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CLASSIFICATION REPORT

RESISTANCE TO FIRE - CLASSIFICATION REPORT EUI-21-000335

1. INTRODUCTION

This classification report defines the classification assigned to Hybrid LGS frame with MW insulation between the frame and on the face in accordance with the procedures given in BS EN 13501-2:2016

RESISTANCE TO FIRE CLASSIFICATION IN ACCORDANCE WITH BS EN 13501-2:2016

Sponsor: KINGSPAN INSULATION LTD
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UNITED KINGDOM

Product name: Hybrid LGS frame with MW insulation between the frame and on the face

Classification report No.: EUI-21-000335

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2. DOCUMENT TRACKING

| Revision Index. | Modification |
|-----------------|-------------------|
| 0 | Original document |

3. INTRODUCTION

This classification report defines the resistance to fire classification assigned to an asymmetrical non-loadbearing wall Hybrid LGS frame with MW insulation between the frame and on the face in accordance with the procedure given in BS EN 13501-2:2016 – Fire classification of construction products and building elements – Classification using data from fire resistance tests, excluding ventilation services.

4. DETAILED OF CLASSIFIED PRODUCT

4.1. GENERAL

The product, non-loadbearing wall Hybrid LGS frame with MW insulation between the frame and on the face, is defined as a non-loadbearing wall with fire separating function in accordance with BS EN 13501-2:2016. Its function is to be fire-resistant as regards fire resistance performance characteristics given in section 7.5.2 of the standard BS EN 13501-2:2016.

The product, Hybrid LGS frame with MW insulation between the frame and on the face, is on the test reports mentioned on section 5 of this report and is described below.

4.2. GENERAL DESCRIPTION

The tested element was using:

- Sample frame: composed by six studs, made of Light Gauge Steel, “C”-section profile, 100 x 50 mm, 1.2 mm thick, floor track, made of LGS “U”-section profile, 104 x 55 mm, 1.2 mm thick and head track, made of LGS “U”-section profile, 104 x 67 mm, 1.8 mm thick
- One of the sides of the frame was assembled:
 - internal layer of VCL membrane reference Visqueen Vapour Barrier (VISQUEEN).
 - intermediate and external layer of glass fibre-reinforced gypsum board reference Gyproc FireLine (BRITISH GYPSUM), 1200 x 2400 x 15 mm (w x h x th), with staggered joints between layers.
- The opposite side of the frame was assembled with:
 - internal layer of calcium silicate-based cementitious board reference Y-Wall (RCM), 12 mm thick.
 - intermediate layer of breather membrane reference Nilvent (KINGSPAN).
 - external layer of stone mineral wool insulation reference K-Roc RS (KINGSPAN), 100 mm thick.
- The cavity formed within the frame was filled with one layer of stone mineral wool insulation reference K-Roc FS (KINGSPAN), 100 mm thick, friction fitted between the studs.

4.3. LIST OF COMPONENTS

| Name | Reference | Characteristics | Material | Supplier |
|--------------|---------------|--|----------|----------------|
| LGS frame | C10005012 | “C”-section profile 100 x 50 mm with slotted ends Th. 1.2 mm; Length: 2975 mm | LGS | KINGSPAN |
| | U1045512 | “U”-section profile 55 x 104 mm ; Th 1.2 mm | | |
| | U1046718 | “U”-section profile 67 x 104 mm ; Th 1.8 mm | | |
| Fixing strap | Gypframe GFS1 | 2400 x 70 mm (L x w); 0.5 mm thick | | BRITISH GYPSUM |
| “L” bracket | Gypframe GA4 | “L”-section profile 50 x 25 mm | | |

