15	1.93	1.75	1.59	1.45
0.7mm steel Wall application Negative/wind suction	Single	3.43	2.92	2.52	2.19	1.93	1.71	1.52
	Double	2.35	2.08	1.85	1.66	1.50	1.36	1.24
	Multi	2.80	2.48	2.22	2.00	1.80	1.64	1.50
0.5mm steel Wall application Positive/wind pressure	Single	2.40	2.04	1.76	1.54	1.35	1.20	1.07
	Double	1.19	1.06	0.95	0.86	0.78	0.71	0.65
	Multi	1.42	1.26	1.13	1.02	0.93	0.84	0.77
0.5mm steel Wall application Negative/wind suction	Single	2.04	1.74	1.50	1.31	1.15	1.02	0.91
	Double	1.28	1.14	1.03	0.93	0.84	0.77	0.70
	Multi	1.52	1.35	1.22	1.10	1.00	0.92	0.84

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

URP32/1000 R – Load/span table

URP32/1000 R (03/2017 a)								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	10.95		0.974	9.750	0.994	10.48
	0.5	4.8	4.036		0.649	6.019	0.552	6.317
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Roof application Positive/imposed downward	Single	3.68	3.14	2.70	2.36	2.06	1.72	1.45
	Double	2.59	2.28	2.03	1.81	1.63	1.47	1.34
	Multi	3.10	2.74	2.44	2.18	1.97	1.78	1.62
0.7mm steel Roof application Negative/wind uplift	Single	3.61	3.07	2.65	2.31	2.03	1.80	1.60
	Double	2.62	2.31	2.05	1.83	1.65	1.49	1.36
	Multi	3.14	2.77	2.47	2.21	1.99	1.81	1.64
0.7mm steel Roof application Positive/snow drift loads	Single	5.52	4.71	4.06	3.53	3.11	2.75	2.45
	Double	3.88	3.42	3.04	2.72	2.44	2.21	2.01
	Multi	4.66	4.11	3.66	3.27	2.95	2.67	2.43
0.7mm steel Wall application Positive/wind pressure	Single	3.68	3.14	2.70	2.36	2.07	1.83	1.64
	Double	2.59	2.28	2.02	1.81	1.63	1.47	1.34
	Multi	3.10	2.74	2.44	2.18	1.97	1.78	1.62
0.7mm steel Wall application Negative/wind suction	Single	3.61	3.07	2.65	2.31	2.03	1.80	1.60
	Double	2.62	2.31	2.05	1.83	1.65	1.49	1.36
	Multi	3.14	2.77	2.47	2.21	1.99	1.81	1.64
0.5mm steel Wall application Positive/wind pressure	Single	2.32	1.98	1.71	1.49	1.31	1.16	1.03
	Double	1.44	1.28	1.14	1.03	0.93	0.85	0.77
	Multi	1.71	1.52	1.36	1.23	1.11	1.01	0.93
0.5mm steel Wall application Negative/wind suction	Single	2.40	2.05	1.77	1.54	1.35	1.20	1.07
	Double	1.19	1.06	0.95	0.86	0.78	0.71	0.65
	Multi	1.42	1.26	1.13	1.02	0.93	0.84	0.77

URP32/1000 W – Load/span table

URP32/1000 W (03/2017 a)								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	10.95		0.973	9.730	0.944	10.470
	0.5	4.8	5.029		0.643	5.993	0.627	6.708
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Wall application Positive/wind pressure	Single	3.60	3.07	2.65	2.31	2.03	1.80	1.60
	Double	2.62	2.31	2.05	1.83	1.65	1.49	1.36
	Multi	3.14	2.77	2.47	2.21	1.99	1.81	1.64
0.7mm steel Wall application Negative/wind suction	Single	3.68	3.14	2.70	2.36	2.07	1.83	1.64
	Double	2.59	2.28	2.02	1.81	1.63	1.47	1.34
	Multi	3.10	2.74	2.44	2.18	1.97	1.78	1.62
0.5mm steel Wall application Positive/wind pressure	Single	2.38	2.03	1.75	1.52	1.34	1.19	1.06
	Double	1.42	1.26	1.13	1.01	0.92	0.83	0.76
	Multi	1.69	1.50	1.35	1.21	1.10	1.00	0.92
0.5mm steel Wall application Negative/wind suction	Single	2.32	1.98	1.71	1.49	1.31	1.16	1.03
	Double	1.44	1.28	1.14	1.03	0.93	0.85	0.77
	Multi	1.71	1.52	1.36	1.23	1.11	1.01	0.93

URP34/1000 R – Load/span table

URP34/1000 R (03/2017 a)								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	14.97		1.319	10.386	1.385	12.892
	0.5	4.8	7.331		0.793	6.379	0.841	8.096
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Roof application Positive/imposed downward	Single	5.13	4.37	3.77	3.11	2.57	2.14	1.80
	Double	3.52	3.10	2.75	2.46	2.22	2.00	1.82
	Multi	4.22	3.73	3.31	2.97	2.67	2.42	2.21
0.7mm steel Roof application Negative/wind uplift	Single	4.89	4.16	3.59	3.13	2.75	2.43	2.17
	Double	3.62	3.19	2.84	2.54	2.29	2.07	1.88
	Multi	4.34	3.83	3.41	3.06	2.76	2.50	2.28
0.7mm steel Roof application Positive/snow drift loads	Single	7.69	6.56	5.65	4.92	4.33	3.83	3.42
	Double	5.28	4.65	4.13	3.69	3.32	3.01	2.73
	Multi	6.33	5.59	4.97	4.45	4.01	3.63	3.31
0.7mm steel Wall application Positive/wind pressure	Single	5.13	4.37	3.77	3.28	2.89	2.56	2.28
	Double	3.52	3.10	2.75	2.46	2.22	2.00	1.82
	Multi	4.22	3.73	3.31	2.97	2.67	2.42	2.21
0.7mm steel Wall application Negative/wind suction	Single	4.89	4.16	3.59	3.13	2.75	2.43	2.17
	Double	3.62	3.19	2.84	2.54	2.29	2.07	1.88
	Multi	4.34	3.83	3.41	3.06	2.76	2.50	2.28
0.5mm steel Wall application Positive/wind pressure	Single	3.11	2.65	2.29	1.99	1.75	1.55	1.38
	Double	1.93	1.71	1.52	1.37	1.23	1.12	1.02
	Multi	2.30	2.04	1.82	1.64	1.48	1.35	1.23
0.5mm steel Wall application Negative/wind suction	Single	2.94	2.50	2.16	1.88	1.65	1.46	1.31
	Double	1.99	1.76	1.57	1.41	1.28	1.16	1.06
	Multi	2.37	2.10	1.88	1.69	1.53	1.39	1.27

URP34/1000 W – Load/span table

URP34/1000 W (03/2017 a)								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	14.97		1.319	10.386	1.385	12.892
	0.5	4.8	7.331		0.793	6.379	0.841	8.096
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Wall application Positive/wind pressure	Single	4.89	4.16	3.59	3.13	2.75	2.43	2.17
	Double	3.62	3.19	2.84	2.54	2.29	2.07	1.88
	Multi	4.34	3.83	3.41	3.06	2.76	2.50	2.28
0.7mm steel Wall application Negative/wind suction	Single	5.13	4.37	3.77	3.28	2.89	2.56	2.28
	Double	3.52	3.10	2.75	2.46	2.22	2.00	1.82
	Multi	4.22	3.73	3.31	2.97	2.67	2.42	2.21
0.5mm steel Wall application Positive/wind pressure	Single	2.94	2.50	2.16	1.88	1.65	1.46	1.31
	Double	1.99	1.76	1.57	1.41	1.28	1.16	1.06
	Multi	2.37	2.10	1.88	1.69	1.53	1.39	1.27
0.5mm steel Wall application Negative/wind suction	Single	3.11	2.65	2.29	1.99	1.75	1.55	1.38
	Double	1.93	1.71	1.52	1.37	1.23	1.12	1.02
	Multi	2.30	2.04	1.82	1.64	1.48	1.35	1.23

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

AS18 S Wall – Load/span table

AS18/990 S; AS18/762 S; AS18/610 S								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	19.827		0.618	2.529	0.618	2.529
	0.5	4.8	7.870		0.433	1.770	0.433	1.770
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Wall application Positive/wind pressure	Single	2.29	1.95	1.65	1.34	1.11	0.92	0.78
	Double	2.27	1.95	1.68	1.46	1.29	1.14	1.02
	Multi	2.78	2.41	2.10	1.83	1.61	1.43	1.27
0.7mm steel Wall application Negative/wind suction	Single	2.29	1.95	1.65	1.34	1.11	0.92	0.78
	Double	2.27	1.95	1.68	1.46	1.29	1.14	1.02
	Multi	2.78	2.41	2.10	1.83	1.61	1.43	1.27
0.5mm steel Wall application Positive/wind pressure	Single	1.60	1.37	1.16	0.94	0.77	0.65	0.54
	Double	1.37	1.20	1.06	0.94	0.84	0.75	0.68
	Multi	1.67	1.46	1.29	1.14	1.02	0.92	0.83
0.5mm steel Wall application Negative/wind suction	Single	1.60	1.37	1.16	0.94	0.77	0.65	0.54
	Double	1.37	1.20	1.06	0.94	0.84	0.75	0.68
	Multi	1.67	1.46	1.29	1.14	1.02	0.92	0.83

TF18 S Wall - Load/span table

TF18/1067 S; TF18/610 S								
Section Properties	$f_u = 220\text{N/mm}^2$		$E = 210\text{kN/mm}^2$		Broad flange in compression		Narrow flange in compression	
	t_N mm	Weight kg/m ²	Web crushing $R_{w,Rd}$ kN/m (40mm min bearing)		$M_{b,Rd}$ kNm/m	$I_{b,Rd}$ cm ⁴ /m	$M_{n,Rd}$ kNm/m	$I_{n,Rd}$ cm ⁴ /m
	0.7	6.7	19.827		0.618	2.529	0.618	2.529
	0.5	4.8	7.870		0.433	1.770	0.433	1.770
	Span	1.20	1.30	1.40	1.50	1.60	1.70	1.80
0.7mm steel Wall application Positive/wind pressure	Single	2.29	1.95	1.65	1.34	1.11	0.92	0.78
	Double	2.27	1.95	1.68	1.46	1.29	1.14	1.02
	Multi	2.78	2.41	2.10	1.83	1.61	1.43	1.27
0.7mm steel Wall application Negative/wind suction	Single	2.29	1.95	1.65	1.34	1.11	0.92	0.78
	Double	2.27	1.95	1.68	1.46	1.29	1.14	1.02
	Multi	2.78	2.41	2.10	1.83	1.61	1.43	1.27
0.5mm steel Wall application Positive/wind pressure	Single	1.60	1.37	1.16	0.94	0.77	0.65	0.54
	Double	1.37	1.20	1.06	0.94	0.84	0.75	0.68
	Multi	1.67	1.46	1.29	1.14	1.02	0.92	0.83
0.5mm steel Wall application Negative/wind suction	Single	1.60	1.37	1.16	0.94	0.77	0.65	0.54
	Double	1.37	1.20	1.06	0.94	0.84	0.75	0.68
	Multi	1.67	1.46	1.29	1.14	1.02	0.92	0.83

Thermal performance

UK Building Regulations 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, 2017, 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.

