

The Building Test Centre

Fire Acoustics Structures

The Building Test Centre

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Assessment Number **BTC 16887FA**

A FIRE TEST ASSESSMENT ON A RANGE OF BRITISH GYPSUM SHAFTWALL PARTITIONS CLAD ON THE CORRIDOR SIDE WITH 15mm GLASROC F FIRECASE AND THE SHAFT SIDE WITH 20mm GLASROC F FIRECASE, CONDUCTED IN ACCORDANCE WITH F.T.S.G. RESOLUTION No. 82 /PPPF GUIDE.

Assessment Date: 15th April 2010
Report Amended: 15th January 2015

www.btconline.co.uk

Applicant: **British Gypsum**
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DETAILS OF THE REQUEST

It is required to assess the following constructions for fire resistance performance if tested in accordance with BS476: Part 22:1987 Clause 5 and BS EN 1364-1:1999.

Lightweight non-loadbearing shaftwall systems, which consists essentially of:

Single Layer Construction (corridor side) – BS Claims only

A Gypframe 62C50 Standard Floor & Ceiling Channel was fixed to the base of the frame using 60mm fire resistant fixings at 600mm centres.

A continuous strip of Gyproc FireStrip was placed along the centreline of a Gypframe 62JC60 'J' Channel and attached to the head of the frame using fire resistant fixings at 300mm centres (long flange to the exposed face).

A Gypframe 60SC55 Starter Channel was shortened by 15mm and positioned between the head and base channels at the left-hand end of the frame (viewed from the corridor face). The channel was fixed in position at 600mm centres using fire resistant fixings.

A Gypframe 60/70I70 or 92/146TI90 'I' Stud was shortened by 15mm and positioned between the head and base channels at the right-hand end of the frame (viewed from the corridor face). The stud was not fixed to the frame and the gap was filled with 25mm rock mineral wool gasket.

Gypframe 60/70I70 or 92/146TI90 'I' Studs shortened by 15mm were positioned between the head and base channels at 600mm centres.

One layer of 20mm Glasroc F FireCase, reduced in length by 15mm, was inserted between the studs with a horizontal joint at 1500mm height. Two 122mm Glasroc F FireCase fire stops were positioned fully into the web of the head channel and behind the vertical flanges of the studs. These were fixed in position through the head channel using 2 x 32mm Gyproc drywall screws. Gyproc G102 Retaining Channels (cut to accommodate the fire stops) were positioned between the Gyproc FireCase and the stud flanges / Gypframe 60SC55 Starter Channel.

A Gypframe GA3 Steel Angle was placed in the horizontal board joint. Two beads of Gyproc Sealant (one top and one bottom) were applied to the back of a 122mm fire stop and then this was fixed to the Gypframe GA3 Steel Angle using 3 x 35mm Gyproc jack point screws.

Gyproc Sealant was applied in the angle formed between the head channel and the restraint frame on the corridor face.

The corridor face metal framework was clad with a single layer of 15mm Gyproc F FireCase. All the boards were reduced by 15mm at the head of the specimen.

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Horizontal joints were located at 2400mm from the base. Gypframe GFS1 Fixing Strap was used behind the horizontal joint.

All corridor face joints were finished using Gyproc Joint Tape and Gyproc Joint Filler. All screw heads were spotted using Gyproc Joint Filler.

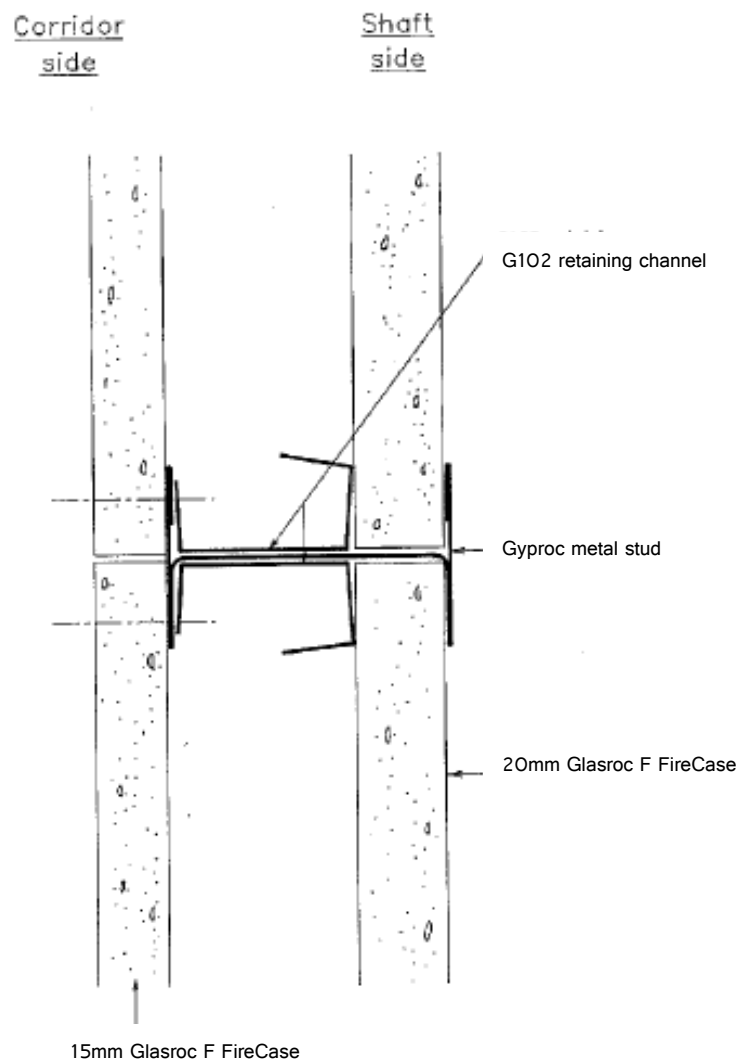


Figure 1 - Horizontal Cross Section

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Double Layer Construction (corridor side)

A Gypframe 62C50 Standard Floor & Ceiling Channel was fixed to the base of the frame using 60mm fire resistant fixings at 600mm centres.

A continuous strip of Gyproc FireStrip was placed along the centreline of a Gypframe 62JC60 'J' Channel and attached to the head of the frame using fire resistant fixings at 300mm centres (long flange to the exposed face).

A Gypframe 60SC55 Starter Channel was shortened by 15mm and positioned between the head and base channels at the left-hand end of the frame (viewed from the corridor face). The channel was fixed in position at 600mm centres using fire resistant fixings.

