

GYPROCK®

Everything else is just plasterboard

Commercial Cinema Wall Systems

Design and installation guide



PROFESSIONAL
SOLUTIONS



CSR

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INTRODUCTION

The Gyprock[®] Cinema Wall System is a purpose designed, high performance, acoustic wall system that is both cost effective and easy to construct.

The wall framework consists of steel columns (also used for roof support) with horizontal girts spanning between columns.

Independent rows of girts are used to support each wall face, and all girts are isolated from the supporting columns with resilient mounts (Gyprock[™] Cinema Wall Mounts).

Two layers of CSR Bradford glasswool or polyester insulation are placed in the wall cavity.

Top hat sections are fixed vertically to the girts and are retained in a steel track section at the top and bottom of each wall leaf.

Three or four layers of 16mm Gyprock Fyrchek[™] plasterboard are fixed to the top hat sections on both sides of the wall.

A typical Gyprock[™] Cinema Wall configuration would be columns spaced at 6000mm horizontal centres, with girts spaced at 2700mm vertical centres and top hats spaced at 900mm horizontal centres.

When complete, the wall has an approximate mass of 90 to 115kg/m², and an overall minimum width of 471mm, though typically 500mm.

APPLICATIONS

The Gyprock[™] Cinema Wall System is primarily intended for large area walls where acoustic separation and a dramatic reduction in sound transmission is required.

Applications include:

- Multi-theatre Cinema Complexes.
- Lecture Halls.
- Drama Theatres.
- Concert Halls.

ADVANTAGES

- Highly cost effective. Can utilise the steel columns that are used to support the roof structure, thereby minimising the structure of the wall frame.
- Excellent Sound Transmission Loss (STL) with particularly good performance at low frequencies.
- Lightweight components make construction easier. (Alternative systems that use full height staggered steel studs can be heavy and difficult to erect. A 13m steel stud can weigh up to 150kg and may require a crane to install. A steel girt in the Gyprock[™] Cinema Wall System typically weighs only 27kg, and can therefore easily be installed using a scissor lift.)
- Top hat profiles may be spaced at up to 900mm centres.
- Fast screw fixing of plasterboard to 1.15mm steel profiles.

CINEMA WALL DURING CONSTRUCTION.



COMPONENTS

Gyprock™ Plasterboard

16mm Gyprock Fyrchek™ plasterboard. Mass 12.5kg/m².

Fasteners

- Gyprock™ Plasterboard Screws for fixing plasterboard to top hat sections –
 - 1st layer – 25mm x N°6 Type 'S', drill point.
 - 2nd layer – 45mm x N°6 Type 'S', drill point.
 - 3rd layer – 40mm x N°10, needle point Laminating Screws.
 - 4th layer – 40mm x N°10, needle point Laminating Screws
- For fixing top hat to girt sections use 8-18 Tek screws (supplied by others).

Jointing Materials

- Gyprock™ Base Coat 45, 60 or 90.
- Gyprock™ Paper Tape
- Gyprock™ all purpose or topping compounds.

Refer to project specification for level of finish requirements.

Sealant

- Gyprock™ Fire Mastic. Fire and acoustic rated sealant. Available in 600ml sausage.

Isolation Mounts

- Gyprock™ Cinema Wall Mounts, Part N° 10563. Available in all states.

Framing

- Columns – Design by others. Columns must be 20mm minimum clear of plasterboard.
- Girts – Lysaght Steel C-Sections or Equivalent - Refer to Table 2 for sizes.
- Top hat Profile – Rondo N°255, 50mm x 35 x 1.15mm top hat section, or Rondo N°256, 75mm x 35 x 1.15mm top hat section.
- Track for base of top hat sections – Rondo N°340. Note: Lead times and minimum order may apply.

Insulation Materials

- CSR Bradford Glasswool Partition Batt, 110mm thick.

or

- Autex AAB32-100, 32kg/m³, 100mm thick (4-6 denier, no more than 30% meld fibre). Supplied by others, lead times may apply.

HANDLING & STORAGE

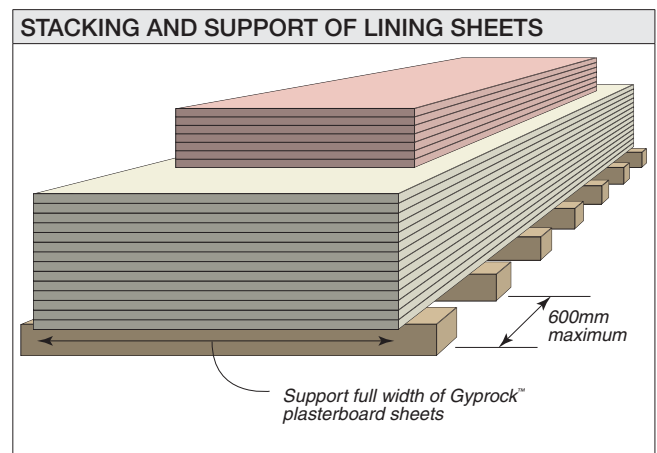
All materials must be kept dry, preferably stored inside. Care should be taken to avoid sagging or damage to ends, edges and surfaces of sheets.

All Gyprock™ plasterboard must be stacked flat, properly supported on a level platform or on support members which extend the full width of the sheets and which are spaced at a maximum of 600mm centres.

If stored outside, sheets must be stored off the ground, stacked as previously detailed and protected from the weather.

Buildings should be sealed against water ingress before plasterboard is installed. It is recommended that plasterboard damaged by water is replaced.

Sheets must be dry prior to fixing, jointing and finishing.



