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The **WHITE BOOK** Education sector guide

**The comprehensive specification guide
for teaching and learning environments**




There has never been a more exciting time for education in the UK. Not only are we building more schools than ever before, but we are now focused on creating new learning environments to inspire our students and young children to ever higher educational achievements. By doing this, we will help them maximise their own potential and contribute effectively to the country's future.

The Government's pledge to rebuild or renew every secondary school in England over the next 10-15 years has demanded a different approach. It requires close cooperation across the design and build team and a new emphasis on robust systems and techniques that speed up the build process whilst providing flexibility to accommodate changing use and class sizes.

To meet this challenge, we have worked as part of the team to develop new and improved wall and ceiling systems. These lifetime guaranteed systems meet our demanding sustainability standards, yet are faster to build, with reduced whole life maintenance costs. They have the strength and durability needed to cope with intensive use throughout the building life.

In this guide we have brought together a comprehensive range of solutions that meet the demands of the Government's intensive build programme. They will help to create unique educational environments to inspire future generations of students and teachers alike. They will help you to design, build and operate the schools of tomorrow.



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Background and theory



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Introduction

The Government has put in place an ambitious build programme of educational reform. As the UK's leading supplier of internal wall and ceiling systems, British Gypsum is dedicated to the provision of innovative learning environments that inspire high achievement.

British Gypsum works closely with specifiers, contractors and clients to ensure that its range of solutions provide consistently high quality environments that offer the best whole life value for money.

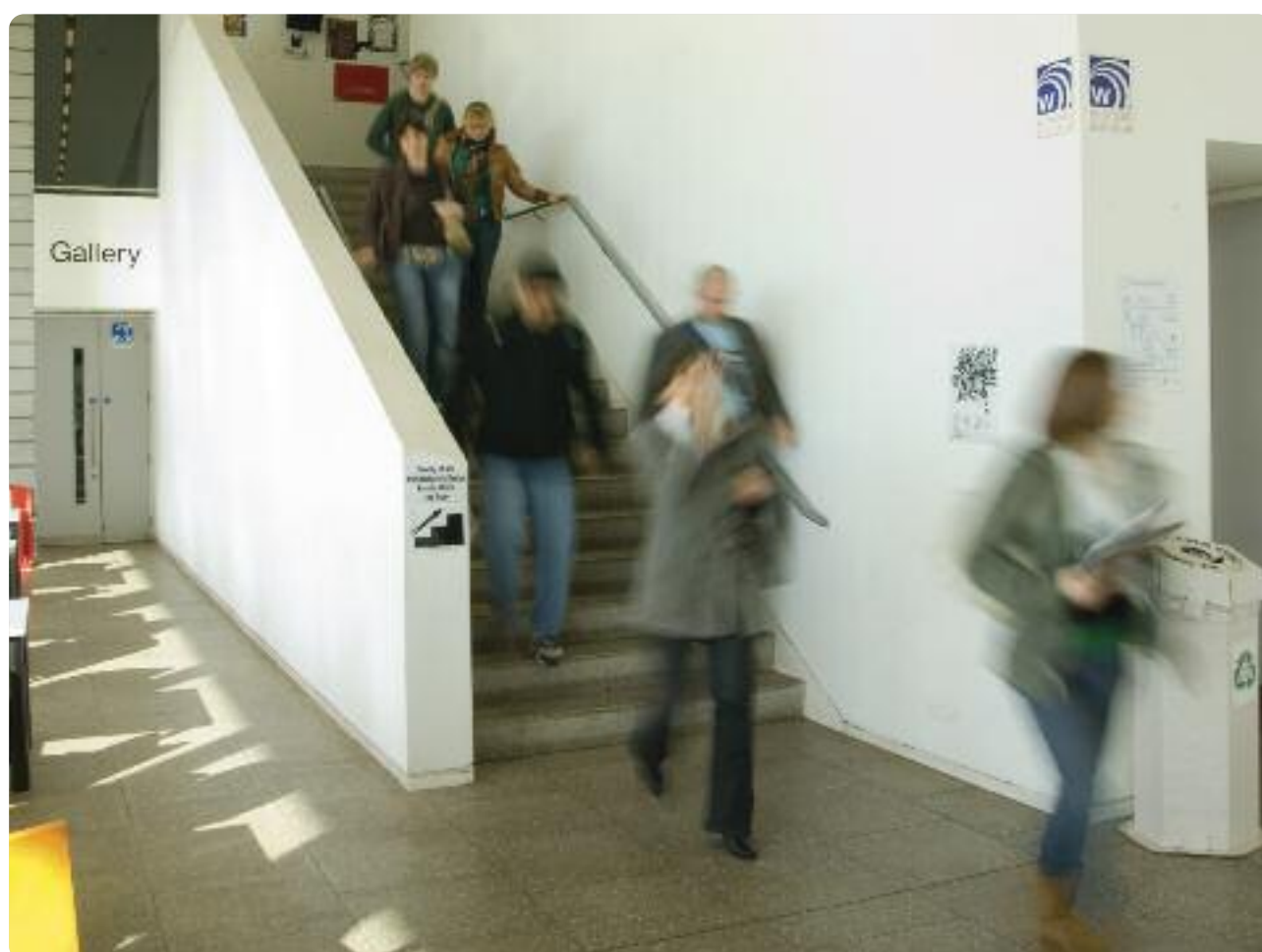
The **WHITE BOOK** Education sector guide details a portfolio of drylining systems developed specifically to meet the requirements of modern educational buildings.

This document takes the specifier through the regulations and guidance that should be taken into account in order to specify the appropriate internal solution to meet and exceed the requirements. All constructions that feature in this sector guide have been extensively tested and have a proven track record in education buildings.

It is important to note that the system solutions and specifications presented in this sector guide are intended for guidance purposes and are British Gypsum's interpretation of **Building Bulletin 93 (BB93)** requirements. The guide should be read in conjunction with **Building Bulletin 93, Building Regulations Approved Documents (or the Scottish Technical Standards for Scotland)** and the **Department for Children, Schools and Families (formerly DfES) Standard Specifications, Layouts and Dimensions (SSLD)** guidance for partitions in schools.

The **WHITE BOOK** Education sector guide includes solutions for:

- Internal partitions – airborne sound insulation between spaces, fire resistance and duty ratings
- Wall linings – sound insulation and thermal performance
- Separating floors and ceilings – airborne and impact sound insulation between spaces and fire resistance
- Acoustic ceilings – reverberation time and acoustic absorption
- Encasements – fire protection





SpecSure®

All of the British Gypsum proprietary systems included in this sector guide are covered by the SpecSure® Lifetime System Warranty.

- Our guarantee that they will perform to the parameters published in our current literature for the period of time that the systems are used for their originally designed purpose.
- Your guarantee of absolute peace of mind when specifying British Gypsum interior systems.

SpecSure® is more than just a performance warranty; it means that the British Gypsum lifetime warranted system you specify:

- Comprises only the highest quality components, designed to work individually and together to deliver the specified level of performance.
- Has the technical expertise and experience of the UK's leading drywall specialists behind it.
- Has been tested in UKAS-approved fire, acoustic and structural test laboratories.
- Has been site tested to demonstrate installation integrity and simplicity.
- Will be supported as required at every stage of the project by the UK's leading on and off-site technical support personnel.
- Will perform to published parameters throughout the life of the system.
- Will be repaired or replaced by British Gypsum in the event of system failure attributed to unsatisfactory product / system performance.



Acoustics

In order to facilitate clear communication and avoid interference with study activities, acoustic considerations are a critical aspect of the design of education buildings.

Requirement E4 of the **Building Regulations Approved Document E (2003)** states that 'Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use'.

To satisfy this requirement, it is recommended that buildings comply with the guidance given in **Building Bulletin 93 (BB93) Acoustic design of Schools, a design guide**.

BB93 was written by the Department for Children, Schools & Families (DCSF), formerly the Department for Education and Skills (DfES), and provides a regulatory framework for the acoustic design of schools. *BB93* also provides supporting advice and recommendations for planning and design of schools and other educational buildings.

This sector guide should be read in conjunction with *BB93* and the DCSF guide *Standard Specifications, Layouts and Dimensions*. It will lead you through the acoustic requirements for each internal element, providing solutions for:

- Insulation of noise between internal walls and floors
- Attenuation of external sound to reduce indoor ambient noise levels
- The control of reverberation with acoustic solutions
- Speech intelligibility in open spaces

Applying Thistle Multi-Finish to certain GypWall partition systems

Applying 2mm Thistle Multi-Finish to both sides of certain GypWall partitions has a positive effect on the sound insulation rating. This is effective on partitions that are limited by their high frequency performance (coincidence region).

The application of Thistle Multi-Finish also adds mass to the partition which has a positive effect on the mid-frequency region of the spectrum.

For more information on the principles of acoustics, please refer to *BB93* Appendix 1, 2 and 3, and the British Gypsum **WHITE BOOK** Basic principles section, and *BS 8233 - The code of practice for sound insulation and noise reduction for buildings*.

Fire prevention and resistance

Student and staff safety is critical in all educational buildings. Since April 2001, all new building work in schools has been subject to approval under Building Regulations Approved Document B.

B2: To ensure fire spread over the internal linings of the building is inhibited.

B3: To ensure the stability of buildings in the event of fire; to ensure that there is a sufficient degree of fire separation within buildings and between adjoining buildings to inhibit the unseen spread of fire and smoke in concealed spaces in buildings.

The Department for Children, Schools & Families (formerly DfES) has recently published **Building Bulletin 100 (BB100)** which covers school premises as a whole, including teaching, ancillary and residential use areas. *BB100* is quoted as the normal means of compliance with Building Regulations Approved Document B for schools. According to *BB100*, any fire resisting element for single or multi-storey buildings, where the top floor is not more than 18 metres above ground level, will be required to provide either 30 or 60 minutes fire resistance, subject to type of element and its location.

Solutions presented in this sector guide meet the requirements of Building Regulations Approved Document B and *BB100*. For protection to steelwork within partitions and linings, please refer to **Table 3.8**, page 53.

NB The fire resistance and sound insulation performances in this sector guide are for imperforate partitions, walls and ceilings incorporating boards with joints taped and filled, or skimmed according to British Gypsum's recommendations. The quoted performances are achieved only if British Gypsum components are used throughout, and the Company's fixing recommendations are strictly observed. Any variation in the specifications should be checked with British Gypsum.

Sustainability

Sustainable design of education buildings

The Government has focused its capital investment in educational buildings on the creation of advanced, eco-efficient primary and secondary schools, which allow for significant savings on running costs as well as a reduced impact on the environment.

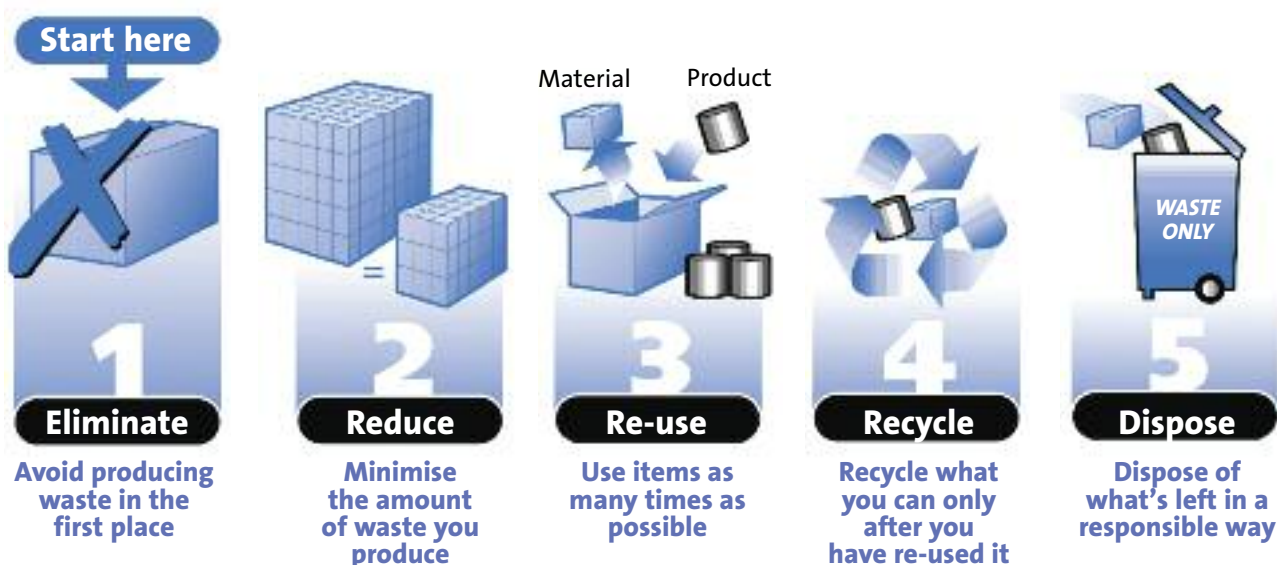
British Gypsum recognises that manufacturing and construction is often perceived to make heavy demands on the environment. It has committed to minimising its impact on valuable natural resources, striving to provide products and systems that enable customers to build in a more sustainable and responsible way.

Sustainable development is about the balance between social, economic and environmental concerns. British Gypsum's approach is to follow these three pillars of sustainability, integrating them into the way they conduct business.

Environmental sustainability is probably the most recognised aspect of sustainable development and one of the most difficult to manage effectively. British Gypsum is concerned with protecting and conserving both biodiversity and the environment. One of the ways British Gypsum is tackling this is through the management and minimisation of waste.

British Gypsum has been instrumental in the development of the Ashdown Agreement, delivering a voluntary commitment by UK plasterboard manufacturers to significantly reduce, and ultimately eliminate, plasterboard manufacturing waste to landfill.

Waste hierarchy process



Source: Environment Agency

Waste hierarchy

In developing a waste management strategy, the waste hierarchy framework has become the cornerstone for sustainable waste management, setting out the order in which options for waste management should be considered based on environmental impact.

Waste costs are usually calculated based on the costs to recycle or send to landfill. There are, however, a number of hidden costs that need to be taken into account including:

- Initial material costs
- Labour cost to load excess material into the building
- Labour cost to remove waste from the building

The total cost of waste is a lot higher than the cost of removal. As a result, British Gypsum works closely with customers to eliminate and reduce waste before it enters the site. Some of the many ways British Gypsum can help include:

Eliminate: best practice design assistance at specification stage, installer training and value engineering.

Reduce: Designing out waste in specifications (see **Detail 13 - Alternative (reduced waste) Severe Duty door detail** on page 41), the use of bespoke board sizes and on-site technical support.

Re-use: Reduced board types on-site making off-cuts easier to use.

Recycle: Recycling and reclamation through the Plasterboard Recycling Service.

British Gypsum's Plasterboard Recycling Service

New legislation and Environment Agency guidance have resulted in more stringent requirements for the management and disposal of construction waste. British Gypsum is committed to recycling waste plasterboard back into the manufacturing process, avoiding landfill. British Gypsum's Plasterboard Recycling Service offers the collection of all British Gypsum plasterboard, cove, gypsum based ceiling tiles and glass reinforced gypsum scrap direct from site.

Following collection, all products are sorted and returned to the plasterboard manufacturing process, saving valuable raw materials and offering a truly green recycling service. On-site receptacles for plasterboard waste can be tailored to the requirements of the project, including skips, bags and wheeliebins.

For more information, please contact the Plasterboard Recycling Service (PRS) Customer Service Centre – T: 0800 633 5040.



The Building Research Establishment Environmental Assessment Method (BREEAM) Education (2008)

This method was created to ensure that construction projects meet high standards of environmental performance without prescribing specific designs. All compliance requirements are inspected by BRE licenced assessors.

BREEAM building assessments are high on the agenda of the regulatory organisations that have a stakehold interest in the education sector. According to the DCSF (formerly DfES), it is a condition of capital funding that new-build and refurbishment projects achieve a 'VERY GOOD' rating under BREEAM Education. This requirement covers:

- All major new-build projects valued at over £500,000 (Primary Schools) and £2,000,000 (Secondary Schools).
- All major refurbishment projects valued at over £500,000 (Primary Schools) and £2,000,000 (Secondary Schools) and involving rebuild or complete refurbishment of more than 10% of the floor area of the school.
- Smaller schemes may be suitable for formal BREEAM assessment. Designers should, as far as practicable, apply the same standard to all projects.

The draft Strategy for Sustainable Construction Consultation Paper (July 2007) states the long-term objective that 100% of new-build projects on government estate achieve a rating of BREEAM 'EXCELLENT', see **Figure 1.1** for more information.

Points can be obtained for many of the BREEAM criteria through the incorporation of British Gypsum systems.

Figure 1.2 refers to the key areas.

Figure 1.1 - BREEAM 2008 rating benchmarks

BREEAM rating	% score
UNCLASSIFIED	<30
PASS	≥30
GOOD	≥45
VERY GOOD	≥55
EXCELLENT	≥70
OUTSTANDING	≥85

Source: BREEAM Education 2008 Section 14: Pre-Assessment Estimator

Robustness of design

Many areas within school and educational buildings are subject to intensive use by occupants who have little incentive to exercise care, which can result in significant damage to the surroundings. Regular, unplanned maintenance can be disruptive to the learning environment. Therefore, when designing internal school spaces, the use of durable partitions has a significant impact on whole life costs and leads to more predictable maintenance cycles.

Performance requirements for partitions

BS 5234: Part 2: 1992 - Partition Grading

BS 5234 comprises two parts – Part 1 - General requirements, and Part 2 - Specification for performance requirements for strength and robustness in relation to end use categories. The standard covers performance aspects such as stiffness, crowd pressure, impacts, anchorages and door slamming resistance.

Figure 1.2

Credit reference	Solutions and support	Maximum potential credits
(Energy) Ene1 Percentage improvement in CO ₂ emissions over and above building regulations	<ul style="list-style-type: none"> • Air tightness detailing assistance • External envelope performance improvements 	15
(Health and Wellbeing) Heal2 Indoor air quality	<ul style="list-style-type: none"> • ACTIVair products could contribute towards points as part of an indoor air quality and testing plan 	2
(Health and Wellbeing) Heal3 Meeting and exceeding the acoustic requirements of BB93	<ul style="list-style-type: none"> • UKAS accredited test data for all systems • High acoustic performance systems • Specification assistance 	3
(Materials) Mat05 Responsible sourcing of materials	<ul style="list-style-type: none"> • Gyproc plasterboards, Glasroc specialist boards, Thistle plasters and core products have been certified to BES 6001 'Responsible Sourcing of Construction Products' achieving a 'Very Good' • British Gypsum is fully ISO 14001:2004 certified across all mining, manufacturing and central functions 	3
(Materials) Mat06 Insulation	<ul style="list-style-type: none"> • Isover glass mineral wool • 80% recycled content • Green Guide rating A+ 	2
(Materials) Mat07 Designing for robustness	<ul style="list-style-type: none"> • Single layer Severe Duty solutions (GypWall ROBUST and GypWall EXTREME) 	1
(Materials) Mat01 Material specification	<ul style="list-style-type: none"> • A range of A and A+ Green Guide rated systems available for internal and external walls incorporating British Gypsum products 	2
(Waste) Wst1 Construction site waste management	<ul style="list-style-type: none"> • Reduced waste details • Plasterboard Recycling Service 	4
(Pollution) P018 Noise attenuation	<ul style="list-style-type: none"> • Enhanced acoustic performance for external envelope using British Gypsum systems 	1

Source: BREEAM Education 2008 Section 14

In order to claim a partition duty, a designated performance level must be achieved for all elements in the test – see **Figure 1.3** below for examples of room type in each category.

The Building Regulations do not specifically detail requirements for strength and robustness of partitions. However, the Department for Children, Schools & Families (DCSF, formerly DfES) sets out structural performance requirements by room type in Buildings Bulletin 100 and the recently published Standard Specifications, Layouts and Dimensions document. These guidance documents state that walls must be a minimum of Heavy and Severe Duty respectively, in accordance with *BS 5234: Part 2: 1992*. British Gypsum has developed single layer partition systems that achieve Heavy and Severe Duty ratings. They are featured in Section 2 of this sector guide.

According to the guidance set out by the DCSF, Severe Duty partitions that satisfy the requirements of *BS 5234: Part 2: 1992* are recommended. All British Gypsum Severe Duty partitions are tested to this standard. **GypWall ROBUST**, incorporating Gyproc DuraLine satisfies *BS 5234: Part 2: 1992* strength and robustness requirements to Severe Duty in single layer form. The system is tried and tested in schools throughout the UK. Where whole life cost is increasingly being considered, **GypWall ROBUST** offers flexibility and additional durability over single layer **GypWall CLASSIC** systems.

Throughout 2006, British Gypsum worked closely with key stakeholders in the Education sector to develop a new system that would provide a durable alternative to traditional masonry systems.

In 2007, British Gypsum launched **GypWall EXTREME**, the ultimate impact resistant partition for use where additional durability is required above and beyond Severe Duty. It is able to cope with the rigours of intensive, high traffic spaces within educational buildings where blockwork has traditionally been specified. **GypWall EXTREME** has successfully been installed in recently built educational buildings in the UK.

Please refer to Section 2 - Selecting partitions for specific solutions to meet Duty requirements.

Lifetime maintenance costs

Whole life cost consideration is a critical aspect of school and educational building design. British Gypsum has developed a number of single and double layer systems specifically for the varied requirements in the Education sector. These systems offer cost effective solutions to meet both capital and revenue requirements.

The DCSF (formerly DfES) recommend a balanced scorecard approach to assessing whole life costing. British Gypsum systems, particularly **GypWall ROBUST** and **GypWall EXTREME**, offer significant benefits that increase whole life cost effectiveness when compared to traditional masonry systems:

- Greater flexibility for high frequency remodelling
- Integration of mechanical and electrical services
- Installation cost savings
- Cost effective and more environmentally friendly disposal
- Build programme predictability
- Reduced disruption costs



Figure 1.3 – BS5234: Part 2: 1992

Partition Duty	Category	Examples
Light	Adjacent space only accessible to persons with high incentive to exercise care. Small chance of accident occurring or of misuse	Staff accommodation
Medium	Adjacent space moderately used, primarily by persons with some incentive to exercise care. Some chance of accident occurring or of misuse	Teachers office
Heavy	Adjacent space frequently used by the public and others with little incentive to exercise care. Chances of accident occurring or of misuse	Ancillary circulation areas
Severe	Adjacent space intensively used by the public and others with little incentive to exercise care. Prone to vandalism and abnormal rough use	Major circulation areas

Source: BS 5234: Part 2: 1992

GypWall systems for specific Duty requirements

Heavy

GypWall CLASSIC single boarded solutions



Key facts

- Range of stud options to match performance requirements
- Acoustic stud option for enhanced acoustic performance
- Fully satisfies *BS 5234: Parts 1 and 2* for both strength and robustness requirements up to Heavy Duty
- 30 - 60 minutes fire resistance to BS and EN standards¹
- Accommodates services within stud cavity
- Stud options for additional height

¹ Please consider Severe and Severe Plus solutions where additional fire, acoustic or duty performance is required.

Severe

GypWall ROBUST single boarded solutions, and GypWall CLASSIC double boarded solutions



Key facts

- High impact resistance
- Fully satisfies *BS 5234: Parts 1 and 2* for both strength and robustness requirements to Severe Duty in a single layer
- Single layer solutions can achieve 60 minutes fire resistance to EN standards
- Double layer solutions can achieve up to 120 minutes fire resistance to EN standards
- Stud options for additional height
- Achieves high levels of sound insulation

Severe plus

GypWall EXTREME and GypWall EXTREME/ROBUST hybrid solutions



Key facts

- Tested far beyond the performance requirements of *BS 5234: Part 2: 1992* Severe Duty
- Capable of securing heavy fixings on a single layer without the need for additional patressing²
- Achieves Severe Duty to *BS 5234* with a single 12.5mm board lining
- Excellent resistance to deliberate attack
- Reduces maintenance lifecycle costs
- Excellent acoustic performance
- Extremely cost effective system combining Gyproc plasterboards and Rigidur H
- Hybrid system ideal for corridor applications

² Dependent on fixing and geometry of the object.

High performance finishes

Thistle Durafinish is a gypsum finish plaster specially formulated for increased resistance to accidental damage, enabling significantly improved maintenance cycles and lower long-term cost in heavy traffic areas of many types of educational building. Please refer to page 56 for additional information.



Please refer to the **WHITE BOOK** – Finishing systems and decorative effects, or the Thistle Durafinish Product Data Sheet for more information, available to download from www.british-gypsum.com



Fixing to GypWall linings

Introduction

There is a wide variety of fixing devices suitable for securing fixtures and fittings to British Gypsum systems. Generally, the choice of individual fixing devices will depend on the type of system, the loading requirements, and the general level of use. This section gives recommendations on the selection of generic devices and proprietary fixings.

When using drylined walls, there is normally a cavity to be bridged between the boards and the background. The fixing device should be long enough to allow for this and to penetrate adequately into the solid wall or background. When timber or metal framed partitions are used, lightweight fixtures can be made directly to the partition linings.

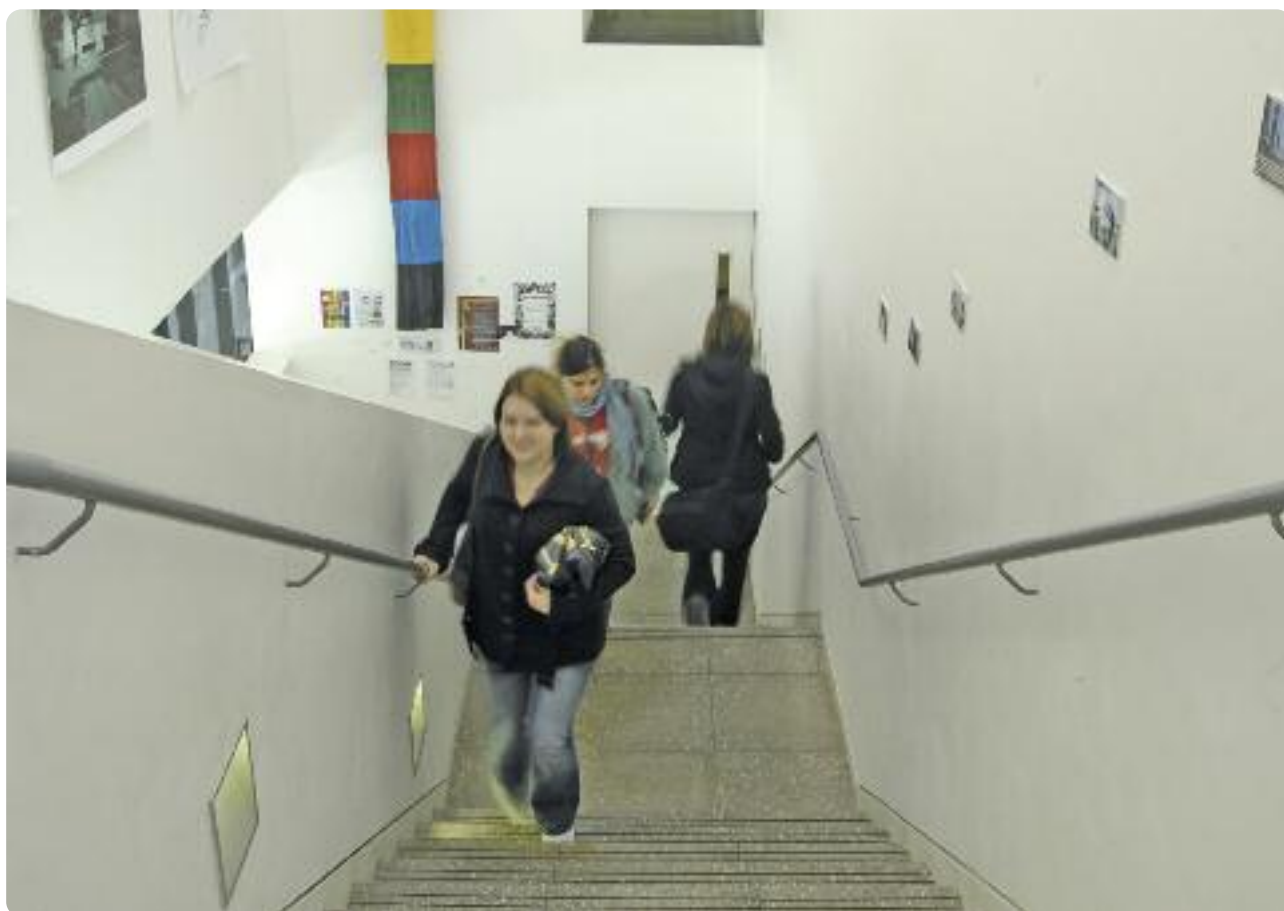
Medium weight fixtures should be made into the studs, or to Gypframe 99 FC 50 Fixing Channels. Heavyweight fixtures (to BS 5234) such as wash basins, wall cupboards and shelving should be fixed to Gypframe 150 FC 90 Fixing Channels. Gypframe 150 FC 90 Fixing Channels have been designed to suit Gypframe 'C' Studs, 'I' Studs, AcouStuds and GypLyner GL1 Lining Channels at 600mm, 400mm or 300mm centres.

Tests have shown that Gypframe 150 FC 90 Fixing Channel can exceed the requirements of BS 5234: Part 2: 1992 Annex K&L.

Gypframe Service Support Plate should be used to provide support to 18mm plywood patresses fitted between stud centres.

GypWall EXTREME, using Rigidur H, offers additional fixing strength to reduce the need for patressing. Please see the Product Data Sheet: 'Glasroc Rigidur H for commercial applications' for more information, available to download from www.british-gypsum.com

















Fixings

The example fixing devices, typical safe working loads and typical failure loads given in Table 1.4 relate to the installation of single fixtures. It is important to ensure that the drylining system specified is capable of supporting the loads, particularly if installing multiple fixtures. For further advice please contact the British Gypsum Drywall Academy.

Table 1.4 – Example fixing devices and typical safe working loads

System	Lightweight fixtures up to 3kg (e.g. socket)	Lightweight to medium fixtures 4-8kg (e.g. small mirror)	Medium weight fixtures 9-20kg (e.g. shelf)	Medium to heavy fixtures 21-50kg (e.g. cupboard)	Heavy fixtures 51-100kg (e.g. basin)
ShaftWall	A	B or C	D or I	G, H or I	K or H
GypWall systems ¹					
GypLyner iwl					
Timber stud	A	B or C	K or D	K	K
Drilyner	A	B	F	L	L
Gyplyner UNIVERSAL wall	A	B or C	D or E	J, K or L	K or L
Reference	Typical SWL ² (typical failure load)	Description			Detail
A	3kg (12kg)	No. 10 woodscrew into Gyproc plasterboard			
B	4kg (16kg)	Steel picture hook and masonry nail into Gyproc plasterboard			
C	6kg (24kg)	Metal self-drive screws into single layer Gyproc plasterboard			
	8kg (32kg)	Metal self-drive screws into double layer Gyproc plasterboard into timber nogging			
D	12kg (48kg)	Steel expanding cavity fixing, e.g. M5 x 40, into Gyproc plasterboard (board thicknesses up to 12.5mm)			
	18kg (72kg)	Steel expanding cavity fixing, e.g. M5 x 65, into Gyproc plasterboard (board thicknesses from 15mm to 28mm)			
E	19kg (76kg)	Gyproc Drywall Screw fixed through Gyproc plasterboard into 0.5mm Gypframe metal stud / Gypframe 99 FC 50 Fixing Channel			
F	20kg (140kg)	Heavy Duty plastic plug fixed through Gyproc plasterboard into masonry with 55mm minimum penetration			
G	30kg (120kg)	Gyproc Jack-Point Screws fixed through Gyproc plasterboard into minimum 0.9mm Gypframe metal stud / Gypframe 150 FC 90 Fixing Channel			
H	50kg (200kg)	No. 12 self-tapping screws fixed through Gyproc plasterboard into minimum 0.9mm Gypframe metal stud / Gypframe 150 FC 90 Fixing Channel			
I	40kg (160kg)	Steel expanding metal cavity fixing, e.g. M4 x 40, through Gyproc plasterboard into 0.9mm Gypframe metal stud / Gypframe 150 FC 90 Fixing Channel (board thicknesses up to 12.5mm)			
	50kg (200kg)	Steel expanding metal cavity fixing, e.g. M4 x 65, through Gyproc plasterboard into 0.9mm Gypframe metal stud / Gypframe 150 FC 90 Fixing Channel (board thicknesses from 15 to 28mm)			
	50kg (200kg)	Steel expanding metal cavity fixing, e.g. M5 x 65, fixing through Gyproc plasterboard into plywood supported by Gypframe Service Support Plate			
J	60kg (240kg)	8mm steel frame fixing fixed through Gyproc plasterboard into masonry with minimum 55mm penetration			
K	120kg (480kg)	No. 12 self-tapping screw fixed through Gyproc plasterboard into timber sub-frame			
L	130kg (520kg)	M8 steel bolt / anchor fixed through Gyproc plasterboard into masonry with minimum 55mm penetration			

¹ For GypWall QUIET SF, ensure that the fixings do not bridge the Gypframe RB1 Resilient Bars, otherwise the acoustic performance may be compromised.







² Safe Working Load (SWL) - a safety factor of 4 (steel fixings) and 7 (plastic fixings) has been used.

NB For technical assistance on above fixings please contact the fixings manufacturer. The suitability of the fixing must be confirmed by the building designer / fixing manufacturer. Reference can also be made to the Construction Fixing Association (CFA) guidance note 'Fixing For Plasterboard', which is currently under review by the CFA and can be accessed at www.fixingscfa.co.uk. When specifying a fixing to / through Gyproc Thermaline laminates, please give consideration to the thickness and compressibility of the insulation to ensure that the fixing used is fit for purpose. The information within Table 1.4 does not take into consideration any additional forces that may be applied whether it be accidental, abuse or otherwise.

The example fixing devices, typical safe working loads and typical failure loads given in Table 1.4 relate to the installation of single fixtures. It is important to ensure that the drylining system specified is capable of supporting the loads, particularly if installing multiple fixtures.

Additional example fixing devices and typical safe working loads when fixing into Rigidur H (GypWall EXTREME) and including 12.5mm Gyproc WallBoard, 15mm Gyproc SoundBloc and 15mm Gyproc DuraLine for comparison where appropriate, are shown in the table below:

Table 1.5 – Example fixing devices and typical safe working loads for GypWall EXTREME

Reference	Typical SWL ¹ (typical failure load)	Description	Detail
B	17kg (68kg)	Steel picture hook and masonry nail into 12.5mm Rigidur H	
	18kg (72kg)	Steel picture hook and masonry nail into 15mm Rigidur H	
M	7kg (49kg)	Fischer PD nylon plug and screw into 12.5mm Gyproc WallBoard	
	10kg (70kg)	Fischer PD nylon plug and screw into 15mm Rigidur H	
	11kg (77kg)	Fischer PD nylon plug into 15mm Gyproc DuraLine	
	20kg (140kg)	Fischer PD nylon plug and screw into 12.5mm or 15mm Rigidur H	
N	21kg (147kg)	Fischer UX (8 x 50) nylon plug and screw into 12.5mm Rigidur H	
	27kg (189kg)	Fischer UX (8 x 50) nylon plug and screw into 15mm Rigidur H	
A	30kg (120kg)	No. 10 woodscrew into 12.5mm or 15mm Rigidur H	
O	17kg (68kg)	Fischer HM8 x 55 steel cavity fixing into 15mm Gyproc SoundBloc	
	20kg (80kg)	Fischer HM8 x 55 steel cavity fixing into 15mm Gyproc DuraLine	
	49kg (196kg)	Fischer HM8 x 55 steel cavity fixing into 15mm Rigidur H	
P	58kg (232kg)	Fischer KD6 steel cavity fixing into 12.5mm Rigidur H	
	74kg (296kg)	Fischer KD6 steel cavity fixing into 15mm Rigidur H	

¹ Safe Working Load (SWL) - a safety factor of four (steel fixings) and seven (plastic fixings) has been used.

NB For technical assistance on above fixings please contact the fixings manufacturer. The suitability of the fixing must be confirmed by the building designer / fixing manufacturer. Reference can also be made to the Construction Fixing Association (CFA) guidance note 'Fixing For Plasterboard', which is currently under review by the CFA and can be accessed at www.fixingscfa.co.uk

The information within **Table 1.5** does not take into consideration any additional forces that may be applied whether it be accidental, abuse or otherwise.

The example fixing devices, typical safe working loads and typical failure loads given in **Table 1.5** relate to the installation of single fixtures. It is important to ensure that the drylining system specified is capable of supporting the loads, particularly if installing multiple fixtures.

Indoor air quality

We typically spend 80% of our time indoors, in schools, offices, hospitals and our homes. Clean air is something we assume we have in the buildings in which we live, work and learn, yet impurities found in the air can cause health problems and a reduction in our general well-being.

Clean air on the other hand can speed up patient recovery in hospitals, reduce absence at work and increase pupils' concentration at school.

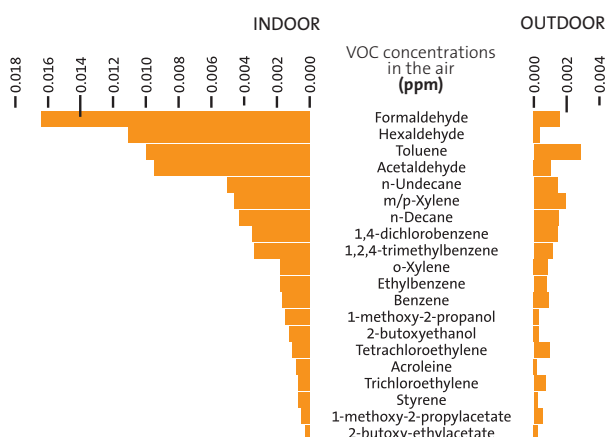
Volatile organic compounds (VOCs)

Although we don't notice them, pollutants called volatile organic compounds (VOCs) including formaldehyde are often present in the air we breathe – naturally emitted from furniture, carpets, paints, varnishes, cleaning products and building materials.

VOCs have an initial boiling point of less than or equal to 250°C. They are emitted as a gas from a liquid or solid and enter the surrounding air. VOCs are numerous and varied. They include both human-made and naturally occurring chemical compounds. Formaldehyde (CH₂O) is both the highest concentration and highest risk VOC. Refer to figure 1 – VOC concentration.

Studies have shown that the air indoors can have concentrations of VOCs many times higher than the outdoor air. The increased focus on the reduction of energy consumption is leading to more airtight buildings, which means the quality of air is becoming even more critical. Refer to figure 1 – VOC concentration. Studies have shown that ventilation systems are only about 30% effective at removing VOCs from the air indoors.

1 VOC concentration comparison, indoor vs outdoor



Source: Indoor Air Quality Observatory (OQAI)

Some of the health problems VOCs can cause

People often complain about health problems after extended periods of time spent indoors. Studies have shown that many of these symptoms can be attributed to VOCs:

- Headaches
- Nausea
- Lack of concentration
- Eye irritation
- Fatigue
- Breathing problems

The World Health Organisation (WHO) concerns about formaldehyde (which is a common VOC) in relation to human health are well published (WHO guidelines for indoor air quality: selected pollutants; 2010). All current regulation focuses on VOC emissions at project handover, and in reducing the VOC content of construction products.

Legislation and guidance

However, academic and evidence based design is increasingly highlighting that the major issue with VOCs is post handover / during building use.

Building regulations and guidance relating to VOCs:

- Building Regulations Approved Document F (ventilation)
- Building Bulletin 101 (education)
- BRE Digest 464 Part 2
- BRE Environmental Assessment Method (BREEAM) (indoor air quality)
- Health Technical Memorandum (HTM)03-01
- Leadership in Energy and Environmental Design (LEED) (indoor air quality)

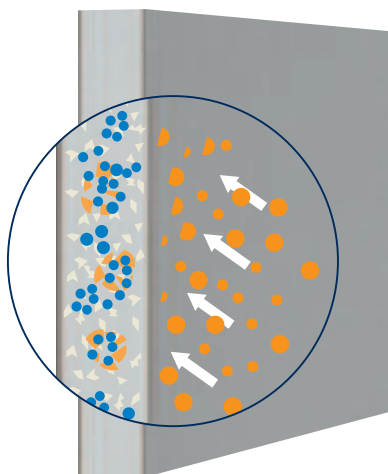
You can't see or smell VOCs. Therefore there is no way of knowing what concentrations you are being exposed to on a daily basis.

ACTIVair technology

ACTIVair is a new technology added to certain British Gypsum products. It is designed specially to decompose formaldehyde into non-harmful inert compounds, thus eliminating the risk of re-emission. It is tested to capture and convert 70% of formaldehyde. Refer to figure 2 – ACTIVair technology.

Improving the indoor air quality is a major consideration amongst clients and building occupants, most notably those concerned with sustainability and health and wellbeing. Good clean air can reduce health problems as well as enhancing our healthy living in both our work and living spaces.

2 ACTIVair technology



1. Formaldehyde molecules (●) in the air are absorbed by the plasterboard
2. ACTIVair technology (→) converts them into inert compounds
3. The inert compounds (●) remain locked in the plasterboard

ACTIVair technology

ACTIVair technology:

- Decomposes 70% of formaldehyde making indoor spaces healthier¹
- Uniquely captures and converts formaldehyde, removing the risk of re-emission even if the product is damaged or at end of life
- Will continue to work for at least 50 years
- Works though an emulsion paint finish
- Is fully recyclable through the British Gypsum closed loop Plasterboard Recycling Scheme (PRS) - Plasterboard only
- Has no impact on the installation or performance of the products or systems they are included in with regards to fire, acoustics, thermal or durability compared to standard versions of the products

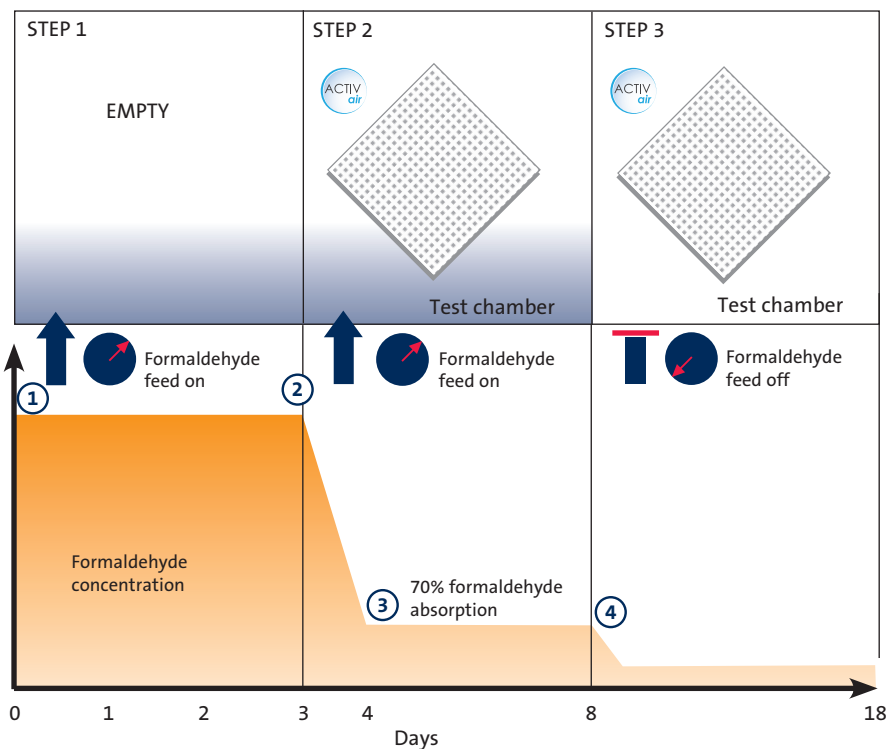


¹ In a controlled test environment

The effectiveness of **ACTIVair** technology has been tested by the accredited Eurofins and VITO laboratories to ISO 16000-23. The test shows that ACTIVair decomposes 70% of the formaldehyde in a controlled test environment. Refer to figure 3 – **ACTIVair** test principle.

When using **ACTIVair** products aim to have coverage in each room on the walls and/or ceiling equivalent to the m² area of the floor.

