

Title:

Fire Resistance Test
In Accordance With
BS EN 1365-2: 2014,
On A Loadbearing
Timber Floor
Construction Protected
By A Plasterboard
Ceiling When
Incorporating Twelve
Downlighter Light
Fitting Assemblies.

Date of Test:

12th July 2023

Issue 1

9th November 2023

WF Report No.

529758/R



Prepared for:

JCC Lighting Products
Ltd

Lux Park,
Chichester Business
Park, City Fields Way,
Tangmere, Chichester,
West Sussex.



0249

Test Specimen

Summary of Tested Specimen

The timber floor had overall nominal dimensions of 4330 mm long by 3000 mm wide by 244.5 mm deep. The floor comprised 195 mm high C16 softwood solid timber joists at 600 mm centres. The unexposed face of the floor comprised nominally 22 mm thick tongue and groove chipboard. The floor assembly was protected by an inner layer of 12.5 mm thick 'Gyproc Wallboard', through fixed to the timber framework with screws and an outer layer of 15 mm thick 'Gyproc Fireline', through fixed to the timber framework with screws.

The ceiling incorporated twelve specimen downlighter light fittings. The lights were referenced as follows:

Test Ref.	Model Ref.	Cut Out Diameter.
1	JC1001	70 mm
2	JC10010	70 mm
3	JC1101	68 mm
4	JC1102	82 mm
5	JC1020	70 mm
6	JC010036	68 mm
7	JC010037	90 mm
8	JC010038	125 mm
9	JC010039	157 mm
10	JC010040	90 mm
11	JC010041	125 mm
12	JC010042	157 mm

The floor supported a uniformly distributed load of 0.696 kN/m². This load was calculated to represent the maximum design load for the timber floor construction.

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>Loadbearing Capacity</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="454 465 1433 674"> <thead> <tr> <th>Criteria</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td><i>L</i>: Clear span - in mm</td> <td>4150</td> </tr> <tr> <td><i>d</i>: Depth of structural section - in mm</td> <td>195</td> </tr> <tr> <td>Limiting deflection ($L^2/400d$) - in mm</td> <td>220.8</td> </tr> <tr> <td>Limiting rate of deflection ($L^2/9000d$) - in mm/min</td> <td>9.8</td> </tr> <tr> <td>Measured Deflection $1.5 \times (L^2/400d)$ - in mm</td> <td>331.2</td> </tr> </tbody> </table> <p>Failure to support the load is deemed to have occurred when a 'Measured Deflection' greater than or equal to '1.5 x Limiting Deflection' is observed</p> <p>Or</p> <p>Both the 'Limiting rate of deflection' and 'Limiting deflection' are exceeded.</p> <p>The criterion was satisfied for 79 minutes after which time the test was discontinued.</p>	Criteria	Value	<i>L</i> : Clear span - in mm	4150	<i>d</i> : Depth of structural section - in mm	195	Limiting deflection ($L^2/400d$) - in mm	220.8	Limiting rate of deflection ($L^2/9000d$) - in mm/min	9.8	Measured Deflection $1.5 \times (L^2/400d)$ - in mm	331.2
Criteria	Value												
<i>L</i> : Clear span - in mm	4150												
<i>d</i> : Depth of structural section - in mm	195												
Limiting deflection ($L^2/400d$) - in mm	220.8												
Limiting rate of deflection ($L^2/9000d$) - in mm/min	9.8												
Measured Deflection $1.5 \times (L^2/400d)$ - in mm	331.2												
<p>Integrity</p>	<p>It is required that the specimen retains its separating function, without:</p> <ul style="list-style-type: none"> ▪ causing ignition of a cotton pad when applied ▪ permitting the penetration of a gap gauge as specified in BS EN 1363-1: 2020 ▪ sustained flaming on the unexposed surface ▪ subsequent failure of loadbearing capacity <p>These requirements were satisfied for the periods shown below:</p> <p>Sustained flaming 79 minutes</p> <p>Gap gauge 79 minutes No failure*</p> <p>Cotton pad 79 minutes</p>												
<p>Insulation</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. These requirements were satisfied for the period shown below:</p> <p>Specimen 79 minutes Due to integrity failure</p> <p>*Test was discontinued after a period of 79 minutes.</p>												

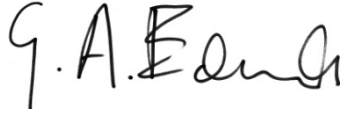
Date of Test

12th July 2023

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Signatories


Responsible Officer K. Brennan* Technical Officer


Approved G. Edmonds* Senior Technical Officer

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

Report Issued: 9th November 2023

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Revision History

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

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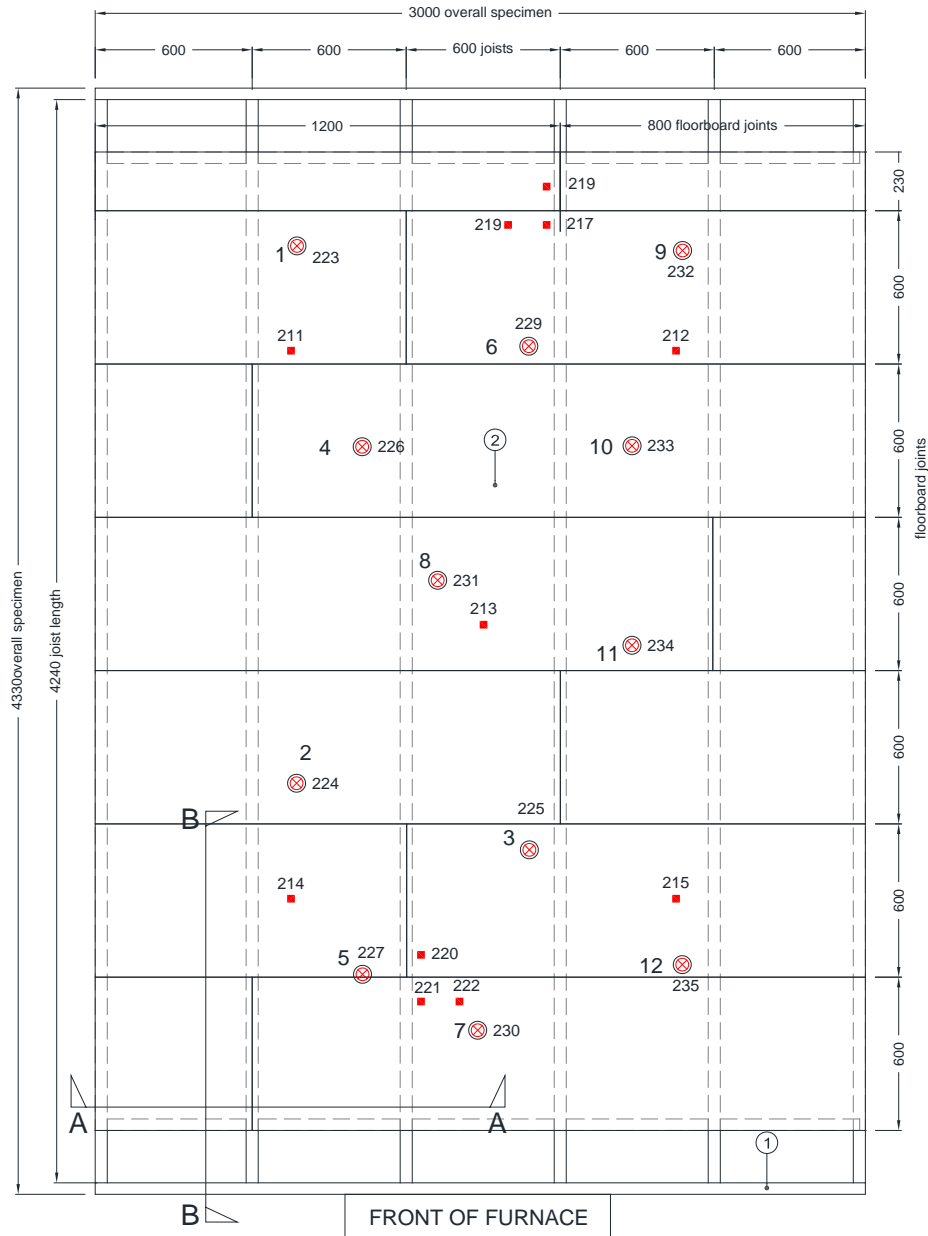
FIELD OF DIRECT APPLICATION42

Test Conditions

Standard	<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>
Sampling	<p>Warringtonfire 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 Warringtonfire.</p>
Installation	<p>Representatives of Warringtonfire assembled the floor construction and installed the downlighters between the 3rd and 11th July 2023</p>
Conditioning	<p>The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 17 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 17.5°C to 29°C and 35.5% to 71% respectively.</p>
Instruction to Test	<p>The test was conducted on the 12th July 2023 at the request of JCC Lighting Products Ltd, the test sponsor.</p>
Ambient Temperature	<p>The ambient air temperature in the vicinity of the test construction was 26°C at the start of the test with a maximum variation of +1°C during the test.</p>
Furnace	<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>
Thermocouples	<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>
Application of the load	<p>The full test load was applied via dead load and hydraulic rams uniformly distributed over the test Specimen 2 hours before the commencement of the test.</p>
Loadbearing Capacity Criteria	<p>A linear deflection transducer was provided at the approximate centre on the unexposed surface of the specimen to record its vertical deflection.</p>
Furnace Pressure	<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>

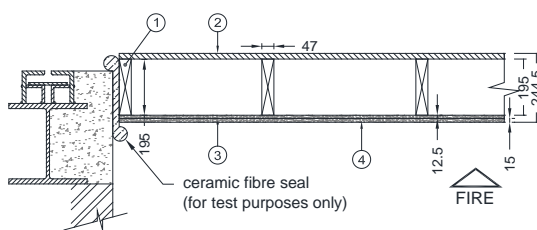
Test Construction

Figure 1 – General plan view of test specimen showing thermocouple positions- unexposed face and section A-A and section B-B

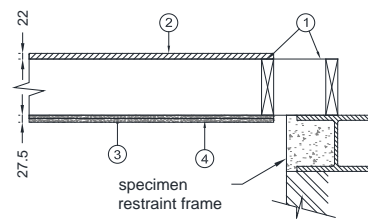


GENERAL PLAN VIEW OF TEST SPECIMEN SHOWING THERMOCOUPLE POSITIONS - UNEXPOSED FACE

- Positions of surface thermocouples
- ⊗ Positions of mineral insulated thermocouples at mid-cavity, adjacent to each downlight