ACOUSTIC PERFORMANCE

Laboratory testing was performed on the Gyprock™ Cinema Wall System ‘CSR 945’ with 3 layers of 16mm Gyprock Fyrchek™ plasterboard on each side and 2 layers of 110mm thickness glasswool infill. The test was conducted at the National Acoustic Laboratories and achieved a result of R_w 77, C_{tr} -6. (AFT Report N°428).

The field test was performed by PKA Acoustic Consulting on the same system, and is detailed in test report N°99017-R01 ‘Field Performance of Gyprock™ Cinema Wall System’.

Additional systems’ performance values have been assessed in PKA Acoustic Consulting Report PKA 201001.

Table 1 provides detailed acoustic performance information for this system.

TABLE 1: ACOUSTIC PERFORMANCE (dB)										
System	R_w	R'_w	NIC	1/1 Octave Band Centre Frequency, Hz						
				63	125	250	500	1k	2k	4k
Typical Noise Reduction Specification	–	62	65	35	42	55	65	70	75	75
Measured Field Noise Reduction	–	65	69	37	45	62	>70	>75	>75	>75
CSR 945(a), (Laboratory)	77	–	–	44	58	68	72	78	88	85
CSR 946 (PKA)	79	–	–	46	60	70	74	80	>90	>90
CSR 947 (PKA)	81	–	–	48	62	72	76	82	>90	>90

NOTES:

R_w – Weighted Sound Reduction Index.

This is a rating measured in accordance with Australian Standard AS1191 ‘Acoustics - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions’.

R_w is determined from a laboratory test of the normalised noise reduction across a wall. Normalisation takes into account wall transmitting area and reverberation time in the laboratory.

R'_w – Weighted Apparent Sound Reduction Index.

This is a rating measured in accordance with Australian Standard AS2253 ‘Methods for Field Measurement of the Reduction of Airborne Sound Transmission in Buildings’.

R'_w is determined from a field test of the normalised noise reduction between two cinemas, including all indirect sound transmission that bypasses the wall. The better the indirect transmission paths (flanking paths) are controlled, the closer R'_w will be to the R_w value.

Acoustic Consultant’s Role

As part of the routine role played by the Acoustic Consultant in the overall design of a cinema project, the Acoustic Consultant should ensure that the intended acoustic isolation of the Gyprock™ Cinema Wall System is realised. As a minimum requirement, the following must be considered:

- Potential for flanking transmission via front and rear walls, entry doors and lobby, bio-box, floor slab, air conditioning duct cross-talk, fire escapes, etc.
- Junction details for perimeter of cinema wall.
- Penetrations through the wall skins, such as electrical cables and speaker wires.
- Quality of workmanship is appropriate.

NIC – Noise Isolation Class.

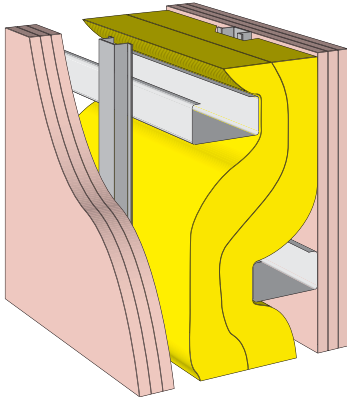
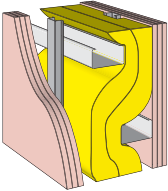
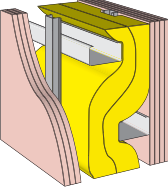
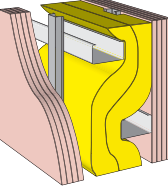
This a rating of the measured results in accordance with Australian Standard AS2253 ‘Methods for Field Measurement of the Reduction of Airborne Sound Transmission in Buildings’, in a fully furnished cinema with good flanking control.

NIC is determined from a field test of the noise reduction between two cinemas, without normalisation of the results. This rating represents the level of acoustic separation perceived by occupants.

The Difference Between NIC and R'_w .

The principle difference between NIC and R'_w is that for R'_w the test results are normalised to determine the rating. Normalisation takes into account transmitting wall area and reverberation time in the cinema. Normalisation also enables nominal comparison between different installations. However, differences in flanking control between installations will provide different results. A direct comparison of wall performance between installations, using either NIC or R'_w , is only possible when the flanking transmission is known or identical. The NIC rating represents what is actually perceived by movie-goers.

Steel Frame Internal Wall Systems – Cinema Wall

SYSTEM SPECIFICATION		TYPICAL LAYOUT (CSR 945 shown)		ACOUSTIC OPINION
<ul style="list-style-type: none"> Lining material as per system table. Steel columns, to engineer's design. Girts fixed to columns with Gyprock™ Cinema Wall Mounts. Top hat sections at 900mm maximum centres to engineer's design. 2 x layers glasswool or polyester insulation. Refer to insulation specification. Lining material as per system table. 				<p>PKA-201001</p> <p>NOT Deemed Discontinuous Construction</p> <p>* Test ATF428</p>
FRL Report/Opinion	SYSTEM N°	WALL LININGS	CAVITY INFILL (Refer to Page 3 and 7)	R _w
120/120/120 FAR2357	CSR 945 	<i>BOTH SIDES</i> <ul style="list-style-type: none"> 3 x 16mm Gyprock Fyrchek™ plasterboard 	(a) 2 x 110 Bradford Glasswool Building Blanket (b) 2 x Autex AAB32-100	77* 77
			MINIMUM WALL THICKNESS mm	471
120/120/120 FAR2357	CSR 946 	<i>SIDE ONE</i> <ul style="list-style-type: none"> 3 x 16mm Gyprock Fyrchek™ plasterboard <i>SIDE TWO</i> <ul style="list-style-type: none"> 4 x 16mm Gyprock Fyrchek™ plasterboard 	(a) 2 x 110 Bradford Glasswool Building Blanket (b) 2 x Autex AAB32-100	79 79
			MINIMUM WALL THICKNESS mm	487
120/120/120 FAR2357	CSR 947 	<i>BOTH SIDES</i> <ul style="list-style-type: none"> 4 x 16mm Gyprock Fyrchek™ plasterboard 	(a) 2 x 110 Bradford Glasswool Building Blanket (b) 2 x Autex AAB32-100	81 81
			MINIMUM WALL THICKNESS mm	503

DESIGN CONSIDERATIONS

This publication provides typical construction details for the Gyprock™ Cinema Wall System, and some typical examples of the acoustic detailing appropriate for penetrations, junctions and perimeters etc.

