

**Title:**

Fire Resistance Test  
In Accordance With  
BS EN 1365-2: 2014,  
On A Loadbearing  
Timber Floor  
Construction Protected  
By A Plasterboard  
Ceiling And  
incorporating seven  
down lighters.

**Date of Test:**

1st February 2021

**Issue 2:**

27th July 2021

**WF Report No.**

437610/R



**Prepared for:**

**JCC Lighting  
Products Ltd.**

Innovation Centre,  
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0249

**This report  
supersedes test  
report 437610/R  
Issue 1 issued on the  
8th March 2021.**

# Test Specimen

## Summary of Tested Specimen

The timber floor had overall nominal dimensions of 4288 mm long by 3000 mm wide by 290 deep. The floor comprised 253 mm high 'Wolf Systems Ltd' joists at 600 mm centres. The unexposed face of the floor comprised nominally 22 mm thick flooring grade tongue and groove chipboard. The floor assembly was protected by a single layer of 15 mm thick 'Gyproc Wallboard', through fixed to the joists with screws.

The ceiling incorporated seven downlighter light fittings, giving a downlighter density of 0.6 per square metre. The lights are referenced as follows:

Test Ref.	Model Ref.	Converter Plate.
1	V50 JC1001 BN	JC1003 BN
2	JC010010 WH	N/A
3	JC010016 WH	N/A
4	V50 Tilt JC1002 CH	N/A
5	V50 Tilt JC1002 CH	JC1004 BN
6	V50 JC1001 BN	N/A
7	JC010023 WH	N/A

The floor supported a uniformly distributed load of 1.3 kN/m<sup>2</sup>. This load was provided by the test sponsor as to represent the expected working load for the floor construction in practice.

*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.*

## Performance Criteria and Test Results

<p><b>Loadbearing Capacity</b></p>	<p>This is the time in completed minutes for which the test specimen continues to maintain its ability to support the test load during the test. Support of the test load is determined by both the amount and the rate of deflection. The limiting deflection and the limiting rate of deflection for the specimen, as specified by the Standard, are calculated as:</p> <table border="1" data-bbox="478 481 1412 728"> <thead> <tr> <th>Criteria</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td><i>L</i>: Clear span - in mm</td> <td>4100</td> </tr> <tr> <td><i>d</i>: Depth of structural section - in mm</td> <td>253</td> </tr> <tr> <td><b>Limiting deflection (<math>L^2/400d</math>) - in mm</b></td> <td><b>165.5</b></td> </tr> <tr> <td><b>Limiting rate of deflection (<math>L^2/9000d</math>) - in mm/min</b></td> <td><b>7.4</b></td> </tr> <tr> <td><b>Measured deflection <math>1.5 \times (L^2/400d)</math> - in mm</b></td> <td><b>248.2</b></td> </tr> </tbody> </table> <p>Failure to support the load is deemed to have occurred when a '<b>Measured Deflection</b>' greater than or equal to '<b>1.5 x Limiting Deflection</b>' is observed</p> <p><b>Or</b></p> <p>Both the '<b>Limiting rate of deflection</b>' and '<b>Limiting deflection</b>' are exceeded.</p> <p>The criterion was satisfied for <b>33 minutes</b> after which time the test was discontinued.</p>	Criteria	Value	<i>L</i> : Clear span - in mm	4100	<i>d</i> : Depth of structural section - in mm	253	<b>Limiting deflection (<math>L^2/400d</math>) - in mm</b>	<b>165.5</b>	<b>Limiting rate of deflection (<math>L^2/9000d</math>) - in mm/min</b>	<b>7.4</b>	<b>Measured deflection <math>1.5 \times (L^2/400d)</math> - in mm</b>	<b>248.2</b>
Criteria	Value												
<i>L</i> : Clear span - in mm	4100												
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<b>Measured deflection <math>1.5 \times (L^2/400d)</math> - in mm</b>	<b>248.2</b>												
<p><b>Integrity</b></p>	<p>It is required that the specimen retains its separating function, without:</p> <ul style="list-style-type: none"> <li>▪ causing ignition of a cotton pad when applied</li> <li>▪ permitting the penetration of a gap gauge as specified in BS EN 1363-1: 2020</li> <li>▪ sustained flaming on the unexposed surface</li> <li>▪ subsequent failure of loadbearing capacity</li> </ul> <p><b>These requirements were satisfied for the periods shown below:</b></p> <p><b>Sustained flaming</b> 33 minutes*</p> <p><b>Gap gauge</b> 33 minutes* No failure*</p> <p><b>Cotton pad</b> 33 minutes*</p>												
<p><b>Insulation</b></p>	<p>It is required that 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. Insulation failure also occurs simultaneously with integrity failure. <b>These requirements were satisfied for the period shown below:</b></p> <p><b>Specimen</b> 33 minutes* No failure*</p> <p>*Test duration. Test was discontinued after a period of 33 minutes.</p>												
<p><b>Date of Test</b></p>	<p>1st February 2021</p>												

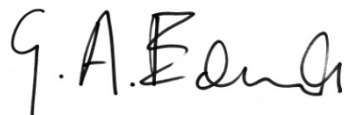
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## Signatories

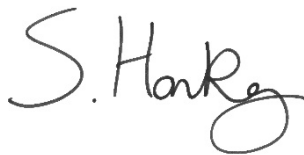
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\* For and on behalf of **Warringtonfire**.

Report Issued: 27th July 2021

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## Revision History

Issue No: 2	Re-issue Date: 27th July 2021
Revised By: C. Sweeney	Approved By: W. Drazkiewicz
Reason for Revision: On page 2; the downlight density has been added to the summary. On page 8; additional dimensions shown on the Figure 1 drawing, showing the distance between the downlights and the distance between the downlights and the joists.	

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

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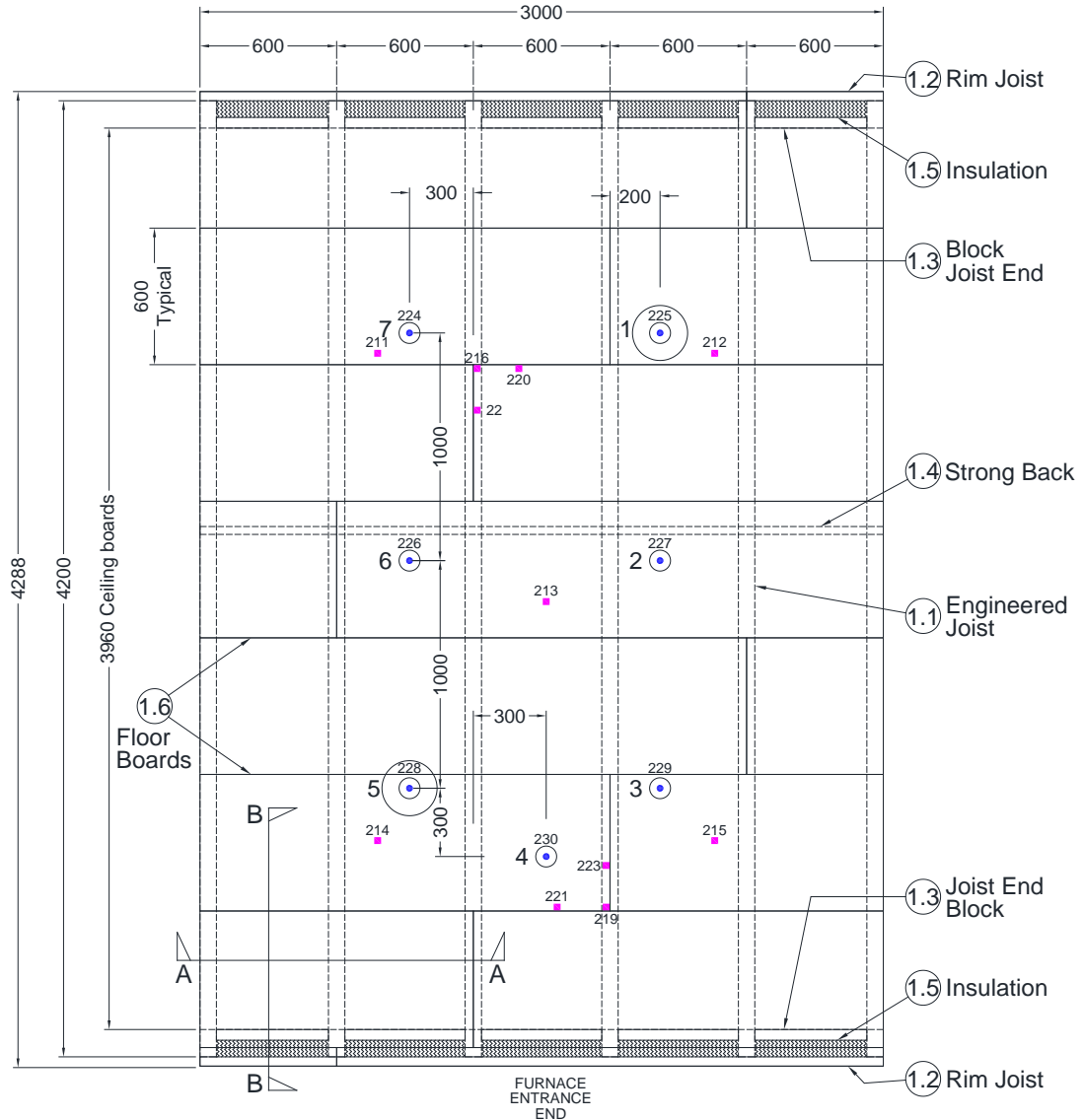
# Test Conditions

