

EXTERNAL WALL CONSTRUCTION

THROUGH-WALL INFILL SFS SYSTEMS

Light gauge Steel Frame Systems (SFS) deliver fast, adaptable and cost-effective buildings at multiple storey heights.

"Steel has become the market leading material for this application owing to its quality, speed of installation and design versatility. So, what does 'Through-Wall' actually mean? Through-Wall could be defined as the composite build-up of the external wall of a building using plasterboard, light gauge steel frame, insulation and sheathing board which, when constructed together, provide the primary fire resistance and weather tightness of the wall.

Structural, fire, thermal, acoustic, weather tightness requirements will define the required performance for the elements and products specified in the wall construction. The final choice of cladding must be considered during the design stage to ensure the load can be carried and the correct cavity barrier is specified."

Andrew Way, Associate Director,
SCI The Steel Construction Institute

We offer a portfolio of wraparound systems for non-loadbearing SFS to support you in this fast moving and often complex industry. Our solutions are tested to meet 60, 90 and 120-minute fire both ways on SFS infill and we will work with you to meet your thermal performance requirements. Our systems have been developed and tested with the same rigour and attention to detail that we apply to all our products and systems.

Test data for our specifications can only be used with defined Hadley Steel Framing SFS components. Please contact us through Technical Support at [british-gypsum.com](https://www.british-gypsum.com) to discuss working with other framing suppliers.

External Wall Construction

Introduction

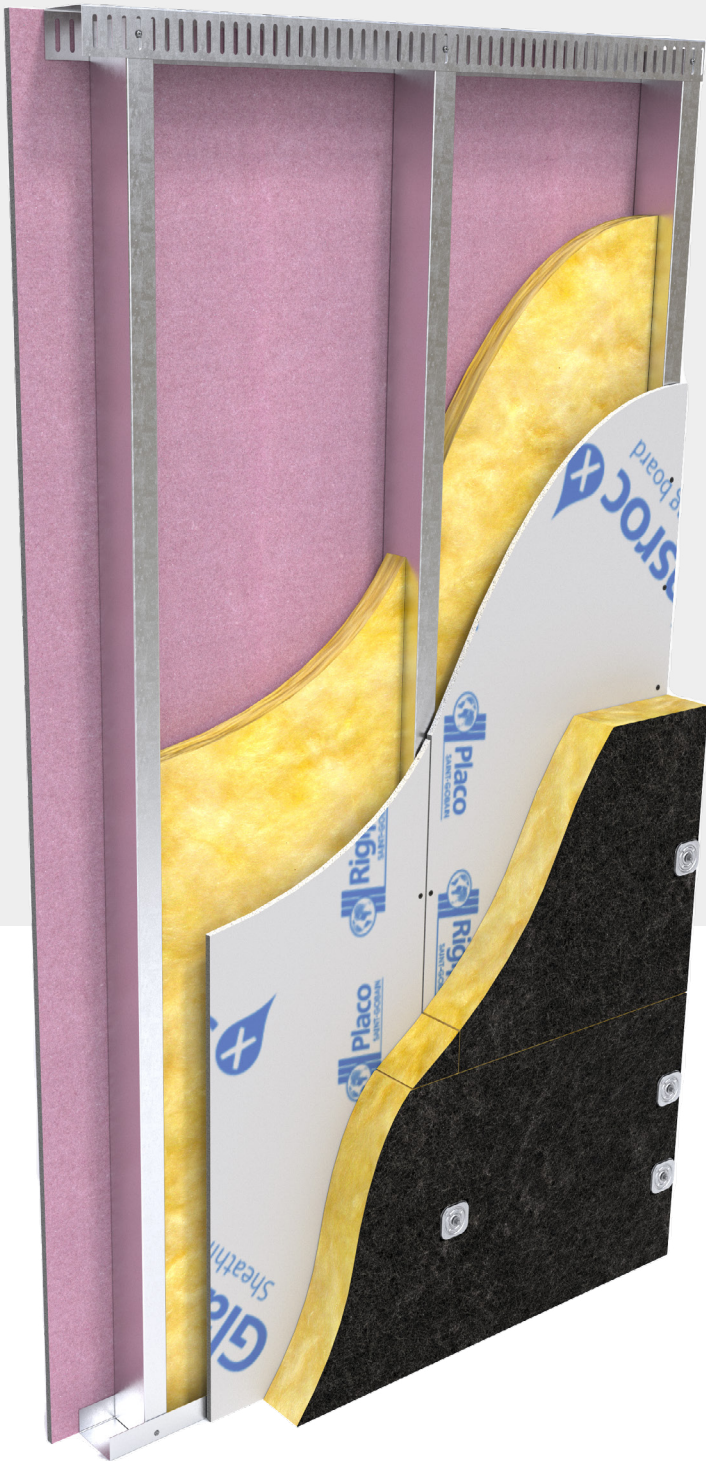
Light gauge steel-framed SFS wraparound solutions to deliver fast, adaptable and cost-effective buildings at multiple storey heights.

Steel-framed construction has grown in popularity particularly in high-rise residential buildings. Traditionally led by steel frame manufacturers, the approach has been based on the design and supply of steel framing. This was then enveloped with plasterboard manufacturers' boards, and supported by a range of test substantiation.

The Finishes and Interiors Sector (FIS) trade association defines three generic types of light steel external wall systems:

- Infill walls
- Continuous walls
- Panelised systems

Our wraparound systems for non-loadbearing SFS are used with infill walls or panelised systems not continuous walls.



Infill walls

The panels for infill walls are generally constructed from individual elements, which are cut to length and installed on site. The panels fit between the elements of the primary structural frame. The panels consist of a bottom track attached to the floor and a head track attached to the underside of the floor above. Vertical light steel C sections are fitted between the head and base tracks, typically at 600mm centres (or reduced to 400 or 300mm where structural design requires closer spacing). In some cases, the panels may be constructed such that they project past the edge of the primary structure

Panelised systems

The panelised system uses prefabricated light steel wall panels, often with insulation and boards attached off-site. These are craned into position and fixed to the primary structural frame.



Our Saint-Gobain Interior Solutions approach

Our approach brings together best-in-class British Gypsum and Saint-Gobain Isover products delivering tested fire, acoustic and thermal performances on non-loadbearing SFS infill systems. This is backed with technical specifications, guidance and advice on specific issues including junctions, abutments and deflection heads – just as we do with all our other products and systems.