3 ACTIVair test principle

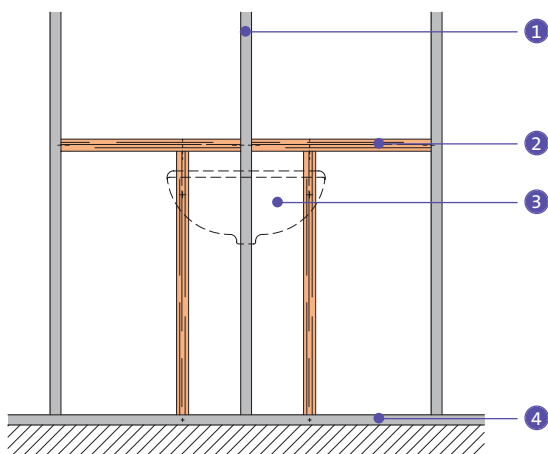


ACTIVair test principle

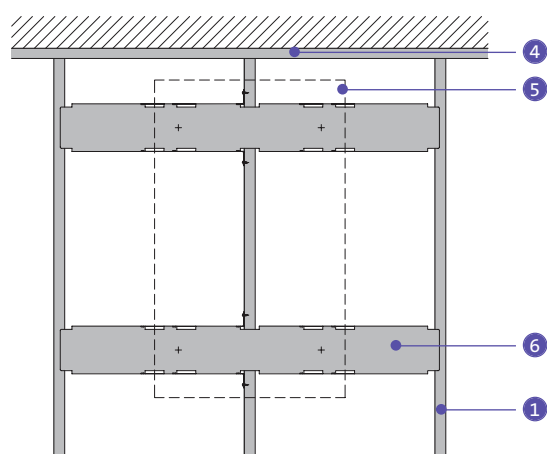
- 1 Formaldehyde was fed into the empty test chamber at a constant level
- 2 On day 3, a sample of a product containing ACTIVair technology was introduced to the test chamber
- 3 After 24 hours, ACTIVair technology had absorbed 70% of the formaldehyde in the chamber, with a continued in-feed of formaldehyde
- 4 Formaldehyde feed was stopped on day 8, and levels were further reduced as they continued to be absorbed by ACTIVair technology

Construction details

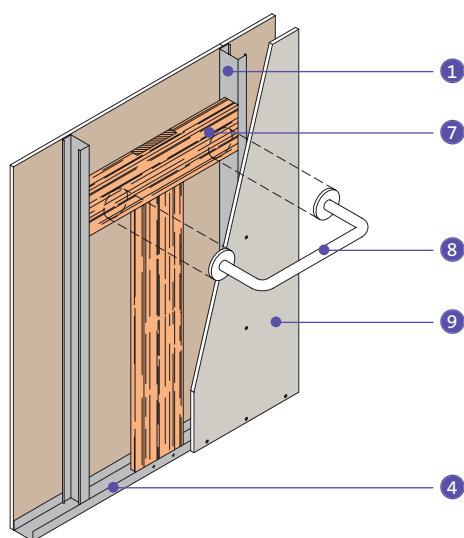
1 Basin – fixture



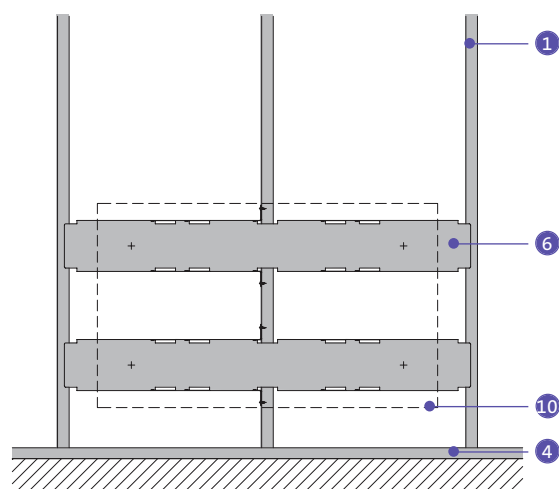
2 Wall cupboard fixture



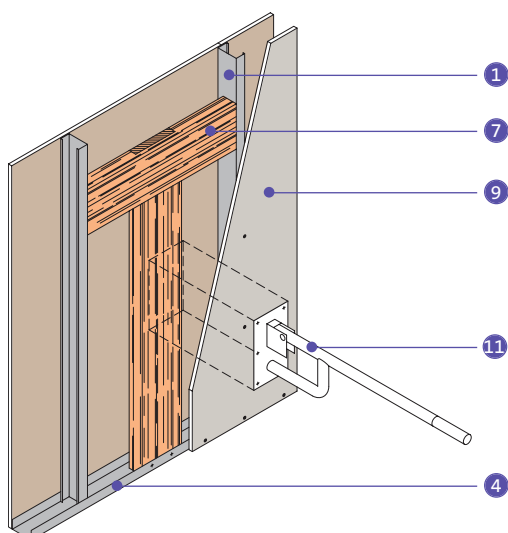
3 Horizontal handrail fixture



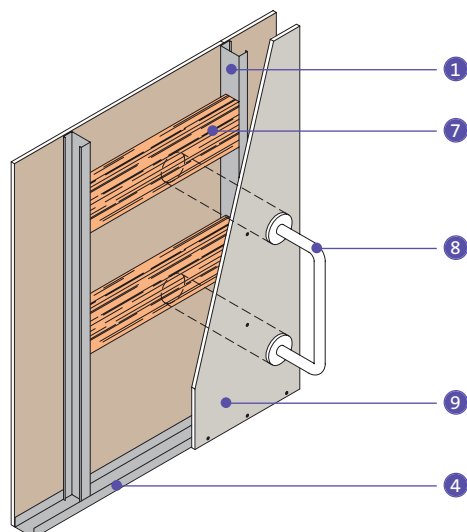
4 Radiator fixture



5 Folding support rail fixture



6 Vertical handrail fixture



- ① Gyproc studs
- ② 50 x 38mm timber suitably fixed to studs and channel
- ③ Basin
- ④ Gyproc plasterboard
- ⑤ Wall cupboard
- ⑥ Gyproc 150 FC 90 Fixing Channel

- ⑦ 150 x 50mm timber suitably fixed to studs and channel
- ⑧ Grab rail
- ⑨ Gyproc plasterboard
- ⑩ Radiator
- ⑪ Folding support rail



Selecting partitions



Selecting partitions

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This section will guide you through the calculation process to arrive at the acoustic requirement for partitions according to *BB93*. Then, using an example school, a number of worked examples will be provided. Finally, British Gypsum solutions designed to meet the various acoustic requirements are presented.



Introduction

Partitions in schools

Teaching and studying can be disrupted by unwanted noise through the walls from adjacent spaces. Building Bulletin 93 (BB93) provides performance standards in terms of the level difference $D_{nT(T_{mf,max}),w}$ for the attenuation of airborne sound transmission between adjoining rooms. These values are defined by the activity in the source room and the noise tolerance in the receiving room.

The level differences must be determined in both directions as one direction may have more stringent performance criteria. These values can simply be found by using **Figure 2.1** and tracing across to where the two room types coincide.

The minimum weighted sound level difference between rooms is quoted in terms of $D_{nT(T_{mf,max}),w}$. However partition performances are based on laboratory airborne sound insulation data measured in terms of sound reduction index R_w . The following procedure applies a correction factor to take account of this difference, and can be used to select an appropriate partition specification.

STEP 1 Determine the minimum BB93 weighted standardised sound level difference between rooms in each direction and the associated reverberation time, $T_{mf,max}$ from **Figure 2.1** on pages 24 and 25.

STEP 2 Estimate the required weighted sound reduction index $R_{w\ est}$ using the following formula:-

$$R_{w\ est} = D_{nT(T_{mf,max}),w} + 10 \log \frac{(S \times T_{mf,max})}{V} + 8 \text{ dB}$$

Where: S = surface area of the separating element
 V = volume of the receiving room

$T_{mf,max}$ = maximum value of the reverberation time T_{mf}

STEP 3 To account for less favourable mounting conditions and flanking noise transmission, a correction factor X is applied to the estimated value above. British Gypsum has followed BB93 recommendations and assumed it to be 5 dB, but a higher value may be required depending on the quality of flanking details – an acoustic consultant should be appointed to advise in this respect.

Therefore the weighted sound reduction index R_w that should be used to select the partition from laboratory test data is:

$$R_w = R_{w\ est} + X \text{ dB or } R_w = R_{w\ est} + 5 \text{ dB}$$

It is not possible to calculate the acoustic requirement by room type without the precise room dimensions. In order to demonstrate the full calculation, an example based on a typical secondary school is shown later.

Using the matrix

The level of sound insulation between spaces is directly related to the functions of the two adjoining spaces and their tolerance to noise being transmitted through the common wall. Building Bulletin 93 (BB93) has classified the levels of activity noise and the noise tolerance for each room type found within a school as high, medium, low or very low. To determine the minimum airborne sound insulation performance of the common wall, the ratings are used to find the weighted standardised level difference $D_{nT(T_{mf,max}),w}$ from a separate table. The activity room and receiving room levels are then reversed to establish the more onerous configuration. British Gypsum has combined these two tables into **Figure 2.1** so the standardised level difference $D_{nT(T_{mf,max}),w}$ can instantly be found by tracing across the activity noise and receiving noise room types.

The mid-frequency reverberation times (T_{mf}) for all the room types are also incorporated into **Figure 2.1**, so as to enable easy reference when establishing the required levels of sound absorption, and converting the standardised level difference into a laboratory based airborne sound insulation performance.





Figure 2.1 Matrix

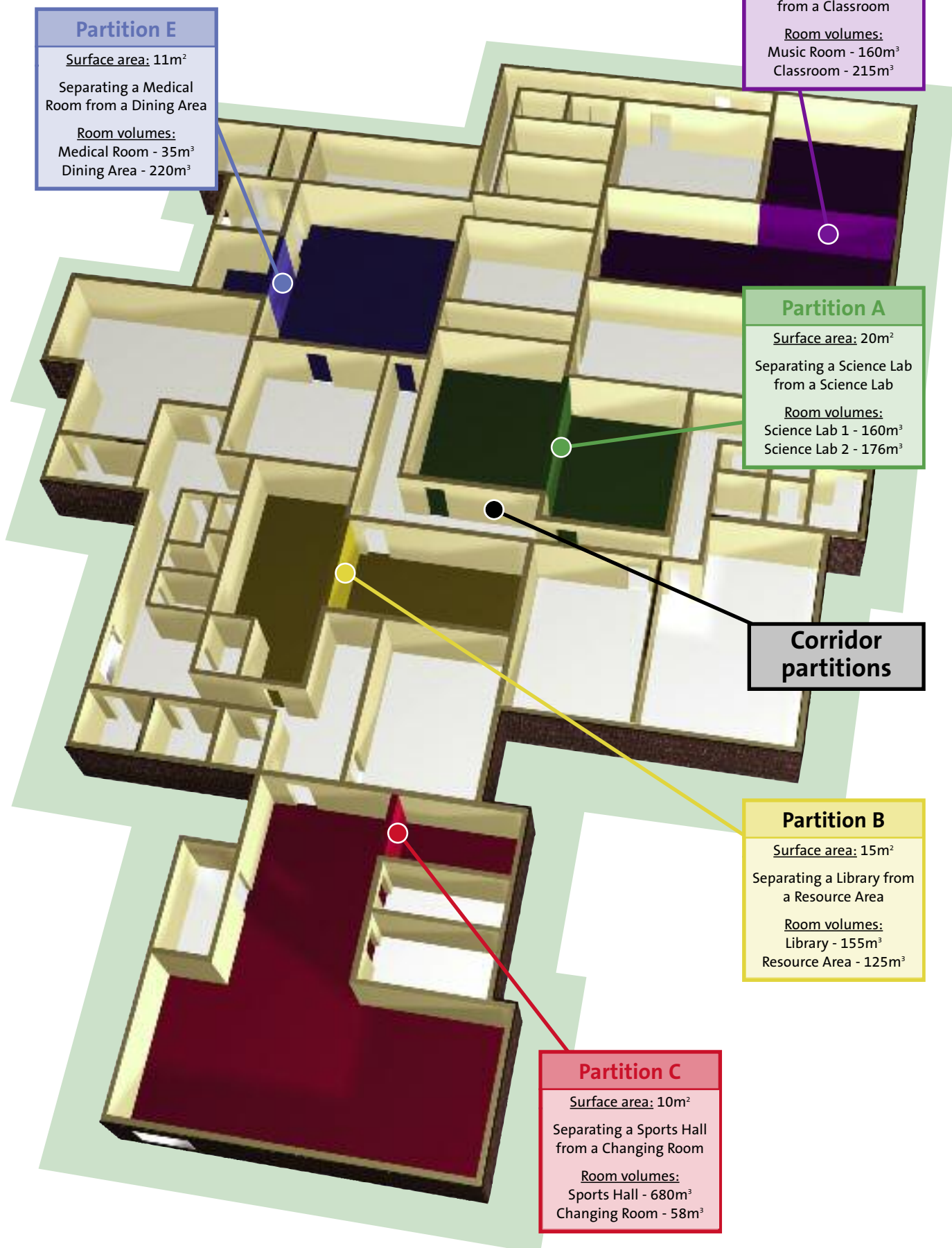
1

Minimum $D_{nT}(T_{mf,max})_w$ (dB)														
		Nursery school		Primary school	Secondary school	Open plan	Music							
		Playrooms	Quiet rooms	Classrooms, class bases, general teaching areas, seminar rooms, tutorial rooms, language laboratories	Classrooms, general teaching areas, seminar rooms, tutorial rooms, language laboratories	Teaching areas	Resource areas	Classrooms	Small practice / group room	Ensemble room	Performance / recital room	Recording studio	Control room for recording	
NOISE TOLERANCE IN RECEIVING ROOM	Nursery school	Playrooms	55	40	45	45	45	45	55	55	55	55	55	55
		Quiet rooms	55	40	45	45	45	45	55	55	55	55	55	55
	Primary school	Classrooms, class bases, general teaching areas, seminar rooms, tutorial rooms, language laboratories	55	40	45	45	45	45	55	55	55	55	55	55
	Secondary school	Classrooms, general teaching areas, seminar rooms, tutorial rooms, language laboratories	55	40	45	45	45	45	55	55	55	55	55	55
	Open plan	Teaching areas	50	35	40	40	40	40	55	55	55	55	55	50
		Resource areas	50	35	40	40	40	40	55	55	55	55	55	50
	Music	Classrooms	55	40	45	45	45	45	55	55	55	55	55	55
		Small practice / group room	55	40	45	45	45	45	55	55	55	55	55	55
		Ensemble room	55	45	50	50	50	50	60	60	60	60	60	55
		Performance / recital room	55	45	50	50	50	50	60	60	60	60	60	55
		Recording studio	55	45	50	50	50	50	60	60	60	60	60	55
		Control room for recording	55	40	45	45	45	45	55	55	55	55	55	55
	Lecture rooms	Small (fewer than 50 people)	55	40	45	45	45	45	55	55	55	55	55	55
		Large (more than 50 people)	55	45	50	50	50	50	60	60	60	60	60	55
	Classrooms designed specifically for use by hearing impaired students (including speech therapy rooms)		55	45	50	50	50	50	60	60	60	60	60	55
	Study room (individual study, withdrawal, remedial work, teacher preparation)		55	40	45	45	45	45	55	55	55	55	55	55
	Libraries	Quiet study areas	55	40	45	45	45	45	55	55	55	55	55	55
		Resource areas	50	35	40	40	40	40	55	55	55	55	55	50
	Science laboratories		50	35	40	40	40	40	55	55	55	55	55	50
	Drama studios		55	45	50	50	50	50	60	60	60	60	60	55
	Design and Technology	Resistant materials, CAD/CAM areas	45	30	35	35	35	35	55	55	55	55	55	45
		Electronics / control, textiles, food, graphics, design / resource areas	50	35	40	40	40	40	55	55	55	55	55	50
	Art rooms		50	35	40	40	40	40	55	55	55	55	55	50
	Assembly halls, multi-purpose halls (drama, PE, audio / visual presentations, assembly, occasional music)		55	40	45	45	45	45	55	55	55	55	55	55
	Audio visual, video conference rooms		55	40	45	45	45	45	55	55	55	55	55	55
	Atria, circulation spaces used by students		50	35	40	40	40	40	55	55	55	55	55	50
	Indoor sports hall		50	35	40	40	40	40	55	55	55	55	55	50
	Dance studio		50	35	40	40	40	40	55	55	55	55	55	50
	Gymnasium		50	35	40	40	40	40	55	55	55	55	55	50
	Swimming pool		45	30	35	35	35	35	55	55	55	55	55	45
	Interviewing / counselling rooms, medical rooms		55	40	45	45	45	45	55	55	55	55	55	55
	Dining rooms		45	30	35	35	35	35	55	55	55	55	55	45
	Ancillary spaces	Kitchens	45	30	35	35	35	35	55	55	55	55	55	45
		Offices, staff rooms	50	35	40	40	40	40	55	55	55	55	55	50
		Corridors, stairwells	45	30	35	35	35	35	55	55	55	55	55	45
		Coats and changing areas	45	30	35	35	35	35	55	55	55	55	55	45
		Toilets	45	30	35	35	35	35	55	55	55	55	55	45

ACTIVITY NOISE IN SOURCE ROOM																												Mid-frequency reverberation times T_m (seconds)
Small (fewer than 50 people)		Lecture rooms		Classrooms designed specifically for use by hearing impaired students (including speech therapy rooms)	Study room (individual study, withdrawal, remedial work, teacher preparation)	Libraries		Science laboratories	Drama studios	Resistant materials, CAD/CAM areas	Design and technology		Art rooms	Assembly halls, multi-purpose halls (drama, PE, audio / visual presentations, assembly, occasional music)	Audio visual, video conference rooms	Atria, circulation spaces used by students	Indoor sports hall	Dance studio	Gymnasium	Swimming pool	Interviewing / counselling rooms, medical rooms	Dining rooms	Ancillary spaces					
						Quiet study areas	Resource areas																		Electronics / control, textiles, food, graphics, design / resource areas			
45	45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	55	55	55	55	40	55	55	45	55	55	45	<0.6
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	55	55	55	55	55	40	55	55	45	55	55	45	<0.6
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	55	55	55	55	55	40	55	55	45	55	55	45	<0.6
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	55	55	55	55	55	40	55	55	45	55	55	45	<0.8
40	40	40	35	35	40	40	50	50	50	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<0.8
40	40	40	35	35	40	40	50	50	50	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<1.0
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	<1.0
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	<0.8
50	50	50	45	45	50	50	55	55	55	50	50	55	50	50	55	50	50	55	55	55	45	55	55	50	55	55	50	0.6-1.2
50	50	50	45	45	50	50	55	55	55	50	50	55	50	50	55	50	50	55	55	55	45	55	55	50	55	55	50	1.0-1.5
50	50	50	45	45	50	50	55	55	55	50	50	55	50	50	55	50	50	55	55	55	45	55	55	50	55	55	50	0.6-1.2
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	<0.5
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	<0.8
50	50	50	45	45	50	50	55	55	55	50	50	55	50	50	55	50	50	55	55	55	45	55	55	50	55	55	50	<1.0
50	50	50	45	45	50	50	55	55	55	50	50	55	50	50	55	50	50	55	55	55	45	55	55	50	55	55	50	<0.4
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	<0.8
45	45	45	40	40	45	45	55	55	55	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	<1.0
40	40	40	35	35	40	40	50	50	50	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<1.0
40	40	40	35	35	40	40	50	50	50	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<0.8
50	50	50	45	45	50	50	55	55	55	50	50	55	50	50	55	50	50	55	55	55	45	55	55	50	55	55	50	<1.0
35	35	35	30	30	35	35	45	45	35	35	35	45	35	35	45	35	35	45	45	45	30	45	45	35	45	45	35	<0.8
40	40	40	35	35	40	40	50	50	40	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<0.8
40	40	40	35	35	40	40	50	50	40	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<0.8
45	45	45	40	40	45	45	55	55	45	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	0.8-1.2
45	45	45	40	40	45	45	55	55	45	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	<0.8
40	40	40	35	35	40	40	50	50	40	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<1.5
40	40	40	35	35	40	40	50	50	40	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<1.5
40	40	40	35	35	40	40	50	50	40	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<1.5
40	40	40	35	35	40	40	50	50	40	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<1.2
35	35	35	30	30	35	35	45	45	35	35	35	45	35	35	45	35	35	45	45	45	30	45	45	35	45	45	35	<2.0
45	45	45	40	40	45	45	55	55	45	45	45	55	45	45	55	45	45	55	55	55	40	55	55	45	55	55	45	<0.8
35	35	35	30	30	35	35	45	45	35	35	35	45	35	35	45	35	35	45	45	45	30	45	45	35	45	45	35	<1.0
35	35	35	30	30	35	35	45	45	35	35	35	45	35	35	45	35	35	45	45	45	30	45	45	35	45	45	35	<1.5
40	40	40	35	35	40	40	50	50	40	40	40	50	40	40	50	40	40	50	50	50	35	50	50	40	50	50	40	<1.0
35	35	35	30	30	35	35	45	45	35	35	35	45	35	35	45	35	35	45	45	45	30	45	45	35	45	45	35	*
35	35	35	30	30	35	35	45	45	35	35	35	45	35	35	45	35	35	45	45	45	30	45	45	35	45	45	35	<1.5
35	35	35	30	30	35	35	45	45	35	35	35	45	35	35	45	35	35	45	45	45	30	45	45	35	45	45	35	<1.5

Figure 2.2 - Typical school layout

Determining the Weighted Sound Reduction index for partitions



The following example works through the calculation process required to establish the weighted sound reduction index (R_w) for **Partition D** in the example school layout shown in **Figure 2.2**.

Using the following formula, combined with the minimum $D_{nT(T_{mf,max}),w}$ figures obtained from **Figure 2.1**, pages 24 and 25, the R_w figure for the partition between the two areas under consideration can be established. It is important to determine the R_w value in both directions considering each room as both the receiving room and the source room. Once this has been done the higher of the two values should be selected and an appropriate partition specification can be selected by following the colour coded guidance tabs on the side of this publication.

Formula:

$$R_w = D + 10 \log \left(\frac{S T_{mf}}{V} \right) + 8^{**} + 5^{**} \text{ dB.}$$

Where D = minimum standardised sound level difference - $D_{nT(T_{mf,max}),w}$ - see **Figure 2.1**, pages 24 and 25.

T_{mf} = maximum value of reverberation time in receiving room - see **Figure 2.1**, pages 24 and 25.

S = surface area of the partition in m^2 .

V = volume of receiving room in m^3 .

** = constants used in conversion (source - BB93).

Therefore, for **Partition D** between a Music Room and a Classroom the calculation would be as follows:

$$\text{Music Room (source) to Classroom (receiving) - } R_w = 55 + 10 \log \left(\frac{20 \times 0.8}{215} \right) + 8 + 5 = 57 \text{ dB.}$$

$$\text{Classroom (source) to Music Room (receiving) - } R_w = 45 + 10 \log \left(\frac{20 \times 1.0}{160} \right) + 8 + 5 = 49 \text{ dB.}$$

The weighted sound reduction index required between these two rooms will therefore be the higher of these two values.

R_w 57 dB = **Partition D**.



Selecting your partition type

Example A: R_w 44 dB See appropriate tab reference for partition specification options

Example B: R_w 48 dB See appropriate tab reference for partition specification options

Example C: R_w 53 dB See appropriate tab reference for partition specification options

Example D: R_w 57 dB See appropriate tab reference for partition specification options

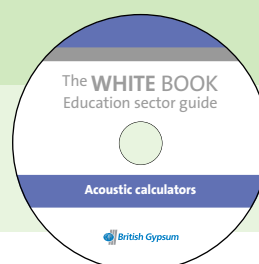
Example E: R_w 63 dB See appropriate tab reference for partition specification options

Corridor partitions: To account for the intermittent use of circulation spaces, all corridor partitions, except those between music rooms (which should have a minimum performance of R_w 45 dB), should have a minimum performance of R_w 40 dB

The partition types in the following tables are grouped around the DCSF Standard Specifications, Layouts and Dimensions (SSLD) guidance for partitions in schools.

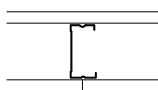
To simplify the process of determining the required R_w British Gypsum has developed an easy-to-use performance calculator which is located in the back cover of this publication. Simply place the disk in your computer and follow the guidance instructions to determine the required R_w for all of the partitions on your school project.

British Gypsum recommends that a qualified acoustic consultant be appointed to check all acoustic specifications, details and calculations.



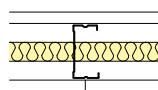
Solutions to meet R_w 40-44 dB (43 = DCSF partition type A)

1



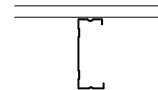
One layer of board each side of Gypframe
70 S 50 'C' Studs at 600mm centres.
Linings as in table.

2



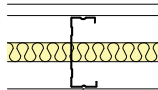
One layer of board each side of Gypframe
70 S 50 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.

3



One layer of board each side of Gypframe
92 S 50 'C' Studs at 600mm centres.
Linings as in table.



4



One layer of board each side of Gypframe
92 S 50 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.

Heavy

Table 2.1 - GypWall CLASSIC specification solutions for R_w 40-44 dB (Type A 43 dB)

Heavy	System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB		Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm)		System reference	
					Any finish ³	Skim only ⁴			BS	EN ¹	Any finish ³	Skim only ⁴
30 minutes fire resistance		EN	BS									
1	CLASSIC	SoundBloc		1 x 15	42		102	26	3800	3800	A206165	
3	CLASSIC	SoundBloc		1 x 15	44	45	124	27	4700	4000	A206261	A206261S
60 minutes fire resistance		EN	BS									
3	CLASSIC	FireLine		1 x 15	40	41	124	25	4700	4000	A206265	A206265S
1	CLASSIC	SoundBloc f		1 x 15	42		102	27	3800	3800	A206301	
2	CLASSIC	FireLine		1 x 15	43	44	102	24	3800	3800	A206110	A206110S
4	CLASSIC	FireLine		1 x 15	44	45	124	25	4700	4000	A206266	A206266S
3	CLASSIC	SoundBloc f		1 x 15	44	45	124	27	4700	4000	A206305	A206305S

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² These systems have an **ACTIVair** board option available for VOC control to improve indoor air quality. Refer to the indoor air quality section for further details.

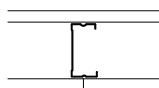
³ Sound insulation performance for partitions finished using jointing or plaster skim.

⁴ Sound insulation performance for partition finished with a 2mm skim finish of Thistle Multi-Finish.



Solutions to meet R_w 40-44 dB (43 = DCSF partition type A)


1



One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
Linings as in table.

Severe

Table 2.2 - GypWall robust specification solutions for R_w 40-44 dB (Type A 43 dB)

System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB		Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm)		System reference	
				Any finish ³	Skim only ⁴			BS	EN ¹		
60 minutes fire resistance											
1	ROBUST	Duraline		1 x 15	42	43	102	29	4000	4000	Q606043 Q606043S

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.


² These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

³ Sound insulation performance for partitions finished using jointing or plaster skim.

⁴ Sound insulation performance for partition finished with a 2mm skim finish of Thistle Multi-Finish.

Severe

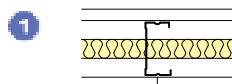
Table 2.2 - GypWall robust specification solutions for R_w 40-44 dB (Type A 43 dB)

System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB	Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm)		System reference	
							BS	EN ¹		
60 minutes fire resistance		EN BS								
1	EXTREME	Rigidur H		1 x 12.5	44	97	31	3800	3800	X606009

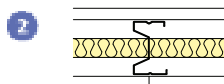
¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

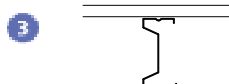
Solutions to meet R_w 45-49 dB (48 = DCSF partition type B)



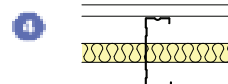
One layer of board each side of Gypframe
70 S 50 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.



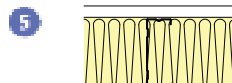
One layer of board each side of
Gypframe 70 AS 50 AcouStuds at 600mm
centres. 25mm Isover APR 1200 in
the cavity. Linings as in table.



One layer of board each side of Gypframe
92 AS 50 AcouStuds at 600mm centres.
Linings as in table.







One layer of board each side of Gypframe
92 S 50 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.



One layer of board each side of Gypframe
92 S 50 'C' Studs at 600mm centres.
100mm Isover Modular Roll in the cavity.
Linings as in table.

Heavy

Table 2.4 - GypWall classic specification solutions for R_w 45-49 dB (Type B 48 dB)

System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB		Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm)		System reference	
				Any finish ³	Skim only ⁴			BS	EN ¹		Any finish ³
Fire resistance											
	EN	BS									
CLASSIC	SoundBloc		1 x 15	45	46	124	27	4900	4000	A206A281	A206A281S
CLASSIC	SoundBloc		1 x 15	47	48	102	26	3800	3800	A206197	A206197S
CLASSIC	SoundBloc		1 x 15	48		102	26	4000	4000	A206A253	
CLASSIC	SoundBloc		1 x 15	49	50	124	27	4700	4000	A206262	A206262S
Fire resistance											
	EN	BS									
CLASSIC	FireLine		1 x 15	46	48	124	25	4700	4000	A206268	A206268S
CLASSIC	SoundBloc F		1 x 15	45	46	124	27	4900	4000	A206A305	A206A305S
CLASSIC	SoundBloc F		1 x 15	47	48	102	27	3800	3800	A206302	A206302S
CLASSIC	SoundBloc F		1 x 15	48		102	27	4000	4000	A206A302	
CLASSIC	SoundBloc F		1 x 15	49	50	124	27	4700	4000	A206306	A206306S

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

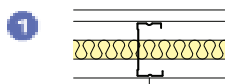
² These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

³ Sound insulation performance for partitions finished using jointing or plaster skim.

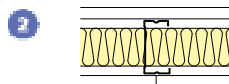
⁴ Sound insulation performance for partition finished with a 2mm skim finish of Thistle Multi-Finish.



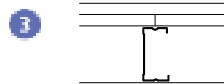
Solutions to meet R_w 45-49 dB (48 = DCSF partition type B)



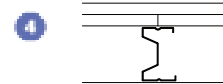
One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.



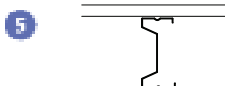
One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
50mm Isover APR 1200 in the cavity.
Linings as in table.



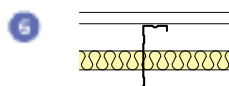
Two layers of board each side of Gypframe
70 S 50 'C' Studs at 600mm centres.
Linings as in table.



Two layers of board each side of Gypframe
70 AS 50 AcouStuds at 600mm centres.
Linings as in table.








One layer of board each side of Gypframe
92 AS 50 AcouStuds at 600mm centres.
Linings as in table.



One layer of board each side of Gypframe
92 S 60 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.

Severe

Table 2.5 - GypWall CLASSIC and GypWall ROBUST specification solutions for R_w 45-49 dB (Type B 48 dB)

Severe	System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB Any finish ³ Skim only ⁴		Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm) BS EN ¹			Any finish ³	System reference Skim only ⁴
	60 minutes fire resistance												
	EN	BS											
5	ROBUST	DuraLine		1 x 15	45	46	124	29	4900	4000	A206A277	A206A277S	
1	CLASSIC	DuraLine		1 x 15	47		102	29	4000	4000	Q606044		
2	CLASSIC	DuraLine		1 x 15	48	50	102	29	4000	4000	Q606045	Q606045S	
6	ROBUST	DuraLine		1 x 15	48	49	124	29	4900	4000	A206258	A206258S	
3	CLASSIC	WallBoard		2 x 12.5	45		122	35	4600	4600 ²	A206015		
4	CLASSIC	WallBoard		2 x 12.5	47		122	35	4700	4700 ²	A206A015		
3	CLASSIC	SoundBloc		2 x 12.5	49		122	33	4600	4600	A206166		
120 minutes fire resistance													
EN	BS												
3	CLASSIC	FireLine		2 x 12.5	46		122	40	4600	4200	A206079		

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

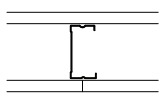
³ Sound insulation performance for partitions finished using jointing or plaster skim.

⁴ Sound insulation performance for partition finished with a 2mm skim finish of Thistle Multi-Finish.

Solutions to meet R_w 45-49 dB (48 = DCSF partition type B)

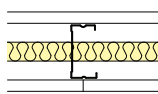


1



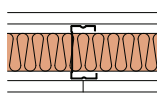
One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
Linings as in table.

2



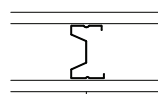
One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.

3



One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
60mm Isover ULTIMATE Piano Plus
20 kg/m³ in the cavity. Linings as in table.

4



One layer of board one side, two
layers of board other side of Gypframe
70 AS 50 AcouStuds at 600mm centres.
Linings as in table.

**Severe
plus**

Table 2.6 - GypWall EXTREME specification solutions for R_w 45-49 dB (Type B 48 dB)

	System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB	Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm) BS	Max. partition height (mm) EN ¹	System reference
30 minutes fire resistance EN BS										
2	EXTREME	Rigidur H		1 x 12.5	47	97	31	3800	3800	X606010
1	EXTREME	Rigidur H		1 x 15	45	102	37	4000	4000	X606001
1	EXTREME/ROBUST Hybrid	DuraLine / Rigidur H		15/15	45	102	33	4000	4000	X606017
4	EXTREME/ROBUST Hybrid	DuraLine / WallBoard (inner) + Rigidur H		15/15 + 12.5	47	115	40	4200	4200	X606A019
4	EXTREME/ROBUST Hybrid	DuraLine / SoundBloc (inner) + Rigidur H		15/15 + 12.5	49	115	44	4200	4200	X606A021
60 minutes fire resistance EN BS										
3	EXTREME	Rigidur H		1 x 12.5	49	97	31	3800	3800	X606012

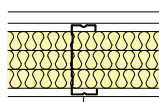
¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.



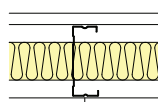
Solutions to meet R_w 50-55 dB (53 = DCSF partition type C)

1



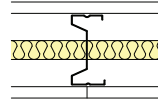
One layer of board each side of Gypframe 92 S 50 'C' Studs at 600mm centres. 3 x 25mm Isover APR 1200 in the cavity. Linings as in table.

2



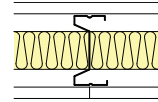
One layer of board each side of Gypframe 92 S 50 'C' Studs at 600mm centres. 50mm Isover APR 1200 in the cavity. Linings as in table.

3



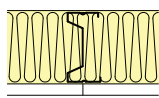
One layer of board each side of Gypframe 92 AS 50 AcouStuds. 25mm Isover APR 1200 in the cavity. Linings as in table.

4



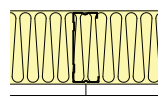
One layer of board each side of Gypframe 92 AS 50 AcouStuds at 600mm centres. 50mm Isover APR 1200 in the cavity. Linings as in table.

5



One layer of board each side of Gypframe 92 AS 50 AcouStuds at 600mm centres. 100mm Isover Modular Roll in the cavity. Linings as in table.


6



One layer of board each side of Gypframe 92 S 50 'C' Studs at 600mm centres. 100mm Isover Modular Roll in the cavity. Linings as in table.

Heavy

Table 2.7 - GypWall classic specification solutions for R_w 50-55 dB (Type C 53 dB)

System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB Any finish ³ Skim only ⁴		Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm) BS EN ¹			System reference
Fire resistance EN BS											
CLASSIC	SoundBloc		1 x 15	50	51	124	27	4700	4000	A206263	A206263S
CLASSIC	SoundBloc		1 x 15	50	51	124	27	4900	4000	A206A282	A206A282S
CLASSIC	SoundBloc		1 x 15	51	52	124	27	4900	4000	A206A283	A206A283S
CLASSIC	SoundBloc		1 x 15	52	54	124	27	4900	4000	A206A284	A206A284S
Fire resistance EN BS											
CLASSIC	SoundBloc F		1 x 15	50	51	124	27	4700	4000	A206309	A206309S
CLASSIC	SoundBloc F		1 x 15	50	51	124	27	4900	4000	A206A306	A206A306S
CLASSIC	SoundBloc F		1 x 15	51	52	124	27	4700	4000	A206308	A206308S
CLASSIC	SoundBloc F		1 x 15	51	52	124	27	4900	4000	A206A309	A206A309S
CLASSIC	SoundBloc F		1 x 15	52	53	124	27	4700	4000	A206307	A206307S
CLASSIC	SoundBloc F		1 x 15	52	54	124	27	4900	4000	A206A308	A206A308S

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

³ Sound insulation performance for partitions finished using jointing or plaster skim.

⁴ Sound insulation performance for partition finished with a 2mm skim finish of Thistle Multi-Finish.









Solutions to meet R_w 50-55 dB (53 = DCSF partition type C)

- 1 One layer of board each side of Gypframe 70 AS 50 AcouStuds at 600mm centres. 50mm Isover APR 1200 in the cavity. Linings as in table.
- 2 One layer of board each side of Gypframe 70 AS 50 AcouStuds at 600mm centres. 80mm Isover Modular Roll in the cavity. Linings as in table.
- 3 Two layers of board each side of Gypframe 70 S 50 'C' Studs at 600mm centres. 50mm Isover APR 1200 in the cavity. Linings as in table.
- 4 Two layers of board each side of Gypframe 70 AS 50 AcouStuds at 600mm centres. Linings as in table.
- 5 Two layers of board each side of Gypframe 70 S 50 'C' Studs at 600mm centres. 25mm Isover APR 1200 in the cavity. Linings as in table.
- 6 Two layers of board each side of Gypframe 70 AS 50 AcouStuds at 600mm centres. 25mm Isover APR 1200 in the cavity. Linings as in table.
- 7 One layer of board each side of Gypframe 92 S 60 'C' Studs at 600mm centres. 3 x 25mm Isover APR 1200 in the cavity. Linings as in table.
- 8 One layer of board each side of Gypframe 92 AS 50 AcouStuds. 25mm Isover APR 1200 in the cavity. Linings as in table.
- 9 One layer of board each side of Gypframe 92 AS 50 AcouStuds at 600mm centres. 50mm Isover APR 1200 in the cavity. Linings as in table.
- 10 Two layers of board each side of Gypframe 92 S 50 'C' Studs at 600mm centres. Linings as in table.

Severe

Table 2.8 - GypWall CLASSIC and GypWall ROBUST specification solutions for R_w 50-55 dB (Type C 53 dB)

Severe	System name (GypWall)	Board type	Available with ACTIVair technology ³	Lining thickness mm	Sound insulation R _w dB Any finish ⁴ Skim only ⁵		Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm) BS EN ¹			System reference
											Any finish ⁴	Skim only ⁵
	60 minutes fire resistance EN BS											
1	ROBUST	DuraLine		1 x 15	50	51	102	29	4000	4000	Q606A046	Q606A046S
2	ROBUST	DuraLine		1 x 15	50		102	29	4000	4000	Q606A047	
3	CLASSIC	WallBoard		2 x 12.5	50		122	36	4600	4600 ²	A206142	
8	ROBUST	DuraLine		1 x 15	50	51	124	29	4900	4000	A206A278	A206A278S
9	ROBUST	DuraLine		1 x 15	52	53	124	30	4900	4000	A206A279	A206A279S
5	CLASSIC	SoundBloc		2 x 12.5	52		122	43	4600	4000	A206198	
7	ROBUST	DuraLine		1 x 15	52	53	124	30	4900	4000	Q606057	Q606057S
3	CLASSIC	SoundBloc		2 x 12.5	53		122	44	4600	4000	A206230	
90 minutes fire resistance EN BS												
4	CLASSIC	SoundBloc		2 x 15	54	55	132	51	5000	4000	A206A167	A206A167S
120 minutes fire resistance EN BS												
10	CLASSIC	FireLine		2 x 15	50	51	154	52	5800	5000	A206273	A206273S
6	CLASSIC	FireLine		2 x 12.5	54	55	122	40	4700	4000	A206A111	A206A111S

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² 30 minutes fire resistance to BS EN 1364-1: 1999.

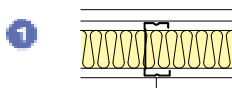
³ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

⁴ Sound insulation performance for partitions finished using jointing or plaster skim.

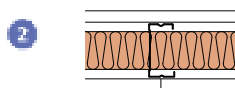
⁵ Sound insulation performance for partition finished with a 2mm skim finish of Thistle Multi-Finish.



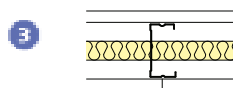
Solutions to meet R_w 50-55 dB (53 = DCSF partition type C)



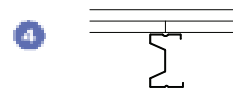
One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
50mm Isover APR 1200 in the cavity.
Linings as in table.



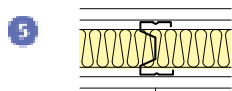
One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
60mm Isover ULTIMATE Piano Plus
20 kg/m² in the cavity. Linings as in table.



One layer of board each side of Gypframe
70 S 60 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.



Two layers of board each side of Gypframe
70 AS 50 AcouStuds at 600mm centres.
Linings as in table.



One layer of board one side, two
layers of board other side of Gypframe
70 AS 50 AcouStuds at 600mm centres.
50mm Isover APR 1200 in the cavity.
Linings as in table.

**Severe
plus**

Table 2.9 - GypWall EXTREME specification solutions for R_w 50-55 dB (Type C 53 dB)

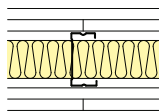
	System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB	Partition thickness mm	Approx. weight kg/m²	Max. partition height (mm) BS EN ¹	System reference
30 minutes fire resistance EN BS									
1	EXTREME/ROBUST Hybrid	DuraLine / Rigidur H		15/15	50	102	33	4000 4000	X606018
3	EXTREME	Rigidur H		1 x 15	51	102	36	4000 4000	X606002
1	EXTREME	Rigidur H		1 x 15	52	102	36	4000 4000	X606003
5	EXTREME/ROBUST Hybrid	DuraLine / WallBoard (inner) + Rigidur H		15/15 + 12.5	52	115	40	4200 4200	X606A020
5	EXTREME/ROBUST Hybrid	DuraLine / SoundBloc (inner) + Rigidur H		15/15 + 12.5	55	115	44	4200 4200	X606A022
60 minutes fire resistance EN BS									
2	EXTREME	Rigidur H		1 x 15	51	102	36	4000 4000	X606004
4	EXTREME	SoundBloc (inner) + Rigidur H		2 x 12.5	54	122	52	4700 4000	X606A006
4	EXTREME	WallBoard (inner) + Rigidur H		1 x 15+1 x 12.5	54	127	52	4700 4000	X606A005

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

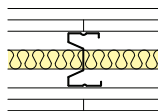
Solutions to meet R_w 56-60 dB (58 = DCSF partition type D)

1



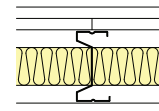
Two layers of board each side of Gypframe
70 S 50 'C' Studs at 600mm centres.
50mm Isover APR 1200 in the cavity.
Linings as in table.

2



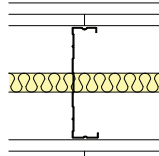
Two layers of board each side of Gypframe
70 AS 50 AcouStuds at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.

3



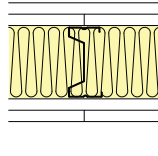
Two layers of board each side of Gypframe
92 AS 50 AcouStuds at 600mm centres.
50mm Isover APR 1200 in the cavity.
Linings as in table.

4



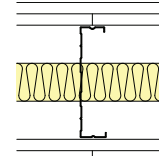
Two layers of board each side of Gypframe
146 S 50 'C' Studs at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.

5



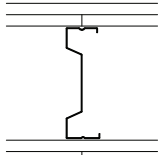
Two layers of board each side of Gypframe
92 AS 50 AcouStuds at 600mm centres.
100mm Isover Modular Roll in the cavity.
Linings as in table.

6



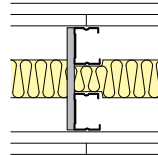
Two layers of board each side of Gypframe
146 S 50 'C' Studs at 600mm centres.
50mm Isover APR 1200 in the cavity.
Linings as in table.

7



Two layers of board each side of Gypframe
146 AS 50 AcouStuds at 600mm centres.
Linings as in table.








8



GypWall QUIET with two layers of board
each side. 50mm Isover APR 1200 in the
cavity. Linings as in table.