A Gypframe 60/70I70 or 92/146TI90 'I' Stud was shortened by 15mm and positioned between the head and base channels at the right-hand end of the frame (viewed from the corridor face). The stud was not fixed to the frame and the gap was filled with 25mm rock mineral wool gasket.

Gypframe 60/70I70 or 92/146TI90 'I' Stud shortened by 15mm were positioned between the head and base channels at 600mm centres.

One layer of 20mm Glasroc F FireCase, reduced in length by 15mm, was inserted between the studs with a horizontal joint at 1500mm height. Two 122mm Glasroc F FireCase fire stops were positioned fully into the web of the head channel and behind the vertical flanges of the studs. These were fixed in position through the head channel using 2 x 32mm Gyproc drywall screws.

Gypframe G102 Retaining Channels (cut to accommodate the fire stops) were positioned between the Gyproc FireCase and the stud flanges / Gypframe 60SC55 Starter Channel.

A Gypframe GA3 Steel Angle was placed in the horizontal board joint. Two beads of Gyproc Sealant (one top and one bottom) were applied to the back of a 122mm fire stop and then this was fixed to the Gypframe GA3 Steel Angle using 3 x 35mm Gyproc jack point screws.

Gyproc Sealant was applied in the angle formed between the head channel and the restraint frame on the corridor face.

The corridor face metal framework was clad with a double layer of 15mm Gyproc F FireCase. All the boards were reduced by 15mm at the head of the specimen.

The inner layer of boards was screw fixed at 300mm centres to all framing members, except to the head channel, using 35mm Gyproc Jack-Point Screws.

The outer layer was screw fixed at 300mm centres to all framing members, except to the head channel, using 41mm Gyproc Jack-Point Screws. All joints were staggered between layers.

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Horizontal joints were located at 300mm from the base on the inner layer and 2700mm from the base on the outer layer. Gyproframe GFS1 Fixing Strap was used behind the outer layer horizontal joint.

All corridor face joints were finished using Gyproc Joint Tape and Gyproc Joint Filler. All screw heads were spotted using Gyproc Joint Filler.

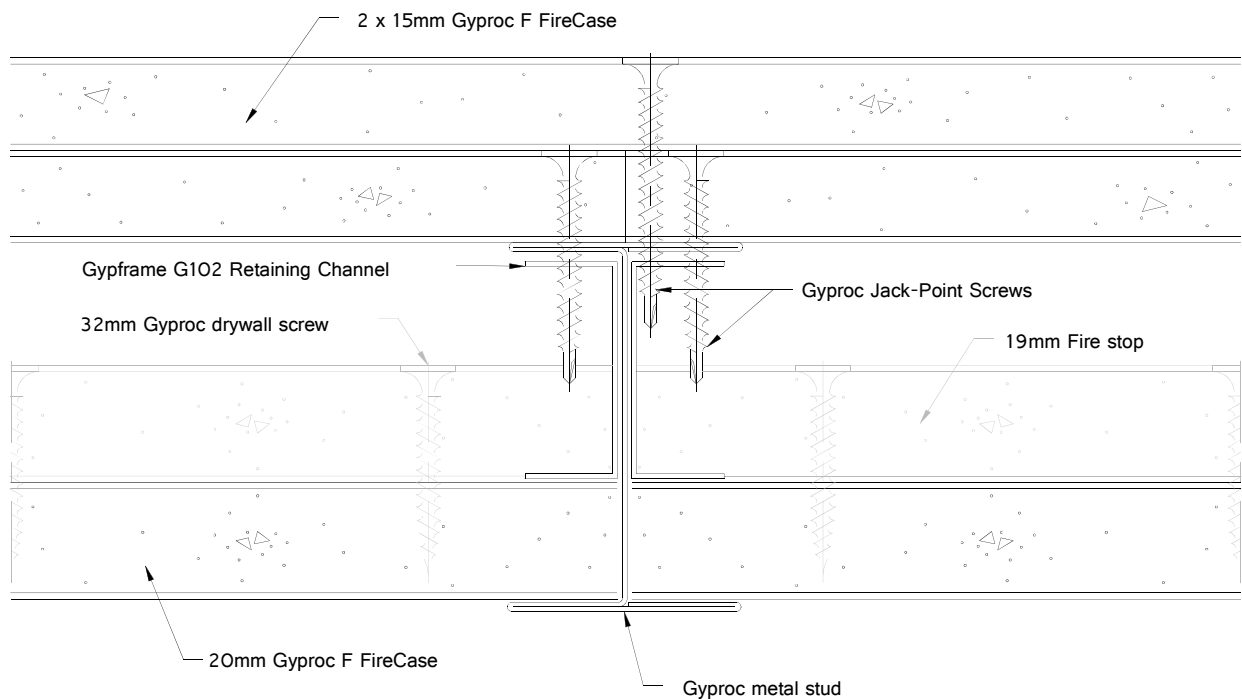


Figure 2 - Horizontal Cross Section

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Triple Layer Construction (corridor side)

A Gypframe 62C50 Standard Floor & Ceiling Channel was fixed to the base of the frame using 60mm fire resistant fixings at 600mm centres.

A continuous strip of Gyproc FireStrip was placed along the centreline of a Gypframe 62JC60 'J' Channel and attached to the head of the frame using fire resistant fixings at 300mm centres (long flange to the exposed face).

A Gypframe 60SC55 Starter Channel was shortened by 15mm and positioned between the head and base channels at the left-hand end of the frame (viewed from the corridor face). The channel was fixed in position at 600mm centres using fire resistant fixings.

A Gypframe 60/70I70 or 92/146TI90 'I' Stud was shortened by 15mm and positioned between the head and base channels at the right-hand end of the frame (viewed from the corridor face). The stud was not fixed to the frame and the gap was filled with 25mm rock mineral wool gasket.

Gypframe 60/70I70 or 92/146TI90 'I' Studs shortened by 15mm were positioned between the head and base channels at 600mm centres.

One layer of 20mm Glasroc F FireCase, reduced in length to leave a 15mm gap at the head of the aperture, was inserted between the studs with a horizontal joint at 1500mm height. Two 122mm Glasroc F FireCase fire stops were positioned fully into the web of the head channel and behind the vertical flanges of the studs. The second Firestop was rebated as required to fit between the stud flanges. These were fixed in position through the head channel using 2 x 32mm Gyproc drywall screws.