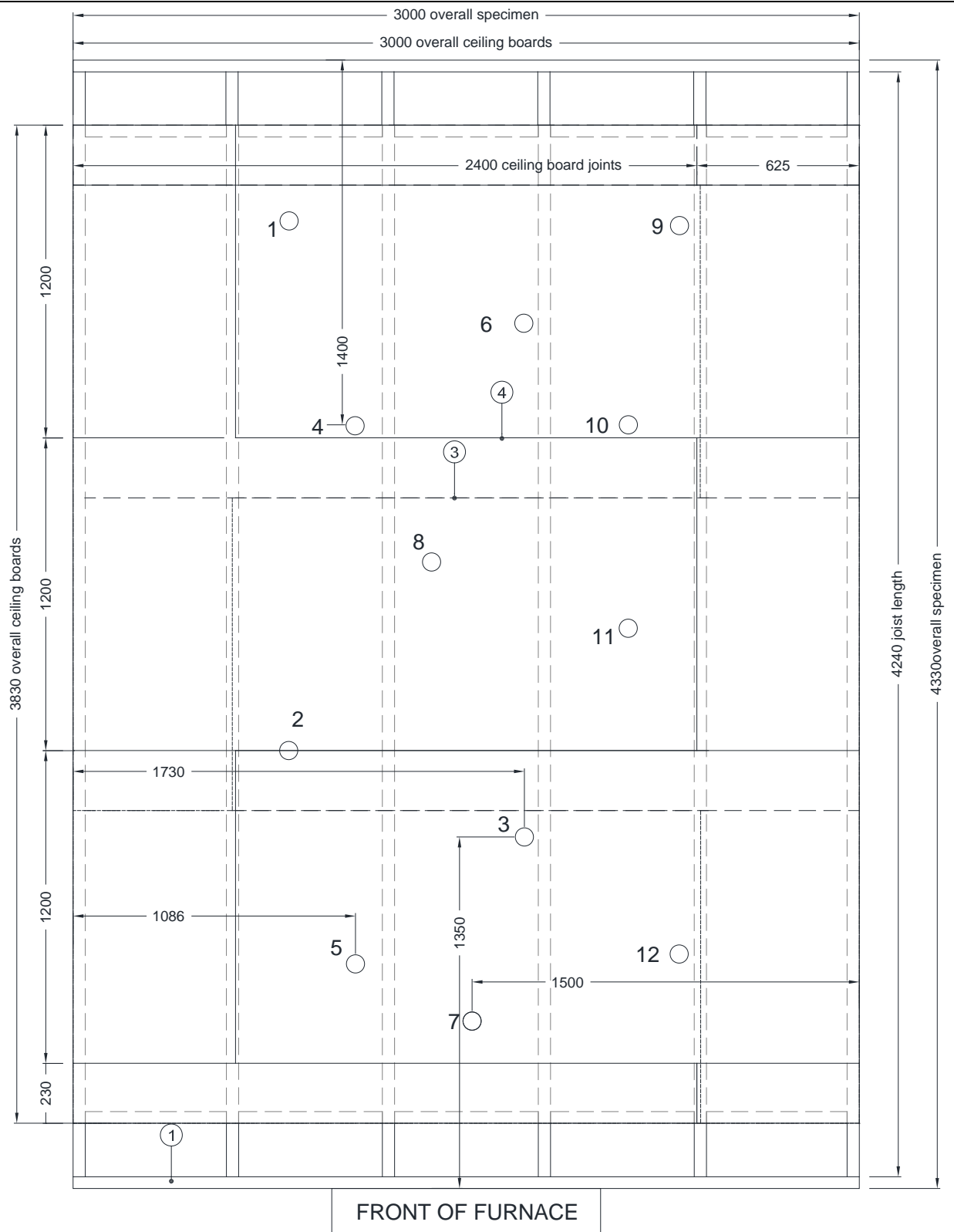
SECTION A - A



SECTION B - B

Do not scale. All dimensions are in mm

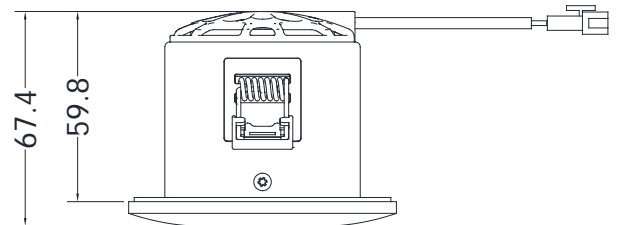
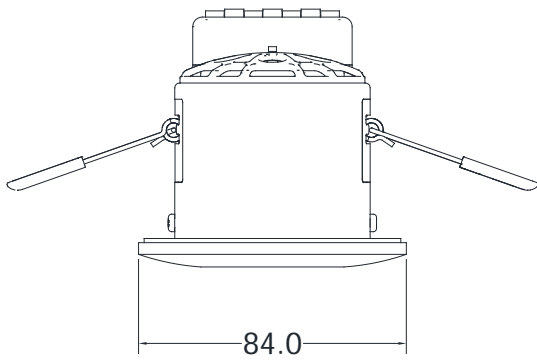
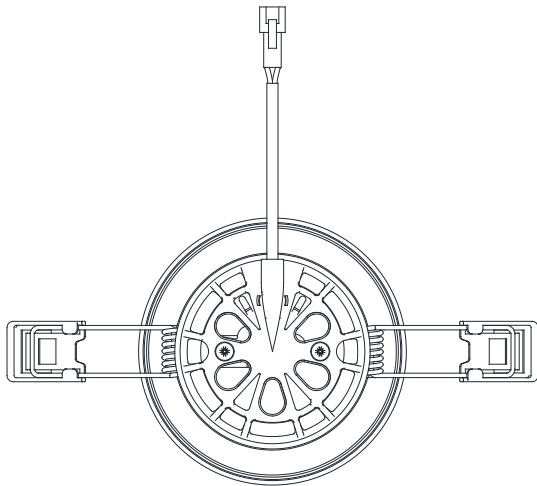
Figure 2 – General plan view of test specimen- exposed face



GENERAL PLAN VIEW OF TEST SPECIMEN - EXPOSED FACE

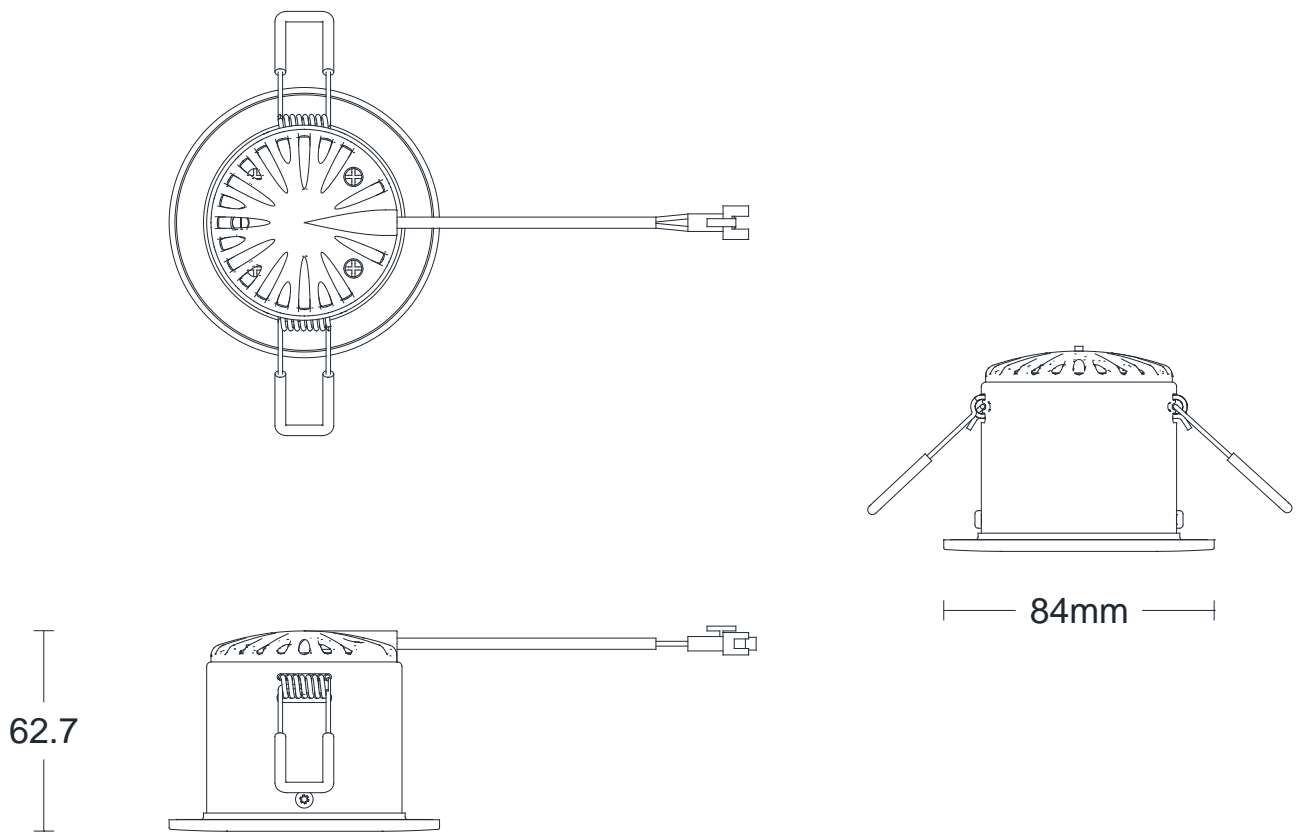
Do not scale. All dimensions are in mm

Figure 3 – Downlight 1- JC1001



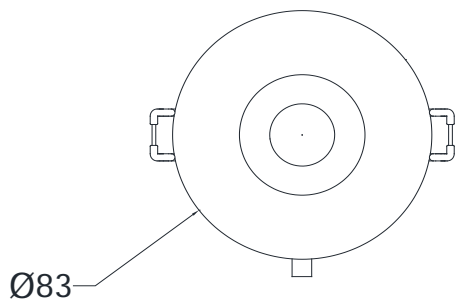
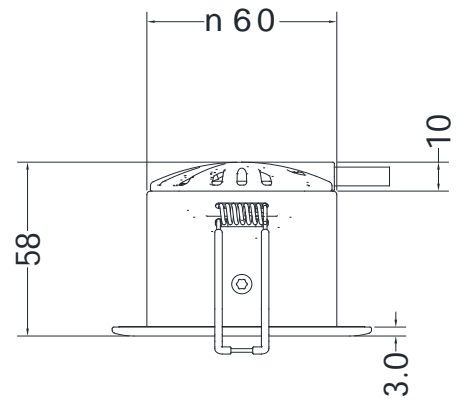
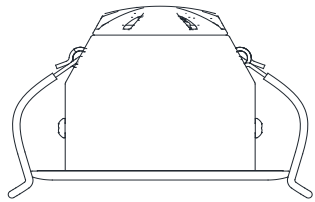
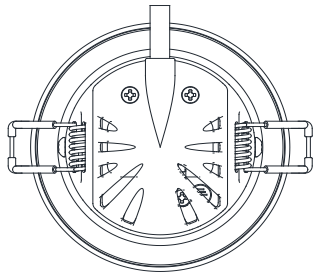
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Figure 4 – Downlight 2- JC10010



