Warringtonfire
Holmesfield Road
Warrington
Cheshire
WA1 2DS
United Kingdom
T: +44 (0)1925 655116
W: www.warringtonfire.com

Title:

The Fire Resistance Performance of a Non-Loadbearing Ceiling Assembly Incorporating An Access Hatch, Tested in Accordance with BS EN 1364-2: 2018, With Additional Guidance From BS EN 1634-1:2014 + A1:2018

Date of Test:

2nd June 2020

Issue 1:

19th October 2020

WF Report No.

422990D/R

Prepared for:

Panel Technologies Limited

49-61 Jodrell Street
Nuneaton,
Warwickshire
CV11 5EG
United Kingdom

Test Specimen

Summary of Tested Specimen

The specimen had approximate overall nominal dimensions of 4000 mm long by 3000 mm wide which comprised of the British Gypsum suspended ceiling configuration referenced G100038. The suspended ceiling assembly referenced British Gypsum G100038 comprised perimeter channel fixed to the supporting construction on all four sides, primary support channels ran transversely across the aperture with secondary support channels spanning the aperture. The framework was clad with three layesr of 10 mm thick glassroc multiboard fixed back to the perimeter and secondary support channels. Two structural steel section ran transversely across the aperture and the ceiling assembly was support from these via hanger straps fixed to the primary support channels.

Specimen D was fitted into an aperture 1207 mm long by 907 mm wide. The leaf had overall dimensions of 1195 mm wide x 895 mm long and was pivoted along a singular edge with the opposite edge fitted with a 3 point lock , a layer of mineral wool foil faced was fitted to the leaf to the unexposed face. The hatch opened towards heating conditions and was latched at three points for the duration of the test.

Detailed drawings of the test specimen(s) and a comprehensive description of the test construction based on a detailed survey of the specimen(s) and information supplied by the sponsor of the test are included in the Test Specimen and Schedule of Components sections of this report.

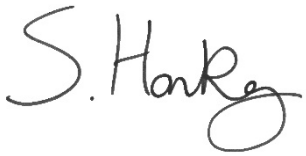
Ceiling Results

General	The ceiling assembly was tested in accordance with BS EN 1364-2: 2018 and the results for the tested assembly.	
Integrity	It is required that the specimen retains its separating function, without either causing ignition of a cotton pad when applied, or permitting the penetration of a gap gauge as specified in BS EN 1634-1: 2014 + A1:2018, or resulting in sustained flaming on the unexposed surface. **These requirements were satisfied for the periods shown below:**	
Sustained flaming	4 minutes	
Gap gauge	56 minutes*	(6 mm)
Cotton pad	4 minutes	
Insulation (I_2)	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 with the exception that the limit for temperature rise for any frame member or transom member adjacent to the leaf/leaves of the doorset or openable window shall be 360°C. Insulation failure also occurs simultaneously with integrity failure as specified in BS EN 1634-1: 2014 + A1:2018. **These requirements were satisfied for the period shown below:**	
Specimen	1 minutes	Exceeded mean temperature criteria
	*Test was discontinued after a period of 58 minutes.	

Signatories

Responsible Officer
Anthony Green-Morris*
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: 19th October 2020

Revision History

Issue No:	Re-issue Date:
Revised By:	Approved By:
Reason for Revision:	