Gypframe G102 Retaining Channels (cut to accommodate the fire stops) were positioned between the Glasroc F FireCase and the stud flanges / Gypframe 60SC55 Starter Channel.

Gypframe GA3 Steel Angle was placed in the horizontal board joint. Two beads of Gyproc Sealant (one top and one bottom) were applied to the back of a 122mm fire stop and then this was fixed to the Gypframe GA3 Steel Angle using 3 x 35mm Gyproc jack point screws.

Gyproc Sealant was applied in the angle formed between the head channel and the restraint frame on the corridor face.

The corridor face metal framework was clad with a treble layer of 15mm Gyproc F FireCase. All the boards were reduced to leave a 15mm gap at the head of the specimen.

The inner layers of boards were screw fixed at 300mm centres to all framing members, except to the head channel, using 35mm Gyproc Jack-Point Screws.

The middle layers of boards were screw fixed at 300mm centres to all framing members, except to the head channel, using 41mm Gyproc Jack-Point Screws.

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The outer layers of boards were screw fixed at 300mm centres to all framing members, except to the head channel, using 60mm Gyproc Jack-Point Screws.

All joints were staggered between layers.

Horizontal joints were located at 2400mm from the base on the inner layer and 600mm from the base on the middle layer. Gypframe GFS1 Fixing Strap was used behind the outer layer horizontal joint.

All corridor face joints were finished using Gyproc Joint Tape and Gyproc Joint Filler. All screw heads were spotted using Gyproc Joint Filler.

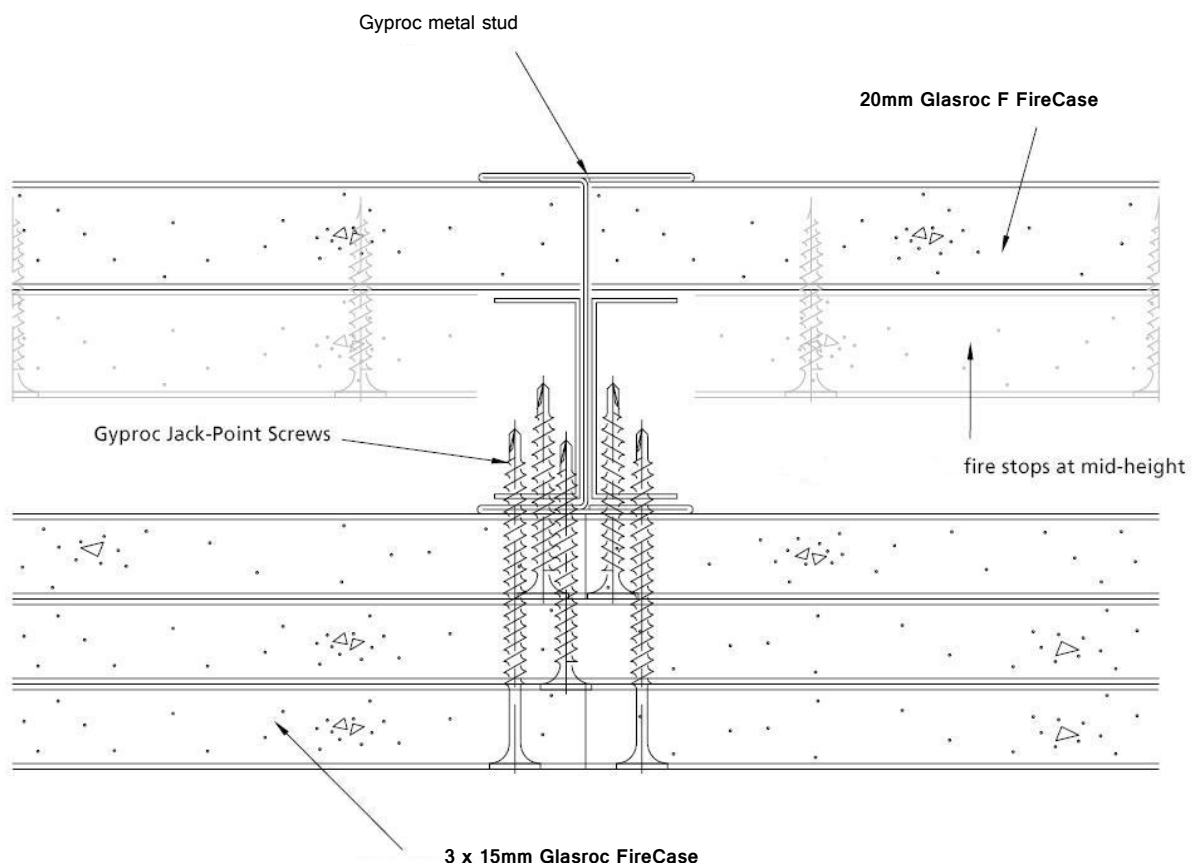


Figure 3 - Horizontal Cross Section

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The range of ShaftWall systems required to be incorporated in the above constructions is as follows:

Board Construction (corridor side)	Stud Section Size	Maximum Height (mm)
Single Layer BS only	60 70	4200
	70 70	
	92 90	6000
	146T 90	7700
Double Layer	60 70	4500
	70 70	
	92 90	6000
	146T 90	
Triple Layer	60 70	4500
	70 70	
	92 90	6000
	146T 90	

The fire resistance performance from the corridor and shaft side is required.

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THE ASSESSORS

The Building Test Centre operates as an independent accredited test house for the construction industry. The Building Test Centre has unrivalled experience in the development of drywall systems. The Building Test Centre is UKAS accredited under No. 0296 and 0296SI for fire resistance, reaction to fire, acoustic and structural testing. The Building Test Centre is wholly owned by British Gypsum a major manufacturer of building products.

The Building Test Centre is a founder member of the Fire Test Study Group an organisation comprising the UKAS accredited fire test laboratories conducting fire testing in the UK primarily for building control approval. The aim of the group is to ensure a common interpretation of test standards by all laboratories.



ASSESSMENT AUTHORISATION

Assessment Author

A handwritten signature in blue ink, appearing to read 'P Miller', written over a light grey grid background.

Paul Miller
BSc(Hons.),
Fire Resistance Laboratory Supervisor

Reviewing Assessor

A handwritten signature in blue ink, appearing to read 'P Barnes', written over a light grey grid background.

Philip Barnes
BTC Manager

Assessment Date 15th April 2010.

This assessment is not valid unless it incorporates the Declaration by Applicant form duly signed by the applicant.