These details are not intended to be applied without first seeking the advice of an acoustic consultant familiar with the specific project construction and its performance requirements.

To ensure optimum cost effectiveness and construction ease, the specification of a Gyprock™ Cinema Wall System is best at the earliest part of the design stage.

Flanking Sound Paths

Appropriate consideration of flanking sound paths is required to achieve the intended acoustic isolation of cinema to cinema noise.

Common flanking paths are gaps around doors, through floors, ceilings, external walls and junctions. In the case of doors the location, construction and seals are critical to their performance.

Continuous floor slabs transmit noise from cinema to cinema, thus isolating these from the theatre floor and seating by using a suspended/floating floor system above the slab is an effective method of reducing this sound path.

Noise that travels through ceilings can be reduced by installing a resiliently suspended ceiling with 2 layers of 16mm Gyprock Fyrchek™.

Fire Rating

When designed, installed and detailed as per this manual, the Gyprock™ Cinema Wall System has 120/120/120 FRL (BRANZ assessment FAR2357). Structural Design

The Gyprock™ Cinema Wall System has a minimum wall thickness of 471mm.

The wall must span from the base floor slab to the underside of the roof.

The Gyprock™ Cinema Wall System has been designed to take advantage of the construction/cost benefits of utilising the roof support columns also as the support structure for the wall. However, cleating of the girts to the roof support structure shall be subject to the project engineer's approval.



Refer to Tables 2, 3 and 4 for maximum permissible span details for girts and top hat sections.

The Gyprock™ Cinema Wall System has been designed for a UDL of 0.25kPa and a limiting deflection of (span ÷ 240 or 30mm maximum), which includes the deflection of the isolation mounts.

Girts have been designed for no bridging to reduce interference with the insulation and to maintain acoustic performance. Girts must be made level before fixing of top hats.

Staggering the girts a minimum of 300mm vertically allows sufficient room for the insulation to pass between them. A

larger stagger will be required where back-to-back girts are used. When selecting girts, ensure the appropriate minimum clearance is provided between the girt on one side and the plasterboard on the other side to accommodate the insulation. Refer to 'Cavity Insulation' on page 7.

TABLE 2: MAXIMUM PERMISSIBLE SPAN FOR LYSAGHT C-SECTION STEEL GIRTS		
Girt Section	Girt Spacing (mm)	
	2700	2900
Single Girt Section 	Girt Span (mm)	
C20024	6500	6400
C20019	6000	5800
C20015	5400	5300
C15024	5100	5000
C15019	4750	4650
C15015	4400	4300
C15012	4100	4000
Back-to-Back Girt Sections 		
C20024	8000	7900
C20019	7650	7500
C20015	7200	7000
C15024	6450	6300
C15019	6000	5850
C15015	5550	5400
C15012	5150	5000
C10019	4150	4050

NOTES: Back-to-back girts are to be fixed together with staggered N°6 Tek screws at 300mm maximum centres.

TABLE 3: MAXIMUM PERMISSIBLE SPAN FOR N°255 TOP HAT STEEL SECTION		
Span Type	Maximum Span (mm)	Maximum Cantilever
Simple	1900	25% of adjacent span
Continuous*	2700	20% of adjacent span

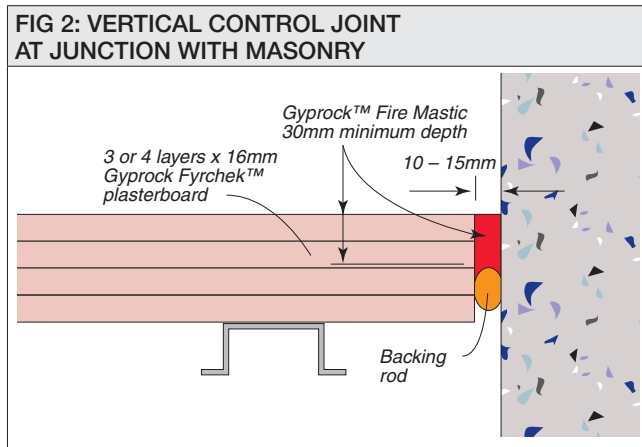
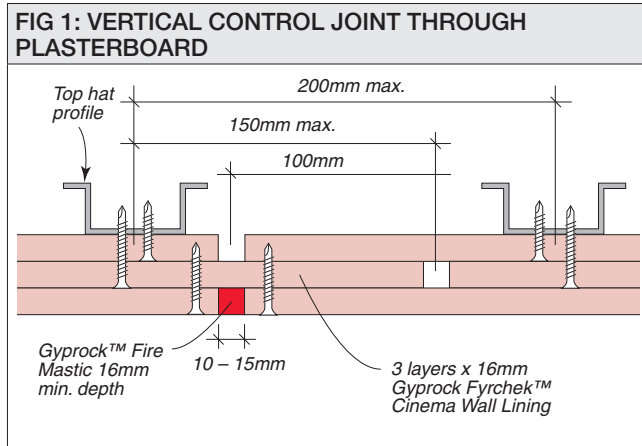
TABLE 4: MAXIMUM PERMISSIBLE SPAN FOR N°256 TOP HAT STEEL SECTION		
Span Type	Maximum Span (mm)	Maximum Cantilever
Simple	2400	25% of adjacent span
Continuous*	2900	20% of adjacent span

Note to Tables 3 and 4.

