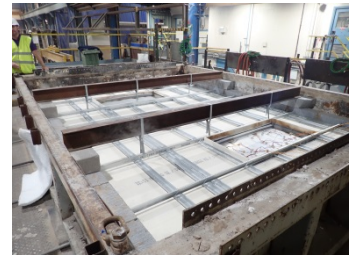


Title:

Fire Resistance Test In
Accordance With BS EN
1364-2: 2018, And
Additional Guidance Of BS
EN 1634-1 On A Non-
Loadbearing Ceiling
Assembly Incorporating
Five Access Hatches.

WF Report No:

403948 Issue 4



Prepared for:

Panel Technologies

49-61 Jodrell Street
Warwickshire
CV11 5EG

Date:

21st November 2019



Summary

Objective	To determine the fire resistance performance of a ceiling assembly incorporating five horizontally mounted, access panel hatches, when tested in accordance with BS EN 1364-2: 2018.
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 E. The hatches were installed into a suspended ceiling formed from a metal grid and three layers of Glasroc F multiboard. Hatch A had overall nominal dimensions of 1207 mm by 607 mm the doorset was formed from 0.9 mm thick steel with a powder coated finish. Hatch B had overall nominal dimensions of 300 mm by 300 mm the doorset were formed from 0.9 mm thick steel with a powder coated finish. Hatch C had overall nominal dimensions of 1207 mm by 607 mm the doorset was formed from 0.9 mm thick steel with a powder coated finish. The hatch incorporated a 12.5 mm thick section of 'Megadeco' board which was inserted into the tray of the hatch. Hatch D had an overall diameter of 600 mm the doorset was formed from 0.9 mm thick steel with a powder coated finish. Hatch E had an overall diameter of 300 mm the doorset was formed from 0.9 mm thick steel with a powder coated finish. If the performance of the ceiling and hatches was to be assessed against the integrity and insulation criteria from BS EN 1364-2: 2018, the test results could be expressed as follows:

Test Results:		Hatch A	Hatch B	Hatch C	Hatch D	Hatch E	Overall Ceiling
Integrity	Sustained flaming	120 minutes	110 minutes	120 minutes	120 minutes	120 minutes	110 minutes
	Gap gauge	120 minutes	110 minutes	120 minutes	83 minutes	120 minutes	83 minutes
	Cotton Pad	29 minutes	16 minutes	53 minutes	13 minutes	28 minutes	13 minutes
Insulation		n/a	n/a	15 minutes	n/a	n/a	n/a

The test was discontinued after a period of 120 minutes.

Date of Test 13th June 2019.

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Signatories



Responsible Officer

N. Howard*

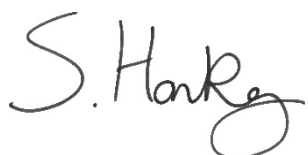
Technical Officer



Approved

S. Gilfedder*

Test Report Co-Ordinator



Head of Department

S. Hankey*

Business Unit Head-Fire Resistance

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

Report Issued

Date: 21st November 2019

Issue 3 – Amendments to hatch sizes within the test construction drawings NH. Issued: 29th November 2019.

Issue 4 - Further amendments to hatch sizes within the test construction drawings NH. Issued: 6th January 2020.

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Test Procedure

Introduction

Ceilings often incorporate features such as lighting, ventilation and access and inspection panels and as such, those may affect the performance of the ceiling to provide a fire separating function.

The test was conducted in accordance with BS EN 1364-2: 2018, 'Fire resistance tests for non-loadbearing elements – Part 2: ceilings'. 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 ceiling specimen and access hatches were judged on their ability to comply with the performance criteria for integrity and where appropriate insulation, as required by BS EN 1364-2: 2018. Hatch C is reported utilising guidance of BS EN 1634-1.

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 13th June 2019 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 ceiling assembly was installed into a refractory concrete lined, steel restraint frame on the 11th June 2019 representatives of Warringtonfire conducted the installation. The access hatches were installed by the sponsor on 12th June 2019.

Sampling

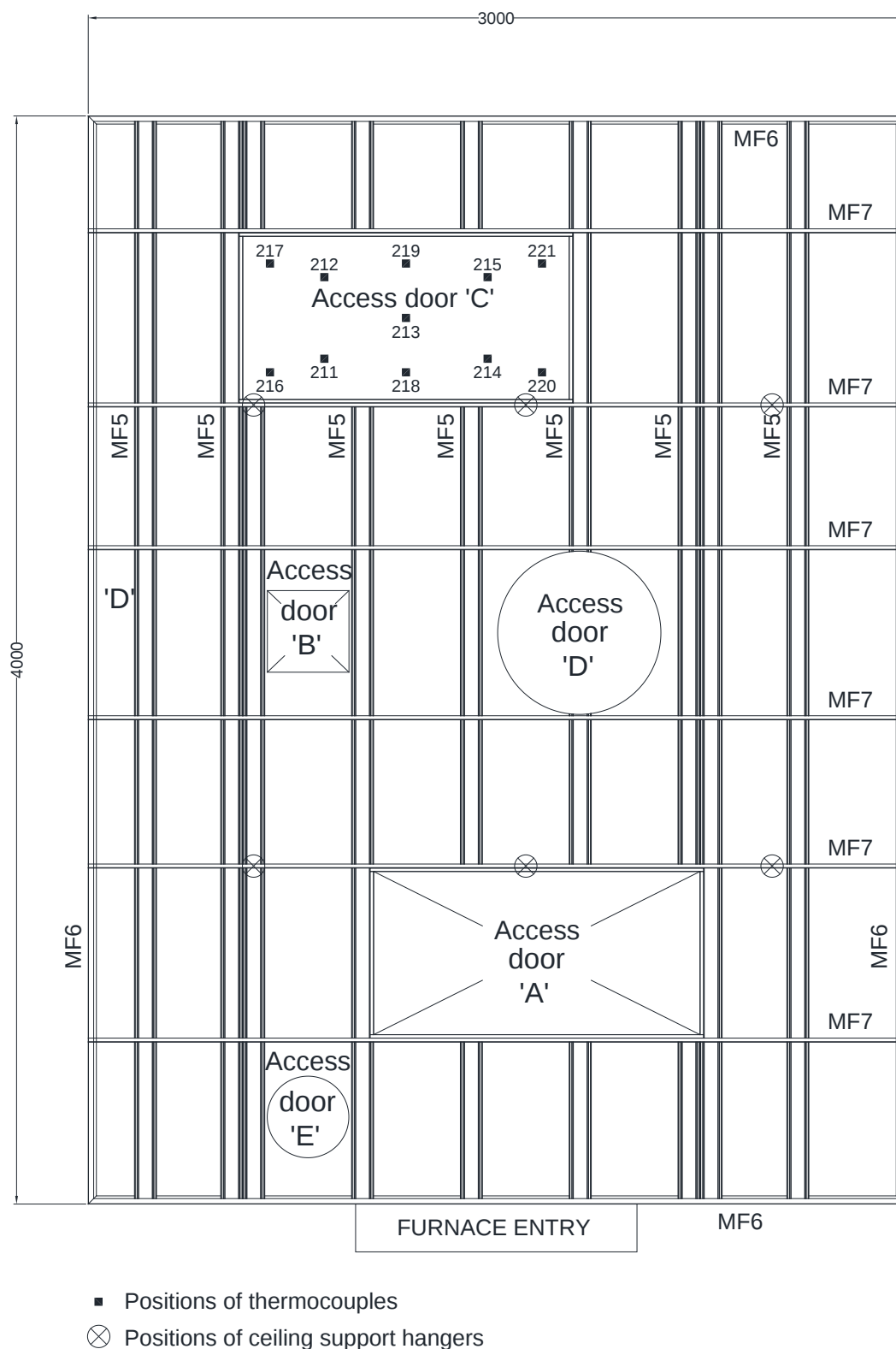
Warringtonfire was not involved in any selection or sampling procedures of the specimen or any of their components.

Conditioning

The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 2 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 19.5°C to 23.5°C and 50.5% to 72% respectively.

