

# RENO LED LIGHTING INC.

## TEST REPORT

### SCOPE OF WORK

MODIFIED UL 263-2011(R2022), MODIFIED ASTM E119-20 AND MODIFIED CAN/ULC-S101-14 TESTING ON WOOD JOIST FLOOR-CEILING ASSEMBLY INCORPORATING LED SLIM PANEL, FR-LED-6-S15W-5CCT\*\*-PL, FR-LED-4-S9W-5CCT\*\*-PL AND FR-LED-4-S12W-5CCT\*\*-PL AND LED FLOATING GIMBAL, FR-LED-6-S15W-5CCT-FG-\*\*, FR-LED-4-S9W-5CCT-FG-\*\*

### REPORT NUMBER

230309116GZC-001

### TEST DATE(S)

2022-07-25

### ISSUE DATE

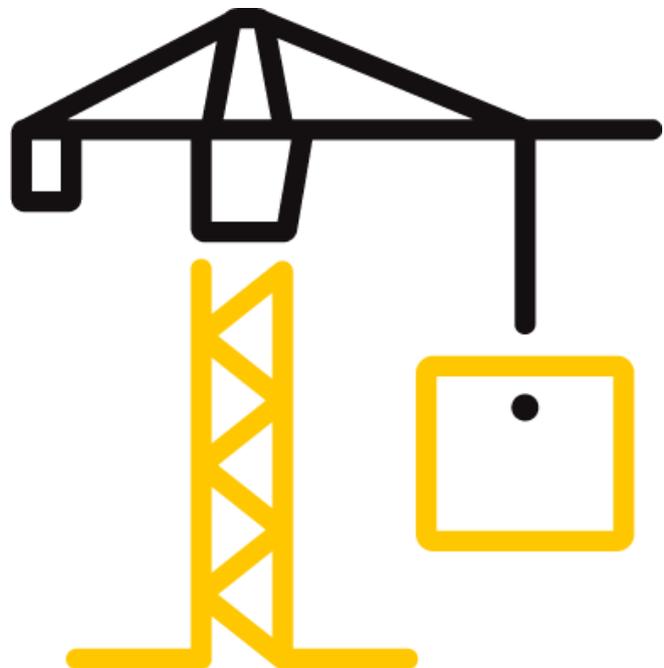
2023-03-22

### [REVISED DATE]

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Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

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5. All the test results give the statement of conformity refer to the decision rule of "Procedure 2 "Accuracy Method" as stated in the IEC Guide 115:2007.

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### REPORT ISSUED TO

#### RENO LED LIGHTING INC.

7&8-615 Denison St, Markham, ON L3R 1B8

### SECTION 1

#### SCOPE

Intertek has conducted an evaluation for RENO LED LIGHTING INC. to determine the fire resistance characteristics of unrestrained wood joist floor-ceiling assembly incorporating one LED SLIM PANEL, model FR-LED-6-S15W-5CCT\*\*-PL and one LED FLOATING GIMBAL, model FR-LED-6-S15W-5CCT-FG-\*\* for a 2-hour fire resistance rating test. The fire test was designed also to demonstrate evaluation on LED SLIM PANEL, model FR-LED-6-S15W-5CCT\*\*-PL, FR-LED-4-S9W-5CCT\*\*-PL and FR-LED-4-S12W-5CCT\*\*-PL; LED FLOATING GIMBAL, model FR-LED-6-S15W-5CCT-FG-\*\*, FR-LED-4-S9W-5CCT-FG-\*\*. This evaluation began on June 17, 2022 and was completed on July 25, 2022. The test was conducted on July 25, 2022.