| 0.7 m thick | | | | |
|---|------------------------------------|--|---|----------------|
| Side A – internal layer | Visqueen Vapour Barrier | 2 x 50 m (w x L) – full roll Green tinted, translucent membrane | Polyethylene membrane | VISQUEEN |
| Side A – intermediate and external layer | Gyproc FireLine | 1200 x 2400 x 15 mm (w x h x th) Tapered edges. Surface mass: 12.9 kg/m ² measured Density: 862 kg/m ³ measured Reaction to fire: A2, s1-d0 (stated) $\lambda_D=0.24$ W/m. K (stated). $R_D=0.06$ m ² K/W (stated); | Glass-fibre reinforced plasterboard | BRITISH GYPSUM |
| Side B – internal layer | Y-Wall | 1200 x 2400 x 12 mm (w x h x th) Surface mass: 16.7 kg/m ² measured Density: 1390 kg/m ³ (measured) Reaction to fire: A1 (stated) $\lambda_D \leq 0.30$ W/m. K (stated) | Calcium silicate-based cementitious board | RCM |
| Side B – intermediate layer | Nilvent | 1.5 x 50 m (w x L) – full roll 0.6 mm thick Reaction to fire class E (stated) | Laminated 3-layer polyolefin membrane | KINGSPAN |
| Side B – external layer | K-Roc RS | 600 x 1200 mm (slab size) Th. 100mm. Density: 45.6 kg/m ³ (stated) Reaction to fire: A1 (stated) $\lambda_D=0.034$ W/m. K (stated). $R_D=2.90$ m ² K/W (stated) | Stone mineral wool | |
| Insulation between studs | K-Roc FS | 610 x 1220 mm (slab size) Th. 100 mm. Density: 30.64 kg/m ³ (stated) Reaction to fire: A1 (stated) $\lambda_D=0.036$ W/m. K (stated). $R_D=2.75$ m ² K/W (stated) | | |
| Insulation on the deflection detail | RW5 | Cut to strips of 15 x 25 mm Density: 100 kg/m ³ (stated) Reaction to fire: A1 (stated) $\lambda_D=0.034$ W/m. K (stated) | | ROCKWOOL |
| Double sided tape (VCL to frame) | Double sided vapour tape | 20 mm x 50 m Self-adhesive, double-sided tape | <i>Information not available</i> | VISQUEEN |
| Overlapping tape | Vapour Tape System | 75 mm wide Self-adhesive, single sided | Single sided foil tape | VISQUEEN |
| Tape – sheathing boards | DAFA UV tape | 60 mm wide Self-adhesive, single sided | Acrylic tape | DAFA |
| Screw LGS to LGS | TEKS screw Product code: 921166 | 5.5 x 25 mm (Ø x L) Low profile pancake head screw | Coated steel | SPIT |
| Screw floor track and stud to testing frame | TAPCON 6x32 | 6 x 32 mm (Ø x L) Hex-head masonry screw | | |
| Screw head track to testing frame | TAPCON DOME 6x40 | 6 x 40 mm (Ø x L) Low profiled, dome-head masonry bolt | Zinc plated steel | |
| Screw internal layer of plasterboard to LGS | 00032PSDD | 3.5 x 32 mm (Ø x L) Self-drilling drywall screw | | TIMCO |
| Screw external layer of plasterboard to LGS | 00042PSDD | 3.5 x 42 mm (Ø x L) Self-drilling drywall screw | | |
| Screw sheathing board to LGS | Wingdriller WDL5 5.5x50 | 5.5 x 50 mm (Ø x L) Wing-tipped, self-drilling screw | Coated steel | EJOT |
| Insulation fixing – edge of slabs | SUREFAST SF-T-75 x 75 | Head flange diameter 75 mm Tube length 75 mm | Polypropylene | FIXFAST |
| | SF-RS-SSA4-4.8x80 | 4.8 x 80 mm (Ø x L) Self-drilling screw | Stainless steel | |
| Insulation fixing – centre of the slabs | SF-P-SS-70-D | 70 mm (overall Ø) | | |
| | SF-RS-SSA4-4.8x160 | 4.8 x 160 mm (Ø x L) Self-drilling screw | | |

| | | | | |
|-------------------|--------------------|---|--------------------------------|----------------|
| Jointing tape | Gyproc Joint Tape | 50 mm wide | Paper tape | BRITISH GYPSUM |
| Jointing compound | Gyproc Promix Lite | Ready-mixed jointing compound 17 litre tub | Gypsum-based jointing compound | |