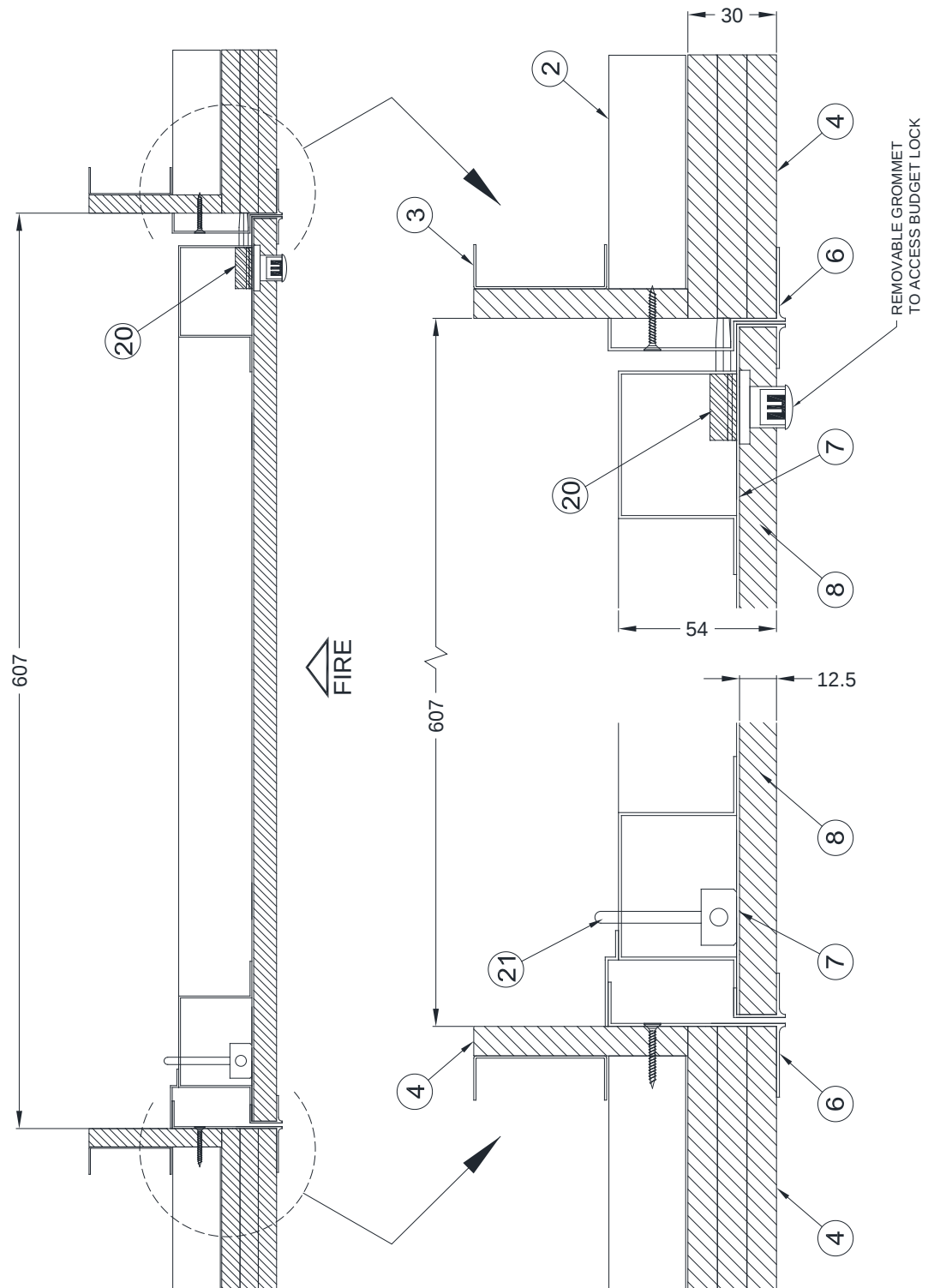
Test Specimen

Figure 1- General Plan of Test Construction



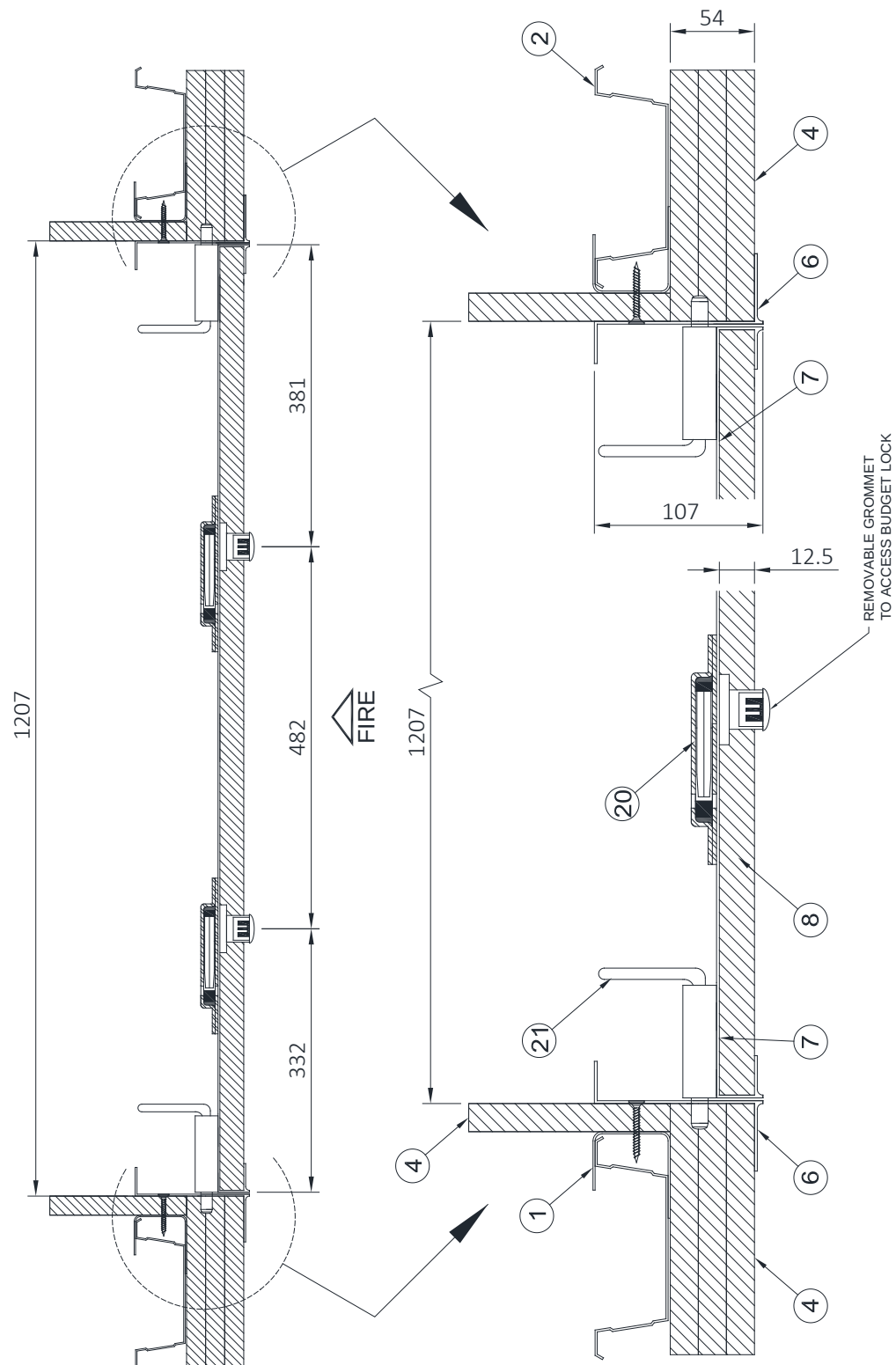
Do not scale. All dimensions are in mm

Figure 2 – Details of Panel A – Horizontal cross section through panel – 56-120-PD-BF-BL



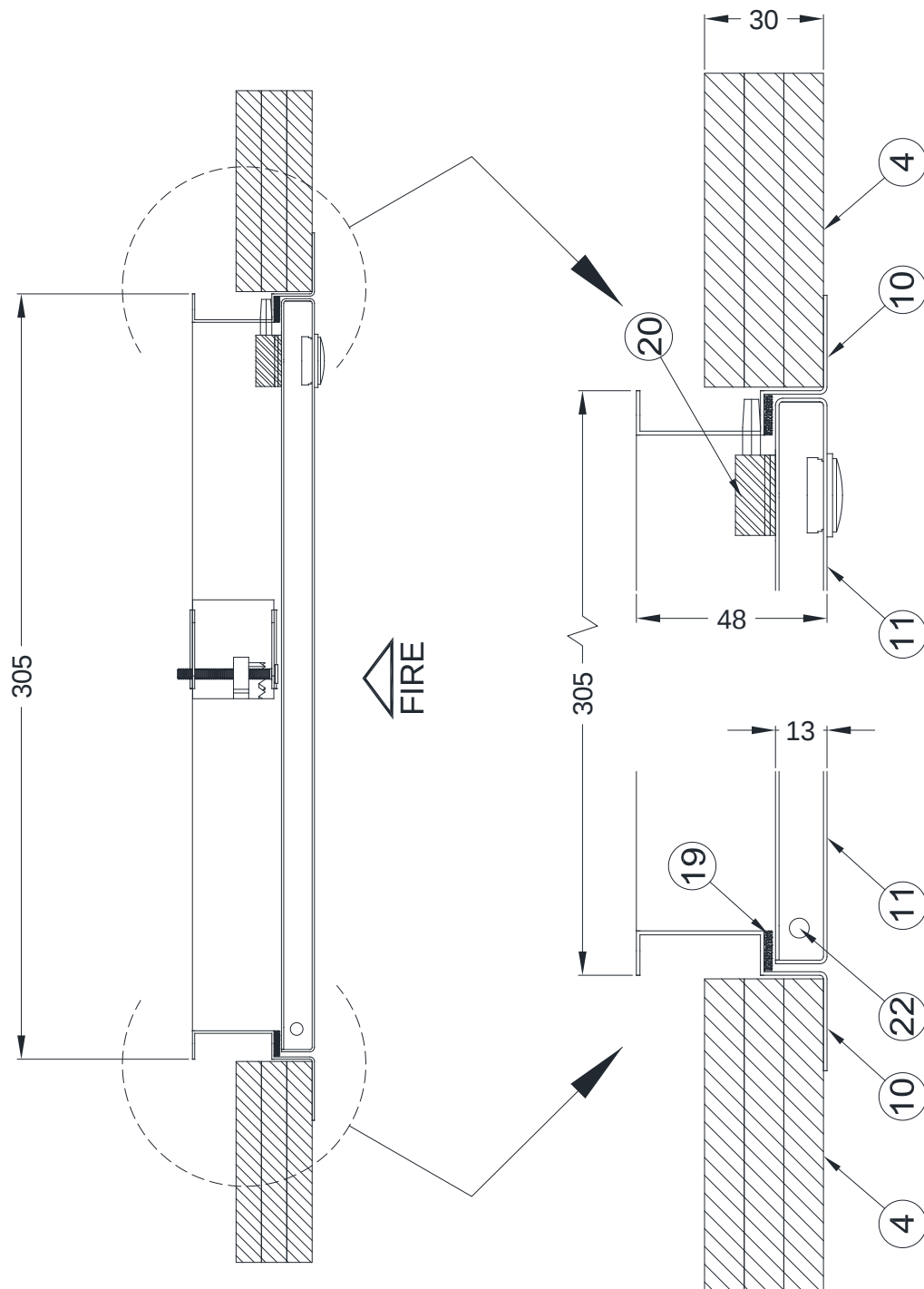
Do not scale. All dimensions are in mm

Figure 3 – Details of Panel A – Horizontal cross section through panel – 56-120-PD-BF-BL