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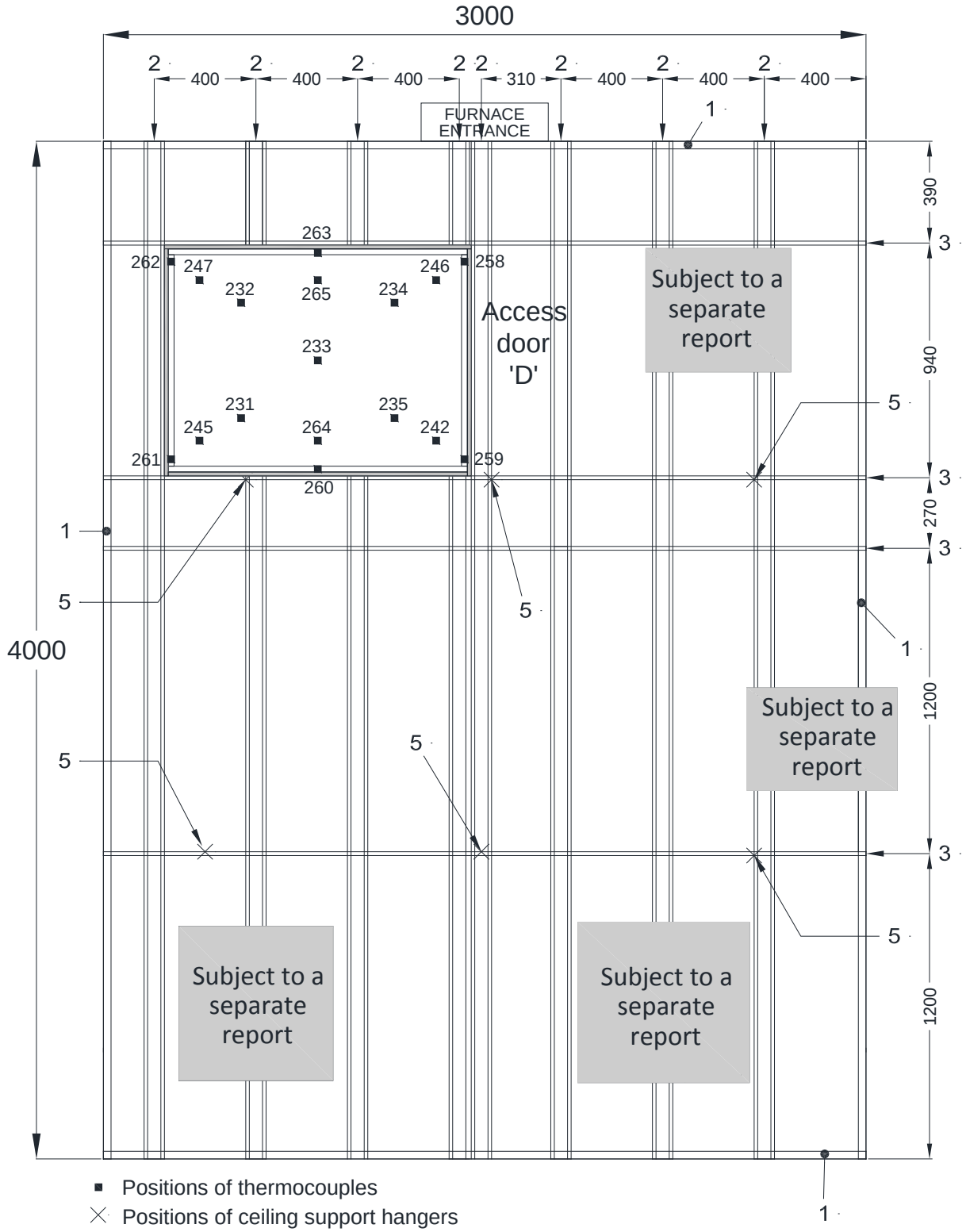
Test Conditions

Standard	BS EN 1364-2: 2018 Fire resistance tests for non-loadbearing elements - Part 2: Ceilings, with additional guidance from BS EN 1634-1:2014 + A1:2018.
Sampling	**Warringtonfire** was not involved in the sampling or selection of the tested specimen or any of the components. The results obtained during the test only apply to the test samples as provided by the test sponsor.
Installation	The specimen was received on the 1 June 2020 and installed into a refractory concrete lined steel restraint frame. The specimen was installed by a representative of the Warringtonfire on the 1 June 2020.
Conditioning	The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of seven 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 18^{o}C to 23.5^{o}C and 36.5% to 49% respectively.
Instruction to Test	The test was conducted on the 2nd June 2020 at the request of Panel Technologies Limited, the test sponsor. Mr. D Blenkinsopp, a representative of the test sponsor witnessed the test.
Pre-Test Conditioning	Prior to testing, the hatch was subjected to appropriate mechanical pre-test conditioning in accordance with the requirement of EN 16034:2014, Annex A.
Ambient Temperature	The ambient air temperature in the vicinity of the test construction was 18ºC at the start of the test with a maximum variation of +1ºC during the test.
Furnace	The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2020 Clause 5.1 using eight plate thermometers, distributed over a plane 100 mm below the surface of the test construction.
Thermocouples	Thermocouples were provided to monitor the unexposed surface of the specimen. The output of all instrumentation was recorded at no less than one minute intervals. The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.
Furnace Pressure	After the first five minutes of testing and for the remainder of the test, the furnace atmospheric pressure was controlled so that it complied with the requirements of BS EN 1363-1: 2020, clause 5.2.1 The calculated pressure differential relative to the laboratory atmosphere 100 mm below the specimen was 20 (+0/-5) Pa between 5 and 10 minutes and 20 (+0/-3) Pa thereafter. Throughout the test there were fluctuations of the pressure conditions due to the nature of the specimen.

