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Assessment Number **BTC 14055FA**

A FIRE TEST ASSESSMENT ON A BRITISH GYPSUM CASOLINE MF CEILING SUSPENDED BELOW A TIMBER FLOOR CLAD WITH 2 x 15mm GYPROC SOUNDBLOC CONDUCTED IN ACCORDANCE WITH F.T.S.G. RESOLUTION No. 82 /PFPF GUIDE.

Assessment Date: 1st August 2005

www.btconline.co.uk

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

It is required to assess the following construction for 60 minutes fire resistance performance if tested in accordance with BS EN 1365-2: 2000.

The specimen is constructed in a refractory concrete lined steel restraint frame having an opening of 4000mm long x 3000mm wide.

195mm deep x 38mm thick C24 grade timber joists are placed, nominally, at 600mm centres, spanning 4000mm length of the test frame. Full-depth noggings are fixed at each end of the joists (within the test aperture) and at mid-span of the specimen with 100mm round nails.

The tops of the joists are covered with a walking surface of, nominally, 18mm finished thickness tongue and groove floor boarding which is fixed using 32mm Gyproc drywall timber screws.

Gypframe MF6 Perimeter Channel is fixed around the perimeter of the restraint frame using 60mm fire resistant fixings at 600mm centres so that the total cavity depth is 277mm.

70mm Gypframe GAH2 Acoustic Hangers are fixed to the side of alternative joists at 1200mm centres using two 32mm Gyproc drywall timber screws (forming 1200mm x 1200mm grids).

Gypframe MF12 Soffit Cleats are fixed to the underside of each Gypframe GAH2 Acoustic Hanger using a M6 Nut, bolt and two washers (larger than the rubber grommet).

Gypframe MF8 Strap Hanger (approximately 70mm long) is fixed to each Gypframe MF12 Soffit Cleat using a Gypframe MF11 Nut and Bolt.

The primary grid is formed using Gypframe MF7 Primary Support Channel positioned on the Gypframe MF6 Perimeter Channel at 1200mm centres, running parallel to (and directly below) the joist positions. The Gypframe MF7 Primary Support Channels are extended by overlapping two sections by 150mm and fixing together with two Gypframe Wafer Head Jack-Point Screws.

The Gypframe MF7 Primary Support Channel is fixed to each section of Gypframe MF8 Strap Hanger using two Gypframe Wafer Head Jack-Point Screws.

The secondary grid is formed using Gypframe MF5 Ceiling Section fitted perpendicular to the underside of the Gypframe MF7 Primary Support Channels at 450mm centres and secured using Gypframe MF9 Connecting Clips.

Positioned in the void is a single layer of 80mm thick Isowool Modular Roll.

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The underside of the grid is lined with a double layer of 15mm Gyproc SoundBloc, perpendicular to the Gypframe MF5 Ceiling Sections.

The inner layer is fixed at 230mm centres within the field of the board and at 150mm centres around the ceiling perimeter using 25mm Gyproc drywall screws.

The outer layer is fixed at 230mm centres within the field of the board and at 150mm centres around the ceiling perimeter using 42mm Gyproc drywall screws.

All board joints are staggered between layers and all board ends coincide with the Gypframe MF5 Ceiling Sections in both layers.

All joints are finished using Gyproc Joint Tape and Gyproc Joint Filler. All screw heads are spotted using Gyproc Joint Filler.