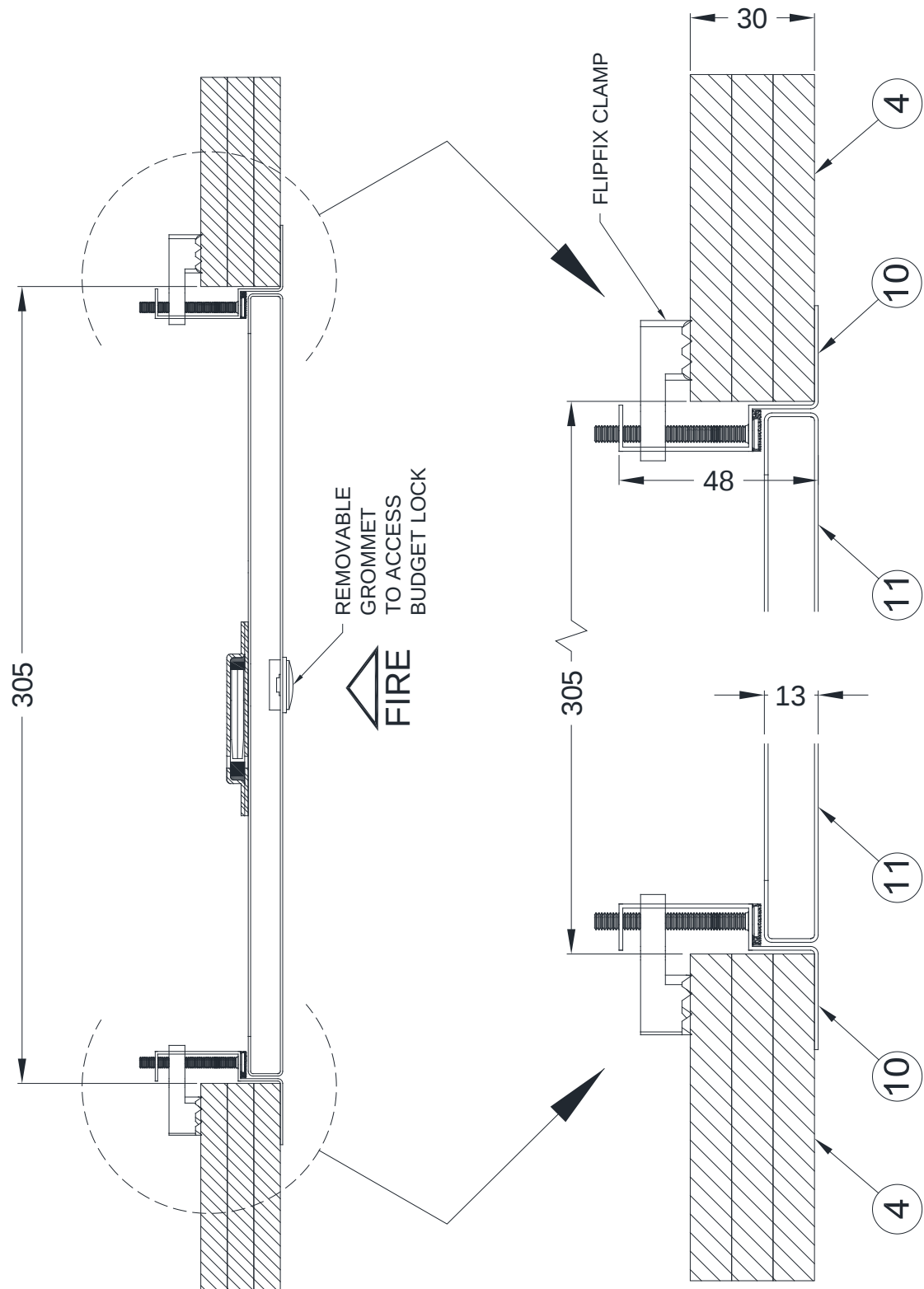
Do not scale. All dimensions are in mm

Figure 4 – Details of Panel B – Horizontal cross section through panel – FF-090-MD-PF-AT



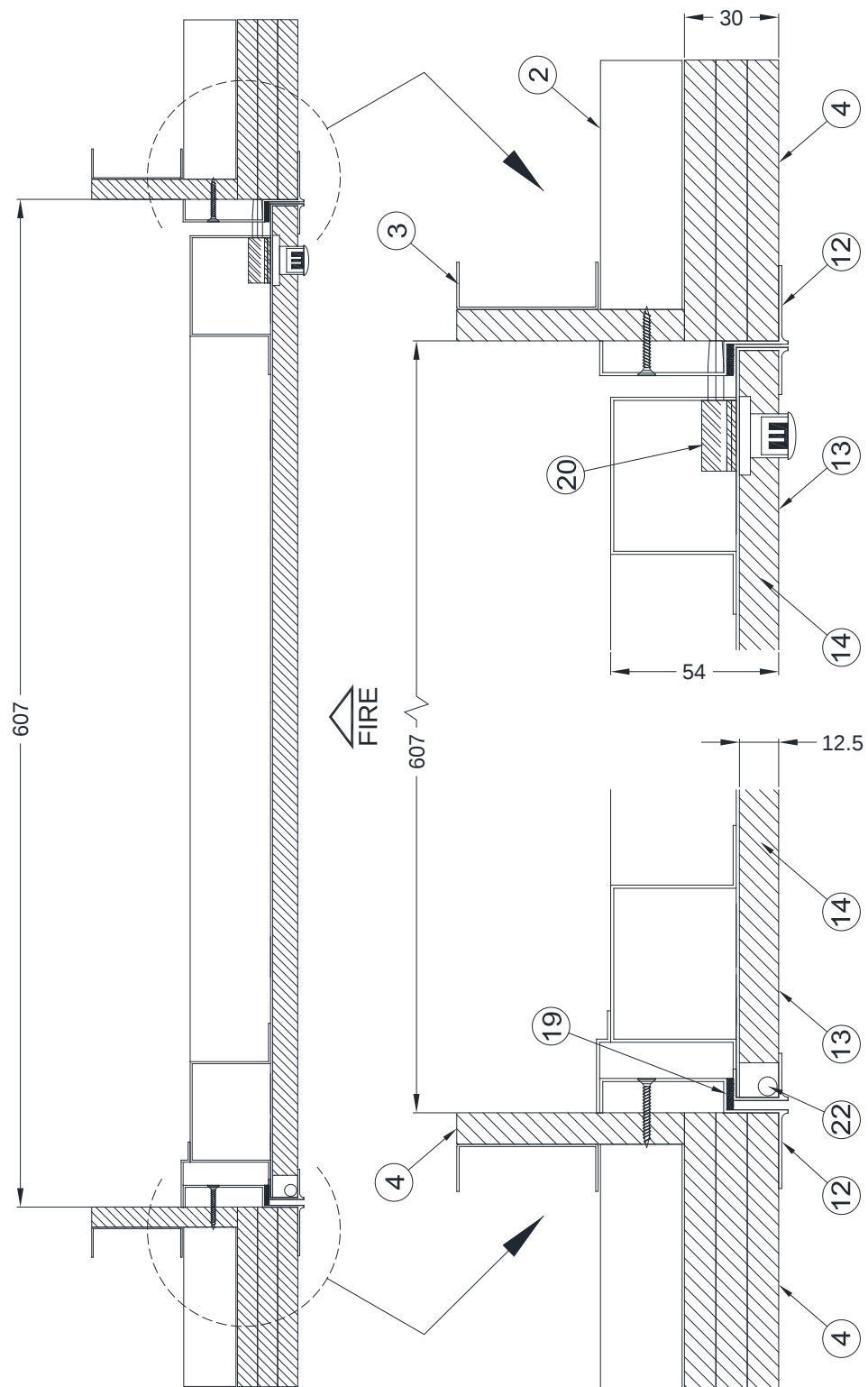
Do not scale. All dimensions are in mm

Figure 5 – Details of Panel B – Horizontal cross section through panel – FF-090-MD-PF-AT