LGS = Light Gauge Steel --- w = width --- h = height --- th = Thickness --- Ø = diameter --- L = Length

4.4. DETAILED DESCRIPTION

4.4.1. Sample frame

The sample frame was made using the following LGS elements:

- . six “C”-section studs reference C10005012 (KINGSPAN), 100 x 50 mm, 1.2 mm thick, 2975 mm long, with slotted top end.
- . one “U”-section floor track reference U1045512 (KINGSPAN), 104 x 55 mm, 1.2 mm thick, 2975mm long.
- . one “U”-section head track reference U1046718 (KINGSPAN), 104 x 67 mm, 1.8 mm thick, 2975mm long.

The framing elements were fixed together with low profile pancake head screws reference TEKS screw – product code 921166 (SPIT), 5.5 x 25 mm (Ø x L), using one screw on each side, per junction. The studs were fixed to the top track on their slotted end and the frame included a 25 mm head deflection detail.

The floor track and one of the studs were fixed to the testing frame using hex-head masonry screws reference TAPCON 6x32 (SPIT), 6 x 32 mm (Ø x L), evenly spaced at 600 mm centres.

The head track was fixed to the testing frame using low-profiled dome-head masonry bolt reference TAPCON DOME 6x40 (SPIT), 6 x 40 mm (Ø x L), evenly spaced at 600 mm centres.

The overall dimension of the frame was 2975 x 3000 x 100 mm (w x h x th).

4.4.2. Insulation between studs

One layer of stone mineral wool insulation K-Roc FS (KINGSPAN), 610 x 1220 mm (w x L), 100 mm thick, with stated density 28-32 kg/m³, Reaction to fire Euroclass A1, λ_D=0.036 W/m. K and R_D=2.75 m²K/W, was friction fitted between the LGS studs.

4.4.3. Side A

One of the sides of the frame was assembled using:

- . internal layer of polyethylene membrane reference Visqueen Vapour Barrier (VISQUEEN), 2000mm wide.
- . intermediate and external layer of glass-fibre reinforced gypsum board reference Gyproc FireLine (BRITISH GYPSUM), 1200 x 2400 x 15 mm (w x h x th), with tapered edges, surface mass 12.9 kg/m² and density 862 kg/m³ (measured by the lab), stated reaction to fire class A2-s1, d0, λ_D=0.24 W/m. K and R_D=0.06 m²K/W.

The membrane was fixed to the studs and tracks using self-adhesive tape reference Double sided vapour tape (VISQUEEN), 20 mm wide.

The layers of plasterboard were installed to stagger vertical and horizontal joints between layers.

The boards were left 25 mm from the head of the sample, creating a head deflection detail. The gap was filled using stone mineral wool strips reference RW5 (ROCKWOOL). The strips of stone mineral wool were kept in place by a “L” bracket, fixed to the testing frame, using masonry bolts, evenly spaced at 600 mm centres.

The internal layer of plasterboard was fixed using self-drilling drywall screws reference 00032PSDD (TIMCO), 3.5 x 32 mm (Ø x L). The screws were evenly spaced at 300 mm centres along the floor track, studs, and a fixing strap reference Gypframe GFS1 (BRITISH GYPSUM), 70 mm wide, 0.5 mm thick, installed below the head of the sample. The internal layer of plasterboard was not fixed to the head track.

The external layer of plasterboard was fixed using self-drilling drywall screws reference 00042PSDD (TIMCO), 3.5 x 42 mm (\varnothing x L). The screws were evenly spaced at 300 mm centres along the floor track, studs, and a fixing strap reference Gypframe GFS1 (BRITISH GYPSUM), 70 mm wide, 0.5 mm thick, installed between the two layers of plasterboard, in line with the horizontal joint on the external layer.