Severe²

Table 2.10 - GypWall CLASSIC and GypWall QUIET specification solutions for R_w 56-60 dB (Type D 58 dB)

System name (GypWall)	Board type	Available with ACTIVair technology ⁵	Lining thickness mm	Sound insulation R _w dB		Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm)			System reference		
				Any finish ⁶	Skim only ⁷			BS	EN ¹	Any finish ⁶	Skim only ⁷		
60 minutes fire resistance EN BS													
2	CLASSIC	SoundBloc		2 x 12.5	58	59	122	43	4600	4000	A206A198	A206A198S	
90 minutes fire resistance EN BS													
1	CLASSIC	SoundBloc		2 x 15	56	57	132	51	4900	4000	A206231	A206231S	
3	CLASSIC	SoundBloc		2 x 12.5	58	59 (53)	144	52	5800	5000	A206A291	A206A291S	
5	CLASSIC	SoundBloc		2 x 12.5	59 (54)	60 (54)	144	52	5800	5000	A206A292	A206A292S	
4	CLASSIC	SoundBloc		2 x 15	59		208	51	7900	4000	A206211		
6	CLASSIC	SoundBloc		2 x 15	59 (53)	60 (53)	208	51	7900	4000	A206243	A206243S	
7	CLASSIC	SoundBloc		2 x 15	59	60 (54)	208	51	7900	4000	A206A179	A206A179S	
120 minutes fire resistance EN BS													
3	CLASSIC	FireLine		2 x 12.5	55	56	144	52	5800	3000 ³	A206A295	A206A295S	
5	CLASSIC	FireLine		2 x 12.5	56	58	144	52	5800	3000 ⁴	A206A296	A206A296S	
8	QUIET	FireLine		2 x 15	60 (53)	61 (53)	200	52	7500	7500	A216010	A216010S	

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² All solutions to meet R_w 56-60 dB are a minimum Severe Duty by default.

³ 5800mm maximum partition height at 90 minutes fire resistance EN.

⁴ 4900mm maximum partition height at 90 minutes fire resistance EN.

⁵ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

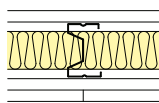
⁶ Sound insulation performance for partitions finished using jointing or plaster skim.

⁷ Sound insulation performance for partition finished with a 2mm skim finish of Thistle Multi-Finish.



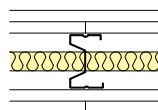
Solutions to meet R_w 56-60 dB (58 = DCSF partition type D)

1



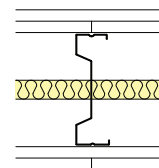
One layer of board one side, two layers of board other side of Gypframe
70 AS 50 AcouStuds at 600mm centres. 50mm Isover APR 1200 in the cavity. Linings as in table.

2



Two layers of board each side of Gypframe
70 AS 50 AcouStuds at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.

3



Two layers of board each side of Gypframe
146 AS 50 AcouStuds at 600mm centres.
25mm Isover APR 1200 in the cavity.
Linings as in table.

**Severe
plus**

Table 2.11 - GypWall EXTREME specification solutions for R_w 56-60 dB (Type D 58 dB)

	System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R _w dB	Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm) BS EN ¹	System reference
60 minutes fire resistance EN BS									
1	EXTREME/ROBUST Hybrid	DuraLine / DuraLine (inner) + Rigidur H		15/15+12.5	56	115	44	4200	4200 X606A024
2	EXTREME	SoundBloc (inner) + Rigidur H		1 x 15+1 x 12.5	58	127	56	4700	4000 X606A007
3	EXTREME	SoundBloc (inner) + Rigidur H		1 x 15+1 x 12.5	60	203	56	7800	4000 X606A013

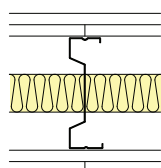
¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.



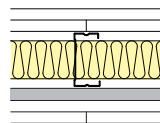
Solutions to meet ≥ R_w 61 dB (63 = DCSF partition type E)

1



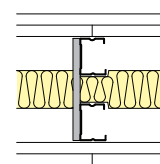
GypWall classic, two layers of board each side of Gypframe 146 AS 50 AcouStuds at 600mm centres. 50mm Isover APR 1200 in the cavity. Linings as in table.

2



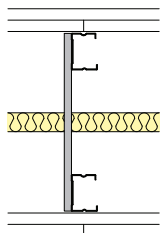
GypWall quiet sf, Gypframe 70 S 50 'C' Studs at 600mm centres. Gypframe RB1 Resilient Bar to one side. Two layers of board each side. 50mm Isover APR 1200 in the cavity. Linings as in table.

3



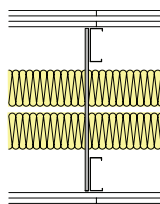
GypWall quiet, Gypframe 48 S 50 'C' Studs at 600mm centres. Two layers of board each side. 50mm Isover APR 1200 in the cavity (cavity width 137mm). Linings as in table.

4



GypWall quiet, Gypframe 48 S 50 'C' Studs at 600mm centres. Two layers of board each side. 25mm Isover APR 1200 in the cavity (cavity width 237mm). Linings as in table.








5



GypWall audio, three layers of board each side. 2 x 100mm Isover APR 1200 in the cavity. Linings as in table.

Severe²

Table 2.12 - GypWall CLASSIC, QUIET, QUIET SF, AUDIO solutions for R_w 61 dB and > (Type E 63 dB)

Severe	System name (GypWall)	Board type	Available with ACTIVair technology ³	Lining thickness mm	Sound insulation R _w dB	Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm)				System reference
					Any finish ⁴	Skim only ⁵		BS	EN ¹		Any finish ⁴	Skim only ⁵
	60 minutes fire resistance											
2	QUIET SF	SoundBloc		2 x 12.5	61		138	43	4000	4000	A316008	
90 minutes fire resistance												
1	CLASSIC	SoundBloc		2 x 15	61	62 (56)	208	51	8100	4000	A206A243	A206A243S
2	QUIET SF	SoundBloc		2 x 15	62		148	51	4200	4200	A316009	
3	QUIET	SoundBloc		2 x 15	62(56)	63(56)	200	55	7500	5000	A216009	A216009S
2	QUIET SF	Plank (inner) + SoundBloc		1 x 19+1 x 12.5	63		151	54	3700	3700	A316011	
4	QUIET	SoundBloc		2 x 15	63(57)	64(57)	300	55	7500	5000	A216008	A216008S
120 minutes fire resistance												
5	AUDIO	SoundBloc		3 x 15	76		550	80	9000	9000	A326013	

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² All solutions to meet R_w 61 dB and above are a minimum Severe Duty by default.

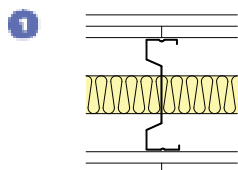
³ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

⁴ Sound insulation performance for partitions finished using jointing or plaster skim.

⁵ Sound insulation performance for partition finished with a 2mm skim finish of Thistle Multi-Finish.



Solutions to meet $\geq R_w$ 61 dB (63 = DCSF partition type E)



Two layers of board each side of Gypframe

146 AS 50 AcouStuds at 600mm centres.

50mm Isover APR 1200 in the cavity.

Linings as in table.

Severe plus	Table 2.13 - GypWall EXTREME specification solutions for R_w 61 and > dB (Type E 63 dB)								
	System name (GypWall)	Board type	Available with ACTIVair technology ²	Lining thickness mm	Sound insulation R_w dB	Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm) BS EN ¹	System reference
60 minutes fire resistance EN BS									
1	EXTREME	SoundBloc + Rigidur H		15 + 12.5	62	203	55	7800 4000	X606A014

¹ The maximum heights quoted are limited by the fire state field of application or by limiting deflection of L/240 at 200 Pa, whichever is the more onerous.

² These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

ShaftWall solutions



Key facts

- Lightweight, fast-track construction
- Provides fire protective shaft enclosures and stairwells
- Shaft enclosures built from one side only
- Installation can commence prior to making the building envelope fully weather-tight
- Minimal wall thickness from 77mm
- Satisfies deflection and air pressure requirements

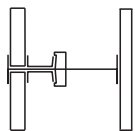


1



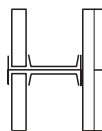
Gyproframe 60, 70 or 92mm 'I' Stud framework with Gyproc CoreBoard between studs, secured by Gyproframe Retaining Channel. 25mm Isover APR 1200 in cavity (optional). Lining boards to non-shaft side, as per table.

2



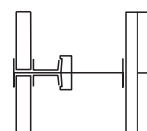
Gyproframe 146 TI 90 Tabbed 'I' Stud framework with Gyproc CoreBoard between studs, secured by Gyproframe Retaining Channel. 25mm Isover APR 1200 in cavity (optional). Lining boards to non-shaft side, as per table.

3



Gyproframe 60, 70 or 92mm 'I' Stud framework with Gyproc CoreBoard between studs, secured by Gyproframe Retaining Channel. 25mm Isover APR 1200 in cavity (optional). Lining boards to non-shaft side, as per table.

4



Gyproframe 146 TI 90 Tabbed 'I' Stud framework with Gyproc CoreBoard between studs, secured by Gyproframe Retaining Channel. 25mm Isover APR 1200 in cavity (optional). Lining boards to non-shaft side, as per table.

Heavy

Table 2.14 - Heavy Duty specification solutions for ShaftWall

	Board type	Lining thickness mm	Stud size mm	Insulation required	Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm) BS ¹ EN	Sound insulation R _w dB ⁴	System reference
60 minutes fire resistance BS									
1	FireLine	1 x 15	60 I 70	No	77	30	4200 –	39	A306001
1	FireLine	1 x 15	60 I 70	Yes	77	30	4200 –	42	A306010
1	FireLine	1 x 15	70 I 70	No	87	30	4200 –	39	A306001
1	FireLine	1 x 15	70 I 70	Yes	87	30	4200 –	42	A306010
1	FireLine	1 x 15	92 I 90	No	109	31	6000 –	40	A306004
1	FireLine	1 x 15	92 I 90	Yes	109	31	6000 –	43	A306011
2	FireLine	1 x 15	146 TI 90	No	163	33	7700 –	43	A306007
2	FireLine	1 x 15	146 TI 90	Yes	163	33	7700 –	46	A306007

Severe

Table 2.15 - Severe Duty specification solutions for ShaftWall

	Board type	Lining thickness mm	Stud size mm	Insulation required	Partition thickness mm	Approx. weight kg/m ²	Max. partition height (mm) BS ¹ EN	Sound insulation R _w dB ⁴	System reference
60 minutes fire resistance EN 90 minutes fire resistance BS									
3	FireLine	2 x 12.5	60 I 70	No	87	39	4400 4400 ²	40	A306002
3	FireLine	2 x 12.5	60 I 70	Yes	87	39	4400 4400 ²	44	A306012
3	FireLine	2 x 12.5	70 I 70	No	97	39	4400 4400 ²	40	A306002
3	FireLine	2 x 12.5	70 I 70	Yes	97	39	4400 4400 ²	44	A306012
3	FireLine	2 x 12.5	92 I 90	No	119	40	6400 6000 ²	45	A306005
3	FireLine	2 x 12.5	92 I 90	Yes	119	40	6400 6000 ²	47	A306014
4	FireLine	2 x 12.5	146 TI 90	No	173	42	7900 6000 ²	48	A306008
4	FireLine	2 x 12.5	146 TI 90	Yes	173	42	7900 6000 ²	52	A306020
120 minutes fire resistance EN BS									
3	FireLine	2 x 15	60 I 70	No	92	43	4500 4500 ³	42	A306003
3	FireLine	2 x 15	60 I 70	Yes	92	43	4500 4500 ³	45	A306023
3	FireLine	2 x 15	70 I 70	No	102	43	4500 4500 ³	42	A306003
3	FireLine	2 x 15	70 I 70	Yes	102	43	4500 4500 ³	45	A306023
3	FireLine	2 x 15	92 I 90	No	124	44	6700 6000 ³	44	A306006
3	FireLine	2 x 15	92 I 90	Yes	124	44	6700 6000 ³	46	A306025
4	FireLine	2 x 15	146 TI 90	No	178	46	7900 6000 ³	48	A306009
4	FireLine	2 x 15	146 TI 90	Yes	178	46	7900 6000 ³	50	A306028

¹ The temperature of exposed metal may exceed the requirements of BS 476: Part 22 within the fire test period, and therefore relaxation should be sought from the approving Authority on the basis that no combustible materials are likely to be stored adjacent to the structure. In situations where the full period of insulation is required, contact the British Gypsum Drywall Academy.

² 60 minutes fire resistance to BS EN 1364-1.

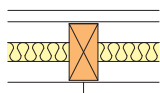
³ 90 minutes fire resistance to BS EN 1364-1. For 120 minutes fire resistance to BS EN 1364-1, please contact the British Gypsum Drywall Academy.

⁴ The acoustic performance figures quoted include ShaftWall partitions with deflection heads.



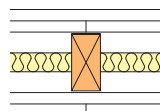
Timber stud solutions

1



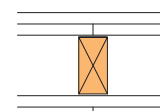
One layer of board each side of 75mm x 38mm timber studs at 600mm centres. 25mm Isover APR 1200 between studs. Linings as in table.

2



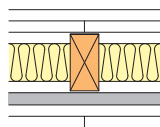
Two layers of board each side of 75mm x 38mm timber studs at 600mm centres. 25mm Isover APR 1200 between studs. Linings as in table.

3



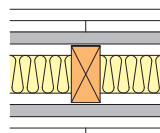
Two layers of board each side of 75mm x 38mm timber studs at 600mm centres. Linings as in table.

4



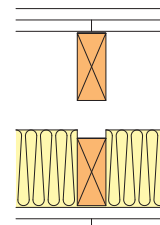
Two layers of board each side of 75mm x 38mm timber studs at 600mm centres with Gypframe RB1 Resilient Bars fixed horizontally to one side at 600mm centres. 50mm Isover APR 1200 in the cavity. Lining as in table.

5



Two layers of board each side of 75mm x 38mm timber studs at 600mm centres with Gypframe RB1 Resilient Bars fixed horizontally to both sides at 600mm centres. 50mm Isover APR 1200 in the cavity. Lining as in table.

6



Two separate timber frames spaced 50mm apart, consisting of 89mm x 38mm timber studs at 600mm centres with noggings. Two layers of board each side. 100mm Isover APR 1200 between the studs on one side. Lining as in table.

Table 2.16 - Timber stud specification solutions for R_w 40-44 dB

Detail	Board type	Available with ACTIVair technology ¹	Lining thickness mm	Sound insulation R_w dB	Partiton thickness mm	Approx. weight kg/m ²	System reference
30 minutes fire resistance - non loadbearing							
1	SoundBloc		1 x 15	43	105	31	A026017
60 minutes fire resistance - non loadbearing							
2	WallBoard		2 x 12.5	42	125	42	A026007
3	SoundBloc		2 x 12.5	44	125	47	A026015
90 minutes fire resistance - non loadbearing							
2	FireLine		2 x 15	42	135	50	A026031

¹ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

Table 2.17 - Timber stud specification solutions for R_w 45-49 dB

Detail	Board type	Available with ACTIVair technology ¹	Lining thickness mm	Sound insulation R_w dB	Partiton thickness mm	Approx. weight kg/m ²	System reference
60 minutes fire resistance - non loadbearing							
2	SoundBloc		2 x 12.5	46	125	47	A026018

¹ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

Table 2.18 - Timber stud specification solutions for R_w 56-60 dB

Detail	Board type	Available with ACTIVair technology ¹	Lining thickness mm	Sound insulation R_w dB	Partiton thickness mm	Approx. weight kg/m ²	System reference
60 minutes fire resistance - non loadbearing							
4	SoundBloc		2 x 12.5	56	141	47	A046005
4	SoundBloc		2 x 15	58	151	55	A046007
5	SoundBloc		2 x 12.5	59	157	47	A046006
5	SoundBloc		2 x 15	60	167	55	A046008

¹ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

Table 2.19 - Timber stud specification solutions for R_w 61+ dB

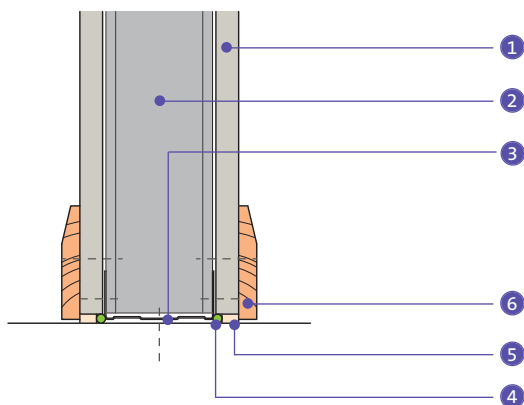
Detail	Board type	Available with ACTIVair technology ¹	Lining thickness mm	Sound insulation R_w dB	Partiton thickness mm	Approx. weight kg/m ²	System reference
60 minutes fire resistance - non loadbearing							
6	Plank (inner) + FireLine		1 x 19+1 x 12.5	63	293	56	A036003

¹ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

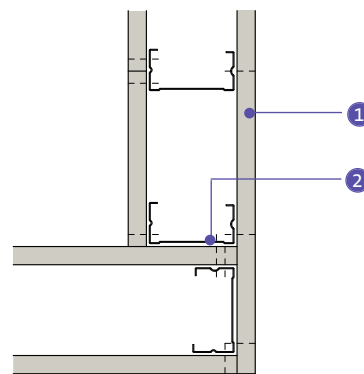
NB For loadbearing constructions and EN fire resistance, please contact the Drywall Academy.

Construction details

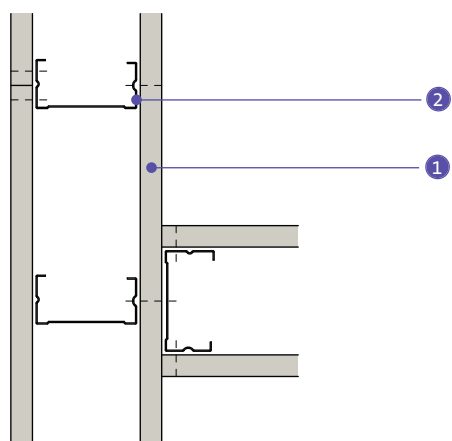
1 Base detail



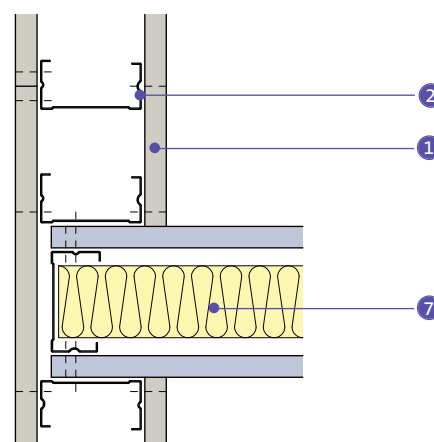
2 Internal / external corner



3 'T' junction

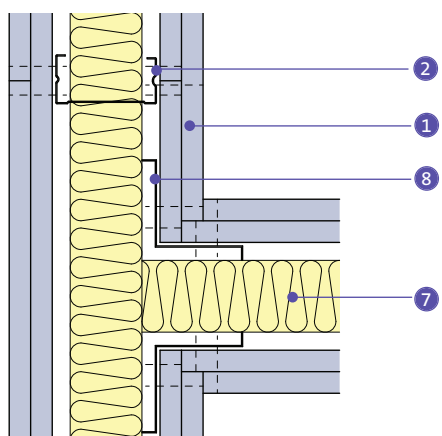


4 'T' junction when partition with higher acoustic performance abuts a partition with lower acoustic performance

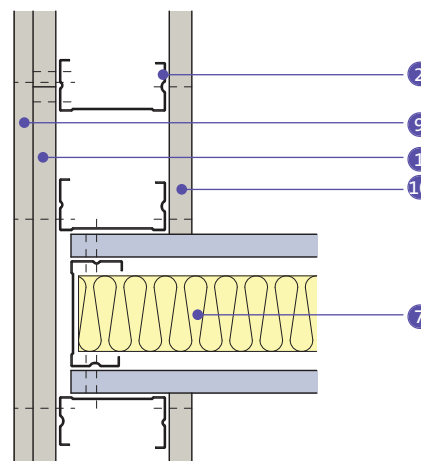


NB Acoustic principles only - detail may not be adequate for all solutions.

5 'T' junction to optimise acoustic performance and to reduce flanking transmission



6 GypWall EXTREME/ROBUST hybrid 'T' junction detail when partition with higher acoustic performance abuts a partition with lower acoustic performance



NB Acoustic principles only - detail may not be adequate for all solutions.

① Gyproc plasterboard or Glasroc F specialist board

② Gypframe 'C' Stud

③ Gypframe Floor & Ceiling Channel

④ Gyproc Sealant

⑤ Bulk fill with Gyproc jointing materials (where gap exceeds 5mm)

⑥ Skirting (by others)

⑦ Isover insulation

⑧ Gypframe GA5 Internal Fixing Angle

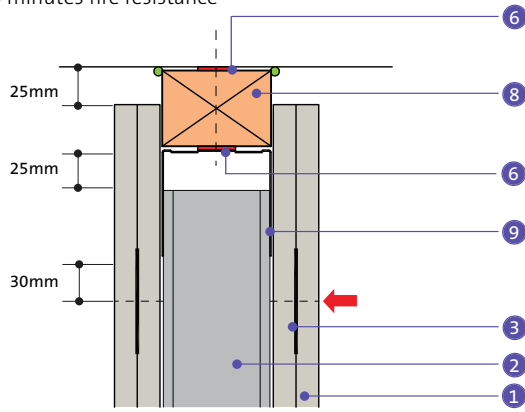
⑨ Rigidur H

⑩ Gyproc DuraLine

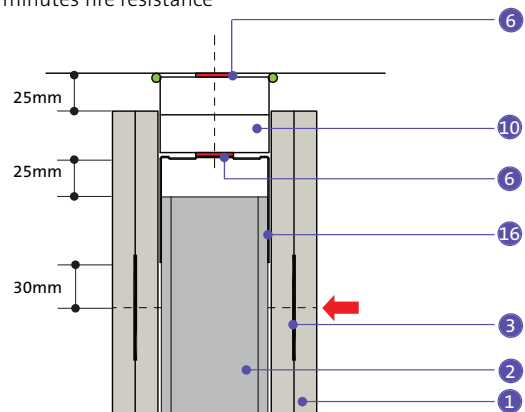
NB For heights over 4200mm or GypWall ROBUST / GypWall EXTREME, use Gypframe Deep Flange Floor & Ceiling Channel.

Construction details

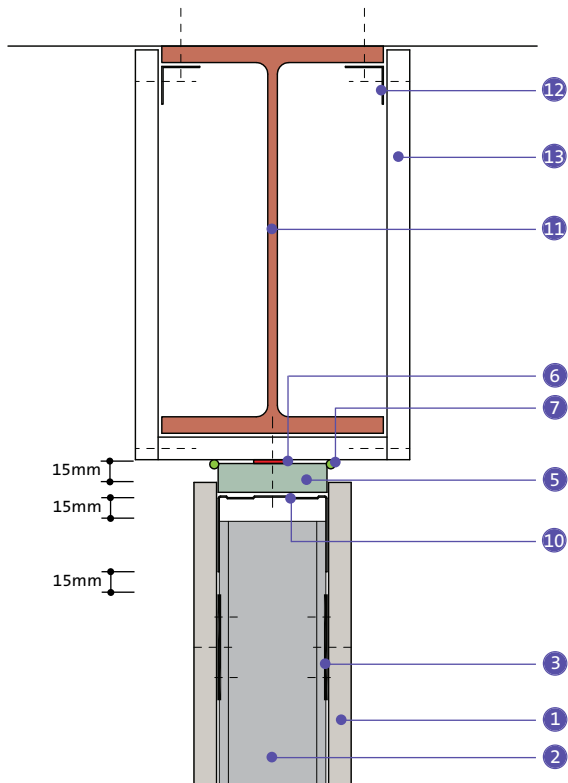
- 7** Deflection head for plus or minus 25mm movement and 60 minutes fire resistance



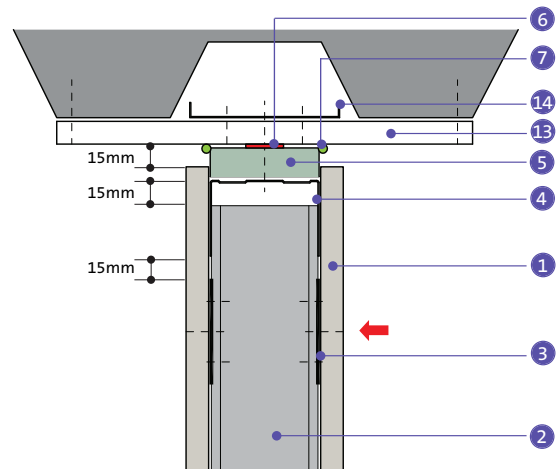
- 8** Deflection head for plus or minus 25mm movement and 60 minutes fire resistance



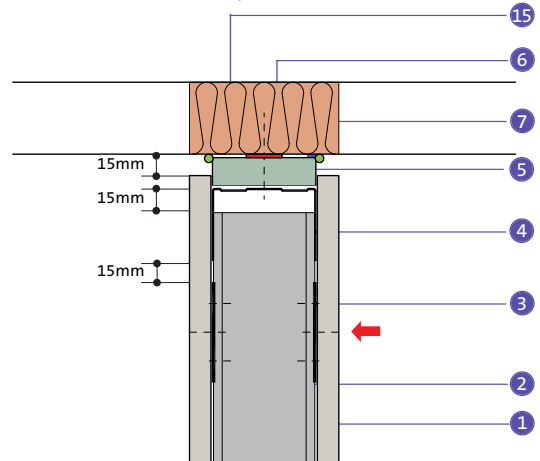
- 9** Beam encasement and partition junction for partitions to satisfy BS 5234: Parts 1 and 2: 1992 - Heavy and Severe Duty



- 10** Deflection head parallel to floor profile for 15mm downward movement and up to 60 minutes fire resistance



- 11** Deflection head perpendicular to floor profile for 15mm downward movement and up to 60 minutes fire resistance



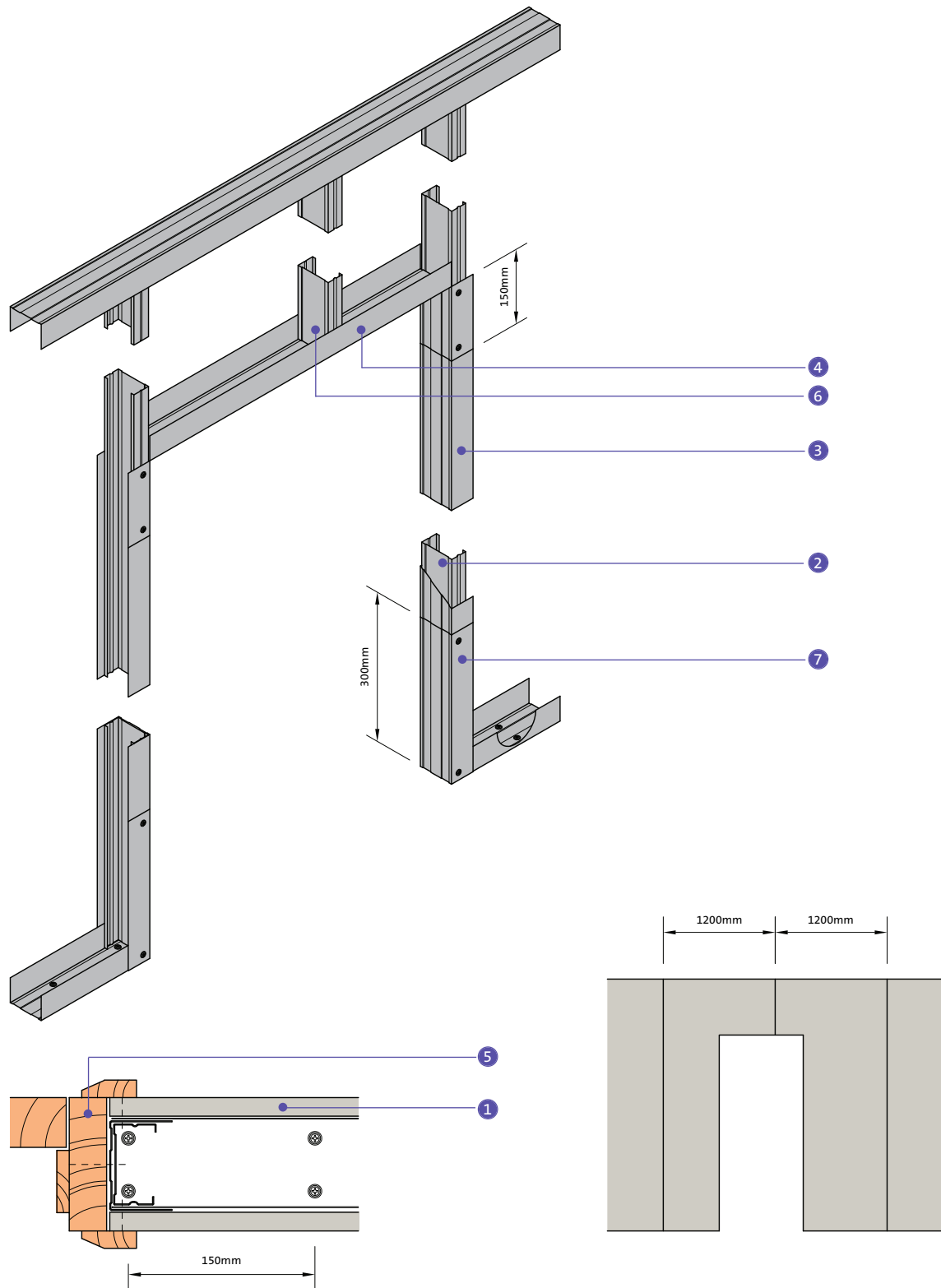
- 1 Gyproc plasterboard or Glasroc F specialist board
- 2 Gyproc 'C' Stud
- 3 Gyproc GFS1 Fixing Strap
- 4 Gyproc Deep Flange Floor & Ceiling Channel suitably fixed through fire-stop to structure at 600mm
- 5 Gyproc CoreBoard
- 6 Gyproc FireStrip (continuous line)
- 7 Gyproc Sealant
- 8 Timber head plate suitably fixed to structure

- 9 Gyproc Extra Deep Flange Floor & Ceiling Channel fixed to timber head plate
- 10 Gyproc Deep Flange Floor & Ceiling Channel suitably fixed through firestop and encasement to beam
- 11 Structural steel beam
- 12 Gyproc GA1 Steel Angle
- 13 Glasroc F FIRECASE
- 14 Gyproc 99 FC 50 Fixing Channel
- 15 Fire stopping (by others)
- 16 Gyproc Extra Deep Flange Floor & Ceiling Channel suitably fixed through fire-stop to structure at 600mm

NB No fixings should be made through the boards into the flanges of the head channel. The arrow (➡) denotes the position of the uppermost board fixing, which should be made into Gyproc GFS1 Fixing Strap. Continuous Gyproc FireStrip must be installed as shown in order to maintain fire performance. Where there is a need for a deflection head in a 90 minute or 120 minute wall, please contact the British Gypsum Drywall Academy for further guidance.

Construction details

12 Door opening to satisfy BS 5234: Parts 1 & 2: 1992 - Heavy and Severe Duty



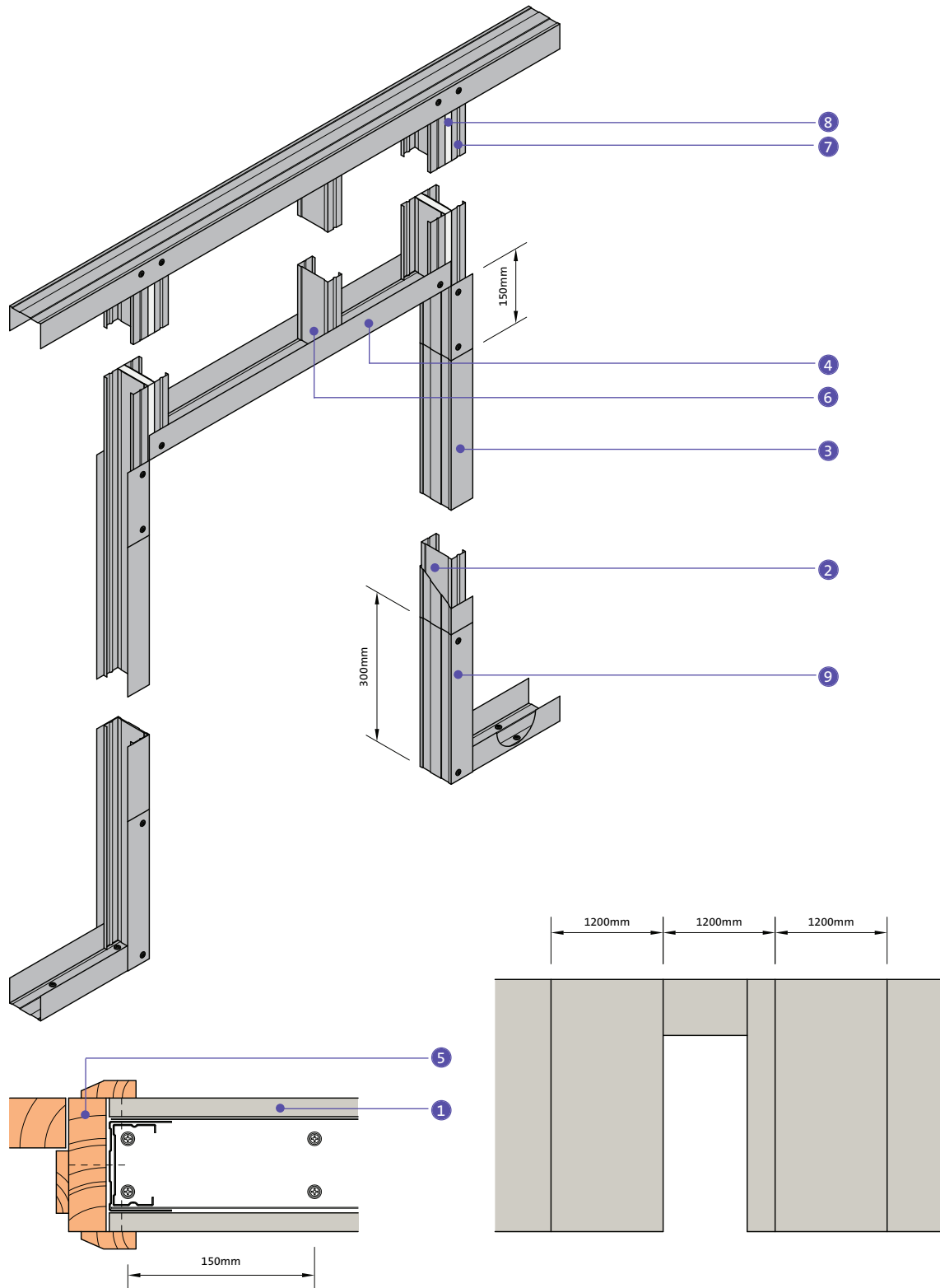
- ① Gyproc plasterboard
- ② Gypframe 'C' Stud
- ③ Gypframe Deep Flange Floor & Ceiling Channel to sleeve studs
- ④ Gypframe Deep Flange Floor & Ceiling Channel cut and bent to form door head
- ⑤ Timber door frame and architrave
- ⑥ Gypframe 'C' Stud to maintain stud module
- ⑦ Gypframe Deep Flange Floor & Ceiling Channel cut and bent to extend up studs

NB Advice should be sought from the door manufacturer prior to the construction of these details.

NB At the base, the channel is cut and bent to extend 300mm up the studs and fixed each side with two Gyproc Wafer Head Drywall Screws. The studs each side of the opening are sleeved full height of opening with Gypframe Floor & Ceiling Channel.

Construction details

13 Alternative door opening to satisfy BS 5324: Parts 1 & 2: 1992 - Heavy and Severe Duty



① Gyproc plasterboard

② Gypframe 'C' Stud

③ Gypframe Deep Flange Floor & Ceiling Channel to sleeve studs

④ Gypframe Deep Flange Floor & Ceiling Channel cut and bent to form door head

⑤ Timber door frame and architrave

⑥ Gypframe 'C' Stud to maintain stud module

⑦ Gypframe 'C' Studs fixed back to back with Gyproc Drywall Screws at 300mm centres staggered

⑧ Plasterboard infill (same type as lining) cut to fit between studs

⑨ Gypframe Deep Flange Floor & Ceiling Channel cut and bent to extend up studs

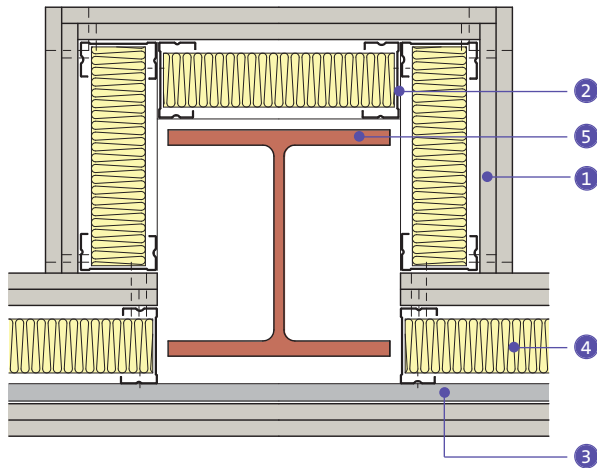
NB Advice should be sought from the door manufacturer prior to the construction of these details.

NB At the base, the channel is cut and bent to extend 300mm up the studs and fixed each side with two Gyproc Wafer Head Drywall Screws. The studs each side of the opening are sleeved full height of opening with Gypframe Floor & Ceiling Channel.

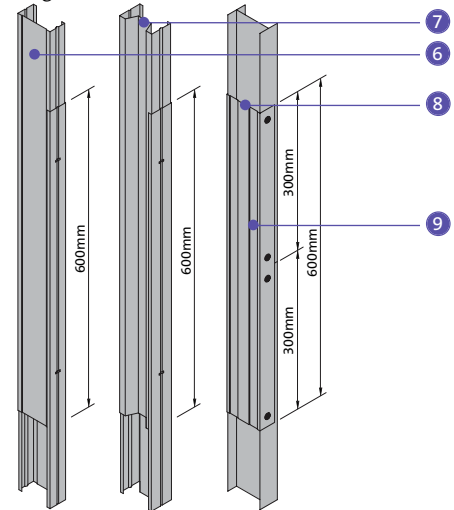
NB The principle of this reduced plasterboard waste door detail is only suitable for GypWall CLASSIC, GypWall ROBUST and GypWall EXTREME, for fixed head situations only.

Construction details

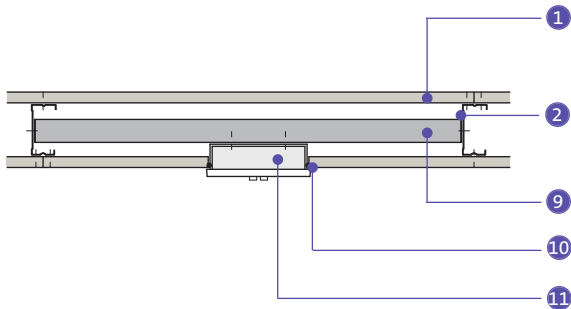
14 Partition and column junction



15 Method of splicing studs

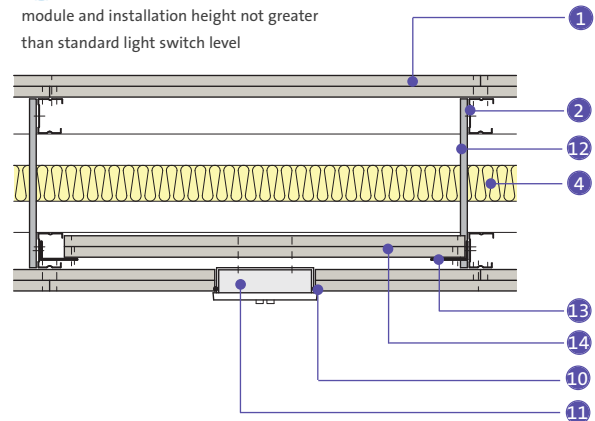


16 Electrical socket box with metal nogging for up to 60 minutes fire resistance



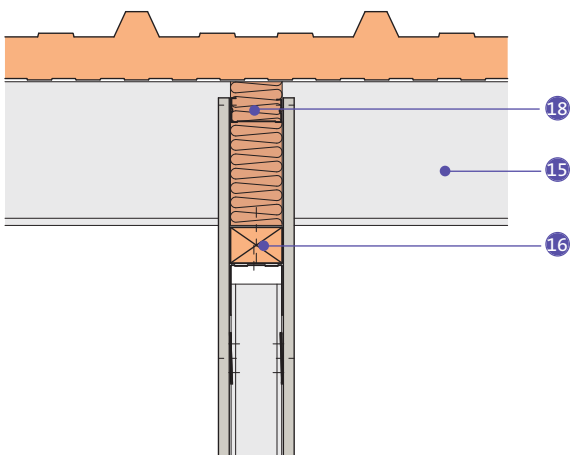
17 Electrical socket box with plasterboard pattress nogging for up to 120 minutes fire resistance

NB Single socket box within one stud module and installation height not greater than standard light switch level

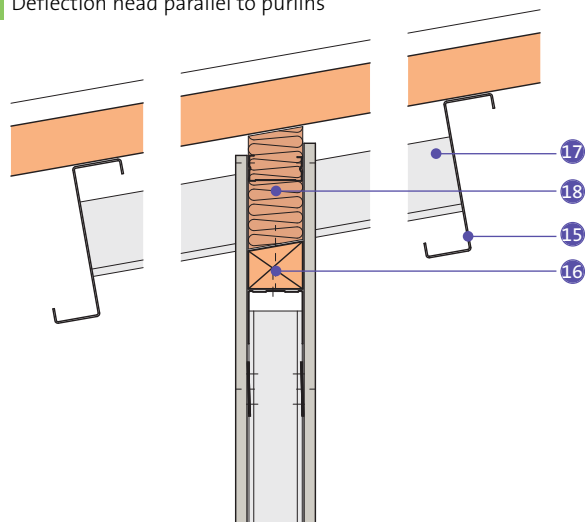


Principles of construction

18 Deflection head perpendicular to purlins



19 Deflection head parallel to purlins



- 1 Gyproc plasterboard
- 2 Gypframe 'C' Stud
- 3 Gypframe RB1 Resilient Bar
- 4 Isover insulation
- 5 Structural steel column
- 6 Gypframe 'C' Studs overlapped and fixed together
- 7 Gypframe AcouStuds overlapped and fixed together
- 8 Gypframe 'I' Studs butted together
- 9 Gypframe Standard Floor & Ceiling Channel

- 10 Gyproc Sealant
- 11 Electrical socket box with metal back
- 12 Gypframe 99 FC 50 Fixing Channel
- 13 Gypframe GA4 Steel Angle
- 14 150mm high Gyproc plasterboard pattress to match partition lining
- 15 Roof purlin
- 16 Suitable size timber head plate
- 17 Trimmer section (by others)
- 18 Fire stopping (by others)



Selecting wall linings



Selecting wall linings

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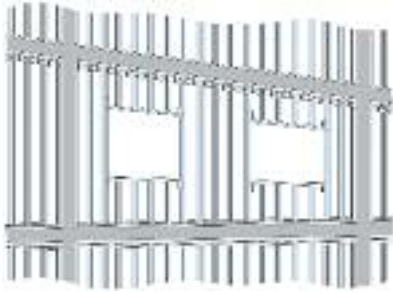
This section will guide you through the process for selecting linings for both external and internal wall constructions. The external wall lining section looks at the three main types of external wall construction, considering lightweight structural steel framing and cladding, traditional masonry constructions, and structural timber framed wall constructions. Guidance is primarily aimed at thermal and fire resistance requirements, with the additional consideration of durability. The internal wall lining section deals mainly with improving the sound insulation of solid masonry wall constructions.



Introduction

The systems used in this section provide cost effective lining solutions to internal and external walls. The next two pages provide a summary of key systems offered and their benefits.