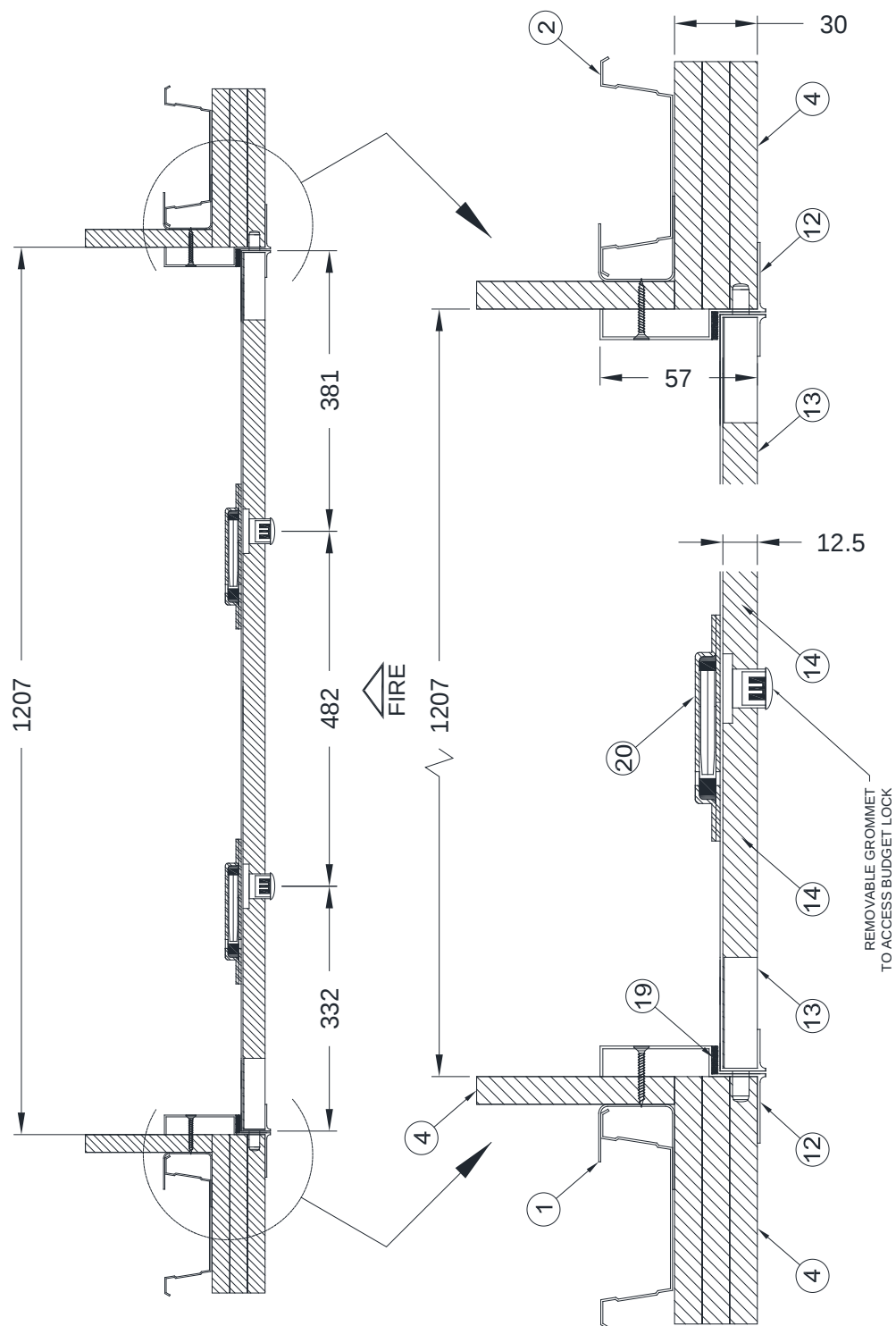
Do not scale. All dimensions are in mm

Figure 6 – Details of Panel C – Horizontal cross section through panel – 56-120-PD-BF-BL-DB



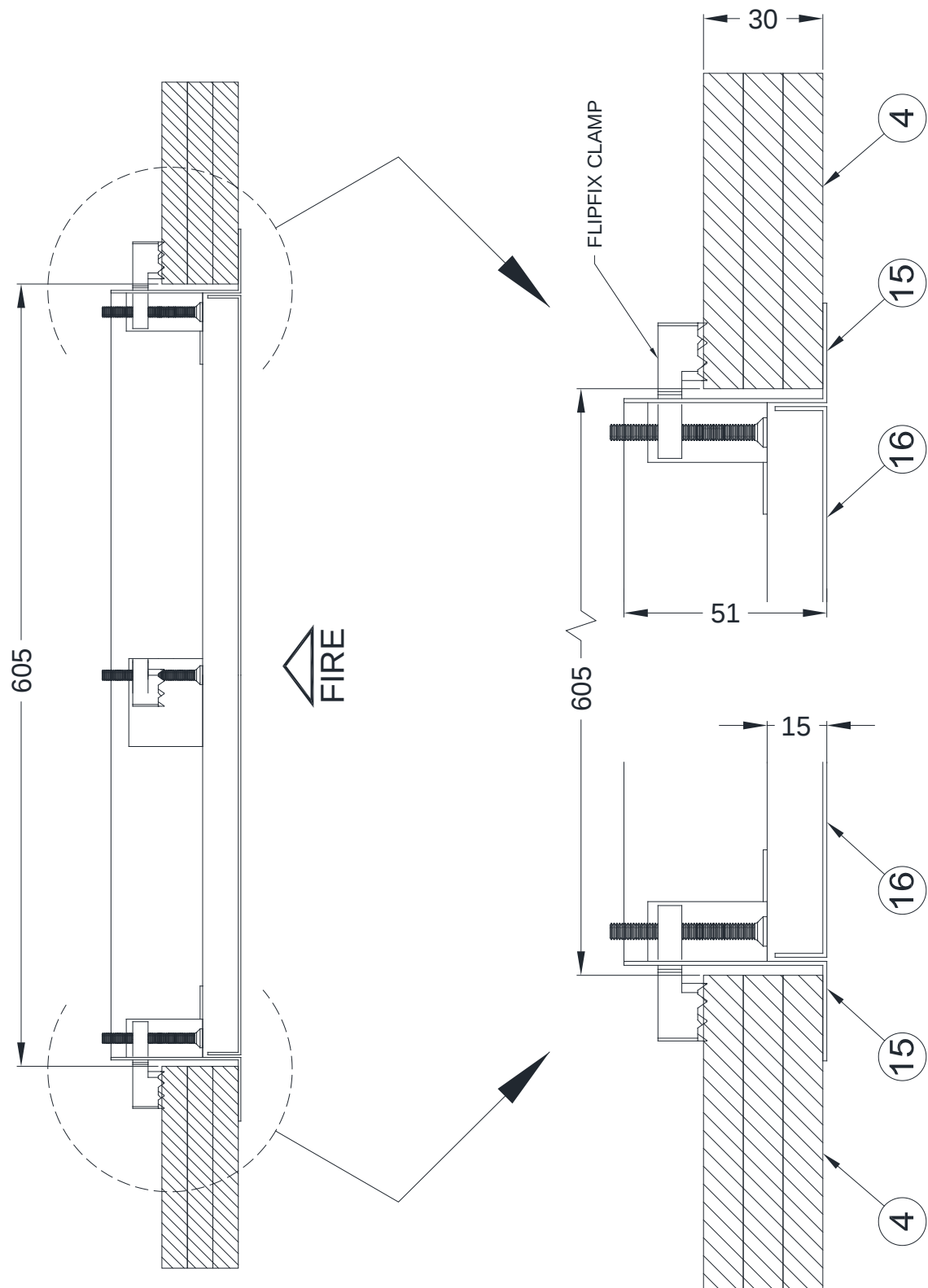
Do not scale. All dimensions are in mm

Figure 7 – Details of Panel C – Horizontal cross section through panel – 56-120-PD-BF-BL-DB