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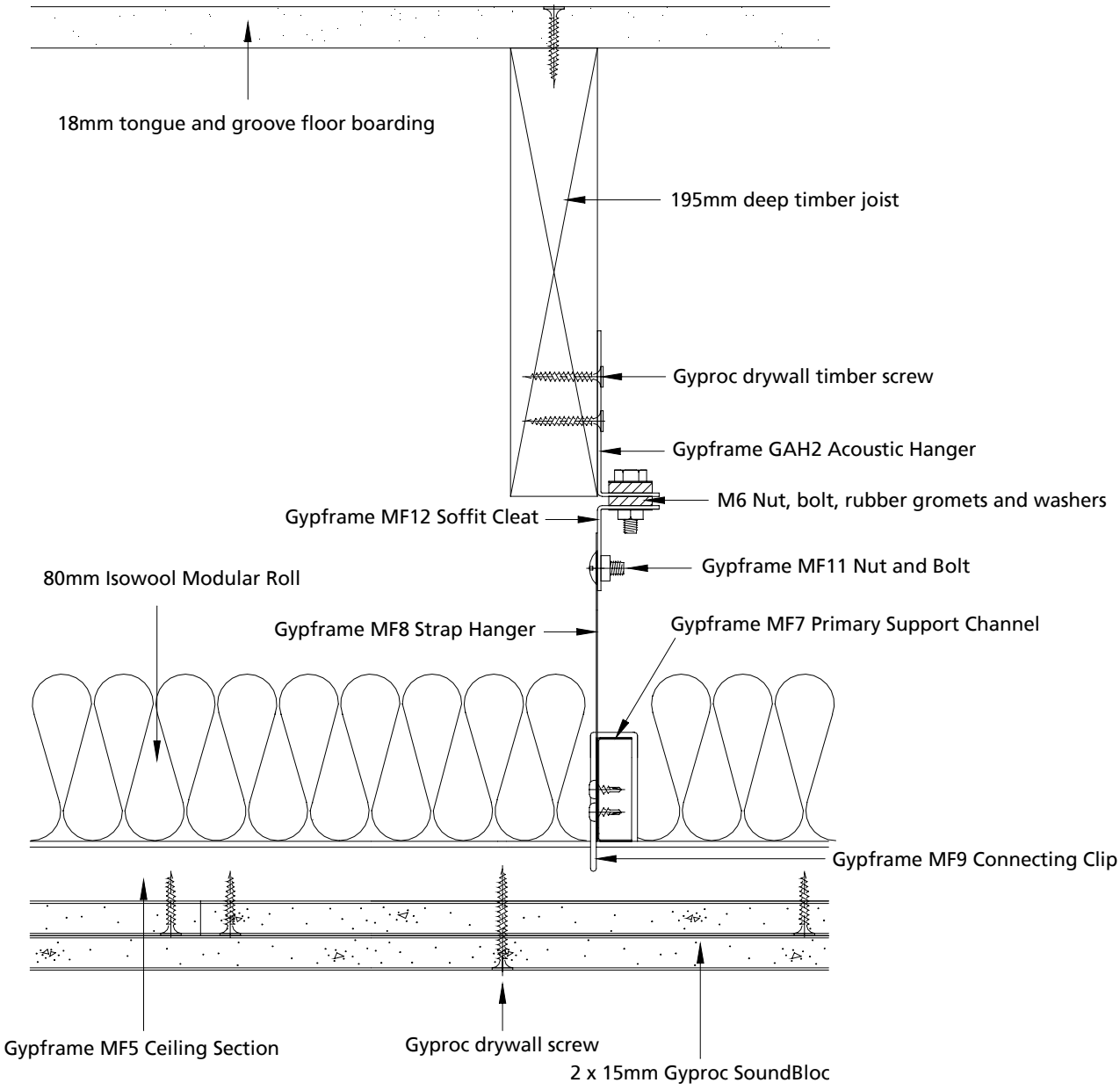

Figure 1. Cross sectional view through proposed floor construction (not to scale).

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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 Limited 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

Robert Evans
MEng. (Hons.), AMIMechE, AIFireE
Project Leader

Reviewing Assessor

Eur Ing. Paul Howard
BSc. (Hons.), CEng., MIOA
Head of Laboratory

Assessment Date 1st August 2005.

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

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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 16 and 17). 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 12081F

A fire resistance test, on a timber joist floor protected by a double layer of 12.5mm Gyproc FireLine board mounted on Gypframe RB1 Resilient Bar, conducted in accordance with BS EN 1365-2: 2000

The specimen was constructed in a refractory concrete lined steel restraint frame having an opening of 4000mm long x 3000mm wide.

195mm deep x 38mm thick C16 grade timber joists were placed, nominally, at 600mm centres, spanning 4000mm length of the test frame. Full-depth noggings were fixed at each end of the joists (within the test aperture) and at mid-span of the specimen with 100mm round nails.

The tops of the joists were covered with a walking surface of, nominally, 115mm wide x 18mm finished thickness tongue and groove floor boarding which was fixed using 40mm Gyproc Nails (2 per board at each joist position).

Gypframe RB1 Resilient Bar was fixed to the underside of the joists, at 450mm centres perpendicular to the joist span and around the perimeter of the floor, using 36mm Gyproc drywall screws.