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.

System U-value

U-value – Roof Systems				
W/m²K	λ0.040 W/mK Nett insulation depth mm	λ0.037 W/mK Nett insulation depth mm	λ0.035 W/mK Nett insulation depth mm	λ0.032 W/mK Nett insulation depth mm
0.25	180	170	160	150
0.20	230	210	200	190
0.18	250	240	230	210
0.16	290	270	250	240
0.15	n/a	290	270	250
0.14	n/a	n/a	290	270

U-value – Wall Systems				
W/m²K	λ0.040 W/mK Nett insulation depth mm	λ0.037 W/mK Nett insulation depth mm	λ0.035 W/mK Nett insulation depth mm	λ0.032 W/mK Nett insulation depth mm
0.25	180	170	160	150
0.20	230	220	210	190
0.18	260	240	230	220
0.16	290	280	260	240
0.15	n/a	290	280	260
0.14	n/a	n/a	300	280

Notes:

- Spacer depth = nett insulation depth.
- Insulation roll = nett insulation depth + 10% for compression.
- Insulation must be under compression and fill the cavity, contacting the outer sheet.
- Overall depth = nett insulation depth + depth of outer profile
- U values are calculated at an average span of 1.5m and take into account metal bridging and profile shapes.

Air permeability: An air tight building is a key component in complying with the Building Regs Part L. A leaking building will fail the compulsory air tightness testing and can lead to expensive and difficult remedial works.

Gemello twin skin roof and wall systems have the benefit of consisting of an impermeable steel inner liner that can be effectively and robustly sealed. Lapped joints with flexible and durable sealants are the most effective method of creating a vapour control layer and the air barrier.

The steel liner is tolerant of variations in the structure, flexing to the structure position and ensuring a good seal.

The air seal is continued at ridges, hips, boundaries and any penetrations. Sealing a steel liner vcl is also less weather and damage dependant than a membrane vcl.

For more information please see the construction details from p 38 onwards.

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

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 variations in the thermal insulation produced by structural requirements.

The rate of additional heat loss through a junction is measured by its linear thermal transmittance, the Psi (ψ) value.

Some junctions, such as ridges, allow continuity of insulation, so have very low psi values, while valley gutters, for example, can have higher psi-values because of the difficulty of maintaining a continuous layer of insulation.

Control of condensation

The fabric of a building must be free from surface or interstitial condensation which could affect 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).

Gemello systems control the risk of interstitial condensation through the high vapour resistance of the liner and seals resisting water vapour entering the system.

Generally, twin skin systems with sealed liners are suitable for Humidity classes 1 to 4 in BS EN 5250 table B5 – (storage, offices, retail, dwellings, sports halls, schools etc, but excluding high humidity buildings such as swimming pools). High humidity or buildings with more intensive internal environments require special design.

To minimise the risk of condensation designers should arrange for moisture to be extracted at source, to prevent high moisture levels within buildings.

Gemello systems control the risk of surface and interstitial condensation by simple, robust and effective means to prevent moisture entering the roof and to minimise cold bridging.

Notional building fabric standards (Part L 2013, England; Part L 2014, Wales)	
Exposed element	U-value (W/m ² K)
Roofs	0.18
Walls	0.26

Scotland Section 6 (Energy) 2017 - Non-domestic	
Exposed element	U-value (W/m ² K)
Roofs	0.18
Walls	0.23

Notional building airtightness standards		
Air permeability (m ³ /m ² h)		
	Side lit or unlit	Top lit
< 250m ²	5	7
250m ² < 3500m ²	3	7
3.500m ² < 10.000m ²	3	5
10.000 <	3	3

The surface condensation risk can be evaluated using the methods in BRE IP 1/06 and the surface temperature factors (f-values) given in design details. 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 surface condensation.

Typical Psi values (ψ) and f-values for various construction detail junctions are shown in the table. For more information, contact SIG technical.

The steel liner is inherently impermeable. Laps, perimeters, penetrations etc. are sealed using durable and effective pre-formed sealants. The flexibility of liner profiles mean that the profiles accommodate structure tolerances.

The flexible insulation is under compression and fitted to minimise any gaps.

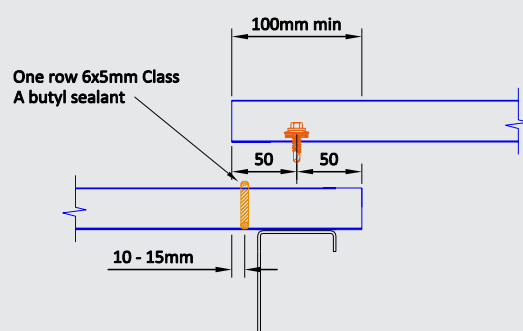
The SIG Technical Team can advise on methods of reducing the risk of condensation at the detail stage.

Construction detail	CAD Detail reference	Psi value ψ W/mK	f-value
		linear thermal transmittance	surface temperature factor
Eaves, external gutter	SIG-GEM-RIDGE-001	0.02	0.95
Dual pitch ridge	SIG-GEM-VERGE-001	0.03	0.95
Verge	SIG-GEM-EAVES-001	0.03	0.95
Insulated valley gutter	SIG-GEM-VALLEY-001	1.26*	0.73*
Boundary wall insulated gutter	SIG-GEM-EAVES-ABUTMENT-001	0.69	0.49

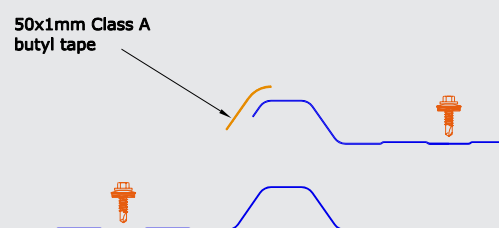
Notes: * = Value is for one side of the valley gutter, use twice the value for a full gutter.
For cad details and other detailing assistance, contact SIG technical.

Side and end lap fastener and seal details

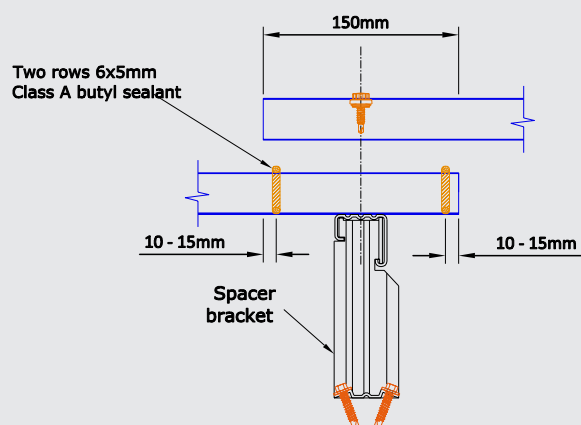
End lap - Liner



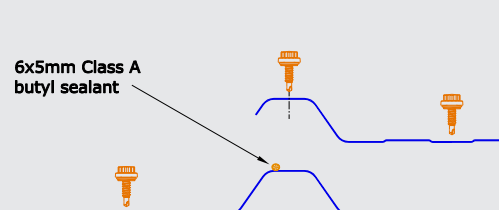
Side lap - Liner



End lap - Top sheet



Side lap - Top sheet



GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

Durability and Guarantees

When you specify an SIG Gemello twin skin system 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 material and system integrity guarantees on the market.

Durability

The durability of a roof or wall system is primarily the life expectancy of the external paint finish. The manufacturers of pre-coated steel coil provide life expectancy information expressed as the guarantee period. The life expectancy of a paint finish will exceed the guarantee period and can be extended by over-painting if or as required. Refer to p 28 for a table of material coating life expectancies and guarantee periods.

The external sheet paint finish should be selected in relation to:-

- Desired colour
- Building location
- Life expectancy
- Guarantee requirements

Standard liner material is suitable for normal dry and unpolluted internal environments. For other conditions, contact SIG technical.

Every building owner has a duty of care towards their building and this includes inspecting and maintaining the external roof and wall cladding.

The roof should be visually inspected regularly by the client at defined intervals, which should be at least once per year, and after severe storms. Where practicable, roofs should be inspected avoiding the need to walk on the roof. Any existing roof should be treated as fragile, unless evidence is available to the contrary. Appropriate safe methods of working at height should be undertaken.

Most wall cladding can be inspected from the ground, however in situations such as elevation changes or hidden abutments these should be inspected at the same time as the roof.

A typical annual inspection check list is shown on p 47 in the Aftercare, Inspection and Maintenance section.

In some coastal and industrial areas, where cladding is sheltered directly beneath a soffit or where there is a lack of rain wash, it may be necessary to increase the inspection schedule periodically, due to the aggressive environment and to remove potentially corrosive deposits from the cladding surface.

Gemello System Integrity Guarantee

The system Integrity Gemello Guarantee can be applied to all correctly specified and correctly installed Gemello twin skin systems at the completion of the installation.

The Gemello Integrity guarantee offers guarantee periods for 12, 25 or 30 years.

The Guarantee periods are determined by the approved components used in the twin skin system. Essentially the material type of the fasteners, the fillers and sealants must be correct to the required Guarantee period and supplied by SIG. Rooflights are also included in the Integrity Guarantee and must also be correctly specified.

For more information regarding the correct component materials please refer to the "Fasteners and sealants" section (p 32) or contact the SIG technical team.

In addition to the Gemello Integrity Guarantee there is also the material Guarantee that applies to the coating of the outer cladding sheet. The coating guarantee period depends on the colour range and coating material selected. Refer to the material guarantees section (p 28).

Both the Gemello Integrity Guarantee and Material Guarantee periods are identified within the NBS by the Gemello code. The first part is the Gemello Integrity Guarantee period and the second is material Guarantee period. A Gemello 30/40 NBS would have a 30 year Gemello Integrity Guarantee with a 40 year material Guarantee.

When the material Guarantee period is less than the Gemello Integrity Guarantee period, the material coating will require maintenance and may require repainting to extend the life expectancy of the material.

With the Gemello Integrity Guarantee, all applications within 2km of the sea are classed as coastal.

Both the Gemello Integrity Guarantee and Material Guarantee must be applied for through SIG. The Gemello Integrity Guarantee must go through the application

Gemello NBS Guarantee references

Twin Skin Systems – Guarantee Identification Matrix					
		Material maximum coating guarantee period (conditions apply)			
		40 Years	30 Years	25 Years	15 Years
Coatings	Colorcoat HPS200 Ultra® Confidex	✓	✓	✓	✓
	Colorcoat Prisma® Confidex		✓	✓	✓
	Leathergrain			✓	✓
SIG System Integrity Guarantee	Gemello 30	Gemello 30/40	Gemello 30/30	Gemello 30/25	Gemello 30/15
	Gemello 25	Gemello 25/40	Gemello 25/30	Gemello 25/25	Gemello 25/15
	Gemello 12	Gemello 12/40	Gemello 12/30	Gemello 12/25	Gemello 12/15

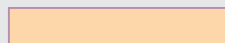
Notes: "Gemello 30 / 40":

30 = 30 year system integrity guarantee period

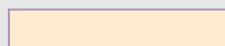
40 = 40 year material coating guarantee period.



Cladding material life expectancy exceeds the SIG Gemello Integrity Guarantee period. Standard inspection & maintenance regimes apply.



