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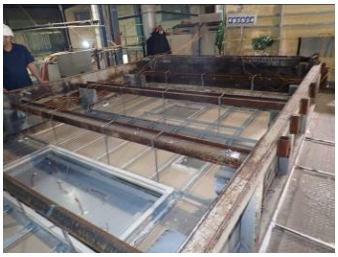
Title:

The Fire Resistance Performance Of Three Horizontally Mounted, Access Panels, tested using the principles of BS EN 1634-1: 2014.

WF Report No:

403834



Prepared for:

Panel Technologies

49-61 Jodrell Street
Warwickshire
CV11 5EG

Date:

29th May 2019

Summary

Objective

To determine the fire resistance performance of three horizontally mounted, access panel doorsets, when tested using the principles of BS EN 1634-1:2014.

Sponsor

Panel Technologies

49-61 Jodrell Street
Warwickshire
CV11 5EG

Summary of Tested Specimen

For test purposes test purposes the access panel doorsets were referenced as Hatch A to C. The doorsets were installed into a suspended ceiling formed from a metal grid.

Hatch A had overall nominal dimensions of 1850 mm by 800 mm the doorset was formed from a 0.9 mm thick powder coated steel tray housing a 12.5 mm thick 'Siniat Megadeco' board. The Megadeco board faced the heating conditions of the test.

Hatch B had overall nominal dimensions of 350 mm by 350 mm the doorset were formed from 0.9 mm thick steel with a powder coated finish

Hatch C had overall nominal dimensions of 640 mm by 640 mm the doorset was formed from 0.9 mm thick steel with a powder coated finish

If the performance of hatches was to be assessed against the integrity and insulation criteria from BS EN 1634-1: 2014, the test results could be expressed as follows:

Test Results:		Hatch A	Hatch B	Hatch C
Integrity	Sustained flaming	127 minutes*	127 minutes*	127 minutes
	Gap gauge	127 minutes*	124 minutes	120 minutes
	Cotton Pad	127 minutes*	32 minutes	34 minutes
Insulation		21 minutes	n/a	n/a

*The test duration. The test was discontinued after a period of 127 minutes.

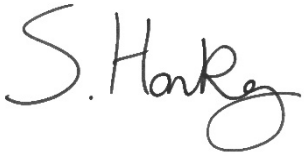
Date of Test

11th October 2018.

Signatories

Responsible Officer
N. Howard*
Testing Officer

Approved
W. Drazkiewicz*
Technical Manager



Head of Department
S. Hankey *
Business Unit Head

* For and on behalf of **Warringtonfire**.

Report Issued

Date: 29th May 2019

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Test Procedure

Introduction

The access panel hatches are required to provide a fire separating function and were therefore tested using the principals of BS EN 1634-1: 2014 'Fire resistance tests for doors and shutter assemblies - Part 1: Fire doors and shutters'. This test report should be read in conjunction with that Standard and with BS EN 1363-1: 2012, 'Fire resistance tests - Part 1: General requirements' and BS EN 1363-2: 1999, 'Fire resistance tests - Part 2: Alternative and additional procedures'.

The specimens were judged on their ability to comply with the performance criteria for integrity and where appropriate insulation, using the principals of BS EN 1634-1: 2014.

The scope of the standard covers doors, shutters and openable windows designed for installation within vertical separating elements, however it would seem reasonable to apply the same principles to horizontally installed specimens and therefore this test is reported as using the principals of BS EN 1634-1: 2014.

Fire Test Study Group/EGOLF

Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.

Instruction To Test

The test was conducted on the 11th October 2018 at the request of **Panel Technologies** the test sponsor.

Test Specimen Construction

A comprehensive description of the test construction is given in the Schedule of Components. The description is based on a detailed survey of the specimen and information supplied by the sponsor of the test.

Installation

The assembly was installed into a refractory concrete lined, steel restraint frame between the 5th and 10th of October 2018. Representatives of **Warringtonfire** conducted the build of the suspended ceiling and representatives of **Panel Technologies** installed the hatches.

Sampling

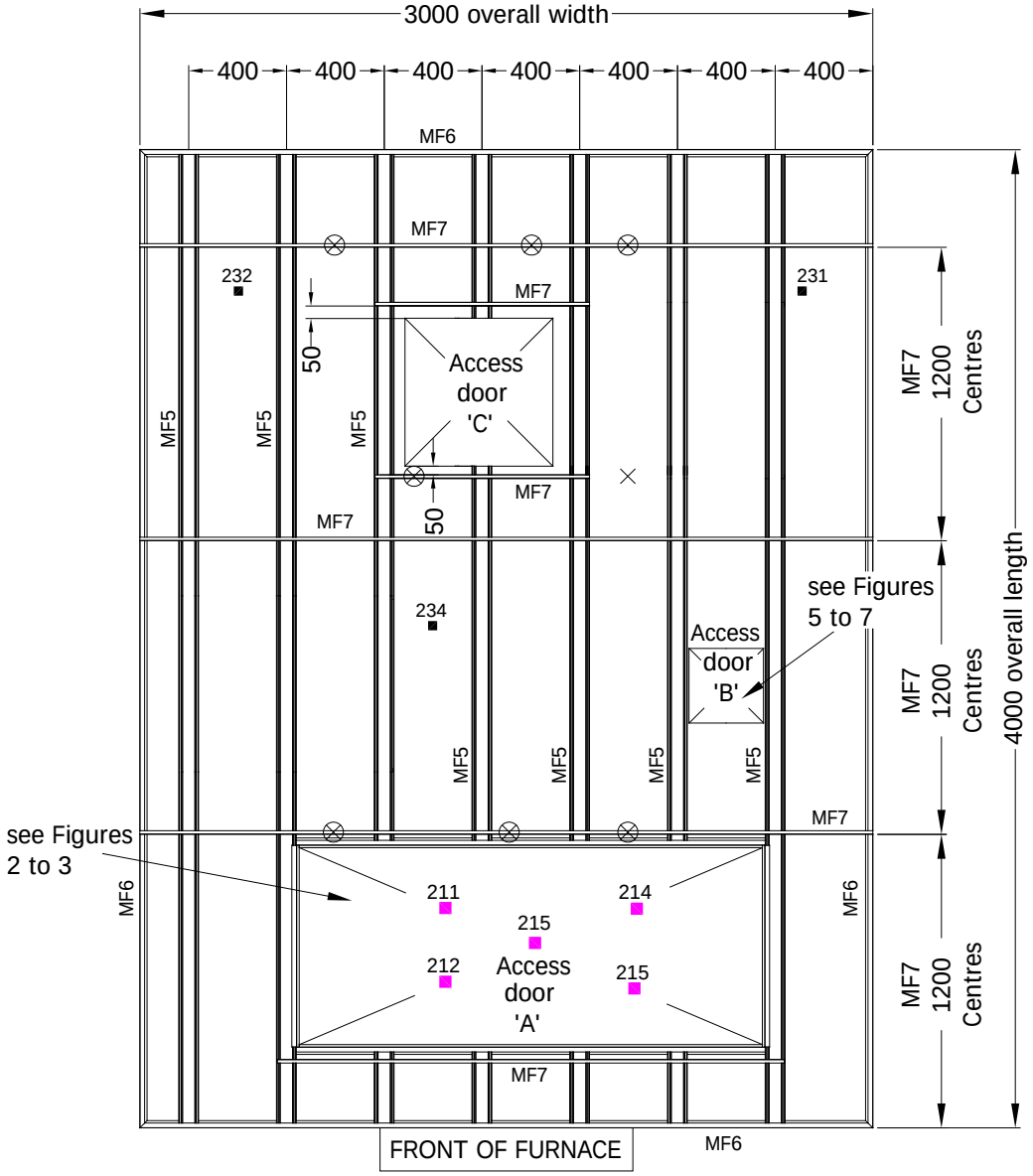
Warringtonfire was not involved in any selection or sampling procedures of the specimen or any of their components.

Conditioning

The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 7 days. Throughout this period of time both the temperature and the humidity of the laboratory were measured and recorded as being within a range of from 10.5°C to 23.5°C and 43.5% to 75% respectively.