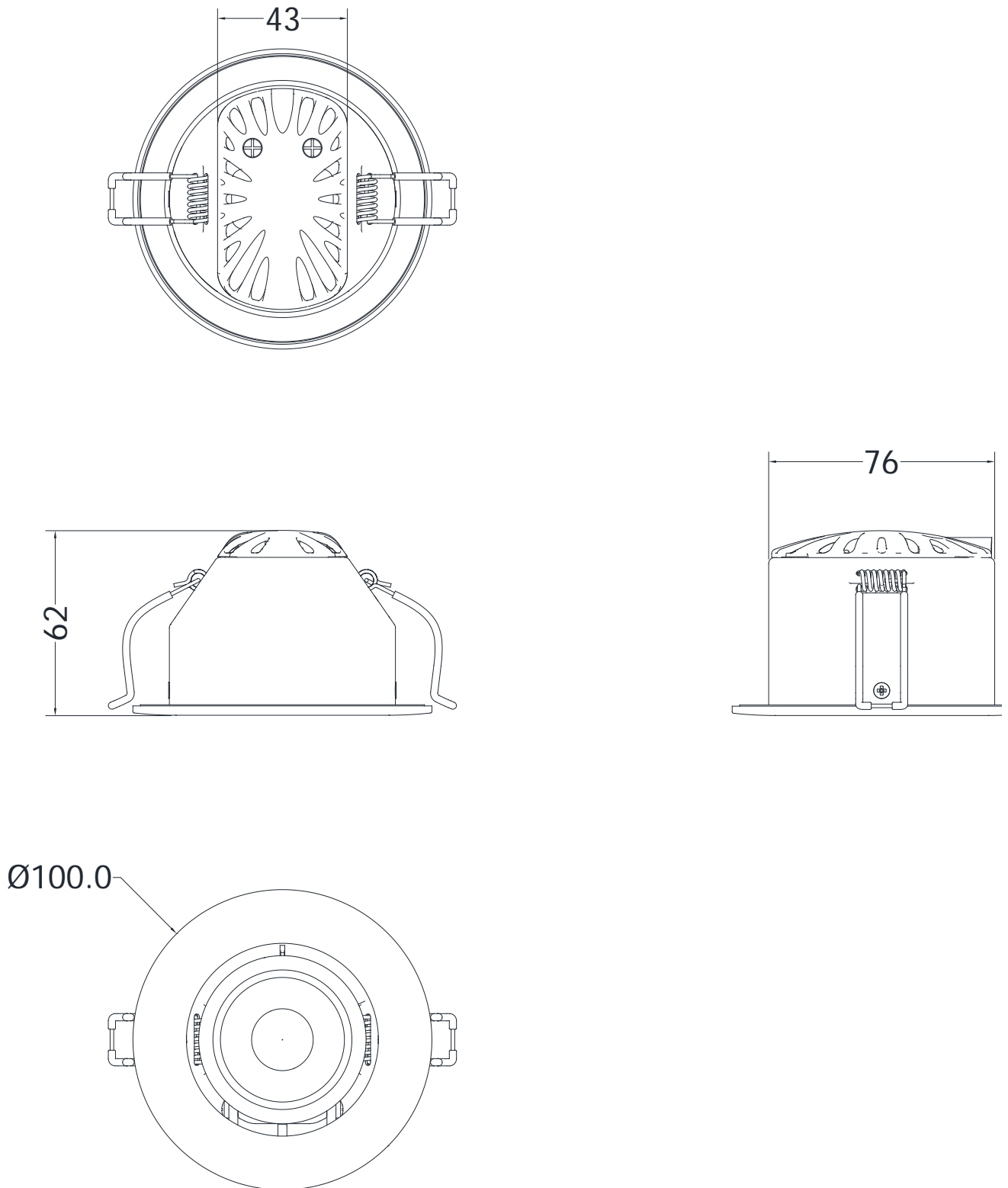
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Figure 5 – Downlight 3- JC1101