The underside of the floor was lined with a double layer of 12.5mm Gyproc FireLine board, perpendicular to the Gypframe RB1 Resilient Bar with Gyproc drywall screws at 230mm centres; 25mm for the inner layer and 36mm for the outer layer. All board joints were staggered between layers and all board ends coincided with Gypframe RB1 Resilient Bar in both layers.

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

The tested construction achieved the following results:

Loadbearing capacity	69 minutes
Integrity	67 minutes
Insulation	67 minutes

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Although the joists used in the construction were graded C16, the load was calculated assuming C24 graded joists. Therefore, a total load of 11.68kN was applied to the specimen through twenty-four equally distributed loading rams.

The test was carried out in accordance with BS EN 1365-2: 2000 taking into account Fire Test Study Group standard interpretations where appropriate. The test was carried out on the 28th June 2002 at the Building Test Centre, UKAS accreditation No. 0296. The test was carried out on behalf of British Gypsum Limited.

BTC 12101F

A fire resistance test, on a timber joist floor protected by a double layer of 15mm Gyproc SoundBloc board mounted on Gypframe RB1 Resilient Bar, conducted in accordance with BS EN 1365-2: 2000

The specimen was constructed in a refractory concrete lined steel restraint frame having an opening of 4000mm long x 3000mm wide.

195mm deep x 38mm thick C24 grade timber joists were placed, nominally, at 600mm centres, spanning 4000mm length of the test frame. Full-depth noggings were fixed at each end of the joists (within the test aperture) and at mid-span of the specimen with 100mm round nails.

The tops of the joists were covered with a walking surface of nominally, 115mm wide x 18mm finished thickness tongue and groove floor boarding which was fixed using 40mm floor brads (2 per board at each joist position).

Gypframe RB1 Resilient Bar was fixed to the underside of the joists, at 600mm centres, perpendicular to the joist span and around the perimeter of the floor, using 36mm Gyproc drywall screws.

The underside of the floor was lined with a double layer of 15mm Gyproc SoundBloc, perpendicular to the Gypframe RB1 Resilient Bar. The inner layer was fixed at 230mm centres within the field of the board and around the ceiling perimeter using 25mm Gyproc drywall screws. The outer layer was fixed at 230mm centres within the field of the board and around the ceiling perimeter using 42mm Gyproc drywall screws.

All board joints were staggered between layers and all board ends coincided with Gypframe RB1 Resilient Bar in both layers.

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

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The tested construction achieved the following results:

Loadbearing capacity	50 minutes
Integrity	50 minutes
Insulation	50 minutes

A total load of 12.8kN was applied to twenty-four equally distributed loading points to represent 127% of the design load. A 100% design load could not be applied due to technical problems.

The test was carried out in accordance with BS EN 1365-2: 2000 taking into account Fire Test Study Group standard interpretations where appropriate. The test was carried out on the 12th June 2002 at the Building Test Centre, UKAS accreditation No. 0296. The test was carried out on behalf of British Gypsum Limited.

BTC 12269F

A fire resistance test, on a timber joist floor protected by a double layer of 12.5mm Gyproc FireLine board mounted on a British Gypsum CasoLine MF ceiling, conducted in accordance with BS EN 1365-2: 2000

The specimen was constructed in a refractory concrete lined steel restraint frame having an opening of 4000mm long x 3000mm wide.

195mm deep x 38mm thick C24 grade timber joists were placed, nominally, at 600mm centres, spanning 4000mm length of the test frame. Full-depth noggings were fixed at each end of the joists (within the test aperture) and at mid-span of the specimen with 100mm round nails.

The tops of the joists were covered with a walking surface of, nominally, 115mm wide x 21mm finished thickness tongue and groove floor boarding which was fixed using 2 ½" floor brads (2 per board at each joist position).

Gypframe MF6A Perimeter Channel was fixed around the perimeter of the restraint frame using 60mm Fire resistant fixings at 600mm centres.

70mm Gypframe GAH2 Acoustic Hangers were fixed to the side of alternative joists at 1200mm centres using two 32mm Gyproc drywall timber screws (forming 1200mm x 1200mm grids).

Gypframe MF12 Soffit Cleats were fixed to the underside of each Gypframe GAH2 Acoustic Hanger using M6 Nut, bolt and two washers (larger than the rubber grommet).