Test Construction

Figure 1- General Elevation of Test Construction

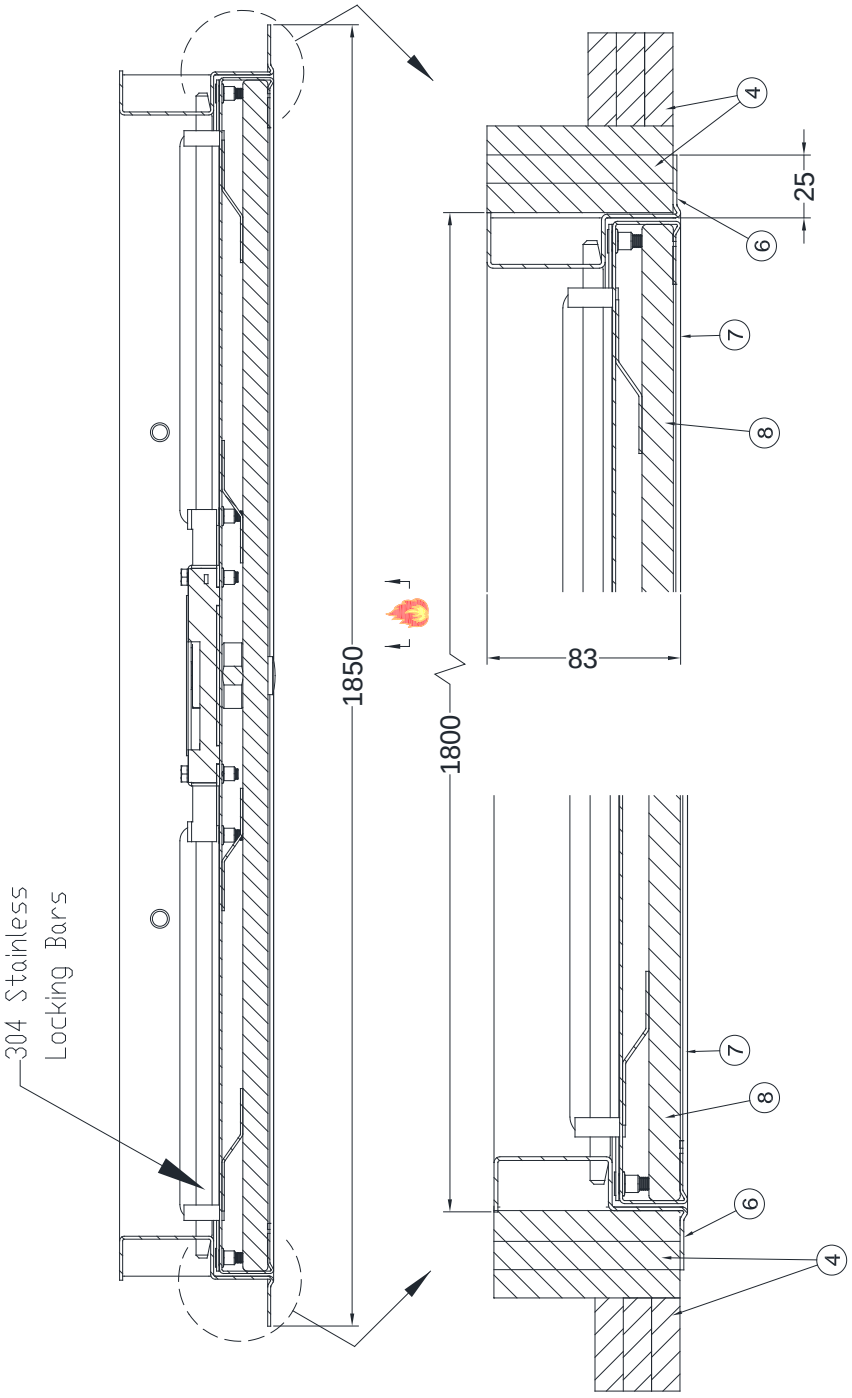


■ Positions of surface mounted thermocouples on unexposed face of ceiling board (Nos.231,232 & 234) (see also Figures 4 and 7 for thermocouple posititons)

⊗ Positions of ceiling support hangers

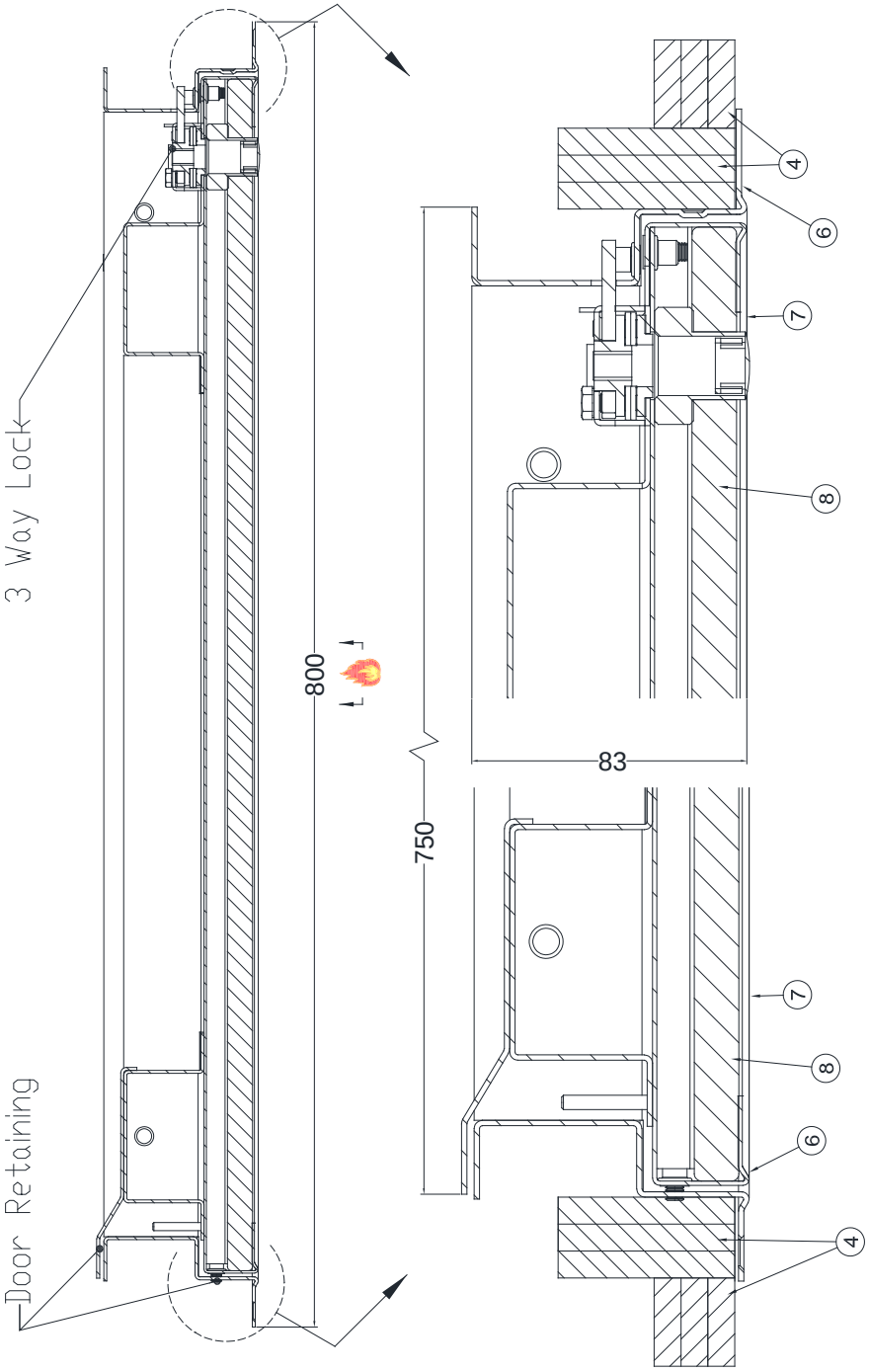
Do not scale. All dimensions are in mm

Figure 2 – Details of Panel A – Horizontal cross section through panel – AP-060-PD-BF-3WL



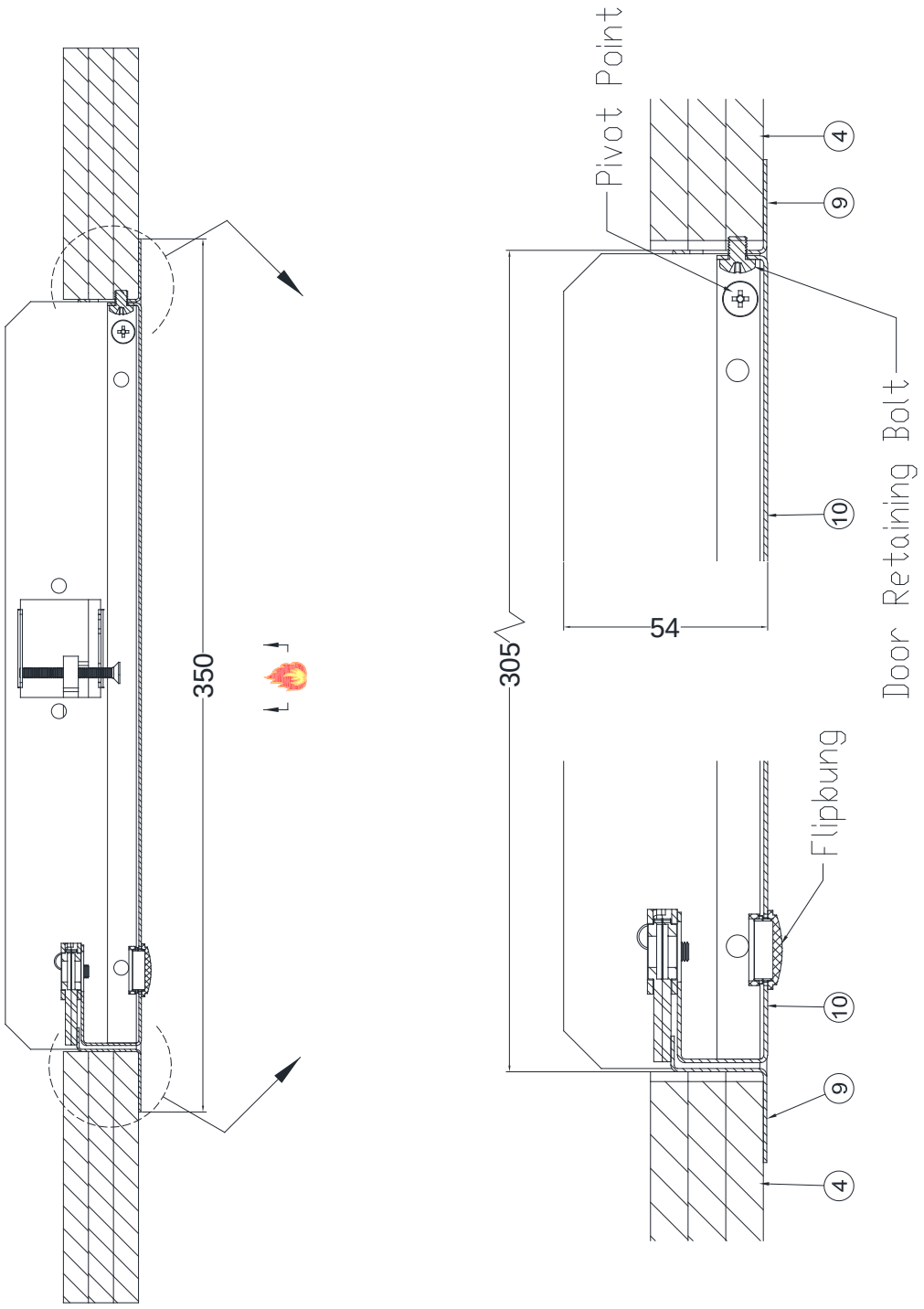
Do not scale. All dimensions are in mm

Figure 3 – Details of Panel A – Horizontal cross section through panel – AP-060-PD-BF-3WL