4.4.4. Side B

The opposite side of frame was assembled using:

- . internal layer of calcium silicate-based cementitious sheathing board reference Y-Wall (RCM), 1200 x 2400 x 12 mm (w x h x th), with measured surface mass 16.7 kg/m² and density 1390 kg/m³, and stated reaction to fire: A1 (according to EN 13501-1) and $\lambda_D \leq 0.30$ W/m. K.
- . intermediate layer of breather membrane reference Nilvent (KINGSPAN).
- . external layer of stone mineral wool rainscreen slabs reference K-Roc RS (KINGSPAN), 600 x 1200 x 100 mm (w x h x th), with declared density 45 kg/m³, 0.034 W/m. K and $R_D = 2.90$ m²K/W.

The sheathing board was installed to stagger vertical and horizontal joints with the internal layer of plasterboard.

The sheathing board was fixed to the LGS frame using wing-tipped self-drilling screws reference Wingdriller WDLS 5.5x50 (EJOT), 5.5 x 50 mm (\varnothing x L). The screws were evenly spaced at 300 mm centres along the studs and floor track. The sheathing board was not fixed to the head track.

A layer of self-adhesive, single sided tape, reference DAFA UV Tape (DAFA), 60 mm wide was applied over the joints of the boards.

The intermediate layer was fixed to the sheathing boards using double sided tape reference Double sided vapour tape (VISQUEEN).

The rainscreen slabs were fixed to the studs, through the breather membrane and sheathing boards. The slabs were fixed using one stainless steel round retainer reference SF-P-SS-70-D (FIXFAST), 70 mm wide, placed in the centre of the slab. The retainers were fixed to the studs using self-drilling stainless steel screw reference SF-RS-SSA4-4.8x160 (FIXFAST), 4.8 x 160 mm (\varnothing x L). Polypropylene insulation retainers' reference SUREFAST SF-T-75 x 75 (FIXFAST), with 75 mm diameter head flange and 75 mm deep tube were installed between adjacent slabs. The polypropylene retainers were fixed to the studs using self-drilling stainless steel screws reference SF-RS-SSA4-4.8x80 (FIXFAST), 4.8 x 80 mm (\varnothing x L).

4.4.5. Additional equipment

No additional equipment was installed on the sample

4.4.6. Finishing

The joints of the external layer of the side boarded with plasterboard were covered using paper jointing tape reference Gyproc Joint Tape (BRITISH GYPSUM) and ready-mixed jointing compound Gyproc Promix Lite (BRITISH GYPSUM). The screw heads on the external layer of the exposed side were covered with a layer of ready-mixed jointing compound Gyproc Promix Lite (BRITISH GYPSUM)

4.5. DRAWINGS

(See Page 6 for the drawing of the sample tested with side A as the exposed side, and Page 7 for the drawing of the sample tested with side B as the exposed side)