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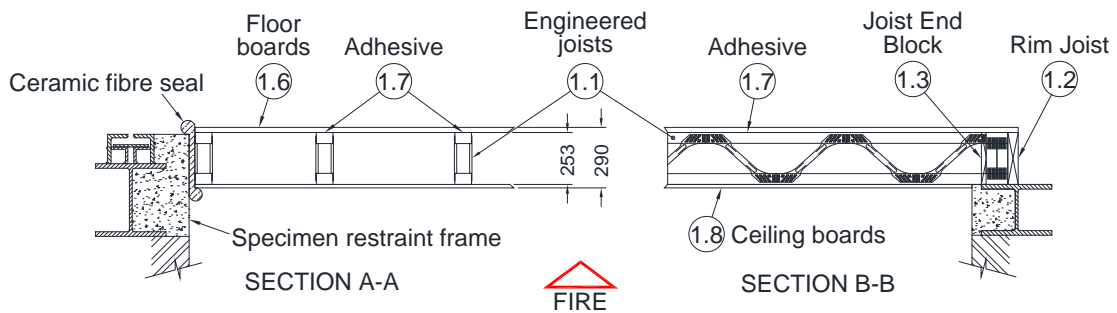
<b>Standard</b>	<p>BS EN 1365-2: 2014, 'Fire resistance tests for loadbearing elements – Part 2: Floors and Roofs'</p> <p>The purpose of the test was to evaluate the performance of a timber floor construction protected by a ceiling of known fire resistance, when incorporating down lighter light fitting assemblies.</p>
<b>Sampling</b>	<p><b>Warringtonfire</b> was not involved in the sampling or selection of the tested specimen or any of the components.</p> <p>The results obtained during the test only apply to the test samples as received and tested by <b>Warringtonfire</b>.</p>
<b>Installation</b>	<p>Representatives of <b>Warringtonfire</b> assembled the floor construction and installed the downlighters between the 27th and 29th January 2021</p>
<b>Conditioning</b>	<p>The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 6 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 7°C to 17°C and 44% to 77.5% respectively.</p>
<b>Instruction to Test</b>	<p>The test was conducted on the 1st February 2021 at the request of <b>JCC Lighting Products Ltd.</b>, the test sponsor.</p>
<b>Ambient Temperature</b>	<p>The ambient air temperature in the vicinity of the test construction was 13°C at the start of the test with a maximum variation of -2°C during the test.</p>
<b>Furnace</b>	<p>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 from the underside of test assembly.</p>
<b>Thermocouples</b>	<p>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 and internal thermocouples are shown in Figure 1.</p>
<b>Application of the load</b>	<p>The full test load was applied via dead load uniformly distributed over the test Specimen 60 minutes before the commencement of the test.</p>
<b>Loadbearing Capacity Criteria</b>	<p>A linear deflection transducer was provided at the approximate centre on the unexposed surface of the specimen to record its vertical deflection.</p>
<b>Furnace Pressure</b>	<p>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 soffit of the specimen was 18 (± 5) Pa between 5 and 10 minutes and 18 (± 3) Pa thereafter.</p>

# Test Assembly

Figure 1- Plan View of Test Specimen



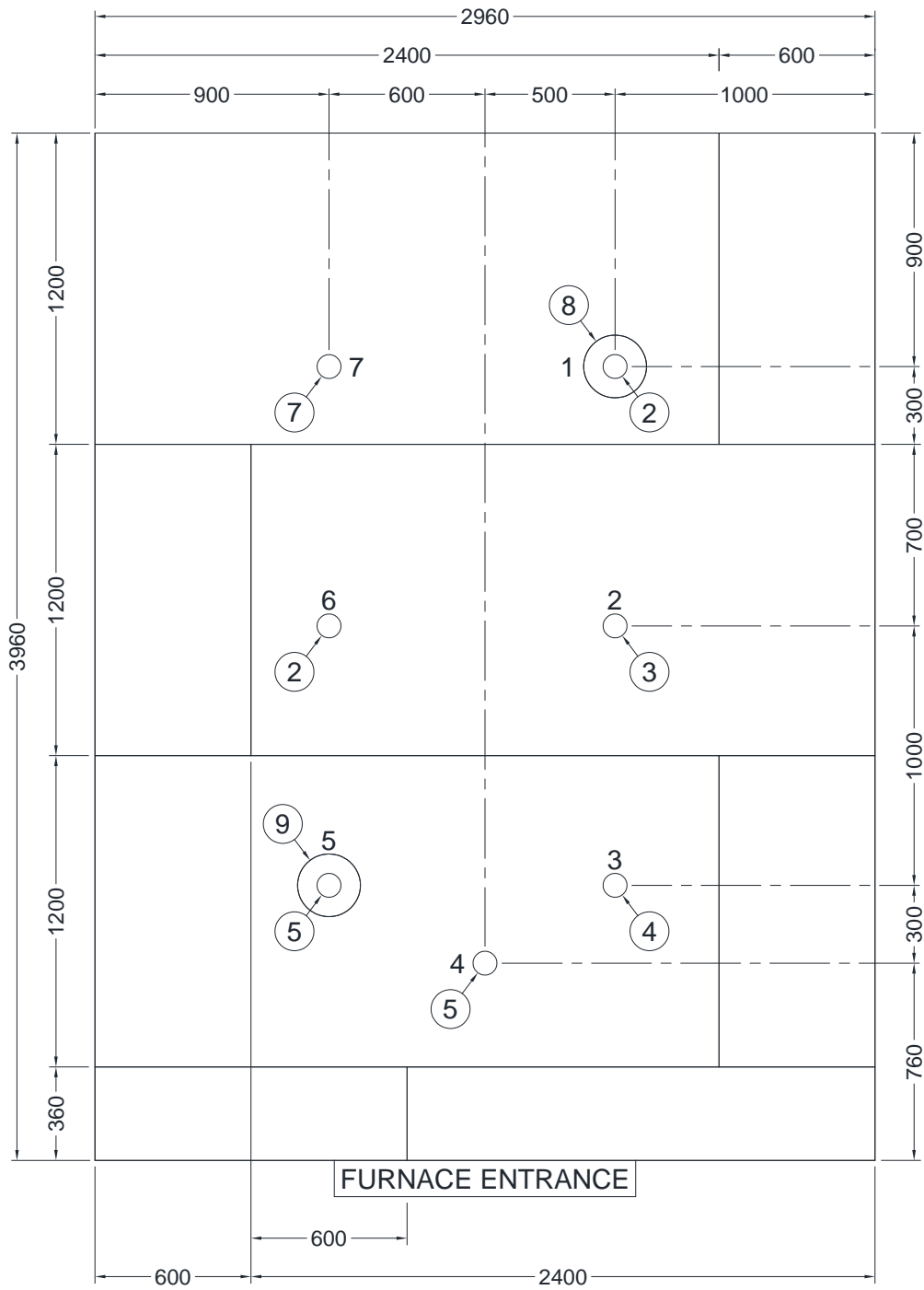
- Positions of thermocouples
- Mid-depth of cavity above light fitting