The test was conducted in accordance with Modified UL 263-2011(R2022), STANDARD FOR SAFETY Fire Tests of Building Construction and Materials, Modified ASTM E119-20, Standard Test Methods for Fire Tests of Building Construction and Materials and Modified CAN/ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

The fire resistance test was conducted at the internal approved facility, located at Shanghai.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

### SECTION 2

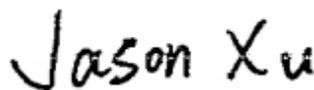
#### SUMMARY OF TEST RESULTS

The wood joist floor-ceiling assembly incorporating LED SLIM PANEL, model FR-LED-6-S15W-5CCT\*\*-PL, FR-LED-4-S9W-5CCT\*\*-PL and FR-LED-4-S12W-5CCT\*\*-PL, LED FLOATING GIMBAL, model FR-LED-6-S15W-5CCT-FG-\*\*, FR-LED-4-S9W-5CCT-FG-\*\* described and tested in this report met the Conditions of Acceptance of Modified UL 263-2011(R2022), Modified ASTM E119-20 and Modified CAN/ULC-S101-14 when exposed to a fire-resistance rating of 2-hour. Construction summary of the full assembly is located in Section 4 of this test report.

This report is co-listing based on Report No. 230224200GZC-001 Dated Mar. 07, 2023.

#### Report Authorized:

Authorized By:



Jason Xu  
Reviewer

Completed By:



Kevin Pan  
Project Engineer

Noted: If you have any questions for the report, please contact: [lillian.lf.he@intertek.com](mailto:lillian.lf.he@intertek.com)

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## SECTION 3

### TEST METHOD

The specimens were evaluated in accordance with the following:

**Modified UL 263-2011(R2022), STANDARD FOR SAFETY Fire Tests of Building Construction and Materials**

**Modified ASTM E119-20, Standard Test Methods for Fire Tests of Building Construction and Materials**

**Modified CAN/ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials**

Test was conducted in accordance with the applicable requirement of UL 263-2011(R2022), STANDARD FOR SAFETY-Fire Tests of Building Construction and Materials, Section 10 Floor and Roof Assemblies Test, and ASTM E119-20, Standard Test Methods for Fire Tests of Building Construction and Materials, Section 8.6 Tests of Floors and Roofs, and CAN/ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials, Section 11 Tests of Floor and Roof Assemblies.

The test will be a modified test, as the test will be reduced in scale, the area exposed to fire do not meet the standard of 180 sq.ft requirement for floor/ceiling assemblies and will also be conducted without a superimposed load which is requested by Section 10.3 of UL 263, Section 7.4.3 of ASTM E119 and Section 11.4.1 of CAN/ULC-S101.

## SECTION 4

### MATERIAL SOURCE/INSTALLATION

The specimens were provided to Intertek directly by the client and were not independently selected for testing. Test specimens were received at the Evaluation Center on June 17, 2022.

### Sample Description:

The full information for the two series is provided by the applicant and as below table:

Name	Series Model	Difference
LED SLIM PANEL	FR-LED-6-S15W-5CCT**-PL	1.power: The power has 9W, 12W and 15W difference, the structure is the same. 2. Size: The sizes are 4 inch and 6 inch respectively, and the construction is the same.
	FR-LED-4-S12W-5CCT**-PL	
	FR-LED-4-S9W-5CCT**-PL	
LED FLOATING GIMBAL	FR-LED-6-S15W-5CCT-FG-**	1.power: There are 9W and 15W differences in power, the structure is the same. 2. Size: The sizes are 4 inch and 6 inch respectively, and the construction is the same.
	FR-LED-4-S9W-5CCT-FG-**	

Note:

"\*\*" symbol indicated finish color types including W, WH; N, BN, SN, NK; B, BK, BL; OB, ORB, BZ or AC; W or WH for white; N, BN, SN or NK for Brushed Nickel; B, BL or BK for black; OB, ORB or BZ for oil rubbed bronze, AC for copper.

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Four representative models of two series are included: FR-LED-6-S15W-5CCT\*\*-PL, FR-LED-4-S12W-5CCT\*\*-PL, FR-LED-6-S15W-5CCT-FG-\*\* and FR-LED-4-S9W-5CCT-FG-\*\*.