CLASSIFICATION REPORT

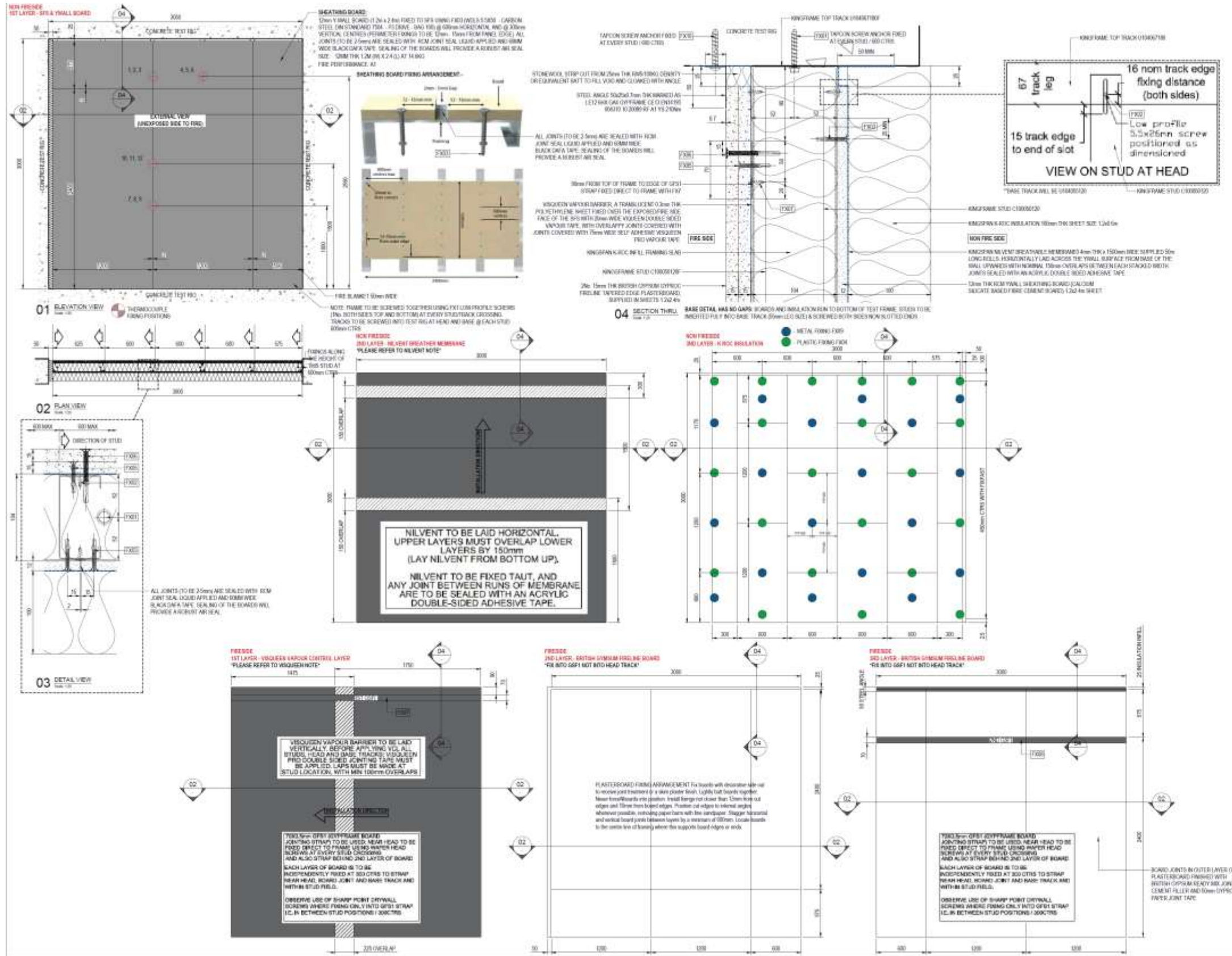


Figure 1 – Drawings provided by the Sponsor – Test EUI-21-B-000335-A

IMPORTANT NOTICE

DO NOT SCALE - IF IN DOUBT ASK

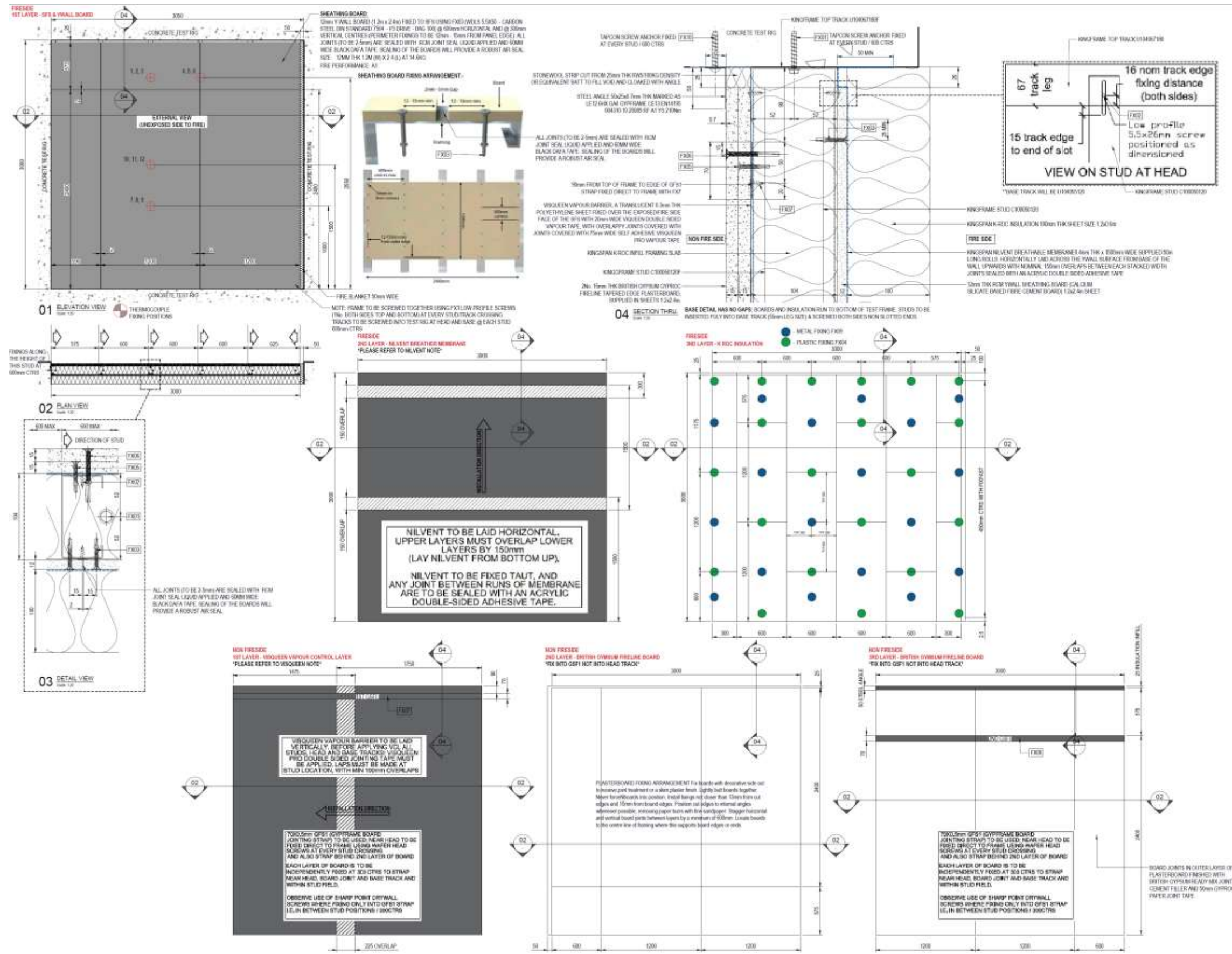
FIXING TABLE

| Fixing | Material | Description |
|--------|----------|----------------------------|
| F01 | SPR | TAPCON BOLT |
| F02 | SPR | GRIP BOLT |
| F03 | FAST | WALL PLATE |
| F04 | FAST | SP-RES-SHA-1-100 WITH 20mm |
| F05 | TRUSS | WALL PLATE |
| F06 | TRUSS | WALL PLATE |
| F07 | TRUSS | WALL PLATE |
| F08 | TRUSS | WALL PLATE |
| F09 | FAST | SP-RES-SHA-1-100 WITH 20mm |
| F10 | SPR | TAPCON BOLT 12x100 |

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KINGSPAN THROUGH WALL FIRE TEST TEST RIG 01 DESIGN

| DATE | BY | DATE | BY |
|----------|----|----------|----|
| 01/01/20 | AD | 01/01/20 | AD |
| 01/01/20 | AD | 01/01/20 | AD |
| 01/01/20 | AD | 01/01/20 | AD |
| 01/01/20 | AD | 01/01/20 | AD |



IMPORTANT NOTICE

This drawing is intended to be used in conjunction with the specification and schedule of materials for the test. It is not intended to be used as a construction document. The user of this drawing is responsible for ensuring that the test is conducted in accordance with the relevant standards and regulations. The user of this drawing is also responsible for ensuring that the test is conducted in a safe and secure manner.