Do not scale. All dimensions are in mm

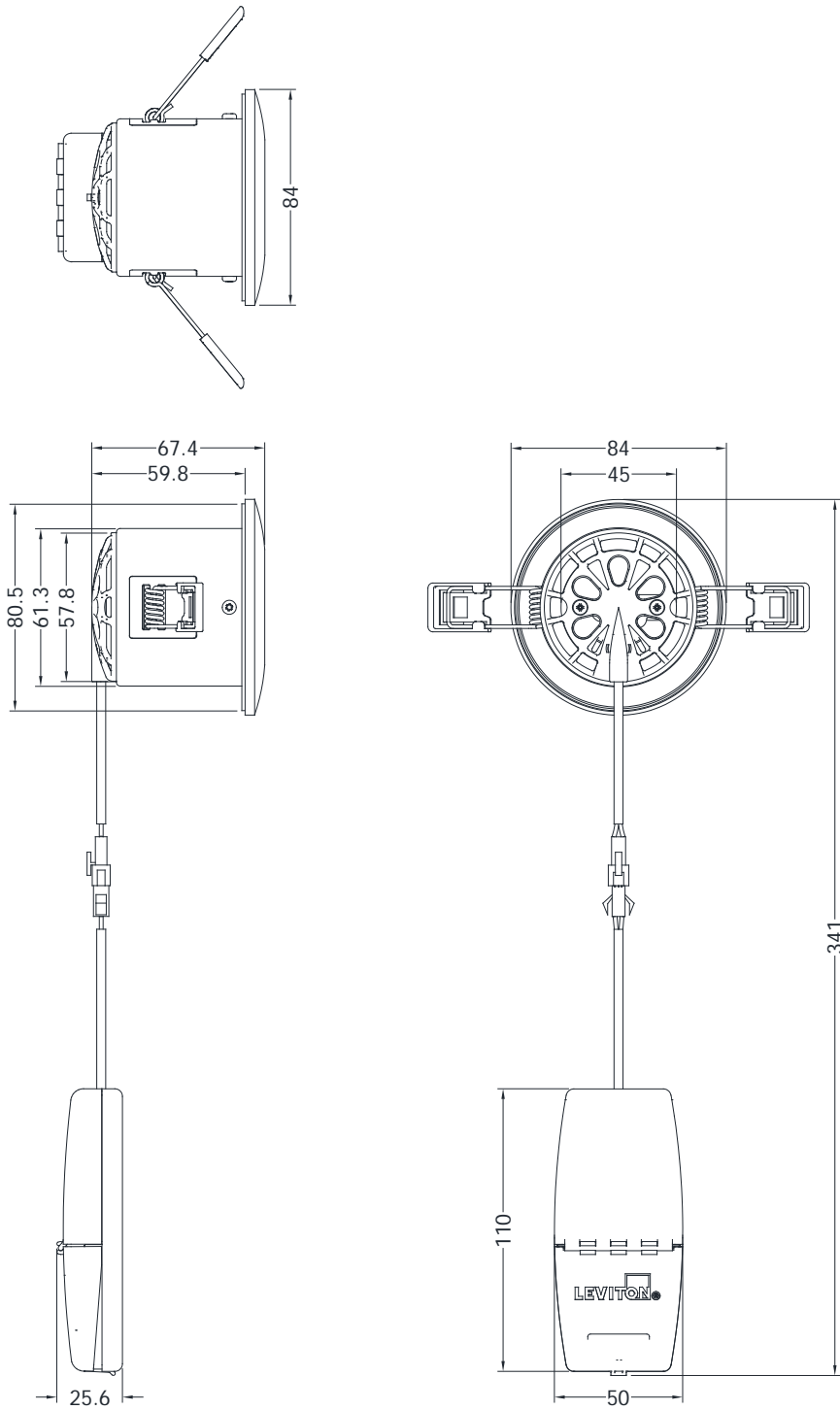


**Figure 2 – Details of Downlighter Positions**



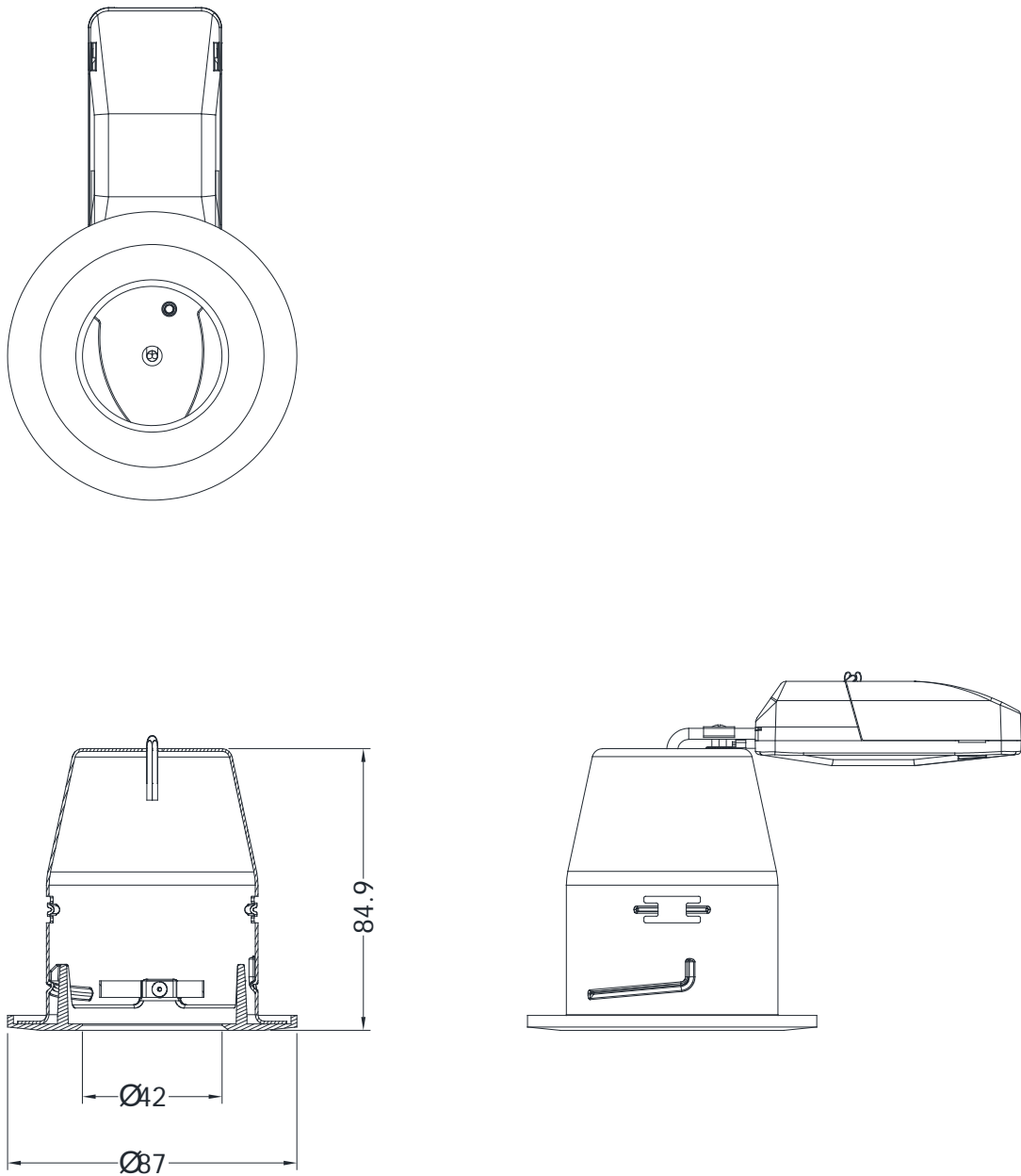
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**Figure 3 – Details of Downlighter Specimens 1 & 6**



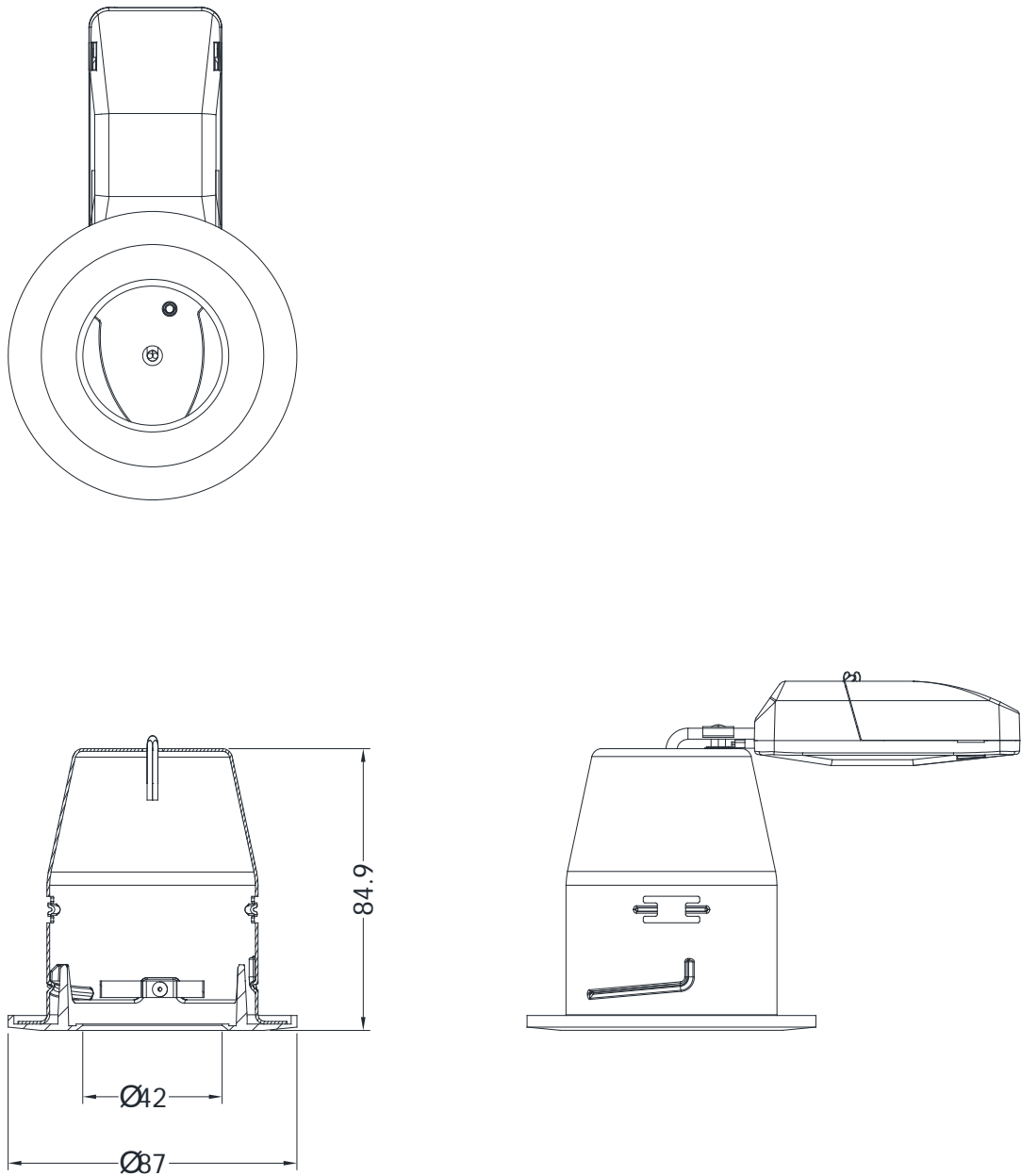
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Figure 4 – Details of Downlighter Specimen 2