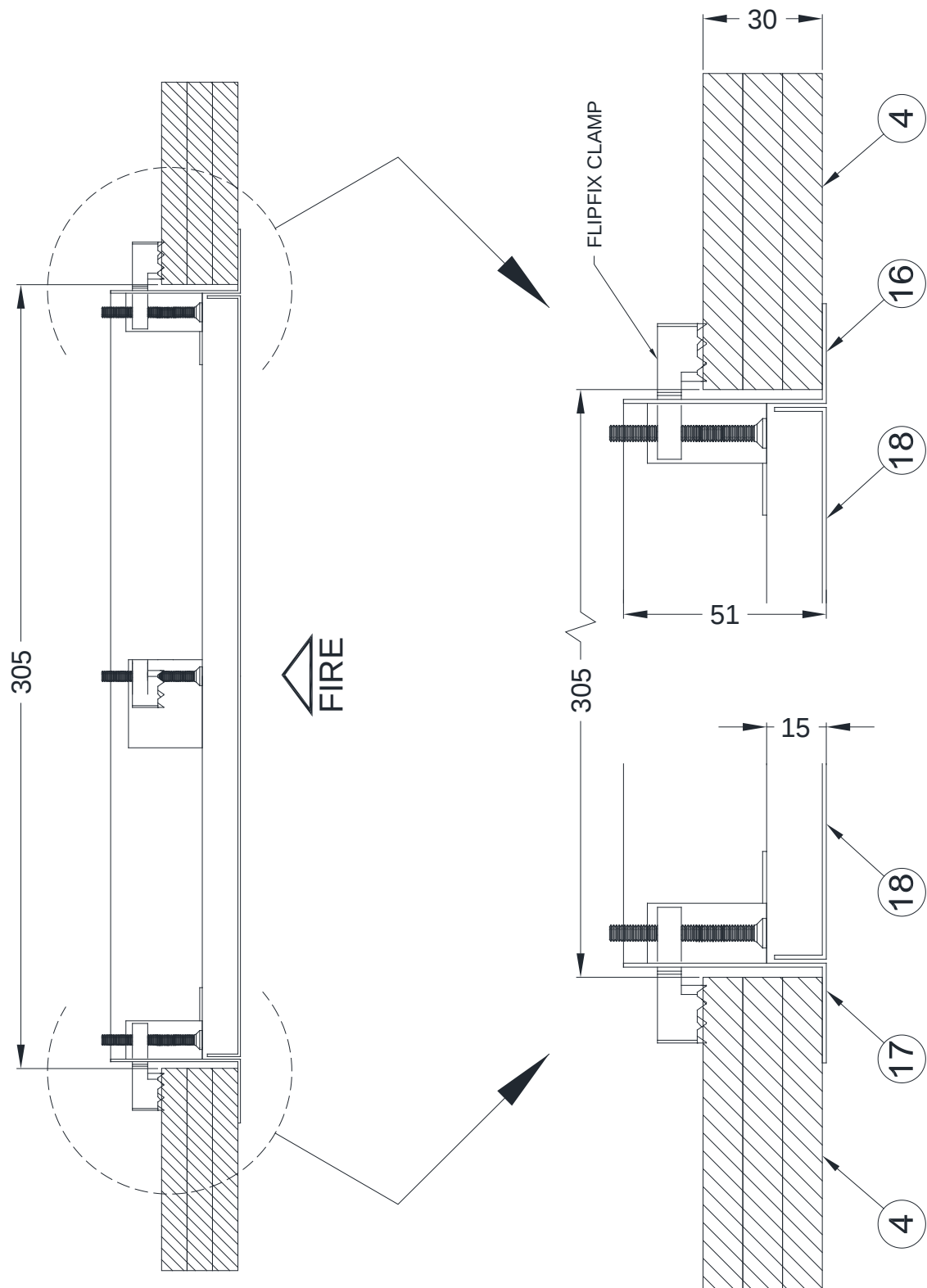
Do not scale. All dimensions are in mm

**Figure 8 – Details of Panel D – Horizontal cross section through panel – FF-180-MD-PF-CIR
600mm DIAMETER**



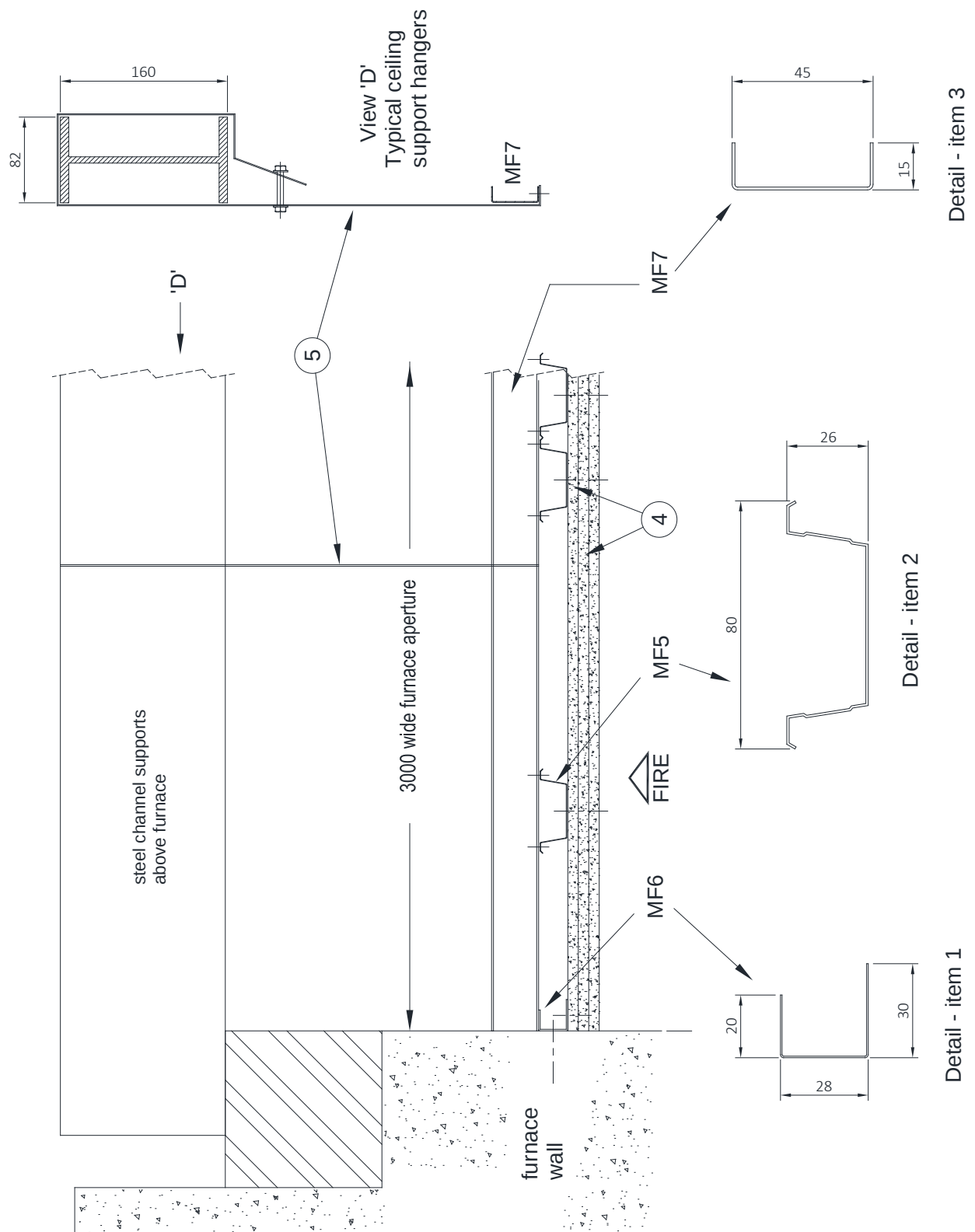
Do not scale. All dimensions are in mm

**Figure 9 – Details of Panel E – Horizontal cross section through panel – FF-180-MD-PF-CIR
300mm DIAMETER**



Do not scale. All dimensions are in mm

Figure 10 – Details of suspended ceiling



Do not scale. All dimensions are in mm

Schedule of Components

(Refer to Figures 1 to 10)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

<u>Item</u>	<u>Description</u>
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	: 0.5 mm
Overall section size	: See Figure 10
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	: 0.5 mm
Overall section size	: See Figure 10
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	: 0.9 mm
Overall section size	: See Figure 10
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.
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, 34 mm long screws for the second layer and 50 mm long screws for the third layer. Board joints of each layer were staggered with respect to each other.

<u>Item</u>	<u>Description</u>
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 10.
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	: 1207 mm x 607 mm
Fixing method	: Screw fixed in place using 3.5 x 50 mm bright zinc plated (BZP) countersunk pozi bugle head cross recess self drilling drywall screws at 300 mm centres
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 10 & 11)	
10. Mounting frame	
Material	: Zinc mild steel, powder coated finish
Thickness	: 0.9 mm steel
Frame size	: 300 mm x 300 mm
Fixing method	: Clamped in place using steel FlipFix fixing device (See figure 11), manufactured from hot galvanised dipped forged steel
11. Door panel	
Material	: Zinc mild steel, powder coated finish
Thickness	: 0.9 mm steel
Access panel assembly 'C' (consisting of items 12, 13 & 14)	
12. Mounting frame	
Material	: Zinc mild steel, powder coated finish
Thickness	: 0.9 mm steel
Frame size	: 1207 mm x 607 mm
Fixing method	: Screw fixed in place using 3.5 x 50 mm bright zinc plated (BZP) countersunk pozi bugle head cross recess self drilling drywall screws at 300 mm centres
13. Door panel	
Material	: Zinc mild steel, powder coated finish
Thickness	: 0.9 mm steel