GypLyner Xternal is a system that works in conjunction with non-loadbearing SFS to provide a required through-wall performance. We describe these as wraparound solutions for SFS, as our products are 'wrapped around'

the steel frame offering a range of fire, acoustics and thermal performances, supported and backed up by test evidence and technical know-how. The SFS framing components are supplied by others, so structural design responsibilities remain with the framing supplier. GypLyner Xternal systems have been tested on Hadley SFS.

Go to page 11.21 to learn more.



All images are for illustrative purposes only. Refer to technical documents for installation details. Board colours are shown for easy reference. Please ensure they are installed facing in the correct direction.

External Wall Construction

Design considerations

The following details key topics related to SFS construction.

Responsibilities

Performance requirements of the building are the responsibility of the design team in conjunction with the contractor.

Design teams will need to satisfy themselves that use of any product meets all relevant national Building Regulations and guidance as well as local, national and other applicable standards relevant for their construction or application, including requirements in relation to fire and applicable height restrictions.

Saint-Gobain Interior Solutions will work alongside design teams and the steel frame supplier in the specification of a wraparound solution that will meet the specific project requirements. We would support a project with technical specifications, details and installation guidance on our products.

Structural design

Structural design is the responsibility of the steel framing supplier and each design produced is typically bespoke and project specific. We work alongside the steel frame supplier in the specification of a wraparound solution that will meet the specific project requirements. We would support a project with technical specifications, details and installation guidance on our products.

Wind loadings

Steel Framing External Wall Infill systems are designed to accommodate wind loadings, which will be considered on a project specific basis in accordance with BS EN 1191-1-4 or BS6399-2 by the steel frame supplier.

Note: See page 11.11 for tested windloading performance of Glasroc X Sheathing Board 12.5mm.

Deflection movement

Vertical building movement caused by dead and live loads should be taken into account by the building contractor. GypLyner Xternal systems have been tested with deflection head in order to accommodate 20mm of deflection/ movement. Glasroc X Sheathing Board layout should be designed to over-sail the deflection head position.

Fire design

Our wraparound solutions for non-loadbearing SFS comprise a series of components when tested together, and specified and installed as tested, can provide evidence of fire performance. There should be no substitution of components without our written approval.

Direction of test

External wall systems are asymmetrical and therefore the building designer should check that the fire test evidence is compliant for the project requirements, for example; fire exposure is tested from each side separately.

Cavity barriers and fire breaks

Cavity barriers and fire breaks must be installed in accordance with the requirements of the relevant Building Regulations. The nature of these cavity barriers and fire breaks will vary according to the design requirements of each particular project and are the responsibility of the architect in conjunction with the contractor.

Fire protection of structural steel

We can provide details to fully encase all structural steel. It may be possible through third-party test data (by a suitably qualified structural or fire engineer) to determine whether the conditions offered by the lining are sufficient to protect hot rolled elements, without the need for additional fire protection measures.

Reaction to fire

The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building. Materials which become part of an external wall, or specified attachment, of a relevant building should be of European Classification A2-s1, d0 or A1, classified in accordance with BS EN 13501-1:2007. Board linings, framing and insulation materials in GypLyner Xternal are either non-combustible (Euroclass A1) or of limited combustibility (Euroclass A2-s1-d), classified in accordance with BS EN 13501-1:2007.

Membranes, seals (for example; EPDM rubber), gaskets, fixings and sealants (for example; Glasroc X Sealant) are exempt from this requirement.

Where fixability of fixtures and fittings is required to the internal lining of external walls, we recommend the use of Gyproc Habito as an inner layer. Gyproc Habito 12.5mm, a plasterboard with an exceptionally strong gypsum core for superior fixing strength, toughness and durability, is of European Classification A2-s1, d0.

Window and door apertures

Allowance for window and door apertures vary on a project specific basis according to the performance requirements of the building and would be the responsibility of the design team in conjunction with the contractor.

Cladding

Tests pertaining to cladding are entirely separate with separate test standards as outlined within Approved Document guidance.

Thermal design

The thermal performance of a building is a critical part of its performance with ever increasing scrutiny and tighter targets being given to the building's energy efficiency. Improving the energy efficiency of the building will not only help save energy but will ensure that obligations towards reducing the impact of carbon emissions can be achieved. By incorporating thermal insulation into the envelope of the building both the thermal comfort of the occupants and the performance of the building can be improved. It is also possible to take this one step further and by exceeding current requirements ensure that the building will also start to meet future targets.

U-values

To meet the thermal requirements of the Building Regulations, it will be necessary to provide U-value calculations on the thermal performance of the system in accordance with BR 443 (2019).

The facade type and its fixing detail will determine the calculation method needed for demonstration of thermal performance. For example, rainscreen facades may require additional 3-D modelling in line with EN ISO 10211-2017.

We can provide advice upon which type of calculation you will require and if you contact us directly, we can work with you to find the correct specification for your project. Contact us through Technical Support at [british-gypsum.com](https://www.british-gypsum.com)

Airtightness and moisture management

Dependent on factors, such as location and building type, there are specific air permeability requirements that may apply to your project. The air permeability test gives a measure of the amount of air that leaks through the building envelope and, as such, is one of the key sources of heat loss from a building.

While our products and systems have been used in situations where a target air permeability rate has been met, this does not cover all possible applications. GypLyner Xternal has not been designed or tested as an air barrier and as such, we strongly recommend that guidance is sought from an air tightness specialist, who will be best placed to advise you on whether additional air seals or construction methods will be required.



There are a number of factors that should be considered when determining if a breather membrane is required, including finished façade type, building location and required air tightness performance. Building Regulation Approved Document C states that a breather membrane should be used over the face of the sheathing board.

Acoustic design

Sound Insulation

Considerations against noise should be taken at the design stage and during construction of the building. The correct acoustic climate must be provided in each space, and noise transmission levels should be compatible with the building's usage, and external environment.

External Wall Construction

Design considerations

Building Regulations

Fire Safety

Fire safety Building Regulations Approved Document B and Technical Handbook (Fire – section 2) are a series of approved documents that provide practical guidance on meeting the fire safety requirements of the Building Regulations 2000 (England and Wales) and Building (Scotland) Regulations 2004 respectively.

External fire spread

Building Regulation Approved Document B states the external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.

The external envelope of a building should not contribute to undue fire spread from one part of a building to another part. This intention can be met by constructing external walls so that both of the following are satisfied.