DO NOT SCALE - IF IN DOUBT ASK

| FX No. | MATERIAL | DESCRIPTION |
|--------|--------------|-------------------------------|
| FX1 | SPIT | TAPCON SILEX |
| FX2 | SPIT | LOW PROFILE 5.5x26mm SCREW |
| FX3 | EAGT | 12mm Y WALL BOARD |
| FX4 | FIREPROOFING | BRITISH GYPSUM FIRELINE BOARD |
| FX5 | INSULATION | ROCKWOOL |
| FX6 | INSULATION | ROCKWOOL |
| FX7 | INSULATION | ROCKWOOL |
| FX8 | INSULATION | ROCKWOOL |
| FX9 | FIREPROOFING | BRITISH GYPSUM FIRELINE BOARD |
| FX10 | SPIT | TAPCON SILEX |

Figure 2 – Drawings provided by the Sponsor – Test EUI-21-B-000335-B

5. REPORTS AND RESULTS IN SUPPORT OF THIS CLASSIFICATION

5.1. REPORTS

| Name of Laboratory | Name of sponsor | Report ref. no | Test method and date field of application rules and date |
|---------------------|-------------------------|-------------------|--|
| EFFECTIS UK/Ireland | KINGSPAN INSULATION LTD | EUI-21-B-000335-A | BS EN 1363-1:2020 BS EN 1364-1:2015 |
| | | EUI-21-B-000335-B | |

5.2. RESULTS

| Test method and test number | Parameter(s) | No. Tests | Results |
|---|----------------------|-----------|--|
| EUI-21-B-000335-A BS EN 1363-1 :2020 BS EN 1364-1 :2015 | Composition | 1 | <u>Frame:</u> "C"-section studs, 100x50 mm, 1.2 mm thick, "U"-section top track, 104 x 67 mm, 1.8 mm thick and "U"-section floor track, 104 x 55 mm, 1.2 mm thick <u>Exposed side:</u> Internal layer of Visqueen Vapour Barrier and intermediate and external layer of Gyproc FireLine, 15 mm thick <u>Unexposed side:</u> Internal layer of Y-Wall, 12 mm thick, intermediate layer of Nilvent membrane and external layer of K-Roc RS, 100 mm thick |
| | Fire side | | Internal layer of Visqueen Vapour Barrier and intermediate and external layer of Gyproc FireLine, 15 mm thick |
| | Integrity Insulation | | 112 minutes 112 minutes |
| EUI-21-B-000335-B BS EN 1363-1 :2020 BS EN 1364-1 :2015 | Composition | 1 | <u>Frame:</u> "C"-section studs, 100x50 mm, 1.2 mm thick, "U"-section top track, 104 x 67 mm, 1.8 mm thick and "U"-section floor track, 104 x 55 mm, 1.2 mm thick <u>Exposed side:</u> Internal layer of Y-Wall, 12 mm thick, intermediate layer of Nilvent membrane and external layer of K-Roc RS, 100 mm thick <u>Unexposed side:</u> Internal layer of Visqueen Vapour Barrier and intermediate and external layer of Gyproc FireLine, 15 mm thick |
| | Fire side | | Internal layer of Y-Wall, 12 mm thick, intermediate layer of Nilvent membrane and external layer of K-Roc RS, 100 mm thick |
| | Integrity Insulation | | 132 minutes 132 minutes |

6. CLASSIFICATION AND FIELD OF APPLICATION

6.1. REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 7 of BS EN 13501-2:2016.

6.2. CLASSIFICATION

The element, Hybrid LGS frame with MW insulation between the frame and on the face is classified according to the following combination of performance parameters and classes as appropriate:

6.2.1. Face A – Fire on the Gyproc FireLine

| | | | | | | | | | | | | | | |
|---|----------|----------|---|--|-----------|---|---|---|---|---|---------|----|----|---|
| R | E | I | W | | t | t | - | M | S | C | IncSlow | sn | ef | r |
| | E | I | | | 90 | | | | | | | | | |

| | |
|---------------------------------------|-------------|
| FIRE RESISTANCE CLASSIFICATION | EI90 |
|---------------------------------------|-------------|

6.2.2. Face B – Fire on the K-Roc RS

| | | | | | | | | | | | | | | |
|---|----------|----------|---|--|------------|---|---|---|---|---|---------|----|----|---|
| R | E | I | W | | t | t | - | M | S | C | IncSlow | sn | ef | r |
| | E | I | | | 120 | | | | | | | | | |

| | |
|---------------------------------------|--------------|
| FIRE RESISTANCE CLASSIFICATION | EI120 |
|---------------------------------------|--------------|