Cladding material life expectancy matches or exceeds the SIG Gemello Integrity Guarantee period. Standard inspection & maintenance regimes apply.



Cladding material life expectancy is less than the SIG Gemello Integrity Guarantee period. Cladding may require re-painting to maintain the aesthetics and durability of the outer sheet. Standard inspection & maintenance regimes apply.

Materials

SIG Gemello profiles are manufactured from pre-coated steel finished with one of the coatings listed in the table.

Coating Specifications				
Coating	Thickness	Agreement	Description	Applications
Colorcoat HPS200 Ultra®	200µm	BBA:91/2717:ps8	Colorcoat HPS200 Ultra® is the most durable pre-finished steel product on the market and offers unrivalled performance. Colorcoat HPS200 Ultra® has the unique Scintilla embossing on the facing side, a durable backing coat to the reverse face and a GalvalloyTM (95% zinc / 5% aluminium) substrate. This provides the protection that make the extensive Confidex® 40 year Guarantee possible, including cut edges. Colorcoat HPS200 Ultra® is maintenance free during the guarantee period and does not need a yearly inspection.	Roofs and walls in all environments including severe industrial and coastal/marine.
Colorcoat Prisma®	50µm	BBA:91/2717:ps2	Colorcoat Prisma® is a high build coating giving the best combination of aesthetic quality and durability available. Colorcoat Prisma® is available in 12 metallic colours, 12 solid colours and 3 matt colours. Colorcoat Prisma® offers a superior lifespan thanks to the GalvalloyTM substrate (95% zinc and 5% aluminium). Colorcoat Prisma® has a Confidex® material guarantee for up to 30 years, including cut edges.	Roofs and walls in all environments including severe industrial and coastal/marine, especially where metallic and other exclusive colours are wanted.
Leathergrain	200µm	N/A	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.
Liner	15µm	N/A	A 15µm bright white polyester paint finish intended for internal applications in dry and unpolluted environments. Liner has a high performance polyester reverse side coating.	Liner to roofs and walls in dry and unpolluted environments.

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: DESIGN DATA

- The SIG Gemello Integrity Guarantee is between SIG and the building owner. All materials and components that have been installed must be registered with SIG for a component audit as part of the Guarantee application process.
- SIG will register the material guarantee unless it is the Tata Confidex material coating guarantee which is directly between the building owner and Tata and must be registered by the building owner via the Tata Confidex application website.
- Should the ownership of the building change then both SIG and the relevant subcontractor must be informed of the change of ownership.
- Should the purpose of the building change then both SIG and the relevant subcontractor must be informed of the change.
- The Gemello Integrity Guarantees do not cover the effects of the accumulation of dirt and debris on areas that are not exposed to washing by rainfall. Maintenance records for these areas must clearly demonstrate that these areas have been washed at least annually.
- SIG must be informed by the guarantee holder within 48 hours of the discovery of any defect or failure of the cladding. SIG or its agents must be given reasonable opportunity to inspect the cladding. Notification must include any details required by SIG or its agents to enable traceability of data relating to the materials involved.
- The Gemello integrity guarantee does not cover the material coating of the outer cladding t-this is covered by a separate material coating warranty.

A typical annual inspection check list is shown on p47 in the Aftercare, Inspection and Maintenance section.

Material Coating Guarantees

Material guarantees up to forty years are available subject to coating type and building location, protecting your building across a range of environments:

- Roof pitch – the guarantee covers pitches down to 4°.
- 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 material guarantee.
- Inland and coastal applications included.

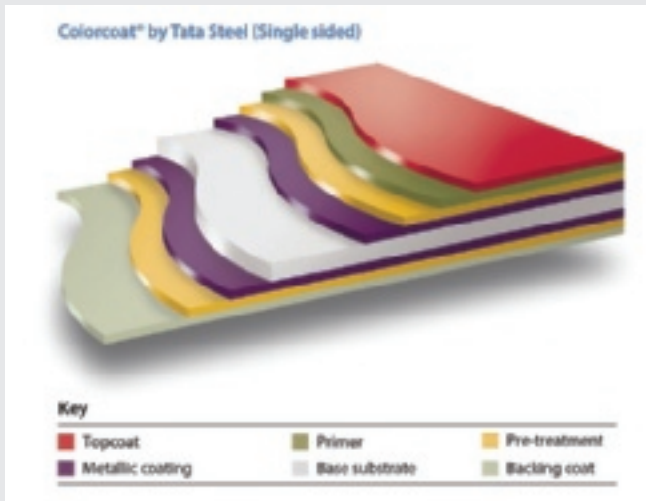


Image courtesy Tata Steel UK Limited

Coating guarantee period/life expectancy ^a - external applications					
Material	Colour range	Inland Roof	Inland Wall	Coastal Roof ^b	Coastal Wall ^b
Colorcoat HPS200 Ultra® (Confidex)	Signature	40 years	40 years	30 years (1km)	30 years (1km)
Colorcoat HPS200 Ultra® (Confidex)	Classics and matt	30 years	40 years	25 years (1km)	30 years (1km)
Colorcoat Prisma® (Confidex)	Solid and metallic	30 years	30 years	25 years (1km)	25 years (1km)
Colorcoat Prisma® (Confidex)	Matt	25 years	25 years	20 years (1km)	20 years (1km)
Leathergrain	Class 1	25 years	30 years	20 years (2km)	25 years (2km)
Leathergrain	Class 2	20 years	25 years	15 years (2km)	20 years (2km)

Note a: The "guarantee period" shown is the maximum material guarantee period and applies to the weather side only. The life expectancy of the material will exceed the guarantee period.

Note b: The figure in () are the coastal distances for the outer cladding material. The Gemello integrity guarantee has a distance of 2km from the sea for coastal locations.

Acoustics

A strong benefit of Gemello twin skin roof and wall systems is the inherent acoustic performance potential in terms of sound insulation, sound absorption and rain noise.

Due to the two steel skins and the flexible mineral fibre insulation material, twin skin constructions can provide an excellent acoustic performance in relation to their light weight.

In addition, the ability to engineer the system design to meet specific project acoustic requirements means that for example, low frequency response can be boosted by the inclusion of cementitious boards or a limp mass membrane. The acoustic engineer can adapt a system to suit his particular project needs.

SIG technical are able to assist in this process by modelling

the predicted acoustic performance for a specific construction using software developed by the MCRMA and Salford University. The unique software uses leading acoustic research and algorithms to model the predictive acoustic response of metal roof and wall systems.

If project specific laboratory certified acoustic test data is required, contact SIG technical for assistance and guidance.

Sound Insulation: The control of sound passing into or out of a building, often referred to as sound reduction, sound insulation or sound attenuation.

The typical measure of sound insulation performance is the weighted Sound Reduction Index (SRI) R_w , measured in dB.

Typical R_w values by insulation type, thickness and U value

Roof systems: Insulation thickness mm/ R_w value dB					
	Glass fibre quilt				Rock fibre quilt
U-value	$\lambda 0.040$ W/mK	$\lambda 0.037$ W/mK	$\lambda 0.035$ W/mK	$\lambda 0.032$ W/mK	$\lambda 0.040$ W/mK
0.25 W/m ² K	180mm/36dB	170mm/36dB	160mm/37dB	150mm/38dB	180mm/36dB
0.20 W/m ² K	230mm/37dB	210mm/37dB	200mm/38dB	190mm/39dB	230mm/37dB
0.18 W/m ² K	250mm/37dB	240mm/37dB	230mm/38dB	210mm/39dB	250mm/38dB
0.16 W/m ² K	290mm/38dB	270mm/38dB	250mm/38dB	240mm/39dB	290mm/38dB
0.15 W/m ² K	n/a	290mm/38dB	270mm/38dB	250mm/39dB	n/a
0.14 W/m ² K	n/a	n/a	290mm/39dB	270mm/39dB	n/a

Notes:

Roof systems

Table shows insulation thickness mm / R_w value dB
24mm to 32mm external profile depths, 0.7mm steel
30mm to 32mm liner profile depths, 0.7mm steel

Bar and bracket spacer, 1m bracket centres

1.5m purlin spacings

For other build ups, contact SIG technical

n/a = data not available, contact SIG technical

Wall systems: Insulation thickness mm/ R_w value dB					
	Glass fibre quilt				Rock fibre quilt
U-value	$\lambda 0.040$ W/mK	$\lambda 0.037$ W/mK	$\lambda 0.035$ W/mK	$\lambda 0.032$ W/mK	$\lambda 0.040$ W/mK
0.25 W/m ² K	180mm/34dB	170mm/34dB	160mm/35dB	150mm/36dB	180mm/35dB
0.20 W/m ² K	230mm/36dB	220mm/36dB	210mm/37dB	190mm/37dB	230mm/37dB
0.18 W/m ² K	260mm/37dB	240mm/37dB	230mm/38dB	220mm/38dB	250mm/38dB
0.16 W/m ² K	290mm/38dB	280mm/38dB	260mm/38dB	240mm/38dB	290mm/39dB
0.15 W/m ² K	n/a	290mm/38dB	280mm/39dB	260mm/39dB	n/a
0.14 W/m ² K	n/a	n/a	300mm/39dB	280mm/39dB	n/a

Notes:

Wall systems

Table shows insulation thickness mm / R_w value dB
24mm to 32mm external profile depths, 0.7mm steel
17mm to 20mm liner profile depths, 0.4mm steel

Bar and bracket spacer, 1m bracket centres

1.5m purlin spacings

n/a = data not available, contact SIG technical

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

Twin skin systems can be engineered to improve on this good performance leading to R_w values around 55dB by the inclusion of modified insulation, boards or limp mass membranes.

Any modifications must maintain the principles of achieving the U-value required, being durable and being practical to install.

A rule of thumb is that a 5dB increase in R_w represents a halving of the sound energy able to pass through. An $R_w = 45$ dB partition will allow half as much sound energy to pass through as an $R_w = 40$ dB partition.

Sound Absorption: The control of reverberation within a building space to suit the activity taking place...theatre, teaching, sports etc.

The typical method to provide sound absorption is to use a pan-perforated liner panel. This is a 0.7mm steel liner panel with perforations to the broad pan, tissue faced acoustic batts and a robust vapour control layer/ air barrier.

This method can be extremely effective and can have a Class A sound absorption coefficient (ie the best rating).

Note though that the inclusion of a perforated layer can reduce the overall sound insulation (R_w) performance while improving the user comfort within the building space.

The vcl in a perforated liner acoustic system is a key component. It is the barrier to vapour and moisture and is the air barrier and subject to building air leakage testing.

The vcl membrane has to be robustly sealed at laps, perimeters and to all penetrations.