Corresponding weights are as follows:

FR-LED-6-S15W-5CCT**-PL	298.5g
FR-LED-6-S15W-5CCT-FG-**	585.2g
FR-LED-4-S12W-5CCT**-PL	165.4g
FR-LED-4-S9W-5CCT-FG-**	292.3g

Documents and samples of LED SLIM PANEL were checked and found that they have the similar material and design. The main difference are diameter and configuration. Model FR-LED-6-S15W-5CCT\*\*-PL with maximum weight and maximum diameter was selected to cover FR-LED-4-S12W-5CCT\*\*-PL and FR-LED-4-S9W-5CCT\*\*-PL.

Documents and samples of LED FLOATING GIMBAL were checked and found that they have the similar material and design. The main difference are diameter and configuration. Model FR-LED-6-S15W-5CCT-FG-\*\* with maximum weight and maximum diameter was selected to cover FR-LED-4-S9W-5CCT-FG-\*\*.

Given the outlined parameters and all models are of a steel backing, Model FR-LED-6-S15W-5CCT-FG-\*\* and Model FR-LED-6-S15W-5CCT\*\*-PL were installed into the ceiling assembly to subject to fire test. The sample ID number assigned by the test lab is S220720010SHF.001.

A description of component list of the floor ceiling assembly is given in the table below. The description of the specimen and information provided by the applicant. All values quoted below are nominal, unless tolerances are given.

FLOOR-CEILING ASSEMBLY		DESCRIPTION
Gypsum Board	Description	Knauf Fireshield Gypsum Board
	Nominal Size	1220mm x 2440mm
	Thickness	15mm
	Density	905kg/m <sup>3</sup>
	Manufacturer	KNAUF
Wood Joists, bearing plates	Type	Solid wood
	Nominal Size	241mm deep x 38mm width
	Density	430kg/m <sup>3</sup>
Bridging	Type	Solid wood
	Nominal Size	100mm deep x 38mm width
	Density	430kg/m <sup>3</sup>
Flooring	Type	Plywood
	Thickness	15mm

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	Density	625kg/m <sup>3</sup>
Insulation	Description	Rockwool
	Thickness	50mm
	Density	150kg/m <sup>3</sup>
Furring Channel	Description	Hat-shaped rigid furring channels, galvanized steel
	Size	68*35*22*0.5mm
Joint Compound	Material	Lafarge Caulk
	Manufacturer	Foshan Manda Building Materials Co., LTD
Specimen A	Model	FR-LED-6-S15W-5CCT**-PL
	Fixing method	Fixed to face gypsum board by two spring clips
Specimen B	Model	FR-LED-6-S15W-5CCT-FG-**-**
	Fixing method	Fixed to face gypsum board by two spring clips

## Assembly Description:

Use a 2-hour fire rated ceiling assembly constructed in accordance with construction specifications of UL Design No. L556. The nominal size of wood joist floor-ceiling assembly is 1680mm long by 1624mm wide by 338mm deep, consisted of wood joists, gypsum board, flooring, rock wool and was constructed at laboratory. The fire rated ceiling assembly consisting of the following:

### Wood Joist

Five 1604mm long wood joists were to be positioned and secured to the wood bearing plates of 1624mm long with three M4.8x75mm Hexagon washer head self-tapping screws per wood joist end. The three staggered bridging of each row were to be positioned between wood joists and secured to the joists with three M4.8x75mm Hexagon washer head self-tapping screws per bridging end.

### Flooring

One layer of 15mm plywood was placed on unexposed side of the wood frame along the direction of wood joists and fastened by ST3.5x35mm flat head self-tapping screws with a spacing of approximately 203mm in the perimeter and in the field.

### Insulation

50mm thick rockwool was positioned into the cavity between wood joists above gypsum board.