Test Construction

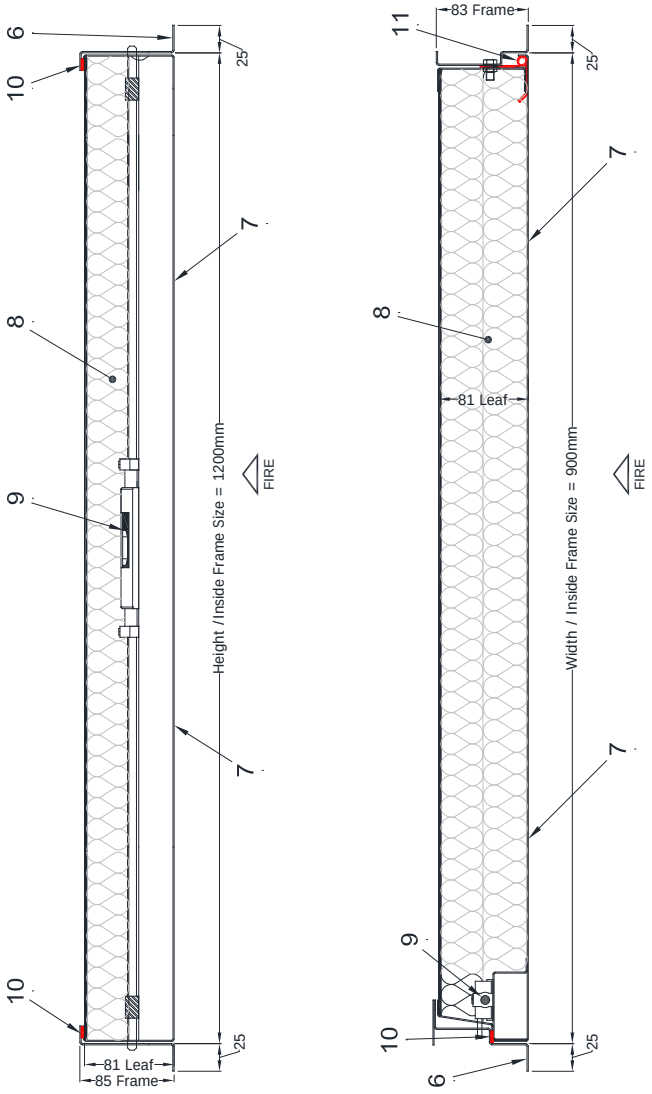
Figure 1 – General Elevation of Test Construction