- The risk of ignition by an external source to the outside surface of the building and spread of fire over the outside surface is restricted.
- The materials used to construct external walls, and attachments to them, and how they are assembled do not contribute to the rate of fire spread up the outside of the building.

The extent to which this is necessary depends on the height and use of the building.

For the most up-to-date information and requirements on the reaction to fire performance of external surface of walls, please refer to Table 10.1 in Volume 1 and Table 12.2 in Volume 2 of Approved Document B.

Beam and slab deflection in a fire state

The guidance provided in Approved Document B (Volume 1 & 2) provides the following guidance where a ‘compartment wall’ abuts the underside of a slab:

The deflection of the slab (or beam) in a fire state should be considered in conjunction with the cold state deflection. The project Structural Engineer should provide this information.

The requirement for fire resistance will be given in the devolved countries Regulations and guidance.

Thermal performance

National Building Regulations require that external walls meet or exceed the requirements set out in the relevant documents such as Approved Document L in England and Wales or Section 6 in Scotland, however compliance with other areas of the Building Regulations such as moisture control, ventilation and overheating should also be achieved.

When determining the levels of insulation required, attention should also be paid to ensuring that continuity of insulation, thermal bridging and air tightness requirements are also met.

Acoustic performance

The National Building Regulations do not require any specific requirements for the sound insulation performance of external walls. When a significant external noise source is present, e.g., a building is being constructed near a rail line, road or airport, only then is the acoustic performance of an external wall considered.

The acoustic performance of the external facade will be controlled by the level of prevailing ambient noise. The windows and any trickle vents will often be the dominant source of noise ingress into a building.

Rain Noise – Rain noise should be considered at design stage where quiet conditions are essential, or where interference with speech communication is undesirable even for a short time (e.g., schools, call centres, some offices, cinemas etc.)

Acoustic reference materials

There are separate guidance documents depending on the building types and these are listed below:

Healthcare – NHS Estates Health Technical Memorandum HTM2045

Education – DfES Building Bulletin 93 (BB93)

Office Buildings – British Council of Offices/BS8233

Commercial, Retail and Leisure Buildings – BS8233:1999. ‘Sound insulation and noise reduction for buildings’ - Code of Practice.

Industrial – BS 8233 & BS 4142:1997 ‘Method for rating industrial noise affecting mixed residential and industrial areas

Residential and Hotels – Approved Document E (2003 Edition) of the Building Regulations 2000.



Further reading

“The use of ‘Through wall’ systems to provide an infill wall on the exterior of buildings has seen substantial growth as the benefits in the systems have been better understood.

FIS has worked closely with the Steel Construction Institute British Gypsum and our members to ensure that designers and engineers get the best consolidated advice from subject matter experts in their specialist guidance Specifiers Guide – Light Gauge Steel Framing Systems (SFS) External Wall Systems – FIS (thefis.org) and ‘Through-Wall’ infill SFS Systems guide (published August 2022).”

Joe Cilia, Technical Director

GypLyner Xternal

Identification

We know just how important it is to have fully proven, tested solutions for your project. That's why we have used our wealth of technical know-how and expertise to develop a comprehensive set of systems and details to meet your project requirements.

GypLyner Xternal is a system that wraps around non-loadbearing SFS to provide a required through-wall performance. We describe these as wraparound solutions for SFS, as our products work in conjunction with the steel frame offering a range of fire, acoustics and thermal performances, supported and backed up by test evidence and technical know-how. The SFS framing components are provided by Hadley Group, so structural design responsibilities remain with the framing supplier.

Test data for our specifications can only be used with defined Hadley Steel Framing SFS components. Please contact us through Technical Support at british-gypsum.com to discuss working with other framing suppliers.

Gyproc Habito 12.5mm

Include Gyproc Habito as an additional part of the internal lining specification to provide high performance fixing capability.



Why specify GypLyner Xternal?

Comprehensive fire and acoustic tested solutions

Systems designed to offer flexible specification options

Meet and exceed thermal performance needs through a range of insulation solutions

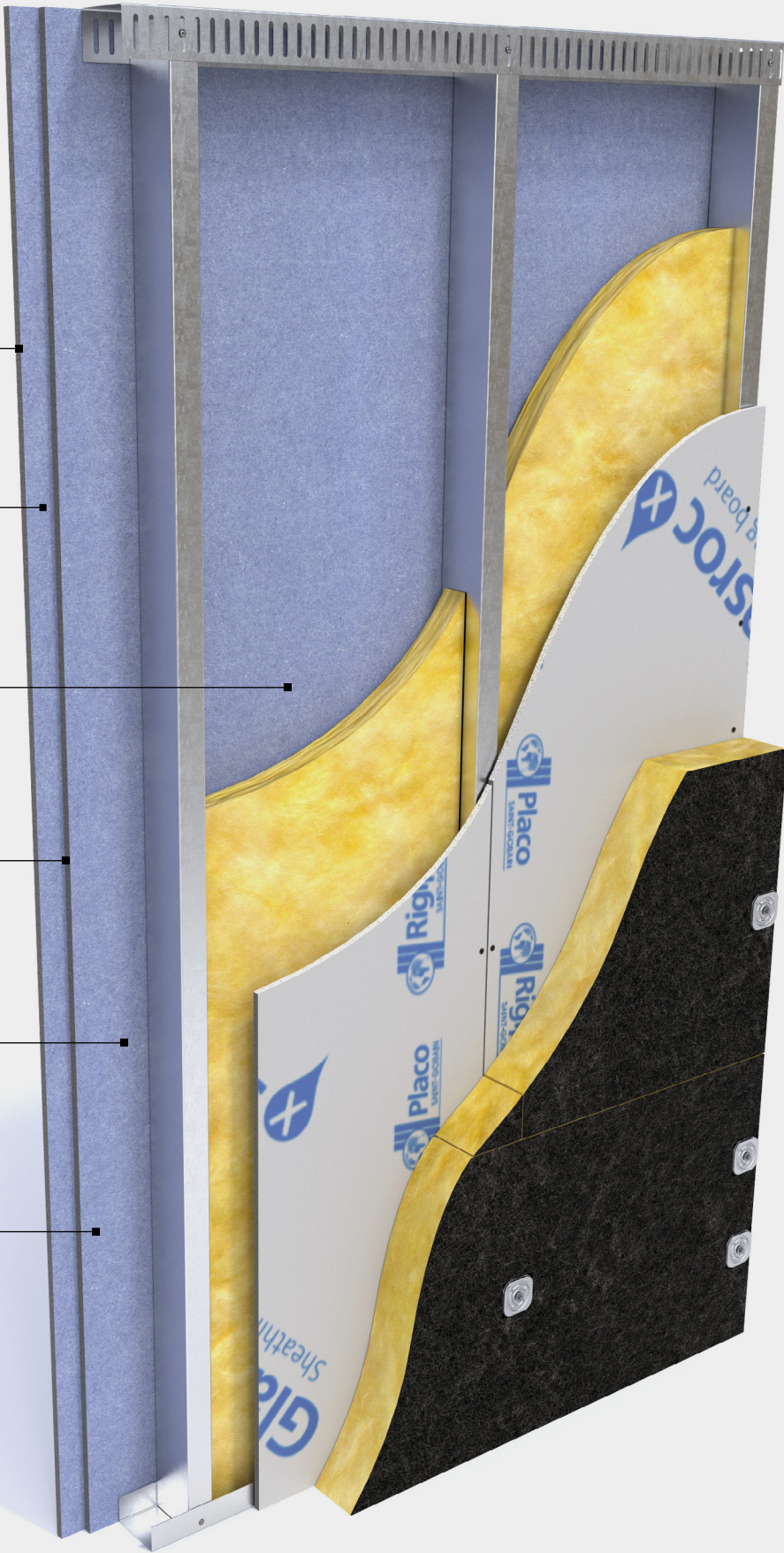
Fire resistance to BS-EN 1364-1:2015
EI 60, 90 and 120 mins (inside to out, outside to in)