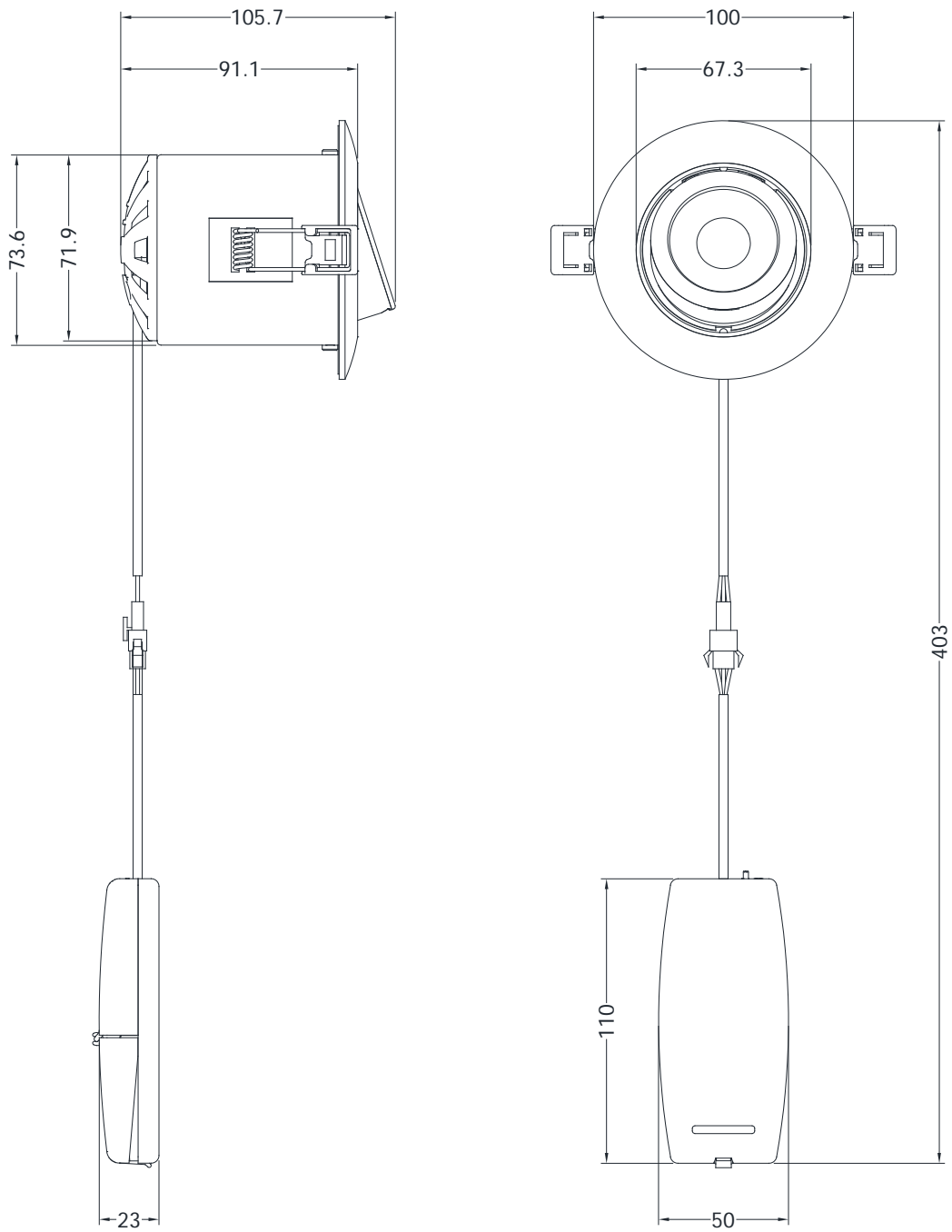
Do not scale. All dimensions are in mm

Figure 5 – Details of Downlighter Specimen 3



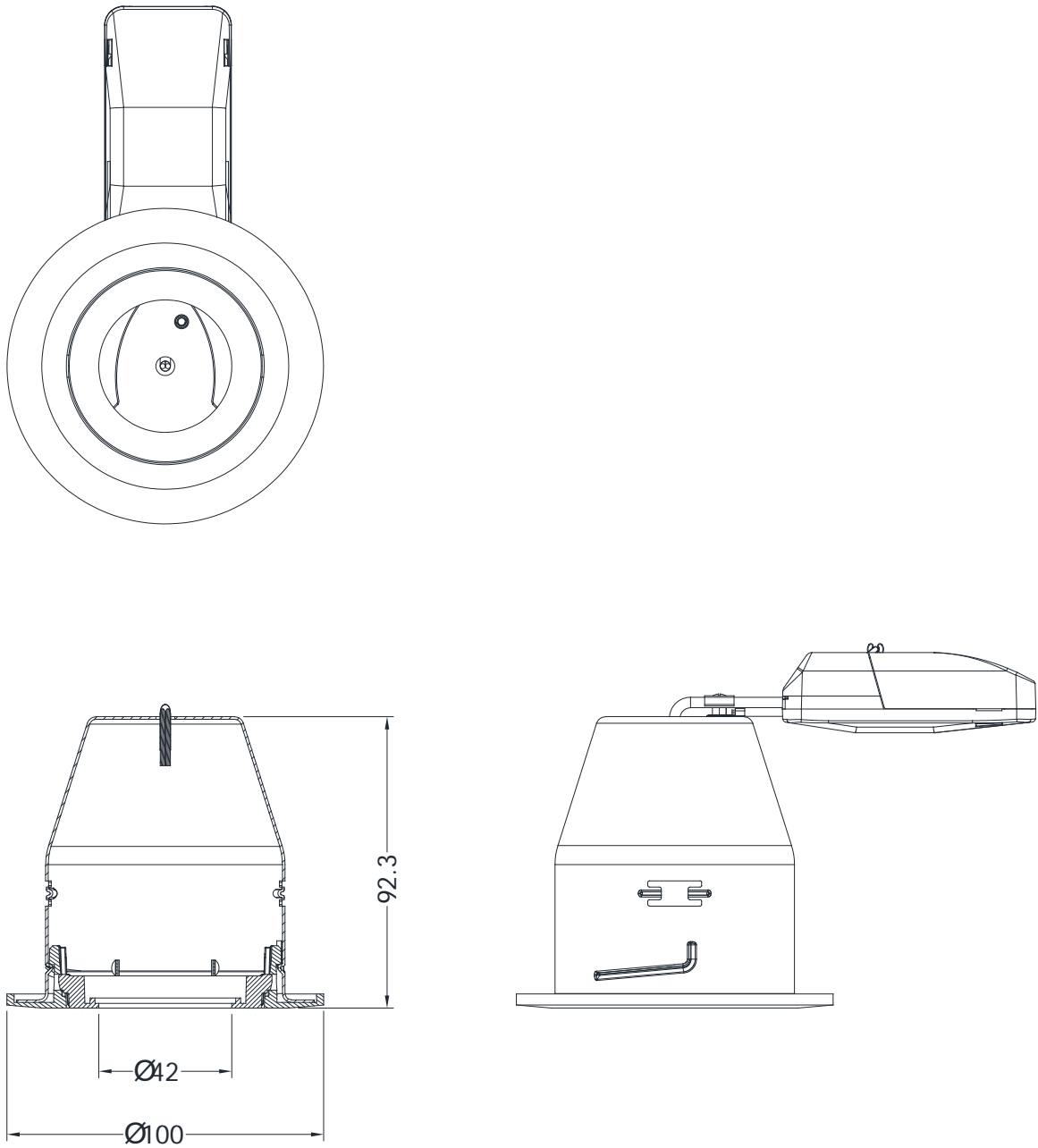
Do not scale. All dimensions are in mm

**Figure 6 – Details of Downlighter Specimens 4 & 5**



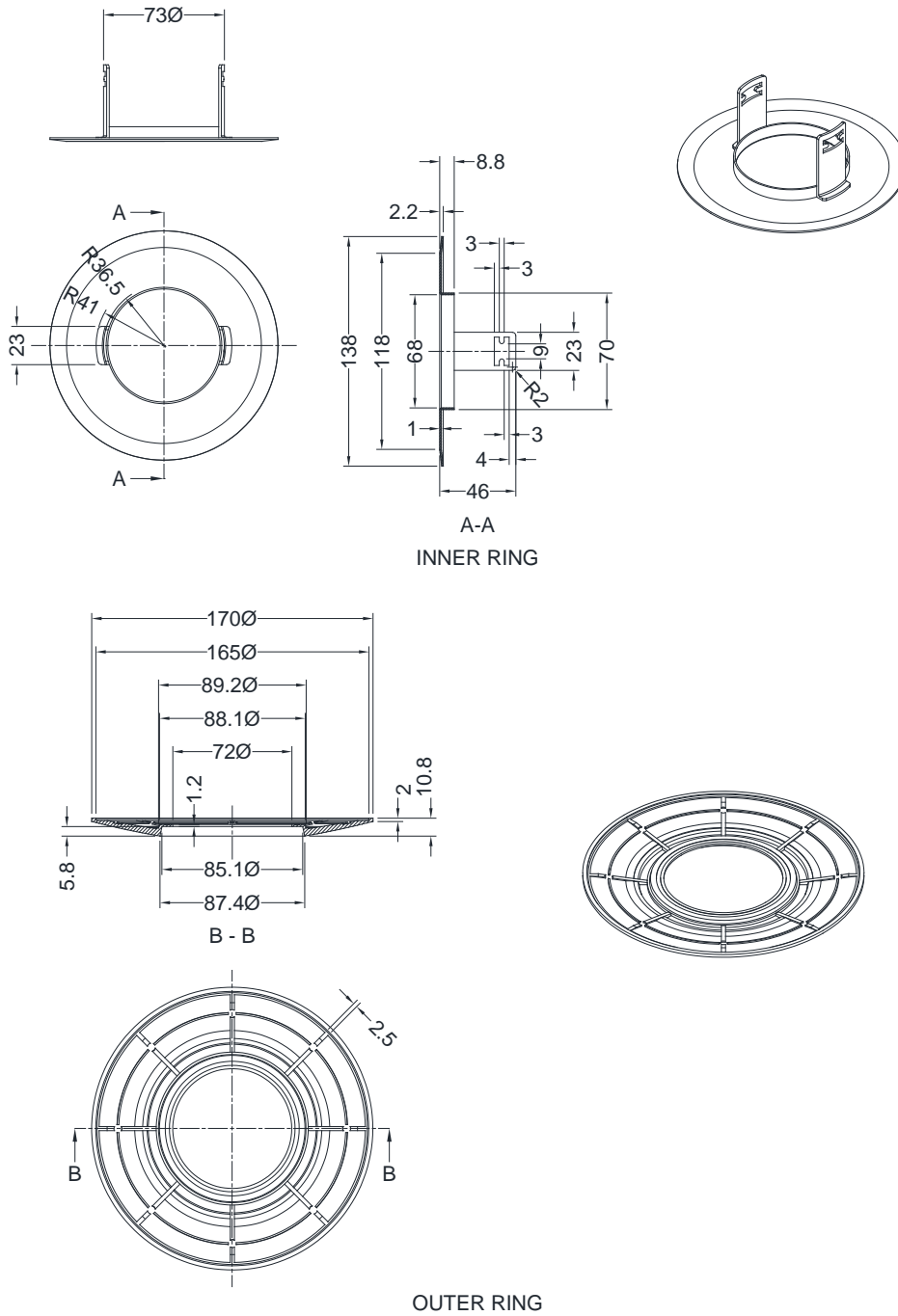
Do not scale. All dimensions are in mm

Figure 7 – Details of Downlighter Specimen 7



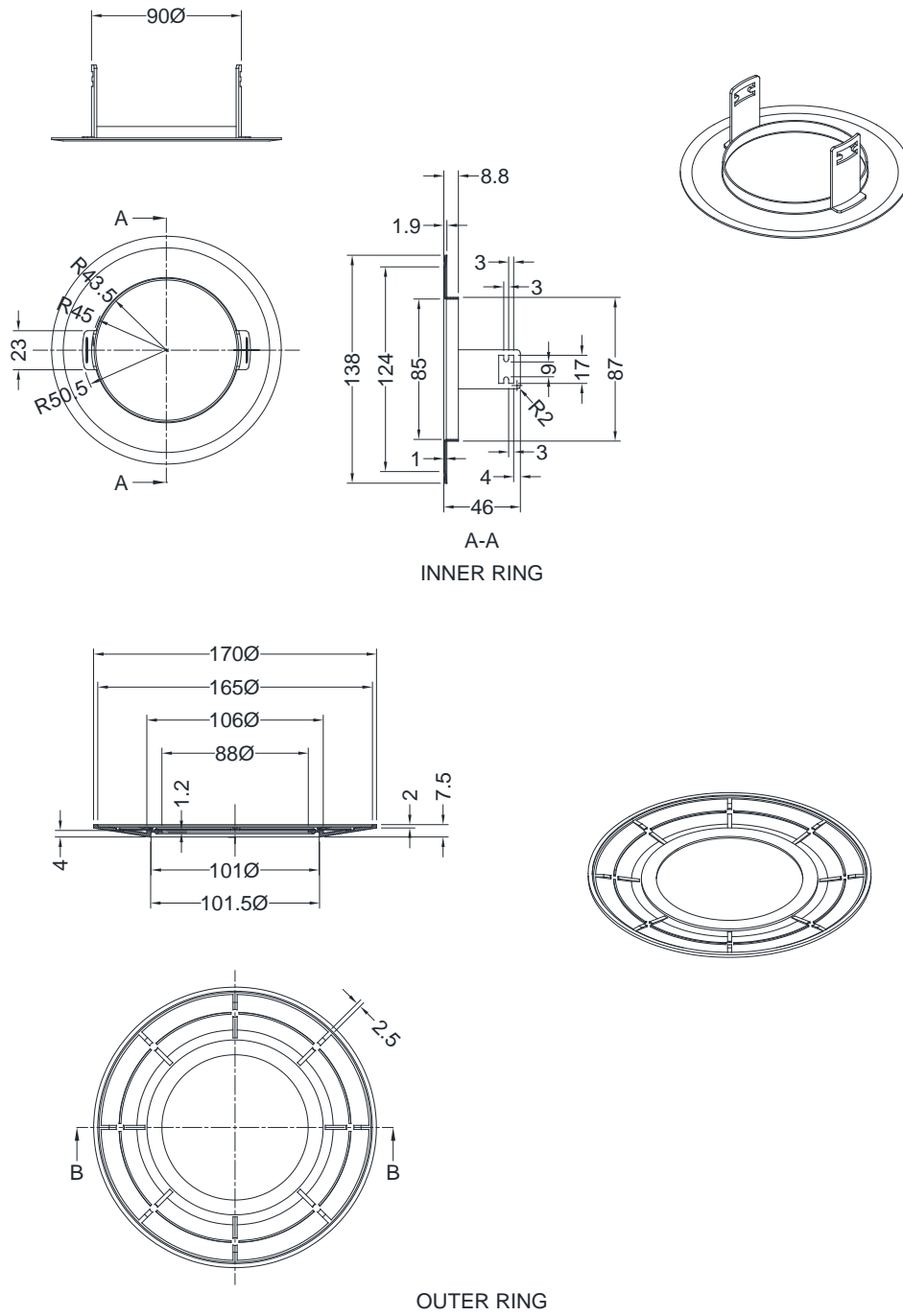
Do not scale. All dimensions are in mm

**Figure 8 – Details of Converter fitted to Specimen 1**



Do not scale. All dimensions are in mm

**Figure 9 – Details of Converter fitted to Specimen 5**



Do not scale. All dimensions are in mm



# Schedule of Components

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(Refer to Figures 1 to 9)

(All other details are as stated by the sponsor)

<u>Item</u>	<u>Description</u>
<b>1. Timber Floor</b>	
1.1. Engineered-Joints	
Manufacturer	: Wolf Systems Ltd
Reference	: Easi Joist
Assembled joist size	: 71 mm wide x 253 mm deep x 4200 mm long
Top and bottom chords	
i. material	: TR26 grade European whitewood
ii. density	: 450 kg/m <sup>3</sup> , stated
iii. cross section	: 71 mm horizontal x 47 mm vertical x 4200 mm long
End and Internal Blocks	
i. material	: TR26 grade European whitewood
ii. density	: 450 kg/m <sup>3</sup> , stated
iii. cross section	: 72 mm x 48 mm x 161 mm
Metal Webs	
i. reference	: WS250
ii. material	: Galvanised mild steel
iii. section size	: 241 mm high x 300 mm long x 0.9 mm thick, 12 off each side of joist
iv. fixing method	: Fitted between top and bottom chords and fixed via integral nailplate
Centres	: 600 mm, please see Figure 1
1.2. Rim Board	
Material	: Softwood, glue-lam
Grade	: GL24c, to BS EN 14080
Density	: 525.8 kg/m <sup>3</sup> , measured
Size	: 40.7 mm wide x 2253 mm deep x 2960 long
Fixing method	: Fitted across the ends of the easi-joists and through screwed to the top and bottom chords of each joist
1.3. Filler Block (Section of Rim Board)	
Material	: Softwood, glue-lam
Grade	: GL24c, to BS EN 14080
Density	: 525.8 kg/m <sup>3</sup> , measured
Size	: 40.7 mm wide x 253 mm deep x 2960 long
Fixing method	: Fitted across the ends of the easi-joists and through screwed to the top and bottom chords of each joist
1.4. Strong Back	
i. material	: TR26 grade European whitewood
ii. density	: 471.6 kg/m <sup>3</sup> , measured
iii. cross section	: 35.2 mm wide x 96.6 mm high x 2960 mm long
iv. fixing method	: Fitted at 90° to joists and screwed to an internal block near mid-span using 2 off 90mm long 5mm diameter screws per joist

<b><u>Item</u></b>	<b><u>Description</u></b>
<b>1.5. Insulation</b>	
i. manufacturer	: Rockwool
ii. reference	: ProRox SL 920 UK
iii. material	: Stone wool based insulation board
iv. density	: 40 kg/m <sup>3</sup> , uncompressed, measured
v. thickness	: 50 mm
vi. fixing method	: Fitted into the gaps formed by the engineered joists, ceiling and joists 7 ceiling end blocks, item 1.1, 1.3 & 1.4 respectively
<b>1.6. Floor Boards</b>	
i. material	: Flooring grade tongue and groove chipboards
ii. reference	: FSC E1 P5
iii. thickness	: 22 mm
iv. density	: 660.9 kg/m <sup>3</sup> , measured