Lightweight load bearing steel framing



Key facts

- Speed and predictability of construction – greater confidence over build programme, faster completion, earlier building occupation and quicker return on investment
- Consistent quality of internal finish
- Lightweight construction and drywall systems enable value engineering of the total construction and savings in the supporting structure and foundations
- Lightweight construction offers increased flexibility in design
- Off-site component pre-fabrication enables maximum design flexibility and rapid site installation, allowing early weather protection to the building
- Allows for the achievement of high thermal and acoustic performance levels in line with current Building Regulations with minimum thicknesses

Steel frame system

Masonry with lightweight non-loadbearing wall linings



Key facts

- Fully independent wall lining
- Compatible with external wall constructions including curtain walling, rain screen claddings, industrial claddings, brickwork and glazed atria
- Used to line non fire-rated service risers
- Used horizontally to form a corridor ceiling
- Satisfies BS 5234 strength and robustness requirements up to Severe Duty
- Provides fire protection to structural steelwork
- Provides fire resistance in association with external structure
- Used to upgrade the sound and thermal performance of an existing masonry wall
- Provides service void
- U-values down to 0.13 W/m²K

Gyplyner iwl system

Structural timber frame



Key facts

- U-values down to 0.27 W/m²K
- Can be pre-manufactured for consistency and ease of site assembly
- Maintains a clear wall cavity
- Gyproc DUPLEX grade boards provide an internal lining incorporating a vapour control layer
- Proven construction

Timber frame system

Independent non-loadbearing wall linings



Key facts

Gyplyner IWL system

- Fully independent wall lining
- Compatible with external wall constructions including curtain walling, rain screen claddings, industrial claddings, brickwork and glazed atria
- Used to line non fire-rated service risers
- Used horizontally to form a corridor ceiling
- Satisfies BS 5234 strength and robustness requirements up to Severe Duty
- Provides fire protection to structural steelwork
- Provides fire resistance in association with external structure
- Used to upgrade the sound and thermal performance of an existing masonry wall
- Provides service void

Metal framed to masonry linings



Key facts

Gyplyner UNIVERSAL system

- Commonality of ceiling and wall lining components
- General purpose lining
- Minimal connection to the structure
- Accommodates background irregularities
- Little or no background preparation needed
- Can satisfy thermal performance and acoustic requirements
- Provides service void
- No height restriction
- Achieves U-values to 0.15 W/m²K

Drywall to masonry linings



Key facts

Drilyner system

- Choice of fixing systems
- Achieves U-values to 0.28 W/m²K
- Linings provide early response room comfort conditions
- Services incorporated with minimum chasing

Metal frame systems

The use of metal frame systems for both internal lining and structural framing provides many advantages over traditional build processes:-

- Speed and predictability of construction: Greater confidence over build programme, faster completion, earlier building occupation and therefore quicker return on investment
- Consistent quality of internal finish
- Superior acoustic performance when width limitations apply
- Lightweight construction and drywall systems allow designers to value engineer the total construction and make savings in other areas of construction - notably the supporting structure, such as foundations
- Lightweight construction offers increased design flexibility
- Off-site component pre-fabrication facilitates rapid site installation, allowing for early weather protection to the building
- Allows for the achievement of high thermal and acoustic performance levels in line with current Building Regulations with minimal thickness.



1 External linings

Acoustic requirements

The use of British Gypsum lining systems can reduce the acoustic problems in Education buildings caused by external noise (including that caused by traffic, aircraft and plant).

Table 1.1 of Building Bulletin 93 (BB93) stipulates the upper limit for the indoor ambient noise level (LAeq,30min(dB)). In order to satisfy these requirements, it is necessary to conduct an external noise level survey, and establish the level of sound reduction the wall must provide. The building envelope can then be designed to ensure that internal ambient noise is conducive with the learning environment.

BREEAM: Schools offer additional credit for ensuring the ambient noise level limit specified in BB93 (table 1.1) is not exceeded by greater than 20 dB during heavy rainfall, as simulated by the design calculations.

As highlighted in Section 3.1 of BB93, Isover mineral wool insulation can provide a significant acoustic benefit over foam plastic insulation whilst still providing good thermal performance.

Thermal performance requirements

Building Regulations Approved Document L (Conservation of fuel and power), became effective from 6th April 2006. In the context of Education buildings, Approved Document L2A (ADL2A) details the requirements for new constructions, and Approved Document L2B (ADL2B), for existing constructions.

Scotland - Section 6, May 2007, details the requirements for new and existing constructions.

Common to the two regulations is the use of the Simplified Building Energy Model (SBEM) as the accepted calculation methodology.

New-build

The thermal transmittance through the building envelope (U-value) is still an important factor when calculating the CO₂ emission figure (as calculated using SBEM) for a new-build construction. British Gypsum offers a number of solutions with high thermal performance, to meet and exceed Building Regulations Approved Document L requirements, which can result in additional points under the BREEAM: Education criteria.

Airtightness

Airtightness requirements are becoming increasingly onerous, driven by Building Regulations Approved Document L. Lower levels of air permeability, as entered into the SBEM calculation, can have a significant bearing on the CO₂ emissions.

Durability

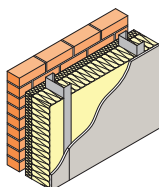
The DCSF (formerly DfES) recommends that the lining to the external wall should be Severe Duty to *BS 5234 Part 2: 1992*.



Examples – select how you wish to build:

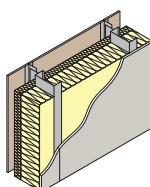
Lightweight steel

1



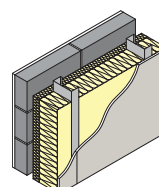
100mm Brick outer, 50mm clear cavity, 50mm Isover Steel Frame Batt, Metsec stud (size as per table) at 600mm centres. Insulation between studs (as per table), Isover Vario. Linings as in table.

2



Cladding (ventilated), 50mm clear cavity, 50mm Isover Steel Frame Batt, Metsec stud (size as per table) at 600mm centres. Insulation between studs (as per table), Isover Vario. Linings as in table.

3



20mm render, 100mm medium block ($\lambda=0.61W/mK$), 50mm clear cavity, 50mm Isover Steel Frame Batt, Metsec stud (size as per table) at 600mm centres. Insulation between studs (as per table), Isover Vario. Linings as in table.

Table 3.1 - Lightweight steel

Detail	Stud size mm	Insulation	Board type	Lining thickness mm	U-value (W/m ² K)
1	100	100mm Isover Steel Frame In-fill Batt	SoundBloc or FireLine ¹	1 x 15	0.26
1	150	150mm Isover Modular Roll	SoundBloc or FireLine ¹	1 x 15	0.24
2	100	100mm Isover Steel Frame In-fill Batt	SoundBloc or FireLine ¹	1 x 15	0.32
2	150	150mm Isover Modular Roll	SoundBloc or FireLine ¹	1 x 15	0.28
3	100	100mm Isover Steel Frame In-fill Batt	SoundBloc or FireLine ¹	1 x 15	0.26
3	150	150mm Isover Modular Roll	SoundBloc or FireLine ¹	1 x 15	0.23

¹ Subject to fire resistance required - contact the British Gypsum Drywall Academy.

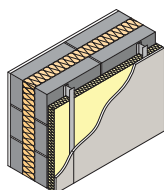
Table 3.2 - Lightweight steel - linings with enhanced impact performance

Detail	Stud size mm	Insulation	Board type	Lining thickness mm	U-value (W/m ² K)
1	100	100mm Isover Steel Frame In-fill Batt	DuraLine	1 x 15	0.26
1	150	150mm Isover Modular Roll	DuraLine	1 x 15	0.24
2	100	100mm Isover Steel Frame In-fill Batt	DuraLine	1 x 15	0.32
2	150	150mm Isover Modular Roll	DuraLine	1 x 15	0.28
3	100	100mm Isover Steel Frame In-fill Batt	DuraLine	1 x 15	0.26
3	150	150mm Isover Modular Roll	DuraLine	1 x 15	0.23

NB For information on Isover Vario please refer to page 61.

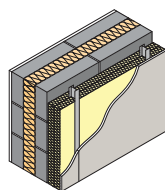
Masonry with Gypliner iwl lining (see Table 3.9 for stud sizes and maximum lining heights)

1



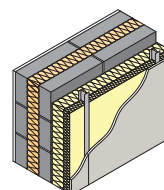
20mm render, 100mm medium block ($\lambda=0.61\text{W/mK}$), 100mm Isover Hi-Cav 32 full-fill, 100mm medium block ($\lambda=0.61\text{W/mK}$), Gypliner iwl with 50mm Isover High Performance Acoustic Slab between studs, Isover Vario. Linings as in table.

2



20mm render, 100mm medium block ($\lambda=0.61\text{W/mK}$), 100mm Isover Hi-Cav 32 full-fill, 100mm medium block ($\lambda=0.61\text{W/mK}$), 50mm Isover High Performance Acoustic Slab, Gypliner iwl with 50mm Isover High Performance Acoustic Slab between studs, Isover Vario. Linings as in table.

3



20mm render, 100mm medium block ($\lambda=0.61\text{W/mK}$), 100mm Isover Hi-Cav 32 full-fill, 100mm medium block ($\lambda=0.61\text{W/mK}$), 100mm Isover High Performance Acoustic Slab, Gypliner iwl with 50mm Isover High Performance Acoustic Slab between studs, Isover Vario. Linings as in table.

Table 3.4 - Masonry with Gypliner iwl lining

Detail	Board type	Lining thickness mm	U-value ($\text{W/m}^2\text{K}$)
1	SoundBloc ² or FireLine ¹	1 x 15	0.20
2	SoundBloc ² or FireLine ¹	1 x 15	0.16
3	SoundBloc ² or FireLine ¹	1 x 15	0.13

¹ Subject to fire resistance required – contact the British Gypsum Drywall Academy.

² These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

Table 3.5 - Masonry with Gypliner iwl lining with enhanced impact performance

Detail	Board type	Lining thickness mm	U-value ($\text{W/m}^2\text{K}$)
1	DuraLine ¹	1 x 15	0.20
2	DuraLine ¹	1 x 15	0.16
3	DuraLine ¹	1 x 15	0.13

¹ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

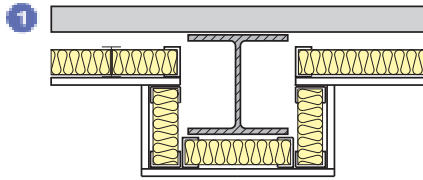
Cavity barriers

Isover Cavity Barriers within concealed spaces will prevent unseen spread of smoke and hot gases. They should be positioned at any junction of cavities in external or stairway walls, floors or roofs where they coincide with compartment walls or walls designed to restrict disproportionate damage. Cavity barriers can be as far apart as 40m, but it is recommended that in schools they should be located to coincide with walls, ceilings and floors separating different activities. This may be especially important in ceilings over assembly halls and other large spaces such as sports halls. Further underfloor barriers may be needed to prevent the transmission of sound horizontally.



Insulated panel systems

Gyplyner iwl can be used as a non-loadbearing internal wall lining where the external structural envelope is formed using an insulated panel system. The specifications in Table 3.7 below provide information on the fire resistance that can be achieved using Gyplyner iwl in conjunction with insulated panel systems.



Board linings to one side of Gyframe 'I' Stud framework and 50mm Isover High Performance Acoustic Slab, forming an independent lining in association with an insulated panel type cladding system incorporating a minimum 0.7mm sheet steel. Linings as in table.

Table 3.7 - Linings to structural steel columns ¹

Detail	Board type ⁴	Lining thickness mm	Duty rating	System reference
Fire resistance² – 30 minutes integrity : 30 minutes insulation³ EN BS				
1	SoundBloc ⁵	2 x 12.5	Severe	B216003
1	SoundBloc ⁵	2 x 15	Severe	B216004
Fire resistance² – 60 minutes integrity : 30 minutes insulation³ EN BS				
1	FireLine	1 x 15	Heavy	B216026
1	DuraLine ⁵	1 x 15	Severe	B216026
Fire resistance² – 90 minutes integrity : 30 minutes insulation³ EN BS				
1	FireLine	2 x 12.5	Severe	B216027
1	FireLine	2 x 15	Severe	B216028
1	DuraLine ⁵	2 x 15	Severe	B216028

¹ The fire resistances apply to external walls, whose construction incorporates structural steel sections with a profiled steel cladding, when the inside of the wall is exposed to fire.

² Where the external wall is more than 1m from the boundary, Building Regulations allow relaxation of the provision for insulation to 15 minutes in certain circumstances.

³ The figures quoted relate to the complete wall structure including the external cladding. The lining also offers fire protection to steel columns, subject to A/V (Hp/A) factor. Refer to Table 3.8.

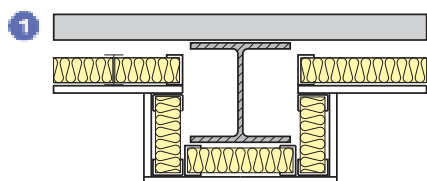
⁴ For improved durability and impact resistance, the outer layer of board can be replaced with a layer of Gyproc DuraLine of equivalent thickness.

⁵ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

NB For assistance with U-value calculations, in order to specify British Gypsum systems, contact the British Gypsum Drywall Academy, quoting the thermal resistance of the particular insulated panel. A vapour control layer may be required depending on the through wall construction.

GyLyner iwl linings - fire protection to structural steel sections

Structural steel columns and beams contained within the cavity of GyLyner iwl system can also be fire protected, subject to section factor A/V (Hp/A). See Table 3.8 for details.



Board linings to one side of Gypframe 'I' Stud framework and 50mm Isover Acoustic Slabs - High Performance. Linings as in table.

Table 3.8 - Fire protection to structural steel

Detail	Board type	Lining thickness mm	Section factor ¹ A/V (Hp/A) m ⁻¹
30 minutes fire resistance EN BS			
1	FireLine	1 x 15	Up to 300
1	SoundBloc ²	2 x 12.5	Up to 300
60 minutes fire resistance EN BS			
1	FireLine	2 x 12.5	Up to 300
90 minutes fire resistance EN BS			
1	FireLine	2 x 12.5	Up to 200 (BS only)
1	FireLine	2 x 15	Up to 300

¹ Based on four sided exposure. Protection is afforded to universal column sections as described in BS 4: Part 1: 1980. Based on critical temperature 550°C (information on other critical temperatures is available).

² These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

NB The fire resistance and sound insulation performances are for imperforate partitions, walls and ceilings incorporating boards with all joints taped and filled, or skimmed according to British Gypsum's recommendations. The quoted performances are achieved only if British Gypsum components are used throughout, and the Company's fixing recommendations are strictly observed. Any variation in the specifications should be checked with British Gypsum. A vapour control layer may be required depending on the through wall construction.

GyLyner iwl linings - maximum heights

Greater maximum heights can be achieved by reducing Gypframe 'I' Stud centres.

Table 3.9 - Maximum heights¹ for Gypframe 'I' Studs at 600mm centres

Detail	Stud type	12.5mm boards		15mm boards		Thermaline laminates
		single	double	single	double	single
1	48 I 50	2400	2700	2400	2800	2400
1	60 I 50	2400	3000	2700	3300	2400
1	60 I 70	3000	3600	3300	3900	3000
1	70 I 70	3600	4200 ²	3900	4300 ²	3600
1	92 I 90	5100 ²	5700 ²	5400 ²	6000 ²	5100 ²
1	146 I 80	6900 ²	7200 ²	7200 ²	7500 ²	6900 ²

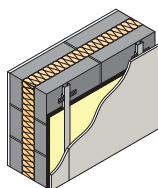
¹ Based on a limiting deflection of L/240 at 200 Pa.

² For heights between 4200mm and 8000mm, Gypframe Deep Flange (DC) or Extra Deep Flange (EDC) Floor & Ceiling Channel should be used at the head and base.

Masonry with GyPlYner UNIVERSAL lining

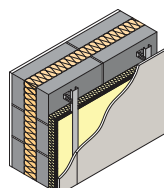
GyPlYner UNIVERSAL can be used as an alternative to GyPlYner iWL to provide wall linings that maximise room sizes.

1



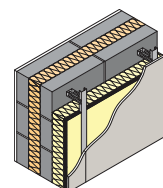
20mm render, 100mm medium block ($\lambda=0.61\text{W/mK}$), 100mm Isover Hi-Cav 32 full-fill, 100mm medium block ($\lambda=0.61\text{W/mK}$), GyPlYner UNIVERSAL with 25mm Isover APR 1200, Isover Vario. Linings as in table.

2



20mm render, 100mm medium block ($\lambda=0.61\text{W/mK}$), 100mm Isover Hi-Cav 32 full-fill, 100mm medium block ($\lambda=0.61\text{W/mK}$), 50mm Isover APR 1200 behind Gypframe GL1 Lining Channel, GyPlYner UNIVERSAL with 25mm Isover APR 1200, Isover Vario. Linings as in table.

3



20mm render, 100mm medium block ($\lambda=0.61\text{W/mK}$), 100mm Isover Hi-Cav 32 full-fill, 100mm medium block ($\lambda=0.61\text{W/mK}$), 100mm Isover APR 1200 behind Gypframe GL1 Lining Channel, GyPlYner UNIVERSAL with 25mm Isover APR 1200, Isover Vario. Linings as in table.

Table 3.10 - Masonry with GyPlYner UNIVERSAL lining

Detail	Board type	Lining thickness mm	U-value (W/m ² K)
1	FireLine	1 x 15	0.23
2	FireLine	1 x 15	0.18
3	FireLine	1 x 15	0.15

Table 3.11 - Masonry with GyPlYner UNIVERSAL lining with enhanced impact performance

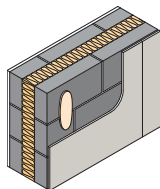
Detail	Board type	Lining thickness mm	U-value (W/m ² K)
1	DuraLine ¹	1 x 15	0.23
2	DuraLine ¹	1 x 15	0.18
3	DuraLine ¹	1 x 15	0.15

¹ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

NB For information on acoustic performance, please refer to the internal wall linings solutions on page 62. For information on Isover Vario please refer to page 61.

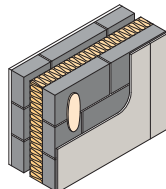
Masonry with Drilyner system or Thistle plasters

1



20mm render, 100mm medium block ($\lambda=0.61$ W/mK), 100mm Hi-Cav 32 full-fill, 100mm medium block ($\lambda=0.61$ W/mK), Drilyner BASIC. Linings as in table.

2



20mm render, 100mm medium block ($\lambda=0.61$ W/mK), 50mm residual cavity, 100mm Hi-Cav 32 partial-fill, 100mm medium block ($\lambda=0.61$ W/mK), Drilyner BASIC. Linings as in table.

Table 3.13 - Masonry with Drilyner system

Detail	Lining type	Lining thickness mm	U-value (W/m ² K)
1	SoundBloc ¹ on Drilyner BASIC	1 x 15	0.26
2	SoundBloc ¹ on Drilyner BASIC	1 x 15	0.27

Table 3.14 - Masonry with Drilyner system or Thistle plasters with enhanced impact performance

Detail	Lining type	Lining thickness mm	U-value (W/m ² K)
1	DuraLine ¹ on Drilyner BASIC	1 x 15	0.26
1	DuraLine ¹ on Drilyner BASIC	1 x 15	0.27
1	Thistle undercoat + Thistle Multi-Finish	11 + 2	0.27
2	Thistle undercoat + Thistle Multi-Finish	11 + 2	0.28

Table 3.15 - Masonry with Drilyner system or Thistle plasters with superior impact performance

Detail	Lining type	Lining thickness mm	U-value (W/m ² K)
1	Rigidur H ¹ on Drilyner BASIC	1 x 15	0.26
2	Rigidur H ¹ on Drilyner BASIC	1 x 15	0.27
1	Thistle undercoat + Thistle Durafinish	11 + 2	0.27
2	Thistle undercoat + Thistle Durafinish	11 + 2	0.28

¹ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

Introducing Thistle Durafinish from British Gypsum

The hardwearing plaster, for hardworking buildings

At British Gypsum, we take plaster very seriously. It may be a cosmetic thing, but appearances matter. And when you're running a building, they matter even more.

A regular plaster is ideal for most areas. But for the more hardworking parts of your building - from the office stairwell to the school corridor - you need a finish that's able to withstand everyday knocks and scrapes, wear and tear. Otherwise you could find yourself putting up with frequent, costly maintenance and a disruptive environment; one that isn't conducive to educating, healing, living, working or playing.



Hello to Thistle Durafinish, goodbye to:

- Spending money on frequent repairs
- Shutting down critical parts of the building for maintenance work
- Dealing with dust and disruption, cleaning and redecorating
- Arranging temporary accommodation or facilities



Help protect against daily wear and tear like this with Thistle Durafinish



Lightly damaged areas deteriorate quickly, making proper cleaning difficult

A smarter, tougher kind of plaster

Thistle Durafinish is a new kind of plaster, unlike anything else on the market. Thanks to in-built resistance to accidental damage, it lasts much, much longer than normal finishing options. Plus, unlike expensive, heavy-duty alternatives, it doesn't need specialist application; your regular or on-site plasterer can easily do the job.

Thistle Durafinish: the tougher plaster that protects against accidental damage

Looks good, stays looking good

It's a fact that if people spend time in a clean, pleasant space, they're more likely to treat it with respect. Thistle Durafinish is a tougher plaster that creates a smooth, even surface that stays that way, day in, day out. So from crowds of kids to cleaning and catering staff, everyone using the space will start to take a bit more pride in their surroundings.

Thistle Durafinish facts

- Proven to provide significantly increased resistance to accidental damage when compared with other plasters
- Can be used on plasterboard or undercoat plasters, or for replastering and repair work on previously finished walls
- Ideal for high-traffic areas including corridors, stairwells and canteens in healthcare, leisure, social housing, education and office buildings
- Has a light-grey colour for easy identification on site
- Formulated for use by your usual plasterer - no special equipment or techniques needed



Even with expensive metal cladding to the walls, damage is still a problem.



Thistle Durafinish reduces damage, repairs and inconvenient closures.

Keep your building open

Hospitals, schools, social housing, leisure complexes, office developments... these are buildings that simply can't afford to have critical or communal spaces closed down for maintenance. That's why every building will benefit from targeted use of Thistle Durafinish, designed specifically for high traffic areas.

So whether you're involved in the specification process of new buildings or responsible for carrying out refurbishments and repairs, find out more about how in the long run, Thistle Durafinish can help you to maintain the right environment and keep your building open.

For more information or to request a sample of Thistle Durafinish, please contact British Gypsum at:

Telephone 0844 800 1991 Fax: 0844 561 8816

www.british-gypsum.com

bgtechnical.enquiries@bpb.com

Gyproc Dri-Wall Adhesive

For use in British Gypsum Drilyner systems

Gyproc Dri-Wall Adhesive is a general purpose gypsum based adhesive for use in a commercial or domestic, new-build or refurbishment environments. Used in the British Gypsum **Drilyner BASIC, SI, TL and MF** systems on high, medium or low suction backgrounds, it comes packed in 25kg bags, each with a coverage of 6-7m². Just mix with water and it's ready to use.



Application

A continuous fillet / ribbon of Gyproc Dri-Wall Adhesive is applied to the wall perimeter and around services and openings as board fixing proceeds.

For **Drilyner BASIC, SI and TL** systems, adhesive dabs are applied in three or four rows (as appropriate) to receive the first board, together with intermediate dabs at ceiling level and a continuous band of adhesive at skirting level. Boards are positioned and supported until the adhesive sets.

For the **Drilyner MF** system, dabs of Gyproc Dri-Wall Adhesive are applied progressively to the wall to each vertical line. Gypframe channels are located onto the adhesive dabs and 'tapped' into position. Board fixing can proceed once the adhesive has fully set.

For more details, see the British Gypsum **WHITE BOOK** or visit www.british-gypsum.com



Air permeability

Here, we provide some good practice guidance on improving the air permeability of the new building's external envelope.

There are a number of factors that are known to influence airtightness:

- Age of the building
- Construction type
- Number of storeys
- Size and complexity
- Seasonal variation
- Site supervision and workmanship

Gyproc Soundcoat Plus

For increased airtightness

Airtightness is the term used to describe the leakage characteristics of a building. This determines the uncontrolled background ventilation or leakage rate of a building. Good installation practices will improve the air permeability of a new building's external envelope.

Airtightness is expressed in terms of a whole building leakage rate at an artificially induced pressure (usually 50 Pa). The lower the air leakage rate, the greater the airtightness.

Within Building Regulations Approved Document L1A and L2A an upper limit on air permeability of $10\text{m}^3/(\text{hr. m}^2)$ is required. In practice, most designs will need to be significantly better than this.

Improving the building's airtightness is crucial to improving the energy performance of the building.

Although air leakage can occur directly, most leaks (circa 75%) occur indirectly. Air leakage paths are often very complicated, therefore air leakage can be difficult to trace and seal effectively.

However, the known main air leakage paths are:

- Cracks, gaps and joints in the structure
- Timber floors
- Joist penetrations of external walls
- Internal stud walls
- Windows and doors (and their surrounds)
- Loft hatches
- Skirting boards
- Chimneys and flues
- Service entries, ducts and electrical components
- Areas of un-plastered wall
- Plasterboard drylining



Introducing Gyproc Soundcoat Plus - a new parge coat from British Gypsum

Parging of masonry walls, prior to drylining, is a commonly used method of improving the acoustic and thermal performance by minimising air leakage through cracks, unfilled joints and block porosity. A building that is well constructed, with a good standard of airtightness, will benefit from improved energy performance, lower heating costs, reduced CO₂ emissions and greater comfort for its users.

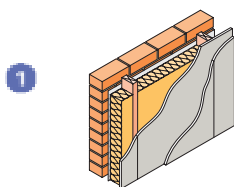
Gyproc Soundcoat Plus optimises the thermal performance of external and separating walls by limiting air leakage and the resultant heat loss.

Key facts - what's changed

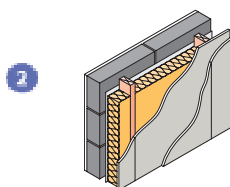
- Gyproc Soundcoat Plus replaces Gyproc SoundCoat to deliver even more performance benefits.
- This new product has been formulated to enable application on to aircrete blocks, as well as aggregate.



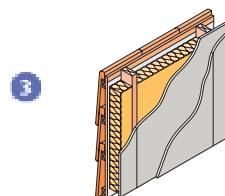
Timber frame linings (15% timber fraction)



100mm brick outer, 50mm clear cavity, 9mm OSB. 140mm x 38mm timber studs at maximum 600mm centres. Timber stud fully filled with 140mm Isover Frame Batt 34, Isover Vario. Linings as in table.



20mm render, 100mm medium block ($\lambda=0.61\text{W/mK}$), 50mm clear cavity, 9mm OSB. 140mm x 38mm timber studs at maximum 600mm centres. Timber stud fully filled with 140mm Isover Frame Batt 34, Isover Vario. Linings as in table.



Cladding on battens – well ventilated, 9mm OSB. 140mm x 38mm timber studs at maximum 600mm centres. Timber stud fully filled with 140mm Isover Frame Batt 34, Isover Vario. Linings as in table.

Table 3.16 - Timber frame (15% timber fraction)

Detail	Lining type	Lining thickness mm	U-value ($\text{W/m}^2\text{k}$)	Fire resistance (BS) ¹ minutes	Fire resistance (EN) minutes	System reference
1	SoundBloc ³ or FireLine	1 x 15	0.28	30	30	B606005
2	SoundBloc ³ or FireLine	1 x 15	0.27	30	30	B606004
3	SoundBloc ³ or FireLine	1 x 15	0.30	30 ²	30 ²	B606006

Systems presented are typical solutions. For specific U-value and condensation risk calculations, please contact the British Gypsum Drywall Academy.

¹ Based on Building Research Establishment Document BR128 report (1988) guidelines, as referenced in the Building Regulations Approved Document B.

² 30 minutes loadbearing capacity; 30 minutes integrity; 15 minutes insulation.

³ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

Table 3.17 - Timber frame (15% timber fraction) with enhanced impact performance

Detail	Lining type	Lining thickness mm	U-value ($\text{W/m}^2\text{k}$)	Fire resistance (BS) ¹ minutes	Fire resistance (EN) minutes	System reference
1	DuraLine ⁴	1 x 15	0.28	30	30	B606005
2	DuraLine ⁴	1 x 15	0.27	30	30	B606004
3	DuraLine ⁴	1 x 15	0.30	30 ²	30 ²	B606006
1	FireLine	2 x 12.5	0.27	60	60	B606008
2	FireLine	2 x 12.5	0.27	60	60	B606007
3	FireLine	2 x 12.5	0.29	60 ³	60 ³	B606009
1	SoundBloc ⁴	2 x 12.5	0.27	60	30	B606005
2	SoundBloc ⁴	2 x 12.5	0.27	60	30	B606004
3	SoundBloc ⁴	2 x 12.5	0.29	60	30	B606006

Systems presented are typical solutions. For specific U-value and condensation risk calculations, please contact the British Gypsum Drywall Academy.

¹ Based on Building Research Establishment Document BR128 report (1988) guidelines, as referenced in the Building Regulations Approved Document B.

² 30 minutes loadbearing capacity; 30 minutes integrity; 15 minutes insulation.

³ 60 minutes loadbearing capacity; 60 minutes integrity; 15 minutes insulation.

⁴ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

Table 3.18 - Timber frame (15% timber fraction) with superior impact performance

Detail	Lining type	Lining thickness mm	U-value ($\text{W/m}^2\text{k}$)	Fire resistance (BS) minutes	Fire resistance (EN) minutes	System reference
1	Rigidur H ³	1 x 12.5	0.28	30 ¹	30 ¹	B606010
2	Rigidur H ³	1 x 12.5	0.27	30 ¹	30 ¹	B606011
3	Rigidur H ³	1 x 12.5	0.30	30 ^{1 2}	30 ^{1 2}	B606012

Systems presented are typical solutions. For specific U-value and condensation risk calculations, please contact the British Gypsum Drywall Academy.

¹ Based on Building Research Establishment Document BR128 report (1988) guidelines, as referenced in the Building Regulations Approved Document B.

² 30 minutes loadbearing capacity; 30 minutes integrity; 15 minutes insulation.

³ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

NB Timber fraction is the proportion of timber to mineral wool.

Skin.

The most advanced moisture management system known to man...



Vario.

The most advanced moisture management system known to specifiers...

Breathable and airtight. New Vario KM Duplex UV climate membrane for timber frame construction

Vario acts like a sensitive skin, altering its structure depending on relative humidity. In winter, it prevents vapour from the warm interior diffusing into the timber structure. In summer the micropores open, allowing vapour to escape into the building interior. What's more, the system of membrane, tapes and sealant is so effective it can also help you deliver airtightness levels far lower than the 10m³/(hr. m²) required under Part L2A 2006. A total solution, developed in Germany and proven across Northern Europe.

For further information contact the ISOVER Technical Support Team on 0115 945 1143 or email isover.enquiries@saint-gobain.com



ISOVER

The world's leading Acoustic & Thermal Insulation

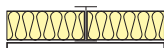


2 Internal linings

Where masonry walls are being used for internal, loadbearing space division, it may be necessary to upgrade the acoustic performance. The following Gyplyner **UNIVERSAL** and Gyplyner **IWL** system specifications provide solutions for improved acoustic performance of the internal loadbearing masonry walls within education buildings.

Gyplyner IWL

1



Solid masonry wall, of mass 180kg/m². Gyframe
'I' Stud framework (minimum 10mm stand off from
masonry) fixed to one side to give 85mm minimum cavity.
Cavity filled with 50mm Isover Acoustic Slab located within
'I' Stud framing. Linings as in table.

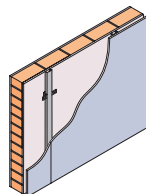
Table 3.19 - Gyplyner IWL

Detail	Lining type	Available with ACTIVair technology ¹	Lining thickness mm	Un-lined wall R _w dB	Acoustic improvement R _w dB	Lined wall R _w dB	System reference
1	SoundBloc		1 x 15	45	+14	59	B216002
1	SoundBloc		2 x 12.5	45	+16	61	B216031

¹ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

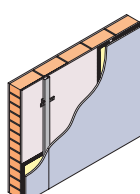
Gyplyner UNIVERSAL

1



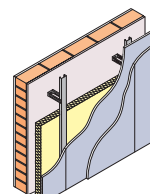
Solid masonry wall, of mass 200kg/m². Gyframe GL1
Lining Channel framework fixed to one side to give
35mm cavity. Other side finished with 13mm Thistle
plaster. Linings as in table.

2



Solid masonry wall, of mass 200kg/m². Gyframe GL1
Lining Channel framework fixed to one side to give
35mm cavity. 25mm Isover APR 1200 in cavity. Other side
finished with 13mm Thistle plaster. Linings as in table.

3



Solid masonry wall, of mass 200kg/m². Gyframe GL1
Lining Channel framework fixed to one side to give
85mm cavity. 50mm Isover APR 1200 in cavity. Other side
finished with 13mm Thistle plaster. Linings as in table.

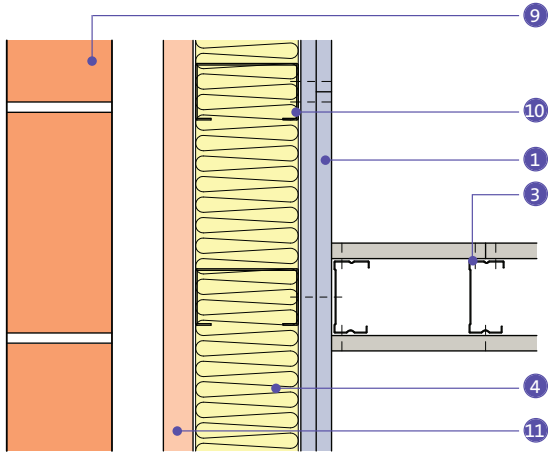
Table 3.20 - Gyplyner UNIVERSAL

Detail	Lining type	Available with ACTIVair technology ¹	Lining thickness mm	Un-lined wall R _w dB	Acoustic improvement R _w dB	Lined wall R _w dB	System reference
1	SoundBloc		1 x 15	47	+2	49	B226009
2	SoundBloc		1 x 15	47	+10	57	B226008
2	SoundBloc		2 x 12.5	47	+13	60	B226003
3	SoundBloc		1 x 15	47	+17	64	B226007
3	SoundBloc		2 x 12.5	47	+19	66	B226005

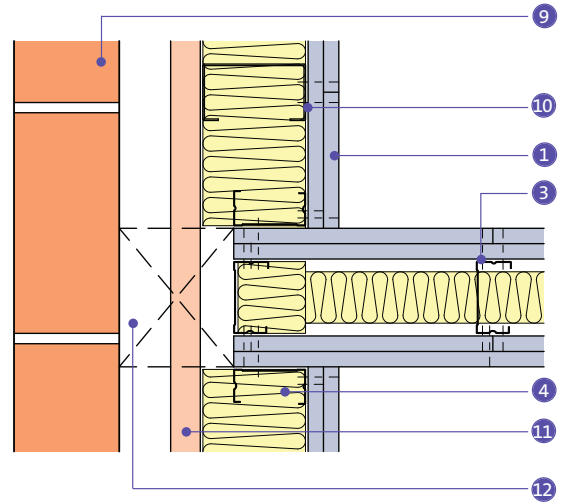
¹ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

Construction details

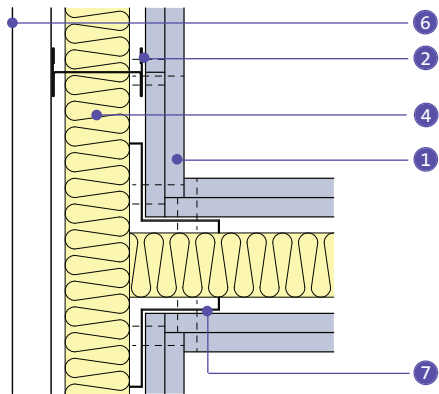
1 Partition abutment with Metsec external wall (low acoustic)



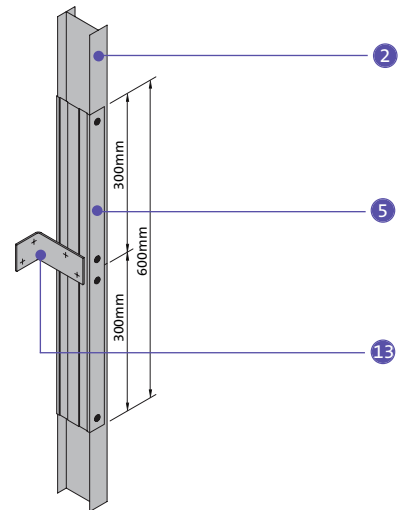
2 Partition abutment with Metsec external wall (high acoustic)



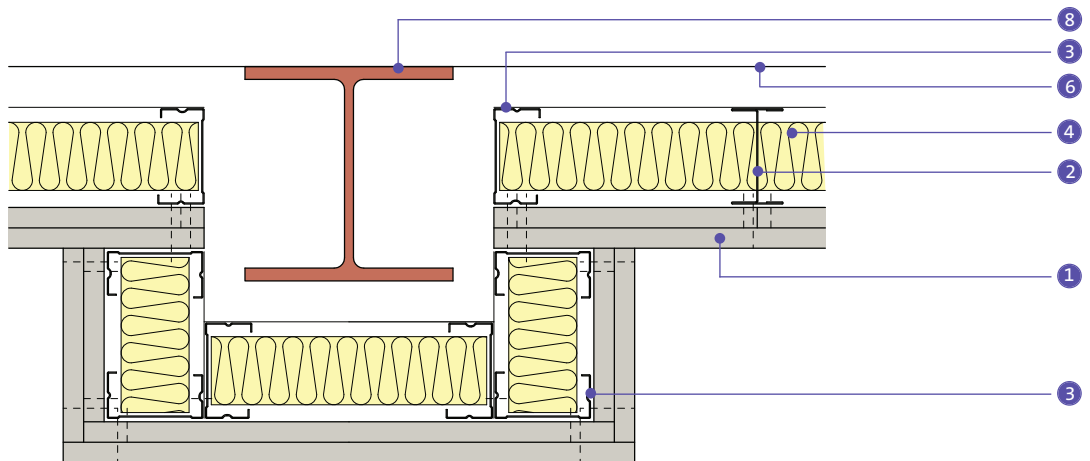
3 Partition junction to optimise acoustic performance and to reduce flanking transmission



4 Gypframe 'T' Stud / splicing and bracing



5 Typical internal cladding to steel column

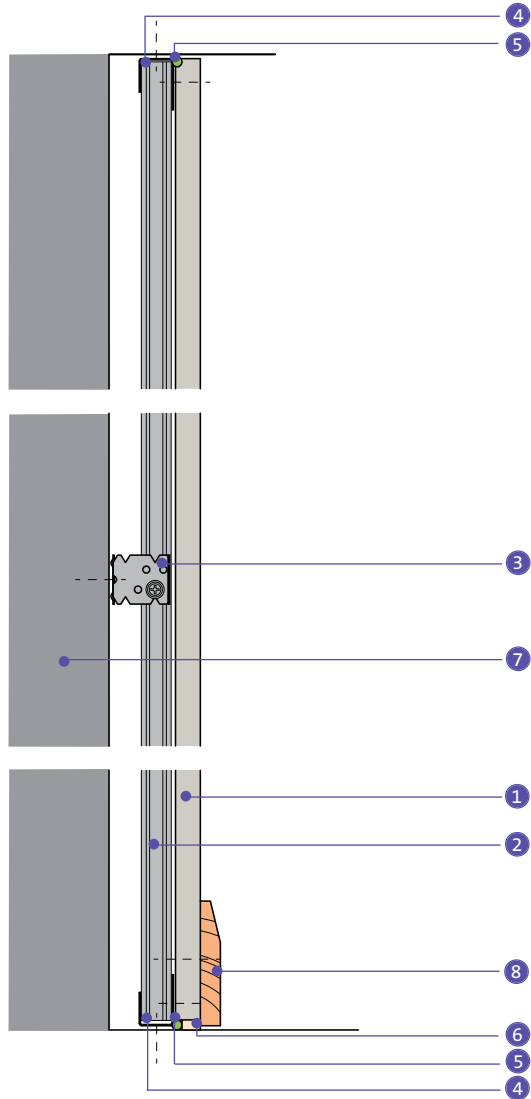


- 1 Gypframe 'T' Stud
- 2 Gypframe 'C' Stud
- 3 Isover insulation
- 4 Gypframe Standard Floor & Ceiling Channel
- 5 Wall structure
- 6 Gypframe GA5 Internal Fixing Angle
- 7 Steel column

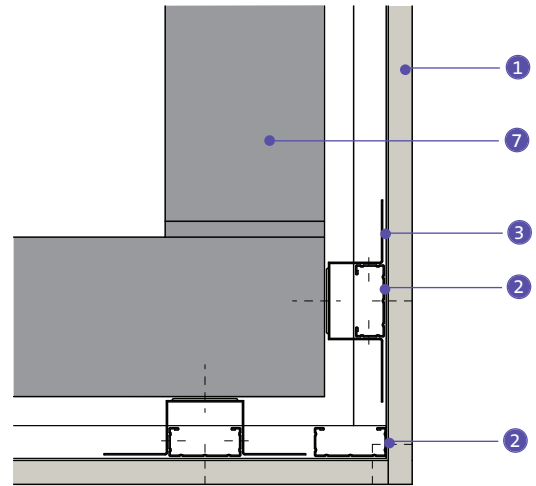
- 8 External cladding
- 9 External wall stud framework
- 10 Rigid insulation board
- 11 Cavity barrier (subject to regulatory requirements)
- 12 Suitable size angle brace (by others)

Construction details

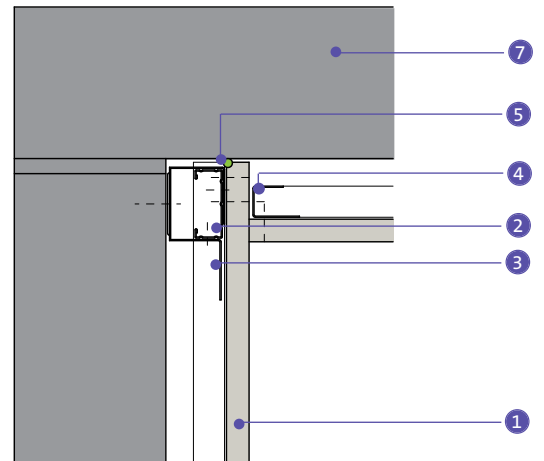
6 Head and base



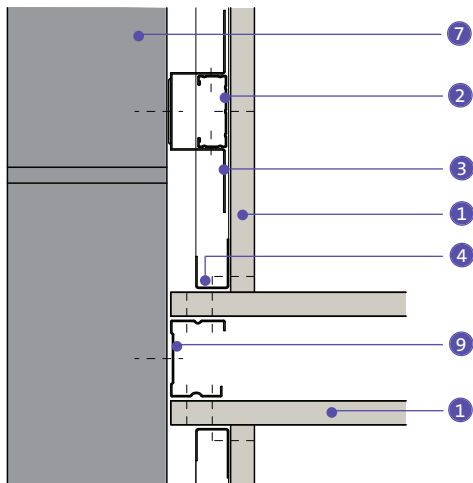
7 External angle



8 Internal angle



9 Partition junction



- 1 Gyproc plasterboard
- 2 Gypframe GL1 Lining Channel
- 3 Gypframe GL2 or GL9 Bracket fixed with Gypframe GL11 Gyplyner Anchor
- 4 Gypframe GL8 Track
- 5 Gyproc Sealant
- 6 Bulk fill with Gyproc jointing materials (where gap exceeds 5mm)
- 7 Wall structure
- 8 Skirting
- 9 Gypframe 'C' Stud



Selecting floors and ceilings



Selecting floors and ceilings

Introduction	74
<i>BB93</i> selection table	75
Solutions - key systems	76
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Dense slab	77
Precast concrete planks	78
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This section will guide you through the regulatory requirements for airborne and impact sound insulation between spaces, and recommend specifications to achieve them.



Introduction

This section will guide you through the regulatory requirements for airborne and impact sound insulation between spaces, and recommend specifications to achieve them.

Noise generated by impacts on a floor structure can be transmitted vertically into spaces directly below in the form of impacts. The movement of people, e.g. footsteps, on the floor above can be disruptive and interfere with the learning activities taking place in the receiving room. Through the use of British Gypsum floor treatments and acoustically engineered ceiling systems, the levels of impact noise can be controlled.

Figure 4.1 describes the minimum impact sound insulation performances between rooms in terms of $L_{nT(T_{mf,max}),w}$. However, British Gypsum floor and ceiling system performances are based on laboratory impact sound insulation data measured in terms of the weighted normalised impact sound pressure level, $L_{n,w}$.