Installation details for junctions, abutments, windows and deflection requirements

All done with the rigour and attention to detail you have come to expect



There are specifications within this system that qualify for British Gypsum SpecSure® warranty. For more information see british-gypsum.com/specsure



GypLyner Xternal

Introduction

We offer a portfolio of tested wraparound performance solutions. Our solutions are tested on Hadley SFS to meet 60, 90 and 120 minute fire performance “in-to-out and out-to-in”.

Test conditions for our specifications

- All tests conducted on Hadley SFS framing
- Fire resistance tests for non-loadbearing SFS infill in accordance with BS EN 1364-1:2015 (tested build ups do not include breather membrane or vapour control layers, client to assess. Tested in both directions – inside-to-out and outside-to-in)
- Tested with both Slip Klip and Slotted Head Track deflection detail
- Specifications have been tested to achieve required periods of fire resistance. They can be further optimised to achieve project-specific thermal and acoustic performances
- Tested with 50mm Isover Acoustic Partition Roll (APR 1200)
- Maximum height 4m

Notes

Test data for our specifications can only be used with defined Hadley Steel Framing SFS components.

Include Gyproc Habito as an additional part of the internal lining specification to provide high performance fixing capability.

Windloading

Table 2: Glasroc X Sheathing Board 12.5mm windloading		
Stud centres (mm)	Screw centres (mm)	Reportable Failure Load (kPa)
600	300	1.4
600	200	1.8
400	300	2.2
400	200	2.6

Note for table: NB. In any particular situation, the wind load is determined in accordance with BS EN 1991-1-4:2005+A1:2010 and this is specific to the building, its location, orientation etc.

To this wind load the structural engineer will apply a safety factor, which is taken from BS EN 1990, which covers the Basis of Structural Design.

Tested in accordance with EAD 090062-00-0404:2018

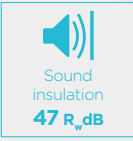


60 minute fire performance

Board side lining:
1 x Gyproc FireLine 15mm

Cavity insulation:
50mm Isover Acoustic Partition Roll (APR 1200)

External side lining:
Glasroc X Sheathing Board 12.5mm

External insulation:
50mm Isover Polterm Max Plus





Tested performances above are for 100mm SFS only. 70mm tested performances also available.

Board side lining:
1 x Gyproc FireLine 15mm

Cavity insulation:
50mm Isover Acoustic Partition Roll (APR 1200)

External side lining:
Glasroc X Sheathing Board 12.5mm

External insulation:
100mm Isover Polterm Max Plus



Tested performances above are for 100mm SFS only. 70mm tested performances also available.

Looking for performance selection tables?

We're committed to providing technical information that is transparent, clear, accurate, and always up-to-date. So you can rely on it when making decisions at any stage of the design, specification, installation, use, maintenance and disposal process. All performance data is now available to view and download on our website.

british-gypsum.com/gyplyner-external






90 minute fire performance

Board side lining:
2 x Gyproc SoundBloc 15mm

Cavity insulation:
50mm Isover Acoustic Partition Roll (APR 1200)

External side lining:
Glasroc X Sheathing Board 12.5mm



Tested performances above are for 100mm SFS only. 70mm tested performances also available.

Board side lining:
2 x Gyproc SoundBloc 15mm

Cavity insulation:
50mm Isover Acoustic Partition Roll (APR 1200)

External side lining:
Glasroc X Sheathing Board 12.5mm

External insulation:
100mm Isover Polterm Max Plus






Tested performances above are for 100mm SFS only. 70mm tested performances also available.

120 minute fire performance

Board side lining:
3 x Gyproc FireLine 15mm

Cavity insulation:
50mm Isover Acoustic Partition Roll (APR 1200)

External side lining:
Glasroc X Sheathing Board 12.5mm



Tested performances above are for 100mm SFS only. 70mm tested performances also available.

Board side lining: 2 x Gyproc SoundBloc 15mm

Cavity insulation: 100mm Isover Acoustic Partition Roll (APR 1200)