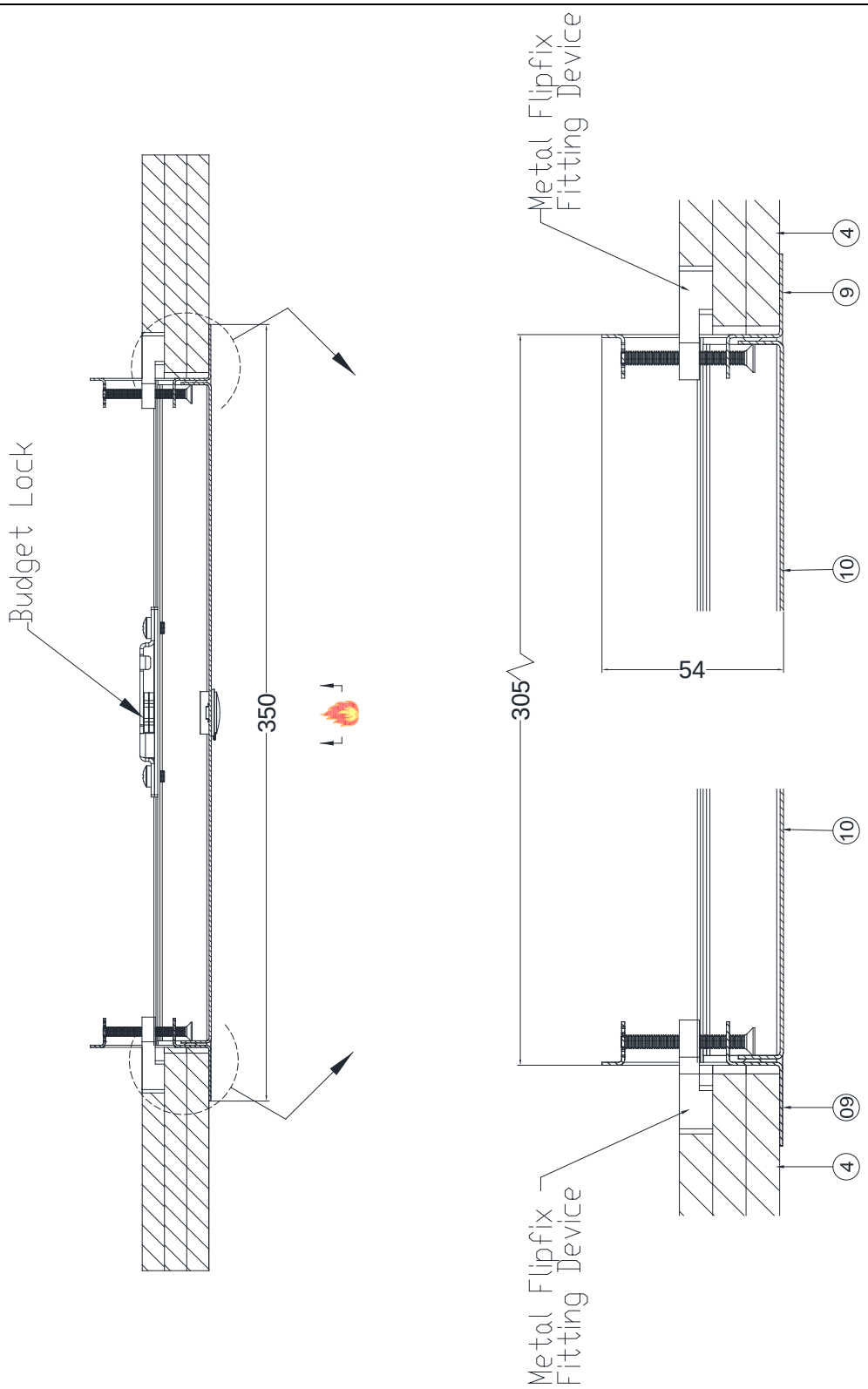
Do not scale. All dimensions are in mm

Figure 4 – Details of Panel B – Horizontal cross section through panel – FF-060-MD-PF-BL (2 flip fix) Welded frame



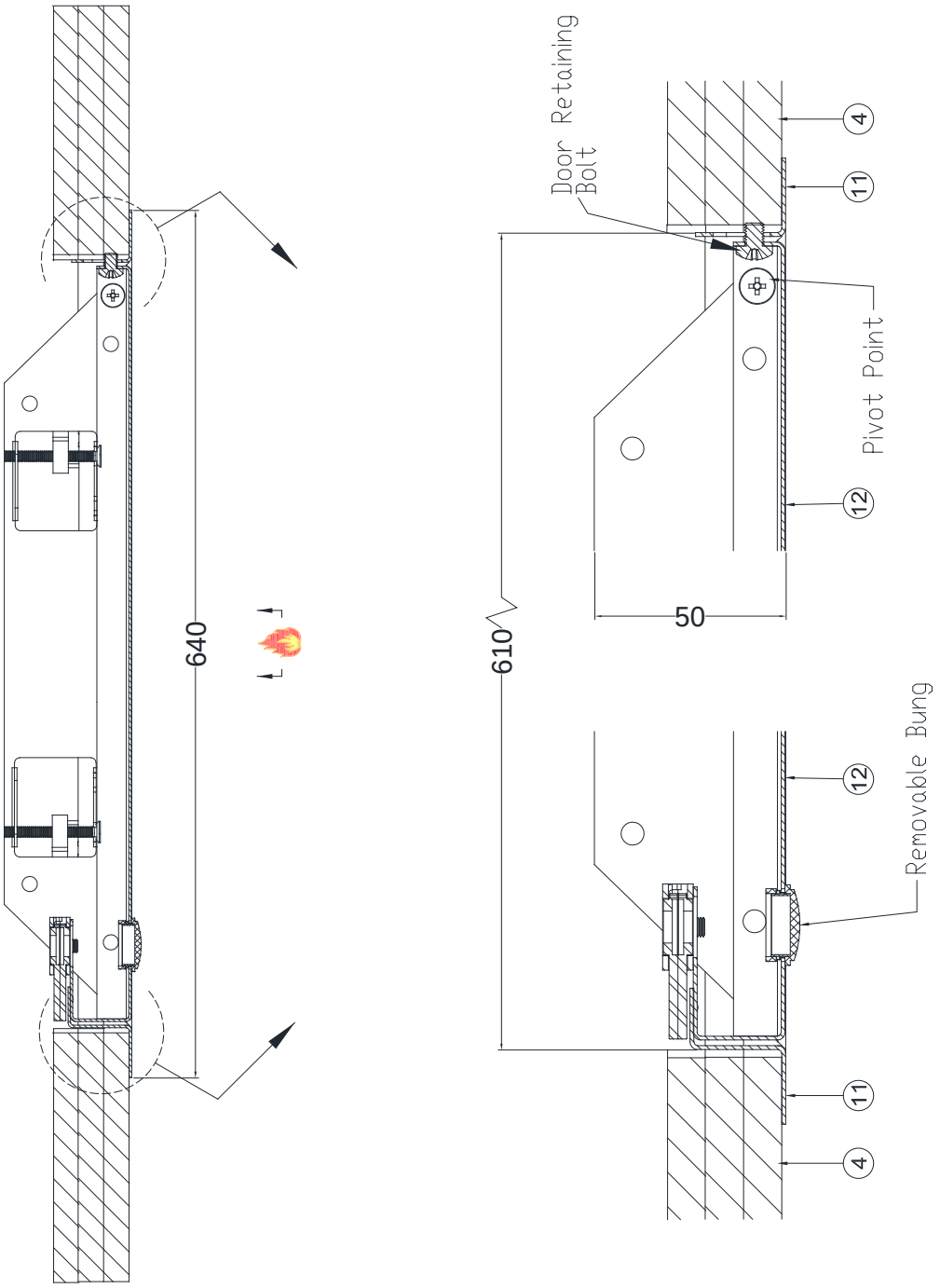
Do not scale. All dimensions are in mm

Figure 5 – Details of Panel B – Horizontal cross section through panel – FF-060-MD-PF-BL (2 flip fix) Welded frame