GENERAL ELEVATION VIEWED FROM UNEXPOSED FACE

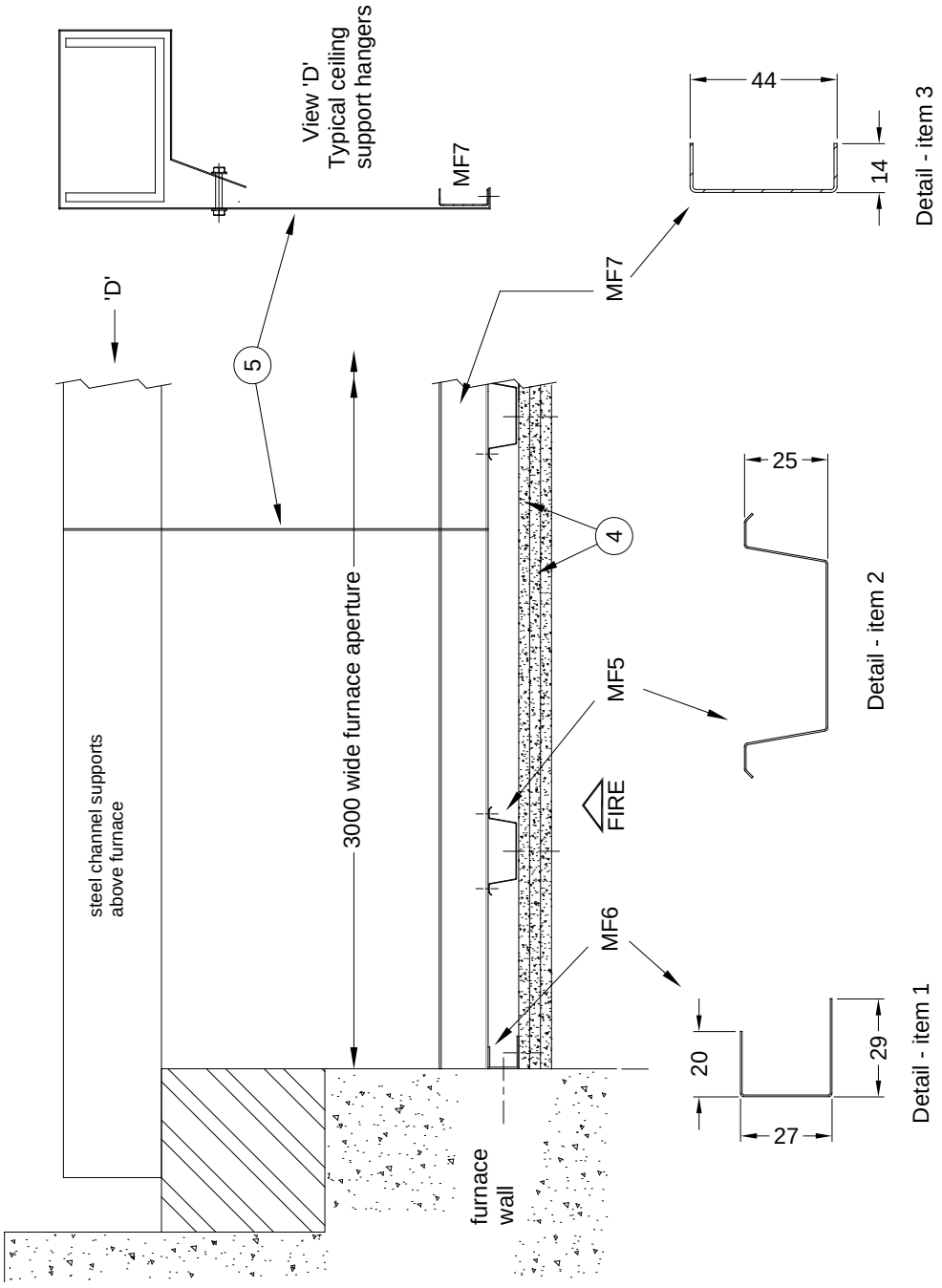
Do not scale. All dimensions are in mm

Figure 2 – Details of Panel D – 1200 x 900 mm 12-FR-MD-PF-3WL



Do not scale. All dimensions are in mm

Figure 3 – Details of Suspended Ceiling



Do not scale. All dimensions are in mm

Schedule of Components

(Refer to Figures 1 to 3)
(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 3
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 3
Fixing method	:	Sections were fitted longitudinally screw fixed 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 3
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 and perimeter channels 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 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 3.
Quantity	:	For positions of the hangers, see Figure 1.
Access panel assembly – 1200 x 900 mm 12-FR-MD-PF-3WL (consisting of items 6 to 11)		
6. Mounting frame		
Material	:	Zinc mild steel
Thickness	:	1.2 mm steel
Opening size	:	1207 mm x 907 mm
Overall Frame size	:	1250 mm x 950 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
Thickness	:	0.9 mm steel
Overall size	:	1195 mm x 895 mm
Fixing method to frame	:	Fixed with full length piano hinge. Panel was locked with using 3-point lock.
8. Door infill		
Manufacturer	:	Rockwool
Reference	:	Ductslab
Material	:	Stone wool
Thickness	:	40 mm
Density	:	45 kg/m^3 (stated)
Fixing method to frame	:	Slid under door leaf to return leaf
9. 3 – Point lock		
Manufacturer	:	C.R.A International
Type	:	3 - point lock assembly
Material		
i. Latch casing	:	BZP Mild steel
ii. Locking bar	:	304 Grade 8mm Diameter Round Bar
iii. Latch	:	BZP Mild Steel
Overall Size		
i. Latch Casing	:	16mm x 162mm
ii. Locking Bar	:	8mm Diameter
iii. Latch	:	18mm x 4mm
Operation		Engaged
10. Draught Seal		
Manufacturer	:	CB Frost
Reference	:	CF6 PU 8X4
Material	:	Self Adhesive Light Grey PU Foam Strip
Section size	:	8 mm x 3 mm

Fixing method	:	Self-adhered into the frame rebate.

Item		**Description**
11. Piano Hinge		
Manufacturer	:	Cooke Brothers
Reference	:	543441101.
Material	:	Mild Steel
Overall sizes	:	3” width open, 1.5mm thick material, 6mm Ø hinge pin with 1” long joints
Fixing method		
i. to door frame	:	4 no. M6 steel screws per blade
ii. to door leaf	:	M6 Nuts and Washers
Details of Fixings		
i. Type	:	Screws complete with suitable nuts and washers
ii. Material	:	Steel
iii. Size	:	25 mm long x 6 mm diameter
iv. Number Off Per Hinge Blade	:	4 No.
Details of Bedding Material	:	None