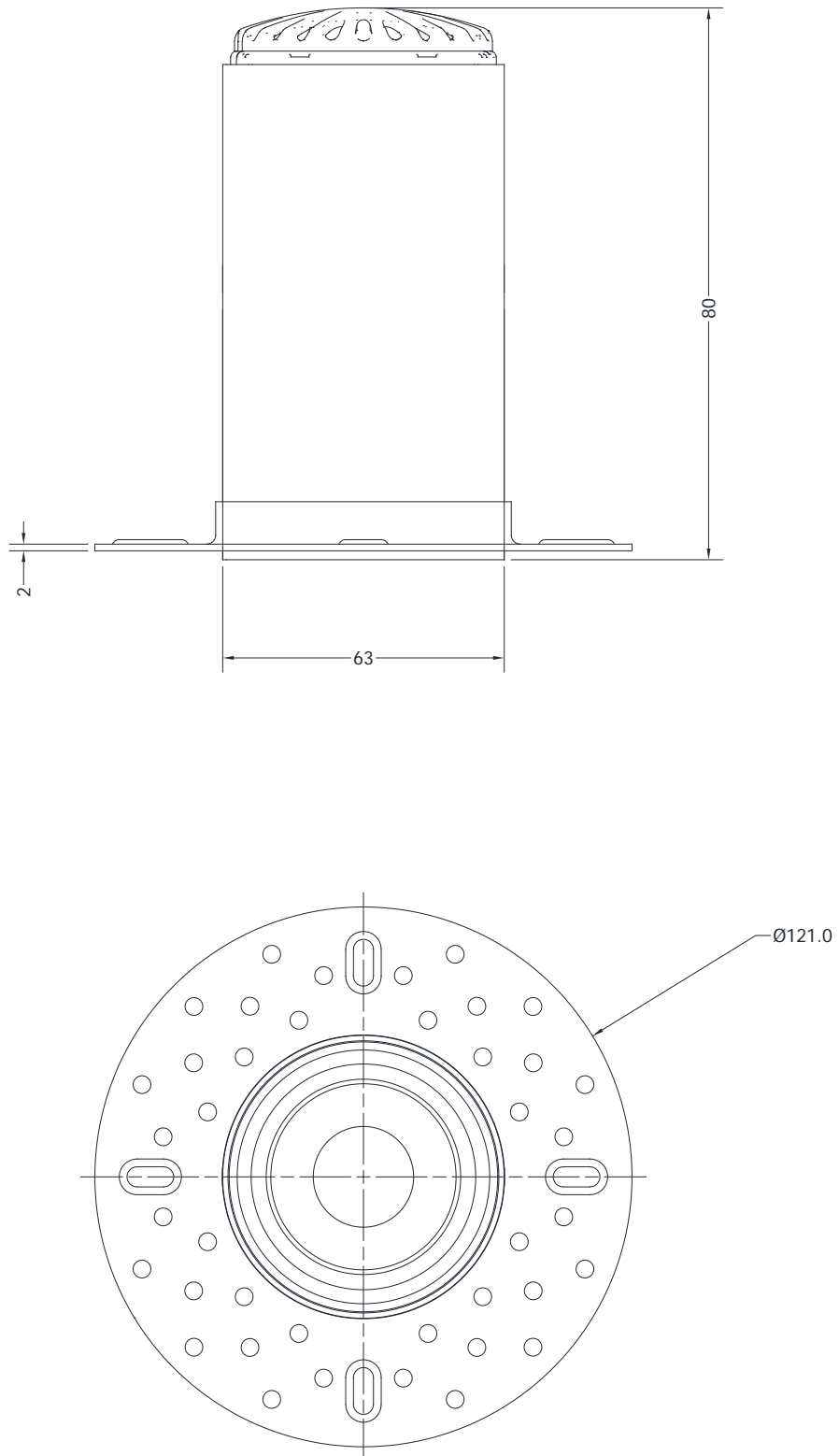
Do not scale. All dimensions are in mm

Figure 6 – Downlight 4- JC1102



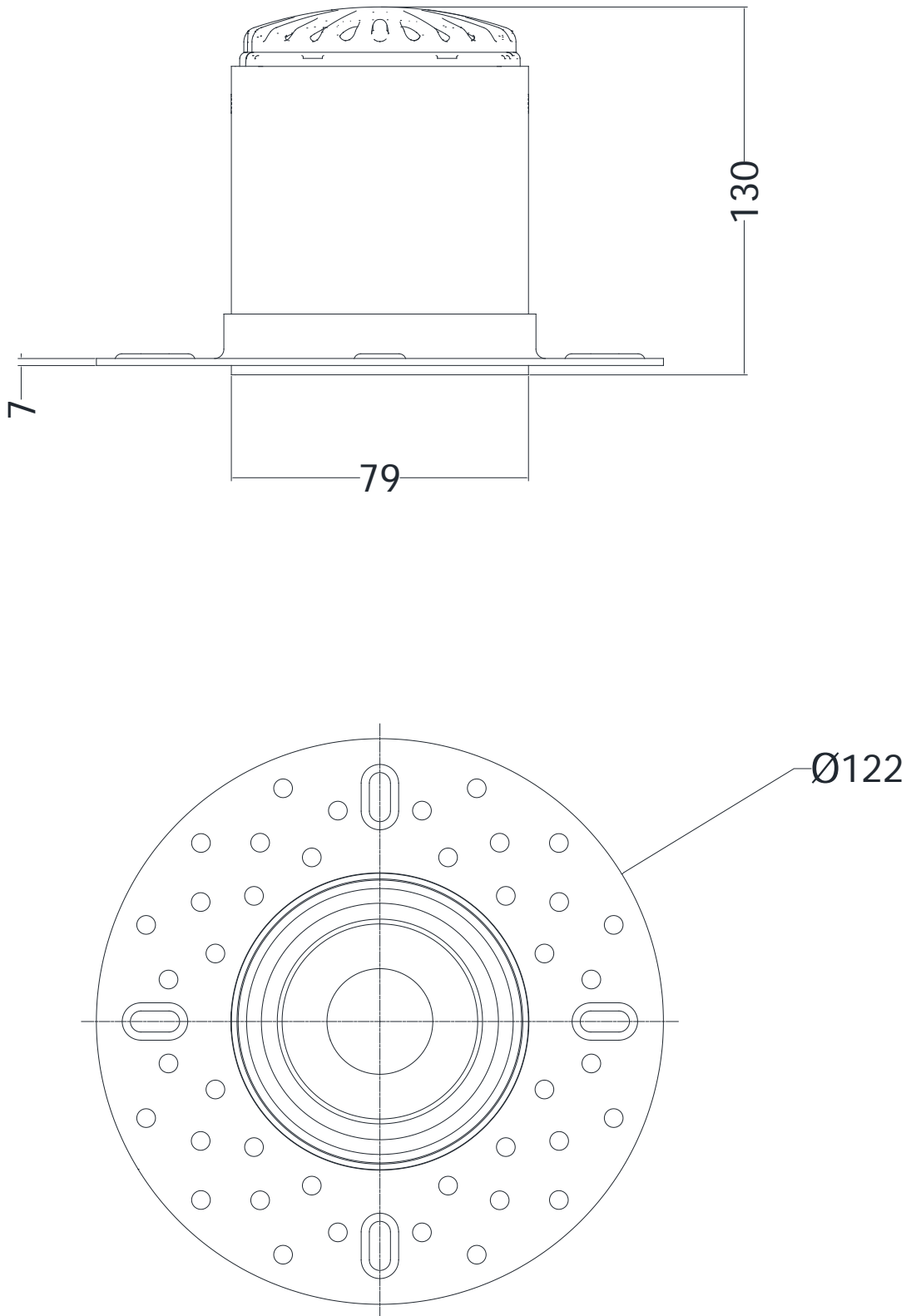
Do not scale. All dimensions are in mm

Figure 7 – Downlight 5- JC1020



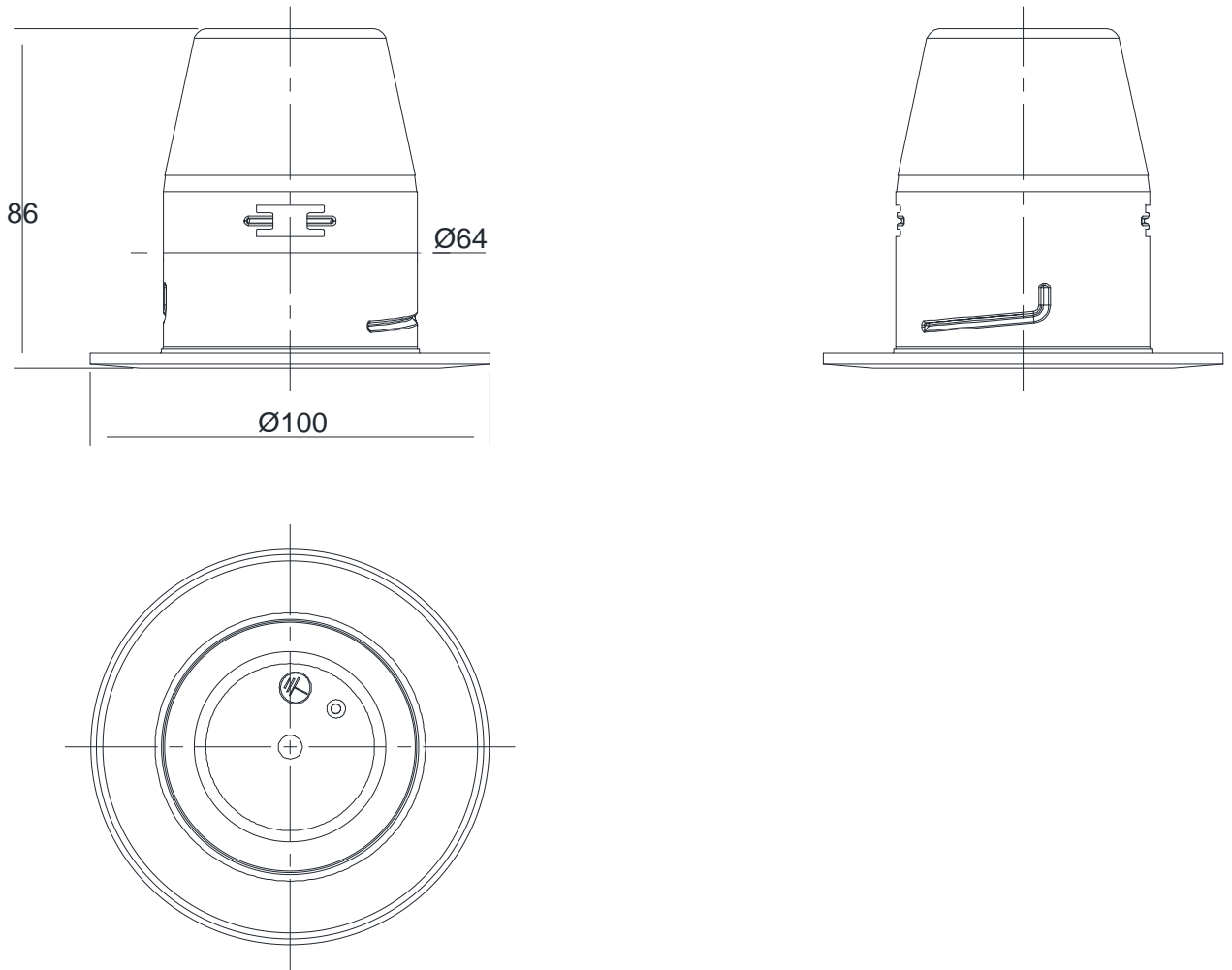
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Figure 8 – Downlight 6- JC010036



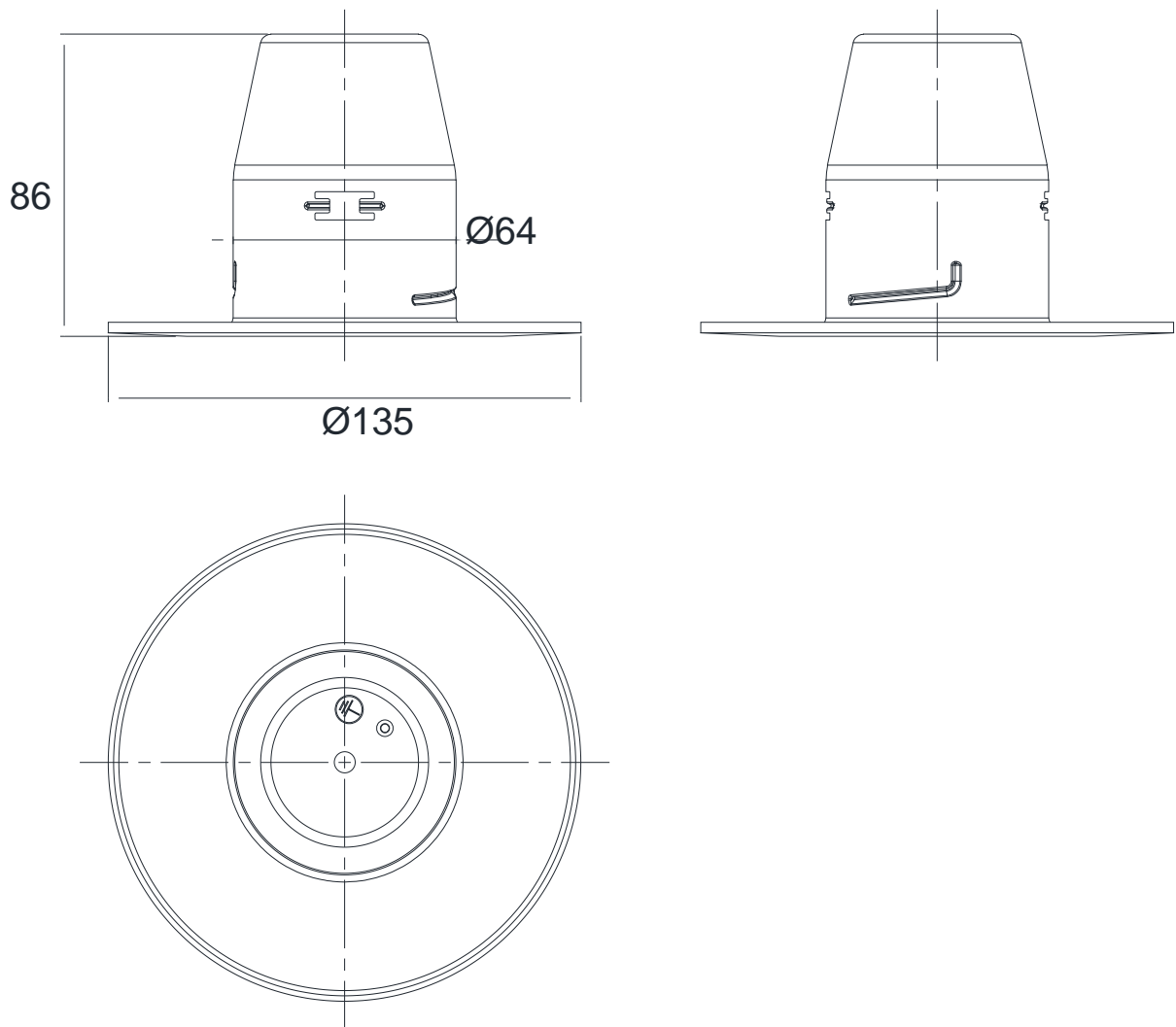
Do not scale. All dimensions are in mm

Figure 9 – Downlight 7- JC010037



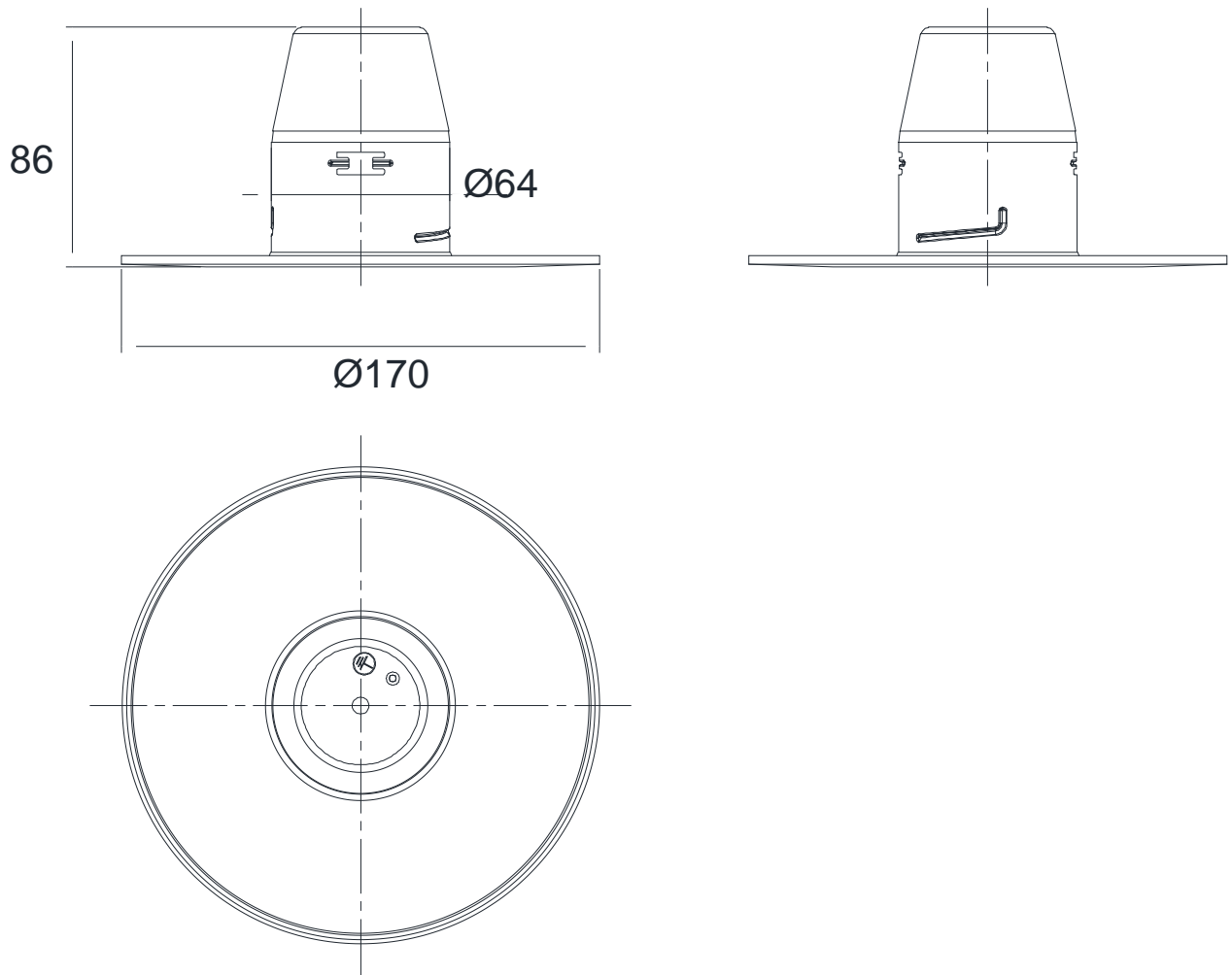
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Figure 10 – Downlight 8- JC010038