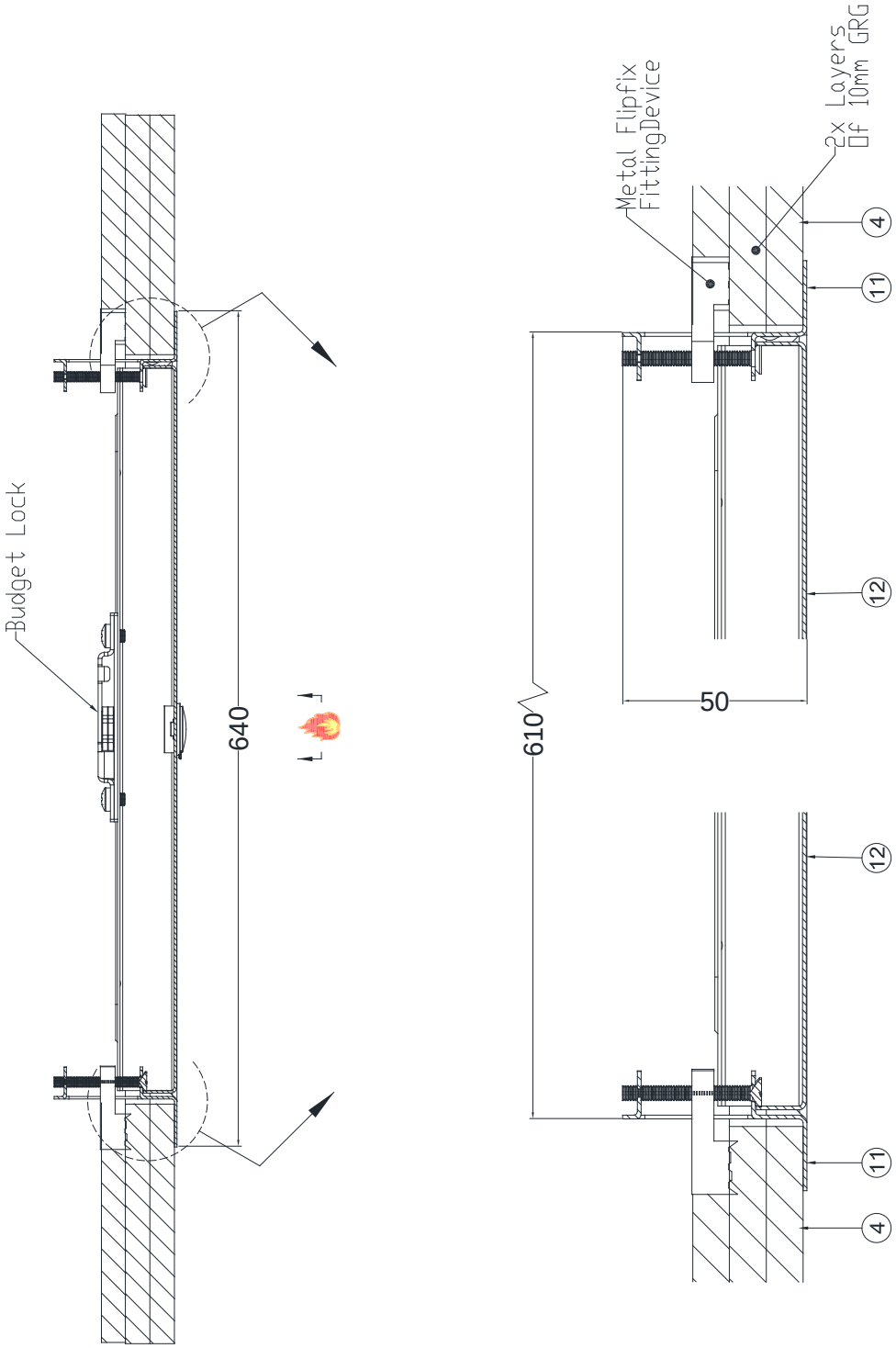
Do not scale. All dimensions are in mm

Figure 6 – Details of Panel C – Horizontal cross section through panel – FF-060-MD-PF-BL (2 flip fix) Seamless weld



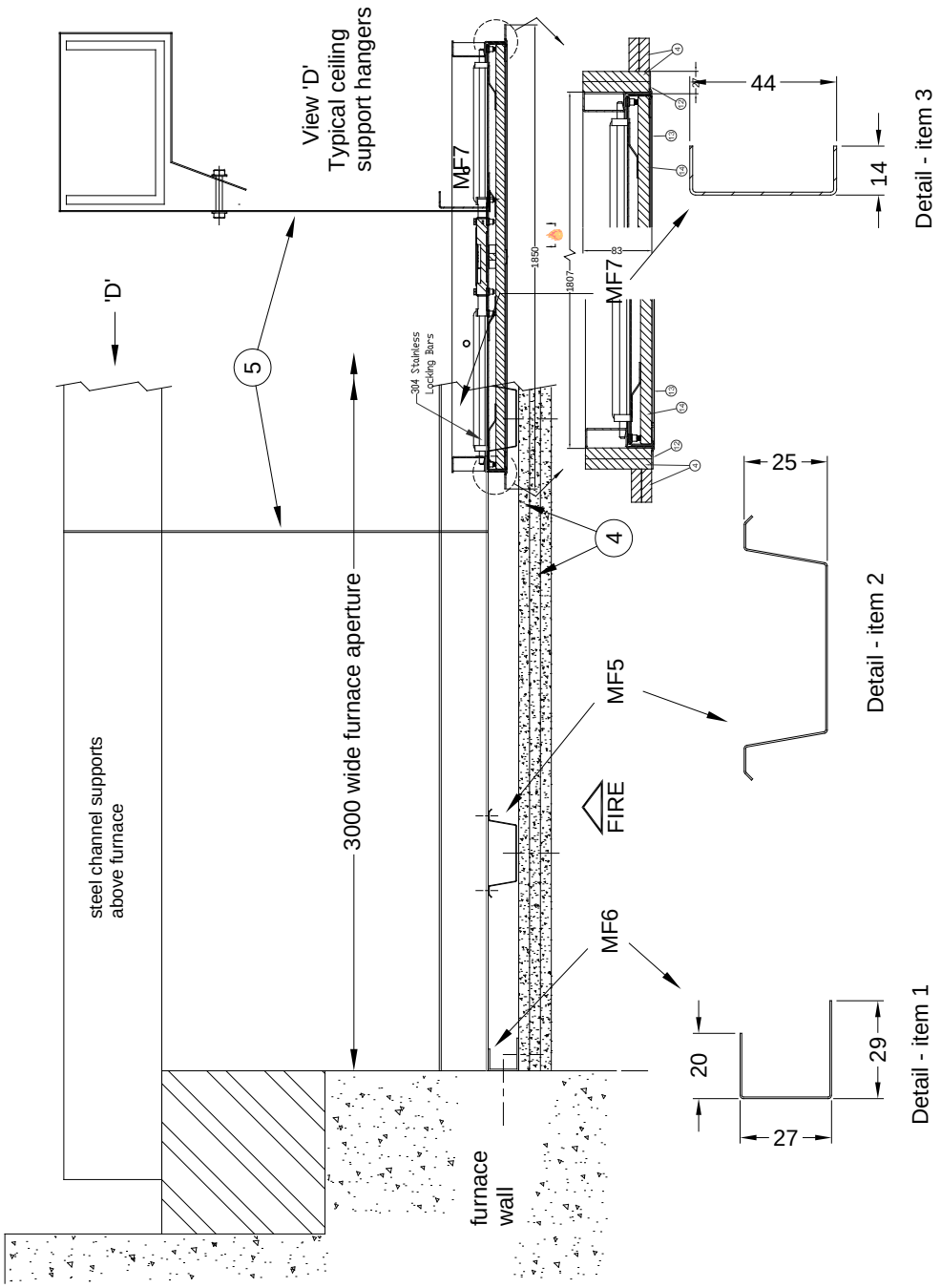
Do not scale. All dimensions are in mm

Figure 7 – Details of Panel C – Horizontal cross section through panel – FF-060-MD-PF-BL (2 flip fix) Seamless weld