* The continuous span values detailed are applicable only where the ratio of longer span to shorter span is less than or equal to 1.12. Where this is not the case, the simple span value must be used.

Control Joints

Control joints shall be provided at junctions with dissimilar materials and at the locations of any floor control joints. If a painted finish is specified, control joints are also required at 12m max. centres. Refer to FIG 1 and 2.



Cavity Insulation

To maintain the acoustic isolation between each side of the wall, compression of the insulation as it passes the girts must be limited. The minimum gap between the plasterboard and girt is to be:

- 140mm for 2 x 110mm glasswool insulation.
- 200mm for 2 x 100mm polyester insulation.

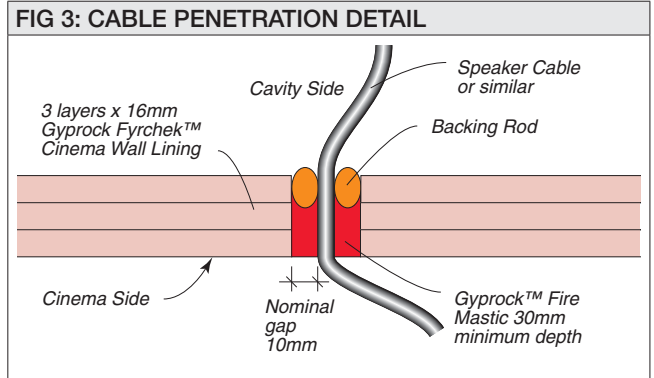
Where this minimum cannot be maintained, one layer of insulation shall be discontinuous at the girt. Insulation shall cover the entire wall area, offset all joints between layers.

Penetrations

To maintain the integrity of high performance acoustic walls, electrical penetrations must be kept to a minimum, and must be as detailed in FIG 3.

Plumbing Services

The installation of plumbing services in this high performance wall system can compromise the wall performance. Seek advice from your acoustic consultant in this case.



Design Assistance

CSR DesignLINK™ is a dedicated team that assists architects, engineers and other design professionals in selecting wall, ceiling and flooring system solutions. With expert advice garnered from years of industry experience, DesignLINK™ is available to offer advice on system design, performance and installation.

Additional resources include brochures, design guides, calculators, REVIT® and CAD files, and access to The Gyprock Red Book™. Please call 1800 621 117 or email designlink@csr.com.au.



INSTALLATION

Framing & Insulation

Install steel girts (for one side of the wall) between the steel support columns, and fix to steel cleats using Gyprock™ Cinema Wall Mounts at each connection. Refer to FIG 5, 6 and 7.

Install insulation for the full height and width of the wall. Refer to FIG 5 and 6. Insulation can be fixed at the top to the girts with a steel angle.

Ensure there are no gaps in the insulation, butt all joints tightly and offset joins in adjacent layers.

Install steel girts to second side of the wall beginning from the top.

Alternatively, insulation can be supported from girt to girt, as long as the wall has full insulation coverage and insulation is not over-compressed.

Install and fix top hat retaining track to the concrete slab at each top hat location. Refer to FIG 10 and 11 for details.

Install top hat profiles vertically at 900mm centres and at 300mm maximum from each end of the wall. Fix to all girts with a N°8 Tek screw in each top hat flange.

Accurate spacing of top hats is imperative to enable correct fixing of plasterboard. Refer to FIG 4.