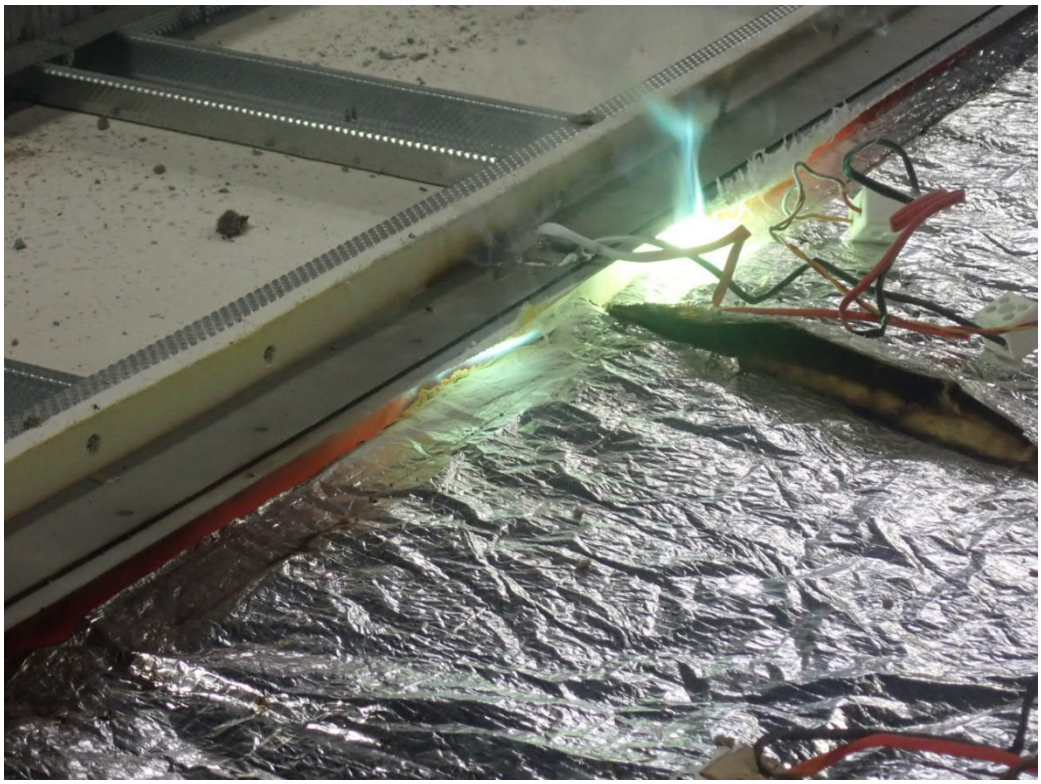
Test Observations

Time		All observations are from the unexposed face unless noted otherwise.
mins	secs	
00	00	**The test commences.**
02	48	Steam/smoke from the perimeter of Hatch D.
04	11	Dark grey discolouration around the perimeter of Hatch D.
21	42	The leaf of hatch D can be seen to be bowing towards heating conditions.
42	06	Sustained flaming from longitudinal edge of hatch D. Sustained flaming integrity failure is deemed to have occurred.
58	30	**Part of the suspended ceiling has detached from the main structure and the test has become unsafe to continue. The test is discontinued.**

Test Photographs

The unexposed face of the specimen prior to testing

The unexposed face of Hatch D showing sustained flaming at 42 minutes



Temperature and Deflection 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	102
2	445	440
4	544	567
6	603	597
8	646	660
10	678	682
12	706	697
14	728	729
16	748	753
18	766	768
20	781	784
22	796	795
24	809	808
26	820	818
28	832	827
30	842	836
32	852	848
34	860	864
36	869	867
38	877	883
40	885	894
42	892	902
44	899	905
46	906	906
48	912	913
50	918	918
52	924	922
54	930	933
56	935	935
58	940	943

Individual And Mean Temperatures Recorded On The Unexposed Surface Of Specimen D Panel Leaf

Time Mins	T/C Number 231 Deg. C	T/C Number 232 Deg. C	T/C Number 233 Deg. C	T/C Number 234 Deg. C	T/C Number 235 Deg. C	Mean Temp Deg. C
0	25	25	25	30	26	26
2	25	25	25	31	26	26
4	26	26	26	32	27	27
6	27	29	29	43	28	31
8	34	36	38	46	35	38
10	41	42	43	49	41	43
12	45	49	47	52	46	48
14	48	63	55	58	55	56
16	56	75	67	68	67	67
18	68	100	83	80	75	81
20	76	110	106	107	105	101
22	97	128	115	119	114	115
24	117	155	131	140	131	135
26	140	177	152	167	157	159
28	163	195	167	179	175	176
30	180	210	178	191	187	189
32	193	223	187	209	197	202
34	201	235	195	205	203	208
36	211	245	201	215	211	217
38	219	259	211	224	219	226
40	231	273	218	229	229	236
42	242	282	226	241	239	246
44	249	288	235	249	246	253
46	257	292	240	254	253	259
48	260	295	241	257	257	262
50	262	300	246	260	262	266
52	264	302	247	264	263	268
54	263	305	250	264	264	269
56	268	308	252	268	266	272
58	270	311	255	269	272	275

Individual Temperatures Recorded On The Unexposed Surface Of Specimen D Panel Frame