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ASSESSMENT AMENDMENTS

Page	Amendments	Date
1	Report amended added to title	15/01/2015
1-28	Page amended added to footer	15/01/2015
1-28	Font changed from Frutiger to Arial	15/01/2015
25	Conclusion table split to show BS & EN separately	15/01/2015
25	92I90 and 146TI90 for 90 and 120 minute heights changed to match cold state heights in BTC 13064F	15/01/2015
25	Caveat 1 placed on applicable constructions	15/01/2015

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TEST EVIDENCE

The test evidence used in this assessment has been used under the authorisation of the test report owner and has been used with their permission (see Pages 26 and 27). Furthermore, the test evidence has been reviewed in accordance with Annex D of the PFPF guide to ensure that the test reports are still valid.

BTC 16875F

A FIRE RESISTANCE TEST ON A GYPWALL METAL STUD PARTITION, WITH 70mm STUD FRAMEWORK CLAD EACH SIDE WITH A DOUBLE LAYER OF 15mm GLASROC F FIRECASE EX SHERBURN, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 1999.

The specimen was constructed in a refractory concrete lined steel restraint test frame with an opening of 3000 mm (high) x 3000 mm (wide).

Gypframe 72C50 Standard Floor and Ceiling Channels were fixed to the head and base of the test aperture at 600mm centres using 60mm fire resistant fixings.

Gypframe 70S50 'C' Studs were positioned at 600mm centres between the channels. The right-hand stud viewed from the unexposed face was not fixed to the perimeter of the test frame, and the gap between the stud and the frame lining was filled with a 25mm thick rock mineral fibre gasket.

At the left-hand edge a Gypframe 70S50 'C' Stud was used to fix the partition to the test frame, using 60mm fire resistance fixings at 600mm centres.

Both the unexposed face and the exposed face of the specimen were clad with a double layer of British Gypsum 15mm Glasroc F FireCase boards. The inner layer boards were fixed with 40mm Glasroc FireCase Screws at 300mm centres around the perimeter of the boards only. The outer layer boards were fixed with 50mm Glasroc FireCase Screws at 300mm centres around the perimeter and within the field of the boards.

All vertical joints were staggered between layers, with a full board at the free edge of the exposed face. A horizontal joint was positioned at 2400mm from the base on the outer layer boards and at 600mm from the base on the inner layer boards, on both faces of the specimen. A Gypframe GFS1 fixing strap was used behind the horizontal outer layer board joint.

All external board joints were taped and filled using Gyproc Paper Joint Tape and Gyproc Joint Filler as appropriate. All screw heads were spotted using Gyproc Joint Filler.

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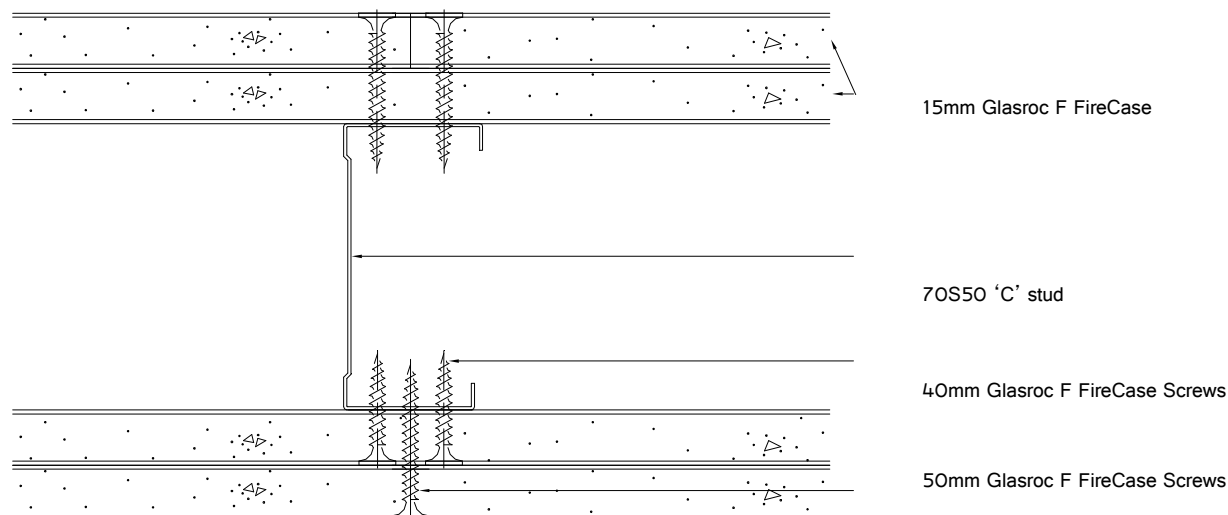


Figure 4 - Horizontal Cross Section

The tested construction achieved the following results:

Integrity	No Failure
Insulation	172 minutes

The test was carried out in accordance with BSEN 1364-1:1999 taking into account Fire Test Study Group standard interpretations where appropriate. The test was carried out on the 8th April 2010 at the Building Test Centre, UKAS accreditation No. 0296. The test was carried out on behalf of British Gypsum.

BTC 12785F

A FIRE RESISTANCE TEST ON A BRITISH GYPSUM GYPWALL PARTITION CLAD WITH A DOUBLE LAYER OF 15mm GYPROC FIRELINE BOARD EACH SIDE OF GYPFRAME 70S50 STUDS, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1: 1999.

The specimen was constructed in a refractory concrete lined steel restraint frame having an opening of 3000mm high x 3000mm wide.

Gypframe 72C50 Standard Floor & Ceiling Channels were fixed to the head and base of the test aperture at 600mm centres with 60mm fire resistant fixings. Gypframe 70S50 'C' Studs were positioned at 600mm centres between the channels. The left hand stud viewed from unexposed face

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was not fixed to the perimeter test frame, and the gap between the stud and the frame lining was filled with a 25mm rock mineral fibre gasket. At the right-hand end a Gypframe 70S50 'C' Stud was used to fix the partition to the test frame with 60mm fire resistant fixings at 600mm centres.

The framework was lined both sides with a double layer of 15mm Gyproc FireLine board. The inner layer was fixed around the perimeter with 25mm Gyproc drywall screws at 300mm centres. The outer layer was fixed around the perimeter and within the field of the board with 42mm Gyproc drywall screws at 300mm centres. All joints were staggered between layers.