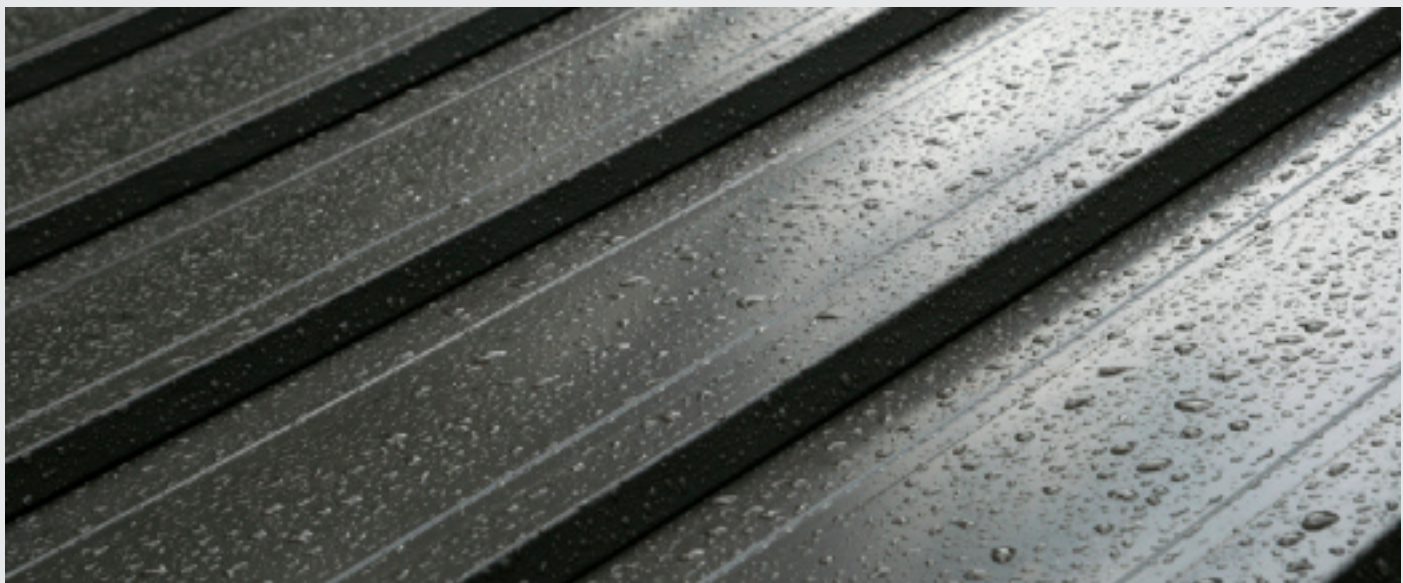
Often a self-adhesive foil backed membrane is more tolerant of installation and foot traffic, and easier to seal well at all interruptions.

For more information on perforated liner acoustic systems, speak to SIG technical.

Rain noise: When heavy rain falls onto a roof it generates a loud impact noise on the outer sheet that can be transferred to the internal environment. This applies to all lightweight roofs, not just metal roofing. In large spaces this can be intrusive especially if the space is used for communication, teaching etc.

Rain causes an impact on the roof surface and the best way to control this is by the use of an absorbent flexible insulation material. The fibrous nature of the insulation absorbs sound energy emanating from rain impact on the external skin, reducing the sound reaching the inside of the building.

The test measure of rain noise is the L_{IA} value and a typical twin skin steel roof can give $L_{IA}=57$ dB (the lower the value the better). This order of value can be reduced by engineering and the inclusion of limp mass membranes.





Fire

Fire resistance

Gemello twin skin systems are tested and assessed by Exova Warringtonfire, Report WF359820, to BS476:Pt22: 1987 to provide fire barrier performance of 120 minutes integrity and 35 minutes insulation.

The assessment covers all SIG roof, wall and liner profiles in all available material thicknesses (0.7mm and 0.5mm outer sheets, 0.7mm and 0.4mm liners).

The assessed spacer is Techbar and the insulation rock fibre between 160mm and 250mm thick.

Reaction to fire

All Gemello twin skin systems use glass or rock based mineral fibre insulation. Besides being integral to the thermal and acoustic performance of a system, mineral wool insulation is a truly non-combustible product achieving Euroclass A1 to BS EN 13501-1, ie the best rating.

Material Fire properties

Material	Thickness	Reaction to Fire	External fire performance:	External fire exposure test	Building Regulations
Standards and Regulations		BSEN 13501-1:02:	BS EN 13501-5:02: External roof fire performance. Building Regs E&W:AD – B: Appendix A, table A5. Building Regs NI: Technical Booklet E, table 4.6	BS476-3:58 Building Regs E&W:AD – B:	Approved Document AD-B
Colorcoat HPS200 Ultra®	200µm	C-s2,d0	"Notional class Broof(t4) (table A5) Broof(t1,2,3). Commission Decision 2005-403 EC"	Notional class AA (table A5)	Class 0
Colorcoat Prisma®	50µm	A2-s1, d0	Deemed to satisfy without further testing as per Commission Decision 2000-553 EC	AA	Class 0
Liner	15µm	A1	Deemed to satisfy without further testing as per Commission Decision 2000-553 EC	N/A	Class 0
Glass fibre insulation		A1			
Rock fibre insulation		A1			

Fire Wall

Exova Warringtonfire	Reports WF150032 issue2 and WF359820
Integrity	120 minutes
Insulation	35 minutes
Outer profiles	AS24/1000 R, AS24/1000 W, AS30/1000 R, AS30/1000 W, TF32/1000 R, TF32/1000 W, URP32/1000 R, URP32/1000 W, URP34/1000 W, URP34/1000 R
Outer profile material thicknesses	0.5mm, 0.7mm
Liner profiles	AS30/1000 L, AS20/1000 WL, TF32/1000 L, TF17/1000 WL, URP32/1000 L, URP20/1000 WL
Liner profile material thicknesses	0.7mm, 0.4mm
Insulation type	Rockwool 23kg/m³
Insulation thicknesses	160mm - 250mm

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **DESIGN DATA**

Fasteners and sealants

The Gemello Integrity guarantee required will dictate the selection of fasteners, sealants and fillers, refer to the tables below.

If the project is coastal (within 2km of the sea), or if you need to clarify anything, seek guidance from SIG technical.

Fasteners are generally self-drilling and tapping screws with bonded rubber sealing washers and, for external applications, integral colour matched heads. Washer diameters are selected for the application

(refer to the components table).

Colour heads can be low profile dome heads or moulded plastic heads.

Fasteners for rooflights should be a poppy red colour to distinguish the rooflight locations on a roof, a safety aid for people accessing the roof.

Refer to the Construction Details section for fastener and sealant locations p34

Accessory components minimum specifications		
Gemello 30 (Inland and coastal locations (within 2km of the sea) / Gemello 25 (Coastal locations (within 2km of the sea)		
Application	Components	Description
Outer Fixings	Main fixing	Grade 316 / A4 Stainless Steel, ROOF: Ø19 washer, WALL: Ø16washer, integral coloured head
	Stitcher	Grade 316/ A4 Stainless Steel, Ø16 washer, integral coloured head
Inner Fixings	Liner, spacer fixing	Grade 316/ A4 Stainless Steel, Ø16 washer
	Stitcher if specified	Grade 316/ A4 Stainless Steel, Ø16 washer
Fillers	Ridge / eaves filler	30kg/m ³ Closed cell, cross linked flexible polymers
Sealants	Top sheet End lap	6 x 5 Class A Butyl Sealant
	Top sheet Side lap	6 x 5 Class A Butyl Sealant
	Liner End lap	6 x 5 Class A Butyl Sealant
	Liner Side lap	50mm x 1mm Class Butyl Tape
	Fillers Embedment	Gun applied Butyl Sealant

Accessory components minimum specifications		
Gemello 25 (Inland locations only)		
Application	Components	Description
Outer Fixings	Main fixing	Grade 304 / A2 Stainless Steel, ROOF: Ø19 washer, WALL: Ø16washer, integral coloured head
	Stitcher	Grade 304/ A2 Stainless Steel, Ø16 washer, integral coloured head
Inner Fixings	Liner, spacer fixing	Grade 304/ A2 Stainless Steel, Ø16 washer
	Stitcher if specified	Grade 304/ A2 Stainless Steel, Ø16 washer
Fillers	Ridge / eaves filler	30kg/m ³ Closed cell, cross linked flexible polymers
Sealants	Top sheet End lap	6 x 5 Class A Butyl Sealant
	Top sheet Side lap	6 x 5 Class A Butyl Sealant
	Liner End lap	6 x 5 Class A Butyl Sealant
	Liner Side lap	50mm x 1mm Class Butyl Tape
	Fillers Embedment	Gun applied Butyl Sealant

Gemello 12 guarantee: Accessory components minimum specifications		
Gemello 12 (Inland locations only)		
Application	Components	Description
Outer Fixings	Main fixing	Carbon Steel, ROOF: Ø19 washer, WALL: Ø16washer, integral coloured head
	Stitcher	Carbon Steel, Ø16 washer, integral coloured head
Inner Fixings	Liner, spacer fixing	Carbon Steel, Ø16 washer
	Stitcher if specified	Carbon Steel, Ø16 washer
Fillers	Ridge / eaves filler	30kg/m ³ Closed cell, cross linked expanded polyethylene
Sealants	Top sheet End lap	6 x 5 Class A Butyl Sealant
	Top sheet Side lap	6 x 5 Class A Butyl Sealant
	Liner End lap	6 x 5 Class A Butyl Sealant
	Liner Side lap	50mm x 1mm Class Butyl Tape
	Fillers Embedment	Gun applied Butyl Sealant

Note: Accessories for Gemello guarantee systems must be supplied by SIG. Refer to SIG technical for rooflight specifications

Rooflights

Rooflights for Gemello twin skin roof systems are site assembled triple skin assemblies in a choice of profile weights and fire ratings, depending upon the application and Gemello system guarantee.

Rooflights should be used at design roof pitches of 6° and above, giving a finished pitch of at least 4°.

The selection of material weight is dictated by the non-fragility status and applied loadings. The fixing and sealing methods are critical to long term durability and non-fragility.

SIG rooflights are non-fragile Class B to ACR[M]001 when installed to the specification.

Note that although rooflights are non-fragile, they are not walkable.

GRP rooflights may be used in single skin and double skin site assembled applications and where specified, include insulating intermediate layers to provide improved insulation levels for compliance with current thermal legislation.

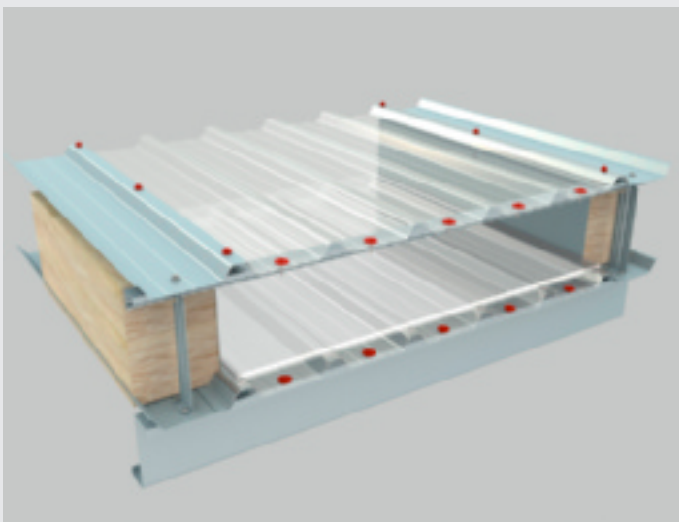
Thermal:

Single skin $U = 5.7W/m^2K$.

Triple skin $U = 1.7W/m^2K$ to $1.3W/m^2K$ depending on the insulating core selected.

Note: Double skin rooflights give $U = 3.0W/m^2K$ with no insulating core and do not comply with Building Regulations.

Lower U values are available on enquiry.