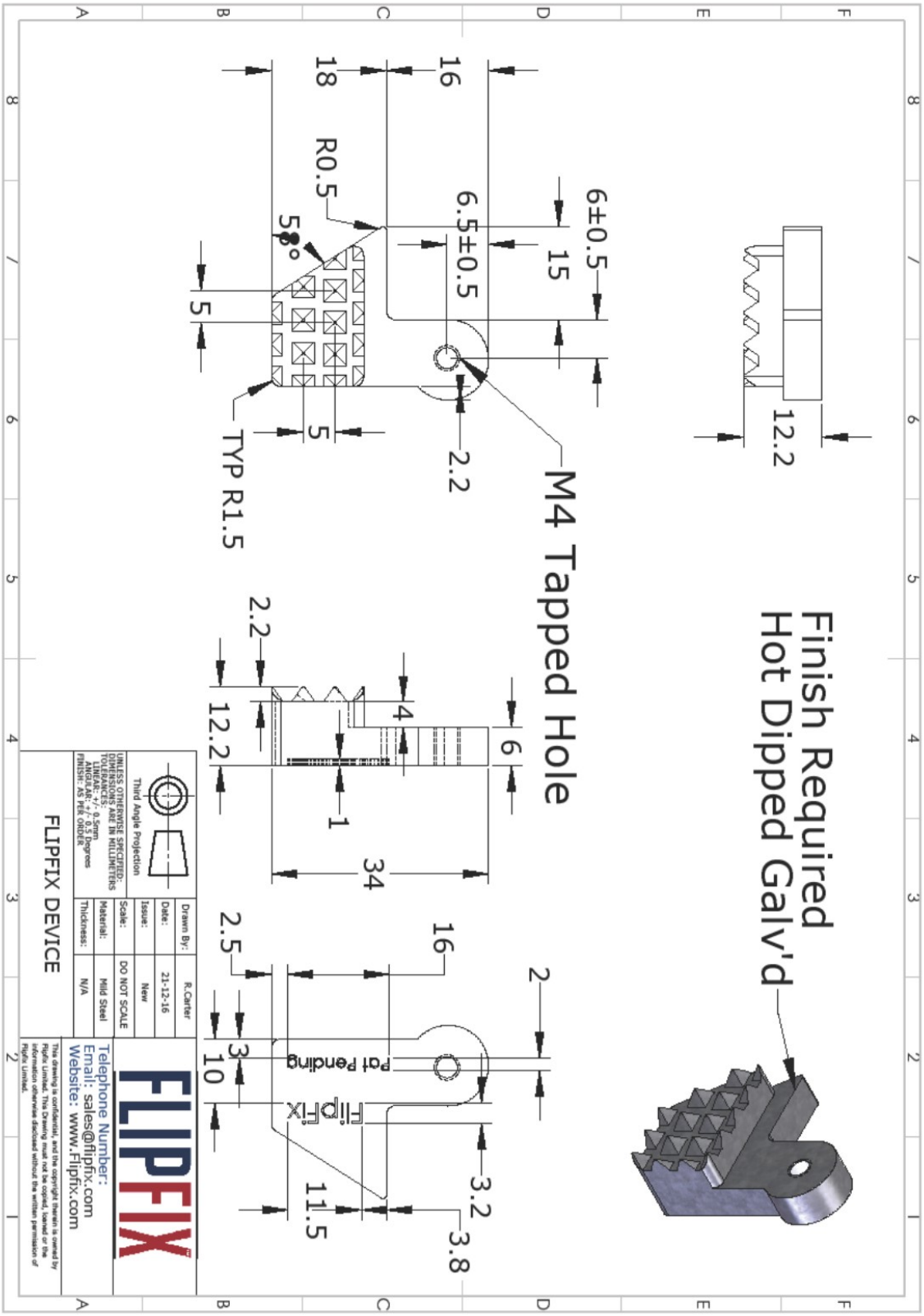
Do not scale. All dimensions are in mm

Figure 8 – Details of suspended ceiling



Do not scale. All dimensions are in mm

Figure 9 – Details of Flipfix Device



Do not scale. All dimensions are in mm

Schedule of Components

(Refer to Figures 1 to 9)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

Item		Description
British Gypsum suspended ceiling configuration G100038 (comprising items 1 to 5)		
1. Ceiling perimeter channel		
Reference	:	Gypframe MF6
Material	:	Galvanised mild steel formed channel
Thickness	:	0.6 mm
Overall section size	:	See Figure 8
Fixing method	:	Fixed to the concrete lining of the specimen restraint frame using 7.5 mm diameter x 40 mm long Multi-Fix masonry screws at 600 mm centres.
2. Ceiling secondary support sections		
Reference	:	Gypframe MF5
Material	:	Galvanised mild steel section
Thickness	:	0.6 mm
Overall section size	:	See Figure 8
Fixing method	:	Sections were fitted longitudinally at 400 mm centres, with each end fitted within the perimeter channel. Sections were also fixed to the primary support channels (see item 3).
3. Ceiling primary support channel		
Reference	:	Gypframe MF7
Material	:	Galvanised mild steel formed channel
Thickness	:	1.2 mm
Overall section size	:	See Figure 8
Fixing method	:	Primary sections fitted laterally across the ceiling on top of the longitudinally fitted secondary sections (item 2) at positions shown on Figure 1. Both sections fixed together at each intersection using 2 no. 13 mm Gyproc 13 mm wafer head jack-point steel screws. Additional sections were fitted either side of Specimen A and Specimen C.
4. Ceiling boards		
Manufacturer	:	Saint Gobain
Reference	:	Glasroc F Multiboard
Material	:	Glass-reinforced gypsum plasterboard
Thickness	:	3 no. layers, each layer 10 mm thick
Supplied board size	:	1200 mm x 2400 mm
Density	:	850 kg/m^3 (stated)
Fixing method	:	Gyproc drywall screws at 150 mm centres along the perimeter MF6 channels (item 1) and along the MF5 sections (item 2). 25 mm long screws for first layer boards and 34 mm long screws for the second layer. Board joints of each layer were staggered with respect to each other.

Item		Description
5. Ceiling support hangers		
Type	:	Metal fixing band
Reference	:	Simpson Strong Tie FB20A
Fixing method	:	Upper end of the band was secured by being strapped around steel support channels which were installed above the ceiling assembly for the purpose of the test. The lower end of the band was screw fixed to the MF7 primary support channel using a single 13 mm wafer head jack-point steel screw. See Figure 8.
Quantity	:	For positions of the hangers, see Figure 1.
Access panel assembly 'A' (consisting of items 6, 7 & 8)		
6. Mounting frame		
Material	:	Zinc mild steel, powder coated finish
Thickness	:	0.9 mm steel
Frame size	:	800 mm x 1850 mm
Fixing method	:	Clamped within the opening in the ceiling plasterboard panels using generic drywall wall screws. Aperture lined with three layers of item 4
7. Door panel		
Material	:	Zinc mild steel, powder coated finish
Thickness	:	0.9 mm steel
8 Door panel insulation		
Manufacturer	:	Siniat
Reference	:	Megadeco board
Density	:	800 kg/m^3 (stated)
Thickness	:	12.5mm thick
Fixing method	:	Inserted into the door tray
Access panel assembly 'B' (consisting of items 8 & 9)		
9. Mounting frame		
Material	:	Zinc mild steel, powder coated finish
Thickness	:	0.9 mm steel
Frame size	:	350 mm x 350 mm
Fixing method	:	Clamped within the opening in the ceiling plasterboard panels using 2 no. metal FLipFix devices. (see figure 9) fitted centrally along two edges.
10. Door panel		
Material	:	Zinc mild steel, powder coated finish
Thickness	:	0.9 mm steel
Access panel assembly 'C' (consisting of items 10 & 11)		
11. Mounting frame		
Material	:	Zinc mild steel, powder coated finish
Thickness	:	0.9 mm steel
Frame size	:	640 mm x 640 mm
Fixing method	:	Clamped within the opening in the ceiling plasterboard panels using 4 no. metal FLipFix devices. (see figure 9) Two devices fitted along each edge 139 mm from the edge.
12. Door panel		
Material	:	Zinc mild steel, powder coated finish
Thickness	:	0.9 mm steel

Instrumentation

General

The instrumentation was provided in accordance with the requirements of the Standard.

Furnace

The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2012, Clause 5.1 using eight plate thermometers, distributed over a plane 100 mm below the surface of the test construction.

Thermocouple Allocation

Thermocouples were provided to monitor the unexposed surface of Hatch A and the output of all instrumentation was recorded at no less than one minute intervals.

Thermocouples 211 to 215 (Hatch A)

At five positions on the doorset, one at the approximate centre and one at approximately the centre of each quarter section of the doorset.

The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.

Integrity Criteria

Cotton pads and gap gauges were available to evaluate the integrity of the specimen.

Furnace Pressure

The furnace atmospheric pressure was controlled so that it complied with the requirements of BS EN 1363-1: 2012. Clause 5.2. The calculated pressure differential relative to the laboratory atmosphere 100 mm below the face of the assembly was 18 (±3) Pa.

Deflection/Radiation

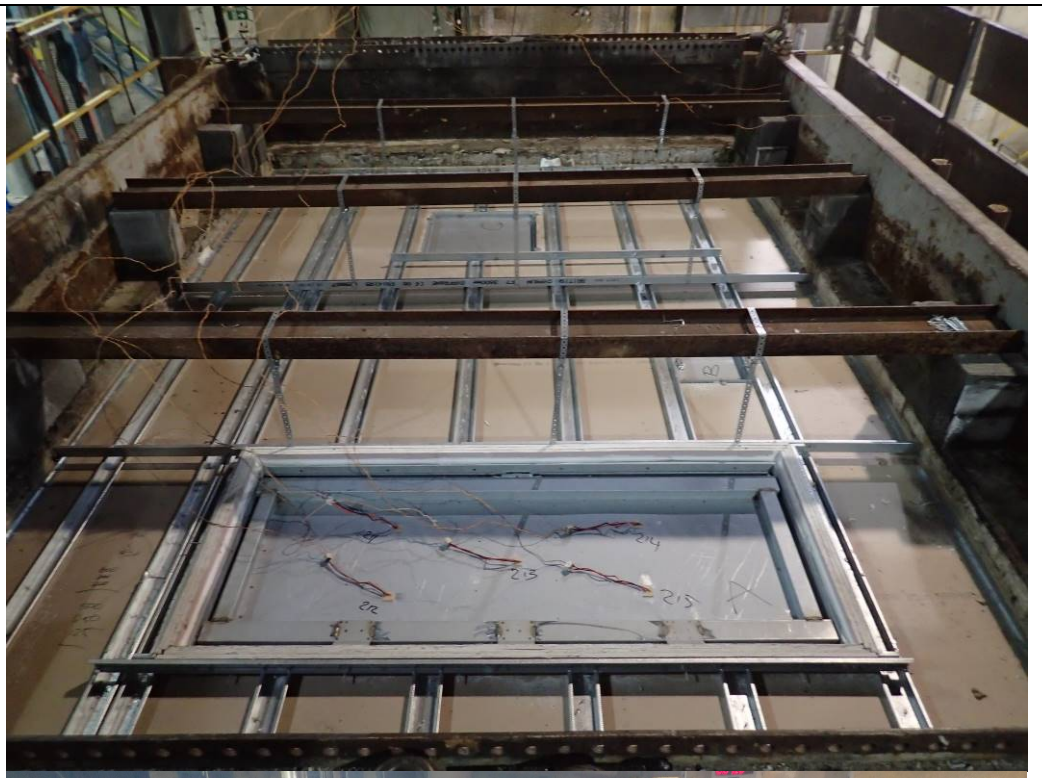
Due to the nature of the test assembly, it was not possible for safety reasons, to measure deflections and heat radiation. However visual observations of the deflections are noted in the observations.

Test Observations

Time		All observations are from the unexposed face unless noted otherwise.
mins	secs	The ambient air temperature in the vicinity of the test construction was 22ºC at the start of the test with a maximum variation of +2ºC during the test.
00	00	**The test commences.**
02	00	Smoke emits from Hatch A.
04	30	The smoke release from Hatch A increases in volume.
05	30	Steam release replaces the smoke release from Hatch A.
07	30	Sections of frame of Hatch A discolour. Steam release from hatches B and C.
10	00	Viewed from the exposed face: The 1st layer of board begins to slump.
20	00	Hatch B and C radiates a dull red in colour.
25	00	Viewed from the exposed face: The 1st layer of board begins to slump.
30	00	Each Hatch A, B and C continues to satisfy the integrity criteria of the test.
32	00	**A cotton pad integrity test is performed over Hatch B. The pad ignites.**
34	00	**A cotton pad integrity test is performed over Hatch C. The pad ignites.**
60	00	All hatches satisfy the sustained flame and gap gauge integrity criteria.
80	00	Viewed from the exposed face: The first layer of board begins to fall away into the furnace chamber.
90	00	No further significant changes are evident at this time.
93	00	More board falls into the furnace chamber.
120	00	Each hatch satisfies the sustained flaming and gap gauge criteria.
120	45	A through gap is evident on Hatch C in excess of 6mm by 150 mm. **Gap gauge failure of Hatch C is deemed to occur**.
124	00	A through gap is evident on Hatch B in excess of 6mm by 150 mm. **Gap gauge failure of Hatch B is deemed to occur**.
127	00	Hatch C falls into the furnace chamber. **The test is discontinued at the request of the sponsor.**