FIG 4: TYPICAL WALL LAYOUT – ELEVATION

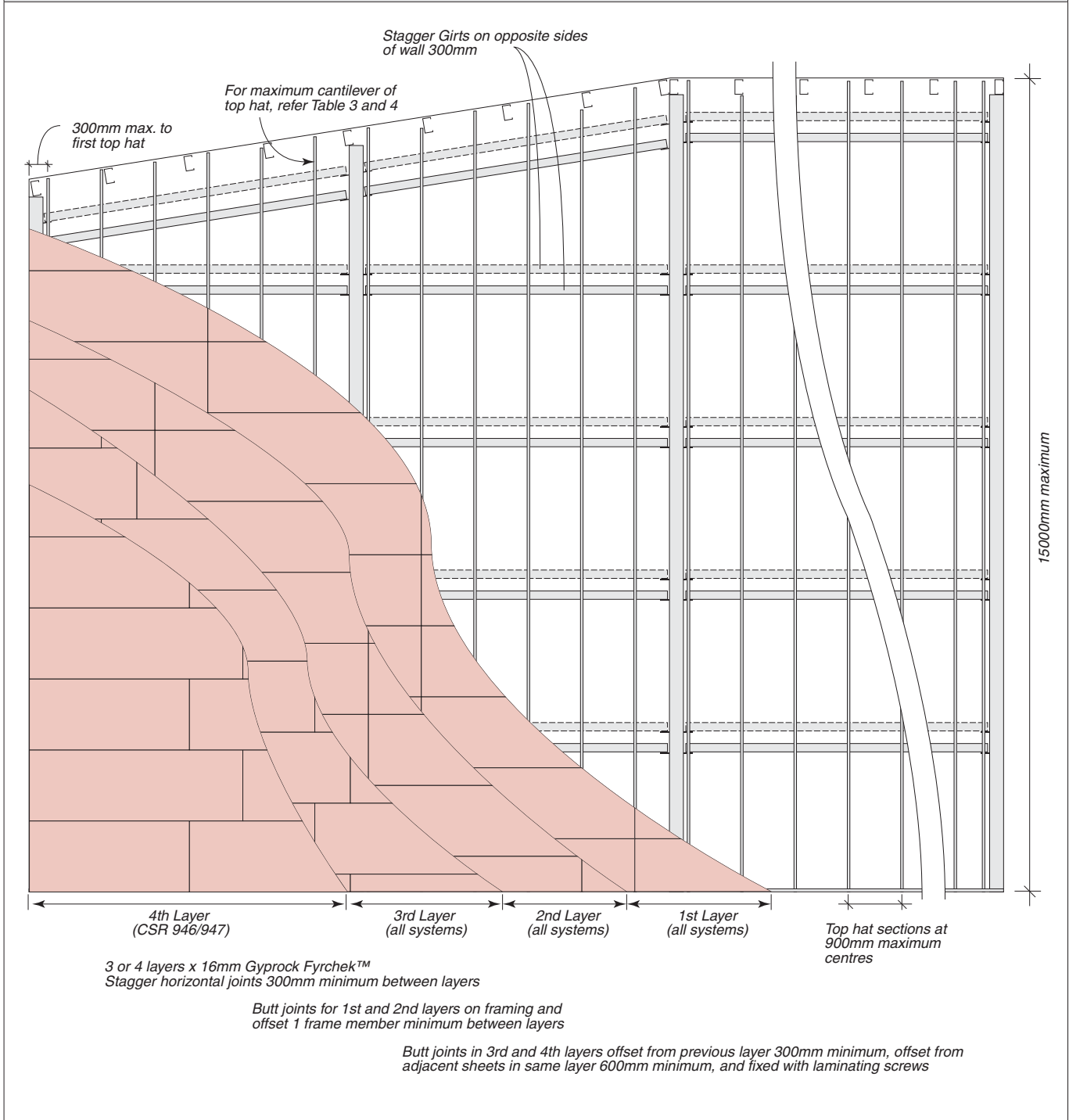


FIG 5: TYPICAL WALL CROSS SECTION – ELEVATION

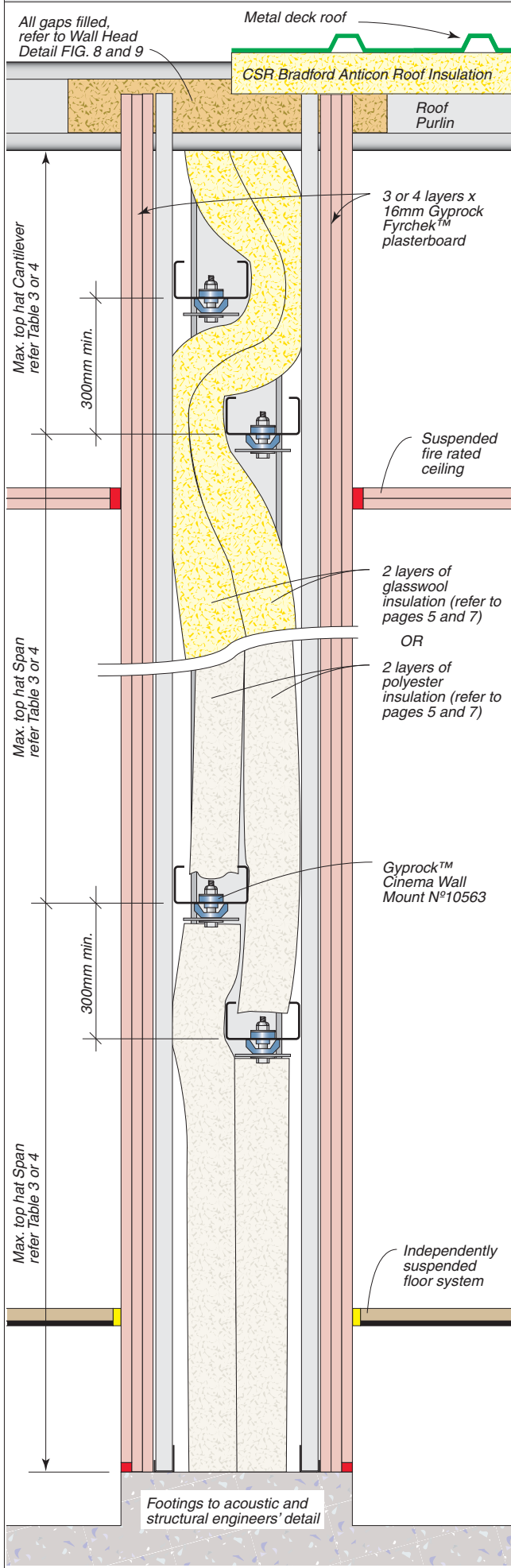


FIG 6: TYPICAL WALL CROSS SECTION – PLAN

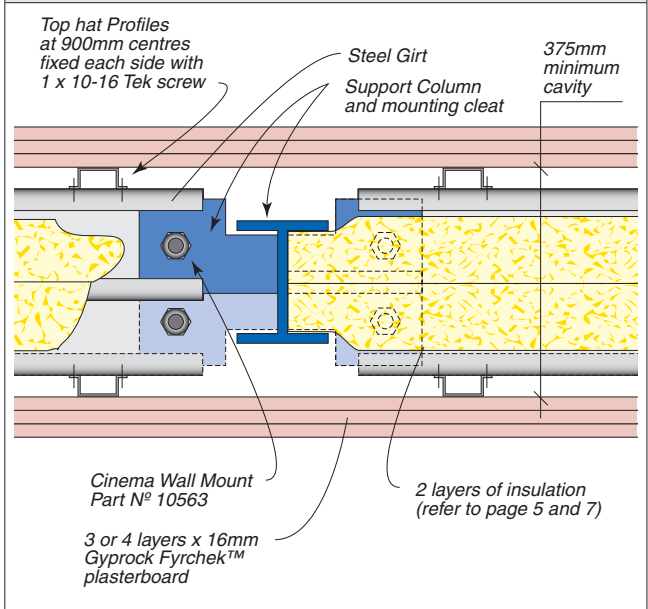