External side lining: Glasroc X Sheathing Board 12.5mm

External insulation: 200mm Isover Polterm Max Plus



Thermal performances

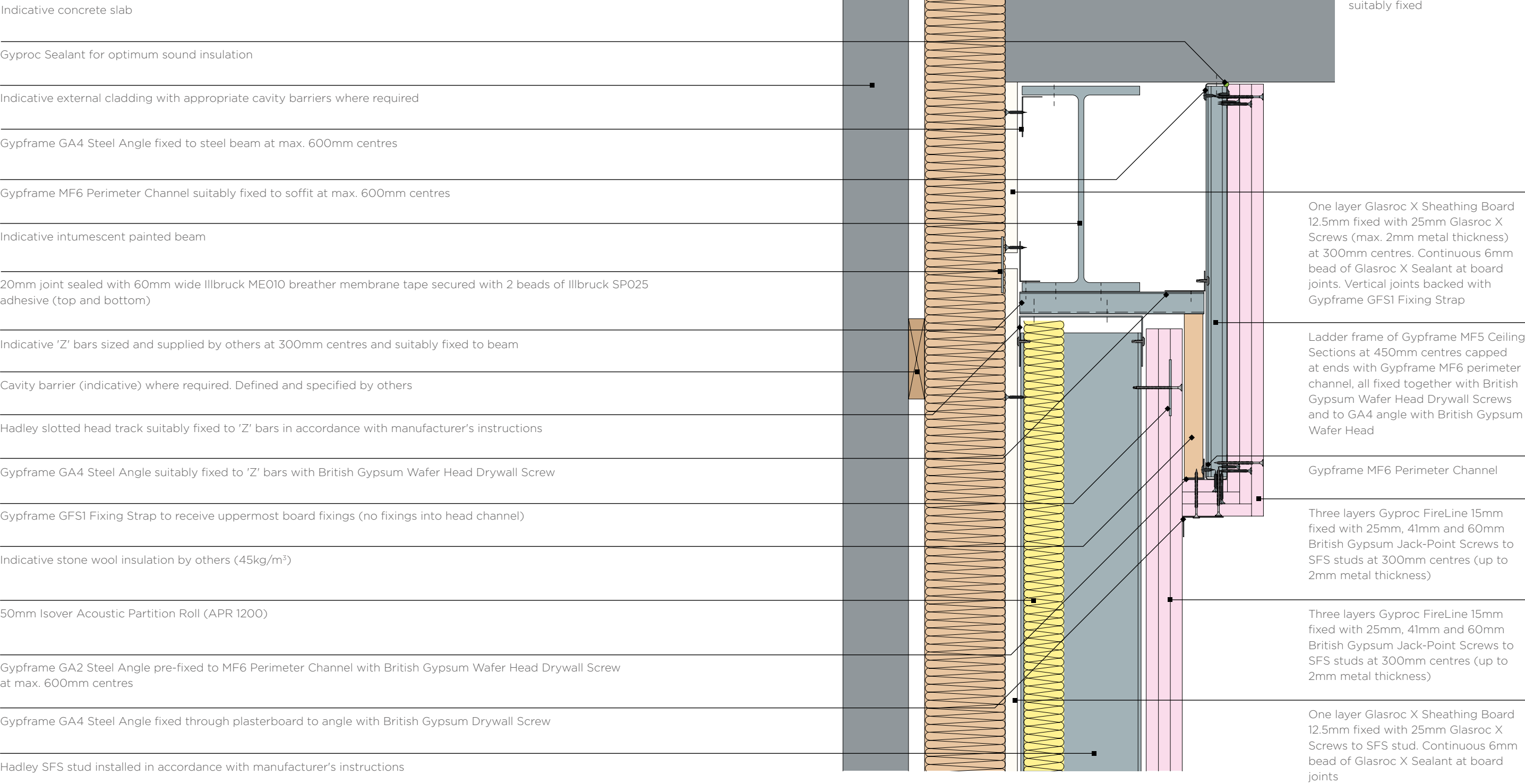
Thermal performances of our systems can be matched to your requirements. Contact us through Technical Support on british-gypsum.com.

GypLyner Xternal

Construction details

The following pages highlight key examples of available construction details. Further details are available to support your project and optimise performance.

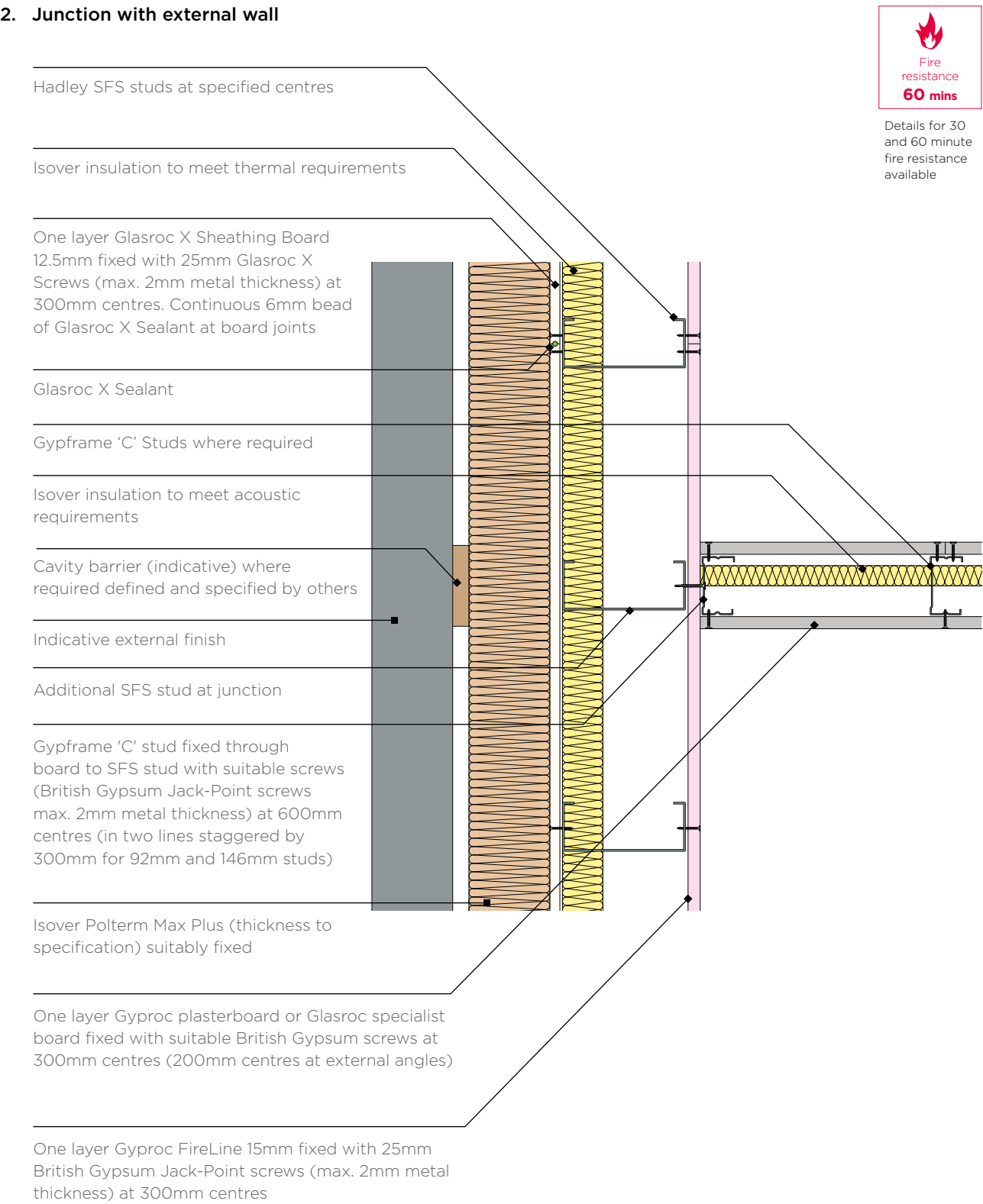
1. Typical SFS deflection detail – tested for up to 120 mins (inside-to-out)