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Gypframe MF8 Strap Hanger (approximately 70mm long) was fixed to each Gypframe MF12 Soffit Cleat using a Gypframe MF11 Nut and Bolt.

The primary grid was formed using Gypframe MF7 Primary Support Channel rested on the top flange of the Gypframe MF6A Perimeter Channel (not fixed) at 1200mm centres. The Gypframe MF7 Primary Support Channel ran parallel to the joist positions. The Gypframe MF7 Primary Support Channel was extended by overlapping two sections by 150mm and fixing together with two Gypframe Wafer Head Jack-Point Screws.

The Gypframe MF7 Primary Support Channel was fixed to each section of Gypframe MF8 Strap Hanger using two Gypframe Wafer Head Jack-Point Screws.

The secondary grid was formed using Gypframe MF5 Ceiling Section fitted perpendicular to the underside of the Gypframe MF7 Primary Support Channel at 450mm centres and secured using Gypframe MF9 Connecting Clips.

The underside of the grid was lined with a double layer of 12.5mm Gyproc FireLine, perpendicular to the Gypframe MF5 Ceiling Sections. The inner layer was fixed at 230mm centres within the field of the board and at 150mm centres around the ceiling perimeter using 25mm Gyproc drywall screws. The outer layer was fixed at 230mm centres within the field of the board and at 150mm centres around the ceiling perimeter using 36mm Gyproc drywall screws.

All board joints were staggered between layers and all board ends coincided with the Gypframe MF5 Ceiling Sections in both layers.

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

The tested construction achieved the following results:

Loadbearing capacity	63 minutes
Integrity	63 minutes
Insulation	63 minutes

A total load of 10.72kN was applied to twenty-four equally distributed loading points to represent 100% of the design load.

The test was carried out in accordance with BS EN 1365-2: 2000 taking into account Fire Test Study Group standard interpretations where appropriate. The test was carried out on the 11th December 2002 at the Building Test Centre, UKAS accreditation No. 0296. The test was carried out on behalf of British Gypsum Limited.

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BTC 12487F

A fire resistance test, on a timber joist floor protected by a double layer of 15mm Gyproc SoundBloc board mounted on Gypframe RB1 Resilient Bar, conducted in accordance with BS EN 1365-2: 2000

The specimen was constructed in a refractory concrete lined steel restraint frame having an opening of 4000mm long x 3000mm wide.

195mm deep x 38mm thick C24 grade timber joists were placed, nominally, at 600mm centres, spanning 4000mm length of the test frame. Full-depth noggings were fixed at each end of the joists (within the test aperture) and at mid-span of the specimen with 100mm round nails.

The tops of the joists were covered with a walking surface of nominally, 115mm wide x 18mm finished thickness tongue and groove floor boarding which was fixed using 40mm floor brads (2 per board at each joist position).

Gypframe RB1 Resilient Bar was fixed to the underside of the joists, at 450mm centres, perpendicular to the joist span and around the perimeter of the floor, using 36mm Gyproc drywall screws.

100mm Isowool General Purpose Roll was positioned in the joist cavity.

The underside of the floor was lined with a double layer of 15mm Gyproc SoundBloc, perpendicular to the Gypframe RB1 Resilient Bar. The inner layer was fixed at 200mm centres within the field of the board and at 150mm centres around the ceiling perimeter using 25mm Gyproc drywall screws. The outer layer was fixed at 200mm centres within the field of the board and at 150mm centres around the ceiling perimeter using 42mm Gyproc drywall screws.

All board joints were staggered between layers and all board ends coincided with Gypframe RB1 Resilient Bar in both layers.

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

The tested construction achieved the following results:

Loadbearing capacity	70 minutes
Integrity	70 minutes
Insulation	68 minutes

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A total load of 10.56kN was applied to twenty-four equally distributed loading points to represent 100% of the design load.

The test was carried out in accordance with BS EN 1365-2: 2000 taking into account Fire Test Study Group standard interpretations where appropriate. The test was carried out on the 19th February 2003 at the Building Test Centre, UKAS accreditation No. 0296. The test was carried out on behalf of British Gypsum Limited.

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DISCUSSION

With loadbearing timber joist floor constructions, the duration of fire performance is governed by the level of protection offered by the exposed face linings and the support provided to these linings by the steel framework and fixings.