Horizontal joints were positioned 2700mm from the base for the outer layers on both the exposed and unexposed faces of the construction. Horizontal joints were positioned 300mm from the base for the inner layers on both the exposed and unexposed faces of the construction. A Gypframe GFS1 Fixing Strap was used behind the horizontal board joints in the outer layers.

All joints were taped and filled using Gyproc Paper Joint Tape and Gyproc Joint Filler. All screw heads were spotted using Gyproc Joint Filler.

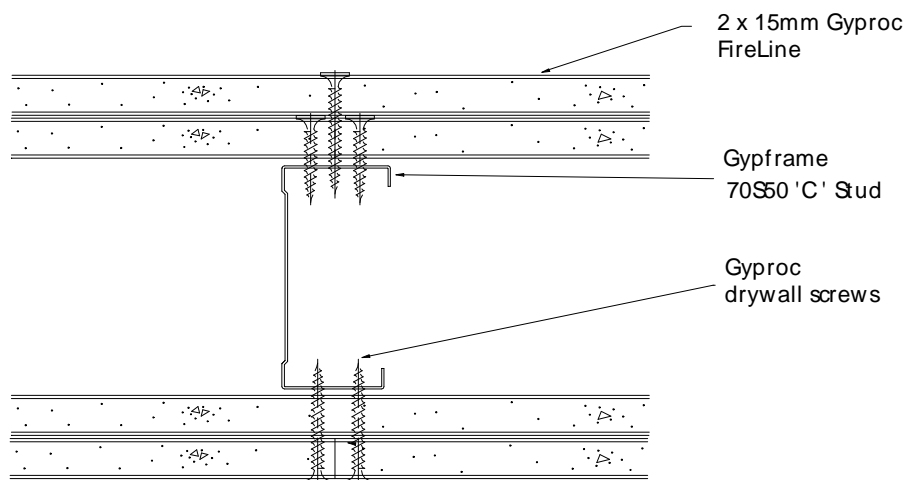


Figure 5 - Horizontal Cross Section

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The tested construction achieved the following results:

Integrity	164 minutes
Insulation	154 minutes

The test was carried out in accordance with BSEN 1364-1:1999 taking into account Fire Test Study Group standard interpretations where appropriate. The test was carried out on the 15th May 2003 at the Building Test Centre, UKAS accreditation No. 0296. The test was carried out on behalf of British Gypsum.

BTC 16807F

A FIRE RESISTANCE TEST ON A BRITISH GYPSUM SHAFTWALL PARTITION WITH 60mm STUD FRAMEWORK CLAD ON THE CORRIDOR SIDE WITH A TREBLE LAYER OF 15mm GLASROC F FIRECASE EX SHERBURN, CONDUCTED IN ACCORDANCE WITH BS EN 1364-1:1999.

The test specimen was constructed in a refractory concrete lined steel restraint frame having an overall opening of 3000mm (high) x 3000mm (wide).

A Gypframe 62C50 Standard Floor & Ceiling Channel was fixed to the base of the frame using 60mm fire resistant fixings at 600mm centres.

A continuous strip of Gyproc FireStrip was placed along the centreline of a Gypframe 62JC60 'J' Channel and attached to the head of the frame using fire resistant fixings at 300mm centres (long flange to the exposed face).

A Gypframe 60SC55 Starter Channel was shortened by 15mm and positioned between the head and base channels at the left-hand end of the frame (viewed from the unexposed face). The channel was fixed in position at 600mm centres using fire resistant fixings.

A Gypframe 60I70 'I' Stud was shortened by 15mm and positioned between the head and base channels at the right-hand end of the frame (viewed from the unexposed face). The stud was not fixed to the frame and the gap was filled with 25mm rock mineral wool gasket.

Gypframe 60I70 'I' Studs shortened by 15mm were positioned between the head and base channels at 600mm centres.

One layer of 20mm Glasroc F FireCase, reduced in length to leave a 15mm gap at the head of the aperture, was inserted between the studs with a horizontal joint at 1500mm height. Two 122mm Glasroc F FireCase fire stops were positioned fully into the web of the head channel and behind the vertical flanges of the studs. The second Firestop was rebated as required to fit between the

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stud flanges. These were fixed in position through the head channel using 2 x 32mm Gyproc drywall screws.

Gypframe G102 Retaining Channels (cut to accommodate the fire stops) were positioned between the Glasroc F FireCase and the stud flanges / Gypframe 60SC55 Starter Channel.

Thermocouples were added to the retaining channels on the studs at mid height on the web and cold flanges of the central two flanges.

Gypframe GA3 Steel Angle was placed in the horizontal board joint. Two beads of Gyproc Sealant (one top and one bottom) were applied to the back of a 122mm fire stop and then this was fixed to the Gypframe GA3 Steel Angle using 3 x 35mm Gyproc jack point screws.

Gyproc Sealant was applied in the angle formed between the head channel and the restraint frame on the unexposed face.

The unexposed face metal framework was clad with a treble layer of 15mm Gyproc F FireCase. All the boards were reduced to leave a 15mm gap at the head of the specimen.

The inner layers of boards were screw fixed at 300mm centres to all framing members, except to the head channel, using 35mm Gyproc Jack-Point Screws.

The middle layers of boards were screw fixed at 300mm centres to all framing members, except to the head channel, using 41mm Gyproc Jack-Point Screws.

The outer layers of boards were screw fixed at 300mm centres to all framing members, except to the head channel, using 60mm Gyproc Jack-Point Screws.

All joints were staggered between layers.

Horizontal joints were located at 2400mm from the base on the inner layer and 600mm from the base on the middle layer. Gypframe GFS1 Fixing Strap was used behind the outer layer horizontal joint.

All unexposed face joints were finished using Gyproc Joint Tape and Gyproc Joint Filler. All screw heads were spotted using Gyproc Joint Filler.