v. size	: 600 mm wide
vi. fixing method	: Fitted in a single layer and bonded with Egger Protect D4 adhesive to the top chords of each joist and the tops of the rim boards and filler blocks as well as in the tongue and groove of adjoining boards
<b>1.7. Adhesive</b>	
i. manufacturer	: Egger
ii. type	: D4 adhesive
iii. reference	: Egger Protect
iv. curing method	: Air cured
v. application method	: Nozzle
<b>1.8. Ceiling Boards</b>	
i. manufacturer	: British Gypsum
ii. reference	: Gyproc Wallboard TE
iii. material	: Type A gypsum complete with strong paper liners
iv. thickness	: 1 off layer 15 mm thick
v. density	: 763.8 kg/m <sup>3</sup> , measured
vi. fixing method	: The boards were screw fixed to the soffit of the joists with all joints staggered, paper taped and skimmed with British Gypsum jointing compound
<b>2. Specimens 1 &amp; 6</b>	
Manufacturer	: JCC Lighting
References	
i. specimen 1	: V50 JC1001 BN
ii. specimen 6	: V50 JC1001 BN
Overall dimensions and construction	: See Figure 3 for details
<b>Luminaire Details</b>	
i. body materials	: Steel, Heat Sink of extruded aluminium, Lens of Polycarbonate, Rim of Die cast aluminium
ii. diffuser material	: PMMA
iii. diffuser rating	: 650°C
iv. chipset	: SUNPU 2828
v. weight	: 0.29Kg
vi. input voltage	: 230-240V
vii. input frequency	: 50-60Hz
viii. inrush current	: ≤5A 2.2μS
ix. running current	: 175mA
x. electrical class	: II

<u>Item</u>	<u>Description</u>
<b>2. Specimens 1 &amp; 6 (Continued)</b>	
Luminaire Details	
xi. lamp type	: LED
xii. dimmable	: Yes
xiii. MacAdam steps	: 5
xiv. lumen depreciation	: L70 @ 51,000hrs
xv. LED driver manufacturer	: JCC Lighting
xvi. IP rating	: IP65
xvii. operating temperature	: -5 °C to 25 °C
xviii. correlated colour temperature	: 3000K & 4000k
xix. colour rendering index	: Ra80
xx. forward voltage	: 36V DC
xxi. total power	: 7W
xxii. power factor	: 0.9
xxiii. intumescent	: 80 mm x diameter x 1 mm thick graphite based intumescent
xxiv. sealing ring	: 10 mm x wide x 1 mm thick silicone rubber based seal
xxv. cut out size	: 70 mm
<b>3. Specimen 2</b>	
Manufacturer	: JCC Lighting
Reference	: JC010010 WH
Overall dimensions and construction	: See Figure 4 for details
Luminaire Details	
i. body materials	: Mild Steel
ii. bezel materials	: Die Cast Aluminium
iii. weight	: 0.24kg
iv. input voltage	: 220-240vAC
v. electrical class	: Class I
vi. lamp type	: GU10 Cap
vii. maximum lamp size	: LED GU10 Lamps Only – 10W
viii. IP rating	: IP20
ix. operating temperature	: Ambient 26°C
x. sealing ring	: 9.5 mm wide x 1 mm thick silicone rubber based seal
xi. cut out size	: 72 mm
<b>4. Specimen 3</b>	
Manufacturer	: JCC Lighting
Reference	: JC010016 WH
Overall dimensions and construction	: See Figure 9 for details
Luminaire Details	
i. body materials	: Mild Steel
ii. bezel materials	: Die Cast Aluminium
iii. weight	: 0.30kg
iv. input voltage	: 220-240vAC
v. electrical class	: Class I
vi. lamp type	: GU10 Cap
vii. maximum lamp size	: LED GU10 Lamps Only – 10W
viii. IP rating	: IP65
ix. operating temperature	: Ambient 26°C
x. sealing ring	: 9.5 mm wide x 1 mm thick silicone rubber based seal
xi. cut out size	: 72 mm