Sealants:

Liner:

The liner should lap onto the liner sheet at all edges, end and side laps

End laps: 100mm overlaps onto metal at up slope and down slope ends. 100mm laps at intermediate purlins.

1 line 6mm bead class A butyl sealant strip 25mm from sheet edge.

Side laps: Seal using 1 line 50mm x 1mm Class A butyl/foil side lap sealant over side lap

External sheet:

End laps: 150mm, 2 lines 5x6mm Class A butyl sealant either side of the fixing line plus an optional run of clear low modulus, acetoxysilicone 10 – 15mm from the outer sheet edge.

Side laps: one full rib overlap, 1 line 5x6mm Class A butyl sealant. The side lap can be over/over or over/under (note that GRP onto metal is always preferred).

Fasteners:

Fasteners are to be stainless steel grade 304/A2 or 316/A4, to match the liner and top sheet fastener specifications.

Washers are min 29mm diameter and poppy red colour (for safety).

Liner:

End laps and intermediate supports: 5No/m (max 200mm) positioned 50mm from the sheet edge (ie central in a 100mm end lap). Under sheet edge distance 50mm min.

Side laps: Stitch at max 450mm centres.

External sheet:

End laps and intermediate supports: 5No/m (max 200mm) positioned 75mm from the sheet edge in a 150mm end lap. Under sheet edge distance 50mm min.

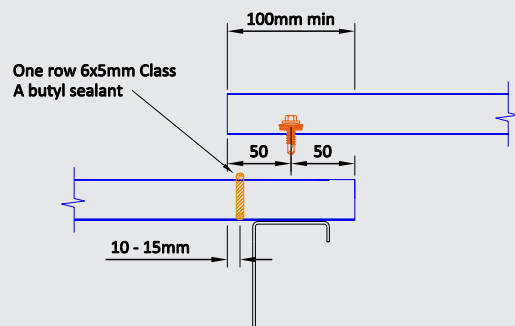
Side laps: $>10^\circ$ stitch at max 450mm centres. $\leq 10^\circ$ stitch at max 300mm centres.

Contact SIG technical for further guidance on rooflight selection and specification.

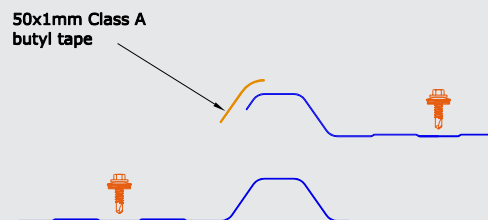
GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **CONSTRUCTION DETAILS**

Profile side and end laps

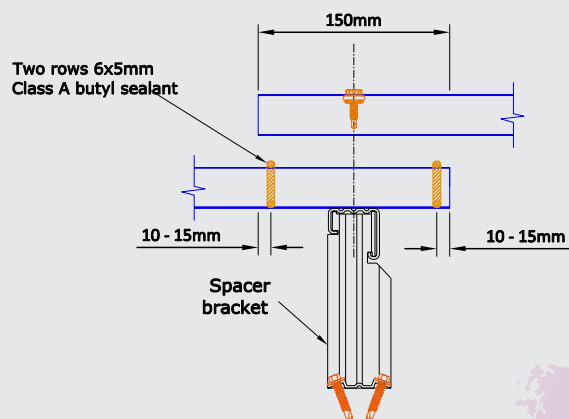
End lap - Liner



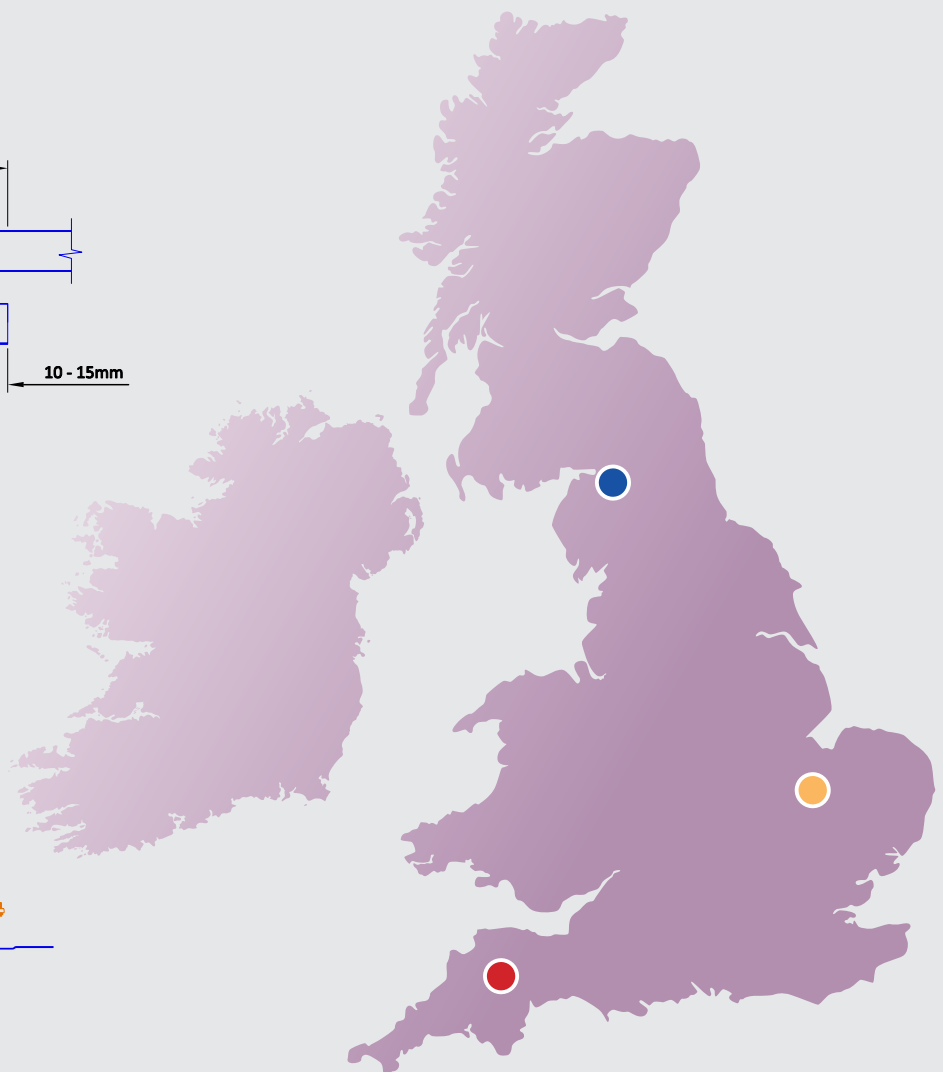
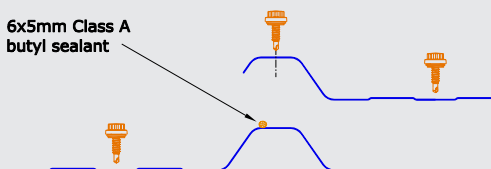
Side lap - Liner



End lap - Top sheet



Side lap - Top sheet



GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **SYSTEM PRODUCTION LOCATIONS**

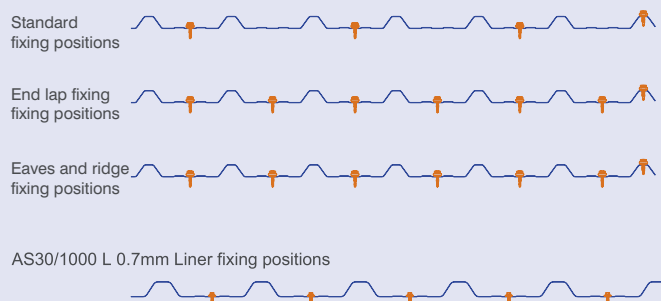
Fastener locations

The fastener locations for all profiles are shown below.

Roof profiles:

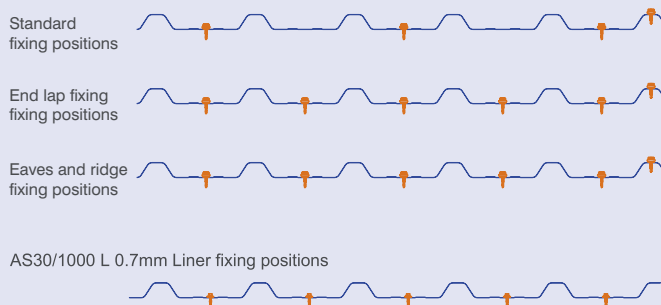
AS24/1000 Roofing Profile

AS24/1000 R: outer roof sheet: fixing guide -



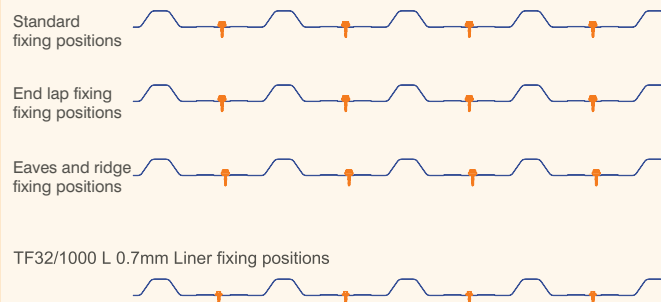
AS30/1000 Roofing Profile

AS30/1000 R: outer roof sheet: fixing guide -



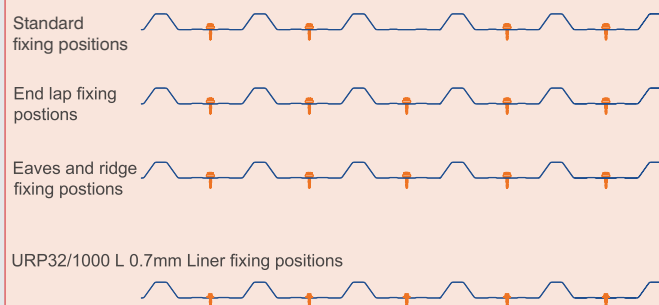
TF32/1000 Roofing Profile

TF32/1000 R: outer roof sheet: fixing guide -



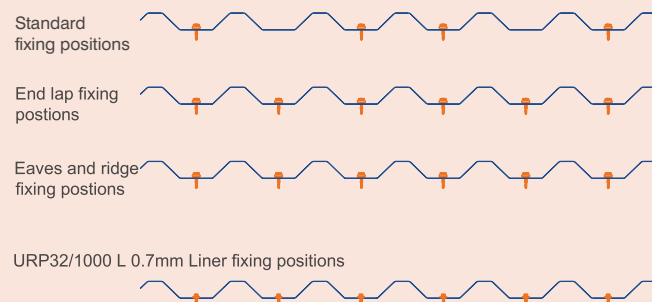
URP32/1000 Roofing Profile

URP32/1000 R: outer roof sheet: fixing guide -



URP34/1000 Roofing Profile

URP34/1000 R: outer roof sheet: fixing guide -



GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: CONSTRUCTION DETAILS

Fastener locations

The fastener locations for all profiles are shown below.