<u>Item</u>	<u>Description</u>
14 Door panel insulation	
Manufacturer	: Siniat
Reference	: Soundbloc board
Density	: 800 kg/m ³ (stated)
Thickness	: 12.5mm thick
Fixing method	: Inserted into the door tray
Access panel assembly 'D' (consisting of items 15 & 16)	
15. Mounting frame	
Material	: Zinc mild steel, powder coated finish
Thickness	: 0.9 mm steel
Frame size	: 600 mm diameter
Fixing method	: Clamped in place using 4 No. steel FlipFix fixing device (See figure 11), manufactured from hot galvanised dipped forged steel
16. Door panel	
Material	: Zinc mild steel, powder coated finish
Thickness	: 0.9 mm steel
Access panel assembly 'E' (consisting of items 17 & 18)	
17. Mounting frame	
Material	: Zinc mild steel, powder coated finish
Thickness	: 0.9 mm steel
Frame size	: 300 mm diameter
Fixing method	: Clamped in place using 4 No. steel FlipFix fixing device (See figure 11), manufactured from hot galvanised dipped forged steel
18. Door panel	
Material	: Zinc mild steel, powder coated finish
Thickness	: 0.9 mm steel
19. Intumescent Tape	
Reference	: Norseal FS1000
Material	: Intumescent Tape
Thickness	: 4.5 mm
20. Budget Lock	
Supplier	: C.R.A International
Reference	: Standard budget lock
Product Code	: L11A
Material	: Bright zinc plated mild steel
21. Fast Fix Hinge System	
Supplier	: Bagshaw Engineering
Reference	: Standard budget lock
Product Code	: HINGE-RF-R56-120
Material	: Electroplated R56 rapid fit hinge
Size	: 8 mm x 15 mm x 40 mm
22. Pin Hinge	
Supplier	: TR Fastenings
Product Code	: PAN-POZI-TRITAP-M5X8-BZP

Reference : M5 x 8mm Bright Zinc Plated (BZP) Pan Pozi Head
Cross Recess Tritap Screw

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 D and the output of all instrumentation was recorded at no less than one minute intervals.
Thermocouples 211 to 215 (Hatch C)	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 20 (± 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 15°C at the start of the test with a maximum variation of +5°C during the test.
00	00	The test commences.
02	10	Steam release is visible from the perimeter of hatches A to E.
03	10	The steam release turns to smoke.
13	00	A cotton pad is applied to hatch D and ignites. Cotton pad failure is deemed to occur.
16	00	A cotton pad applied to hatch B and ignites. Cotton pad failure is deemed to occur.
28	00	A cotton pad is applied to hatch E and ignites. Cotton pad failure is deemed to occur.
29	30	A cotton pad is applied to hatch A and ignites. Cotton pad failure is deemed to occur.
30	00	All hatches A to E continue to satisfy the sustained flaming and gap gauge criteria of the test.
33	00	A through gap is evident at the latch side of hatch D which is greater than 6 mm but cannot move 150 mm and only moves approximately 75mm.
45	00	Viewed from the exposed face: the first layer of board remains in place and intact. The specimen glows a bright orange in colour.
53	00	A cotton pad is applied to specimen C and ignites. Cotton pad failure is deemed to occur.
60	00	All hatches A to E continue to satisfy the sustained flaming and gap gauge criteria of the test.
83	00	A 6mm gap gauge is applied to hatch D and is allowed to penetrate into the furnace chamber and move by 200mm. Gap gauge integrity failure of hatch D is deemed to occur.
87	00	Viewed from the exposed face: The first layer of the board shows signs of cracking while segments falling away into the furnace chamber.
88	45	Viewed from the exposed face: The plasterboard of hatch A falls away into the furnace chamber.
110	00	Hatch B falls through into the furnace chamber. Gap gauge Integrity failure is deemed to occur.
120	00	The test is discontinued at the request of the sponsor.

Test Photographs

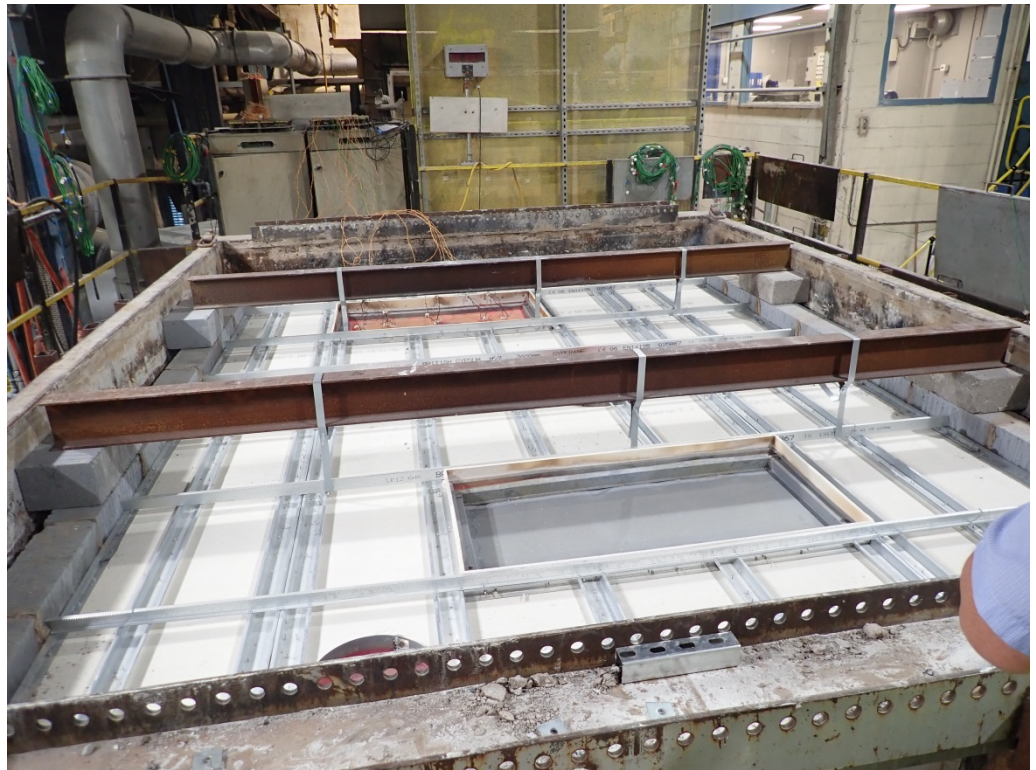
The exposed face of the test assembly prior to the start of the test



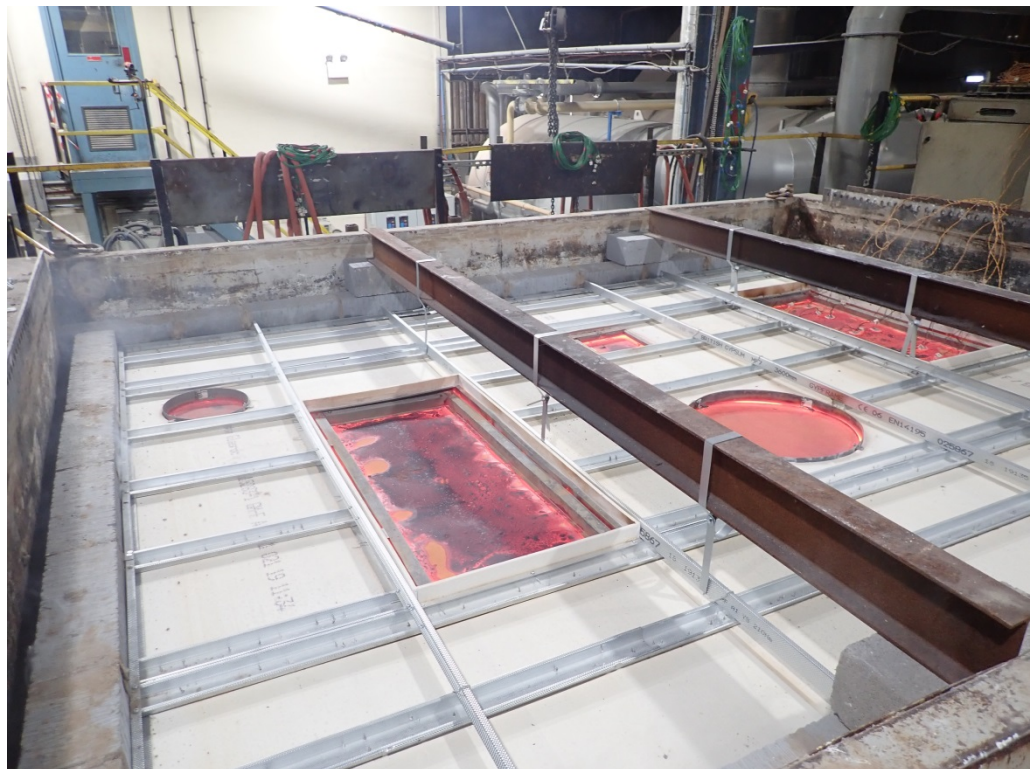
The unexposed face of the test assembly prior to the start of the test