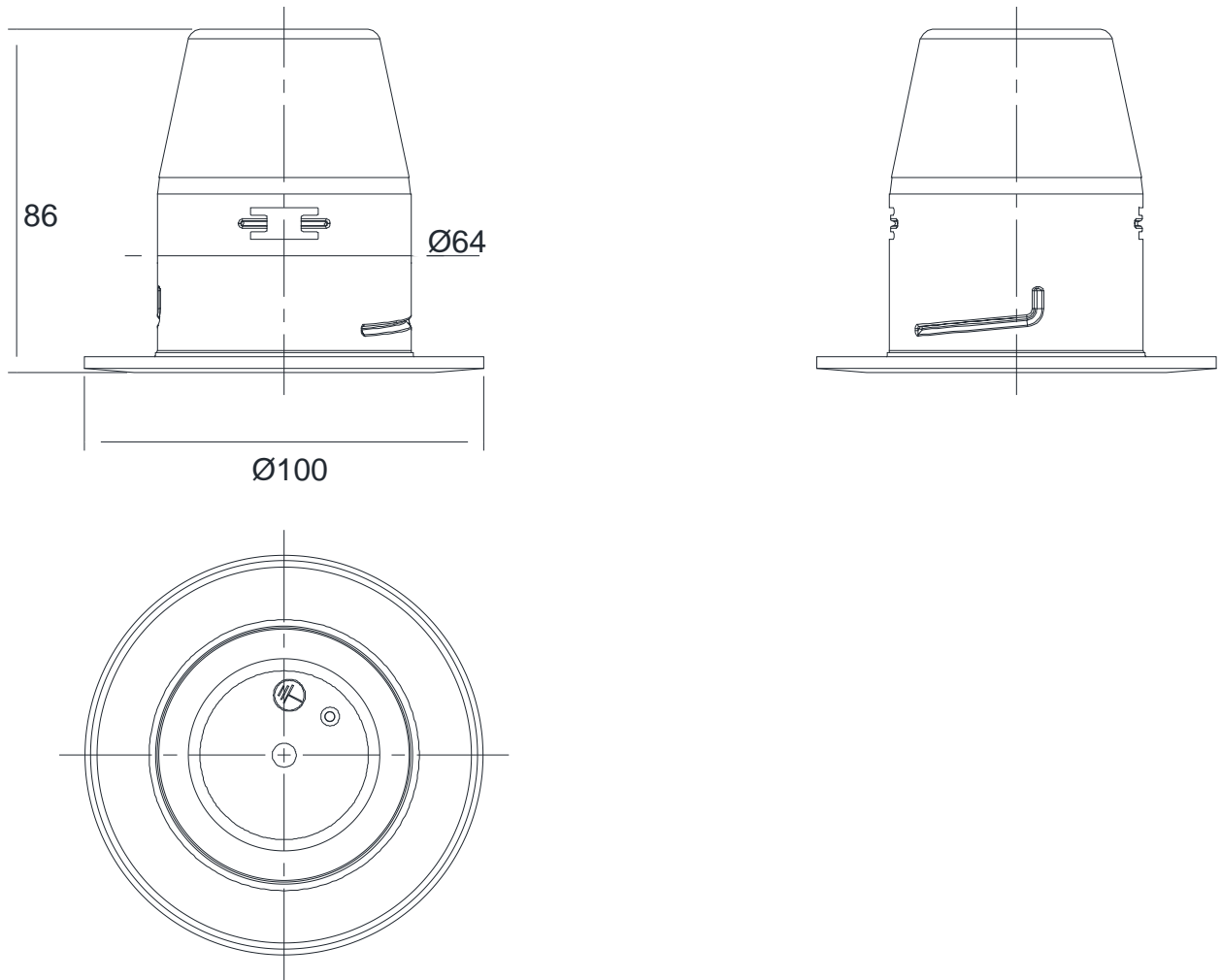
Do not scale. All dimensions are in mm

Figure 11 – Downlight 9- JC010039



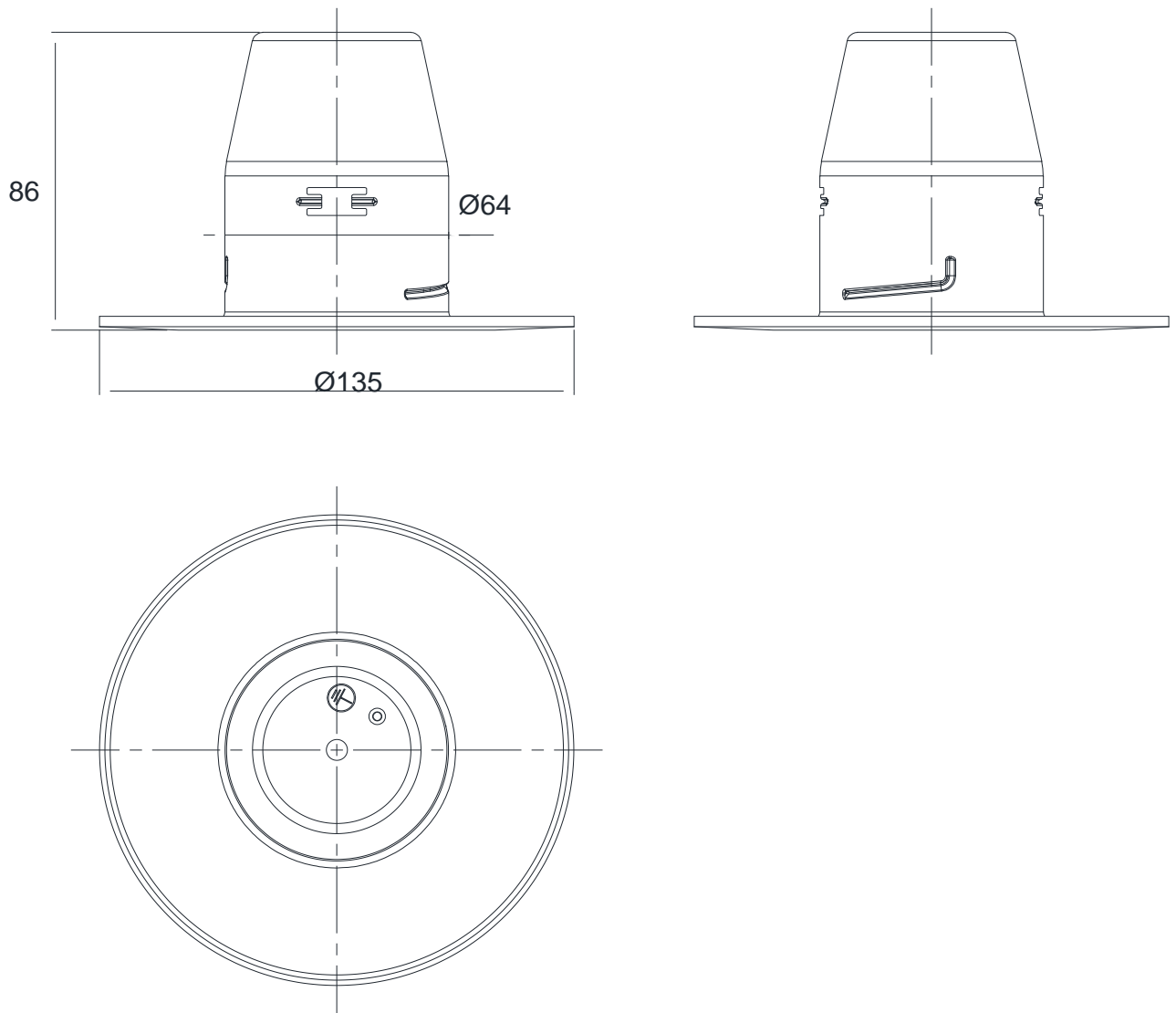
Do not scale. All dimensions are in mm

Figure 12 – Downlight 10- JC010040



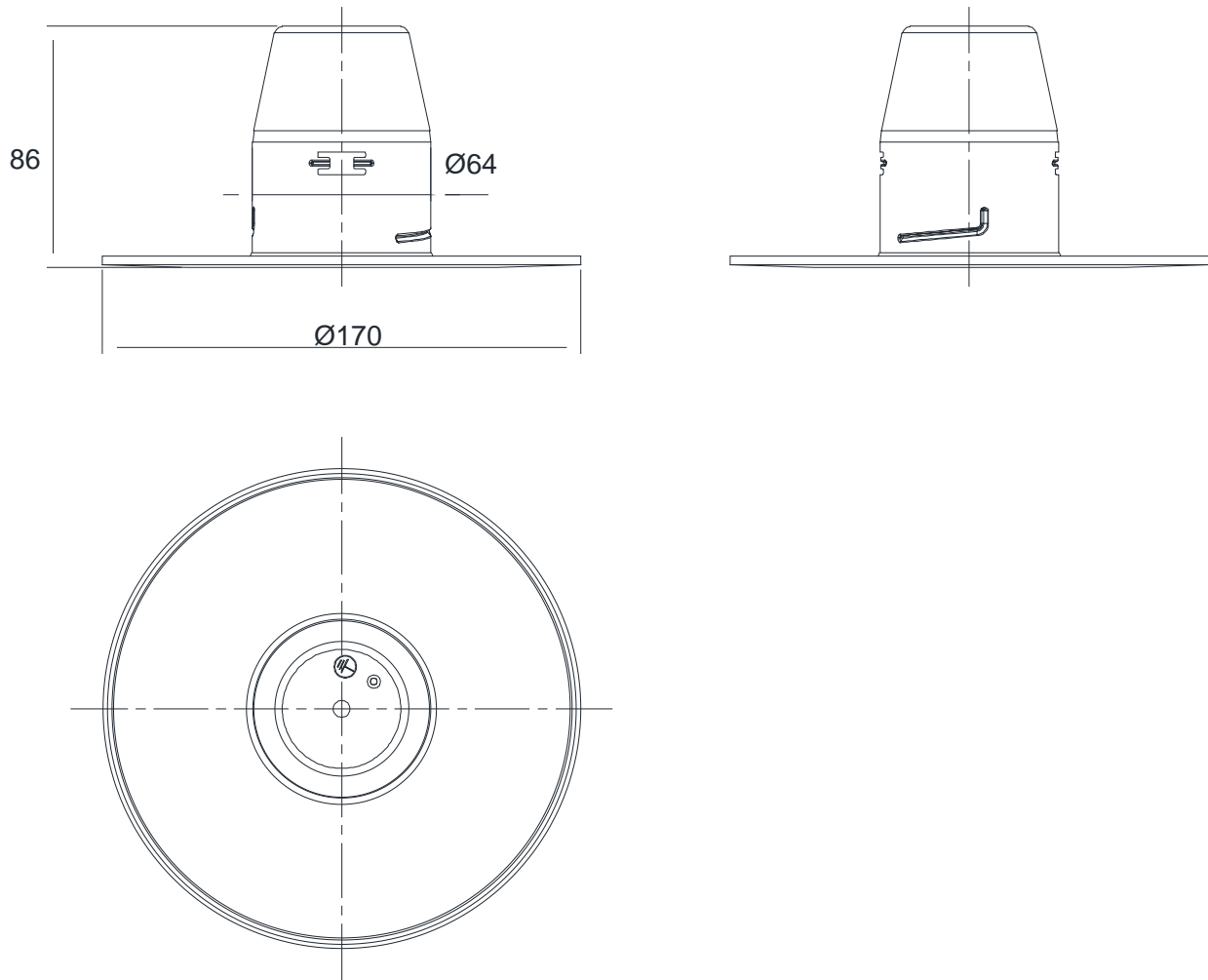
Do not scale. All dimensions are in mm

Figure 13 – Downlight 11- JC010041



Do not scale. All dimensions are in mm

Figure 14 – Downlight 12- JC010042



Do not scale. All dimensions are in mm

Schedule of Components

(Refer to Figures 1 to 14)