To determine what floor specification would achieve the requirements of BB93 the following calculation method can be used:

STEP 1 Determine the maximum weighted BB93 standardised impact sound pressure level from Figure 4.1.

STEP 2 Estimate the required weighted normalised impact sound pressure level $L_{n,w,est}$.

$$L_{n,w,est} = L'_{nT(T_{mf,max}),w} + 10 \log (V/T_{mf,max}) - 18 \text{ dB}$$

Where: V = volume of the receiving room
 $T_{mf,max}$ = maximum value of the reverberation time T_{mf} for the receiving room from Figure 4.1.

STEP 3 To account for less favourable mounting conditions and flanking noise transmission, a correction factor X is applied to the estimated value above. This is assumed to be 5 dB (according to BB93) but may be higher depending on the quality of flanking detailing.

Therefore the final estimate for the weighted normalised impact sound pressure level $L_{n,w}$ that should be used to select the separating floor from laboratory test data is:

$$L_{n,w} = L_{n,w,est} - X \text{ dB}$$

or

$$L_{n,w} = L_{n,w,est} - 5 \text{ dB}$$

Airborne sound transmission through floors must also be considered and measures taken to avoid unwanted noise transmitted through floor constructions, disrupting the learning environment. BB93 provides performance standards in terms of the level difference $D_{nT(T_{mf,max}),w}$ for the attenuation of airborne sound transmission between adjoining rooms. These values are defined by the activity in the source room and the noise tolerance in the receiving room. The level differences must be determined in both directions, as one direction may have more stringent performance criteria.

To simplify the process of determining both the required impact ($L_{n,w}$) and airborne (R_w) sound insulation performances, British Gypsum has developed an easy-to-use performance calculator which is located in the back cover of this publication. Simply place the disk in your computer and follow the guidance instructions to determine the required $L_{n,w}$ and R_w for all of the floors and ceilings on your school project.

British Gypsum recommends that a qualified acoustic consultant be appointed to check all acoustic specifications, details and calculations.

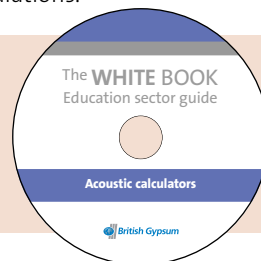


Figure 4.1 – Maximum weighted standardised impact sound pressure level and reverberation time (T_{mf})

Type	Room	Impact sound pressure level	T_{mf} ¹ (seconds)
Nursery school	● Playrooms	65	≤0.6
	● Quiet rooms	60	≤0.6
Primary school	● Classrooms, class bases, general teaching areas, tutorial rooms, language laboratories	60	≤0.6
Secondary school	● Classrooms, general teaching areas, seminar rooms, tutorial rooms, language laboratories	60	≤0.8
Open plan	● Teaching areas	60	≤0.8
	● Resource areas	60	≤1.0
Music	● Classrooms	55	≤1.0
	● Small practice / group room	55	≤0.8
	● Ensemble room	55	0.6 - 1.2
	● Performance / recital room	55	1.0 - 1.5
	● Recording studio	55	0.6 - 1.2
	● Control room for recording	55	≤0.5
Lecture rooms	● Small (fewer than 50 people)	60	≤0.8
	● Large (more than 50 people)	55	≤1.0
Classrooms designed specifically for use by hearing impaired students (including speech therapy rooms)		55	≤0.4
Study room (individual study, withdrawal, remedial work, teacher preparation)		60	≤0.8
Libraries	● Quiet study areas	60	≤1.0
	● Resource areas	60	≤1.0
Science laboratories		65	≤0.8
Drama studios		55	≤1.0
Design and technology	● Resistant materials, CAD/CAM areas	65	≤0.8
	● Electronics / control, textiles, food, graphics, design / resource areas	60	≤0.8
Art rooms		60	≤0.8
Assembly halls, multi-purpose halls (drama, PE, audio / visual presentations, assembly, occasional music)		60	0.8 - 1.2
Audio-visual, video conference rooms		60	≤0.8
Atria, circulation spaces used by students		65	≤1.5
Indoor sports hall		65	≤1.5
Dance studio		60	≤1.2
Gymnasium		65	≤1.5
Swimming pool		65	≤2.0
Interviewing / counselling rooms, medical rooms		60	≤0.8
Dining rooms		65	≤1.0
Ancillary spaces ²	● Kitchens	65	≤1.5
	● Offices, staff rooms	65	≤1.0
	● Corridors, stairwells	65	–
	● Coats and changing areas	65	≤1.5
	● Toilets	65	≤1.5

Source: BB93

¹ Mid-frequency reverberation time, T_{mf} in finished but unoccupied and unfurnished rooms. Common materials often absorb most sound at high frequencies. Therefore reverberation times will tend to be longer at low frequencies than at high frequencies. In rooms used primarily for speech, the reverberation times in the 125Hz and 250Hz octave bands may gradually increase with decreasing frequency to values not more than 30% above T_{mf} .

² The extension of Approved Document E of Schedule 1 to the Building Regulations 2000 (as amended by SI 2002/2871) to schools, applies to teaching and learning spaces and is not intended to cover administration and ancillary spaces. For these areas the values are for guidance only.

Solutions

The following pages detail solutions for concrete and timber floor types used in the construction of educational buildings.

Solution	Page
● Concrete floors	71
– Dense slab	71
– Precast concrete planks	72
– Trapezoidal decking	73
● Timber floors	75

Concealed grid MF suspended ceiling

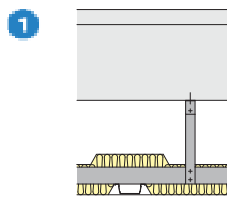


Key facts

- Monolithic appearance
- Suspension from concrete or timber floors
- Acoustic hangers provide option of resilient suspension
- Durable ceiling lining
- Ventilation ducts and other services accommodated in plenum
- Access panels provide services access
- Easy to create bulkheads and change levels


Casoline MF system

Solutions for concrete floors - dense slab



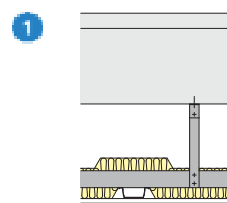
Minimum 25mm screed. Dense concrete minimum 365kg/m³.

Casoline MF ceiling suspended beneath to give a 250mm cavity. 80mm Isover Modular Roll in cavity. Linings as in table.

Ln,w 51-55 dB	Table 4.1 - Casoline mf					
	Board type	Available with ACTIVair technology ²	Ceiling lining thickness mm	Sound insulation R _w (Airborne) dB	System reference	
1	SoundBloc		1 x 12.5	62 ¹	53 ¹	C100033

¹ These performances are estimates based on the guidelines given in BB93, BS 8233: 1999 and similar constructions tested by British Gypsum.

² These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.



Minimum 25mm screed. Dense concrete minimum 365kg/m³.

Casoline MF ceiling suspended beneath to give a 250mm cavity. 80mm Isover Modular Roll in cavity. Linings as in table.

Ln,w ≤ 50 dB	Table 4.2 - Casoline MF				
	Board type	Ceiling lining thickness mm	R _w (Airborne) dB	Sound insulation L _{n,w} (Impact) dB	System reference
1	FireLine ²	2 x 12.5	63 ¹	50 ¹	C100032

¹ These performances are estimates based on the guidelines given in BB93, BS 8233: 1999 and similar constructions tested by British Gypsum.

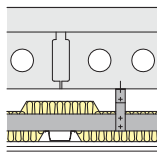
² 30 minutes fire resistance is provided by Gyproc FireLine. For fire performance of the system please contact your concrete block supplier.

NB Concrete floors are inherently fire resisting and don't usually require a contribution from a ceiling lining. Advice should be sought from the supplier for fire resistance provided by the concrete.

NB The ceiling cavity is the distance from the underside of the structural soffit to the back of the plasterboard ceiling lining.

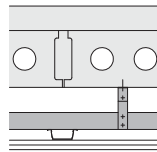
Solutions for concrete floors - precast concrete planks

1



Screed, precast concrete planks (300kg/m²). **CasoLine MF** ceiling suspended beneath to give a 140mm cavity. 80mm Isover Modular Roll in cavity. Linings as in table.

2



Screed, precast concrete planks (300kg/m²). **CasoLine MF** ceiling suspended beneath to give a 140mm cavity. Linings as in table.

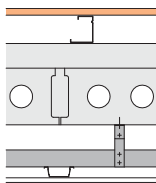
Ln,w
56-60 dB

Table 4.3 - CasoLine MF

	Board type	Available with ACTIVair technology ¹	Ceiling lining thickness mm	Concrete plank thickness mm	Concrete plank weight kg/m ²	Sound insulation R _w (Airborne) dB	L _{n,w} (Impact) dB	System reference
1	SoundBloc		2 x 12.5	150	300	66	57	C100034
2	SoundBloc		2 x 12.5	150	300	54	57	C100035

¹ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

1



18mm chipboard on Gypframe 70 S 65 Steel Battens.
25mm (min) screed applied directly to precast concrete planks (300kg/m²). **GypFloor sb** ceiling suspended from concrete planks to create a 140mm cavity. Ceiling linings as in table.

Ln,w
≤ 50 dB

Table 4.4 - CasoLine MF

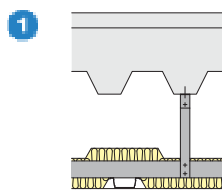
	Board type	Available with ACTIVair technology ¹	Lining thickness mm	Concrete plank thickness mm	Concrete plank weight kg/m ²	Sound insulation R _w (Airborne) dB	L _{n,w} (Impact) dB	System reference
1	SoundBloc		1 x 12.5	150	300	66	50	C100030

¹ These systems have an **ACTIVair** board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains **ACTIVair** technology. Refer to the indoor air quality section in Background & theory.

NB The fire resistance performance is provided by the concrete plank. Advice should be sought from the supplier.

NB The ceiling cavity is the distance from the underside of the structural soffit to the back of the plasterboard ceiling lining.


Solutions for concrete floors - trapezoidal decking



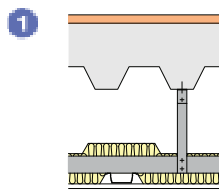
100mm thick concrete slab (2,200 kg/m³). Steel decking sheets.

CasoLine MF ceiling suspended beneath to give a 250mm cavity.

80mm Isover Modular Roll in cavity. Linings as in table.

Ln,w 51-55 dB	Table 4.5 - CasoLine MF						
	Board type	Available with ACTIVair technology ¹	Ceiling lining thickness mm	Concrete slab density kg/m ³	Sound insulation R _w (Airborne) dB	L _{n,w} (Impact) dB	System reference dB
1	SoundBloc		1 x 12.5	2200	62	53	C100037

¹ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.



22mm chipboard flooring. Steel Metsec decking sheets. 100mm thick concrete slab (2,200 kg/m³). CasoLine MF ceiling suspended beneath to give a 250mm cavity. 80mm Isover Modular Roll in cavity. Linings as in table.

Ln,w ≤ 50 dB	Table 4.6 - CasoLine MF					
	Board type	Ceiling lining thickness mm	Concrete slab density kg/m ³	Sound insulation R _w (Airborne) dB	L _{n,w} (Impact) dB	System reference
1	FireLine	2 x 12.5	2200	63	50	C100036

NB The fire resistance performance is provided by the trapezoidal decking. Advice should be sought from the supplier.

NB The ceiling cavity is the distance from the underside of the structural soffit to the back of the plasterboard ceiling lining.

Thermal lining floor systems

Glasroc SoffitLine

Typically used in semi-exposed environments, where perimeters are open to the elements, Glasroc SoffitLine provides a high performance and durable soffit lining that limits heat loss from the building above.

Glasroc SoffitLine combines all the benefits of Glasroc F MULTIBOARD - a superior quality, glass fibre reinforced gypsum board, with a high performance, Class 0 foil-backed phenolic foam.

Glasroc SoffitLine is the ideal solution for car parks and basements where its unrivalled and exceptionally smooth Glasroc F MULTIBOARD surface finish allows the panels to be left undecorated. The foil-backed phenolic foam provides high levels of thermal insulation at minimal thickness, which makes all the difference when headroom is at a premium.

The CFC and HCFC-free phenolic foam with foil backing enables high standards of thermal insulation to be achieved. The foil backing also acts as an integral vapour control layer.

Glasroc SoffitLine is easy to handle and quick and simple to install. It can be fixed to the underside of semi-exposed soffits in three ways:

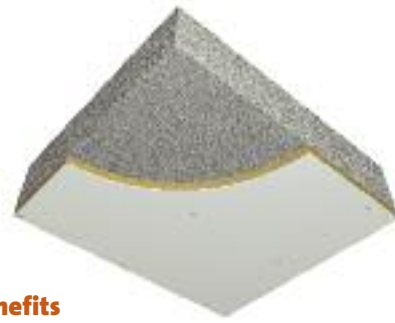
- direct to concrete soffit fix
- fixing via metal framing supports
- fixing via timber batten supports.

Direct to concrete soffit fix is predominantly used in environments where there is very little floor to soffit height, but the advantages of frame fixing far outweigh those of direct soffit fixing.

Primarily frame fixing dramatically reduces the cost of installing Glasroc SoffitLine. It creates a low emissivity air space which contributes to the thermal performance needed, while reducing the board thickness necessary to achieve the required performance levels. This decrease in thickness constitutes an average cost saving of 30% per m² when compared to direct fixing.

Glasroc SoffitLine has superior fixing and handling characteristics and is also resistant to moderate impact and on-site damage.

The surface of Glasroc F MULTIBOARD has good light reflectance properties (>70%) making it the best solution for use in public areas, such as car parks, where ambient lighting is used.

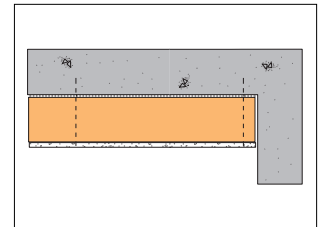


key benefits

- Class 0 / Euroclass B
- CFC and HCFC free
- High impact resistance
- High quality surface finish
- Good light reflectance
- Integral vapour control layer
- Unaffected by temporary exposure to moisture
- Simple and quick to install
- Warranted performance
- Ideal for semi-exposed situation
- High thermal efficiency

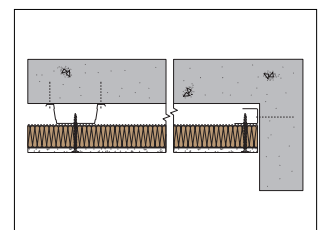
Fixing direct to the soffit

- Glasroc SoffitLine can be directly fixed to the underside of semi-exposed soffits using proprietary anchors at 400mm centres at the edges and in the field of the board.
- When fixing direct to the soffit the length of the proprietary anchors used should be determined by the manufacturer's recommendations concerning loadbearing capacity and suitability of background.



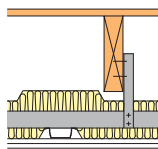
Fixing to concrete soffit with metal framing supports

- Locate Gypframe MF5 Ceiling Section at 600mm centres.
- Fix to the soffit using two suitable fixings spaced at 1200mm centres.
- Fix Glasroc SoffitLine boards at right angles to the MF5 section using Gyproc Drywall Screws of sufficient length to allow a nominal 10mm penetration into the metal.
- Insert screws at 600mm centres at the edges and in the field of the board.



Solutions for timber floors

1

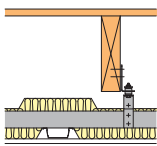


CasoLine MF ceiling² suspended beneath basic floor (ceiling removed) to give 277mm cavity. 100mm Isover General Purpose Roll laid on ceiling boards. Linings as in table.

Ln,w 56-60 dB	Table 4.7 - CasoLine MF						
	Board type	Available with ACTIVair technology ¹	Ceiling lining thickness mm	Floor depth mm	R _w (Airborne) dB	L _{n,w} (Impact) dB	System reference
30 minutes fire resistance EN BS							
1	SoundBloc		2 x 12.5	320	60	60	C106007
60 minutes fire resistance EN BS							
1	SoundBloc		2 x 15	325	60	60	C106014

¹ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

1

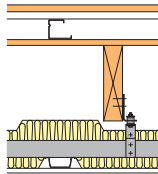


CasoLine MF ceiling² suspended beneath 195 x 45mm timber joists at 600mm centres with t&g chipboard flooring using Gypframe Acoustic Hangers to give 277mm cavity. 80mm Isover Modular Roll in cavity. Linings as in table.

Ln,w 51-55 dB	Table 4.8 - CasoLine MF						
	Board type	Available with ACTIVair technology ¹	Ceiling lining thickness mm	Floor depth mm	R _w (Airborne) mm	L _{n,w} (Impact) dB	System reference dB
30 minutes fire resistance EN BS							
1	SoundBloc		2 x 12.5	320	63	54	C106013
60 minutes fire resistance EN BS							
1	FireLine		2 x 12.5	320	62	55	C106022

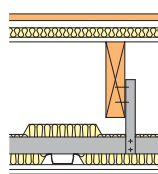
¹ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

1



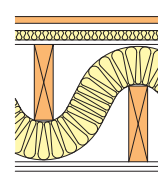
18mm chipboard and one layer of Gyproc Plank on Gypframe 50 S 65 Steel Battens on 15mm OSB subdeck. CasoLine MF ceiling², incorporating Gypframe Acoustic Hangers, to give 287mm cavity. 100mm Isover APR 1200 in the cavity. Linings as in table.

2



Floating floor³ laid over joists. CasoLine MF ceiling² suspended beneath 195mm x 45mm timber joists at 600mm centres to give 277mm cavity. 80mm Isover Modular Roll in cavity. Linings as in table.

3



Separating sub-joist floor comprising of a floating floor³ laid over timber joists (minimum 47mm) at 600mm centres. 100mm Isover APR 1200 in the cavity. Linings as in table.

Ln,w ≤ 50 dB	Table 4.9 - CasoLine MF						
	Board type	Available with ACTIVair technology ¹	Ceiling lining thickness mm	Floor depth mm	R _w (Airborne) dB	L _{n,w} (Impact) dB	System reference
30 minutes fire resistance EN BS							
2	SoundBloc		2 x 12.5	376	66	50	C106011
60 minutes fire resistance EN BS							
1	SoundBloc		2 x 15	419	67	50	C106035
2	SoundBloc		2 x 15	381	66	50	C106025
3	SoundBloc		2 x 15	Variable	66	48	C106050

¹ Comprising walking surface of 18mm t&g wood board flooring, spot-bonded with Gyproc Sealant at 300mm centres to a substrate of Gyproc Plank laid on 25mm Isover Sound Deadening Floor Slabs (Rigid Grade, laid on a minimum of 12mm wood-based sheet sub-deck nailed to the joists).

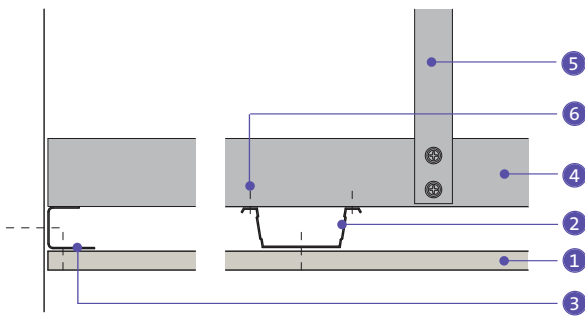
² Normal fixing centres for Gypframe MF5 Ceiling Section and Gypframe MF7 Primary Support Channel (450mm and 1200mm respectively) suspension method is Gypframe MF8 Strap Hangers on Gypframe GA1 Steel Angle unless otherwise stated.

³ These systems have an ACTIVair board option available for formaldehyde control to improve indoor air quality. Alternatively, all systems can be skim finished with Thistle PureFinish which contains ACTIVair technology. Refer to the indoor air quality section in Background & theory.

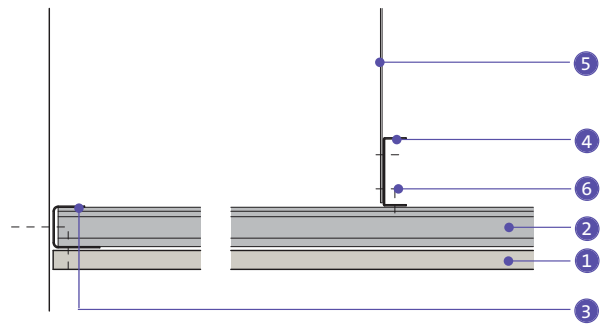
NB The ceiling cavity is the distance from the underside of the walking surface to the back of the plasterboard ceiling lining.

Construction details

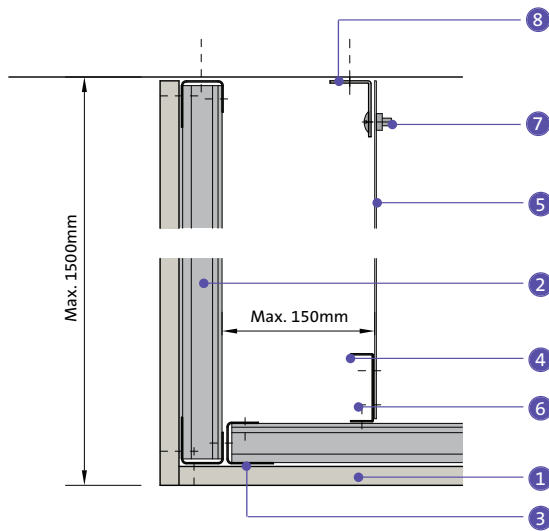
1 Perimeter parallel to Gypframe MF5 Ceiling Section – screw-fixed



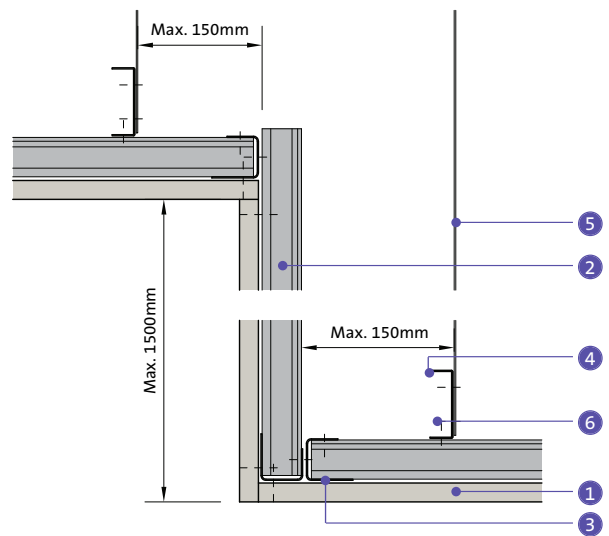
2 Perimeter perpendicular to Gypframe MF5 Ceiling Section – screw-fixed



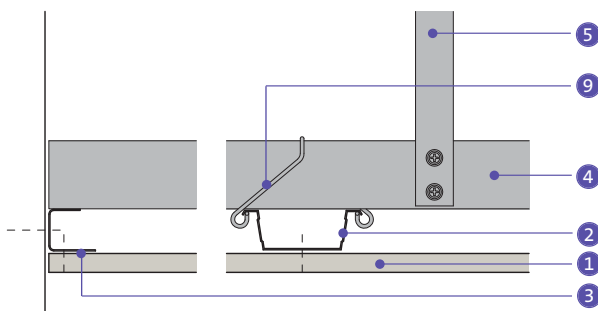
3 Bulkhead – screw-fixed



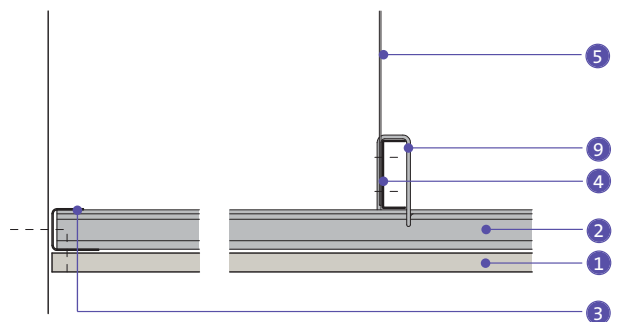
4 Change of level – screw-fixed



5 Perimeter parallel to Gypframe MF5 Ceiling Section – alternative clip-fixed



6 Perimeter perpendicular to Gypframe MF5 Ceiling Section – alternative clip-fixed

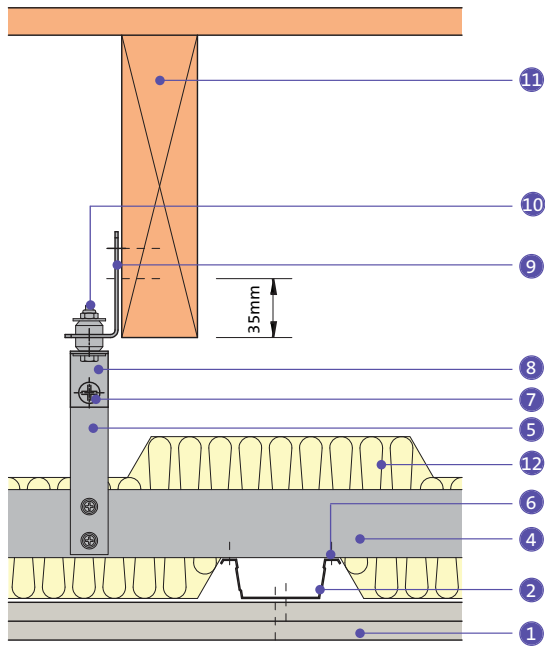


- ① Gyproc plasterboard or Glasroc F specialist board
- ② Gypframe MF5 Ceiling Section
- ③ Gypframe MF6 Perimeter Channel
- ④ Gypframe MF7 Primary Support Channel
- ⑤ Gypframe MF8 Strap Hanger or Gypframe GA1 Steel Angle
- ⑥ Gyproc Wafer Head Jack-Point Screw
- ⑦ Gypframe MF11 Nut and Bolt

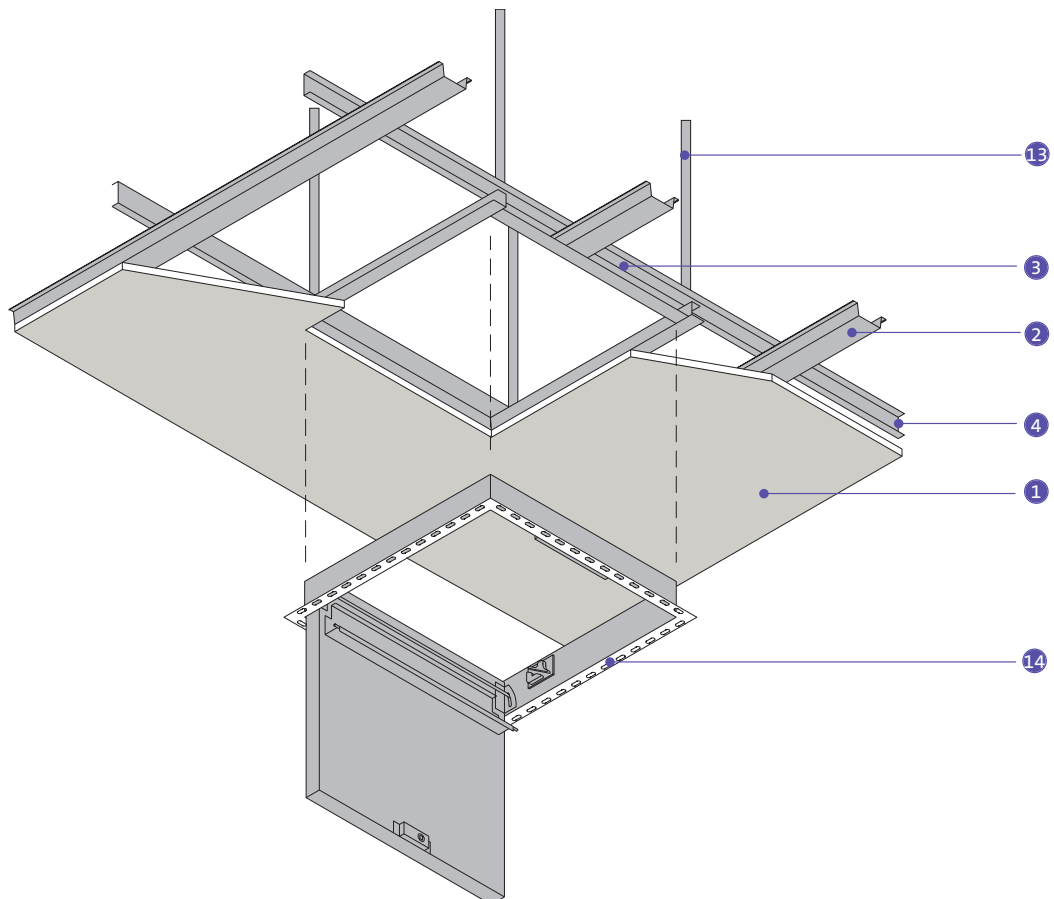
- ⑧ Gypframe MF12 Soffit Cleat
- ⑨ Gypframe MF9 Connecting Clip

Construction details

7 Suspension from timber joist using Gypframe Acoustic Hangers



8 Gyproc Proflex Access Panel installation

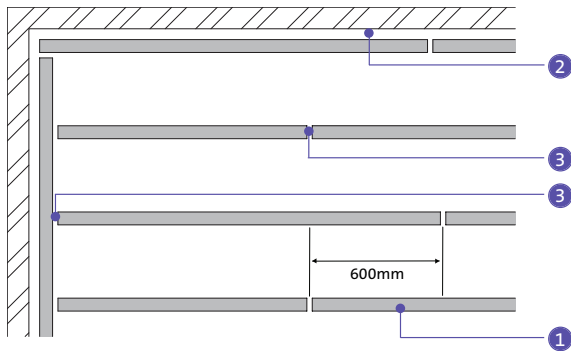


- ① Gyproc plasterboard or Glasroc F specialist board
- ② Gypframe MF5 Ceiling Section
- ③ Gypframe MF6 Perimeter Channel
- ④ Gypframe MF7 Primary Support Channel
- ⑤ Gypframe MF8 Strap Hanger or Gypframe GA1 Steel Angle
- ⑥ Gyproc Wafer Head Jack-Point Screw
- ⑦ Gypframe MF11 Nut and Bolt

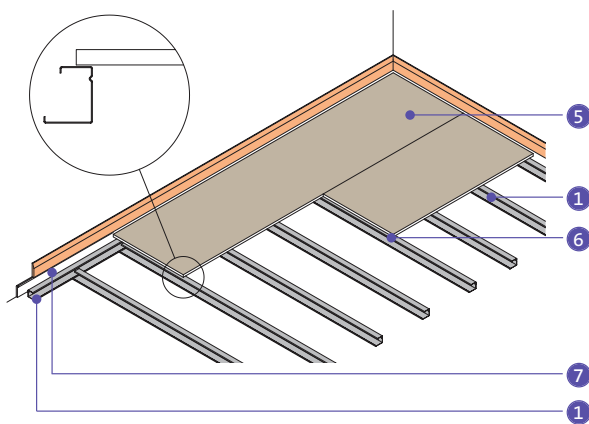
- ⑧ Gypframe MF12 Soffit Cleat
- ⑨ Gypframe Acoustic Hanger
- ⑩ M6 bolt and locking nut (by others)
- ⑪ Timber joist floor
- ⑫ Isover insulation
- ⑬ Gypframe GA1 Steel Angle
- ⑭ Gyproc Proflex Access Panel

Construction details

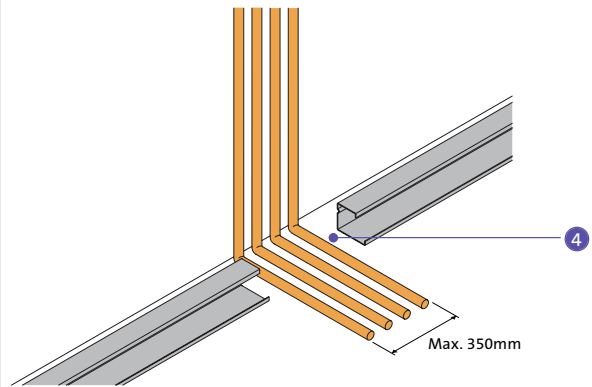
9 Typical batten layout



11 Typical layout (19mm x 2400mm x 600mm Gyproc Plank on battens at 400mm centres)

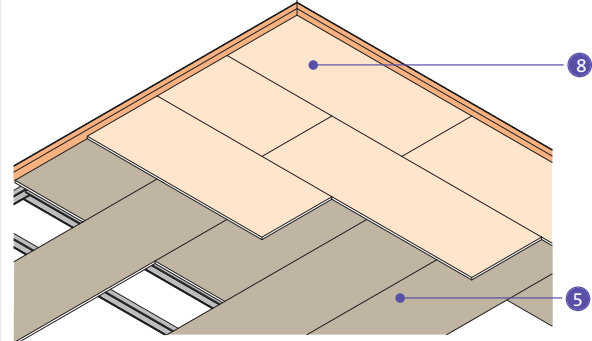


10 Service installation



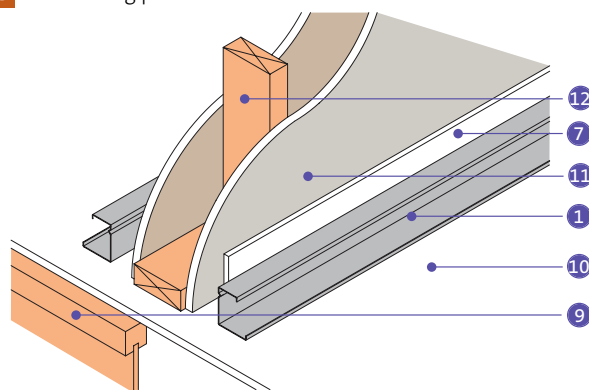
NB Services are incorporated within **GypFloor sb** by allowing a gap in the battens. Service layout should be designed to maintain 400mm maximum spacing between battens.

12 Typical layout (2400mm x 600mm tongue and groove chipboard on Gyproc Plank)



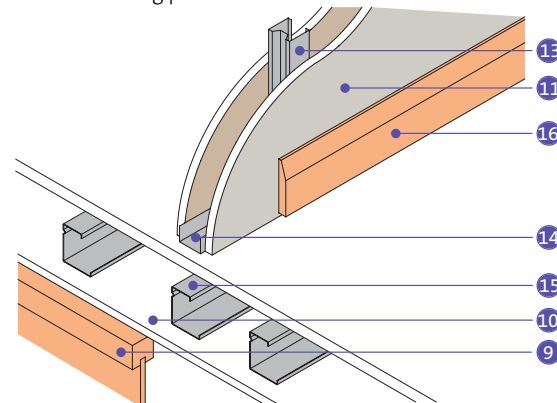
NB Apply glue to the chipboard joints (as recommended by the chipboard manufacturer)

13 Loadbearing partitions



NB Loadbearing partitions should be erected directly onto the sub-floor.

14 Non-loadbearing partitions



NB Non-loadbearing partitions can be erected onto **GypFloor sb**. Provision should be made in the layout to allow a Gyprock Steel Batten beneath the partition to give support and a fixing ground.

- 1 Gyprock Steel Batten
- 2 50mm gap between Gyprock Steel Batten and room perimeter
- 3 25mm gap between battens
- 4 25mm gap between services and battens
- 5 Gyprock Plank
- 6 Board edges supported by a batten
- 7 Gyprock SB3 Flanking Strip
- 8 Chipboard

NB Gyprock SIF5 Floor Screws are recommended (at 600mm centres) for fixing the walking surface to the battens. This prevents movement of the chipboard walking surface, particularly in rooms of a larger area (>10m²).

- 9 Timber joist
- 10 Timbersub-deck
- 11 Gyprock plasterboard
- 12 Timber stud
- 13 Gyprock AcouStud
- 14 Gyprock Floor & Ceiling Channel
- 15 Gyprock Steel Batten providing support for fixing channel
- 16 Skirting



Selecting acoustic ceilings



Selecting acoustic ceilings

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British Gypsum's range of acoustic ceilings create flexibility in design and construction. They were introduced to provide acoustic engineers and specifiers with the products to create the ideal acoustic environment, without compromising on aesthetic appeal.



Introduction

British Gypsum acoustic ceilings

British Gypsum's range of acoustic ceilings create flexibility in design and construction. They provide acoustic engineers and specifiers with the products to create the ideal acoustic environment without compromising on aesthetic appeal.

The comprehensive range includes ceiling tiles, planks and boards, allowing flexibility in design and installation. British Gypsum can offer the back-up and support needed to assist you in specifying the solution that correctly mirrors the performance levels required.

British Gypsum acoustic ceiling systems offer considerable benefits, including:

- **Design flexibility:** British Gypsum offers a range of tiles, planks and boards to create the ideal acoustic and aesthetic solutions.
- **Low maintenance:** British Gypsum ceiling products can be repainted without affecting acoustic performance and are inherently resistant to damage, reducing the overall life-cycle costs considerably.
- **Strength:** British Gypsum ceiling products are stronger than both mineral fibre and metal pan tiles, and can support up to 3kg¹, reducing the need for additional lighting support.
- **Moisture resistance:** British Gypsum's acoustic ceiling products are resistant to staining and sagging.
- **Lifetime warranty:** British Gypsum ceiling systems are covered by the SpecSure® lifetime system warranty, covering them for the entire life of the building. In the unlikely event of system failure, British Gypsum will repair or replace the affected components.

¹ The maximum unsupported weight is dependent on the system. Refer to British Gypsum Drywall Academy for further information.

Improving sound quality in teaching areas

While at school, children are exposed to various types of noise including external, environmental noise and noise generated within the classroom. Previous research has shown that noise has detrimental effects upon children's performance at school, including reduced memory, motivation, and reading ability. In England and Wales, children's academic performance is assessed using standardised tests of literacy, mathematics, and science. A study has been conducted to examine the impact, if any, of chronic exposure to external and internal noise on the test results of children aged 7 and 11 in London (UK) primary schools. Test scores were affected by internal classroom noise, background levels being significantly related to test results. Negative relationships between performance and noise levels were maintained when the data was corrected for socio-economic factors relating to social deprivation, language, and special educational needs. Linear regression analysis has been used to estimate the maximum levels of external and internal noise which allow the schools surveyed to achieve required standards of literacy and numeracy. ©2008 Acoustical Society of America
Statement supplied by: IoA Speech and Hearing Group²

² For additional reading, refer to the following reports:

'The effects of environmental and classroom noise on the academic attainments of primary school children'

and

'The effects of noise on children at school: A review'

Bridget M. Shield – Faculty of Engineering, Science and Built Environment, London South Bank University, Borough Road, London, SE1 0AA

Julie E. Dockrell – School of Psychology and Human Development, Institute of Education, 25 Woburn Square, London, WC1A 0HH

Source: 'Building Acoustics, Volume 10, Number 2, 1 June 2003' pages 97-116

Building Bulletin 93 (BB93) - Overview

The objective is to provide suitable reverberation times for:
(a) clear communication of speech between teacher and student, and between students, in teaching and study spaces.
(b) music teaching and performance areas.

There is no single reverberation time suitable for all teaching areas. BB93 table 1.5 (Figure 5.3) outlines the minimum required mid-frequency reverberation time for rooms that are finished but unoccupied and unfurnished (quoted as T_{mf}). This is the arithmetic average of the reverberation time in the 500 Hz, 1 kHz and 2 kHz octave bands only, commonly known as Speech Band Frequencies.

It is important to take into account low frequency absorption when considering speech intelligibility.

The spectrum for speech falls within the frequency range 250 Hz - 4000 Hz. For good intelligibility, low frequency should not exceed the reverberation time obtained at higher frequency ranges. Lining materials should therefore be selected which have good absorption levels at lower frequencies.

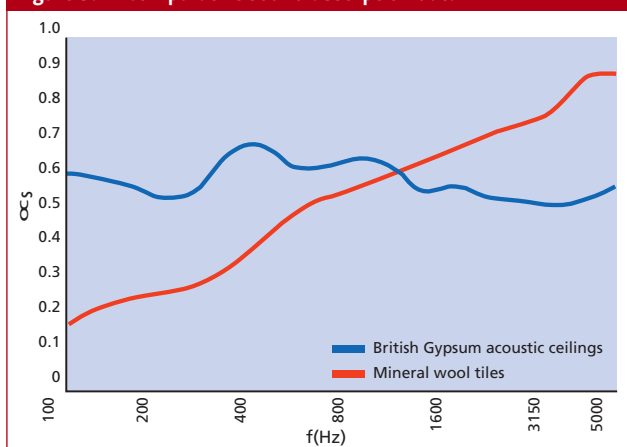
Specialist provision for pupils with hearing impairments

In teaching rooms used by the hearing impaired, good speech intelligibility is essential. *BB93* recommends that the unoccupied mid-frequency reverberation time in these rooms should be no greater than 0.4 seconds.

Low frequency ambient noise (below 500 Hz) should be minimised, as the hearing impaired make use of these frequencies to obtain information from speech.

British Gypsum ceiling systems are effective at absorbing low frequency sound, particularly when compared to mineral fibre tiles (see **Figure 5.1**). This not only meets the needs of *BB93*, but also provides solutions that enhance speech intelligibility.

Figure 5.1 - Comparative sound absorption data



British Gypsum can provide guidance for both *BB93* requirements and speech intelligibility on a project specific basis via our dedicated team of ceiling specialists.

British Gypsum guidance for specific areas

Sound absorption in corridors, entrance halls and stairwells

For these areas, there is no specific reverberation time to be achieved. Unwanted sound needs to be absorbed so that it does not interfere with teaching and study activities in adjacent rooms.

The amount of absorption material required should be calculated in accordance with Building Regulations Approved Document E, Section 7. This describes two calculation methods (**A** and **B**) for controlling reverberation in the common internal parts of buildings.

Method A

Entrance halls, corridors or hallways

Cover an area at least equal to or greater than the floor area with a Class C absorber or better.

Stairwells or stair enclosures

Calculate the combined area of the stair treads, the upper surface of the intermediate landings, the upper surface of the landings (excluding ground floor) and the ceiling area of the top floor. Either cover at least an area equal to this calculated area with a Class D absorber, or cover an area equal to at least 50% of this calculated area with a Class C absorber or better. The absorptive material should be evenly distributed between floor levels and may be applied to any surface facing into the space.

Method B

This method is more complex and requires knowledge of all the materials to be used for lining the area and their sound absorption coefficients. If you wish to use Method B, refer to the detailed worked example in *BB93*, Appendix 7, pages 181-184.

Enclosed teaching spaces

In order to show compliance with *BB93* requirements to the Building Control Body (BCB), calculations must be carried out for each different room design and for each different room type.



Design option

Where corridor widths do not exactly fit the standard product sizes, it may be desirable to install a plain border. This is possible using any of the Class C or better absorbers listed in the ceiling selector guide on page 86. The percentage area of plain board depends on the product performance. See Figure 5.2 for examples.

Figure 5.2 - Percentage area of plain board

Product	Without insulation	With insulation
Gyptone LINE 4	–	13%
Gyptone QUATTRO 41	10%	24%
Gyptone QUATTRO 55	10%	24%
Gyptone POINT 11	5%	5%
Rigitone 15/30	–	7%

For example

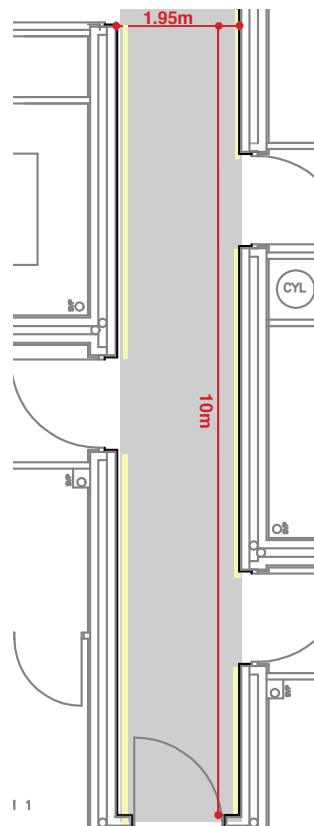
A corridor 1.95m wide x 10m long, total area = 19.5m².

1.8m wide Gyptone QUATTRO 55 Plank is fixed down the centre of the corridor with a 75mm wide border of BASE 33 Plank.

Area of Gyptone QUATTRO 55 Plank = 18m² (92%)

Area of plain plasterboard = 1.5m² (8%)

In this example, no additional Isover insulation is required (see Table 1).