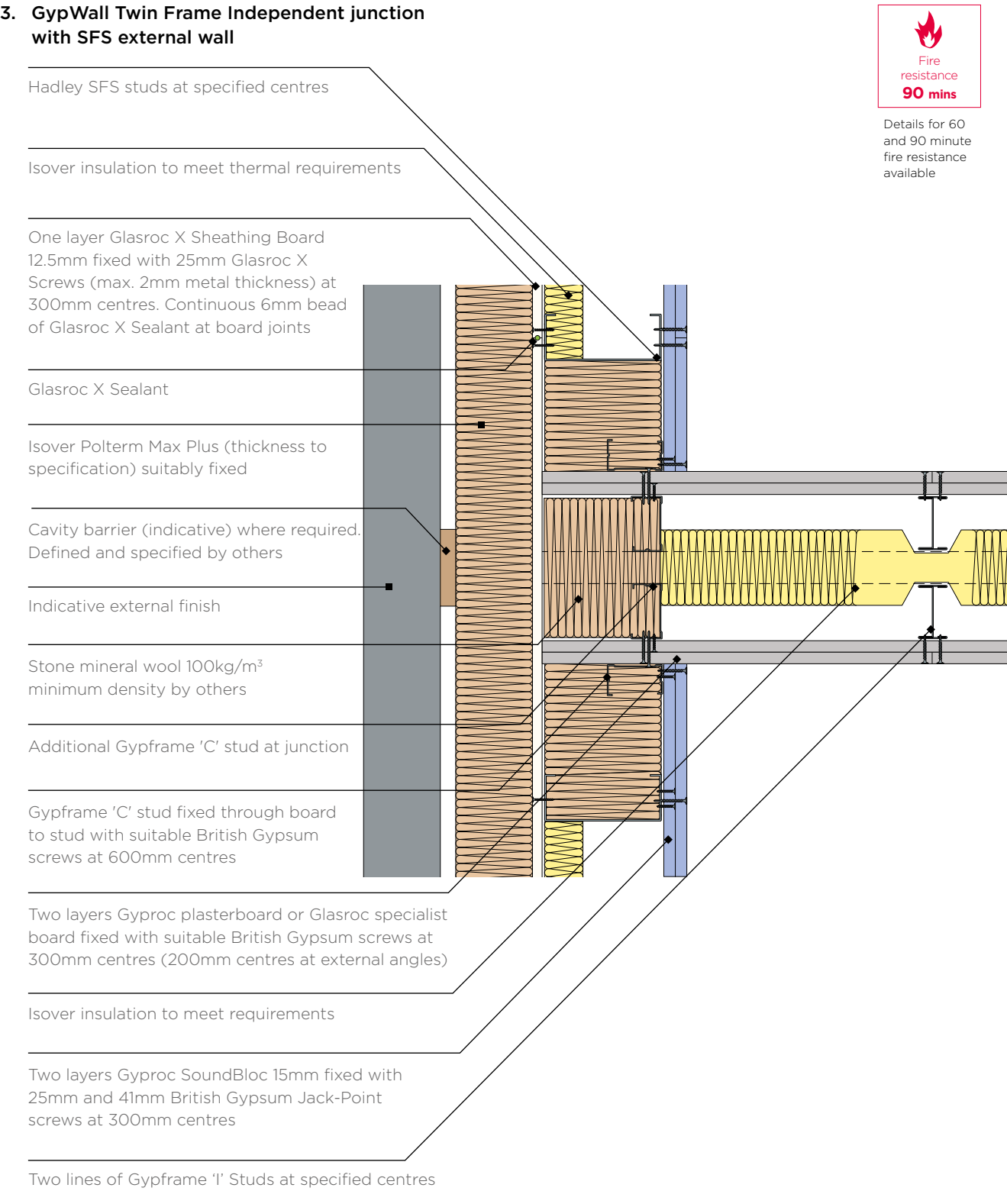
GypLyner Xternal

Construction details

2. Junction with external wall



3. GypWall Twin Frame Independent junction with SFS external wall



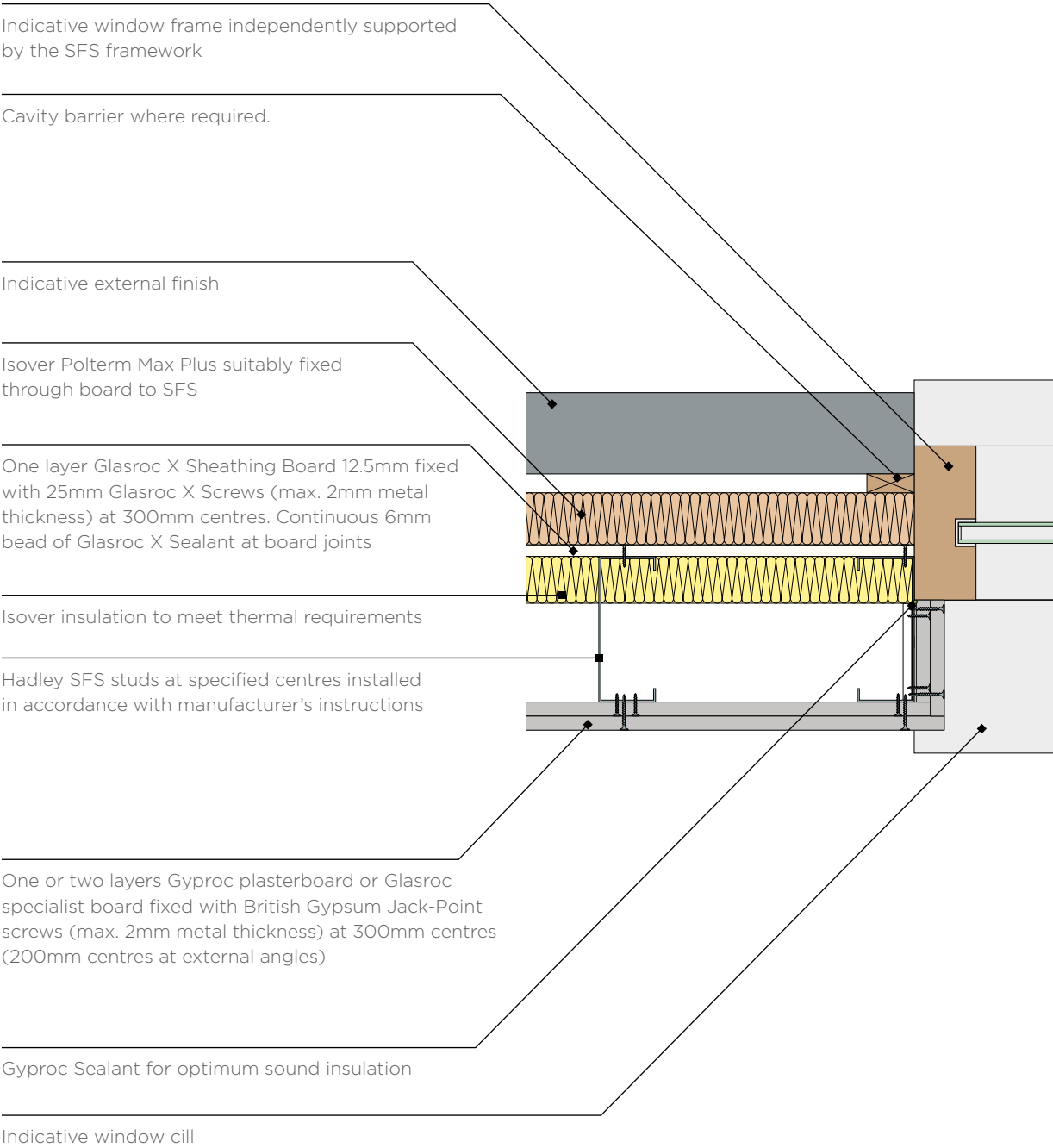
We can provide details to fully encase all structural steel. It may be possible through third party assessment of test data (by a suitably qualified structural or fire engineer) to determine whether the conditions offered by the lining are sufficient to