Wall profiles:

AS24/1000 Wall Profile

AS24/1000 W: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

AS20/1000 WL 0.4mm: Standard fixing position: WALL ONLY



AS20/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



AS30/1000 Wall Profile

AS30/1000 W: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

AS20/1000 WL 0.4mm: Standard fixing position: WALL ONLY



AS20/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



AS18/990 S Wall Profile

AS18/990 S: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

AS20/1000 WL 0.4mm: Standard fixing position: WALL ONLY



AS20/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



AS18/762 S Wall Profile

AS18/762 S: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

AS20/1000 WL 0.4mm: Standard fixing position: WALL ONLY



AS20/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



AS18/610 S Wall Profile

AS18/610 S: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

AS20/1000 WL 0.4mm: Standard fixing position: WALL ONLY





AS20/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



TF32/1000 Wall Profile

TF32/1000 W: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

TF17/1000 WL 0.4mm: Standard fixing position: WALL ONLY



TF17/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



TF18/1067 S Wall Profile

TF18/1067 S: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

TF17/1000 WL 0.4mm: Standard fixing position: WALL ONLY



TF17/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



TF18/610 S Wall Profile

TF18/610 S: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

TF17/1000 WL 0.4mm: Standard fixing position: WALL ONLY



TF17/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



URP32/1000 Wall Profile

URP32/1000 W: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

URP20/1000 WL 0.4mm: Standard fixing position: WALL ONLY



URP20/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY



URP34/1000 Wall Profile

URP34/1000 W: outer wall sheet: fixing guide -

Standard fixing positions 

End lap fixing positions 

URP20/1000 WL 0.4mm: Standard fixing position: WALL ONLY

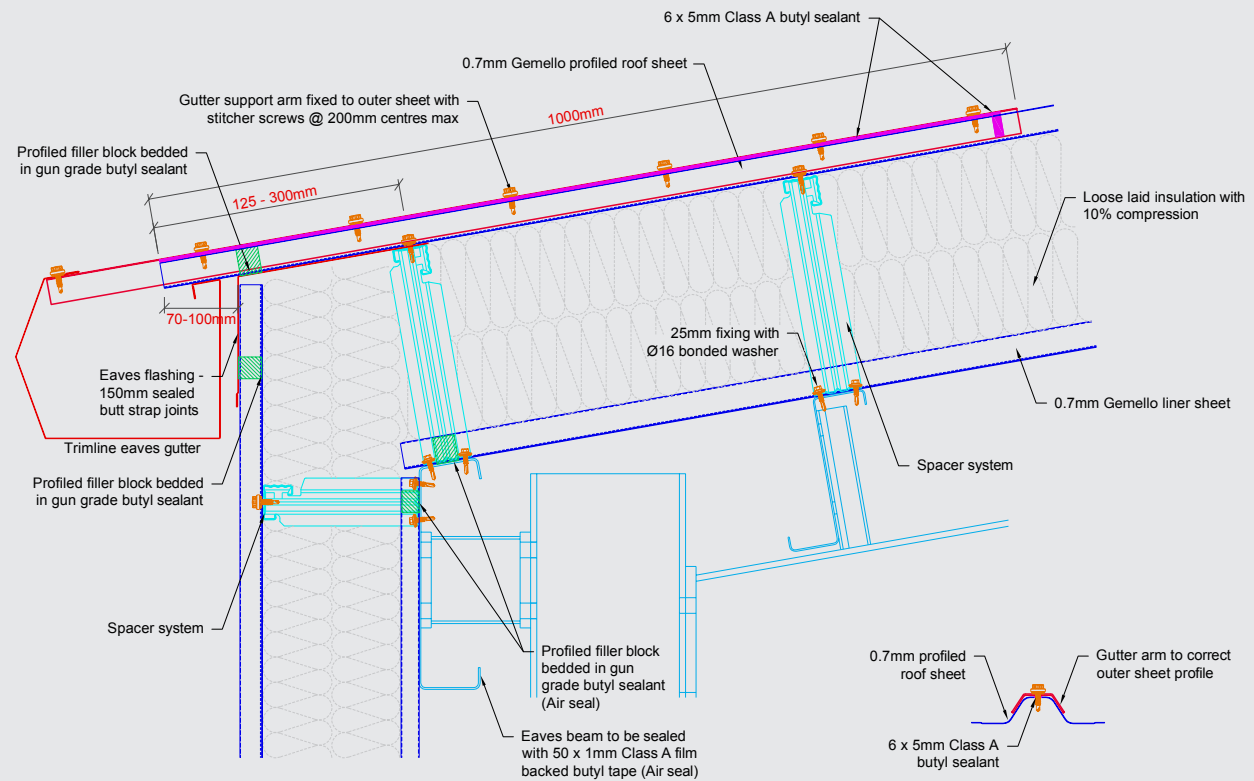


URP20/1000 WL 0.4mm: End lap, ridge and eaves fixing positions: WALL ONLY

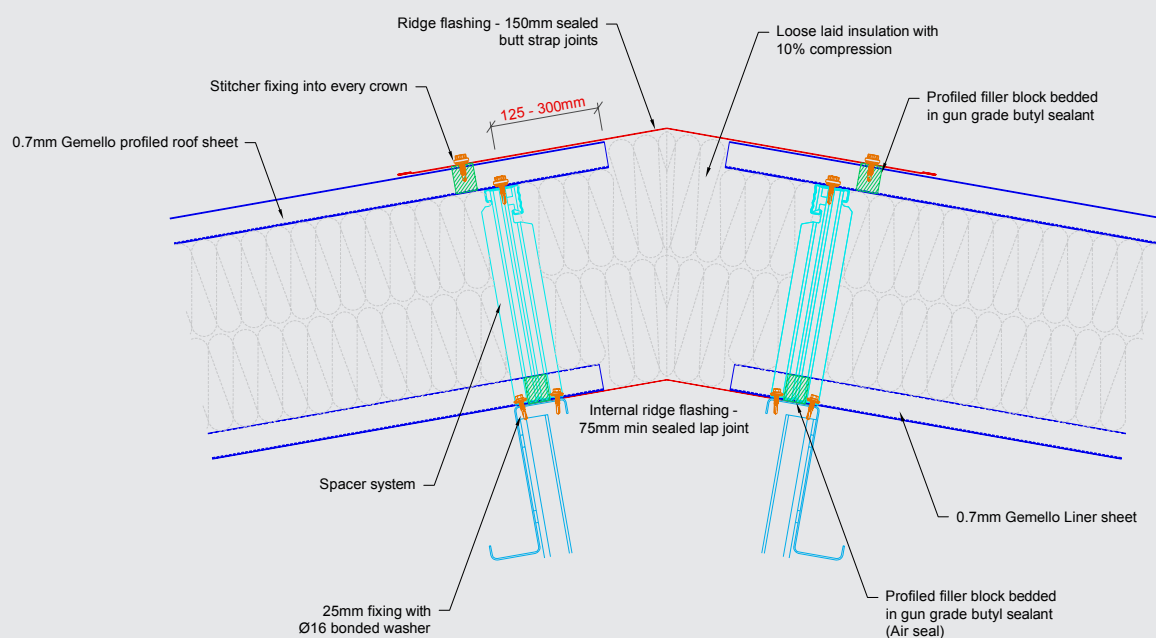


GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **CONSTRUCTION DETAILS**

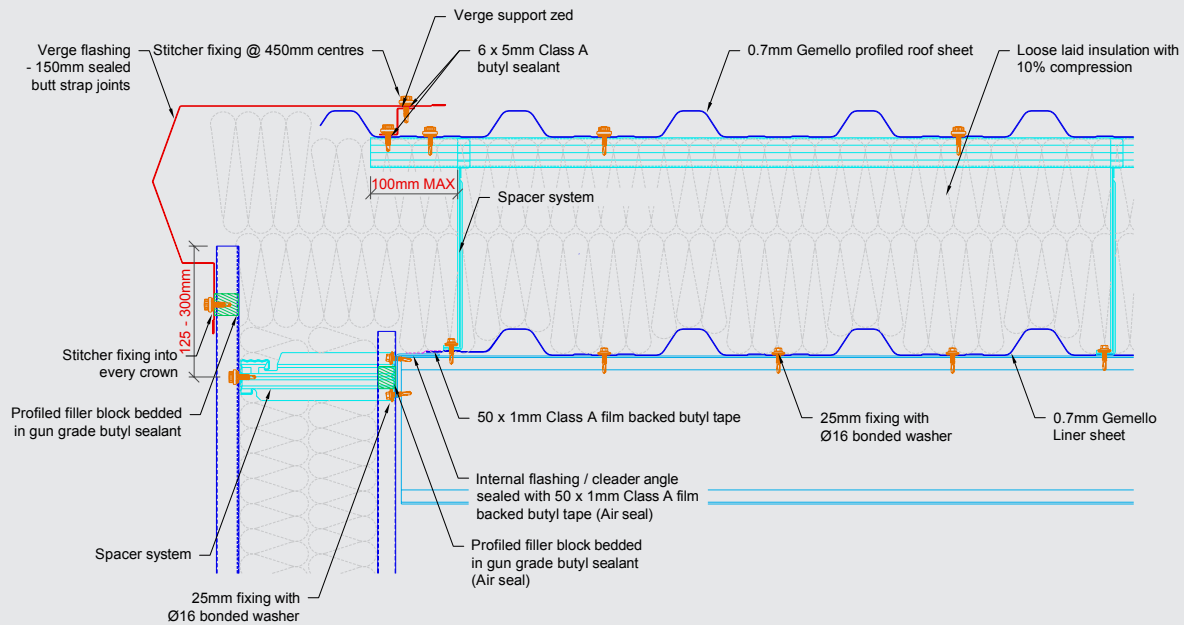
Eaves: External Gutter



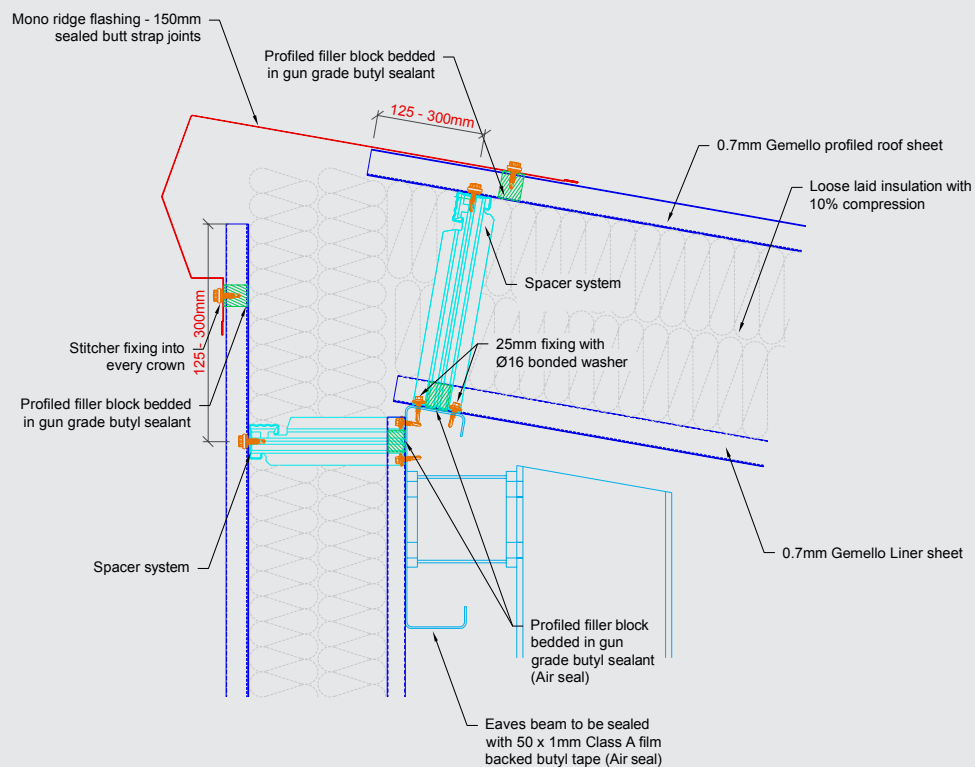
Dual Pitch Ridge



Verge



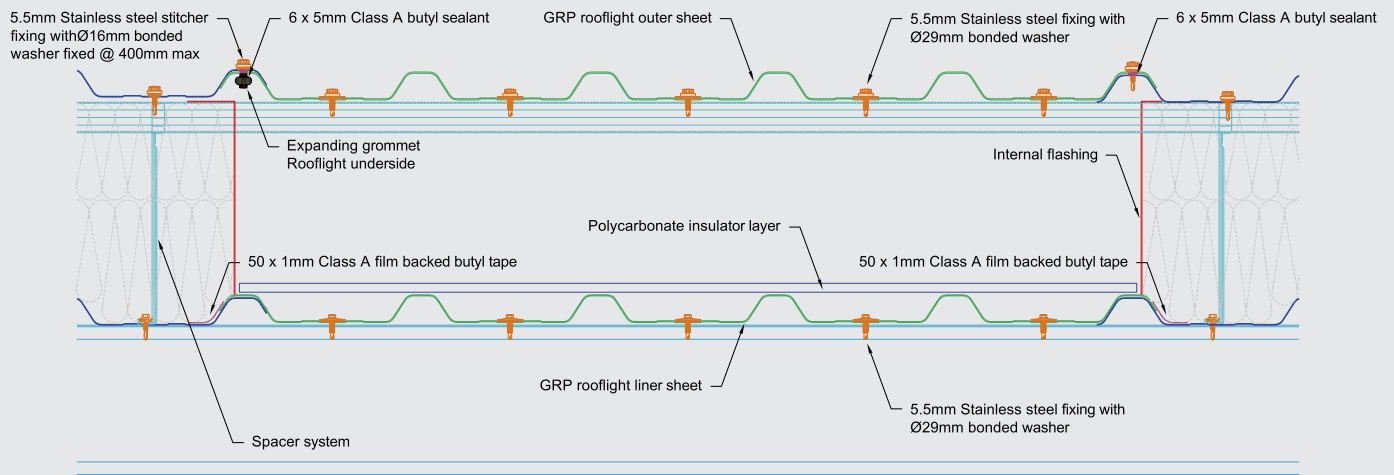
Mono Pitch Ridge



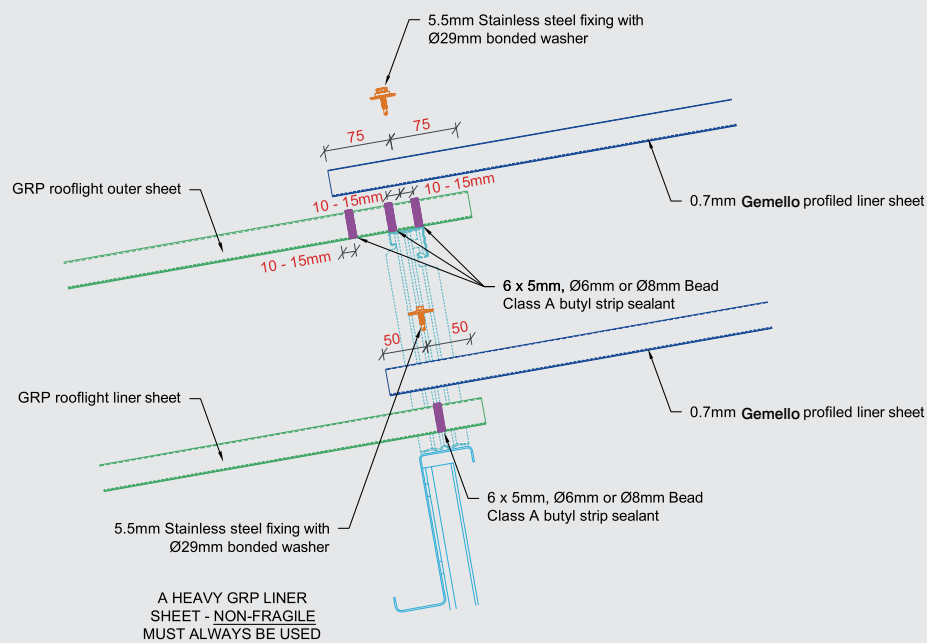
Valley Gutter



Rooflight: Side Lap

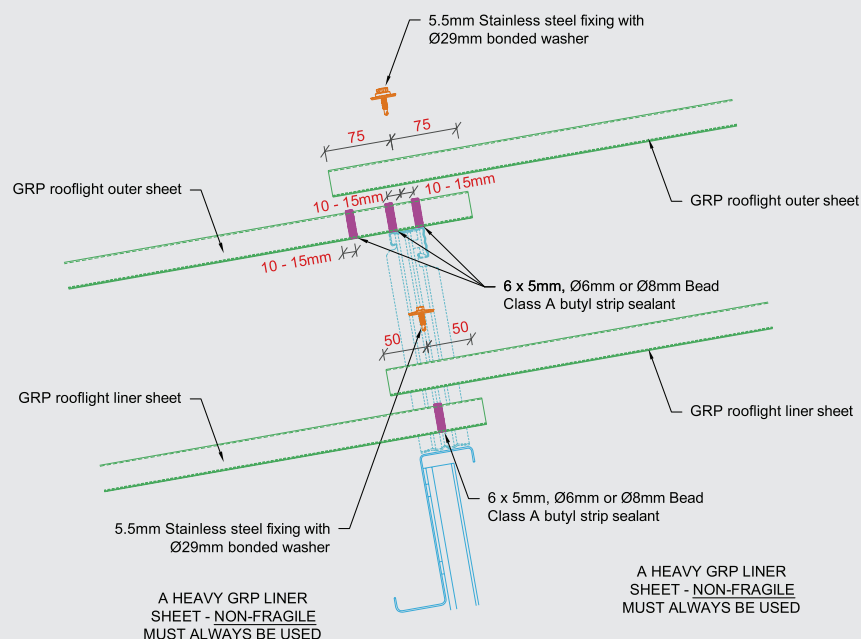


Rooflight: Top End Lap

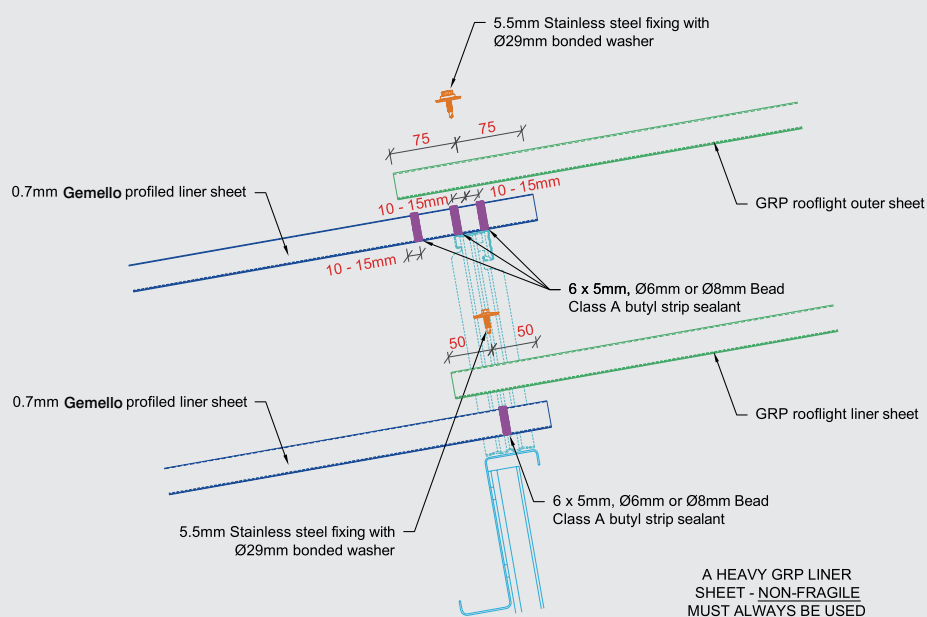


GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **CONSTRUCTION DETAILS**

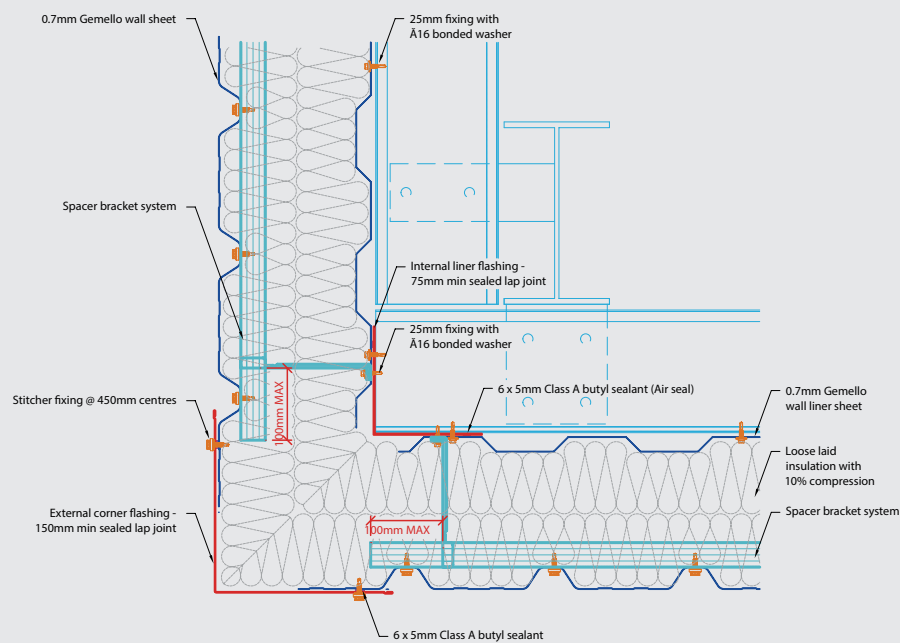
Rooflight: Intermediate Lap



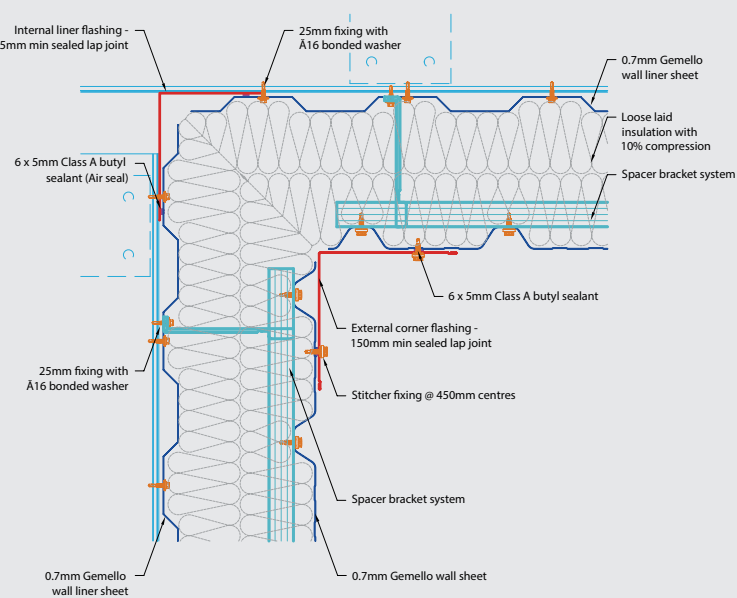
Rooflight: Bottom End



Wall Corner: Vertical Cladding

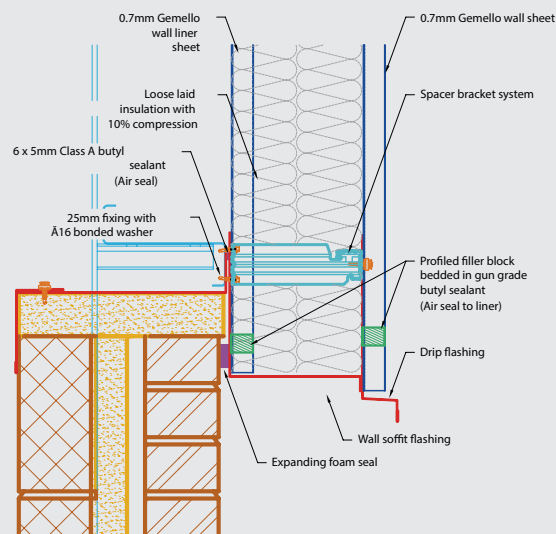


Wall Corner: Horizontal Cladding

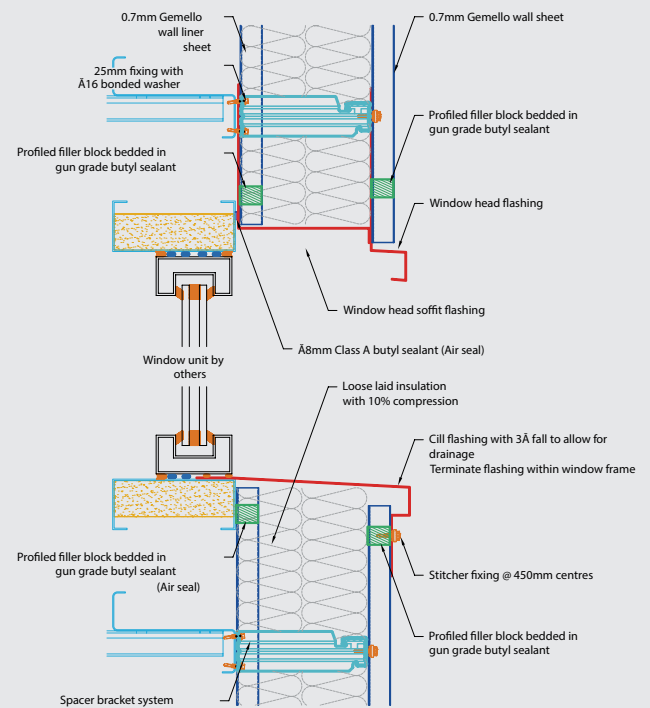


GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **CONSTRUCTION DETAILS**

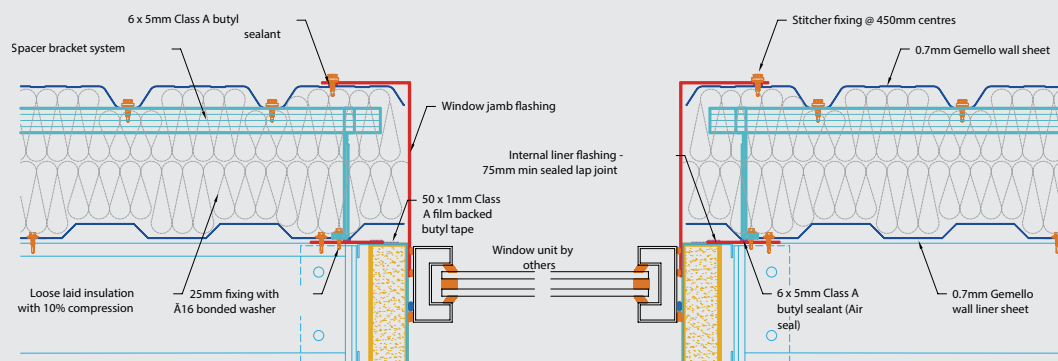
Wall Opening:
(Vertical Cladding) Jamb



Wall Opening:
(Vertical Cladding) Head



Wall Opening: (Vertical Cladding) Cill





GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **SITE GUIDANCE**

Installation Guides

The installation of Gemello twin skin systems is covered separately in Installation Guides for each profile, available from your manufacturer, on-line or from SIG technical.