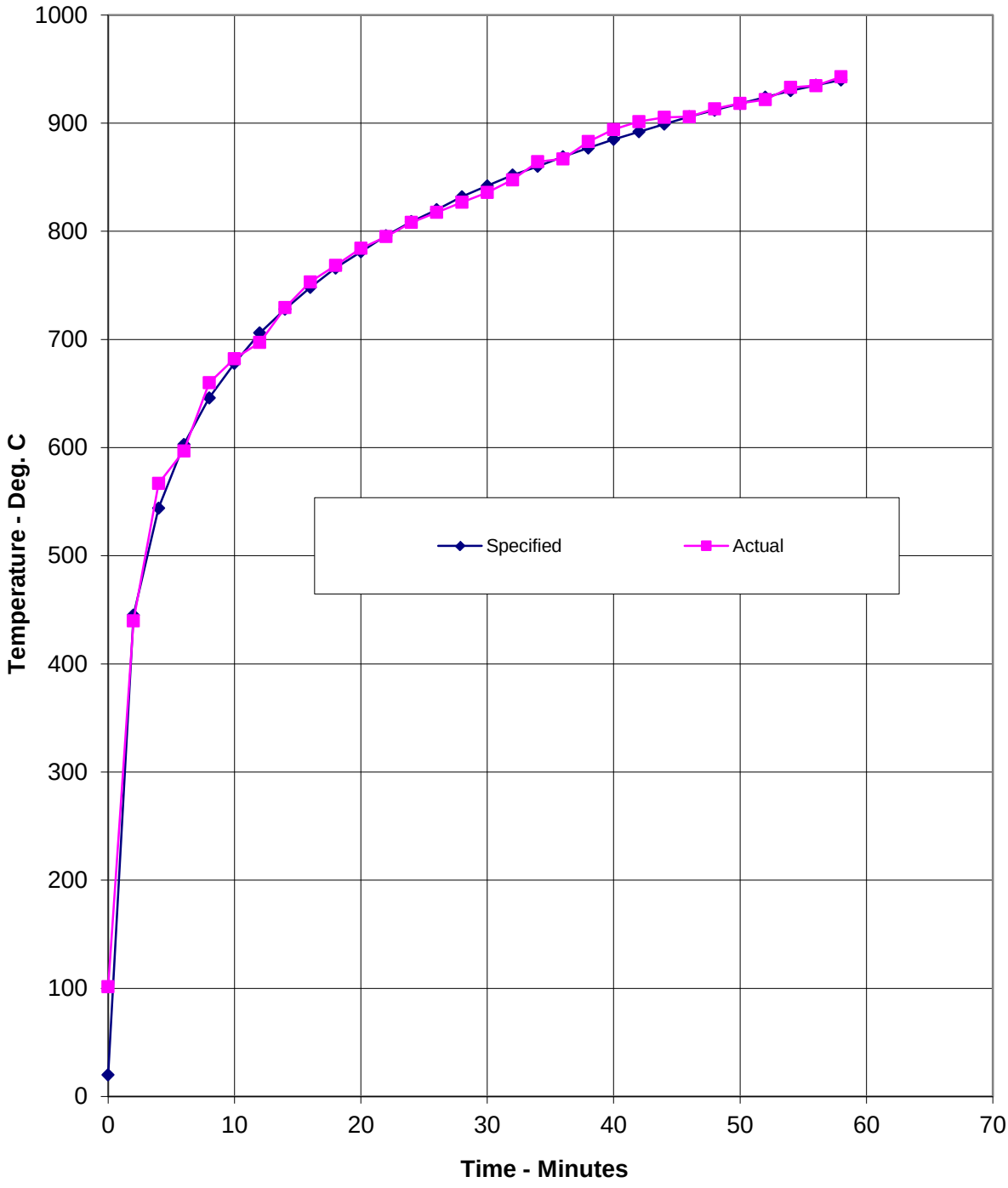
Time Mins	T/C Number 258 Deg. C	T/C Number 259 Deg. C	T/C Number 260 Deg. C	T/C Number 261 Deg. C	T/C Number 262 Deg. C	T/C Number 263 Deg. C
0	29	27	29	24	26	27
2	52	43	52	*	36	34
4	127	98	133	*	65	87
6	271	146	219	*	91	150
8	338	175	250	*	114	218
10	377	194	265	*	136	267
11	388	205	271	*	149	280
12	391	214	275	*	163	288
14	399	233	287	*	188	304
16	399	251	306	*	214	322
18	397	269	345	*	237	336
20	397	286	400	*	256	346
22	401	299	439	*	274	361
24	403	311	456	*	291	383
26	403	320	465	*	304	408
28	401	330	472	*	315	420
30	400	338	479	*	325	430
32	398	350	488	*	334	438
34	393	359	495	*	344	442
36	402	363	512	*	350	446
38	410	369	520	*	355	451
40	412	377	521	*	361	458
42	409	383	519	*	368	474
44	412	383	522	*	371	489
46	414	382	526	*	375	498
48	414	383	529	*	380	503
50	416	382	529	*	385	502
52	408	378	504	*	388	498
54	416	379	533	*	391	496
56	415	377	536	*	395	495
58	407	375	522	*	398	492