Sound absorption rating methods

The following ratings are calculated in accordance with BS EN ISO 11654: 1997.

Sound Absorption Coefficient, α_s

Individual sound absorption figures quoted in third octave frequency bands used within advanced modelling techniques to accurately predict the acoustic characteristics of a space. The coefficient ranges from 0 (total reflection) through to 1 (total absorption).

Practical Sound Absorption Coefficient, α_p

A convenient octave-based expression of the sound absorption coefficient commonly used by acoustic consultants when conducting calculations of reverberation times within a building space.

Sound Absorption Rating, α_w

A single figure rating used to describe the performance of a material. The single figure rating can have a modifier added to indicate if the spectral shape is dominated by a particular frequency range.

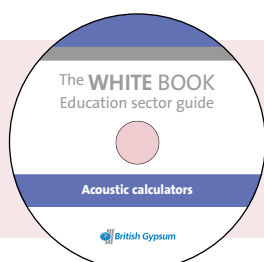
- L means the absorption is predominantly in the low frequency region
- M means the absorption is predominantly in the mid frequency region
- H means the absorption is predominantly in the high frequency region.

The absence of a letter following the rating indicates that the absorber has no distinct area of sound absorption and has an essentially flat spectral shape.



Calculating for classrooms

British Gypsum has developed an easy to use acoustic calculator, which is located in the back cover of this publication, in order to assist in determining the correct British Gypsum acoustic ceiling solution in line with BB93 requirements. It uses generic absorption data supplied as part of BB93 and British Gypsum product data.





BB93 reverberation guidance

Figure 5.3 - Recommended reverberation times, taken from Building Bulletin 93 (BB93), table 1.5

Type of room/activity (receiving room)	T _{mf} ¹ (seconds)
Nursery school playrooms	≤0.6
Nursery school quiet rooms	≤0.6
Primary school: classrooms, class bases, general teaching areas, small group rooms	≤0.6
Secondary school: classrooms, general teaching areas, seminar rooms, tutorial rooms, language laboratories	≤0.8
Open-plan	
Teaching areas	≤0.8
Resource areas	≤1.0
Music	
Music classroom	≤1.0
Small practice / group room	≤0.8
Ensemble room	0.6 - 1.2
Performance / recital room	1.0 - 1.5
Recording studio	0.6 - 1.2
Control room for recording	≤0.5
Lecture rooms	
Small (fewer than 50 people)	≤0.8
Large (more than 50 people)	≤1.0
Classrooms designed specifically for use by hearing impaired pupils	≤0.4
Study room (individual study, withdrawal, remedial work, teacher preparation)	≤0.8
Libraries	≤1.0
Science laboratories	≤0.8
Drama studio	≤1.0
Metal / woodwork classrooms, resource / light craft and practical work	≤0.8
Assembly halls ³ , multi-purpose halls (drama, PE, audio / visual presentations, assembly, occasional music) ³	0.8 - 1.2
Audio-visual, video conference rooms	≤0.8
Atria, circulation spaces used by pupils	≤1.5
Indoor sports hall	≤1.5
Gymnasium	≤1.5
Dance studio	≤1.2
Swimming pool	≤2.0
Interviewing / counselling rooms, medical rooms	≤0.8
Dining rooms	≤1.0
Ancillary spaces ²	
Kitchens	≤1.5
Offices, staff rooms	≤1.0
Corridors, stairwells ⁴	-
Coats and changing areas	≤1.5
Toilets	≤1.5

¹ Mid-frequency reverberation time, T_{mf} in finished but unoccupied and unfurnished rooms. Common materials often absorb most sound at high frequencies. Therefore reverberation times will tend to be longer at low frequencies than at high frequencies. In rooms used primarily for speech, the reverberation times in the 125 Hz and 250 Hz octave bands may gradually increase with decreasing frequency to values not more than 30% above T_{mf}.

² The extension of Approved Document E of Schedule 1 to the Building Regulations 2000 (as amended by SI 2002/2871) to schools, applies to teaching and learning spaces and is not intended to cover administration and ancillary spaces. For these areas the values are for guidance only.

³ For very large halls and auditoria, and for halls designed primarily for unamplified music rather than speech, designing solely in terms of reverberation time may not be appropriate and specialist advice should be sought. In large rooms used primarily for music, it may be appropriate for the reverberation times in the 125 Hz and 250 Hz octave bands to gradually increase with decreasing frequency to values up to 50% above T_{mf}.

⁴ Refer to 'Sound absorption in corridors, entrance halls and stairwells', on Page 83.

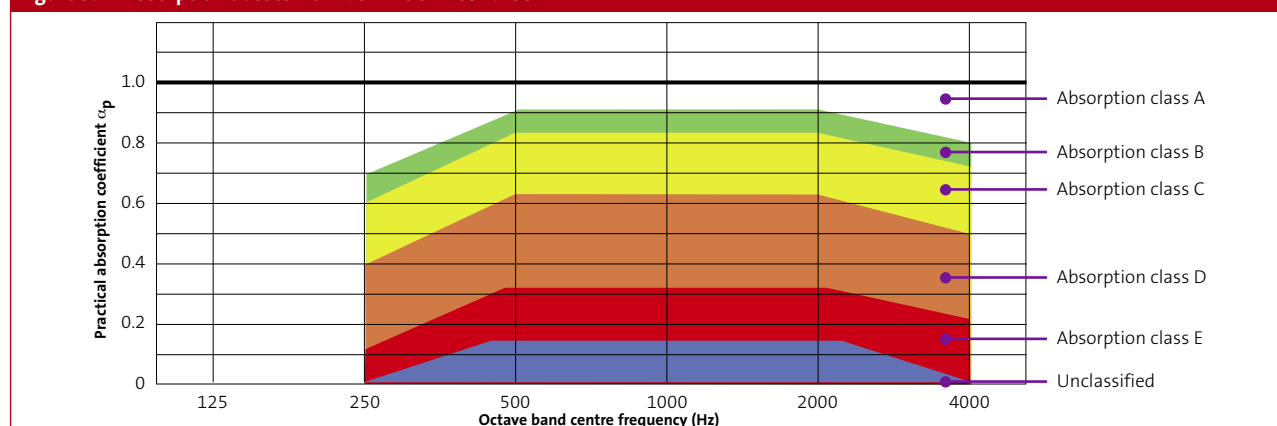
British Gypsum ceiling systems are suitable for all areas (as outlined in the above table) within an education environment. However, we do not advise the use of our sound absorption systems for indoor swimming pools. Alternative ceiling lining solutions are available, please contact the British Gypsum Drywall Academy - Tel: 08705 456123.

Absorption classes

The absorption of surfaces varies with frequency. Therefore, absorption coefficients are generally given for each octave band. A surface is categorised as being in a particular absorption class, A to E (according to *BS EN ISO 11654: 1997*)

depending on its absorption coefficients across the frequency range. To determine the absorption class the octave band values are plotted on a graph from *BS EN ISO 11654: 1997* as shown in **Figure 5.4**.

Figure 5.4 - Absorption classes from *BS EN ISO 11654: 1997*



The table below is designed to guide you to your chosen system solution, based on absorption class and α_w values. The table lists the page numbers for each design in the coloured boxes.

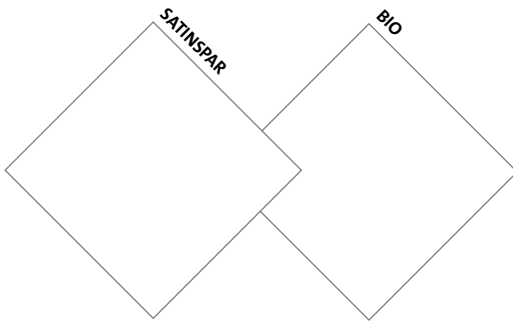
Figure 5.5 – British Gypsum ceiling selector guide

Sound absorption values with page references

Type	Product name	U		E	D						C				B	
		0.10	0.15	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85
Tiles	Gyprex SATINSPAR	*	*													
	Gyprex BIO	*	*													
	Casoprano BIANCA	*	*													
	Casoprano FORTE	*	*													
	Casoprano VOICE									87						
	Casoprano NOVA									87	87	87				
	Casoprano ALTO	*	*													
	Casoprano OLA								87	87	87					
	Casoprano ROC	*	*													
	Casoprano STAR	*	*													
	Gyptone BASE 31	*	*													
	Gyptone SIXTO										88		88		88	88
	Gyptone LINE 4											88	88			
	Gyptone POINT 11										88	88				
	Gyptone POINT 12						88									
Planks	Gyptone QUATTRO 20									88		88				
	Gyptone QUATTRO 22							88								
	Gyptone BASE 33	*	*													
	Gyptone LINE 8											88				
	Gyptone POINT 15											88				
Boards	Gyptone QUATTRO 55											88		88		
	Gyptone QUATTRO 41											88		88		
	Gyptone QUATTRO 45										88	88		88		
	Gyptone QUATTRO 46							88	88							
	Gyptone QUATTRO 47					88	88									
	Gyptone LINE 6							88	88	88						
	Gyptone BASE Curve	*	*													
	Gyptone LINE 7 Curve							88		88						
	Rigitone 8/18								90	90	90		90			
	Rigitone 10/23								90	90		90				
	Rigitone 15/30								90	90	90		90			
	Rigitone 12-20/66								90	90	90	90				
	Rigitone 8-15-20			90	90	90										
	Rigitone 8-15-20 SUPER							90	90							

* These products are not intended to provide sound absorption and have an α_w ranging from 0 to 0.15 (L).

Table 5.1 - Gyprex

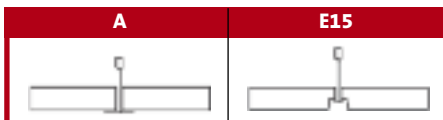


Sound Absorption Rating α_w

A single figure rating used to describe the performance of a material. The single figure rating can have a modifier added to indicate if the spectral shape is dominated by a particular frequency range.

- **L** means the absorption is predominantly in the low frequency region
- **M** means the absorption is predominantly in the mid frequency region
- **H** means the absorption is predominantly in the high frequency region

Product description	α_w	Size (mm)	Edge	Weight (kg/m ²)	Max RH ³	LR ⁴	Reaction to fire	System reference
Gyprex SATINSPAR, BIO	*	600 x 600 1200 x 600	A	6.2	90%	88%	B-s1, d0	—
Gyprex SATINSPAR, BIO	*	600 x 600 1200 x 600	A	6.2	90%	88%	B-s1, d0	—



Edge	Thickness	Edge / Grid system
A	8mm	15mm or 24mm 'T' Section
E15	9.5mm	15mm 'T' Section

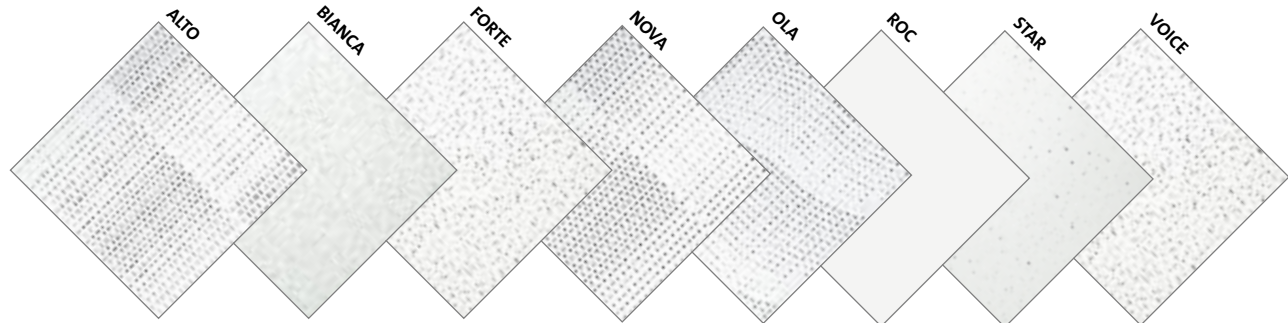
¹ Plus 100mm Isover APR 1200

² Plus 80mm Isover Modular Roll

³ RH = Relative Humidity

⁴ LR = Light Reflectance

Table 5.2 - Casoprano



Product description	α_w	Size (mm)	Edge	Max RH ³	LR ⁴	Reaction to fire	System reference
Casoprano ALTO	*	600 x 600	A / E15	90%	>75%	B-s1, d0	—
Casoprano BIANCA, ROC, STAR	*	600 x 600	A / E15	90%	>85%	B-s1, d0	—
Casoprano FORTE	*	600 x 600	A / E15	90%	>75%	B-s1, d0	—
Casoprano OLA (plenum 400mm)	0.50 (L)	600 x 600	A / E15	90%	>75%	B-s1, d0	C10A086
Casoprano NOVA (plenum 100mm)	0.55 (L)	600 x 600	A / E15	90%	>75%	B-s1, d0	C10A083
Casoprano OLA (plenum 100mm ¹)	0.55 (L)	600 x 600	A / E15	90%	>75%	B-s1, d0	C10A090
Casoprano VOICE (plenum 400mm ²)	0.55 (L)	600 x 600	A / E15	90%	>70%	B-s1, d0	C10A078
Casoprano VOICE (plenum 400mm)	0.55 (L)	600 x 600	A / E15	90%	>70%	B-s1, d0	C10A031
Casoprano NOVA (plenum 300mm)	0.60	600 x 600	A / E15	90%	>75%	B-s1, d0	C10A081
Casoprano OLA (plenum 300mm ¹)	0.60	600 x 600	A / E15	90%	>75%	B-s1, d0	C10A085
Casoprano NOVA (plenum 100mm ¹)	0.60 (L)	600 x 600	A / E15	90%	>75%	B-s1, d0	C10A084
Casoprano NOVA (plenum 300mm ¹)	0.65 (L)	600 x 600	A / E15	90%	>75%	B-s1, d0	C10A082

* These products are not intended to provide sound absorption and have an α_w ranging from 0 to 0.15 (L).

Table 5.3 - Gyptone

Product description	α_w	Size (mm)	Edge	Max RH ⁴	LR ⁵	Reaction to fire	System reference
Gyptone BASE 31	*	600 x 600	A / E15 / D1	70%	82%	A2-s1, d0	—
Gyptone BASE 33	*	300 x 1800 300 x 2100	A / E15	70%	82%	A2-s1, d0	—
Gyptone BASE Curve	*	900 x 2400	Tapered	N/A	N/A	A2-s1, d0	—
Gyptone QUATTRO 47 board (plenum 400mm)	0.35 (L)	1200 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A016
Gyptone QUATTRO 47 board (plenum 45mm ¹)	0.40 (L)	1200 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A017
Gyptone POINT 12 (plenum 200mm)	0.40 (LM)	600 x 600	E15	70%	75%	A2-s1, d0	C10A006
Gyptone LINE 6 (plenum 400mm)	0.45 (L)	1200 x 2400	4 Edge	70%	70%	A2-s1, d0	C10A001
Gyptone LINE 7 Curve (plenum 400mm)	0.45 (L)	900 x 2400	Tapered	N/A	N/A	A2-s1, d0	C10A018
Gyptone QUATTRO 22 (plenum 200mm)	0.45 (L)	600 x 600	A / E15 / D1	70%	73%	A2-s1, d0	C10A007
Gyptone QUATTRO 46 board (plenum 400mm)	0.45 (L)	1200 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A014
Gyptone LINE 6 (plenum 45mm)	0.45 (L)	1200 x 2400	4 Edge	70%	70%	A2-s1, d0	C10A012
Gyptone QUATTRO 20 (plenum 45mm)	0.50 (L)	600 x 600	A / E15 / D1	70%	73%	A2-s1, d0	C10A003
Gyptone LINE 6 (plenum 45mm ¹)	0.50 (L)	1200 x 2400	4 Edge	70%	70%	A2-s1, d0	C10A013
Gyptone QUATTRO 46 board (plenum 400mm ²)	0.50 (L)	1200 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A015
Gyptone LINE 6 (plenum 400mm ²)	0.55 (L)	1200 x 2400	4 Edge	70%	70%	A2-s1, d0	C10A002
Gyptone LINE 7 Curve (plenum 400mm ²)	0.55 (L)	900 x 2400	Tapered	N/A	N/A	A2-s1, d0	C10A019
Gyptone POINT 11 (plenum 45mm)	0.60	600 x 600	E15	70%	75%	A2-s1, d0	C10A093
Gyptone QUATTRO 45 (plenum 45mm)	0.60	900 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A106
Gyptone SIXTO (plenum 45mm)	0.60	600 x 600	E15	70%	70%	A2-s1, d0	C10A099
Gyptone LINE 4 (plenum 200mm)	0.65	600 x 600	E15	70%	70%	A2-s1, d0	C10A004
Gyptone LINE 8 Plank (plenum 200mm)	0.65	300 x 1800 300 x 2100	A / E15	70%	70%	A2-s1, d0	C10A009
Gyptone QUATTRO 20 (plenum 200mm)	0.65	600 x 600	A / E15 / D1	70%	73%	A2-s1, d0	C10A003
Gyptone QUATTRO 41 board (plenum 187mm)	0.65	1200 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A091
Gyptone QUATTRO 41 board (plenum 45mm)	0.65	1200 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A092
Gyptone QUATTRO 55 Plank (plenum 45mm)	0.65	300 x 1800 300 x 2100	A / E15	70%	73%	A2-s1, d0	C10A092
Gyptone QUATTRO 55 Plank (plenum 187mm)	0.65	300 x 1800 300 x 2100	A / E15	70%	73%	A2-s1, d0	C10A034
Gyptone POINT 11 (plenum 200mm)	0.65 (L)	600 x 600	E15	70%	75%	A2-s1, d0	C10A005
Gyptone POINT 15 Plank (plenum 200mm)	0.65 (L)	300 x 1800 300 x 2100	A / E15	70%	75%	A2-s1, d0	C10A010
Gyptone QUATTRO 45 (plenum 187mm)	0.65 (L)	900 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A108
Gyptone LINE 4 (plenum 45mm ¹)	0.60	600 x 600	E15	70%	70%	A2-s1, d0	C10A094
Gyptone SIXTO (plenum 300mm)	0.70	600 x 600	E15	70%	70%	A2-s1, d0	C10A104
Gyptone QUATTRO 41 board (plenum 45mm ¹)	0.75	1200 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A098
Gyptone QUATTRO 45 board (plenum 45mm ¹)	0.75	900 x 2400	4 Edge	N/A	N/A	A2-s1, d0	C10A098
Gyptone SIXTO (plenum 300mm ¹)	0.80	600 x 600	E15	70%	70%	A2-s1, d0	C10A105
Gyptone SIXTO (plenum 300mm ³)	0.85	600 x 600	E15	70%	70%	A2-s1, d0	C10A100

¹ Plus 50mm Isover APR 1200

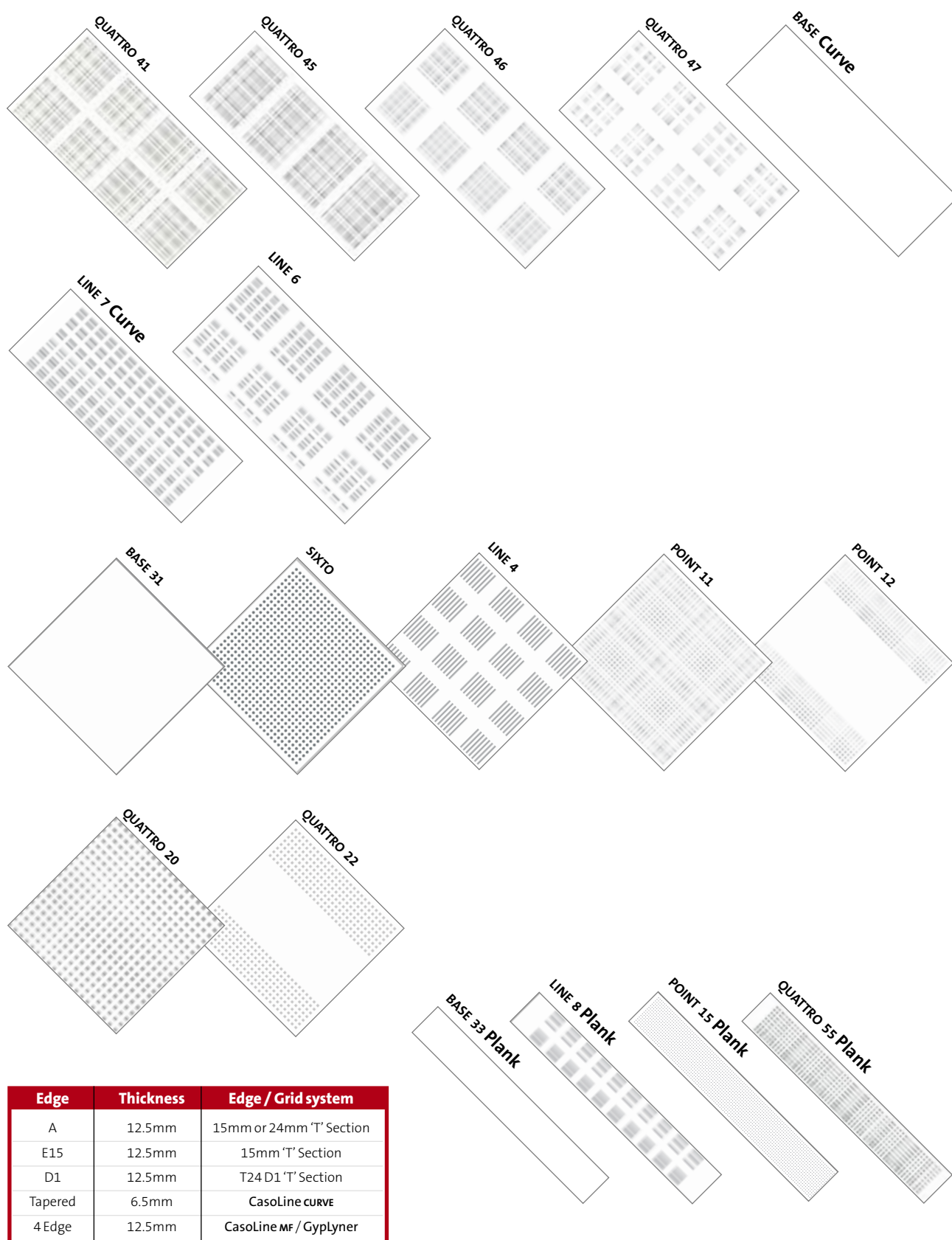
² Plus 100mm Isover APR 1200

³ Plus 75mm Isover High Performance Acoustic Slab

⁴ RH = Relative Humidity

⁵ LR = Light Reflectance

* These products are not intended to provide sound absorption and have an α_w ranging from 0 to 0.15 (L).

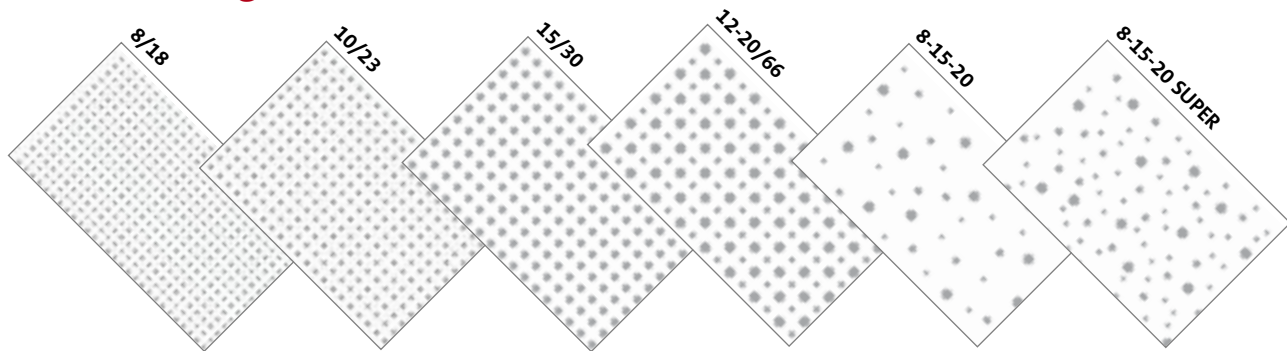


Edge	Thickness	Edge / Grid system
A	12.5mm	15mm or 24mm 'T' Section
E15	12.5mm	15mm 'T' Section
D1	12.5mm	T24 D1 'T' Section
Tapered	6.5mm	CasoLine curve
4 Edge	12.5mm	CasoLine MF / Gyplyner

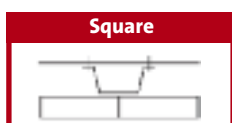
NB For Gyptone Plank, grid system is CasoLine T15p Section.

A	E15	D1	Tapered	4 tapered edge

Table 5.4 - Rigitone



Product description	α_w	Size (mm)	Edge	Weight (kg/m ²)	Reaction to fire	System reference
Rigitone 8-15-20 (plenum 50mm)	0.25 (LM)	1200 x 2000	Square	10	A2-s1, d0	C10A056
Rigitone 8-15-20 (plenum 200mm)	0.30 (LM)	1200 x 2000	Square	10	A2-s1, d0	C10A057
Rigitone 8-15-20 (plenum 200mm ¹)	0.35 (LM)	1200 x 2000	Square	10	A2-s1, d0	C10A068
Rigitone 12-20/66 (plenum 50mm)	0.45 (M)	1188 x 1980	Square	9.5	A2-s1, d0	C10A042
Rigitone 8-15-20 SUPER (plenum 200mm)	0.45 (LM)	1200 x 1960	Square	10	A2-s1, d0	C10A059
Rigitone 8-15-20 SUPER (plenum 200mm ¹)	0.45 (LM)	1200 x 1960	Square	10	A2-s1, d0	C10A069
Rigitone 10/23 (plenum 50mm)	0.45 (M)	1196 x 2001	Square	10	A2-s1, d0	C10A038
Rigitone 15/30 (plenum 50mm)	0.45 (M)	1200 x 2010	Square	9.5	A2-s1, d0	C10A040
Rigitone 10/23 (plenum 200mm)	0.50 (LM)	1196 x 2001	Square	10	A2-s1, d0	C10A039
Rigitone 12-20/66 (plenum 200mm)	0.50 (LM)	1188 x 1980	Square	9.5	A2-s1, d0	C10A043
Rigitone 15/30 (plenum 200mm)	0.50 (LM)	1200 x 2010	Square	9.5	A2-s1, d0	C10A041
Rigitone 8-15-20 (plenum 50mm)	0.50 (M)	1200 x 2000	Square	10	A2-s1, d0	C10A058
Rigitone 8/18 (plenum 50mm)	0.50 (M)	1188 x 1998	Square	10	A2-s1, d0	C10A036
Rigitone 8/18 (plenum 200mm)	0.55 (LM)	1188 x 1998	Square	10	A2-s1, d0	C10A037
Rigitone 12-20/66 (plenum 50mm ²)	0.60 (M)	1188 x 1980	Square	9.5	A2-s1, d0	C10A097
Rigitone 15/30 (plenum 50mm ²)	0.60 (M)	1200 x 2010	Square	9.5	A2-s1, d0	C10A096
Rigitone 8/18 (plenum 50mm ²)	0.60 (M)	1188 x 1998	Square	10	A2-s1, d0	C10A095
Rigitone 10/23 (plenum 200mm ¹)	0.65 (LM)	1196 x 2001	Square	10	A2-s1, d0	C10A061
Rigitone 12-20/66 (plenum 200mm ¹)	0.70 (LM)	1188 x 1980	Square	9.5	A2-s1, d0	C10A063
Rigitone 15/30 (plenum 200mm ¹)	0.70 (LM)	1200 x 2010	Square	9.5	A2-s1, d0	C10A062
Rigitone 8/18 (plenum 200mm ¹)	0.70 (LM)	1188 x 1998	Square	10	A2-s1, d0	C10A060



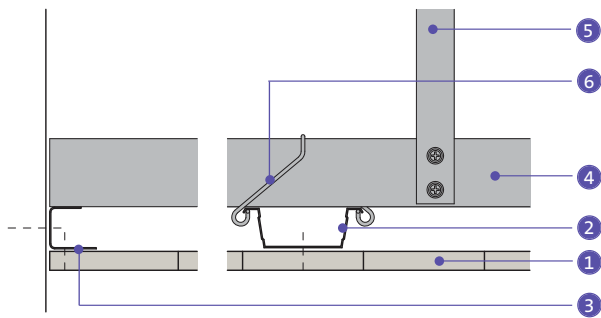
Edge	Thickness	Edge / Grid system
Square	12.5mm	CasoLine mf / Gyplyner

¹ Plus 50mm Isover Frame Batt 32

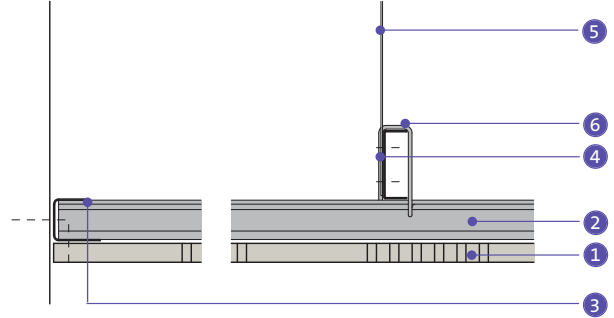
² Plus 50mm Isover APR 1200

Construction details

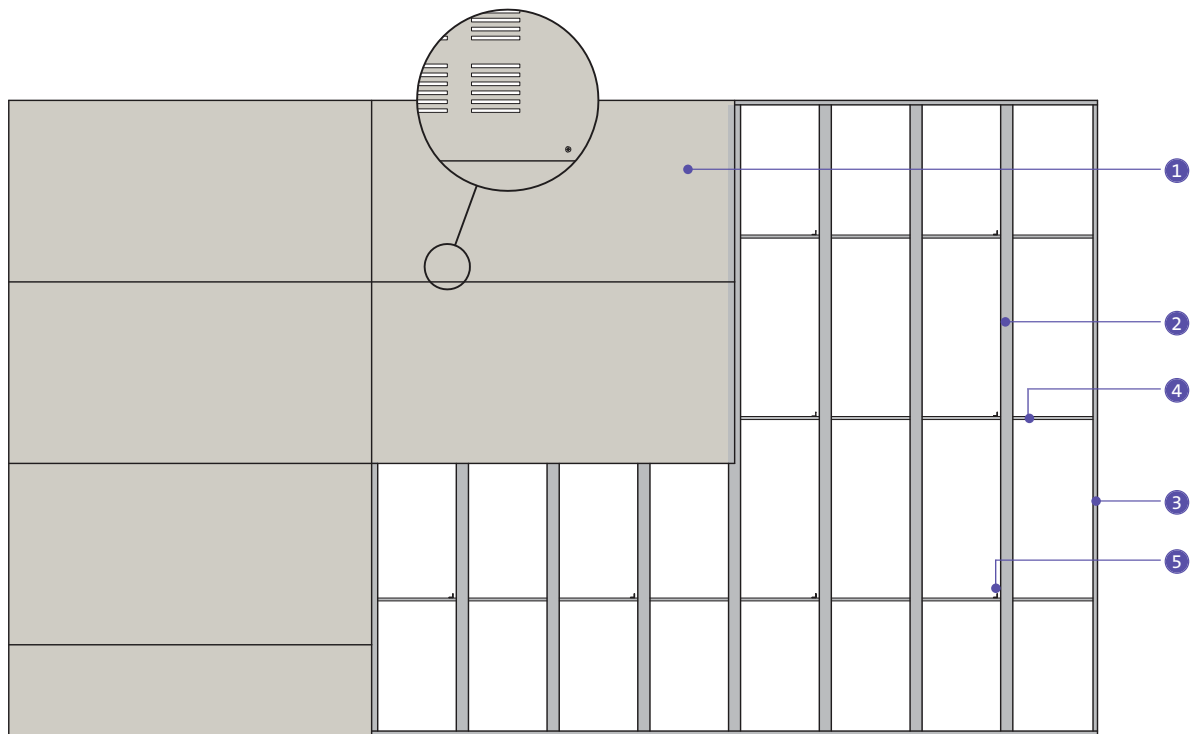
1 Perimeter parallel to Gypframe MF5 Ceiling Section - Gyptone



2 Perimeter perpendicular to Gypframe MF5 Ceiling Section - Gyptone



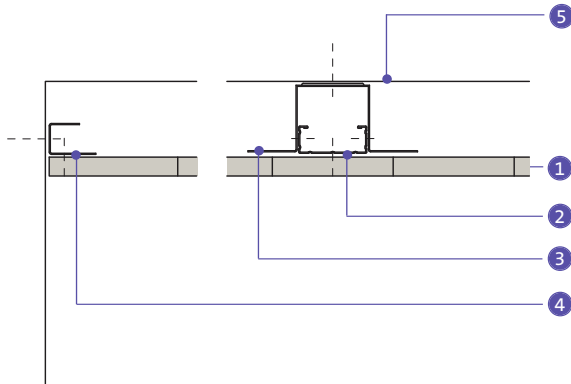
3 Reflected ceiling plan - Gyptone



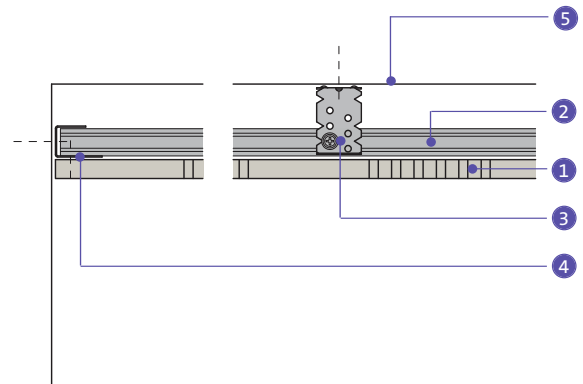
- ① Gyptone boards
- ② Gypframe MF5 Ceiling Section
- ③ Gypframe MF6 Perimeter Channel
- ④ Gypframe MF7 Primary Support Channel
- ⑤ Gypframe MF8 Strap Hanger or Gypframe GA1 Steel Angle
- ⑥ Gypframe MF9 Connecting Clip

Construction details

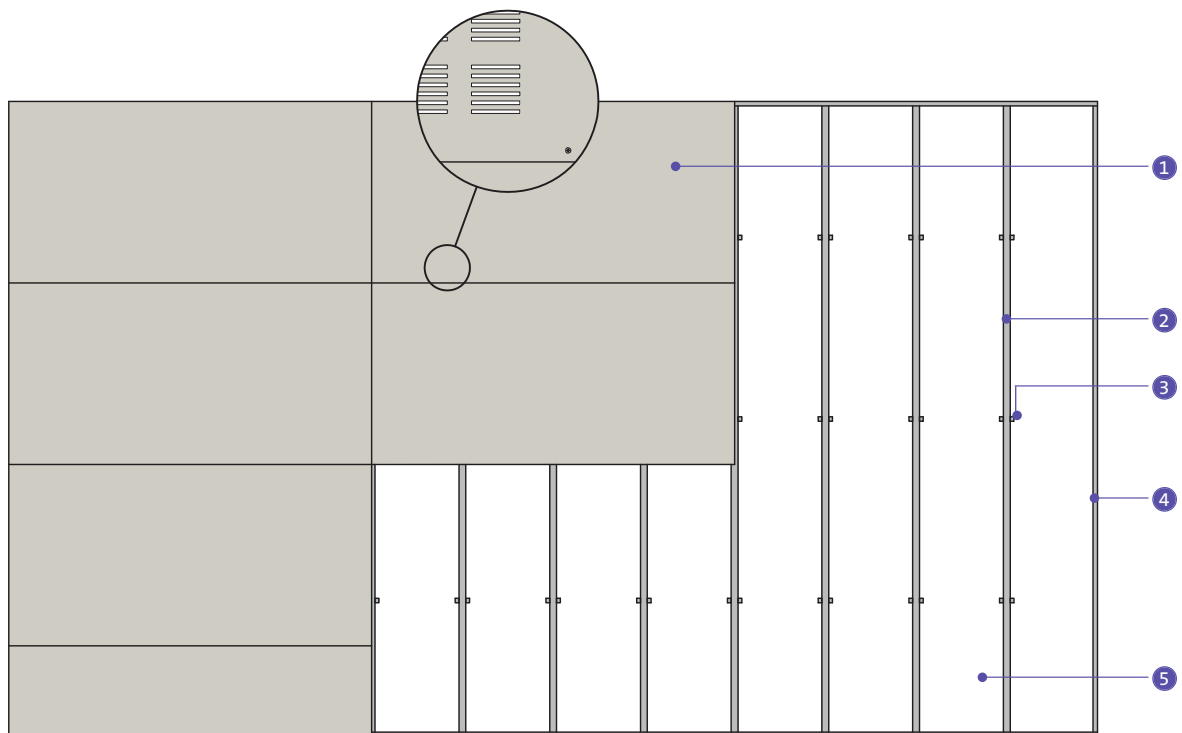
4 Perimeter parallel to Gypframe GL1 Lining Channel for concrete floor - Gyptone



5 Perimeter perpendicular to Gypframe GL1 Lining Channel for concrete floor - Gyptone



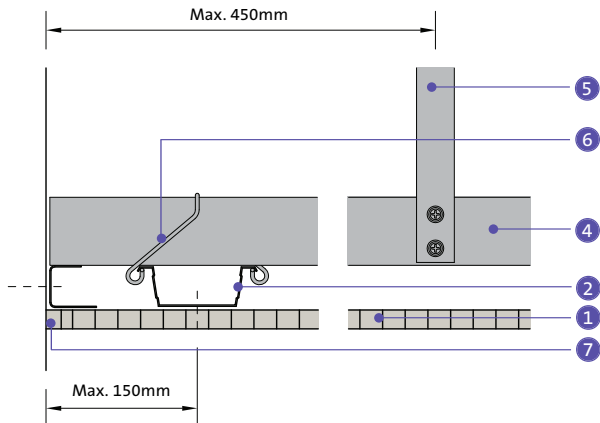
6 Reflected ceiling plan for concrete floor - Gyptone



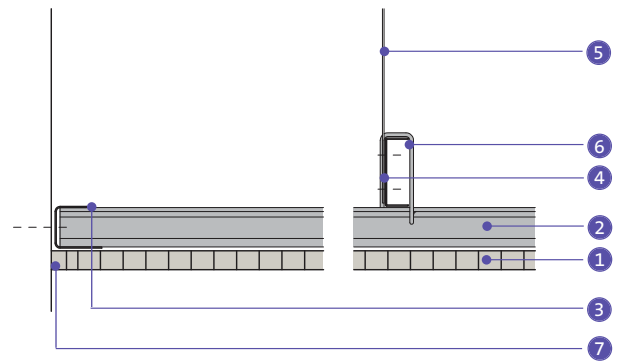
- ① Gyptone boards
- ② Gypframe GL1 Lining Channels
- ③ Gypframe GL2, GL9 or GL12 Brackets
- ④ Gypframe GL8 Track
- ⑤ Concrete soffit

Construction details

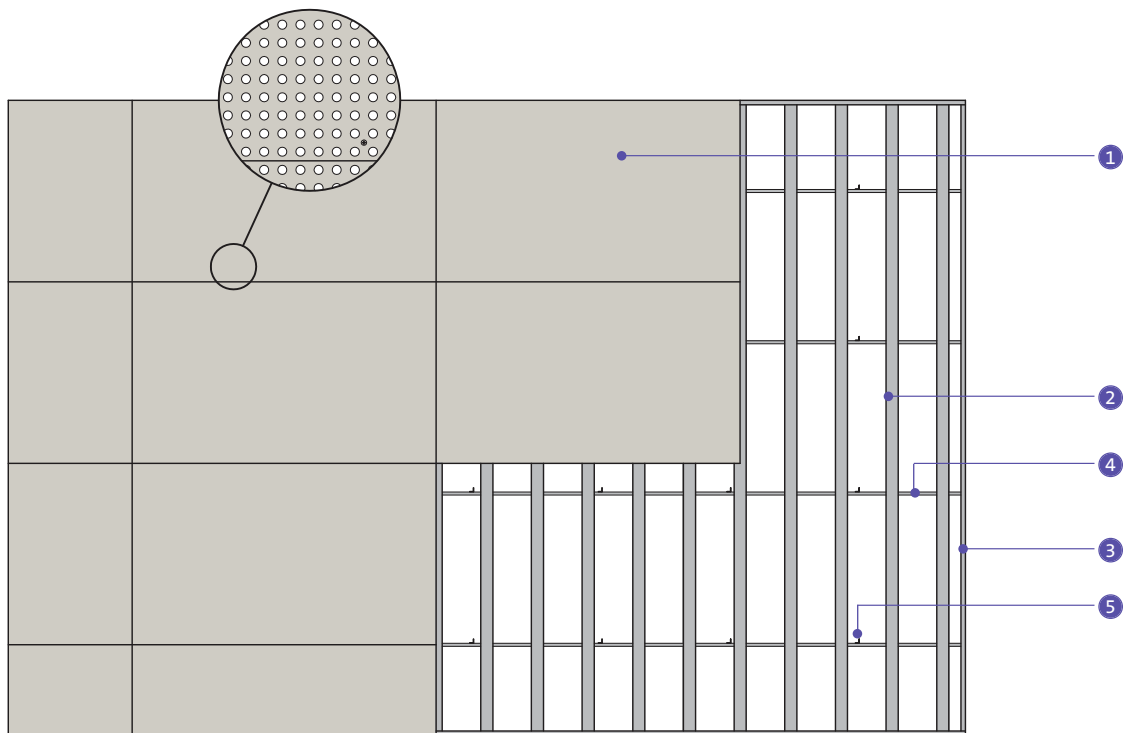
7 Perimeter parallel to Gypframe MF5 Ceiling Section - Rigitone



8 Perimeter perpendicular to Gypframe MF5 Ceiling Section - Rigitone



9 Reflected ceiling plan - Rigitone



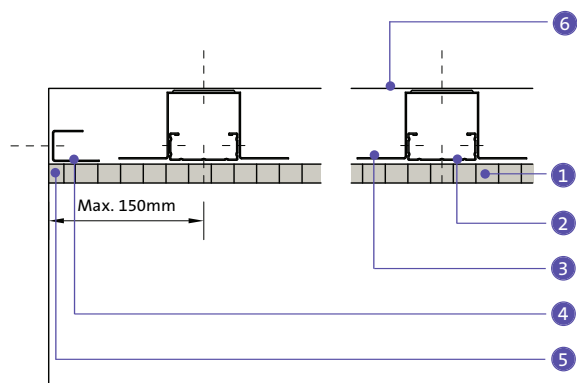
- ① Rigitone boards
- ② Gypframe MF5 Ceiling Section
- ③ Gypframe MF6 Perimeter Channel
- ④ Gypframe MF7 Primary Support Channel

- ⑤ Gypframe MF8 Strap Hanger or Gypframe GA1 Steel Angle
- ⑥ Gypframe MF9 Connecting Clip
- ⑦ Rigitone Vario 60 Jointing Material

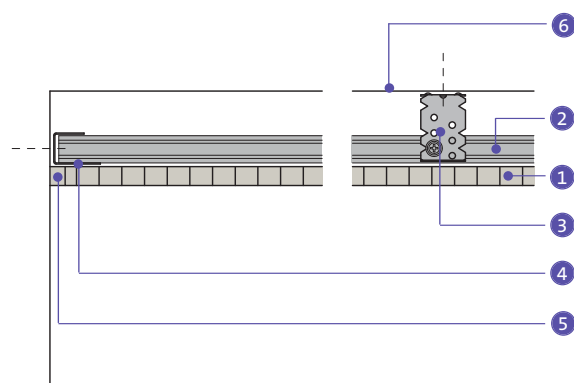
NB A special procedure is used for fixing and jointing Rigitone boards. Detailed installation notes are given in the British Gypsum Ceilings Installation Guide, available to download from www.british-gypsum.com