Test Photographs

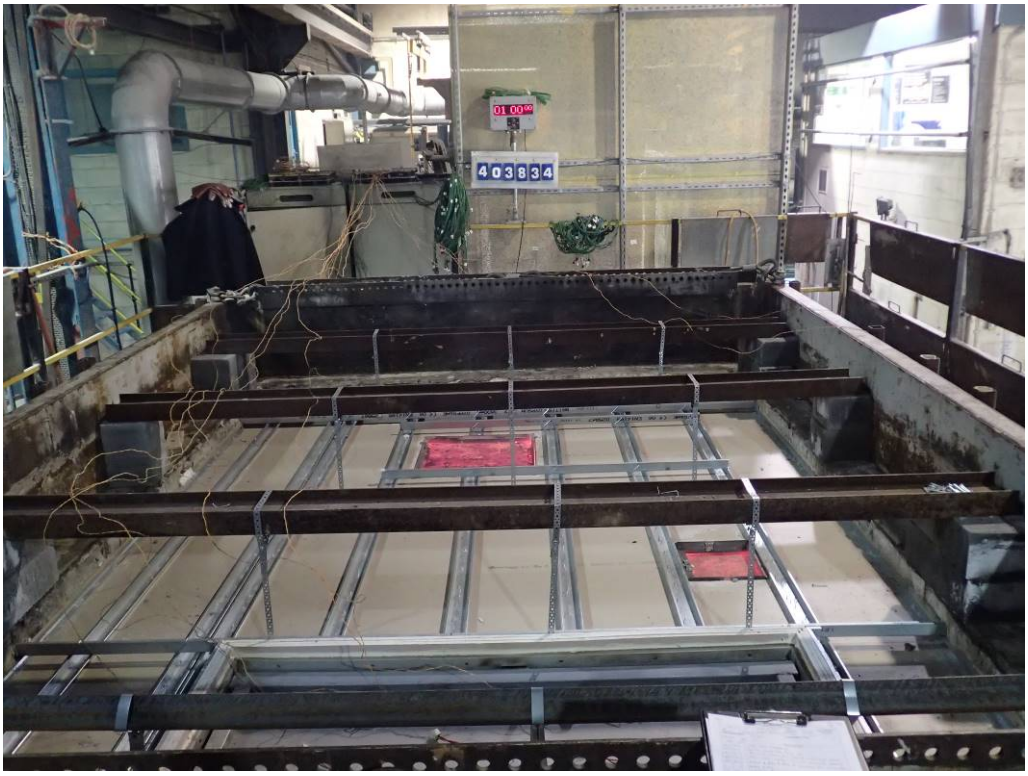
The unexposed face of the test assembly prior to the start of the test



The unexposed face of the test assembly after a test duration of 20 minutes

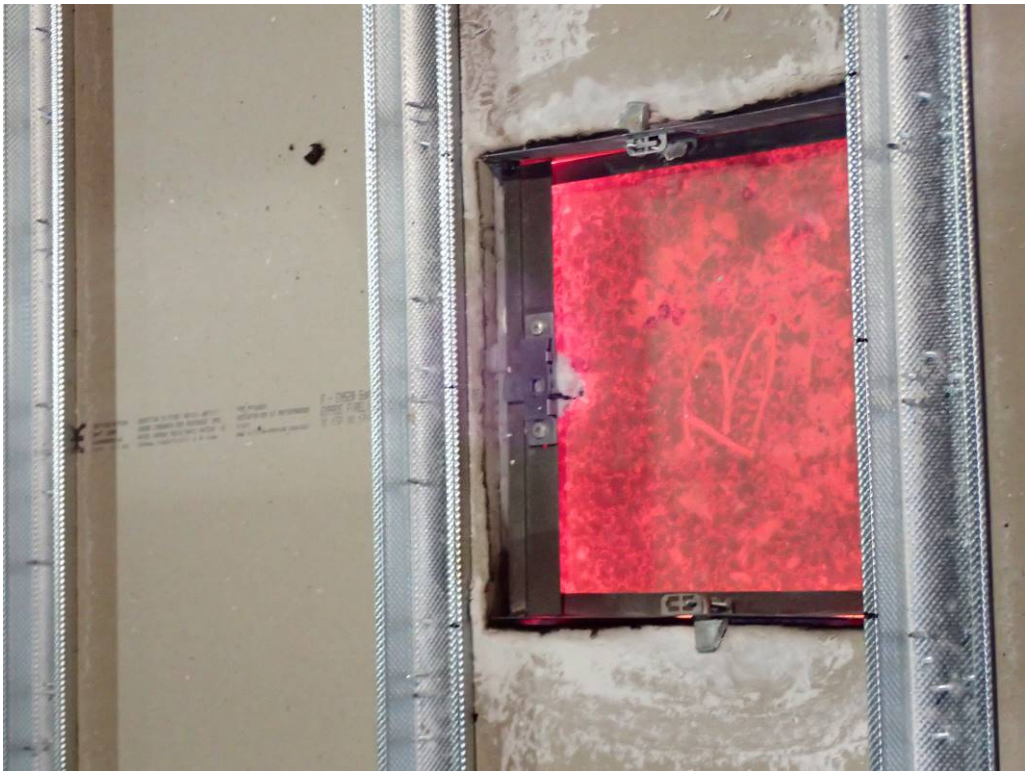
The unexposed face of the test assembly after a test duration of 40 minutes

The unexposed face of the test assembly after a test duration of 60 minutes



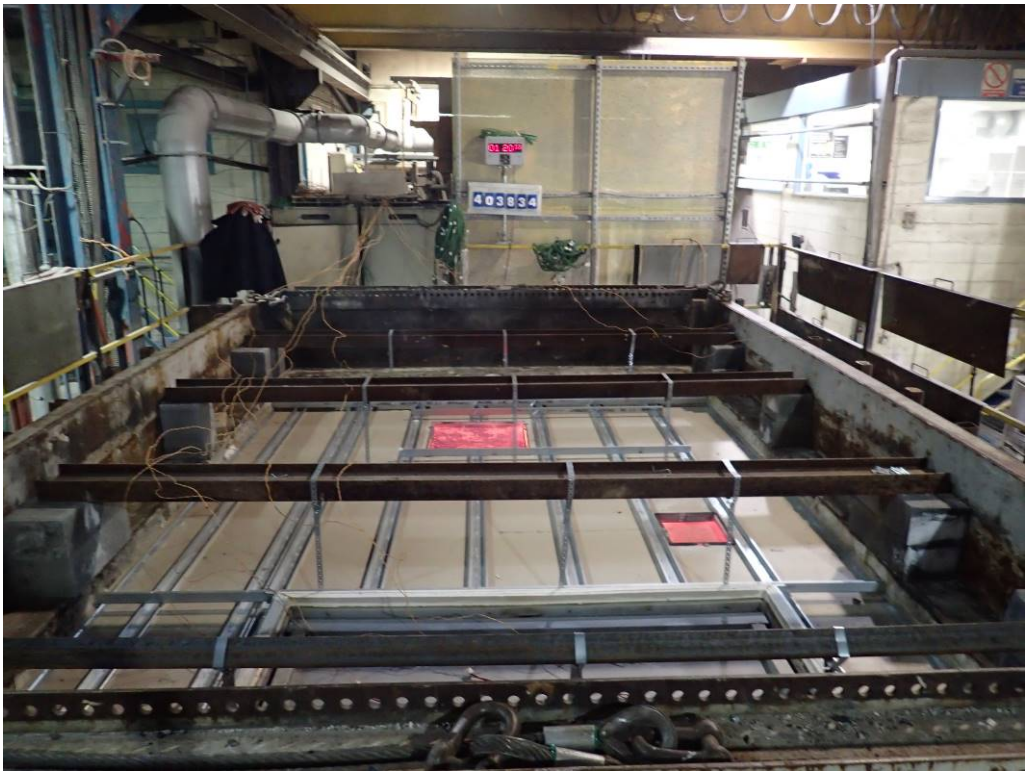
The unexposed face of the test assembly after a test duration of 60 minutes, showing Hatch A

The unexposed face of the test assembly after a test duration of 60 minutes, showing Hatch B

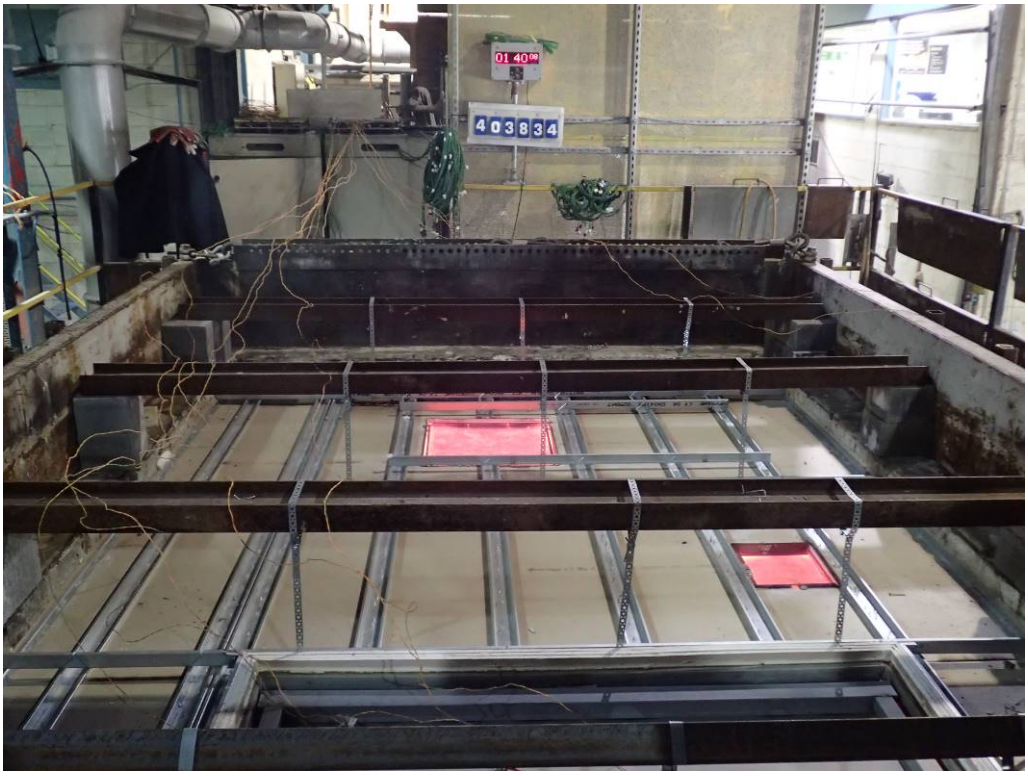


The unexposed face of the test assembly after a test duration of 60 minutes, showing Hatch C