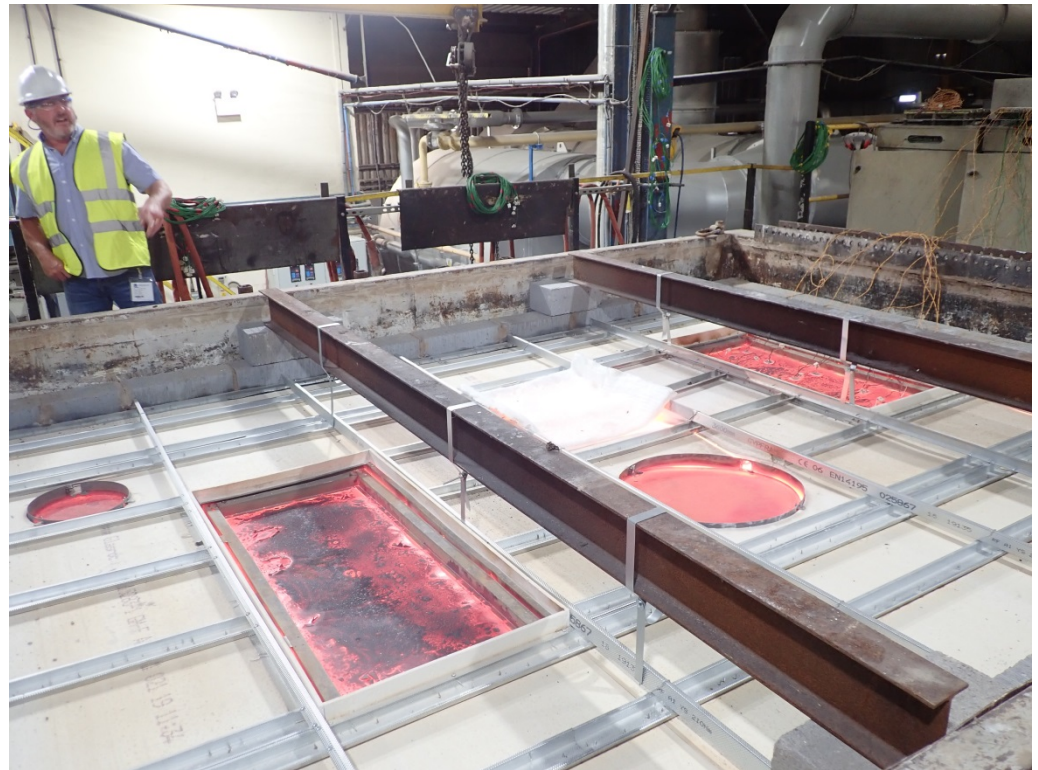
The unexposed
face of the test
assembly after a
test duration of
60 minutes



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



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



Temperature Data

**Mean furnace temperature, together with the temperature/time relationship
specified in the Standard Of BS EN 1363-1: 2012**

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	23
4	544	528
8	646	648
12	706	702
16	748	744
20	781	780
24	809	803
28	832	830
32	852	855
36	869	874
40	885	889
44	899	902
48	912	916
52	924	923
56	935	933
60	945	941
64	955	950
68	964	961
72	973	975
76	981	984
80	988	992
84	996	1001
88	1003	1008
92	1009	1007
96	1016	1013
100	1022	1019
104	1028	1024
108	1033	1029
112	1039	1032
116	1044	1040
120	1049	1049
121	1050	1051

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

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	16	17	17	19	17
4	85	87	85	78	85	84
8	89	90	90	89	92	90
12	89	90	91	91	93	91
16	88	98	88	88	101	93
20	222	249	184	179	215	210
24	311	313	285	273	292	295
28	354	337	323	310	321	329
32	364	354	340	326	337	344
36	373	363	355	341	349	356
40	369	375	367	355	359	365
44	383	367	358	362	369	368
48	394	367	355	351	360	365
52	635	603	616	542	598	599
56	800	794	809	765	792	792
60	810	801	819	772	802	801
64	821	810	827	779	808	809
68	833	819	838	789	820	820
72	848	831	851	802	831	833
76	862	837	861	813	842	843
80	875	840	870	823	851	852
84	886	852	875	829	853	859
88	898	826	875	829	856	857
92	889	826	873	823	854	853
96	919	826	879	827	856	861
100	931	836	880	834	853	867
104	1007	847	881	845	862	888
108	1074	856	884	849	865	906
112	1107	873	888	854	874	919
116	1135	881	906	858	884	933
120	1118	888	916	869	899	938
121	1134	893	918	868	897	942

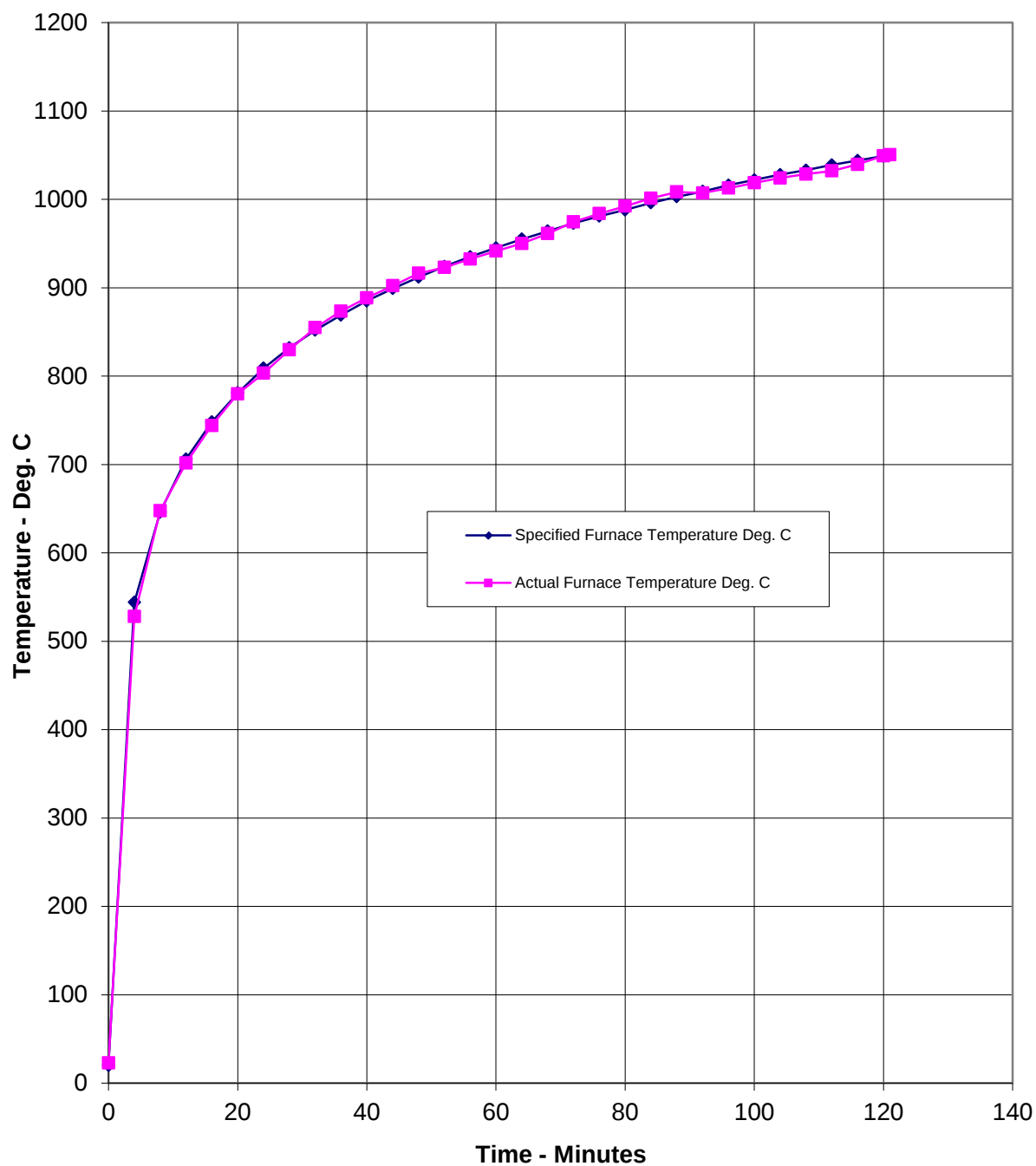
Individual Temperatures Recorded On The Unexposed Surface Of Hatch C

Time Mins	T/C Number 216 Deg. C	T/C Number 217 Deg. C	T/C Number 218 Deg. C	T/C Number 219 Deg. C	T/C Number 220 Deg. C	T/C Number 221 Deg. C
0	20	21	21	21	21	21
4	91	93	88	86	83	85
8	92	94	93	92	94	93
12	91	102	93	93	95	99
15	110	166	91	91	113	118
16	141	216	91	98	127	134
20	283	331	207	201	263	261
24	342	366	295	285	302	303
28	367	378	335	314	330	324
32	367	386	352	328	342	342
36	378	389	367	342	357	352
40	375	400	376	352	365	356
44	396	412	371	358	365	360
48	409	407	374	351	384	373
52	636	635	618	534	593	590
56	805	812	795	755	787	790
60	810	816	804	761	802	803
64	824	827	814	767	804	810
68	832	836	823	778	816	822
72	850	849	836	785	828	834
76	860	859	847	796	839	846
80	870	863	858	807	847	852
84	882	872	868	806	841	863
88	877	876	873	814	959	856
92	878	875	863	811	1215	852
96	880	872	839	804	843	862
100	877	877	867	807	690	868
104	870	875	892	805	683	877
108	881	873	898	811	657	888
112	840	878	781	821	636	897
116	823	871	794	823	612	904
120	832	902	916	833	620	913
121	843	901	870	829	601	913