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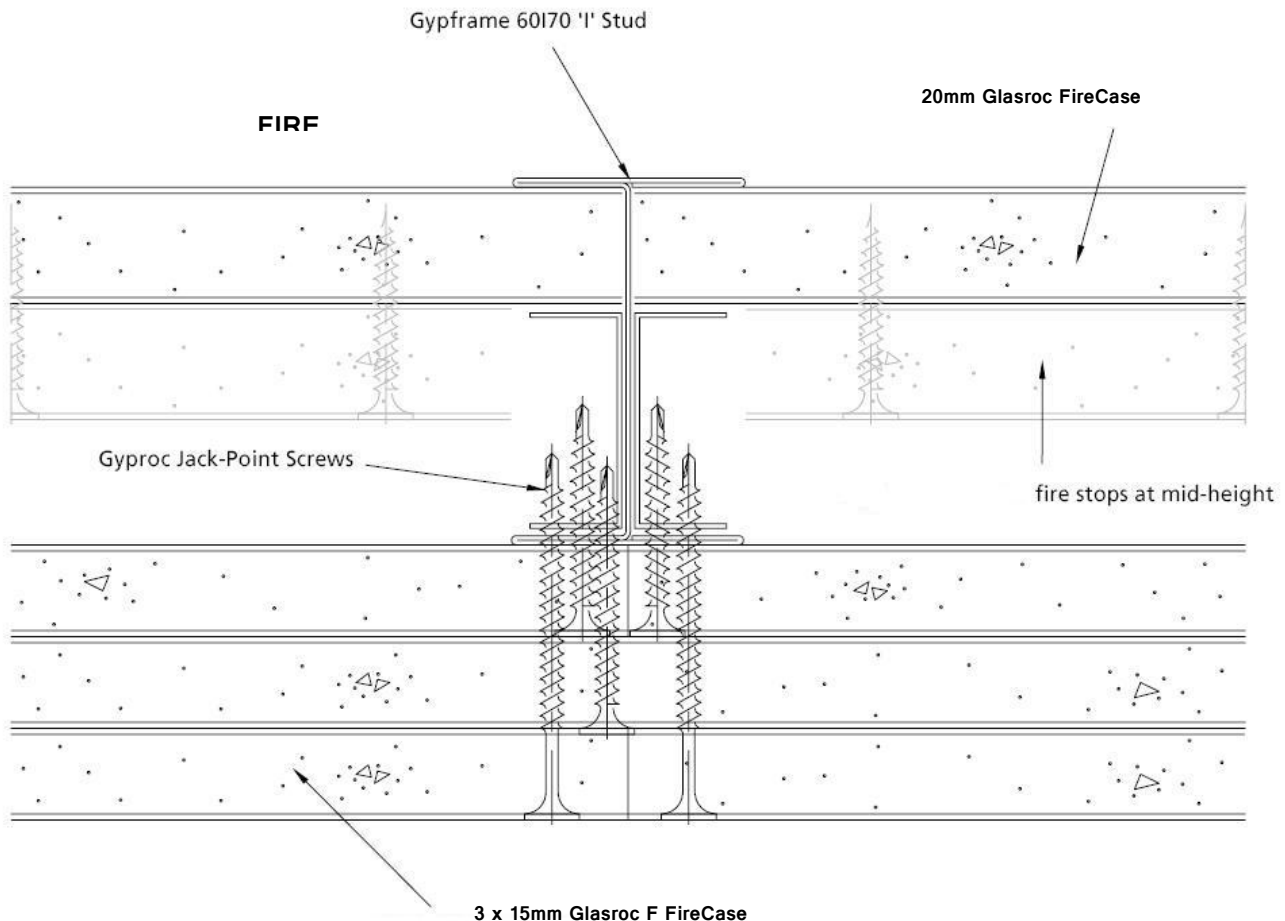


Figure 6 - Horizontal Cross Section

The tested construction achieved the following results:

Integrity	174 minutes
Insulation	174 minutes

The test was carried out in accordance with BSEN 1364-1:1999 taking into account Fire Test Study Group standard interpretations where appropriate. The test was carried out on the 25th February 2010 at the Building Test Centre, UKAS accreditation No. 0296. The test was carried out on behalf of British Gypsum.

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BTC 16008F

A FIRE RESISTANCE TEST ON A 3m BRITISH GYPSUM SHAFTWALL CLAD WITH 2 x 15mm GYPROC FIRELINE BOARD ON GYPFRAME 60I70 'I' STUDS (WITH STANDARD SILICON OIL IN COREBOARD). TESTED IN ACCORDANCE WITH BS EN 1364-1:1999 FROM THE SHAFT SIDE.

The test specimen was constructed in a refractory concrete lined steel restraint frame having an overall opening of 3000mm (high) x 3000mm (wide).

A Gypframe 62C50 Standard Floor & Ceiling Channel was fixed to the base of the frame using 60mm fire resistant fixings at 600mm centres.

A continuous strip of Gyproc FireStrip was placed along the centreline of a Gypframe 62JC60 'J' Channel and attached to the head of the frame using fire resistant fixings at 300mm centres (long flange to the exposed face).

A Gypframe 60SC55 Starter Channel was shortened by 15mm at the head and positioned between the head and base channels at the left-hand end of the frame (viewed from the unexposed face). The channel was fixed in position at 600mm centres using fire resistant fixings.

A Gypframe 60I70 'I' Stud was shortened by 15mm and positioned between the head and base channels at the right-hand end of the frame (viewed from the unexposed face). The stud was not fixed to the frame and the gap was filled with 25mm rock mineral wool gasket.

Gypframe 60I70 'I' Studs shortened by 15mm were positioned between the head and base channels at 600mm centres.

One layer of 19mm Gyproc CoreBoard, reduced in length by 15mm, was inserted between the studs with a horizontal joint at 1500mm height. Two 122mm Gyproc CoreBoard fire stops were positioned fully into the web of the head channel and behind the vertical flanges of the studs. These were fixed in position through the head channel using 2 x 32mm Gyproc drywall screws.

Gypframe G102 Retaining Channels (cut to accommodate the fire stops) were positioned between the Gyproc CoreBoard and the stud flanges / Gypframe 60SC55 Starter Channel.

A Gypframe GA3 Steel Angle was placed in the horizontal board joint. Two beads of Gyproc Sealant (one top and one bottom) were applied to the back of a 122mm fire stop and then this was fixed to the Gypframe GA3 Steel Angle using 3 x 32mm Gyproc drywall screws.

Gyproc Sealant was applied in the angle formed between the head channel and the restraint frame on the unexposed face.

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The unexposed face metal framework was clad with a double layer of 15mm Gyproc FireLine. All the boards were reduced by 15mm at the head of the specimen.

The inner layer of boards was screw fixed at 300mm centres to all framing members, except to the head channel, using 35mm Gyproc Jack-Point Screws.

The outer layer was screw fixed at 300mm centres to all framing members, except to the head channel, using 41mm Gyproc Jack-Point Screws. All joints were staggered between layers.