<b><u>Item</u></b>	<b><u>Description</u></b>
<b>5. Specimens 4 &amp; 5</b>	
Manufacturer	: JCC Lighting
Reference	
i. specimen 4	: V50 Tilt JC1002 CH
ii. specimen 5	: V50 Tilt JC1002 CH
Overall dimensions and construction	: See Figure 6 for details
Luminaire Details	
i. body materials	: Steel, Heat Sink of extruded aluminium, Lens of Polycarbonate, Rim of Die cast aluminium
ii. diffuser material	: PMMA
iii. diffuser rating	: 650°C
iv. chipset	: SUNPU 2828
v. weight	: 0.46Kg
vi. input voltage	: 230-240V
vii. input frequency	: 50-60Hz
viii. inrush current	: ≤5A 2.2μS
ix. running current	: 175mA
x. electrical class	: II
xi. lamp type	: LED
xii. dimmable	: Yes
xiii. MacAdam steps	: 5
xiv. lumen depreciation	: L70 @ 51,000hrs
xv. LED driver manufacturer	: JCC Lighting
xvi. IP rating	: IP65
xvii. operating temperature	: -5 °C to 25 °C
xviii. correlated colour temperature	: 3000K & 4000k
xix. colour rendering index	: Ra80
xx. forward voltage	: 36V DC
xxi. total power	: 7W
xxii. power factor	: 0.9
xxiii. intumescent	: 92 mm x diameter x 1 mm thick graphite based intumescent (top of can)
xxiv. sealing ring	: 10 mm x wide x 1 mm thick silicone rubber based seal
xxv. cut out size	: 85 mm
<b>6. Specimen 7</b>	
Manufacturer	: JCC Lighting
Reference	: JC010023 WH
Overall dimensions and construction	: See Figure 10 for details
Luminaire Details	
i. body materials	: Mild Steel
ii. bezel materials	: Die Cast Aluminium
iii. weight	: 0.30kg
iv. input voltage	: 220-240vAC
v. electrical class	: Class I
vi. lamp type	: GU10 Cap
vii. maximum lamp size	: LED GU10 Lamps Only – 10W
viii. IP rating	: IP65
ix. operating temperature	: Ambient 26°C
x. sealing ring	: 9.5 mm wide x 1 mm thick silicone rubber based seal
xi. cut out size	: 84 mm

<b><u>Item</u></b>	<b><u>Description</u></b>
<b>8. Converter Plate</b>	
Manufacturer	: JCC Lighting
Reference	: JC1003 BN
Materials	
i. inner ring	: Steel
ii. outer ring	: Steel
Overall sizes	: See Figure 8 for details
Fitting methods	
i. inner ring	: Snap fitted into existing aperture in ceiling
ii. outer ring	: Slip fitted over new lighting unit, specimen 1, item 2, and retained when unit is fitted into inner ring
<b>9. Converter Plate</b>	
Manufacturer	: JCC Lighting
Reference	: JC1004 BN
Materials	
i. inner ring	: Steel
ii. outer ring	: Steel
Overall sizes	: See Figure 9 for details
Fitting methods	
i. inner ring	: Snap fitted into existing aperture in ceiling
ii. outer ring	: Slip fitted over new lighting unit, specimen 5, item 5, and retained when unit is fitted into inner ring

# Test Observations

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Time		All observations are from the exposed face unless noted otherwise.
mins	secs	
-60	00	Load applied.
00	00	<b>The test commences.</b>
04	00	The paper layer of the plasterboard and tape/jointing are burning away.
07	00	Light fittings 2, 6 and 7 are flaming and hanging from the ceiling.
10	00	Flaming at light fitting 5 which has partially detached and the long edges of the plasterboard are beginning to ripple.
13	30	Flaming at light fitting 4 which has partially detached.
15	00	Light fitting 1 and 2 are hanging down from the ceiling and are flaming heavily, the ceiling is also glowing bright red.
17	00	Light fitting 5 has become heavily distorted.
18	00	Light fitting 6 has fallen into the furnace.
20	00	There is flaming through the gap between the short edges of the plasterboard.
22	00	The plasterboard is starting to sag between joints.
26	00	Large gaps of around 30mm are opening up between the plasterboard joints.
29	00	Creaking sounds audible from atop the furnace.
29	30	Large sections of plasterboard have fallen into the furnace exposing the joints.
30	30	Boards continue to fall with intense flaming in the furnace also occurring.
33	00	<b>Test discontinued for safety reasons as the deflection rate rises sharply.</b> <b>Specimen is satisfying load bearing, integrity, and insulation criteria.</b>

## Test Photographs

The exposed face of the floor assembly prior to test



The unexposed face of the floor assembly prior to test



The unexposed face of the floor assembly after 15 minutes of testing



The unexposed face of the floor assembly after 30 minutes of testing





# Temperature, Pressure and Deflection Data

Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard BS EN 1363-1: 2020

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	41
1	349	219
2	445	401
3	502	525
4	544	536
5	576	580
6	603	594
7	626	630
8	646	644
9	663	652
10	678	678
11	693	693
12	706	705
13	717	714
14	728	733
15	739	738
16	748	746
17	757	752
18	766	763
19	774	774
20	781	781
21	789	789
22	796	795
23	802	802
24	809	807
25	815	814
26	820	820
27	826	826
28	832	831
29	837	836
30	842	872
31	847	872
32	852	883
33	856	889

**Individual Temperatures And Mean Recorded On The Unexposed Surface Of The Specimen**

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	16	17	17	17	17	17
1	16	17	17	17	17	17
2	16	17	17	17	17	17
3	16	17	17	17	17	17
4	16	17	17	17	17	17
5	16	17	17	17	17	17
6	17	17	17	17	17	17
7	17	17	17	17	17	17
8	17	17	17	17	17	17
9	17	18	18	18	17	18
10	18	18	18	18	18	18
11	18	18	18	18	18	18
12	19	19	19	19	19	19
13	20	20	19	20	19	20
14	21	20	20	20	20	20
15	21	21	20	21	21	21
16	22	22	21	22	21	22
17	23	22	21	23	22	22
18	24	23	22	23	23	23
19	25	24	22	24	23	24
20	26	25	23	25	24	25
21	26	26	23	26	25	25
22	27	26	24	26	26	26
23	28	27	24	27	27	27
24	29	28	25	28	27	27
25	30	29	25	29	28	28
26	31	29	26	29	29	29
27	32	30	26	30	29	29
28	34	31	27	30	30	30
29	36	32	28	31	32	32
30	38	35	31	33	34	34
31	42	42	40	40	39	41
32	46	50	49	47	49	48
33	55	57	50	52	57	54

**Individual Temperatures Recorded On The Unexposed Surface Of The Specimen Adjacent to Joints**

Time Mins	T/C Number 216 Deg. C	T/C Number 219 Deg. C	T/C Number 220 Deg. C	T/C Number 221 Deg. C	T/C Number 222 Deg. C	T/C Number 223 Deg. C
0	16	16	18	17	13	13
1	16	16	18	17	13	13
2	16	16	18	17	13	13
3	16	16	18	17	13	13
4	16	16	18	17	13	13
5	16	16	18	17	13	12
6	16	16	18	17	13	12
7	16	16	18	17	13	12
8	16	16	18	17	13	12
9	16	16	18	18	13	12
10	16	16	19	18	13	12
11	16	16	19	19	13	13
12	16	16	20	19	13	13
13	16	16	21	20	13	13
14	16	16	21	20	13	13
15	17	16	22	21	13	13
16	17	16	23	22	14	13
17	17	16	24	22	14	14
18	17	16	24	23	14	14
19	18	17	25	24	14	14
20	18	17	26	25	15	15
21	18	17	27	25	15	15
22	19	18	28	26	15	15
23	19	18	29	27	16	16
24	19	18	30	28	16	16
25	20	18	31	29	16	16
26	20	19	32	29	17	17
27	20	19	33	30	17	17
28	21	19	35	31	17	18
29	21	20	37	32	18	18
30	22	20	42	34	18	18
31	22	21	50	41	20	21
32	23	24	58	52	33	33
33	24	32	66	58	45	43