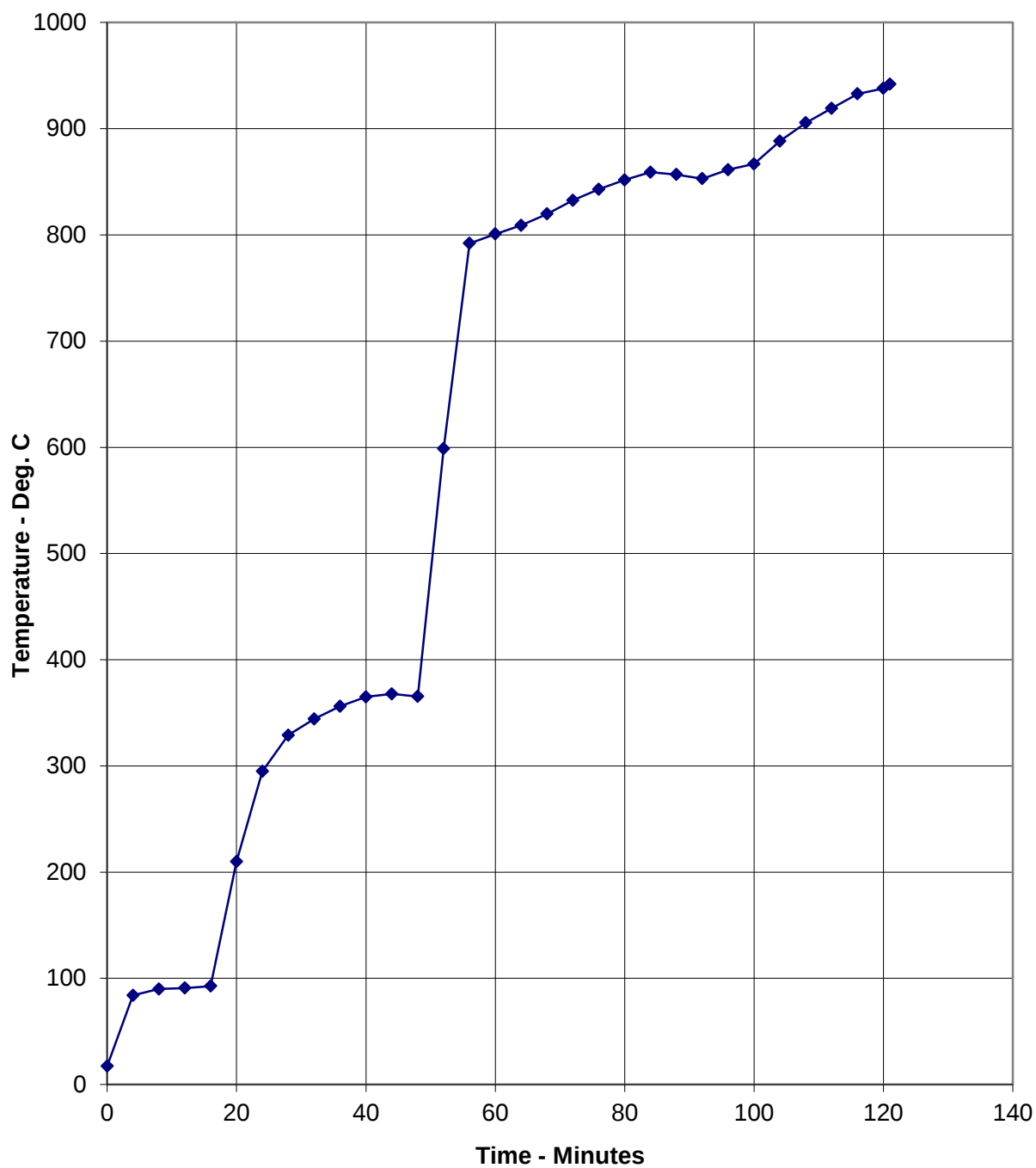
Furnace Pressure Recorded 100 Mm Below The Exposed Face Of The Test Assembly

Time Mins	Recorded Pressure Pascals
0	00.00
4	21.00
8	19.00
12	16.50
16	21.10
20	18.00
24	18.80
28	16.10
32	16.50
36	19.90
40	19.20
44	18.40
48	15.80
52	21.30
56	18.80
60	20.80
64	19.50
68	20.40
72	18.30
76	20.80
80	17.20
84	17.90
88	17.80
92	18.00
96	17.40
100	18.40
104	18.90
108	16.20
112	19.00
116	20.90
120	15.00
121	17.10

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 C



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

sustained flaming on the unexposed surface

If the hatches were assessed separately the results could be interpreted as follows:

These requirements were satisfied for the periods shown below:

	Hatch A	Hatch B	Hatch C	Hatch D	Hatch E	Overall Ceiling
Sustained flaming	120 minutes	110 minutes	120 minutes	120 minutes	120 minutes	110 minutes
Gap gauge	120 minutes	110 minutes	120 minutes	83 minutes	120 minutes	83 minutes
Cotton Pad	29 minutes	16 minutes	53 minutes	13 minutes	28 minutes	13 minutes

Insulation

The mean temperature rise of the unexposed surface shall not be greater than 140°C and that the maximum temperature rise shall not be greater than 180°C (except on the door frame, where the maximum temperature rise shall not exceed 360°C). Insulation failure also occurs simultaneously with integrity failure as specified in BS EN 1364-2: 2018. 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	Hatch D	Hatch E	Overall Ceiling
n/a	n/a	15 minutes	n/a	n/a	n/a

The test was discontinued after 120 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

A specimen of a non-loadbearing ceiling assembly incorporating five access hatches has been subjected to a fire resistance test in accordance with the procedures given in BS EN 1364-2: 2018, 'Fire resistance tests for non-loadbearing elements – Part 2: ceilings', in conjunction 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'.

If the performance of the ceiling was to be assessed against the integrity criteria from BS EN 1364-2: 2018 and insulation criteria of Hatch C from BS EN 1364-1, the test results could be expressed as follows:

If the hatches were assessed separately the results could be interpreted as follows:

	Hatch A	Hatch B	Hatch C	Hatch D	Hatch E	Overall Ceiling
Sustained flaming	120 minutes	110 minutes	120 minutes	120 minutes	120 minutes	110 minutes
Gap gauge	120 minutes	110 minutes	120 minutes	83 minutes	120 minutes	83 minutes
Cotton Pad	29 minutes	16 minutes	53 minutes	13 minutes	28 minutes	13 minutes
Insulation	n/a	n/a	15 minutes	n/a	n/a	n/a

*The test was discontinued after 120 minutes.

Field of Direct Application

General

Test results obtained for fire from above are not applicable for the situation with fire from below, and vice versa.

The results of the fire test are directly applicable to constructions of the sample tested, where only one or more of the modifications listed below are made.

Self-supporting ceilings exposed to fire from below or from above:

Size

a) For ceilings where both length and width are less than 4 m × 3 m, and which were tested at full size, the results may be applied to ceilings of the same size or less than that tested.

b) For ceilings of full size span less than 4 m but of width equal to or greater than 3 m (tested at full size span and 3 m width) and in which the most onerous direction lies in the 4 m direction of the furnace, the results may be applied to ceilings of the same span or less than that tested. There shall be no restriction on application of the result in the width direction. The provisions with respect to most onerous configuration as given in 6.3.2 shall be followed in the direct application of results.

c) For ceilings of full size span greater than or equal to 4 m but of width less than 3 m (tested at 4 m span and full size width) and in which the most onerous direction lies in the 4 m direction of the furnace, the results may be applied to ceilings up to the tested span, increased by 10 %, provided an overrun time in the fire test result is available compared to the intended classification period. The required overrun time is shown in Table 1.

The width is restricted to equal or less than that tested. The provisions with respect to most onerous configuration as given in 6.3.2 shall be followed in the direct application of results.

d) For ceilings where both length and width are greater than or equal to 4 m × 3 m in practice, and which were tested at 4 m × 3 m size, and in which the most onerous direction lies in the 4 m direction of the furnace, the results may be applied to ceilings up to the tested span, increased by 10 %, provided an overrun time in the fire test result is available compared to the intended classification period. The required overrun time is shown in Table 1.

There shall be no restriction on application of the result in the width direction. The provisions with respect to most onerous configuration as given in 6.3.2 shall be followed in the direct application of results.

Overrun Time

Table 1 — Overrun time

Intended classification period (min)	Overrun time
15	≥ 3 min
30, 45 and 60	≥ 6 min
≥ 90	≥ 10 % of the intended classification period

**Cavities above
self-supporting
ceilings**

The test results are valid for cavities of any height.

**Suspended ceiling
with fire from
below**

Test results obtained on a test specimen of 4 m × 3 m or greater, may be applied to ceilings of any dimension, provided that the distribution per unit area of the hangers is not reduced, and the distance between hangers is not increased. The distance between grid members and the load on the hanger, shall not be increased.

Provisions for expansion in the ceiling system shall be increased pro rata with the extension in sizes, while the gap at the perimeter shall be the same as tested.

Fittings

Fittings which may be installed are those which have been included in the test specimen. The distance between the fittings cannot be smaller than tested.

**Length of
supporting
hangers**

The test results are applicable to ceilings suspended by hangers of any length.

**Cables, pipes, etc.
above the ceiling**

The test results are only applicable to the inclusion of cables, pipes, etc. above the ceiling provided they are installed in such a manner that they give no additional mechanical load to the ceilings during the fire.

**Ceilings
incorporating self-
supporting and
suspended parts
with fire from
below**

If the tested width is equal or greater than 3 m and provided that one edge parallel to span is free, the test results are applicable to same span or less than that tested and an unlimited width. This applies to both types of the tested ceiling separately. The distance between hangers, the distance between grid members and the load on the hanger shall not be increased.

Provisions for expansion in the ceiling system shall be increased pro rata with the extension in sizes, while the gap at the perimeter shall be the same as tested.