*Thermocouple Malfunction

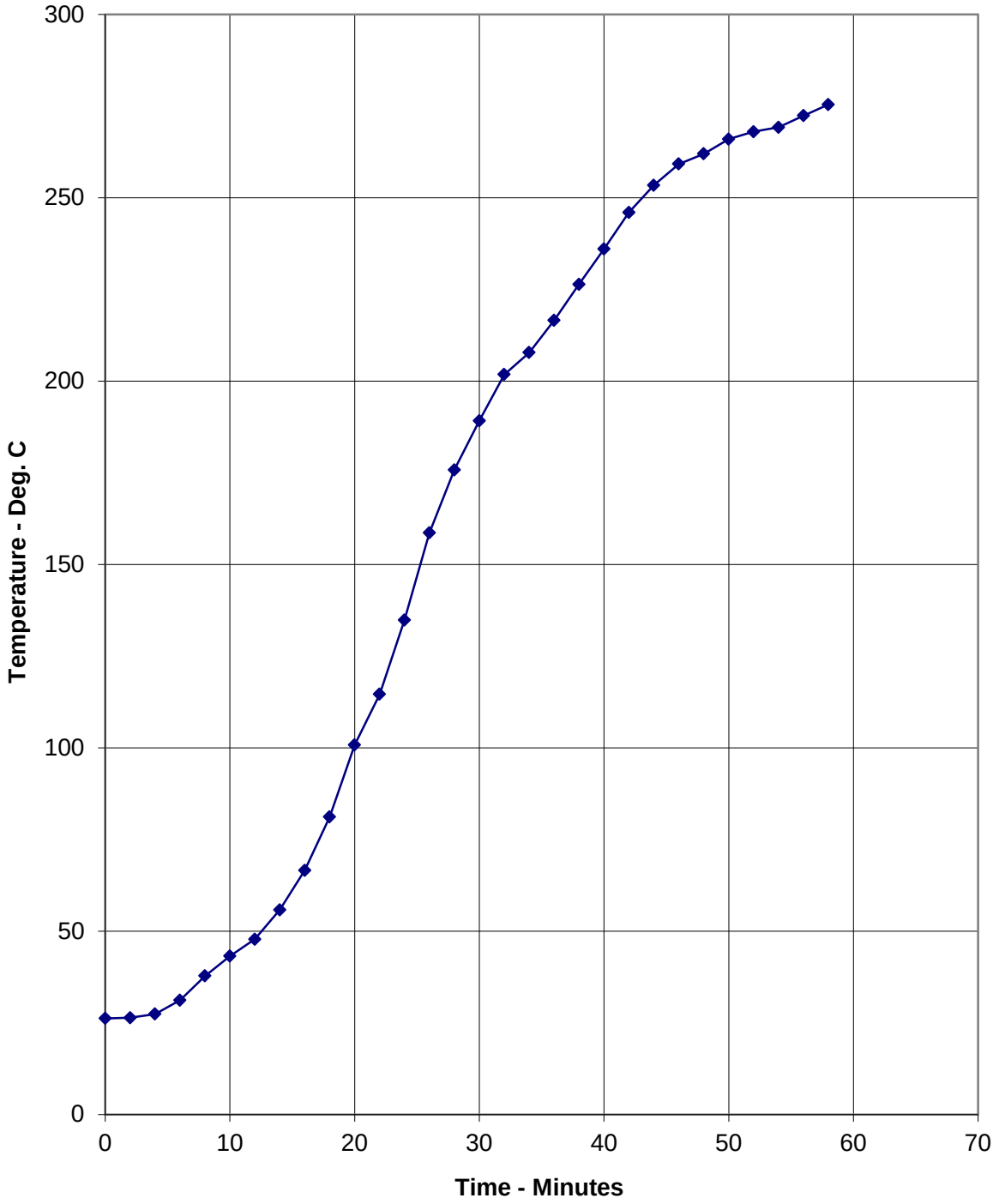
Individual Temperatures Recorded On The Unexposed Surface Of Specimen D 100 mm Away From The Edges

Time Mins	T/C Number 242 Deg. C	T/C Number 245 Deg. C	T/C Number 246 Deg. C	T/C Number 247 Deg. C	T/C Number 264 Deg. C	T/C Number 265 Deg. C
0	24	25	25	25	26	25
2	26	26	25	25	27	25
4	37	37	29	27	26	29
6	38	34	95	30	34	45
8	43	45	94	37	46	51
10	47	50	84	43	47	53
12	53	52	74	48	49	58
14	64	58	89	59	59	79
16	77	67	107	71	80	99
18	108	74	123	93	105	110
20	123	92	145	116	120	115
22	147	115	165	133	141	121
24	168	134	182	156	166	126
26	184	159	196	172	184	129
28	197	176	206	184	198	138
30	209	190	218	195	208	138
32	218	199	228	207	215	142
34	226	205	237	217	223	145
36	236	217	249	230	230	149
38	244	227	264	246	243	154
40	256	238	280	260	250	160
42	267	248	293	269	258	172
44	275	258	302	277	267	181
46	281	264	309	282	269	185
48	284	266	311	285	267	189
50	290	271	319	292	277	186
52	292	268	317	290	276	186
54	294	272	322	297	280	184
56	296	277	327	298	283	181
58	302	282	328	302	285	181