protect hot rolled elements, without the need for additional fire protection measures.

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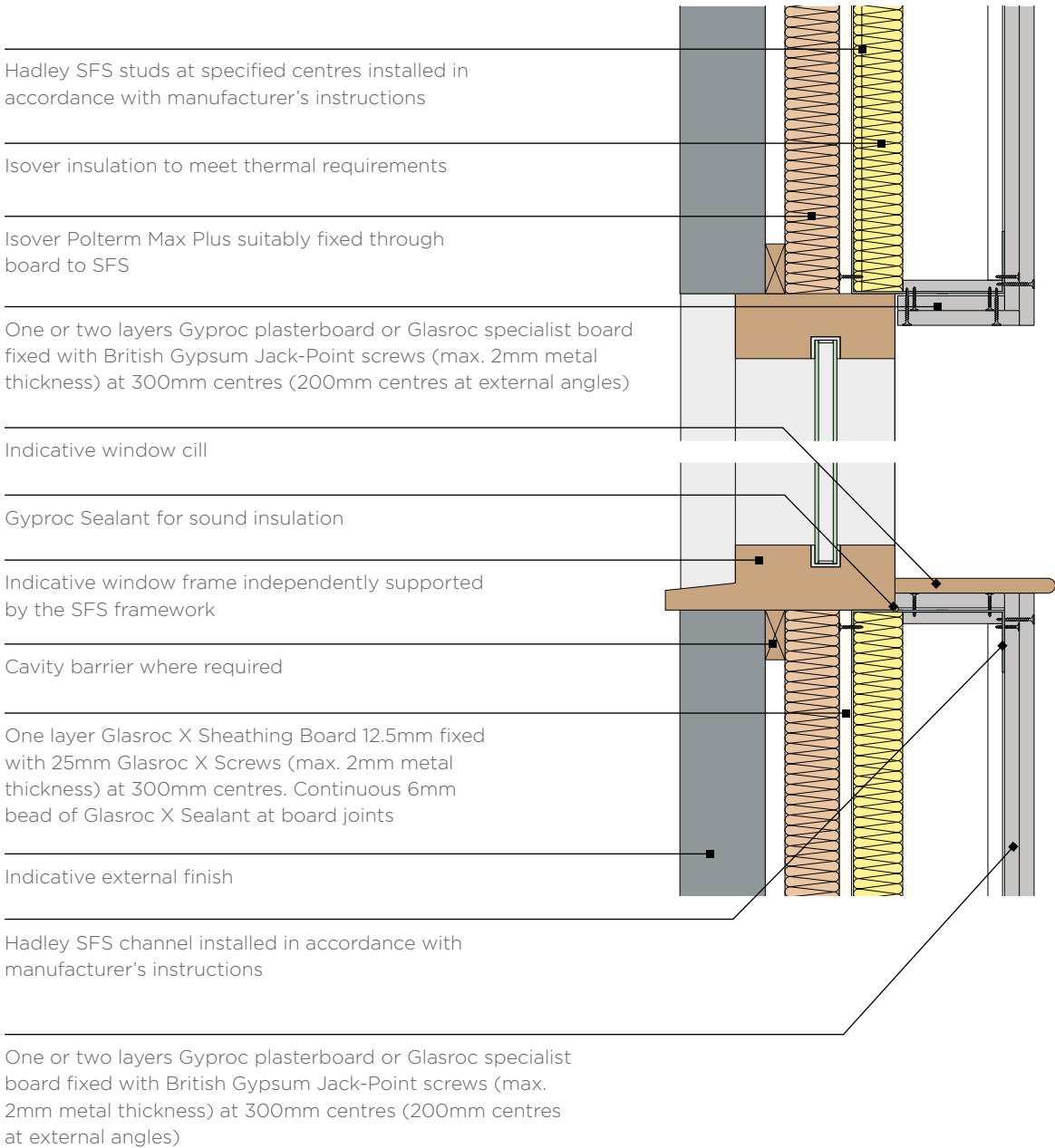
GypLyner Xternal

Construction details

4. Window reveal



5. Window head and cill



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GypLyner Xternal

System components

GypLyner Xternal is a system that wraps around nonloadbearing SFS. SFS framing elements to be supplied by framing supplier.