Horizontal joints were located at 300mm from the base on the inner layer and 2700mm from the base on the outer layer. Gypframe GFS1 Fixing Strap was used behind the outer layer horizontal joint.

All unexposed face joints were finished using Gyproc Joint Tape and Gyproc Joint Filler. All screw heads were spotted using Gyproc Joint Filler.

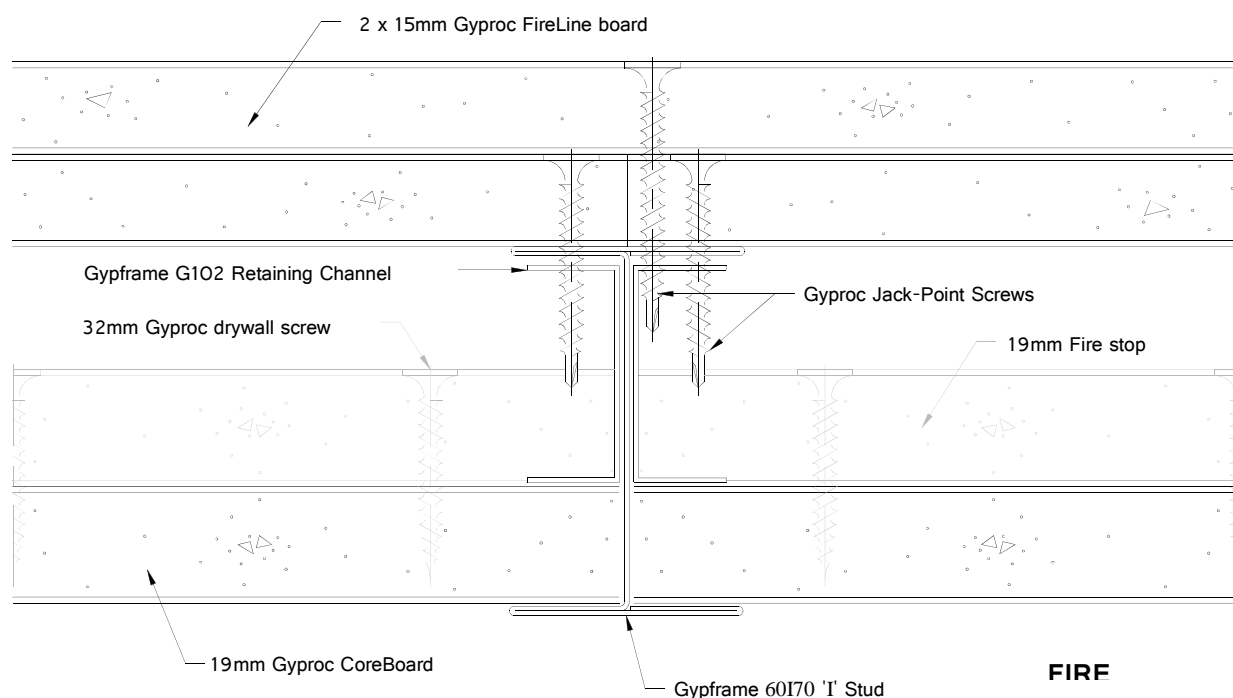


Figure 7 - Horizontal Cross Section

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The tested construction achieved the following results:

Integrity	148 minutes
Insulation	137 minutes

The test was carried out in accordance with BSEN 1364-1:1999 taking into account Fire Test Study Group standard interpretations where appropriate. The test was carried out on the 29th September 2008 at the Building Test Centre, UKAS accreditation No. 0296. The test was carried out on behalf of British Gypsum.

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DISCUSSION

With non-loadbearing lightweight steel stud constructions, the duration of fire performance is governed by the level of protection offered by the exposed face and unexposed face linings and the support provided to these linings by the steel framework and fixings.

The construction described under DETAILS OF THE REQUEST varies from the current substantiated ShaftWall range and are detailed in the table below:

	Requested construction	Tested construction
1. Boards Corridor Side	15mm Glasroc F FireCase	15mm Gyproc FireLine
2. Board Shaft Side	20mm Glasroc F FireCase	19mm Gyproc CoreBoard
3. EN / BS	EN and BS	EN

Boards Corridor side

The performance of 15mm Glasroc F FireCase can be compared directly to 15mm Gyproc FireLine using BTC 16875F and BTC 12785F, see table below.

	BTC 16875F 15mm Glasroc F FireCase	BTC 12785F 15mm Gyproc FireLine
1. Insulation Performance (minutes)	172	154
2. Integrity Performance (minutes)	No Failure	164
3. Protection to Stud (°C)	Max temp. at 30 min	99
	Max temp. at 60 min	133
	Max temp. at 90 min	405
	Max temp. at 120 min	532

From the comparison above it is reasonable to assumed that the insulation, integrity and protection to the stud provided by 15mm Gyproc F FireCase is at least as good as 15mm Gyproc FireLine.

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Boards Shaft side

The performance of 20mm Glasroc F FireCase can be compared directly to 19mm Gyproc CoreBoard using BTC 16807F and BTC 16008F, see table below.

	BTC 16807F 20mm Glasroc F FireCase	BTC 16008F 19mm Gyproc CoreBoard
1. Board Fall (minutes)	153	130
2. Protection to Stud (°C)	Max temp. at 30 min	226
	Max temp. at 60 min	437
	Max temp. at 90 min	556
	Max temp. at 120 min	677

From the comparison above it is reasonable to assume that the time to board fall and protection to the stud provided by 20mm Gyproc F FireCase is at least as good as 19mm Gyproc CoreBoard.

EN to BS

When comparing test standards, the following are deemed to be critical to performance:

1. Furnace temperature
2. Furnace pressure
3. Insulation failure criteria
4. Integrity failure criteria
5. Direct Field of Application
6. Extended Field of Application

Furnace Temperature

Both BS 476: Part 22: 1987 (herewith referred to as BS standard) and BS EN 1364-1: 1999 (herewith referred to as EN standard) follow an identical temperature/time curve. However, the EN standard temperature is measured using the plate thermometer device, as opposed to the bare thermocouple wire used in the BS standard. The plate thermometer has been proven to take longer to heat up, especially during the first few minutes of a fire resistance test. The consequence of this is that far greater energy is input into the furnace.

The conclusion is that the EN standard is more onerous than the BS standard in terms of furnace temperature.