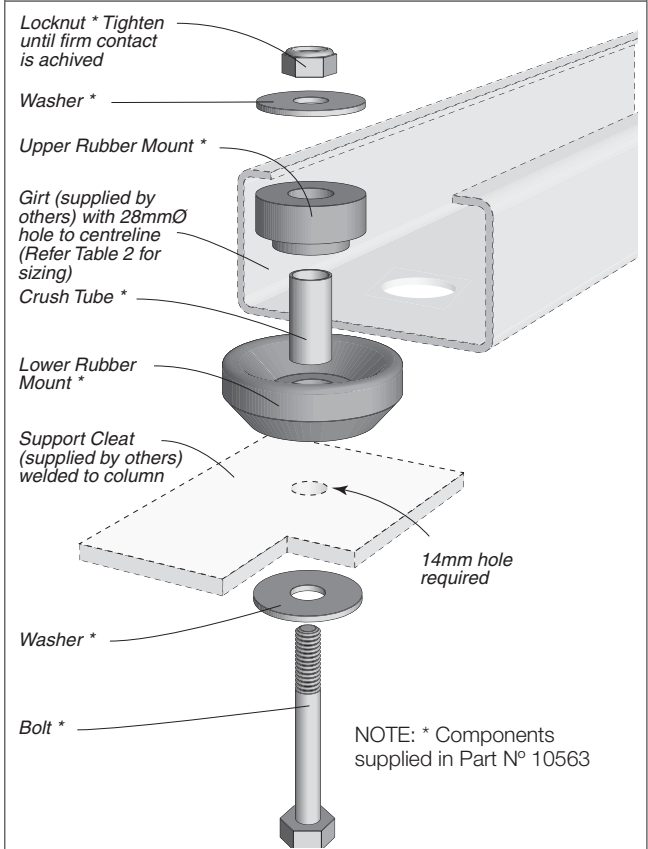


FIG 7: GYPROCK CINEMA WALL MOUNT PART N° 10563.



CINEMA WALL MOUNT



FIG 8: WALL HEAD DETAIL.

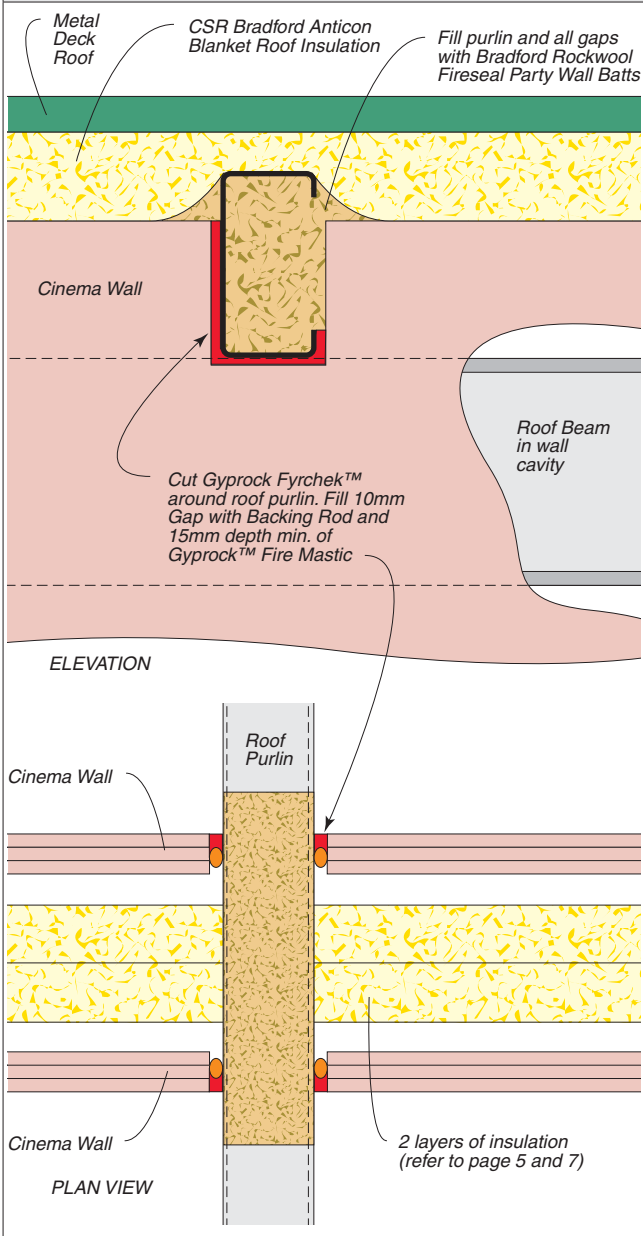


FIG 9: ALTERNATIVE WALL HEAD DETAIL.