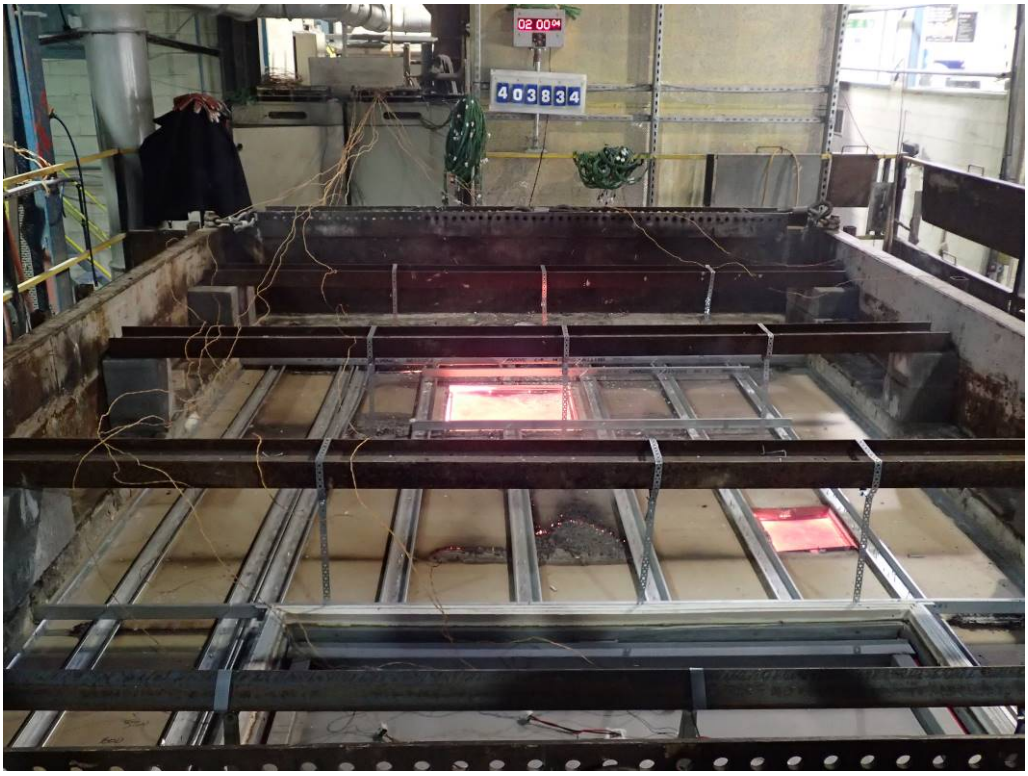
The unexposed face of the test assembly after a test duration of 80 minutes



The unexposed face of the test assembly after a test duration of 100 minutes

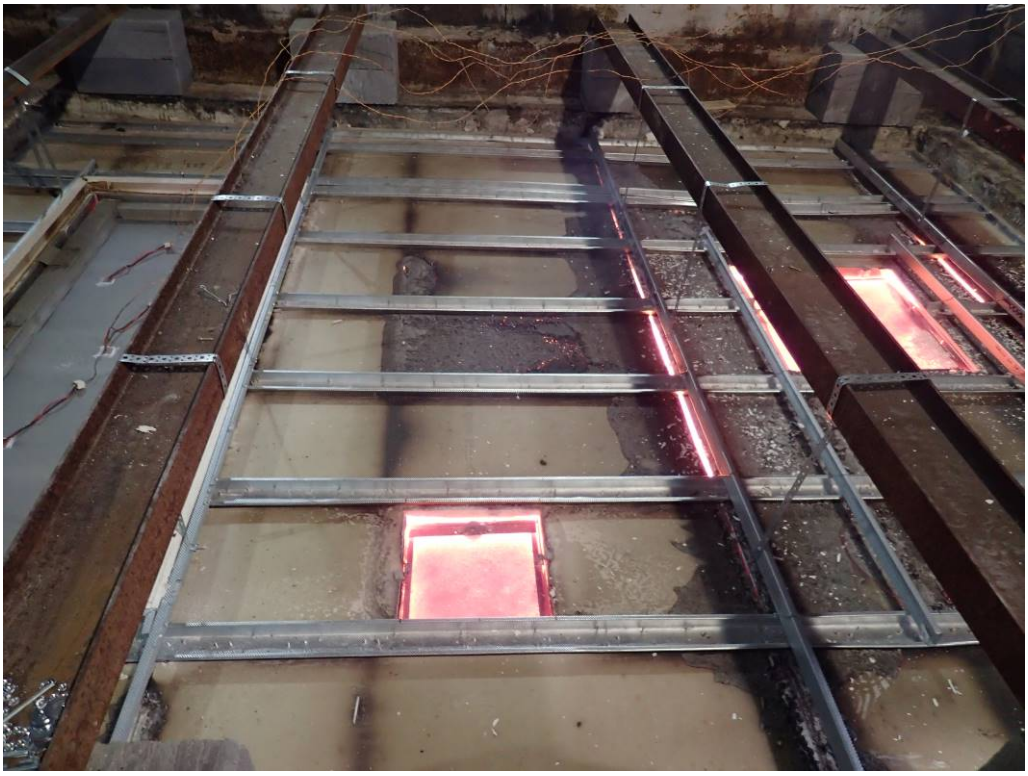


The unexposed face of the test assembly after a test duration of 120 minutes

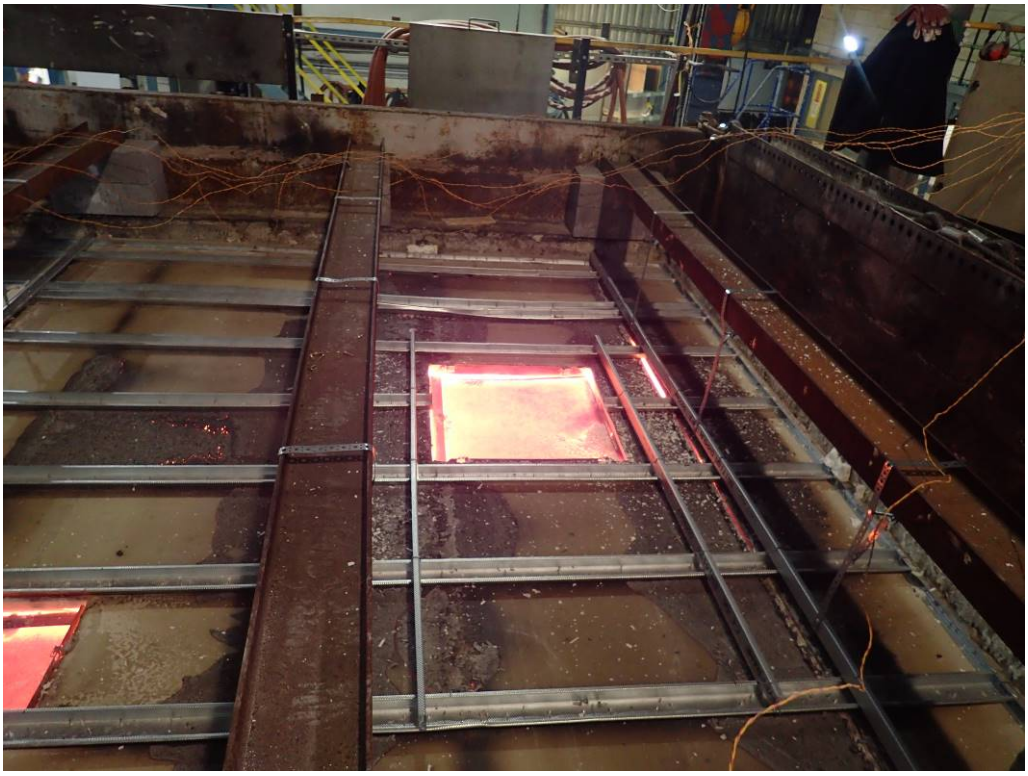


The unexposed face of the test assembly after a test duration of 120 minutes, showing Hatch A

The unexposed face of the test assembly after a test duration of 120 minutes, showing Hatch B



The unexposed face of the test assembly after a test duration of 120 minutes, showing Hatch C



The unexposed face of the test assembly after a test duration of 127 minutes

Temperature Data

Mean furnace temperature, together with the temperature/time relationship specified in the Standard

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	26
5	576	588
10	678	677
15	739	736
20	781	784
25	815	812
30	842	842
35	865	868
40	885	885
45	902	901
50	918	919
55	932	930
60	945	945
65	957	957
70	968	970
75	979	979
80	988	987
85	998	997
90	1006	1006
95	1014	1016
100	1022	1024
105	1029	1032
110	1036	1036
115	1043	1042
120	1049	1048
125	1055	1056
127	1058	1058