(All values are nominal unless stated otherwise)

(All other details are as stated by the sponsor)

<u>Item</u>	<u>Description</u>
1. Timber framework	
Material	: C16 softwood
Section size	: 195 mm deep x 47 mm wide
Density	: 420 kg/m ³ (stated)
Fixing method	: End beams through fixed with six nails to each joist joint. Noggins fixed to joists with two nails per joint. Joists were spaced at 600mm nominal centres.
Fixings	
i. type	: Ring shank nails
ii. size	: 100 mm long x 3.8 mm diameter
2. Floorboards	
Manufacturer	: Norbord
Reference	: Caberfloor P5
Material	: Chipboard (tongue & groove)
Thickness	: 22 mm
Density	: 669 kg/m ³
Fixing method	: Through fixed to timber framework with screws. Adhesive was applied to the top of joists and to tongue and groove joints
Fixings	
i. manufacturer	: Reisser
ii. reference	: Cutter High Performance Wood Screws
iii. type	: Yellow tropicalised steel screws
iv. size	: 60 mm long x 4.0 mm diameter
v. centres	: 230 mm
Adhesive	
i. reference	: Caberfix
ii. type	: D4 grade adhesive
3. Ceiling boards (inner layer)	
Manufacturer	: British Gypsum
Reference	: Gyproc WallBoard
Material	: Aerated high-density gypsum core encased in strong paper liners
Thickness	: 12.5mm
Density	: 616 kg/m ³ (stated)
Fixing method	: Through fixed to internal framework with screws. Board joints were taped and filled
Fixings	
i. manufacturer	: British Gypsum
ii. reference	: 55 mm Collated Drywall Screws
iii. type	: Black phosphate coated steel screws
iv. size	: 55 mm long x 3.5 mm diameter
v. centres	: 230mm

<u>Item</u>	<u>Description</u>
3. Ceiling boards (continued)	
Tape	
i. manufacturer	: British Gypsum
ii. reference	: Gyproc Joint Tape
Filler	
i. manufacturer	: British Gypsum
ii. reference	: Gyproc Ready Mix Joint Cement
4. Ceiling boards (outer layer)	
Manufacturer	: British Gypsum
Reference	: Gyproc Fireline
Material	: Gypsum plasterboard with glass fibre and additional additives.
Thickness	: 15mm
Density	: 760kg/m ³ (stated)
Fixing method	: Through fixed to internal framework with screws. Board joints were taped and filled
Fixings	
i. manufacturer	: British Gypsum
ii. reference	: 55 mm Collated Drywall Screws
iii. type	: Black phosphate coated steel screws
iv. size	: 55 mm long x 3.5 mm diameter
v. centres	: 230mm
Tape	
i. manufacturer	: British Gypsum
ii. reference	: Gyproc Joint Tape
Filler	
i. manufacturer	: British Gypsum
ii. reference	: Gyproc Ready Mix Joint Cement
5. Downlight 1	
Manufacturer	: JCC Lighting
Reference	: JC1001
Description	: Fixed LED recessed downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	
i. height	: 48mm (can), 58 mm (overall)
ii. overall diameter	: 84mm
iii. cut-out diameter	: 70 mm
6. Downlight 2	
Manufacturer	: JCC Lighting
Reference	: JC10010
Description	: Fixed LED Recessed Downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	
i. height	: 46 mm
ii. overall diameter	: 80 mm
iii. cut-out diameter	: 70 mm

<u>Item</u>	<u>Description</u>
7. Downlight 3	
Manufacturer	: JCC Lighting
Reference	: JC1101
Description	: X50 Fire Rated Downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	:
i. height	: 58 mm (can), 60 mm (overall)
ii. overall diameter	: 83 mm
iii. cut-out diameter	: 68 mm
8. Downlight 4	
Manufacturer	: JCC Lighting
Reference	: JC1102
Description	: X50 Tilt Fire Rated Downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	:
i. height	: 62 mm
ii. overall diameter	: 100 mm
iii. cut-out diameter	: 82 mm
9. Downlight 5	
Manufacturer	: JCC Lighting
Reference	: JC1020
Description	: LED Recessed Plaster in Downlight
Material	: Mild steel (can), aluminium (bezel) polycarbonate (connection block)
Overall sizes	:
i. height	: 80mm
ii. overall diameter	: 121
iii. cut-out diameter	: 70 mm
11. Downlight 6	
Manufacturer	: JCC Lighting
Reference	: JC010036
Description	: GU10 Recessed Plaster in downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	:
i. height	: 130mm
ii. overall diameter	: 122 mm
iii. cut-out diameter	: 68 mm
12. Downlight 7	
Manufacturer	: JCC Lighting
Reference	: JC010037
Description	: GU10 Recessed 100mm Converter Downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	:
i. height	: 86 mm
ii. overall diameter	: 100 mm
iii. cut-out diameter	: 90 mm

<u>Item</u>	<u>Description</u>
13. Downlight 8	
Manufacturer	: JCC Lighting
Reference	: JC010038
Description	: GU10 Recessed 135mm Converter Downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip) polycarbonate (connection block)
Overall sizes	:
i. height	: 86 mm
ii. overall diameter	: 135 mm
iii. cut-out diameter	: 125 mm
14. Downlight 9	
Manufacturer	: JCC Lighting
Reference	: JC010039
Description	: GU10 Recessed 170mm Converter Downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate connection block)
Overall sizes	:
i. height	: 86 mm
ii. overall diameter	: 170 mm
iii. cut-out diameter	: 157 mm
15. Downlight 10	
Manufacturer	: JCC Lighting
Reference	: JC010040
Description	: GU10 Recessed 100mm Converter Downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	:
i. height	: 86 mm
ii. overall diameter	: 100 mm
iii. cut-out diameter	: 90 mm
16. Downlight 11	
Manufacturer	: JCC Lighting
Reference	: JC010041
Description	: GU10 Recessed 135mm Converter Downlight
Material	: Mild steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	:
i. height	: 86 mm
ii. overall diameter	: 135 mm
iii. cut-out diameter	: 125 mm
17. Downlight 12	
Manufacturer	: JCC Lighting
Reference	: JC010042
Description	: GU10 Recessed 170mm Converter Downlight
Material	: Steel (can), aluminium (bezel), steel (spring clip), polycarbonate (connection block)
Overall sizes	:
i. height	: 86 mm
ii. overall diameter	: 170 mm
iii. cut-out diameter	: 157 mm

Test Observations

Time		All observations are from the exposed face unless noted otherwise.
-120	00	Load applied
00	00	The test commences.
09	00	Paper layer of first layer of boards burning away and jointing compound starts to detach.
12	00	When viewed from the unexposed face, steam/smoke release around the perimeter of the specimen.
17	00	Downlight 9 dropped from the aperture and joints in boards opening up.
30	00	When viewed from the unexposed face, specimen maintaining all performance criteria.
35	00	Multiple downlights detached, long edges of first layer of boards starting to ripple.
60	00	When viewed from the unexposed face, specimen maintaining all performance criteria.
64	00	Sections of the first layer of board sag and detach. Smoke release and darkening of joints in floorboards.
79	00	Test discontinued owing to sustained flaming.

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 20 minutes of testing



The unexposed face of the floor assembly after 40 minutes of testing



The unexposed face of the floor assembly after 60 minutes of testing



The unexposed face of the floor assembly after 70 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	31
3	502	495
6	603	588
9	663	643
12	706	697
15	739	738
18	766	769
21	789	789
24	809	809
27	826	828
30	842	843
33	856	858
36	869	871
39	881	885
42	892	892
45	902	900
48	912	913
51	921	928
54	930	934
57	938	937
60	945	944
63	953	955
66	960	956
69	966	972
72	973	986
75	979	959
78	985	976
79	986	986

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	26	26	27	27	26	26
3	26	26	26	27	27	26
6	26	26	27	27	27	27
9	27	27	27	28	27	27
12	27	28	27	29	28	28
15	29	30	29	31	29	30
18	31	32	31	33	32	32
21	34	35	34	36	34	35
24	37	37	37	39	37	37
27	39	40	39	43	39	40
30	42	42	41	48	42	43
33	44	44	44	55	44	46
36	46	46	45	61	45	49
39	48	47	47	67	47	51
42	50	49	49	71	49	54
45	52	50	50	75	50	55
48	54	51	51	80	51	57
51	57	52	52	86	53	60
54	60	54	55	91	54	63
57	68	56	59	93	56	66
60	79	60	67	94	60	72
63	87	66	76	94	65	78
66	90	73	82	94	70	82
69	92	81	87	93	76	86
72	93	91	96	95	88	93
75	91	93	92	96	88	92
78	91	91	90	99	88	92
79	92	92	91	100	89	93

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

Time Mins	T/C Number 216 Deg. C	T/C Number 217 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
0	26	26	27	27	27	23
3	26	26	27	27	27	23
6	26	26	27	27	27	23
9	27	26	27	27	27	24
12	27	27	28	28	28	24
15	28	28	29	30	30	26
18	30	30	31	32	32	29
21	32	34	34	35	36	32
24	34	37	36	37	39	35
27	36	41	39	39	41	37
30	38	44	41	41	44	40
33	39	46	43	43	46	42
36	41	48	44	44	48	44
39	42	50	46	46	50	46
42	43	51	47	47	52	47
45	45	52	49	49	54	49
48	46	52	50	50	55	50
51	48	53	52	51	56	52
54	51	56	54	51	58	53
57	56	59	60	53	60	57
60	60	64	69	55	63	60
63	63	69	78	60	66	62
66	67	74	87	66	71	64
69	70	77	91	73	75	68
72	73	79	90	83	86	73
75	78	82	90	85	88	80
78	88	88	92	86	91	84
79	91	90	94	87	91	86