Gyproc® FireLine 15mm
A plasterboard containing glass fibre and other additives for extra fire protection.

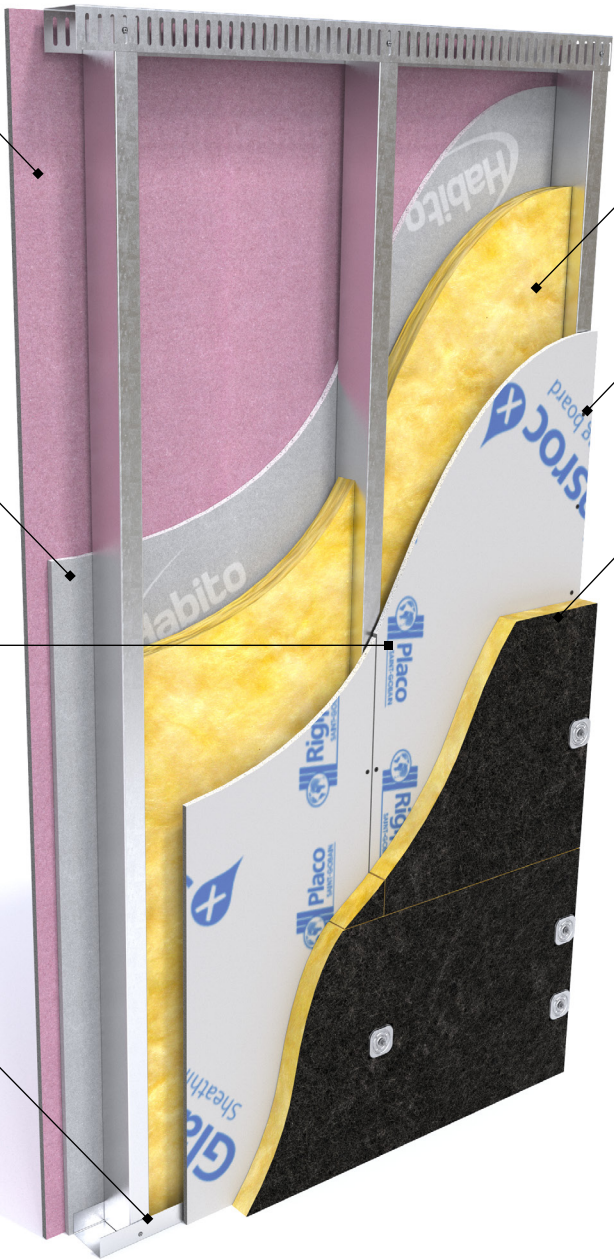


Gyproc® SoundBloc 15mm
A plasterboard with a high density core used to achieve specified sound insulation levels through walls, ceilings and floors.



Gyproc Habito 12.5mm
Include Gyproc Habito as an additional part of the internal lining specification to provide high performance fixing capability.

Glasroc® X Sheathing Board 12.5mm
A high performance gypsum sheathing board with mould resistant properties. Use it to provide external weather protection prior to the installation of the finished exterior façade system.



Steel Frame Infill Batt
Glass mineral wool insulation slab for use between the studs of lightweight steel frames for enhanced thermal and acoustic performance.



Isover Acoustic Partition Roll (APR 1200)
Glass mineral wool for enhanced acoustic and thermal performance.



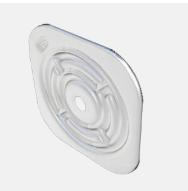
Glasroc X Screws 25mm
Fix weather resistant sheathing to steel frames securely.



Isover Polterm Max Plus
A stone mineral wool slab with a black glass veil on the external side providing thermal and acoustic insulation.



Stainless steel self-drilling insulation fastener screws (6.3mm diameter)
Use to attach Polterm Max Plus into the SFS framework. Minimum 10mm threaded penetration into the SFS framework.



Stress Plate square retaining washers (70mm x 70mm, 6.8mm diameter)
Use with Stainless steel self-drilling insulation fastener screws to attach Polterm Max Plus into the SFS framework.



GypLyner Xternal Warranty

All GypLyner Xternal specifications are covered by the British Gypsum **SpecSure®** warranty.

The **SpecSure®** warranty concerns the claimed technical performances achieved through the wrap around British Gypsum and Saint-Gobain Isover fabric.

The **SpecSure®** warranty does not cover the structural framing elements – design and guidance of the structural element remains the responsibility of the SFS provider.

The systems must comprise only genuine British Gypsum and Saint-Gobain Isover components where specified. We cannot guarantee that the use of other manufacturers' components will meet our rigorous performance and quality standards when installed in our tested systems. For more information see **british-gypsum/specsure**

GypLyner Xternal Installation

The information below is intended to be a basic description of how the system is built.



1 Completed Structural Frame Steel (SFS) framework ready to receive the Glasroc X Sheathing Board.



2 Before offering any boards into position a continuous 6mm bead of Glasroc X Sealant is needed along the vertical edge of the surface that the first sheet of Glasroc X Sheathing Board will abut.



7 Use Gyproc Sealant to seal the perimeter.



8 Use British Gypsum Jackpoint Drywall Screws to fix Gyproc plasterboards or Glasroc specialist boards to the SFS framework.



3 Use Glasroc X Screws 25mm to fix Glasroc X Sheathing Board to the SFS framework.



4 Run a continuous 6mm bead of Glasroc X Sealant along the installed Glasroc X Sheathing Boards exposed edges, which will have other boards abutting against it



9 Isover Polterm Max Plus to be fixed through the Glasroc X sheathing board into the SFS framework.

Important note

Although Isover Polterm Max Plus will not be directly exposed to windload, it will experience substrate movement. Each installation should be designed to withstand, without damage or permanent deformation, the pressures imposed by wind forces.



5 Abut subsequent sheets of Glasroc X Sheathing Board up to the previous one ensuring the sealant "mushrooms" out onto the face of the board, fully sealing the joint.



6 Add appropriate Isover insulation within the cavity.

GypLyner Xternal

Isover Polterm Max Plus fixing

External insulation must be correctly installed to ensure the performance of our systems.

The fixing method for each specification is determined by the performance requirement and is described in the project pack.

Stress plate fixing