Handling and storage

Profiles are delivered to site in plastic banded packs.

Packer sheets are used at the bottom of the packs to provide protection and the ends of packs are wrapped with plastic.

Maximum pack weight 2.3t.

The packs can be off-loaded directly to the roof (positioned over the rafter locations) or to a storage area which should be dry and protected from site traffic. Packs should be covered and stacked to drain using suitable wooden bearers placed above each other and to create a fall.

Handle profiles carefully to avoid marking weather sheets.

Lift sheets from the pack – do not drag them.

Observe site health and safety procedures, method statements and manual handling requirements.

Preparation

Gemello twin skin roof and wall systems are designed to be supported by and fixed to steel purlins. Primary steelwork should be within the tolerances given in National Structural Steelwork Specification for Building Construction (NSSS) and BS EN 1090-2:2008 +A1:2011. Secondary steelwork should be within the tolerances of SCI publication P346 “Best Practice for the Specification and Installation of Metal Cladding and Secondary Steelwork”. MCRMA Guidance documents GD 20 “Guidance document on serviceability states and deflection criteria”, GD 24 “Installation of purlins and side rails” and GD27 “Installed tolerances: best practice design guide” offer useful additional information

Before fixing any sheets check the squareness and accuracy of the steelwork.

Lay into the prevailing wind direction if possible so that laps face away from the wind direction.

Inspect packs and record any damage or shortages on the delivery paperwork. Report any damage or shortages to SIG, backed by photos, within 48 hours of delivery.

Cutting

Where profiles have to be cut on site:

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

Aftercare: Inspection and maintenance

The client/building owner must maintain the roof / walls to BS5427, BS7543 and any other relevant British Standards and codes of practice to keep the roof / walls in good order to achieve the best possible performance and durability.

Inspections should be carried out by trained and experienced personnel after a risk assessment and method statement have been prepared. Inspections should occur at least once a year and always after severe storms.

Where practicable, roofs should be inspected from the eaves or gable ends, avoiding the need to walk on the roof.

Annual inspection checklist

Item	Action ^{A)}
Establish a safe method of work	Check that the roof is non-fragile. ^{B)} Check that the safety equipment is tested in accordance BS EN 795 (including safety lines)
Leaks, inspect from inside for location	Repair as soon as possible and do not leave until annual maintenance.
Damage or decay	Repair or replace as necessary.
Accumulated debris, e.g. trapped leaves or pine needles	Clean away.
Gutters and drain pipes clean, and free draining	Clean out.
Gutter joints defective sealant or loose bolts	Repair.
Loose ridge or other flashings	Repair.
Missing foam fillers or evidence of damage by birds	Replace.
Staining caused by ponding or water	Seek advice from a roofing specialist.
Discoloured areas of the surface coating	Inspect the surface coating and attend to any peeling corrosion or other evident deterioration, as necessary.
Discoloured areas around fume extract ducts should be closely inspected	Re-coat without delay where attack of the coating has occurred.
Dirty rooflights	Clean to maintain light transmission.