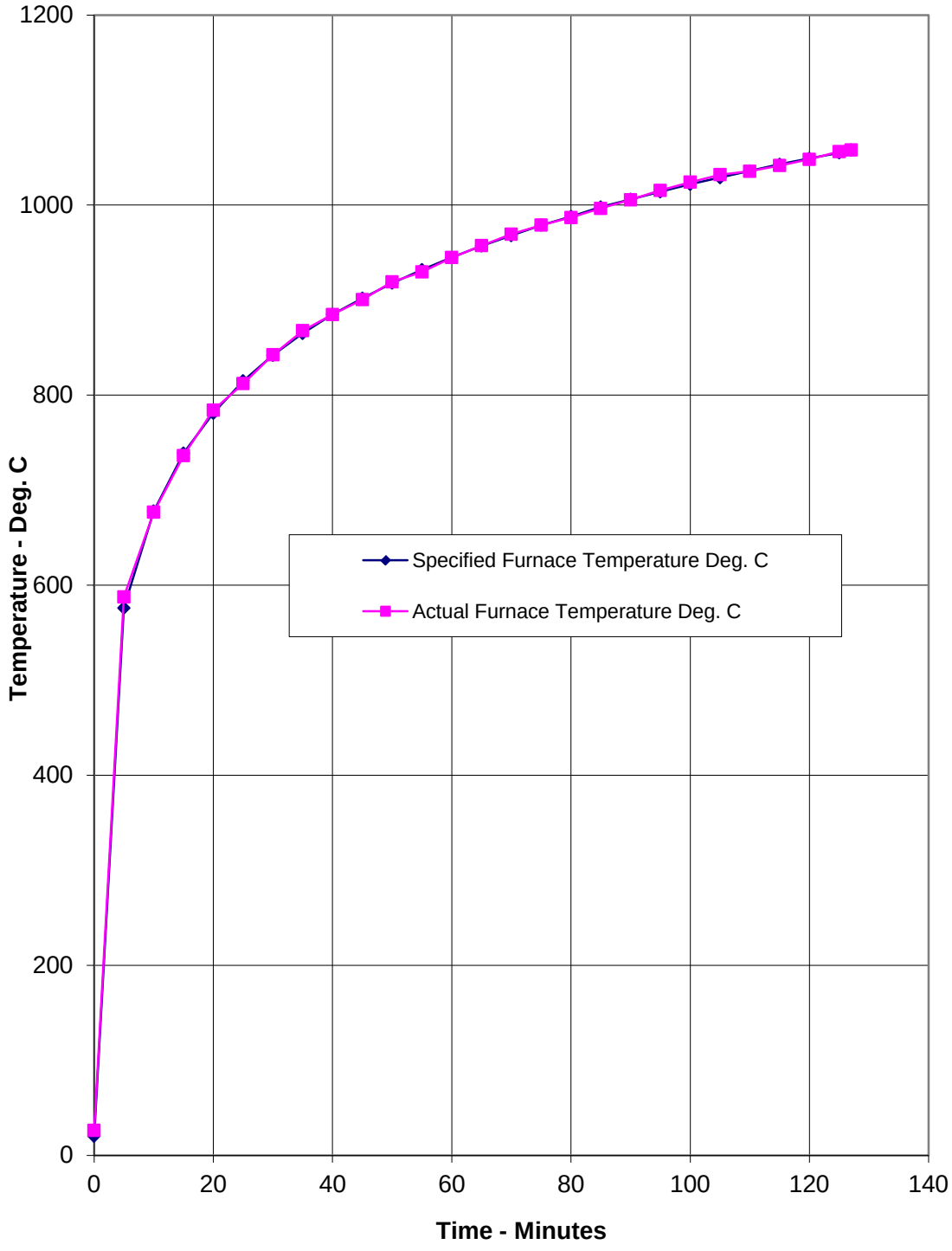
Individual And Mean Temperatures Recorded On The Unexposed Surface Of Hatch A

Time Mins	T/C Number 211 Deg. C	T/C Number 212 Deg. C	T/C Number 213 Deg. C	T/C Number 214 Deg. C	T/C Number 215 Deg. C	Mean Temp Deg. C
0	17	17	18	18	20	18
5	80	74	73	79	80	77
10	91	92	91	91	94	92
15	90	90	91	91	94	91
20	92	93	93	93	94	93
21	123	126	106	124	117	119
22	163	171	140	173	168	163
25	242	249	226	251	252	244
30	299	306	287	303	312	301
35	320	328	313	321	330	322
40	329	339	323	329	342	332
45	337	329	334	336	354	338
50	344	328	334	347	347	340
55	335	330	327	342	341	335
60	332	332	326	333	340	333
65	334	335	329	335	342	335
70	335	338	330	336	343	336
75	338	341	334	339	346	340
80	341	344	336	343	348	342
85	344	347	339	346	352	346
90	346	349	342	349	355	348
95	349	352	345	352	359	351
100	352	355	347	356	362	354
105	355	359	350	357	364	357
110	358	360	352	360	366	359
115	360	362	354	363	369	362
120	360	362	357	365	375	364
125	361	365	358	367	378	366
127	363	367	360	367	379	367

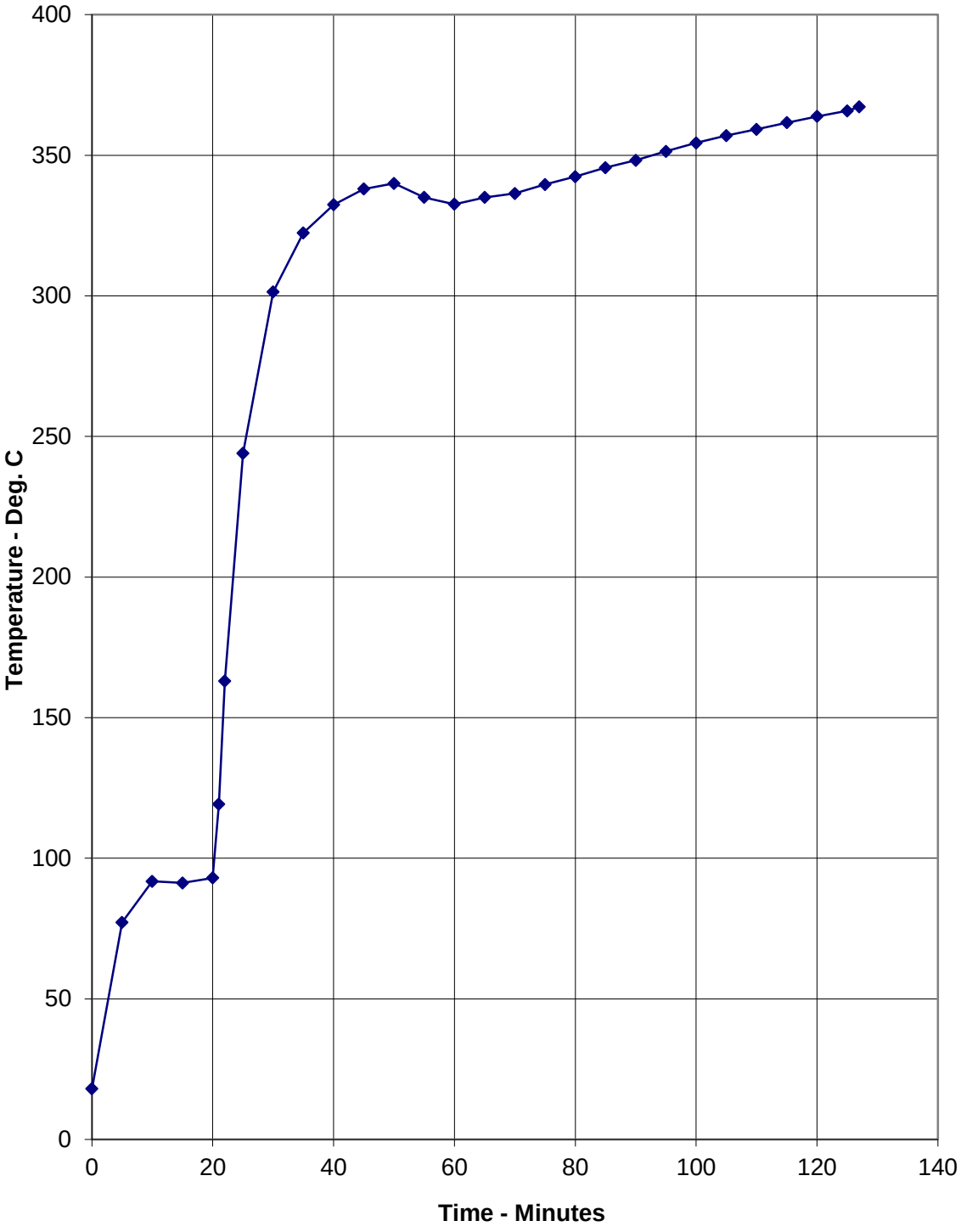
Furnace Pressure Recorded 100 Mm Below The Exposed Face Of The Test Assembly

Time Mins	Recorded Pressure Pascals
0	0.00
5	11.20
10	19.60
15	14.90
20	17.80
25	15.50
30	17.60
35	15.50
40	18.40
45	17.80
50	15.20
55	17.60
60	17.90
65	18.40
70	13.80
75	18.20
80	17.50
85	15.50
90	19.70
95	15.20
100	18.40
105	15.30
110	16.10
115	13.70
120	16.60
125	13.70
127	14.20

Graph showing mean furnace temperature, together with the temperature/time relationship specified in the Standard



Graph Showing The Mean Temperature On The Unexposed Face Of Hatch A



Performance Criteria and Test Results

Integrity

It is required that the specimen retains its separating function, without:

- causing ignition of a cotton pad when applied
- permitting the penetration of a gap gauge as specified in BS EN 1634-1: 2014
- sustained flaming on the unexposed surface

If the performance of hatches was to be assessed against the above integrity criteria, the test results could be expressed as follows:

	Hatch A	Hatch B	Hatch C
Sustained flaming	127 minutes*	127 minutes*	127 minutes
Gap gauge	127 minutes*	124 minutes	120 minutes
Cotton Pad	127 minutes*	32 minutes	34 minutes

Insulation

The mean temperature rise of the unexposed surface shall not be greater than 140ºC and that the maximum temperature rise shall not be greater than 180ºC (except on the door frame, where the maximum temperature rise shall not exceed 360ºC). Insulation failure also occurs simultaneously with integrity failure as specified in BS EN 1634-1: 2014. If the performance of Specimens was to be assessed against those criteria, test results could be expressed as follows:

Hatch A	Hatch B	Hatch C
21 minutes	n/a	n/a

*The test duration. The test was discontinued after 127 minutes.

On-going Implications

Limitations

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in BS EN 1363-1: 2012, and where appropriate BS EN 1363-2:1999. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report. Annex A of BS EN 1363-1: 2012, provides guidance information on the application of fire resistance tests and the interpretation of test data.

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

Conclusions

Evaluation against objective

Three horizontally orientated access panel doorsets have been subjected to a fire resistance test using the principals of BS EN 1634-1: 2014, Fire resistance tests for door and shutter assemblies, BS EN 1363-1: 2012, General requirements and BS EN 1363-2: 1999.

If the performance of hatches was to be assessed against the integrity and insulation criteria from BS EN 1634-1: 2014, the test results could be expressed as follows:

	Hatch A	Hatch B	Hatch C
Sustained flaming	127 minutes*	127 minutes*	127 minutes
Gap gauge	127 minutes*	124 minutes	120 minutes
Cotton Pad	127 minutes*	32 minutes	34 minutes
Insulation	21 minutes	n/a	n/a

*The test duration. The test was discontinued after 127 minutes.