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Furnace Pressure

Both the BS and EN standards assume an identical pressure gradient of 8.5pa per metre height. However, the EN standard specifies a lower neutral pressure height (500mm compared to 1000mm for BS). This leads to greater furnace pressure over the surface of the test specimen. Greater pressure increases the possibility of hot furnace gases escaping through fissures/openings in the test specimen, increasing the possibility of sustained flaming or cotton pad integrity failure.

Insulation failure criteria

For this type of construction, the insulation failure criteria and monitoring equipment type requirements are identical for both standards. The EN standard specifies a greater number of fixed unexposed face thermocouples, leading to an increased possibility of failure.

Integrity failure criteria

For this type of construction, the integrity failure criteria are identical for both standards. The only significant difference between the two standards is the cotton pad test:

BS standard: Distance of cotton material from specimen surface = 25mm
 Time held in position = 15 seconds

EN standard: Distance of cotton material from specimen surface = 30mm
 Time held in position = 30 seconds

Although the cotton material is positioned slightly further from the surface of the specimen, due to the additional time held in place and the greater furnace pressure, it is reasonable to assume that the EN test is at least equivalent to the BS test.

Direct Field of Application

General:

The EN standard includes a field of direct application that states:

The results of the fire test are directly applicable to similar constructions where one or more of the changes listed below are made and the construction continues to comply with the appropriate design code for its stiffness and stability.

- a) Decrease in height
- b) Increase in the thickness of the wall
- c) Increase in the thickness of component materials
- d) Decrease in linear dimension of boards or panels but not thickness
- e) Decrease in stud spacing

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- f) Decrease in distance of fixing centres
- g) Increase in the number of horizontal joints when tested with one joint not more than 500mm from the top edge
- h) The use of surface fixings and fixtures when tested with the fixture or fitting not more than 500mm from the top edge.
- i) Horizontal and/or vertical joints, of the type tested.

The BS standard does not include a direct field of application, and states that test specimen shall be identical to, or representative of the building element to be evaluated. However, this older standard preceded the EN standard and the EN standard direct field of application rules have, subsequently, been adopted as assessment rules by the Fire Test Study Group, applicable to both BS and EN tests (document N817).

Extension of width

Both standards state that the width of an identical construction may be increased if the specimen was tested at a minimum of nominally 3m wide with one vertical edge without restraint.

Extension of height

The EN standard states that the height of constructions tested a minimum of 3m, may be increased to 4m with the following conditions:

- a) if the maximum lateral deflection of the test specimen was not in excess of 100mm
- b) the expansion allowances are increased pro-rata.

There is no height restriction in the BS standard. Therefore, this height restriction does not apply to specimens tested to the BS standard.

It is therefore reasonable to assume that changing the board lining from 19mm Gyproc CoreBoard (shaft side) to 20mm Glasroc F FireCase and from 15mm Gyproc FireLine to 15mm Glasroc F FireCase (corridor side), would not reduce the current claims for insulation and integrity performance of a ShaftWall system.

This applies to ShaftWall systems detailed on page 7 under the details of request; resisting fire from either the corridor or shaft side.

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CONCLUSION

In view of the foregoing evidence, it is our opinion that if the constructions described under DETAILS OF THE REQUEST were subjected to fire resistance testing, in accordance with BS476: Part 22:1987 Clause 5 or BS EN 1364-1:1999, they would provide the following periods of fire:

Solutions to BS 476: Part 22: 1987

Board Construction (corridor side)	Stud Section Size	Maximum Height (mm)	Insulation / Integrity Performance
Single Layer	60I70	4200	Insulation – 60 minutes ¹ Integrity – 60 minutes
	70I70		
	92I90		
	146TI90		
Double Layer	60I70	4500	Insulation – 90 minutes Integrity – 90 minutes
	70I70		
	92I90		
	146TI90		
Double Layer	60I70	4500	Insulation – 120 minutes ¹ Integrity – 120 minutes
	70I70		
	92I90		
	146TI90		
Triple Layer	60I70	4500	Insulation – 120 minutes Integrity – 120 minutes
	70I70		
	92I90		
	146TI90		

¹ – When subject to resist fire from the corridor side, the insulation duration can only be achieved if the temperature of the metal work is ignored.

Solutions to BS EN 1364-1: 1999

Board Construction (corridor side)	Stud Section Size	Maximum fire State Height (mm)	Insulation / Integrity Performance
Double Layer	60I70	4500 ²	Insulation – 90 minutes Integrity – 90 minutes
	70I70		
	92I90	6000 ²	
	146TI90		
Triple Layer	60I70	4500 ²	Insulation – 120 minutes Integrity – 120 minutes
	70I70		
	92I90	6000 ²	
	146TI90		

² – The fire rated heights can be found in Expert Judgements BTC 13064FA, BTC 12753FA and BTC 13445FA referencing to test reports BTC 13021F, BTC 12265F and BTC 12261F.

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LIMITATIONS

This assessment addresses itself solely to the ability of the partition system described to satisfy the criteria of the fire resistance test and does not imply any suitability for use with respect to other unspecified criteria.

This assessment is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to the assessing authority the assessment will be unconditionally withdrawn and the applicant will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of five years after which time it is recommended that it be submitted to the assessing authority for re-appraisal. The opinions and interpretations expressed in this assessment are outside the scope of UKAS accreditation.

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DECLARATION BY THE APPLICANT

We the undersigned confirm that we have read and complied with the obligations placed on us by FTSG Resolution No. 82.

We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which this assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be subjected to a fire test to the Standard against which this assessment is being made.

We are not aware of any information that could adversely affect the conclusion of this assessment.

If we subsequently become aware of any such information we agree to ask the assessing authority to withdraw the assessment.

Signed:Print Name

For and behalf of British Gypsum.

Applicant: British Gypsum

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AUTHORITY FOR USE OF TEST EVIDENCE

Test Report Numbers: BTC 16875F, BTC 12785F, BTC 16807F, BTC 16008F

We the undersigned agree to the above Test Reports being used as supporting evidence for the following assessment:

A FIRE TEST ASSESSMENT ON A RANGE OF BRITISH GYPSUM SHAFTWALL PARTITIONS CLAD ON THE CORRIDOR SIDE WITH 15mm GLASROC F FIRECASE AND THE SHAFT SIDE WITH 20mm GLASROC F FIRECASE, CONDUCTED IN ACCORDANCE WITH F.T.S.G. RESOLUTION No. 82 /PFPF GUIDE.

Assessment client: British Gypsum

Signed: Print Name

Job Title:

Department:

For and behalf of **British Gypsum**

Applicant: British Gypsum

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