**Individual Temperatures Recorded At Mid-Height Of The Cavity Coincidental With The Light Fittings**

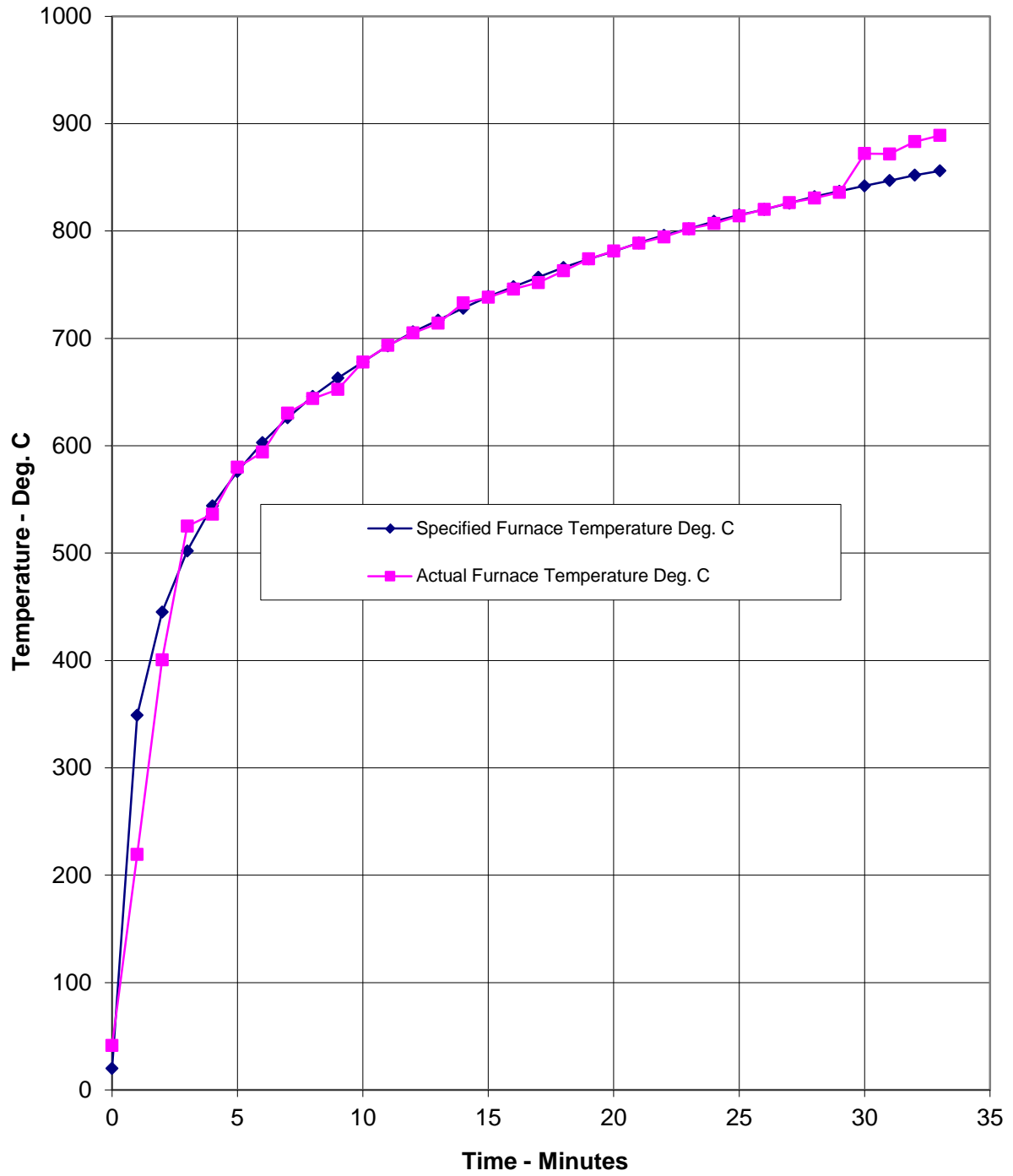
Time Mins	T/C Number 224 Deg. C	T/C Number 225 Deg. C	T/C Number 226 Deg. C	T/C Number 227 Deg. C	T/C Number 228 Deg. C	T/C Number 229 Deg. C	T/C Number 230 Deg. C
0	24	25	25	25	26	25	24
1	26	25	25	27	26	25	24
2	30	28	29	30	31	30	29
3	49	45	48	49	51	49	48
4	55	53	55	58	57	55	53
5	60	57	60	61	61	59	58
6	63	62	64	64	65	63	61
7	65	65	67	66	65	67	64
8	67	68	67	68	67	72	69
9	69	73	69	71	69	77	74
10	71	87	70	74	78	82	79
11	87	95	72	76	85	87	83
12	97	94	74	90	88	91	87
13	101	96	75	95	90	94	89
14	113	98	77	97	92	98	93
15	164	100	79	108	97	106	96
16	149	101	80	144	101	143	99
17	142	103	81	135	105	198	103
18	126	106	83	136	109	193	108
19	119	109	84	132	114	174	114
20	119	116	88	137	118	169	121
21	127	128	88	158	128	159	131
22	146	153	103	170	145	170	146
23	165	176	110	187	162	201	174
24	183	196	110	212	181	224	198
25	201	212	122	236	201	241	219
26	214	225	*	248	218	265	244
27	224	238	*	268	231	276	260
28	236	260	*	289	248	291	281
29	245	351	*	651	262	340	293
30	312	380	*	595	749	433	491
31	350	357	*	607	775	484	602
32	665	400	*	637	781	532	644
33	710	430	*	664	798	556	662

\*Indicates Thermocouple malfunction.

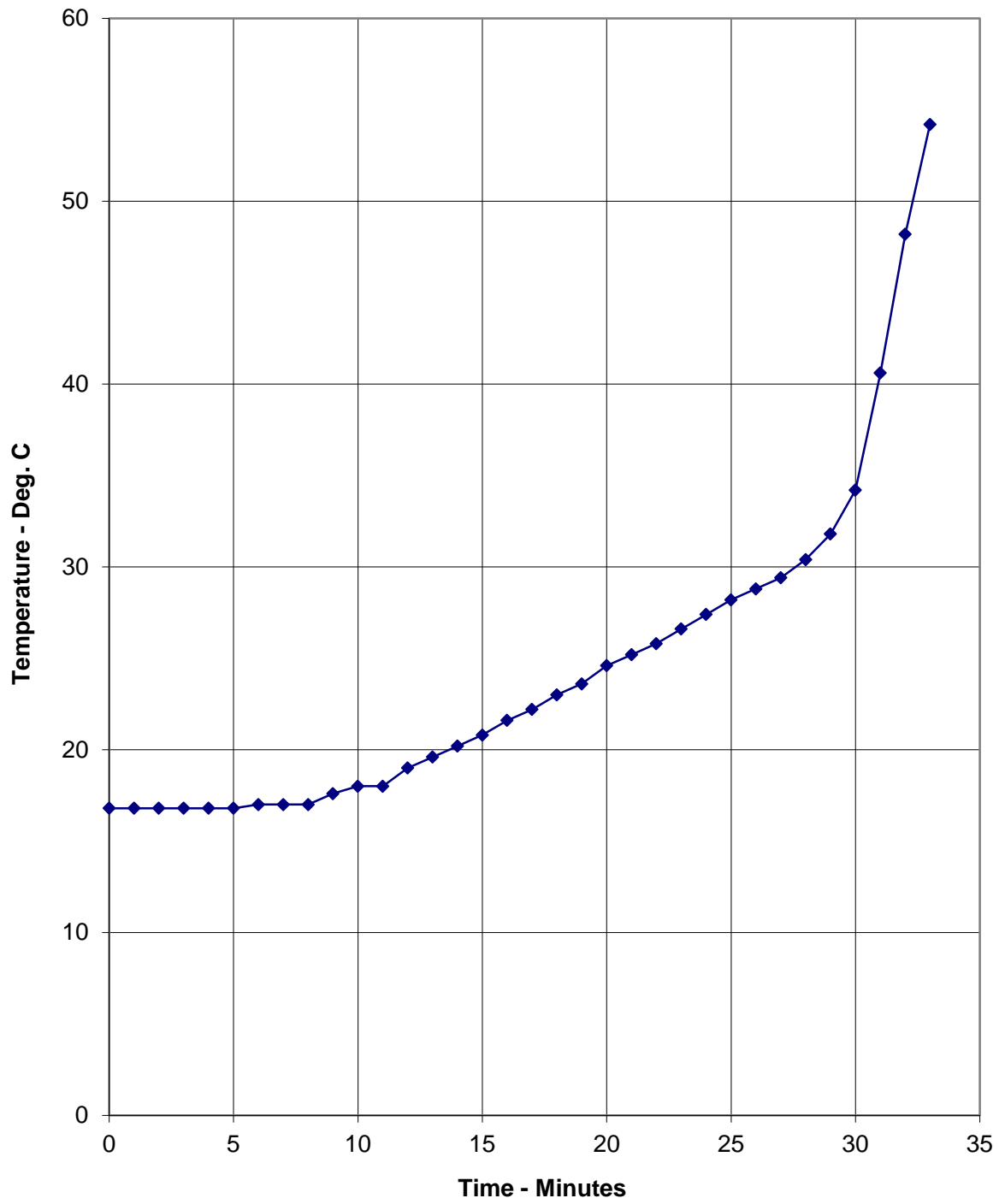
**Central Vertical Deflection Of The Specimen**

Time Mins	Central Vertical Deflection mm	Rate Of Deflection mm/min
0	0.0	0.0
1	0.6	0.9
2	0.7	0.1
3	0.6	0.0
4	0.6	0.0
5	0.3	0.0
6	0.4	0.1
7	0.6	0.2
8	0.7	0.1
9	0.8	0.1
10	0.9	0.2
11	1.0	0.1
12	1.1	0.1
13	1.3	0.2
14	1.4	0.1
15	1.6	0.2
16	1.7	0.1
17	1.9	0.2
18	2.1	0.2
19	2.3	0.2
20	2.4	0.1
21	2.5	0.1
22	2.6	0.1
23	2.7	0.1
24	3.0	0.2
25	3.1	0.2
26	3.2	0.1
27	3.4	0.2
28	3.5	0.2
29	3.7	0.2
30	4.4	0.7
31	7.4	3.0
32	13.1	5.7
33	25.5	12.4