Construction details

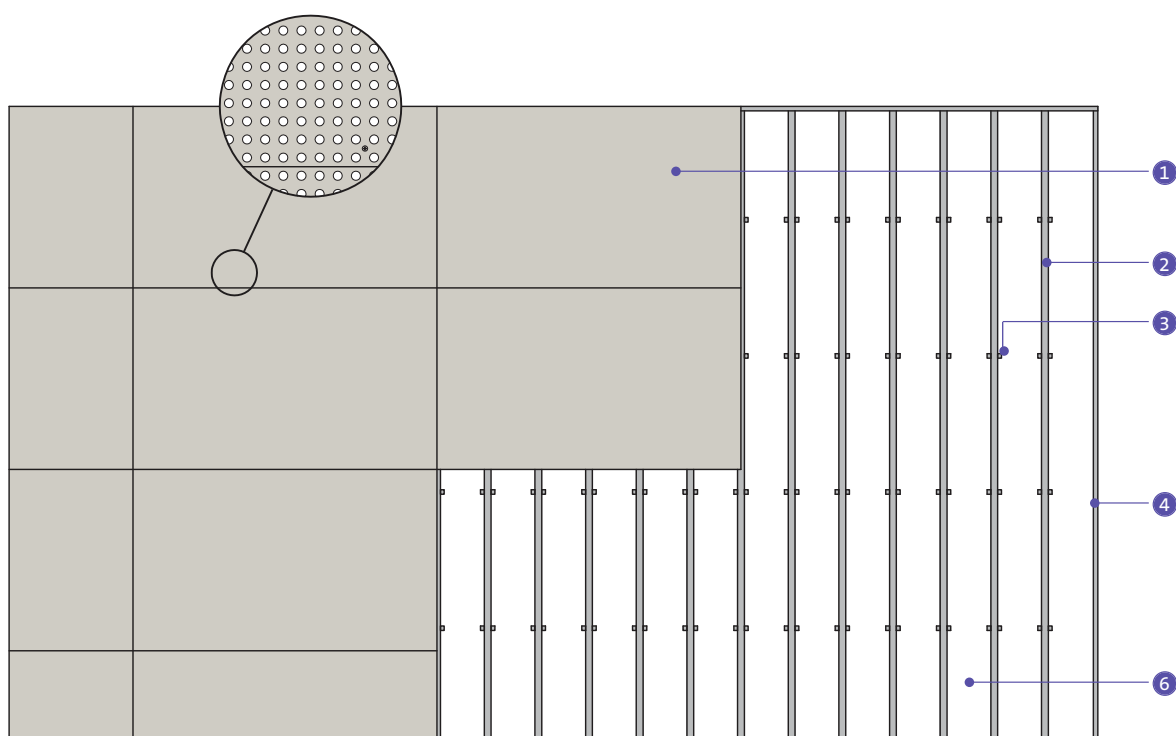
10 Perimeter parallel to Gypframe GL1 Lining Channel for concrete floor - Rigitone



11 Perimeter perpendicular to Gypframe GL1 Lining Channel for concrete floor - Rigitone



12 Reflected ceiling plan for concrete floor - Rigitone

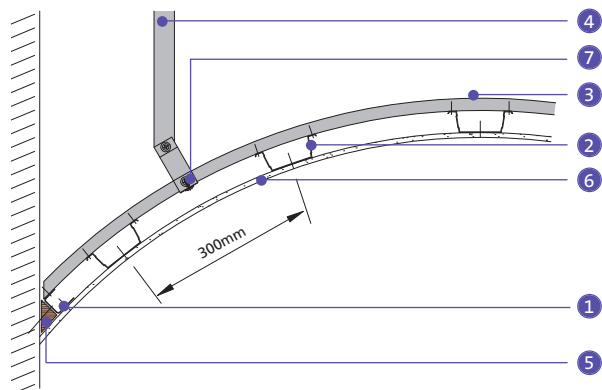


- 1 Rigitone boards
- 2 Gypframe GL1 Lining Channels
- 3 Gypframe GL2, GL9 or GL12 Brackets
- 4 Gypframe GL8 Track

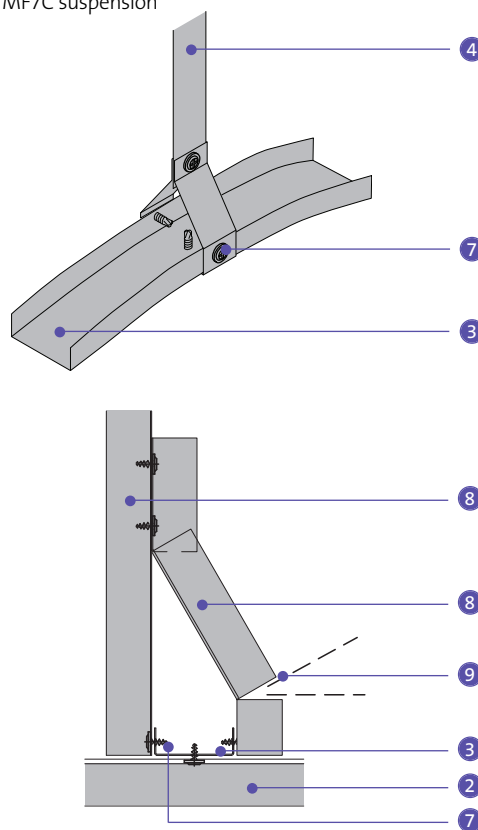
- 5 Rigitone Vario 60 Jointing Material
- 6 Concrete soffit

NB A special procedure is used for fixing and jointing Rigitone boards. Detailed installation notes are given in the British Gypsum **Ceilings Installation Guide**, available to download from www.british-gypsum.com

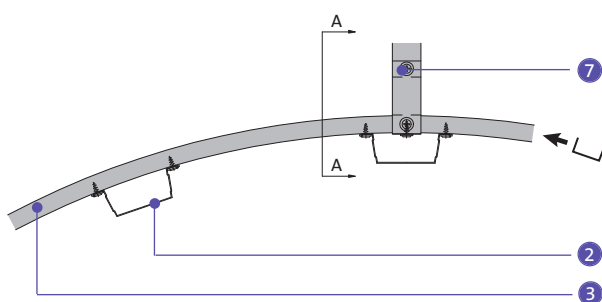
13 Wall junction



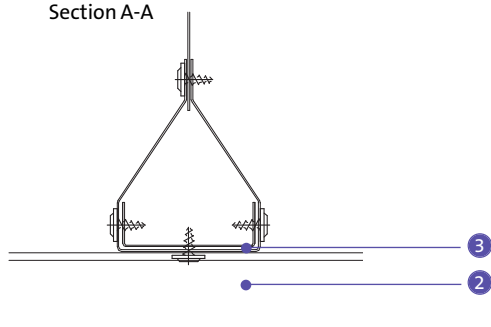
14 Gypframe MF7C suspension



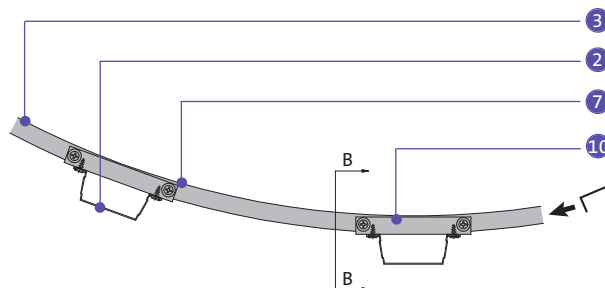
15 Concave curvature



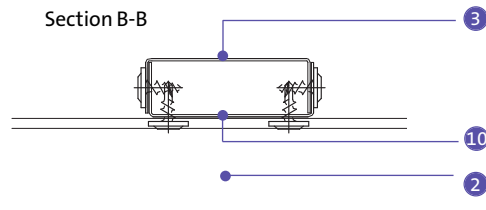
Section A-A



16 Convex curvature



Section B-B

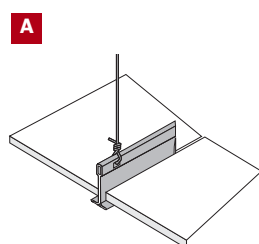
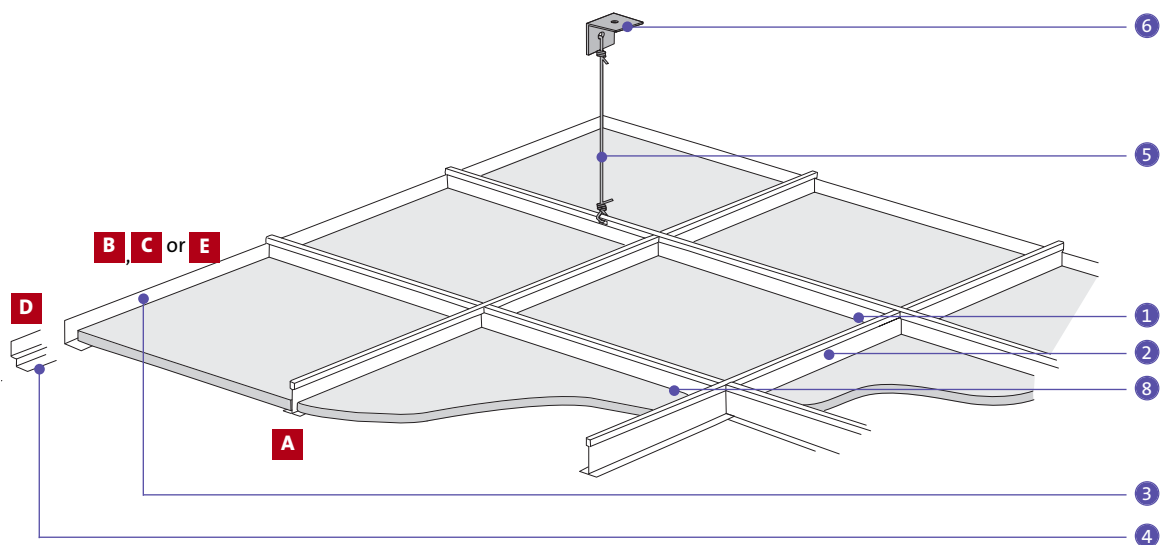


- 1 Gypframe MF6 Perimeter Channel
- 2 Gypframe MF5 Ceiling Section
- 3 Gypframe MF7C Curved Support Channel
- 4 Gypframe MF8 Strap Hanger
- 5 Timber fillet
- 6 Lining board

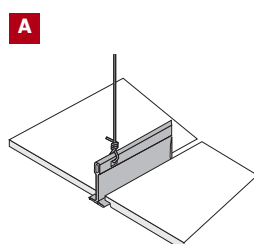
- 7 Gyproc Wafer Head Jack-Point Screw
- 8 Gypframe GA1 Steel Angle
- 9 Gypframe GA1 Steel Angle, cut and bent
- 10 Small section of Gypframe MF7 Primary Support Channel fixed to bridge the Gypframe MF7C Curved Support Channel flanges to provide a flat, positive fixing for the Gypframe MF5 Ceiling Section positions

Construction details

- 17** 15mm and 24mm exposed lay-in grid with interlocking Main and Cross 'T's
- for square edge A and rebated edge E15 and edge E24

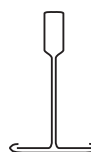


Square edge

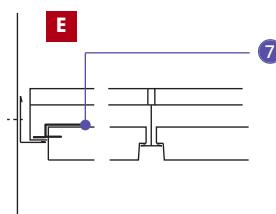
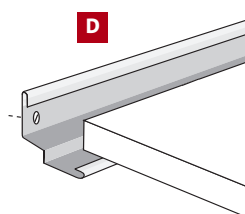
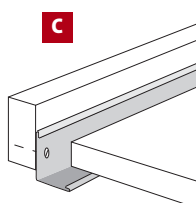
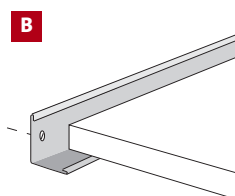


Rebated edge

T24



T15



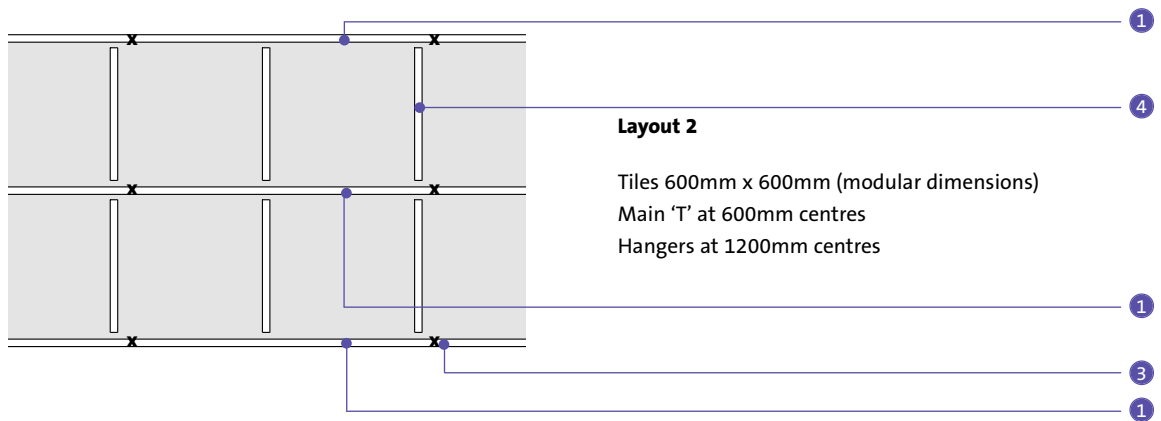
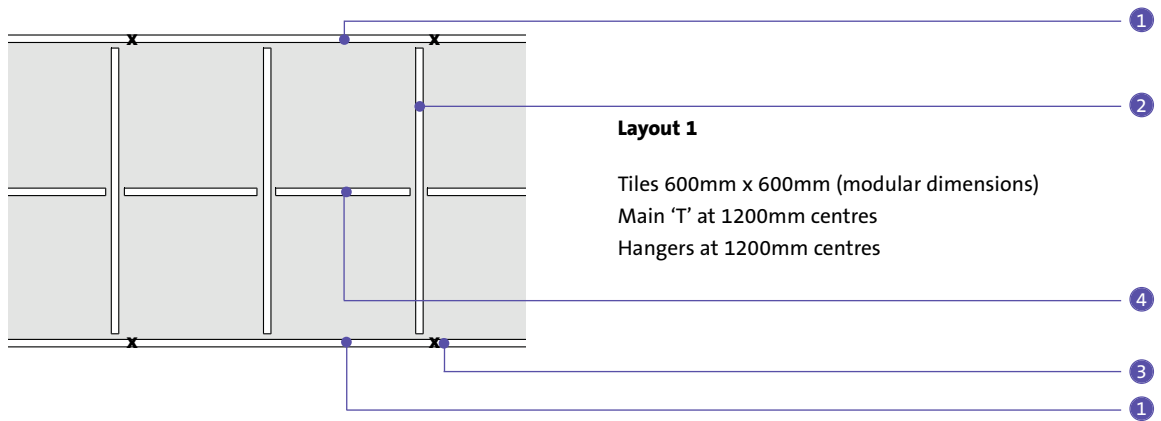
- 1 Main 'T'
- 2 Cross 'T' 1200mm
- 3 Wall angle
- 4 Shadowline moulding
- 5 Suspension wire

- 6 Soffit cleat
- 7 CasoLine CLC03 Perimeter Clip for E15 and E24 tiles
- 8 Cross 'T' 600mm

NB These details are for illustrative purposes only. Precise details will vary according to the proprietary grid system used.

Construction details

- 18** Proprietary 15mm and 24mm exposed lay-in grid with interlocking Main and Cross 'T's
- for square edge A and rebated edge E15 and edge E24

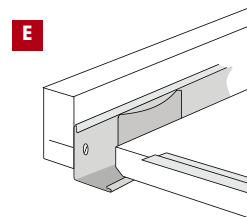
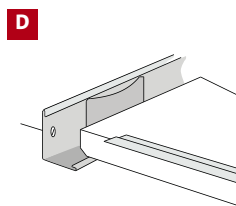
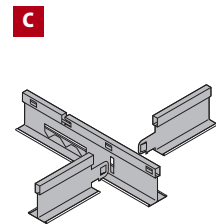
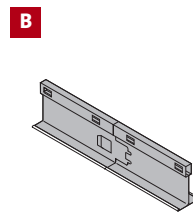
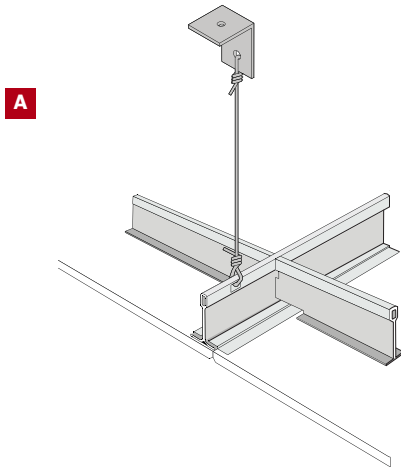
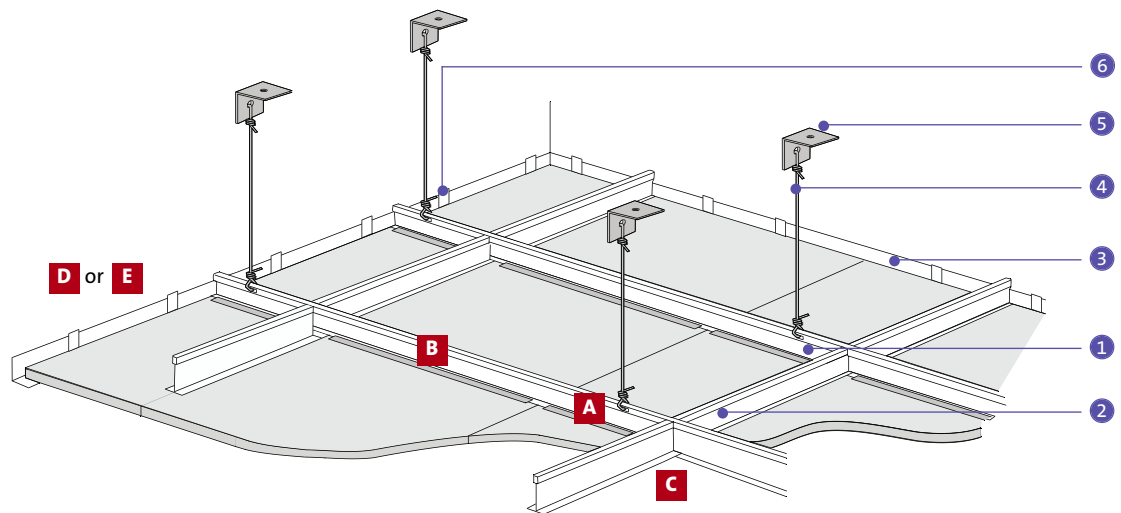


- ① Main 'T' section
- ② Cross 'T' section 1200mm
- ③ Hanger shown as X
- ④ Cross 'T' section 600mm

NB These details are for illustrative purposes only. Precise details will vary according to the proprietary grid system used.

Construction details

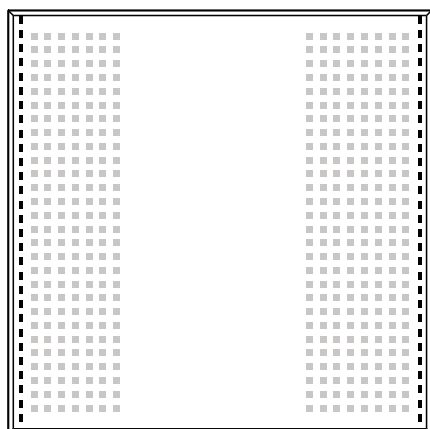
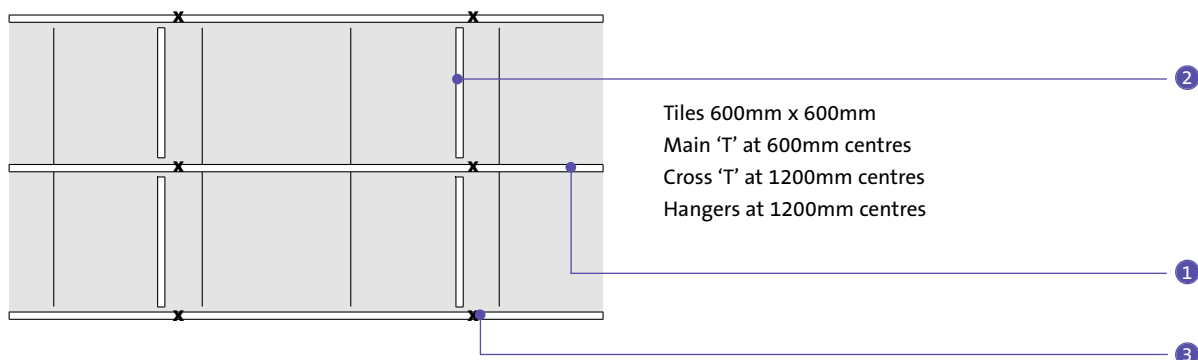
- 19** CasoLine T24D1 concealed grid system consisting of interlocking Main 'T's and Cross 'T' spacers
- for concealed / demountable edge Gyptone D1 edge tiles



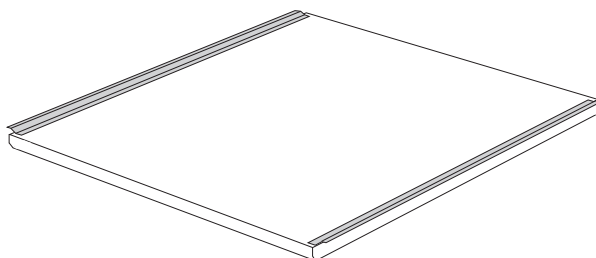
- ① CasoLine CLT2401 Main 'T' section
- ② CasoLine CLT24D101 Cross 'T' section
- ③ CasoLine CLWA01 Wall Angle
- ④ 14swg suspension wire (by others)
- ⑤ Gypframe MF12 Soffit Cleat
- ⑥ CasoLine CLC02 Wall Spring Clip

Construction details

- 20** CasoLine T24D1 concealed grid system consisting of interlocking Main 'T's and Cross 'T' spacers
- for concealed / demountable Gyptone D1 edge tiles



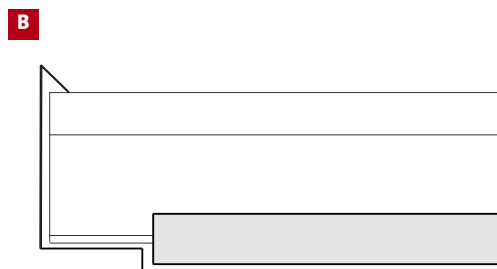
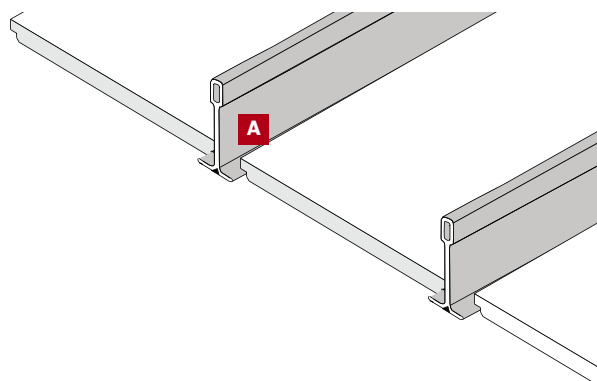
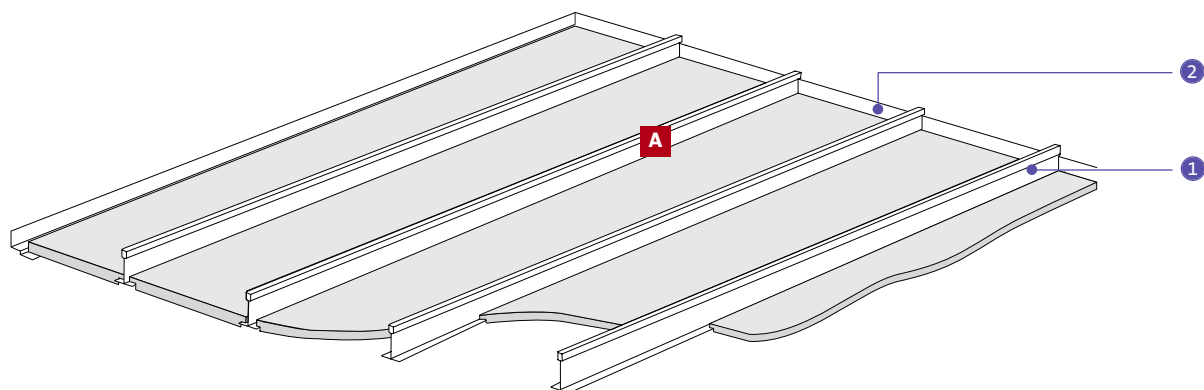
NB Metal support sections on the back of tiles run parallel with perforated areas.



- ① CasoLine CLT2401 Main 'T' section
- ② CasoLine CLT24D101 Cross 'T' section
- ③ Hanger shown as X

Construction details

21 CasoLine T15P exposed metal grid fixing system - for Gyptone plank, edge E/A

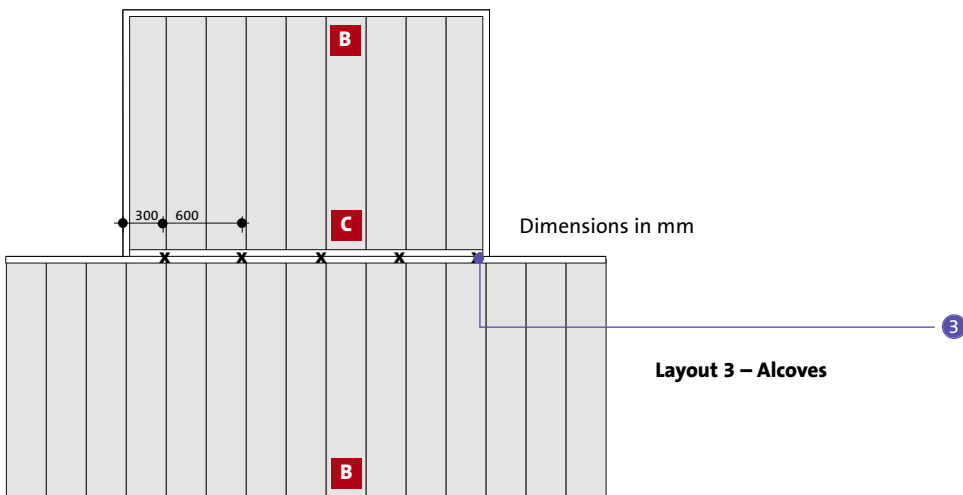
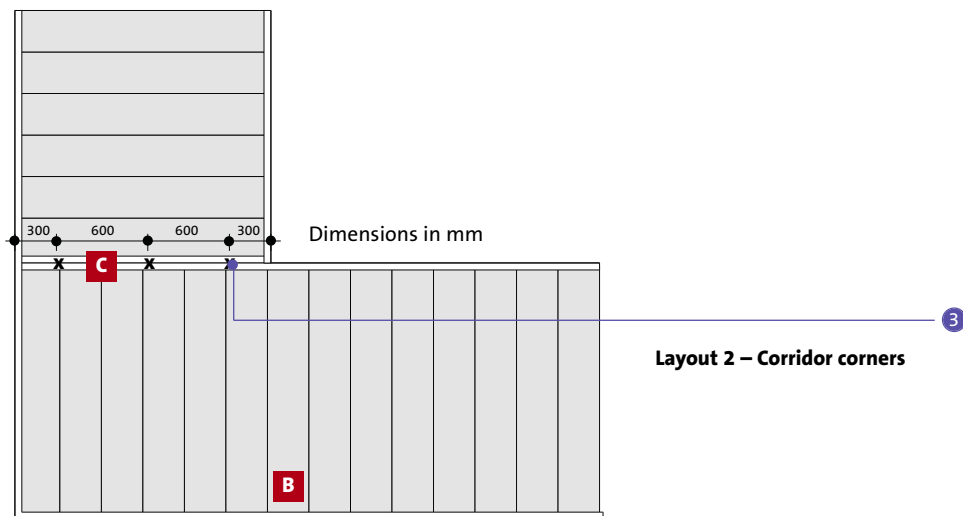
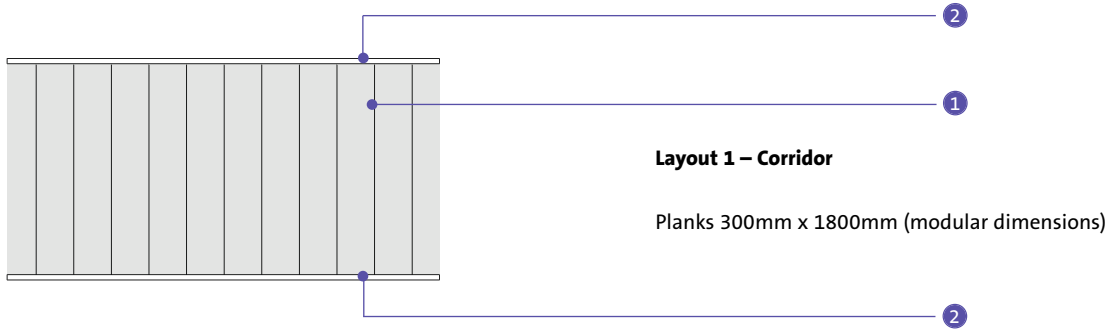


(See example layouts opposite)

- ① CasoLine CLT15P01 Main 'T' section or CasoLine CLT15P02 Main 'T' section
- ② CasoLine CLSM04 Shadowline Moulding
- ③ Gyproc Wafer Head Jack-Point Screw at 300mm centres

Construction details

22 CasoLine T15P exposed metal grid fixing system - for Gyptone plank, edge E/A



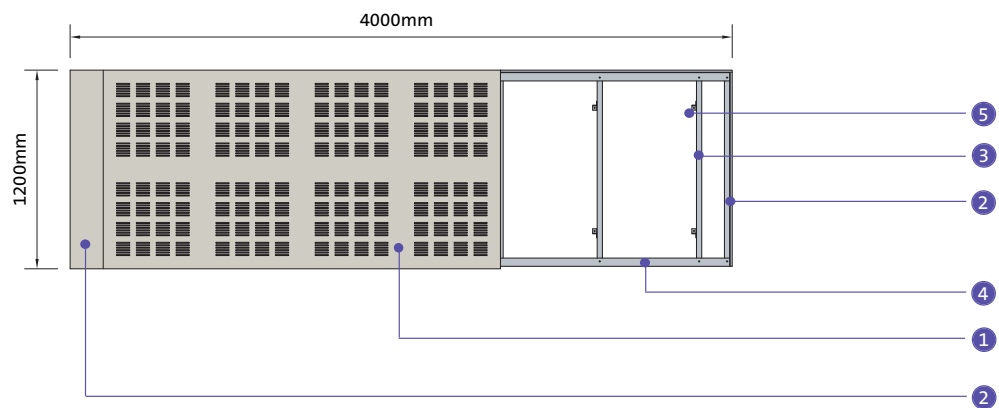
- ① CasoLine CLT15P01 Main 'T' section or CasoLine CLT15P02 Main 'T' section
- ② CasoLine CLSM04 Shadowline Moulding
- ③ Hanger shown as x

Acoustic ceiling raft

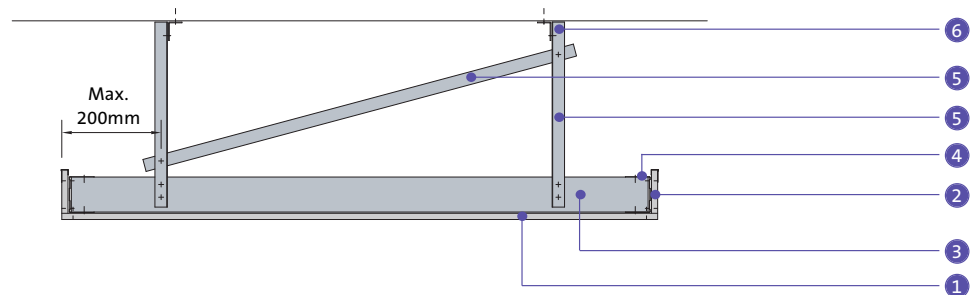
Awareness of environmental issues and energy efficiency has led to an increased desire to utilise the thermal mass of structural soffits in helping to control temperature within buildings.

Utilisation of thermal mass can create design problems when trying to control reverberation within classrooms. This is because the usual method of controlling reverberation within learning spaces is to utilise the ceiling for acoustic control. Ceiling rafts are a popular design choice for a solution to this issue. British Gypsum ceiling systems allow almost limitless design potential as well as good acoustic performance. The following examples are provided for inspiration. For help in designing this type of solution, please contact the British Gypsum Drywall Academy.

23 Ceiling raft reflected plan



24 Ceiling raft section



NB On-site assessment required to determine diagonal bracing requirements for lateral stability.

NB CasoLine MF may also be used, please contact the British Gypsum Drywall Academy.

- ① Gyptone boards
- ② Gyproc plasterboard
- ③ Gypframe 'C' Stud
- ④ Gypframe Deep Flange Floor & Ceiling Channel
- ⑤ Gypframe GA1 Steel Angle
- ⑥ Gypframe MF12 Soffit Cleat



Encasements - fire protection



Encasements - fire protection

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Economic cost	112
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Figures from the Department for Communities and Local Government (DCLG) show that 1300 school fires a year in England and Wales are attended by local authority Fire and Rescue Services. Around 60% of these are started deliberately. It is necessary to greatly reduce the risk of fires occurring in schools and when a fire does occur, reduce the risk of it spreading.



Designing and managing against the risk of fire in schools



Introduction to fire protection

Figures from the **Department for Communities and Local Government (DCLG)** show that 1300 school fires a year in England and Wales are attended by local authority Fire and Rescue Services. Around 60% of these are started deliberately. It is necessary to greatly reduce the risk of fires occurring in schools and when a fire does occur, reduce the risk of it spreading.

Whilst the primary concern is for the safety of the users of the school buildings, a fire can have a serious impact on children's education due to disruption and loss of course work. The important roles that schools play in the local community means that losses incurred as a result of fire can have particularly severe social consequences. As such, it is particularly important that property protection be considered during the design period and throughout the working life of these buildings.

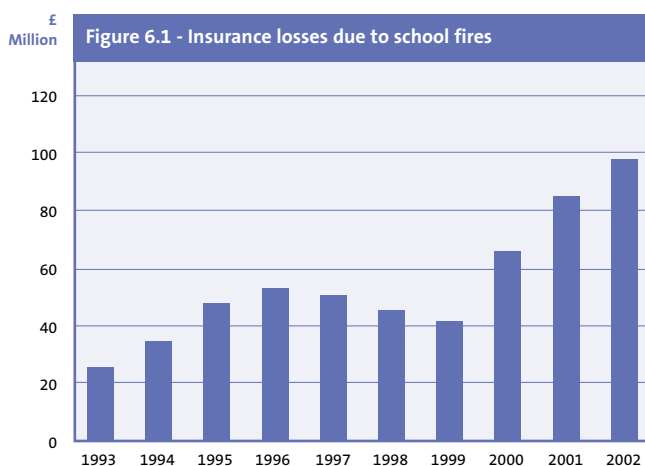
The principles recommended by the insurance industry for property protection are:

- Construct the building from materials that will not contribute to a fire
- Prevent premature collapse or excessive deflection
- Construct the building to minimise fire and smoke spread and confine the fire to its source
- Ensure that all appropriate products or systems are third party approved
- Ensure that all installers are third party approved

Reference: *Building Bulletin 100 (BB100) – Design for fire safety in schools (2007)*.

Economic cost

According to Building Bulletin 100 (BB100) – Design for fire safety in schools (2007), a major problem with fires in schools is the scale of the property losses. See Figure 6.1.



Source: *Building Bulletin 100 (BB100) – Design for fire safety in schools (2007)*

Regulations

Building Regulations Approved Document B

Since April 2001, all new building work in schools has been subject to approval under the Building Regulations.

B2: To ensure fire spread over the internal linings of the building is inhibited.

B3: To ensure the stability of buildings in the event of fire; to ensure that there is sufficient degree of fire separation within buildings and between adjoining buildings to inhibit the unseen spread of fire and smoke in concealed spaces in buildings.

For Scotland, Section 2 of the non-domestic Technical Handbook is relevant.

Regulatory Reform (Fire Safety) Order

Under the Regulatory Reform (Fire Safety) Order 2005 implemented in October 2006, a suite of guides has been prepared for different occupancies. These deal with the provision and management of fire safety by risk assessment of the whole range of existing buildings. The one for schools is covered in 'Risk Assessment Guide for Educational Premises 2006'.

The local authority usually has responsibility for alarm systems and the structural fire integrity of buildings, while the governing body and the head teacher are responsible for day-to-day running of the school and the management of all systems including fire safety.

Once the building is in use, the management regime should be maintained and any variation in that regime should be the subject of a suitable risk assessment.



Compartmentation

When a building is constructed to prevent the spread of fire from another part of the same building or an adjoining building, it is said to be compartmented. The compartments may consist of single or multiple rooms, spaces or stories. The compartments should be constructed so that their relevant boundaries are fire resisting.

Compartmentation does not only serve as a barrier to fire and smoke spread, although that is the primary function. Compartment sizes also provide a degree of control over the fire load present in a compartment and hence the fire severity.

Fire resistance

The fire resistance of an element of construction is a measure of its ability to withstand the effects of fire in one or more ways, as follows:

- Resistance to collapse (loadbearing capacity)
- Resistance to fire penetration (integrity)
- Resistance to the transfer of excessive heat (insulation)

Figure 6.2 - Minimum periods of fire resistance for school buildings

	Minimum periods of fire resistance (minutes) in a:		
	Basement storey (including floor over, not more than 10m deep (2))	Ground or upper storey; Height (m) of top floor above ground, in a building or separated part of a building	
		Not more than 5	Not more than 18 (3)
Not sprinklered	60	60	60
Sprinklered	60	30 (4)	60

Source: Building Bulletin 100 (BB100) – Design for fire safety in schools (2007)

Building Bulletin 100 (BB100) – Design for fire safety in schools (2007)

Building Bulletin 100 (BB100) gives guidance of fire safety design covering schools in England and Wales. The guidance applies to nursery schools, primary and secondary schools, sixth form colleges, special schools and pupil referral units.

Glasroc F FIRECASE

FireCase frameless encasement system provides a high quality cladding to structural steel, and offers up to 120 minutes fire protection. The system affords protection to universal steel columns and beams, together with many joist and castellated beam sections. It is particularly suitable for educational buildings where a robust encasement is required to structural steelwork.

Reaction to fire performance

The surfaces of Glasroc F FIRECASE boards are designated Class 0 and the board is non-combustible (for the purposes of Building Regulations).

Third party accreditation

Third party accredited product conformity certification schemes not only provide a means of identifying materials and designs of system, products or structures which have demonstrated that they have the requisite performance in fire, but additionally provide confidence that the systems, materials, products or structures actually supplied are provided to the same specification or design as that tested or assessed.

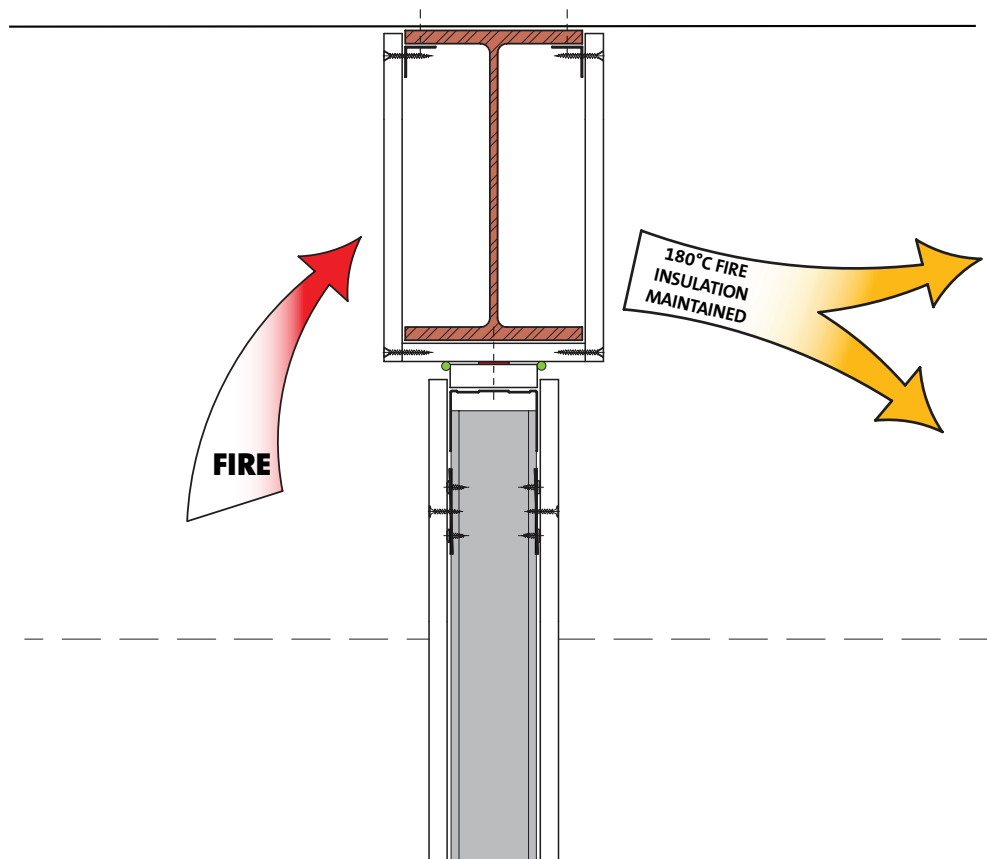
The Glasroc F FIRECASE board has a BBA certificate giving third party accreditation against its fire performance and factory production control. This gives the client peace of mind that the fire protection system will perform in a fire situation.



Benefits to compartmentation

Using the FireCase frameless encasement system will eliminate any potential problems with compartmentation. Unlike some alternative fire protection technologies using the FireCase frameless encasement system will ensure that there are no potential problems with insulation failure through the steelwork (see Figure 6.3). The FireCase frameless encasement system will also give acoustic benefits in terms of minimising sound transmission through the building structure.

Figure 6.3 - Glasroc F FIRECASE low acoustic beam encasement / partition detail



Spatial efficiencies

The FireCase frameless encasement system is fixed directly around the steel columns and beams, without any need for cavity spaces which can optimise valuable floor space across an educational building.

Cost efficiencies

To achieve a superior aesthetic finish to columns and beams, Glasroc F FIRECASE boards are applied. This eliminates the need to coat the steel with intumescent paint, therefore reducing the overall cost of installation.

Flexibility in the learning environment

The Glasroc F FIRECASE board lining provides a smooth, robust surface and there is no requirement to joint or apply a decorative treatment. The FireCase frameless encasement system can be finished if required to blend seamlessly with other British Gypsum systems.

The FireCase frameless encasement system is fully compatible with other British Gypsum systems and supports flexibility during changes to building use. British Gypsum partition systems can be directly fixed to the Glasroc F FIRECASE board linings allowing changes to be made without compromising the structural fire protection. See Figure 6.4 for junction details.

Ease of maintenance

Under the Regulatory Reform Order the responsible person has duty of care for maintaining the buildings fire protection systems. The FireCase frameless encasement system is robust but should damage occur it is simple to detect and, if necessary, repair or replace making management and maintenance easy for building owners.

Warranties

The FireCase frameless encasement system is covered by the British Gypsum SpecSure® lifetime system warranty and project warranties are available to give total peace of mind.

Figure 6.4 - Column encasement and partition junction – up to 60 minutes fire resistance

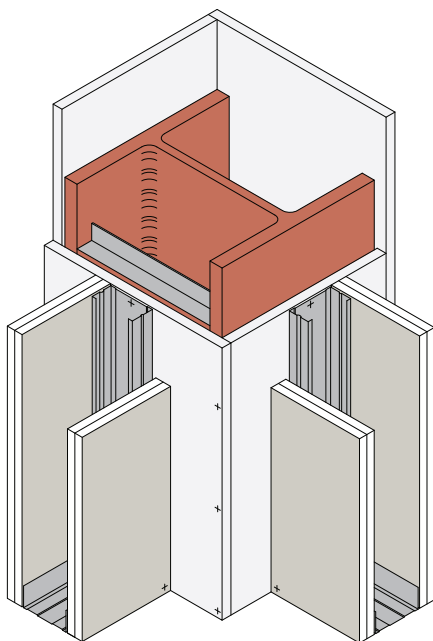


Diagram for illustration purposes only

NB For greater than 60 minutes fire resistance please contact the British Gypsum Drywall Academy.