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

Time Mins	T/C Number 223 Deg. C	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 229 Deg. C
0	26	26	27	26	27	29
3	31	30	31	32	28	34
6	57	59	81	57	47	46
9	73	99	90	78	68	70
12	85	110	95	85	81	87
15	114	110	98	93	88	98
18	152	111	113	100	91	114
21	149	116	120	101	93	114
24	128	121	152	102	95	106
27	116	116	137	106	103	107
30	107	128	141	111	107	114
33	110	117	136	114	109	120
36	111	117	144	114	112	123
39	112	118	129	116	113	129
42	115	122	131	120	117	133
45	127	132	146	132	124	146
48	141	155	177	153	138	168
51	158	181	204	187	166	196
54	176	204	222	211	192	214
57	189	229	249	238	213	230
60	207	251	272	254	230	246
63	220	276	276	273	244	260
66	237	307	415	298	264	276
69	249	377	459	320	305	287
72	286	395	550	359	379	303
75	677	829	776	842	844	759
78	742	890	903	887	883	861
79	772	915	923	902	903	895

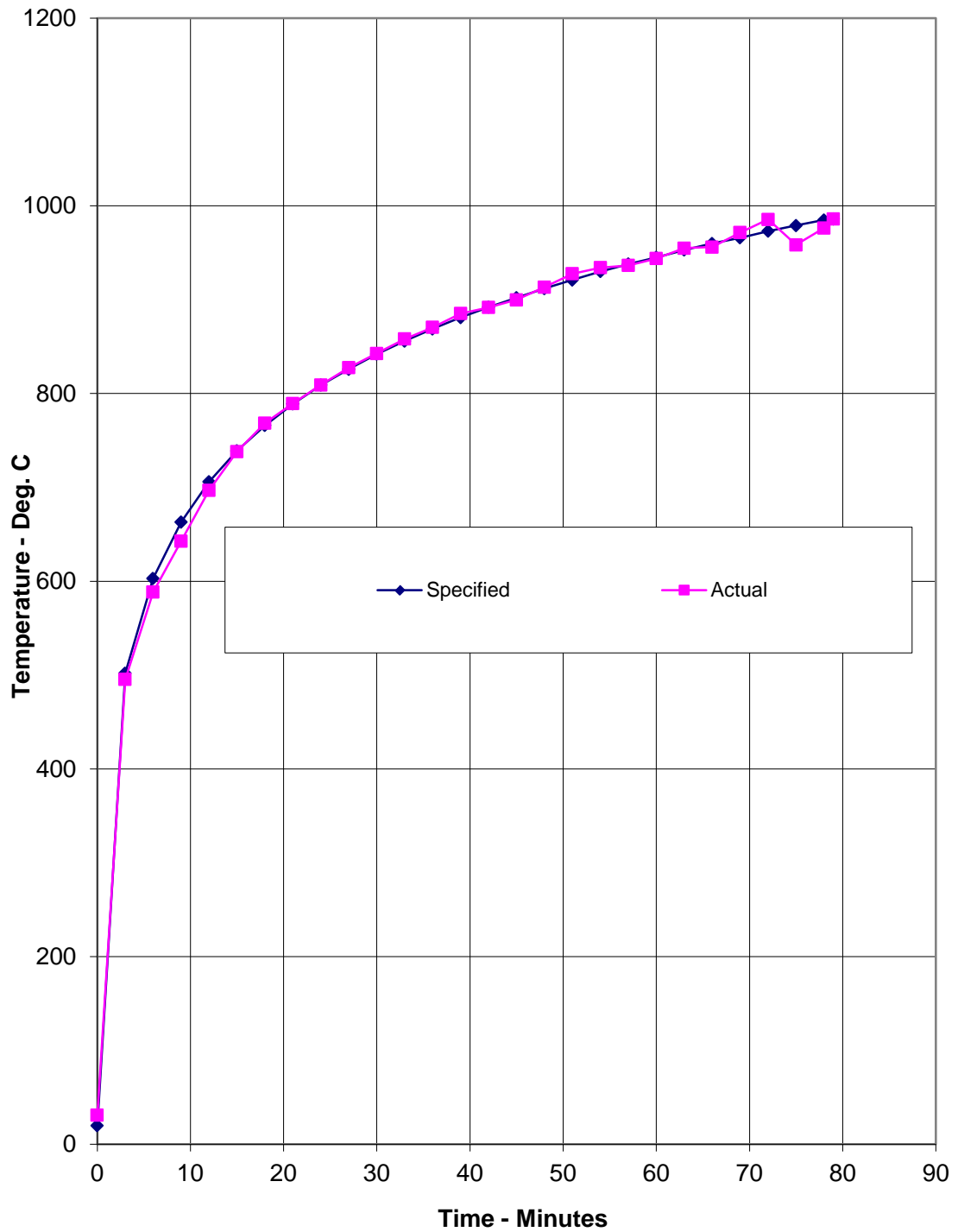
Individual Temperatures Recorded At Mid-Height Of The Cavity Coincidental With The Light Fittings (Continued)

Time Mins	T/C Number 230 Deg. C	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
0	28	30	29	29	29	30
3	29	47	48	34	41	52
6	49	60	87	51	59	82
9	74	93	107	70	82	114
12	99	105	111	89	105	121
15	127	101	132	120	100	143
18	152	133	142	129	102	190
21	119	125	142	111	106	222
24	138	119	160	109	121	262
27	143	120	185	114	124	258
30	141	139	197	121	133	281
33	135	131	213	126	138	281
36	138	134	188	127	143	292
39	136	135	179	133	276	309
42	130	142	208	139	238	324
45	138	153	201	150	244	353
48	158	181	215	177	307	413
51	181	222	304	224	369	475
54	202	248	331	264	352	487
57	225	299	356	292	380	540
60	283	365	373	316	387	562
63	332	377	404	335	394	538
66	340	389	416	354	399	590
69	355	410	427	396	484	582
72	382	477	499	549	864	573
75	474	810	544	642	855	655
78	775	909	718	843	898	724
79	807	934	734	890	923	782

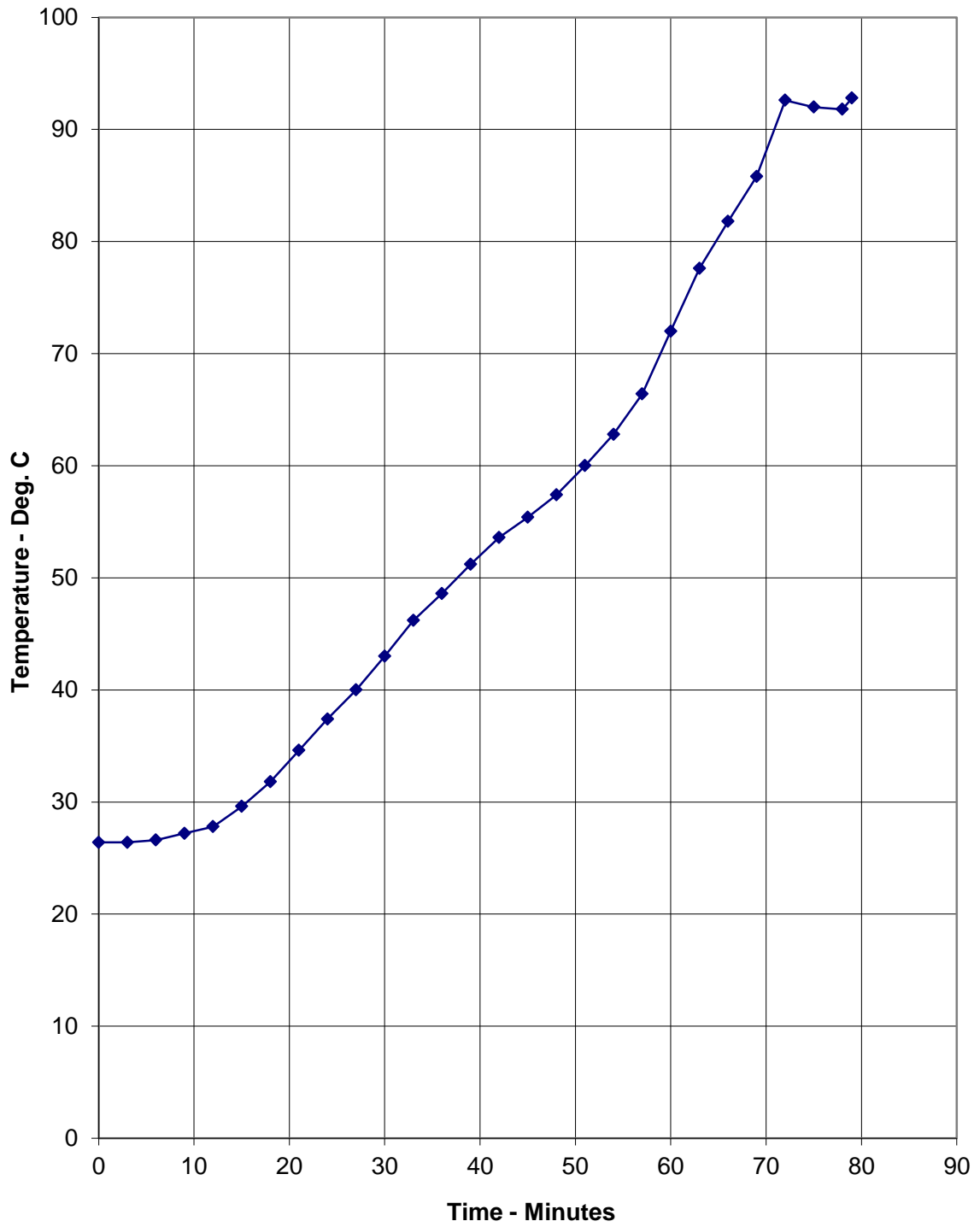
Central Vertical Deflection Of The Specimen

Time Mins	Central Vertical Deflection mm	Rate Of Deflection mm/min
0	0.1	0.0
3	1.5	-0.2
6	1.8	0.2
9	2.2	0.1
12	2.9	0.3
15	3.8	0.4
18	4.9	0.5
21	6.4	0.8
24	7.7	0.6
27	8.9	0.4
30	10.3	0.5
33	11.2	0.4
36	12.0	0.3
39	13.1	0.4
42	13.5	0.2
45	13.8	0.2
48	14.4	0.3
51	14.7	0.1
54	14.7	0.1
57	15.2	0.2
60	16.7	0.6
63	19.4	0.9
66	22.9	1.2
69	26.8	1.3
72	33.0	2.6
75	42.7	4.1
78	64.1	8.3
79	76.6	12.5