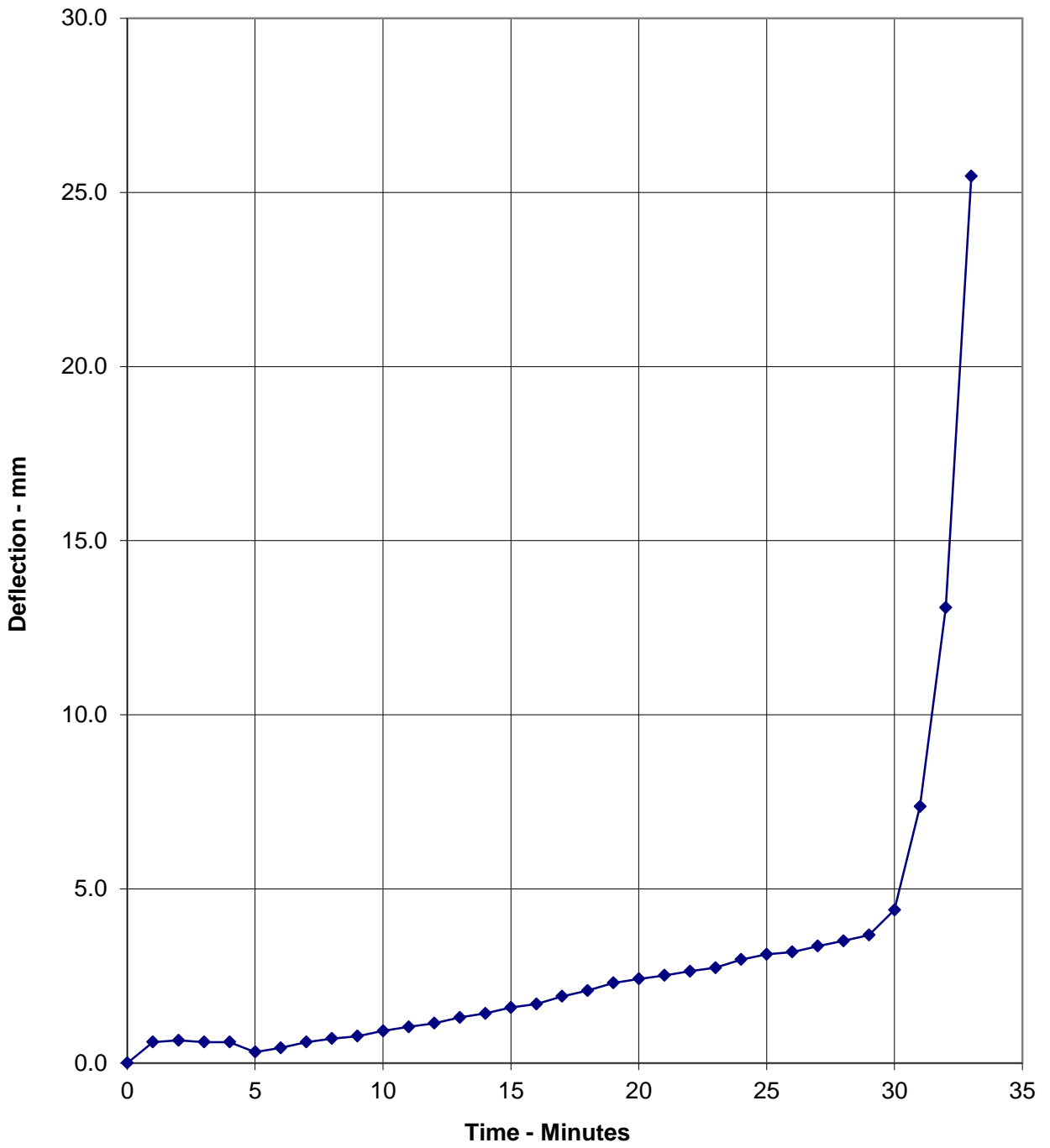
**Graph Showing Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard**



**Graph Showing Mean Temperature Recorded On The Unexposed Surface Of The Specimen**

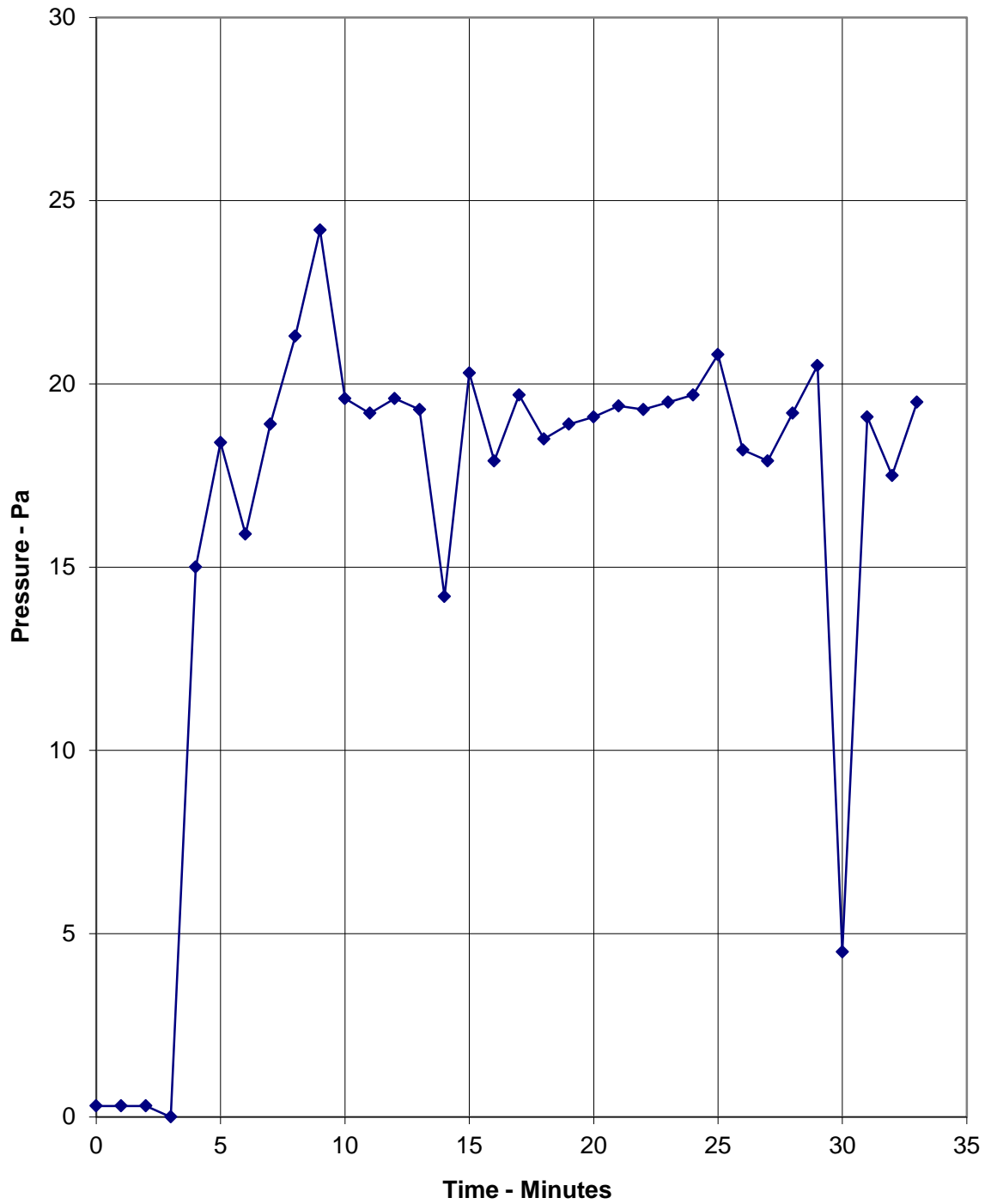


**Graph Showing The Recorded Vertical Deflection Of The Specimen**





Graph Showing Recorded Furnace Pressure 100 mm Below The Underside Of The Specimen



## On-going Implications

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### 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.

**This report supersedes test report 437610/R Issue 1 issued on the 8<sup>th</sup> February 2021.**

### 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

## Field of Direct Application

The results are directly applicable to a similar untested floor construction provided the following is true:

**a) With respect to the structural building member:**

The maximum moments and shear forces, which when calculated on the same basis as the test load, shall not be greater than those tested.

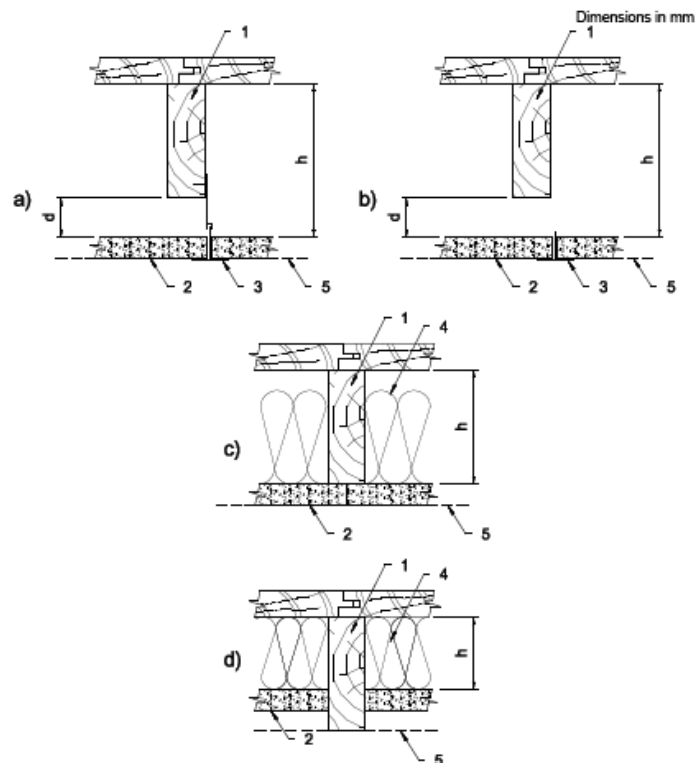
**b) With respect to the ceiling system:**

The size of panels of the ceiling lining may be increased by a maximum of 5 % but limited to a maximum of 50 mm. The length of the grid members can be increased accordingly.

The total area occupied by fixtures and fittings relative to the area of the ceiling lining is not increased and the maximum tested opening in the lining is not exceeded.

**c) With respect to the cavity:**

The height of the cavity 'h' and the minimum distance 'd' between the ceiling and the structural members (see Figure below) are equal to or greater than those tested.



### KEY

- |  |   |
|--|---|
| a) suspended ceiling                                     | 4 insulation                                      |
| b) self-supported ceiling                                | 5 pressure reference line                         |
| c) and d) direct fixed ceiling with insulation in cavity | d distance between ceiling and structural members |
| 1 supporting construction (joist)                        | h height of cavity                                |
| 2 ceiling lining   |   |
| 3 supporting frame                                       |   |