Evidence of access to the roof e.g. for maintenance of ventilators	Touch-up any scratches in coating.
Missing/faded colour caps from fasteners	Replace.
Missing fasteners	Investigate and replace.
Corroded or degraded fastener (including sealing element)	Seek advice on replacement.
Loose fasteners, e.g. where the washer is not in contact the sheet	Tighten only fasteners that are loose. Investigate the cause.
Sealants visible on roof surface	Seek advice on replacement and suitability of the sealant.

^{A)} Where any defects are discovered, these should be reported to the client. Some of these items might be covered by a product/system guarantee. which should be pursued via the contractual chain.

^{B)} See ACR[M]001 "Red Book" [N1]. ACR[CP]001:2014 "Orange Book" [1] for further guidance on non-fragile roofs (Recommended practice for work on profile sheeted roof) and ACR[CP]002 (Guidance Note for Safe Working on Fragile Roofs, otherwise known as the "Green Book" [30]).

GEMELLO TWIN SKIN ROOFING AND WALLING FROM SIG: **INSTALLATION CHECK LIST**

Site inspection check list		Site:	Date:
Liner	Check ✓	Top sheets	Check ✓
1. Screws have sealer washers		1. 2 runs of 6 x 5mm butyl sealant to end laps, set 10-15mm from sheet ends	
2. 6 x 5mm butyl sealant strip to end laps		2. 150mm end laps	
3. 50mm butyl tape over side laps		3. 1 line 6 x 5mm butyl to side laps, to outside of stitcher screws	
4. 100mm end laps		4. Sealant strips overlap at 4-way junction	
5. End laps fixed in every trough		5. Fixings in every trough at sheet ends	
6. Under profile fillers bedded in sealant		6. Fixings in alternate troughs at intermediate supports	
7. Swarf removed		7. Washers are not dished (ie not over tightened)	
8. Liner sealed at verges, hips, penetrations		8. 19mm dia washers for roofing, 16mm dia washers for walling	
Spacer		9. All fasteners must be the correct material as per the specification (Stainless steel fixings are non-magnetic)	
9. 2No. screws per bracket		10. Fasteners have integral colour heads	
10. Bracket screws have sealer washers		11. Sheet oversail past eaves flashing 50mm min	
11. Max bracket spacing 1m		12. Stitchers at max 450mm centres	
12. Brackets upright		13. Eaves and ridge fillers bedded in sealant to top and bottom	
13. Max distance from bar joggle joint to bracket 100mm		Flashings	
14. Max bar cantilever from bracket at verges 100mm		14. Fixed at 450mm centres at verges and to every crown at ridge	
15. Anti-sway brackets used on brackets over 250mm		15. Ridge filler block set back by 25mm from ridge flashing edge	
Insulation		16. 75mm laps, sealed and fixed at max 100mm centres	
16. Grade of insulation matches specification (thickness and lambda value)		17. Flashings have safety edges	
17. Insulation roll compresses by 10% into the cavity		18. Decktite pipe soakers do not block troughs	
18. Insulation packed around spacer brackets and under bar		19. Filler blocks bedded in sealant.	
19. Minimal gaps in insulation		Rooflights	
20. Insulation dry		20. 29/32mm poppy red fasteners	
21. Insulation not walked on (ie not crushed)		21. Fastener frequency as drawings	
22. All insulation packaging removed from roof		22. Check GRP sheet weight outer sheet against spec	
23. Insulation protected from rain at verges and ridge until flashings installed.		23. Check GRP sheet weight inner sheet against spec	
24. Insulation continuous over ridge and hips		24. Intermediate layer installed	

Note: For full installation guidance please refer to the correct Gemello installation guide for your system.

Notes:

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