The construction detailed under DETAILS OF THE REQUEST has the same steel framework to support the lining protection as BTC 12269F, but the lining protection is different and insulation material is incorporated into the ceiling cavity.

Tests BTC 12081F and BTC 12269F show that timber joist floors protected by either a British Gypsum CasoLine MF ceiling hung from acoustic hangers or a ceiling mounted on a Gypframe RB1 Resilient Bar framework clad with 2 x 12.5mm Gyproc FireLine will achieve a fire resistance performance of 60 minutes.

Therefore if a construction achieved a level of performance with a ceiling mounted on Gypframe RB1 Resilient Bars, the same level of performance would be achieved from a British Gypsum CasoLine MF ceiling hung from acoustic hangers.

Tests BTC 12269F and BTC 12487F show that timber joist floors protected by either a double layer of 12.5mm Gyproc FireLine or a double layer of 15mm Gyproc SoundBloc and a layer of 100mm thick Isowool General Purpose Roll mounted on a Gypframe RB1 Resilient Bar framework will achieve a fire resistance performance in excess of 60 minutes.

Therefore, the construction used in BTC 12487F was mounted onto a British Gypsum CasoLine MF ceiling hung from acoustic hangers; the fire resistance performance of the system would achieve 60 minutes.

The only difference between this construction and the construction detailed under DETAILS OF THE REQUEST is the use of 80mm Isowool Modular Roll insulation rather than 100mm Isowool General Purpose Roll. The insulation materials are the same product, therefore the same density etc., but they are just supplied in different widths.

Tests BTC 12101F and BTC 12487F show the difference in performance between the same systems when quilt is and is not used in the ceiling cavity. When the insulation was incorporated in the cavity the fire resistance performance was 68 minutes compared to 50 minutes when no insulation was present. Thus an improvement of 18 minutes was achieved by including 100mm thick insulation in the cavity.

From the above evidence the inclusion of quilt does have some benefit and assuming the relationship between test performance and quilt thickness is linear, reducing the quilt thickness to 80mm would reduce the fire resistance performance by only 4 minutes. Test BTC 12101F was

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overloaded by approximately 27% so the specimen potentially failed prematurely. If the specimen had been loaded to a design load of 100%, the difference in performance between BTC 12101F and BTC 12487F could have been smaller, thus the amount of performance lost due reducing the quilt thickness would also be smaller.

Applying the above assumption, the construction in BTC 12487F would achieve a fire resistance performance of 60 minutes with 80mm Isowool Modular Roll.

In accordance with 'Fire protection of timber floors' published by the Association of Specialist Fire Protection Contractors and Manufacturers, any fire test result achieved using 18mm or 21mm thick tongue and groove softwood floor boarding can be applied to the same construction with a 18mm thick particle board flooring surface.

Therefore it can be assumed that the construction proposed under DETAILS OF THE REQUEST would achieve a fire resistance performance of 60 minutes when tested in accordance with BS EN 1365-2: 2000.

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CONCLUSION

In view of the foregoing evidence, it is our opinion that if the construction described under DETAILS OF THE REQUEST was subjected to fire resistance testing, in accordance with BS EN 1365-2: 2000, it would provide the following periods of fire:

Loadbearing capacity	**60 minutes**
Integrity:	**60 minutes**
Insulation:	**60 minutes**

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 …ROBERT NIGEL ALLEN……

For and behalf of British Gypsum Limited.

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AUTHORITY FOR USE OF TEST EVIDENCE

Test Report Numbers: BTC 12081F, BTC 12101F, BTC 12269F and BTC 12487F

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

A FIRE TEST ASSESSMENT ON A BRITISH GYPSUM CASOLINE MF CEILING SUSPENDED BELOW A TIMBER FLOOR CLAD WITH 2 x 15mm GYPROC SOUNDBLOC CONDUCTED IN ACCORDANCE WITH F.T.S.G. RESOLUTION No. 82 /PFPF GUIDE.

Assessment client: British Gypsum Limited

Signed: R.N.Allen ..... Print Name .....ROBERT NIGEL ALLEN.....

Job Title: ..SENIOR TECHNICAL CONSULTANT...

Department: .....DRYWALL ACADEMY.....

For and behalf of **British Gypsum Limited**