Lining selection

To determine the thickness of cladding required, the designer should follow the procedure below:

1. Establish the required period of fire resistance.
2. Determine the design criteria, i.e. 550°C to *ENV 13381* or 620°C to *BS 476*.
3. Ascertain whether protection is required on three or four sides of the section.
4. Determine the A/V (Hp/A) value for the steel section (refer to **Figure 7.5** and **7.6**). Locate the steel section to be protected, listed by its size and mass per metre, and read off the section factor A/V.
5. Refer to **Table A**, **B** or **C**. Locate the A/V value on the vertical scale. Read across the chart to the column relating to the period of fire resistance required and read off the designated thickness of Glasroc F FIRECASE cladding required to form the encasement.

For castellated sections and cellular beams please refer to the Association for Specialist Fire Protection publication, ASFP Yellow Book - 'Fire Protection for Structural Steel in buildings' for guidance, available to download from www.asfp.org.uk

System references D120001 (screw-fixed system)
D120002 (staple-fixed system)



Table A

The 550°C chart to *BS 476: Part 20: 1987* is the main performance table used for selecting cladding Glasroc F FIRECASE lining thicknesses.

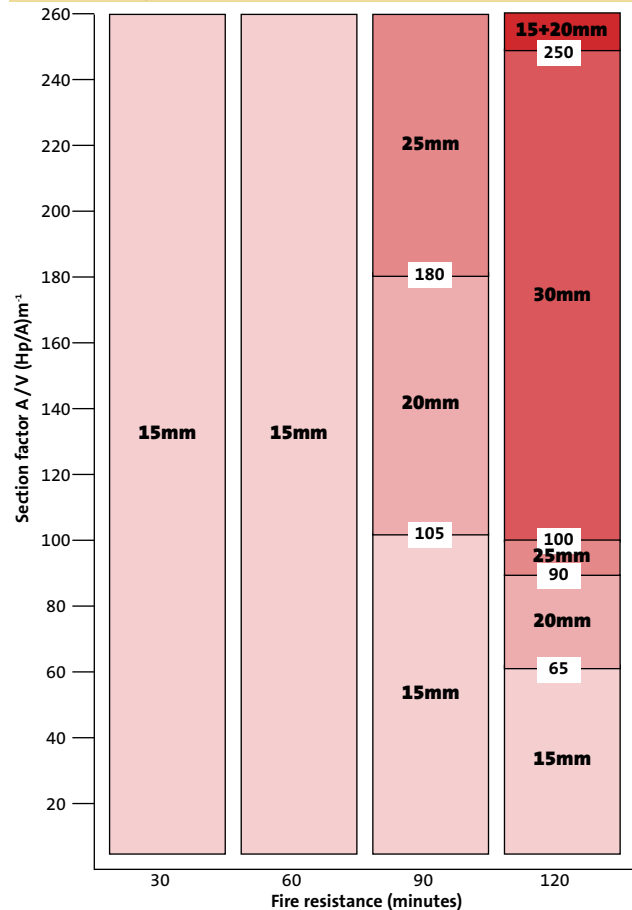


Table C

The 550°C chart to *ENV 13381-4: 2002* can be used for selecting cladding Glasroc F FIRECASE lining thicknesses for columns when performances are required to the new European standards.

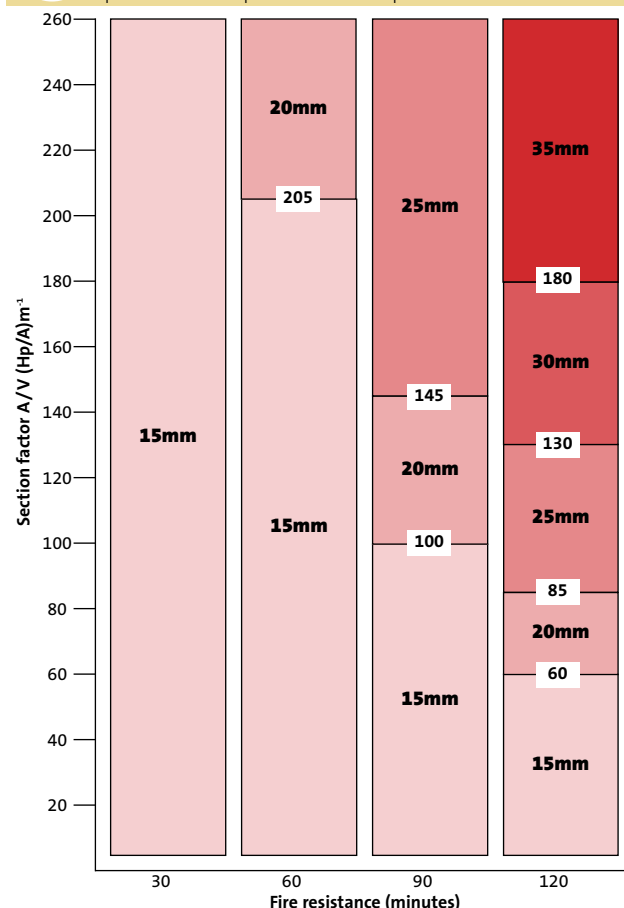


Table B

The 620°C chart to *BS 476: Part 20: 1987* is a performance table that can be used for selecting cladding Glasroc F FIRECASE lining thicknesses for beams supporting concrete slabs.

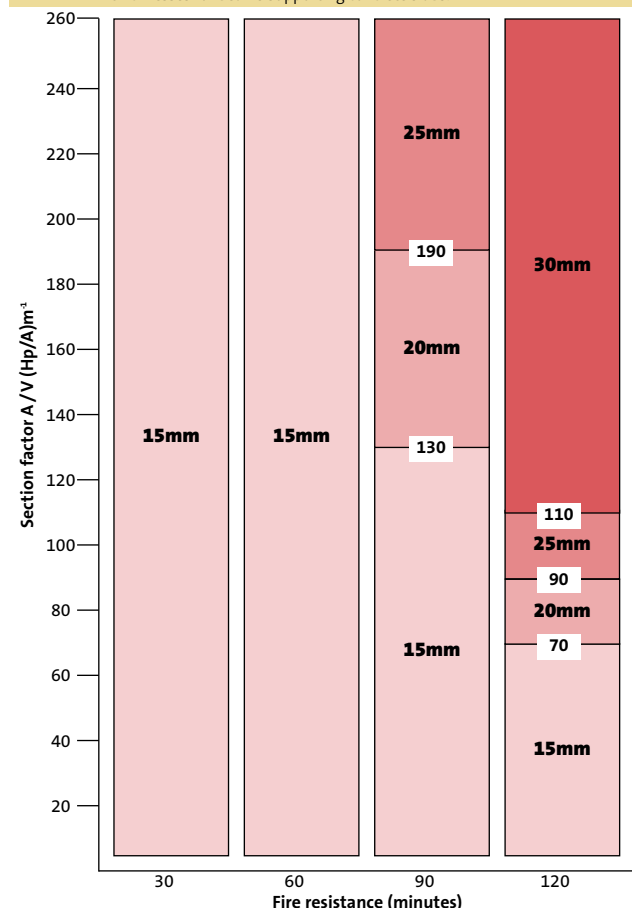


Figure 6.5 - Section factor A / V (Hp/A) of Universal beams
Universal beams

Serial size mm	Mass / metre kg	3 sides m ²	4 sides m ²
914 x 419	388	45	55
	343	50	60
914 x 305	289	60	65
	253	65	75
	224	75	85
	201	80	95
838 x 292	226	70	80
	194	80	90
	176	90	100
762 x 267	197	70	85
	173	80	95
	147	95	110
686 x 254	170	75	90
	152	85	95
	140	90	105
	125	100	115
610 x 305	238	50	60
	179	70	80
	149	80	95
610 x 229	140	80	95
	125	90	105
	113	100	115
	101	110	130
533 x 210	122	85	95
	109	95	110
	101	100	115
	92	110	125
	82	120	140
457 x 191	98	90	105
	89	100	115
	82	105	125
	74	115	135
	67	130	150
457 x 152	82	105	120
	74	115	130
	67	125	145
	60	140	160
	52	160	180
406 x 178	74	105	125
	67	115	140
	60	130	155
	54	145	170
406 x 140	46	160	185
	39	190	220
356 x 171	67	105	125
	57	125	145
	51	135	165
	45	155	185
356 x 127	39	170	195
	33	195	225
305 x 165	54	115	140
	46	130	160
	40	150	180
305 x 127	48	125	145
	42	140	160
	37	155	180
305 x 102	33	175	200
	28	200	225
	25	225	260
254 x 146	43	120	150
	37	140	170
	31	160	200
254 x 102	28	170	200
	25	190	220
	22	215	250
203 x 133	30	145	180
	25	165	210
203 x 102	23	175	210
178 x 102	19	190	230
152 x 89	16	190	235
127 x 76	13	195	240

Figure 6.6 - Section factor A / V (Hp/A) of Universal columns and joist sections
Universal columns

Serial size mm	Mass / metre kg	3 sides m ²	4 sides m ²
356 x 406	634	15	20
	551	20	25
	467	20	30
	393	25	35
	340	30	35
	287	30	45
	235	40	50
356 x 368	202	45	60
	177	50	65
	153	55	75
	129	65	90
305 x 305	283	30	40
	240	35	45
	198	40	50
	158	50	65
	137	55	70
	118	60	85
	97	75	100
254 x 254	167	40	50
	132	50	65
	107	60	75
	89	70	90
	73	80	110
203 x 203	86	60	80
	71	70	95
	60	80	110
	52	95	125
	46	105	140
152 x 152	37	100	135
	30	120	160
	23	155	205

Joists

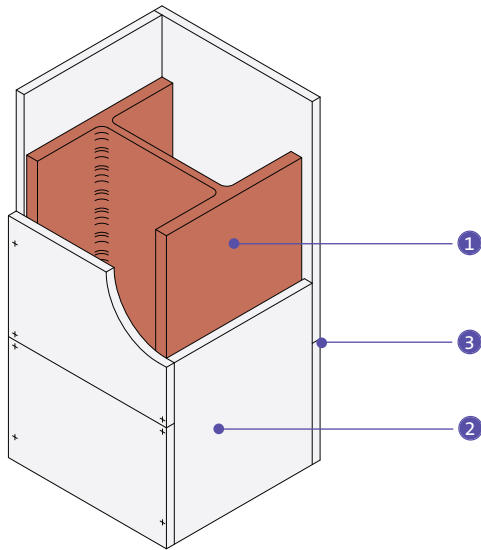
Serial size mm	Mass / metre kg	3 sides m ²	4 sides m ²
254 x 203	81.85	70	90
254 x 114	37.20	130	155
203 x 152	52.09	85	105
152 x 127	37.20	90	120
127 x 114	29.76	100	130
127 x 114	26.79	110	140
114 x 114	26.79	100	135
102 x 102	23.07	105	140
89 x 89	19.35	105	145
76 x 76	12.65	140	185

Planning - key factors

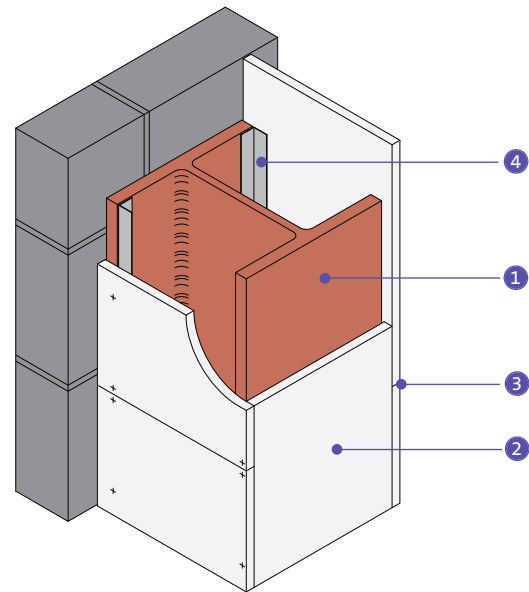
FireCase steel encasement is suitable for protecting structural steel sections with a section factor A / V (Hp/A) up to 260m², calculated on the basis of box protection to three or four sides as required. It will protect universal column and beam sections described in *BS 4: Part 1: 2005*, and many joist and castellated beam sections.

Construction details

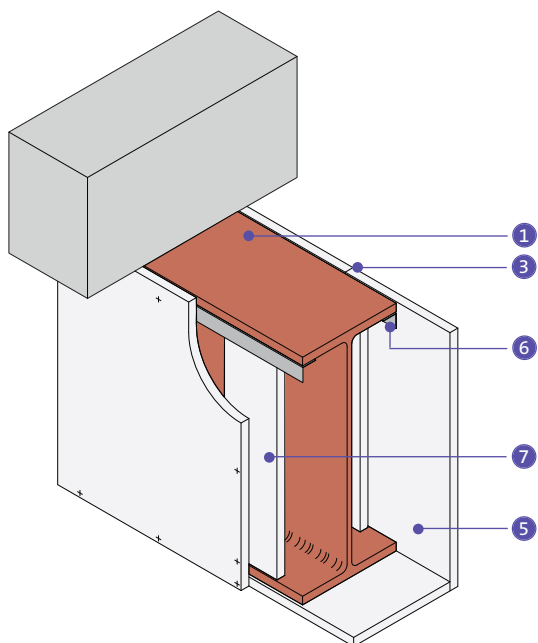
- 1** Four-sided column encasement for up to 120 minutes fire protection



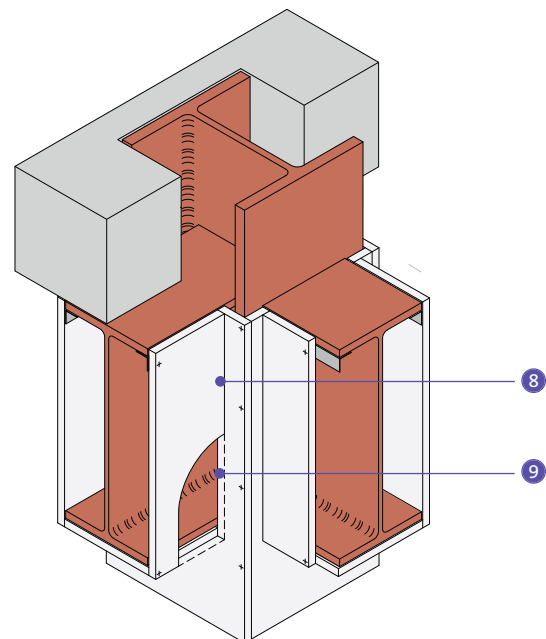
- 2** Three-sided column encasement incorporating steel angles for up to 120 minutes fire protection



- 3** Three-sided beam encasement incorporating steel angles for up to 120 minutes fire protection



- 4** Column and beam encasement junction

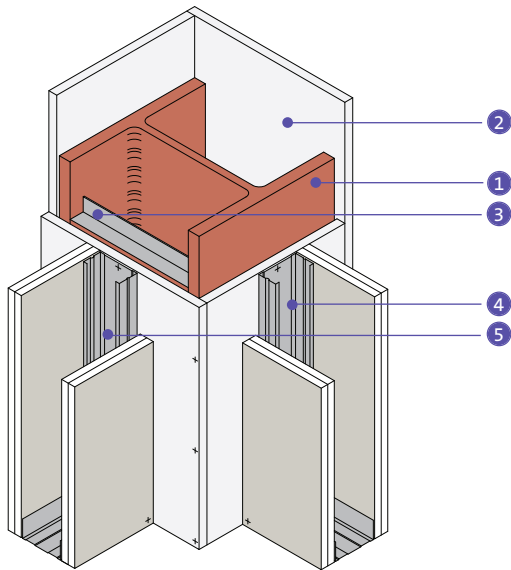


- 1 Structural steel
- 2 Glasroc F FIRECASE fixed together with Glasroc F FIRECASE Screws or Glasroc Staples at 150mm centres and fixed to Gypframe GA1 Steel Angle with Glasroc F FIRECASE Screws at 150mm centres
- 3 Board joints staggered by minimum 600mm between adjacent sides
- 4 Gypframe GA1 Steel Angle suitably fixed to column flange at 600mm centres

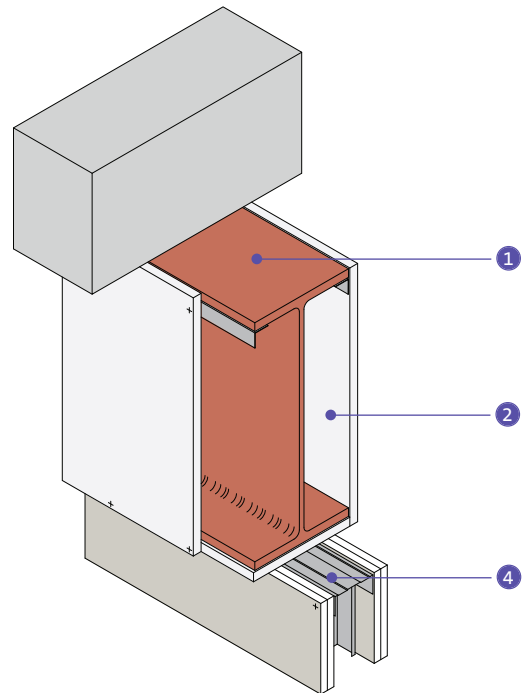
- 5 Glasroc F FIRECASE fixed together and to Gypframe GA1 Steel Angle with Glasroc F FIRECASE Screws at 150mm centres
- 6 Gypframe GA1 Steel Angle suitably fixed to beam flange at 600mm centres
- 7 60mm wide Glasroc F FIRECASE backing strip
- 8 Beam encasement boards butted tight to column encasement
- 9 Column encasement boards cut around penetrations

Construction details

- 5** Column encasement and partition junction for partitions up to 120 minutes fire resistance and BS 5234 Heavy and Severe Duty



- 6** Beam encasement and partition junction for partitions up to 120 minutes fire resistance and BS 5234 Heavy and Severe Duty

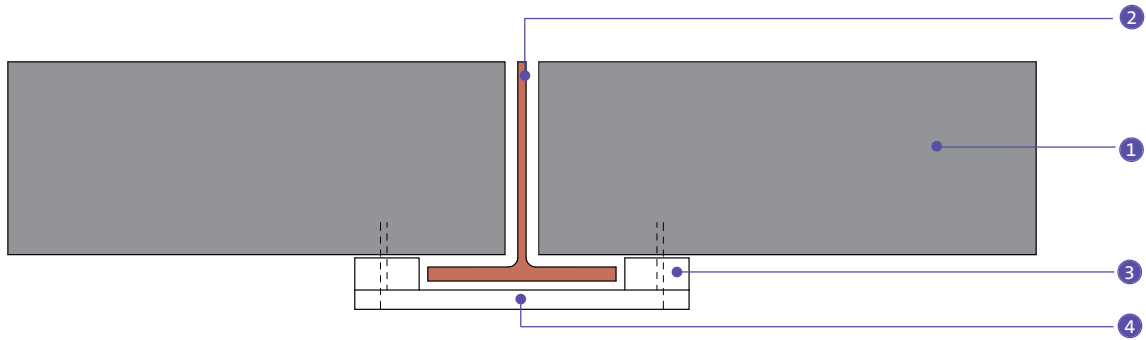


- ① Structural steel
- ② FireCase encasement
- ③ Suitable size Z-section (by others) fixed between column flanges at 600mm centres
- ④ Gypframe 'C' Stud / Channel suitably fixed through Glasroc F FIRECASE to structural steel at 600mm centres (in two lines staggered by 300mm for studs wider than 75mm)

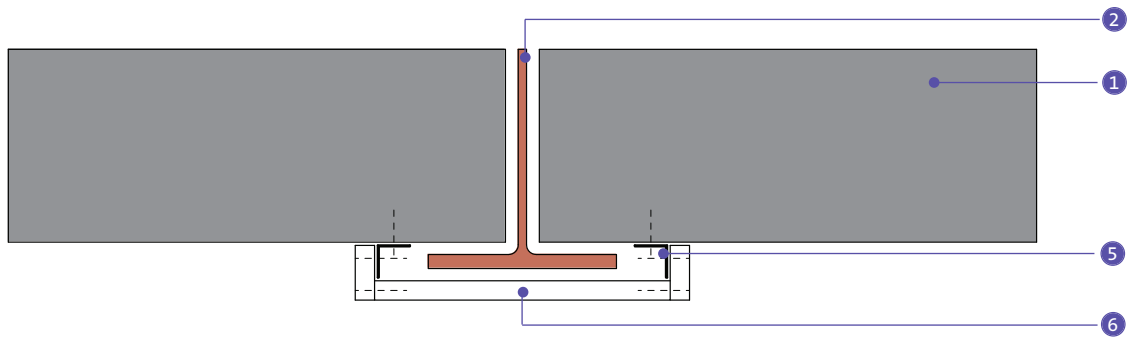
- ⑤ Gypframe 'C' Stud suitably fixed through Glasroc F FIRECASE to Z-sections (in two lines for studs wider than 75mm)

Construction details

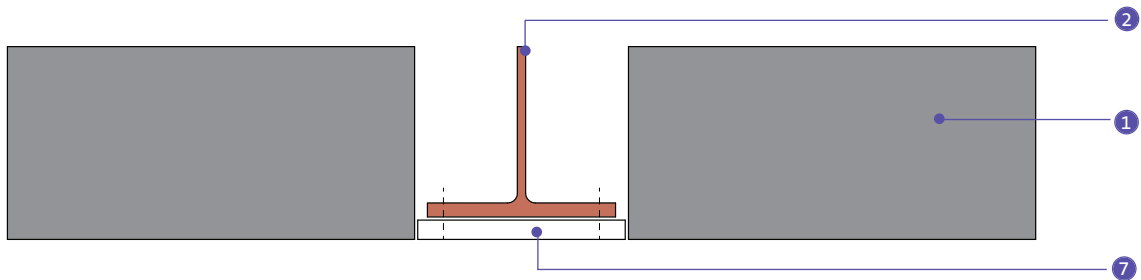
7 Column flange projection less than 30mm



8 Column flange projection less than 30mm using steel angles



9 Encasement flush with blockwork



- ① Blockwork
- ② Structural steel
- ③ Minimum 50mm wide strip of Glasroc F FIRECASE suitably fixed to blockwork at 1200mm centres
- ④ Glasroc F FIRECASE suitably fixed through packer to blockwork at 300mm centres

- ⑤ Gypframe GA1 Steel Angle suitably fixed to blockwork at 600mm centres
- ⑥ Glasroc F FIRECASE fixed together and to Gypframe GA1 Steel Angles with Glasroc F FIRECASE Screws at 150mm centres
- ⑦ Glasroc F FIRECASE fixed to column with mechanical steel pin fixings at 300mm centres, in two lines staggered by 150mm



Flanking sound transmission



Flanking sound transmission

Introduction	124
Air leakage	124
Flanking details	125---

Flanking sound is noise from a source room that is not transmitted via the separating element. It is transmitted indirectly via paths such as windows, external walls and internal corridors. It is imperative that flanking transmission is considered at the design stage and that construction detailing is specified so as to eliminate or at least minimise any downgrading of the acoustic performance.



Introduction

Flanking sound transmission

BB93 contains information to address the performance of individual wall and floor constructions, and the flanking sound paths formed by the junctions between these elements. In all cases, good design and installation practice should be followed. It is vitally important that products are installed correctly. Failure to do so may lead to limitation of acoustic performance and the requirements of BB93 not being met.

The details in this section give guidance on junction detailing with a view to meeting the requirements of BB93.

Air leakage

Air leakage is also an important consideration when optimising sound insulation. Small openings such as gaps, cracks or holes, will conduct airborne sounds and can significantly reduce the sound insulation of a construction. For optimum sound insulation, a construction must be airtight. Most air paths can be sealed at the finishing stage using Thistle plaster or Gyproc jointing materials. Other airpaths, such as gaps around pipes or other small service penetrations, can be sealed with Gyproc Sealant. For larger gaps, such as those at the base of partitions when boards are lifted tight to the ceiling, a bulk fill of Gyproc jointing materials can be used in conjunction with Gyproc Sealant.

Deflection head details

Deflection heads, by definition, must be able to move and, therefore, achieving an airtight seal is very difficult without incorporating sophisticated components and techniques. Air leakage at partition heads will have a detrimental effect on the acoustic performance of any partition.

The approach shown in **Flanking details 12 – Deflection head A** could, for example, result in a loss of around 4 dB to 5 dB due to air leakage (this would be in addition to any loss in performance by flanking transmissions due to poor junction detail). Where acoustic performance is a key consideration, steps can be taken to minimise this loss of performance. **Flanking details 13 – Deflection head B** shows the generally accepted method of achieving this and, provided care is taken to ensure a tight fit between cloaking angle and lining board surface, the loss in performance can be reduced. A loss in performance of around 1 dB to 2 dB would be more typical with this method.

Partition junctions with exposed concrete soffits are a particular example of where the detail in **Flanking details 13 – Deflection head B** should be used.

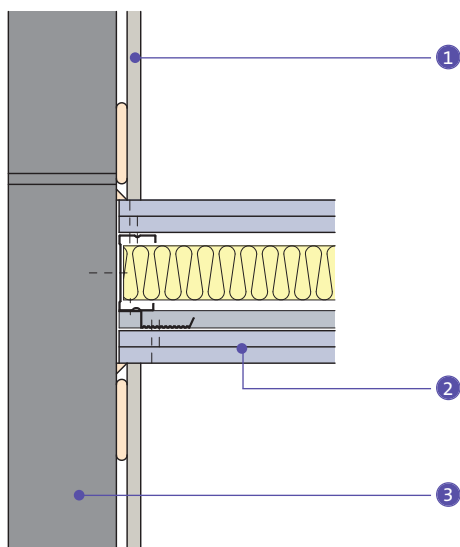
A suspended ceiling installed on both sides of the partition will also provide a cloaking effect. A tight fit between the ceiling perimeter and the surface of the partition lining board is important, although mechanically fixed perimeters are not essential. Ceilings with recessed light fittings may be less effective and if these cannot be sealed in some way, the installation of cloaking angles at the partition head should also be considered. A suspended ceiling may also reduce the level of flanking sound transmission via the soffit.

Door openings can have a significant affect on the acoustic performance of partitions. Consideration should be given to the acoustic performance of doorsets when specifying and also to the location of doors giving access from circulation spaces in to adjacent rooms requiring a high level of acoustic separation. BB93 gives further guidance on the acoustic performance of doorsets and the consideration of lobby doors in certain situations.

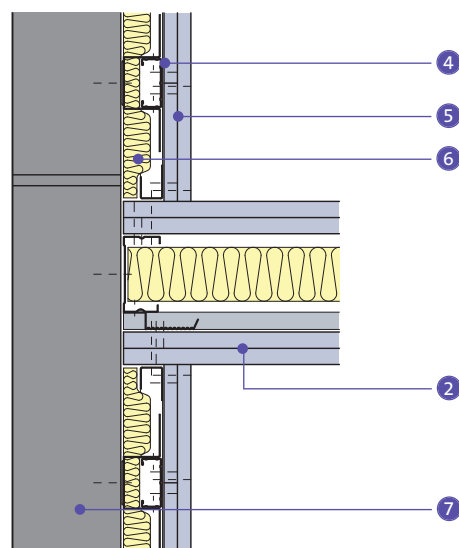
The details shown in this section are for guidance purposes. Final detailing should be verified and approved by the project design team in association with an acoustic design consultant.

Flanking details

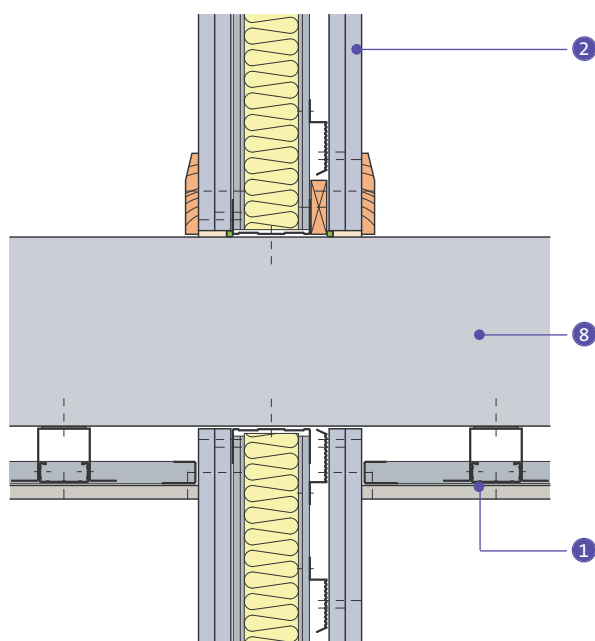
1 Junction with external wall – masonry minimum 365kg/m²



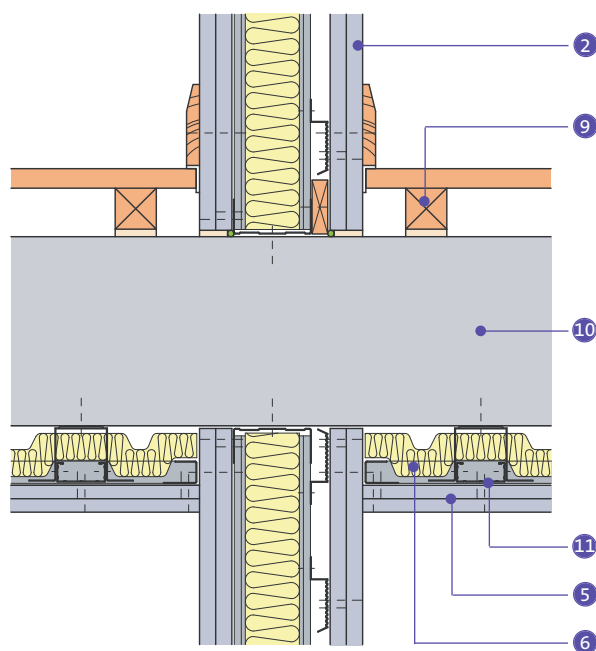
2 Junction with external wall – masonry less than 365kg/m²



3 Junction with separating floor – masonry minimum 365kg/m²



4 Junction with separating floor – masonry less than 365kg/m²

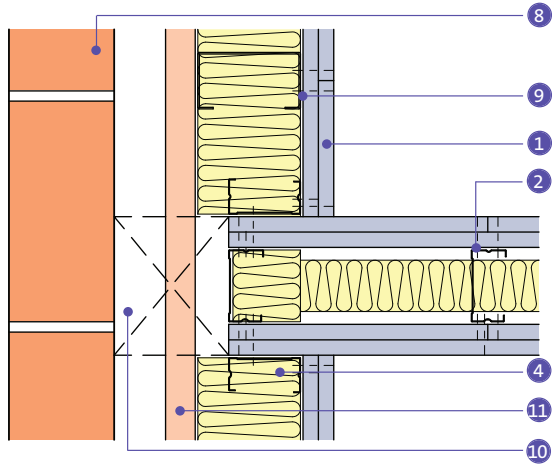


- 1 Lining solution as specified
- 2 **GypWall QUIET SF** partition system
- 3 Masonry minimum 365kg/m²
- 4 **GypLyner UNIVERSAL** wall lining system with minimum 35mm cavity
- 5 Two layers of 12.5mm Gyproc SoundBloc
- 6 25mm Isover APR 1200
- 7 Masonry less than 365kg/m²

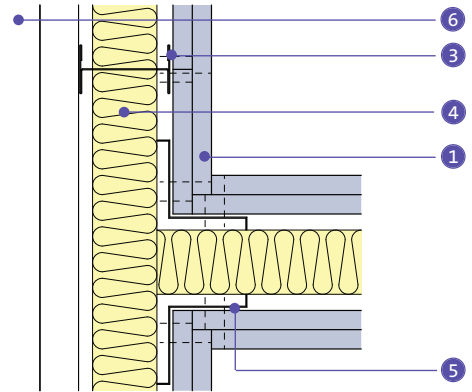
- 8 Floor slab minimum 365kg/m²
- 9 Floating floor solution as specified
- 10 Floor slab less than 365kg/m²
- 11 **GypLyner UNIVERSAL** ceiling system with minimum 35mm cavity

Flanking details

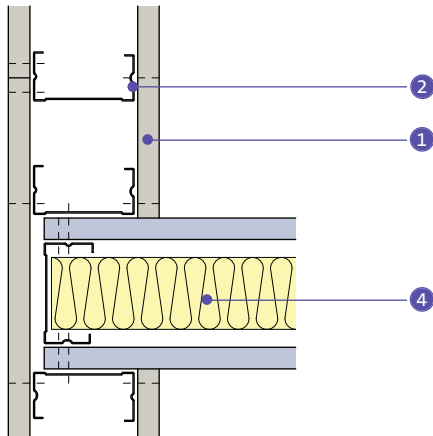
- 5** Junction with external wall when acoustic performance is a key consideration - helps reduce flanking transmission



- 6** Partition junction to optimise acoustic performance and to reduce flanking transmission

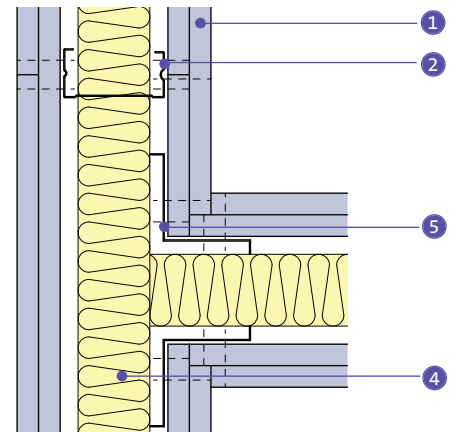


- 7** 'T' junction when partition with higher acoustic performance abuts a partition with lower acoustic performance

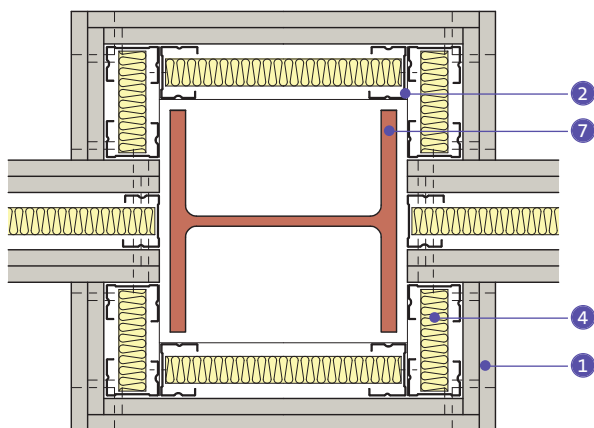


NB Acoustic principles only - detail may not be adequate for all solutions.

- 8** 'T' junction to optimise acoustic performance and to reduce flanking transmission



- 9** Partition and column junction

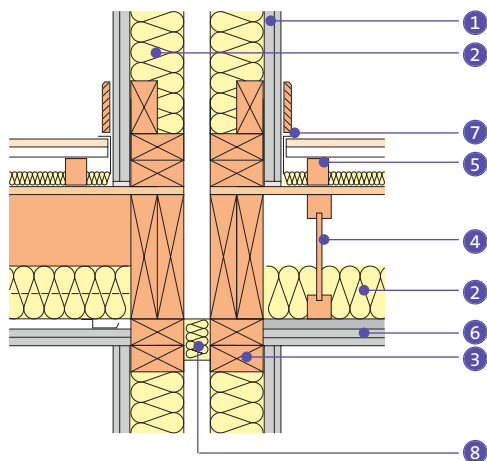


- ① Gyproc plasterboard or Glasroc F specialist board
- ② Gypframe 'C' Stud
- ③ Gypframe 'I' Stud
- ④ Isover insulation
- ⑤ Gypframe GA5 Internal Fixing Angle
- ⑥ Wall structure

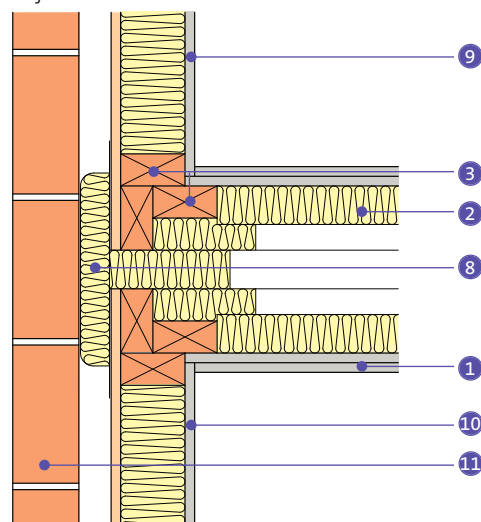
- ⑦ Structural steel column
- ⑧ External cladding
- ⑨ External wall stud framework
- ⑩ Cavity barrier (subject to regulatory requirements)
- ⑪ Rigid insulation board

Flanking details

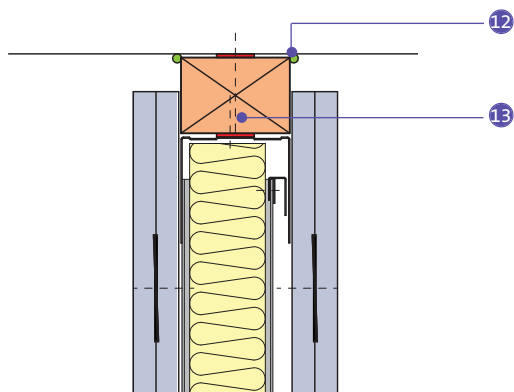
10 Partition to floor junction – optimum acoustic performance



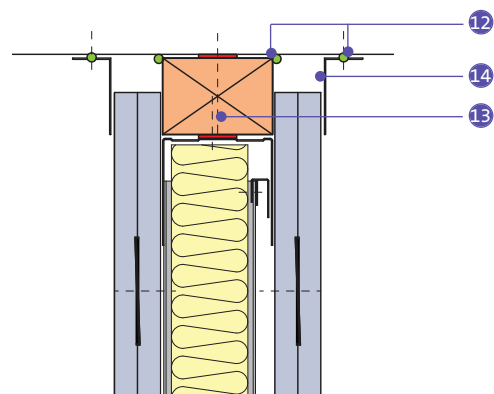
11 External wall junction



12 Deflection head A (subject to fire performance)



13 Deflection head B (subject to fire performance)



- ① Gyproc plasterboard
- ② Isover insulation
- ③ Timber stud framework
- ④ Timber joists - spanning in either direction
- ⑤ Floating floor
- ⑥ Resilient or suspended ceiling
- ⑦ Resilient flanking strip
- ⑧ Isover cavity barrier

- ⑨ One layer 12.5mm Gyproc WallBoard for single storey buildings
- ⑩ Two layers 12.5mm Gyproc WallBoard for multi-storey buildings
- ⑪ External brickwork
- ⑫ Gyproc Sealant for optimum sound insulation
- ⑬ 50mm timber head plate equivalent to channel width forming fire-stop
- ⑭ Gyframe GA4 Steel Angle to minimise loss of sound insulation performance due to air leakage

Please contact your local Project Specification Manager for assistance on the formation of specific NBS specifications.

Project Specification Manager - details by region

Region 1

Project Specification Manager – 07767 238956

Post Codes: PA, G, ML, DG, KA, AB, DD, KW, IV, PH, FK, KY, EH, ZE

Project Specification Manager – 07778 673864

Post Codes: TS, DL, CA, IM, YO, HG, LA, NE, DH, SR, TD

Region 2

Project Specification Manager – 07976 204667

Post Codes: WN, BL, OL, M, WA, CH, LL, SK, CW, L, LF, HX, HD, WF, DN, BD, HU, S

Region 3

Project Specification Manager – 07814 481216

Post Codes: DE, NG, LE, NN, LN, PE, CB

Project Specification Manager – 07778 673840

Post Codes: CV, B, WS, ST, WV, DY, TF, SY

Region 4

Project Specification Manager – 07870 160409

Post Codes: NR, IP, CO

Project Specification Manager – 07774 671200

Post Codes: CM, EC, E, IG, RM, SS

Project Specification Manager – 07766 775373

Post Codes: AL, LU, MK, SG, EN, N, HP, WD, SL, UB, HA, NW, W, WC

Region 5

Project Specification Manager – 07971 661078

Post Codes: SA, LD, CF, NP, HR, WR, BS, GL, SN, OX

Project Specification Manager – 07786 337414

Post Codes: TR, PL, TQ, EX, TA, DT

Project Specification Manager – 07778 673875

Post Codes: BA, SP, BH, SO, PO

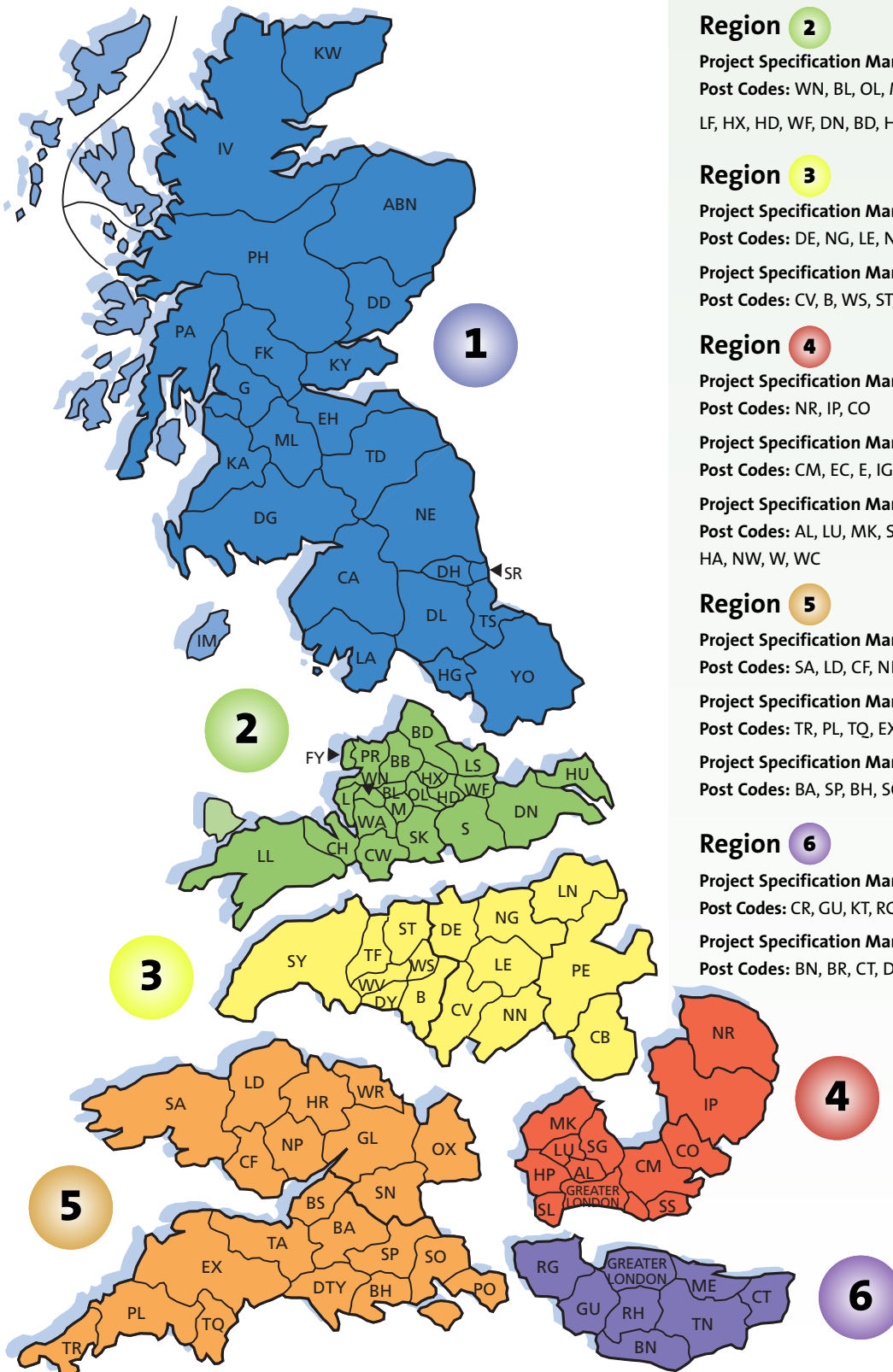
Region 6

Project Specification Manager – 07854 540232

Post Codes: CR, GU, KT, RG, RH, SM, SW, TW

Project Specification Manager – 07525 672070

Post Codes: BN, BR, CT, DA, DY, JE, ME, SE, TN





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For a comprehensive and up-to-date library of information visit the British Gypsum website at: www.british-gypsum.com. For information about products supplied by Artex Limited or Saint-Gobain Isover please see their respective websites.

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