6.3. FIELD OF APPLICATION

According to the standard BS EN 13501-2:2016 – Fire classification of construction products and building elements – Classification using data from fire resistance tests, excluding ventilation services and BS EN 1364-1:2015 – Fire resistance tests for non-loadbearing elements: Walls, the classification is valid for the following end use applications:

Fire side: valid for the sample tested on both sides

6.3.1. Field of direct application of the test results

The direct application field of the test results is limited to the determination of the permissible modifications of the test specimen following a successful fire resistance test. These modifications may be automatically introduced without the sponsor having to apply for any additional assessment, calculation, or agreement.

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:

6.3.1.1. General

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, except with respect to the construction types covered in Annex A and Annex B of BS EN 1364-1:2015 where specific direct field of application rules are given.

- a) decrease in height.
- b) increase in the thickness of the wall.
- c) increase in the thickness of component materials.
- d) decrease in linear dimensions of boards or panels but not thickness.
- e) decrease in stud spacing.
- f) decrease in distance of fixing centres.
- g) increase in the number of horizontal joints, of the type tested, when tested with one joint not more than (500 ± 150) mm from the top edge.
- h) increase in the number of vertical joints, of the type tested.
- i) ~~the use of installations such as electrical sockets, switches, etc. when tested as illustrated in Figures 9, 10 and 11 with the installations not more than 500 mm from the top edge; - not applicable~~
- j) horizontal and/or vertical joints, of the type tested.

The field of direct application for non-loadbearing external and internal walls designed to span horizontally between two independently proven fire resisting vertical structural elements is given in Annex B of BS EN 1364-1:2015

6.3.1.2. Extension of width

The width of the construction can be increased without limitation.

~~For test specimens tested with a supporting construction, the width of an identical construction may be increased if the specimen was tested at a minimum of nominally 2,8 m wide with one vertical edge without restraint. - not applicable~~

~~In case of EW classification, an increase in width of an identical construction is only allowed when the average unexposed surface temperature of any discrete area of the test specimen remains below 300 °C or the measured radiation remains below 6 kW/m². In any other case, no increase in width is allowed. - not applicable~~

6.3.1.3. Extension of height

The height of the construction may be increased by 1.0m,

~~In case of EW classification, an increase in height of an identical construction is only allowed when the average unexposed surface temperature of any discrete area of the test specimen remains below 300 °C or the measured radiation remains below 6 kW/m². In any other case, no increase in height is allowed. - not applicable~~

6.3.1.4. Supporting constructions

The following rules for the field of application apply:

6.3.1.4.1. Standard supporting constructions

a) For specimens tested in the test frame without any supporting construction, the result is applicable to high density rigid supporting constructions with at least the same fire resistance as the test specimen.

~~b) For specimens tested with any standard supporting construction as defined in EN 1363-1, the result is applicable to any other supporting construction of the same type (flexible or rigid) that has the same or a greater classified fire resistance (thicker, denser, more layers of boards, as appropriate) than the one used in the test and the same horizontal and/or vertical orientation, i.e.:~~

- ~~• only vertical if the specimen was tested with the standard supporting construction fixed along the vertical edge~~
- ~~• only horizontal if the specimen was tested with the standard supporting construction fixed along the horizontal edge~~
- ~~• both if the specimen was tested with the standard supporting construction fixed along both the horizontal and the vertical edge (see Figure 17, b3). – not applicable~~

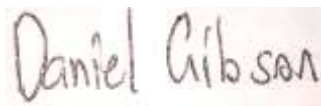
6.3.1.4.2. Non-standard supporting constructions

~~The result of a test on a non loadbearing wall tested in a non standard supporting construction is only applicable to that construction. – not applicable~~

7. LIMITATIONS

This classification document does not represent type approval or certification of the product.

SIGNED



Daniel Gibson
In charge of the Test
Project Leader

APPROVED



Maurice McKee
Lab Manager