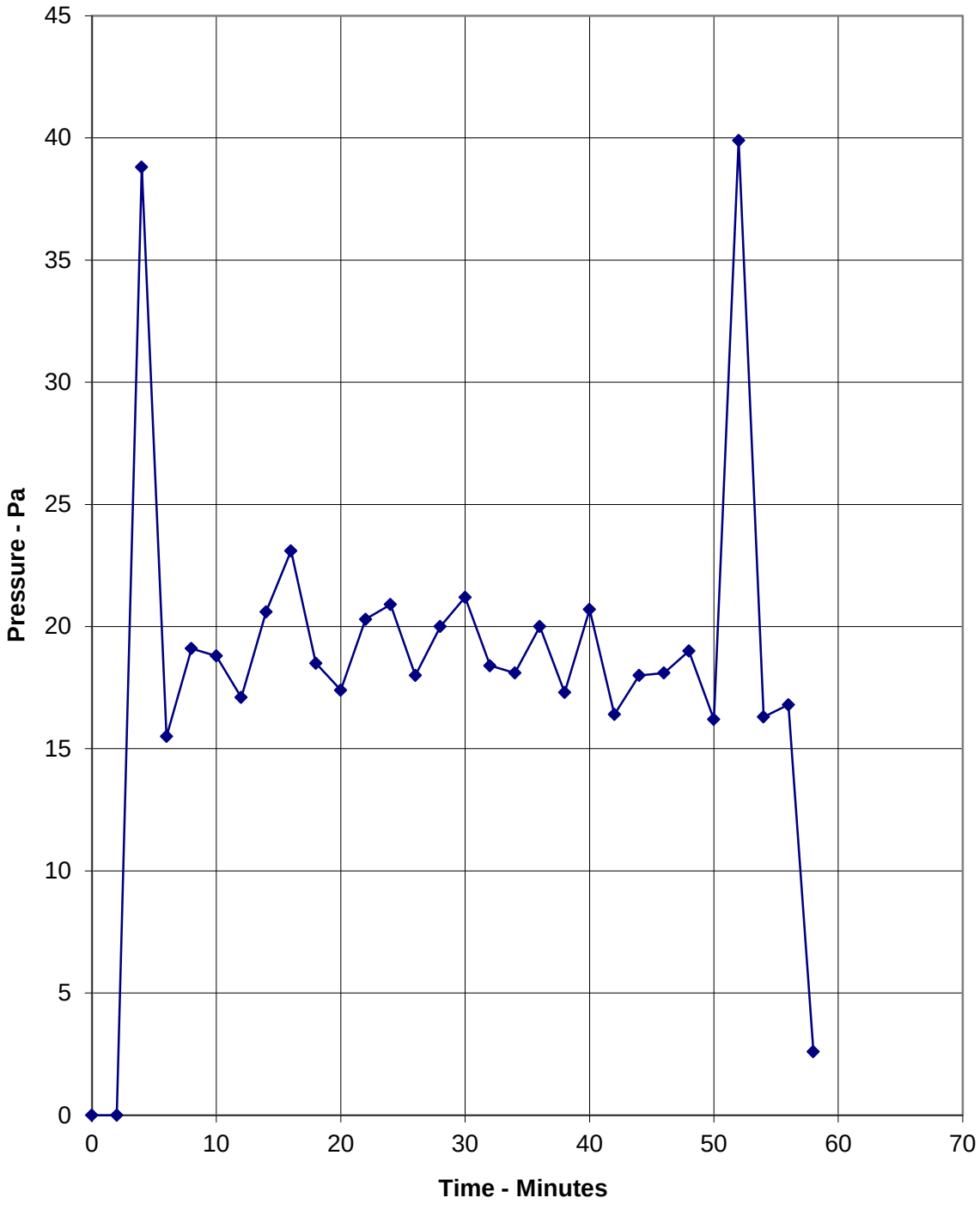
Graph Showing Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard



Graph Showing Mean Temperature Recorded On The Unexposed Surface Of Specimen D Panel Leaf



Graph Showing Recorded Furnace Pressure 100 mm Below The Specimen



On-going Implications

Limitations

This report details the method of construction, the test conditions and the results obtained when the specific elements of construction described herein were tested following the procedure outlined in BS EN 1363-1: 2020, 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: 2020, 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.

EGOLF

Certain aspects of some fire test specifications are open to different interpretations. 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