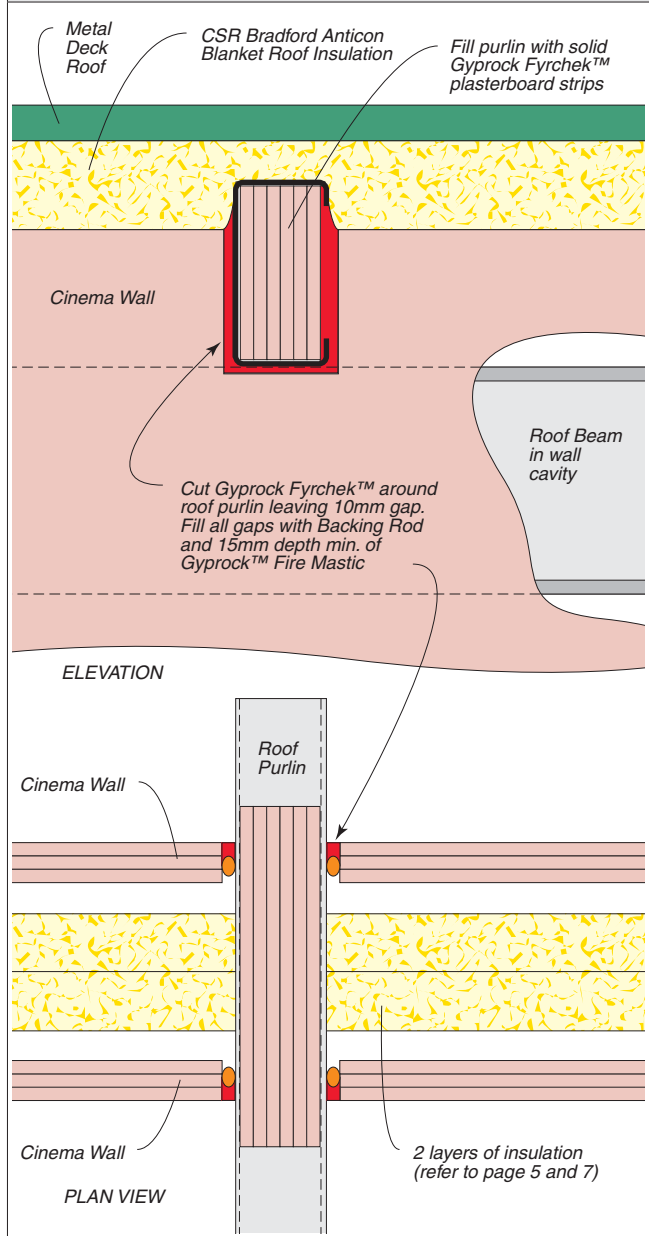


FIG 10: WALL BASE DETAIL – 3 LAYER

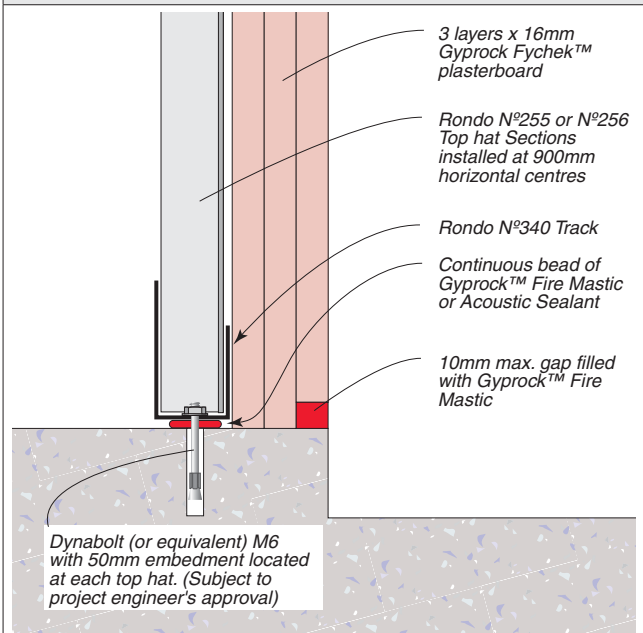
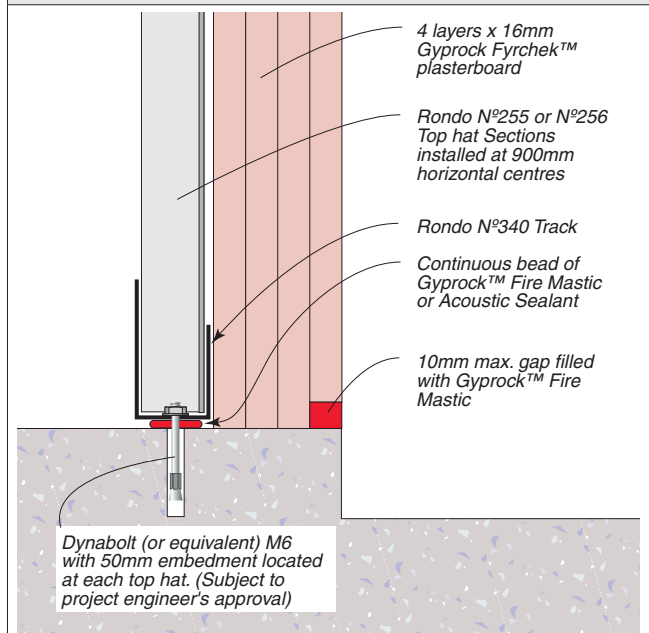