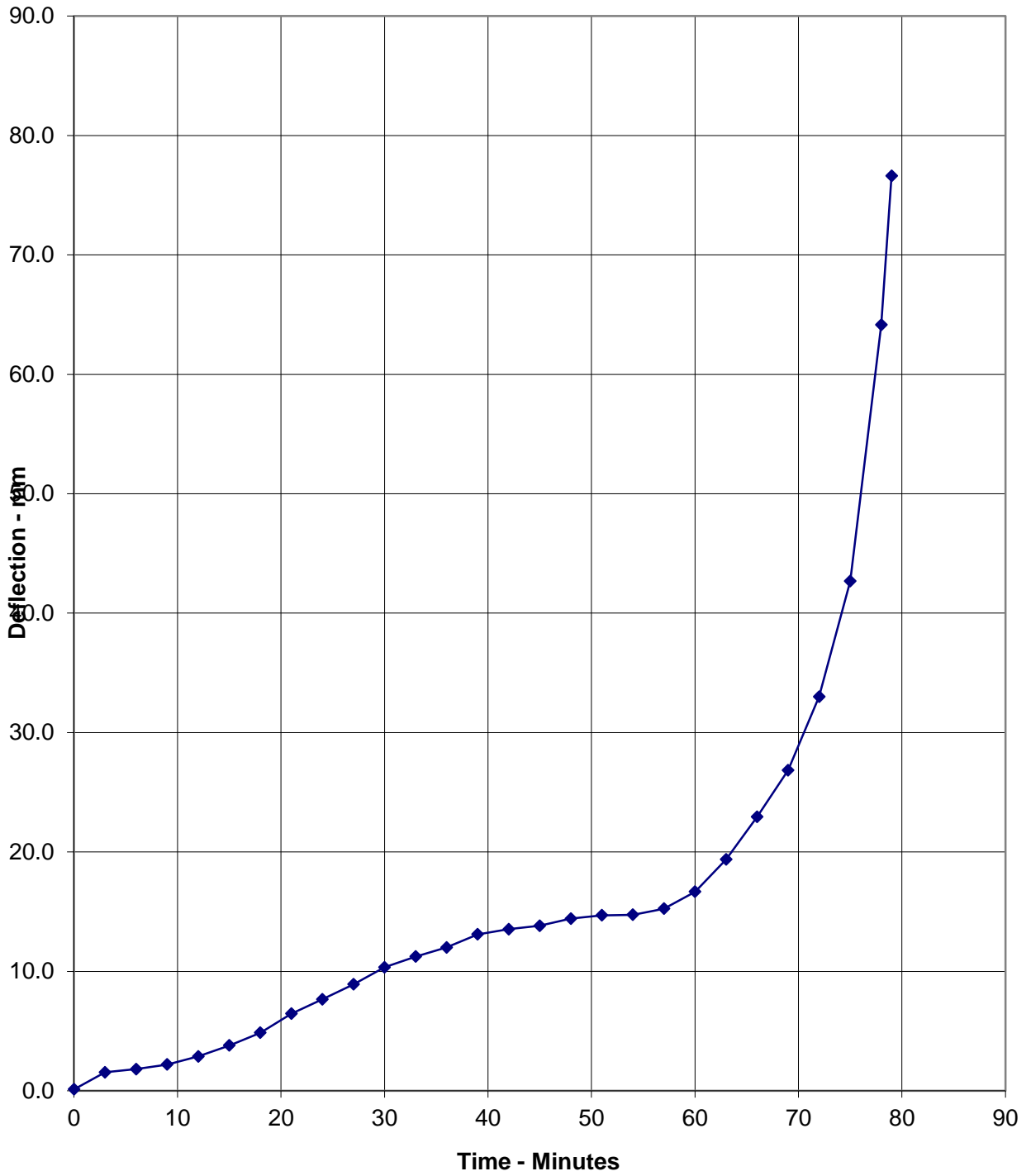
Graph Showing Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard



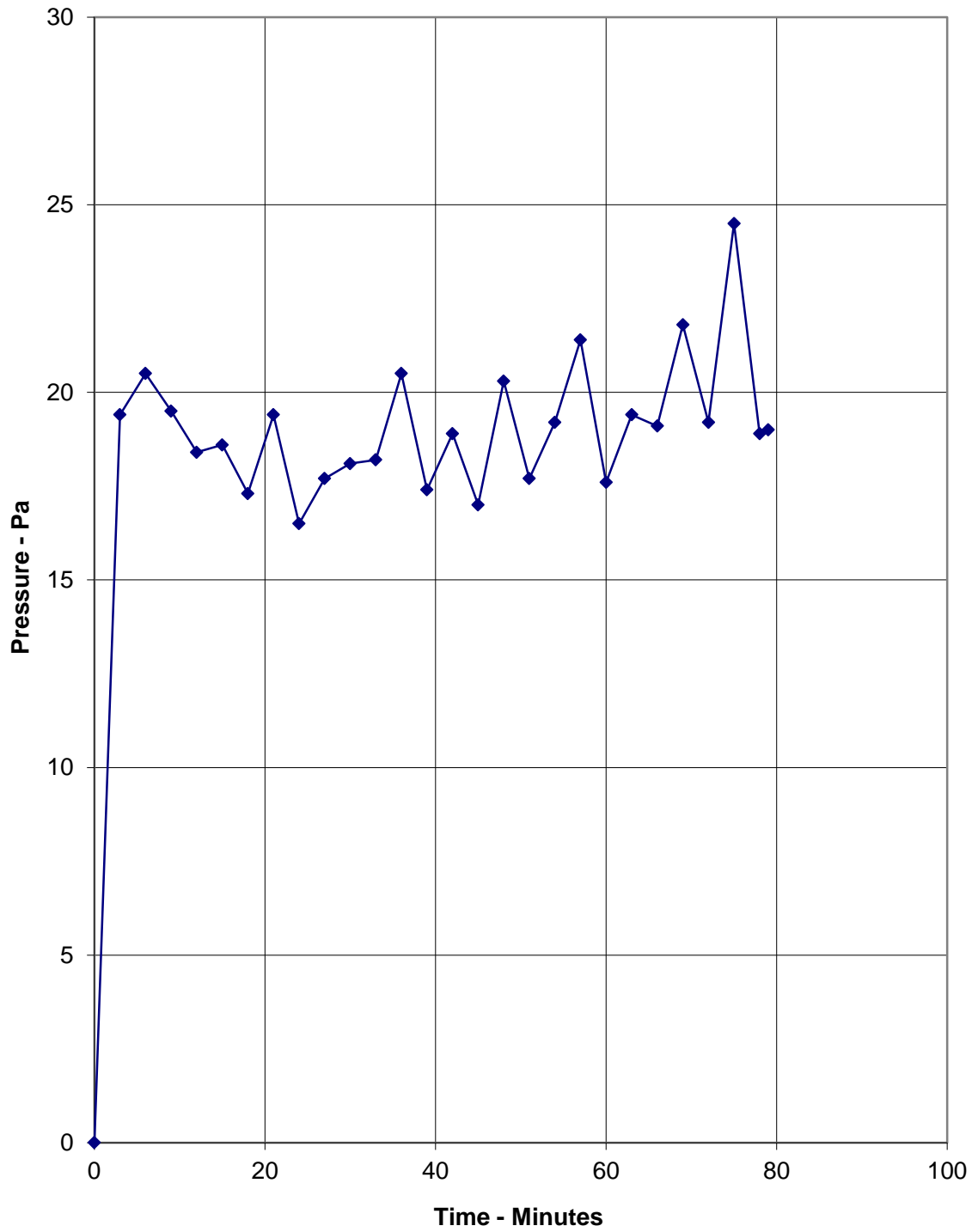
Graph Showing Mean Temperature Recorded On The Unexposed Surface Of The Specimen



Graph Showing The Recorded Vertical Deflection Of The Specimen



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



Load Calculation

Physical parameters of timber joists

Depth :	195	mm
Thickness :	38	mm
Centres (M) :	600	mm
Span (L) :	4150	mm
Ceiling length	3985	mm
Floor boards length	3985	mm
Timber grade :	c16	

Parameters -BS 5268 - Part 2: 2002

Basic dry stress in bending:	5.3	N/mm ²
Modification factor for loading:	1.1	(Section 2.9 (a))
Therefore working stress (F):	5.83	N/mm ²
Nominal density:	535	kg/m ³

Total loading required per joist

moment of inertia (I) $bd^3/12$:	23480437.5	mm ⁴
Distance from neutral axis to base of joist (y):	97.5	mm
Maximum bending stress w (FI/y):	1404009.75	N/mm ²
w = load per unit length		
maximum bending stress = w x L ² / 8		
therefore w= maximum bending stress x 8 / L ² :	0.65217466	N/mm
	652.174655	N/m
Therefor total loading (w):	2706.52482	N
Converted to kg (/ 9.80665)	275.988724	kg

Dead weight

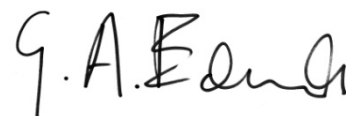
Density of joist:	498.842	kg/m ³
Density of floor boarding	666.364	kg/m ³
Density of ceiling (layer 1)	677.6	kg/m ³
Density of ceiling (layer 2)	798	kg/m ³
Effective width of floor supported per joist (m):	0.6	m
weight of joist	15.3401398	kg
weight of floorboard	35.0520791	kg
weight of ceiling (layer 1)	20.25177	kg
weight of ceiling (layer 2)	28.62027	kg
Total ceiling weight:	48.87204	
Totak dead weight per joist	99.2642589	kg

Imposed Load

total load per joist - dead weight per joist:	176.724465	kg
Convert to kN ((x 9.80665)/1000)	1.73307497	kN
Assuming even distribution of loading		
Maximim imposed load per meter square:	0.69601405	kN/m ²
converted to kg (x101.9716005)	71	kg/m ²



Calculation made by
K. Brennan*
Technical Officer



Calculation checked by
G. Edmonds*
Senior Technical Officer

*For and on behalf of **Warringtonfire**

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

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.

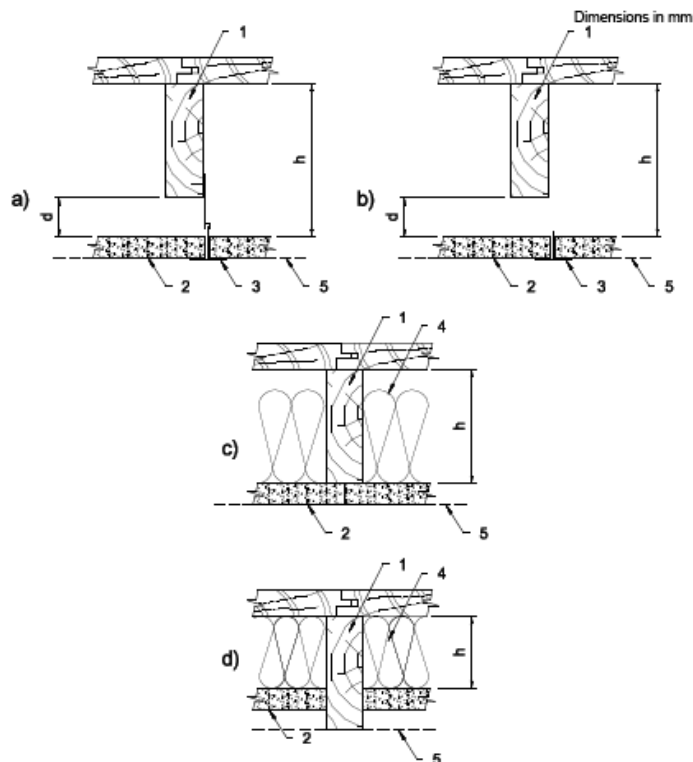
b) With respect to the ceiling system:

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 | |