FIG 11: WALL BASE DETAIL – 4 LAYER



INSTALLATION

Plasterboard

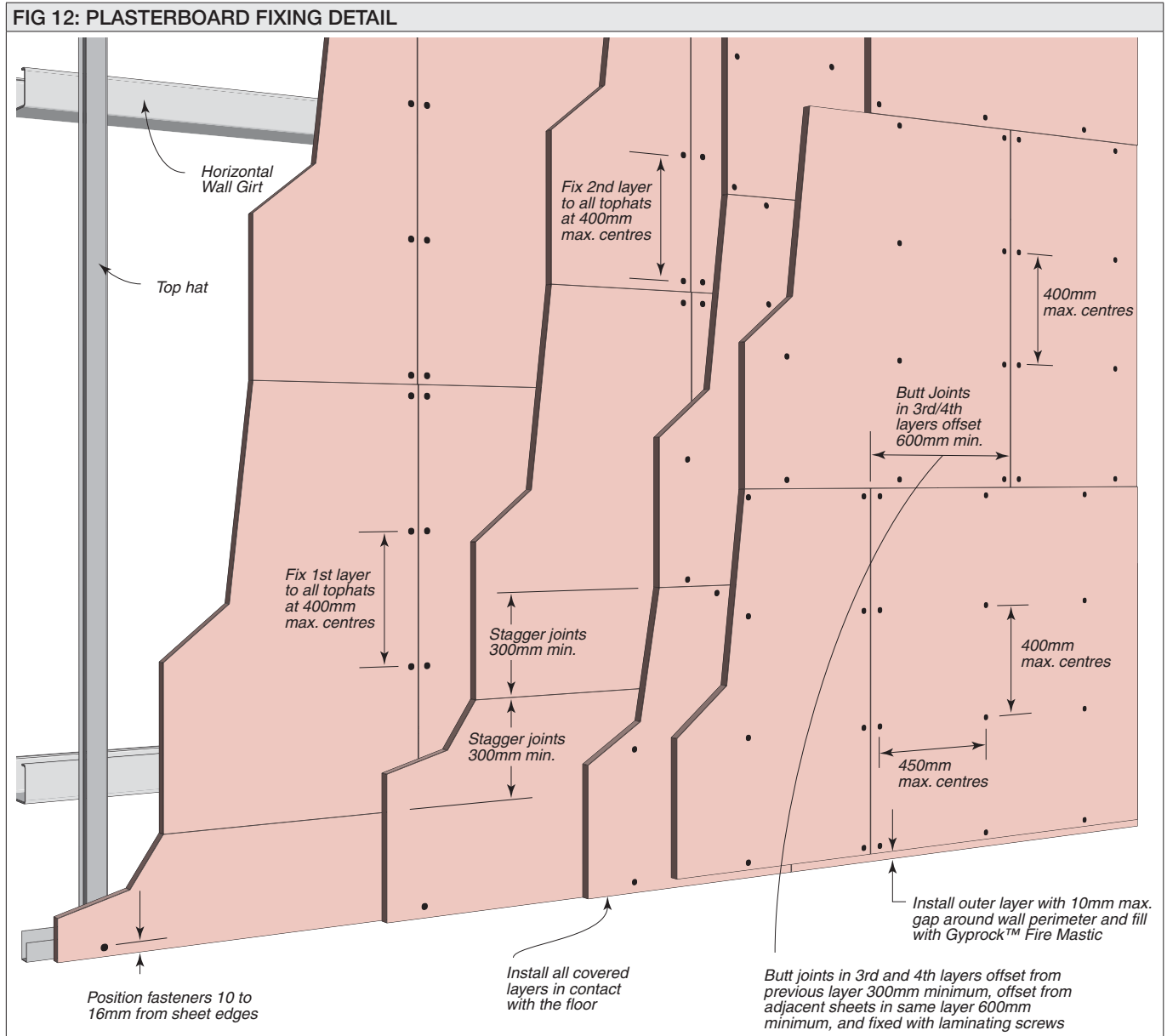
Gyprock Fyrchek™ plasterboard must be installed horizontally and in accordance with details provided in FIG 12.

Screw fixing must be used. Adhesive fixing is not effective in fire rated systems.

JOINTING

As a minimum requirement, the outer layer of Gyprock Fyrchek™ plasterboard must be jointed using Gyprock™ Paper Tape. Jointing must be in accordance with normal Gyprock™ plasterboard practice.

Full details on levels of finish and jointing methods can be obtained from brochure N°GYP547 'Gyprock™ Plasterboard Residential Installation Guide'.



FIXING SPECIFICATIONS	
1st Layer	Gyprock 25'S' Screws
2nd layer	Gyprock 45'S' Screws
3rd/4th layers	Gyprock Laminating Screws N°10 x 40mm
1st Layer	Fixing & Spacing
All Top Hats	Screws at 400mm max. vertical centres
2nd layer	Fixing & Spacing
	Screws at 400mm max. vertical centres
3rd/4th layers	Fixing & Spacing
Field	Laminating Screws at 450mm maximum horizontal centres and 400mm maximum vertical centres
Butt Joints	Laminating Screws at 400mm maximum vertical centres

SURFACE DECORATION

Gyprock™ plasterboard can be painted with a wide range of finishes.

The use of preparatory sealer over the entire surface is recommended prior to application of finish coats.

Health & Safety

Information on any known health risks of our products and how to handle them safely is on their package and/or the documentation accompanying them.

Additional information is listed in the Safety Data sheet.

To obtain a copy, telephone 1300 306 556 or visit www.gyprock.com.au.

Warranty

Gyprock products are designed to achieve optimal performance when part of a CSR integrated system.

CSR Building Products Limited warrants its Australian made Gyprock products to remain free of defects in material and manufacture for the usual lifetime of the product (25 years).

CSR warrants its International Alliance Gyprock products to remain free of defects in material and manufacture for 7 years.

For details on our product warranty, please visit www.gyprock.com.au, or contact us on 1300 306 556.

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