### Gypsum Board

Base layer 15mm Knauf gypsum board applied at right angles to the wood joists by ST3.5x35mm flat head self-tapping screws spaced 12"o.c. Second layer 15mm Knauf gypsum board applied at right angles to joists by ST3.5x50mm flat head self-tapping screws spaced 8"o.c. Second layer joints offset 32" from base layer joints. Third layer 15mm Knauf gypsum board applied at right angles to joists by ST3.5x64mm flat head self-tapping screws spaced 8" o.c. Third layer joints offset 16" from second layer joints. Five Hat-shaped rigid furring channels spaced 16"o.c. applied at right angles to joists over third layer with two ST3.5x64mm flat head self-tapping screws at each joist. Face layer 15mm Knauf gypsum wallboard applied at right angles to

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furring channels by ST3.5x35mm flat head self-tapping screws 8"o.c. The board joints and screws head were coated with 2 layers of joint compound.

### Sample Installation:

Follow the manufacturer's installation instructions, cut a circular opening in the gypsum ceiling such that the annular space between the gypsum board and test specimen does not exceed 1/8 in. The test specimens were fixed to the face layer 15mm Knauf gypsum board of floor-ceiling assembly by spring clips.

The drawings of test specimens and wood joist ceiling assembly can be found in Section 10 and 11 respectively.

## SECTION 5

### EQUIPMENT

List of calibrated instrumentation used for testing

ITEM	EQUIPMENT ID
Horizontal furnace	SH1124
Furnace pressure gauge	SH1124-1~2
Test Clock	SH1042
Furnace thermocouple	SH1097-1
Ambient temperature gauge	SH1097-11
Unexposed thermocouple	SH1097-12

## SECTION 6

### TEST PROCEDURE

The test floor-ceiling assembly was installed in a steel restraint frame and simply supported at four edges with a span of 1500mm. The test assembly was exposed to the fire from the underside, and the exposed area was 1500 mm long by 1500 mm wide. The test assembly was placed on top of the furnace for the fire exposure. The side installed with test specimen was exposed to the fire.

### Fire Endurance Test

After positioning the assembly frame over the furnace opening, the burners were ignited and the timer was started. Temperatures within the furnace were monitored using thermocouples and the data was recorded. The burners were controlled to keep the furnace temperatures within the allowable limits specified in the test standards. The neutral-pressure-plane was controlled by two pressure transducers that adjusted the opening of the exhaust damper. After 5 minutes, the furnace pressure was adjusted so that neutral- pressure-plane inside the furnace was established at 100mm below the underside of the test ceiling. Position for measurement of unexposed temperature was presented in the drawing of Section 7. The test measurement data and photographs were shown in Section 12 and 13 respectively.

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### **Correction factor**

When the indicated resistance period is 1/2h or over, determined by the average or maximum temperature rise on the unexposed or maximum temperature rise on the unexposed surface or within the test specimen, or by failure under load, a correction shall be applied for variation of the furnace exposure from that prescribed, where it will affect the classification, by multiplying the indicated period by two thirds of the difference in area between the curve of average furnace temperature and the standard curve for the first three fourths of the period and dividing the product by the area between the standard curve and a base line of 68°F for the same part of the indicated period, the latter area increased by 54°F\*h(3240°F\*min)to compensate for the thermal lag of the furnace thermocouples during the first part of the test. For fire exposure in the test higher than the standard, the indicated resistance period shall be increased by the amount of the correction and be similarly decreased for fire exposure below standard. The correction can be expressed by the following equation:

$$C = \frac{2I(A - A_s)}{3(A_s + L)}$$

where:

C = correction in the same units as I,

I = indicated fire-resistance period,

A = area under the curve of indicated average furnace temperature for the first three fourths of the indicated period,

As = area under the standard furnace curve for the same part of the indicated period, and

L = lag correction in the same units as A and As (54°F\*h or 30°C\*h (3240°F\*min or 1800°C\*min))

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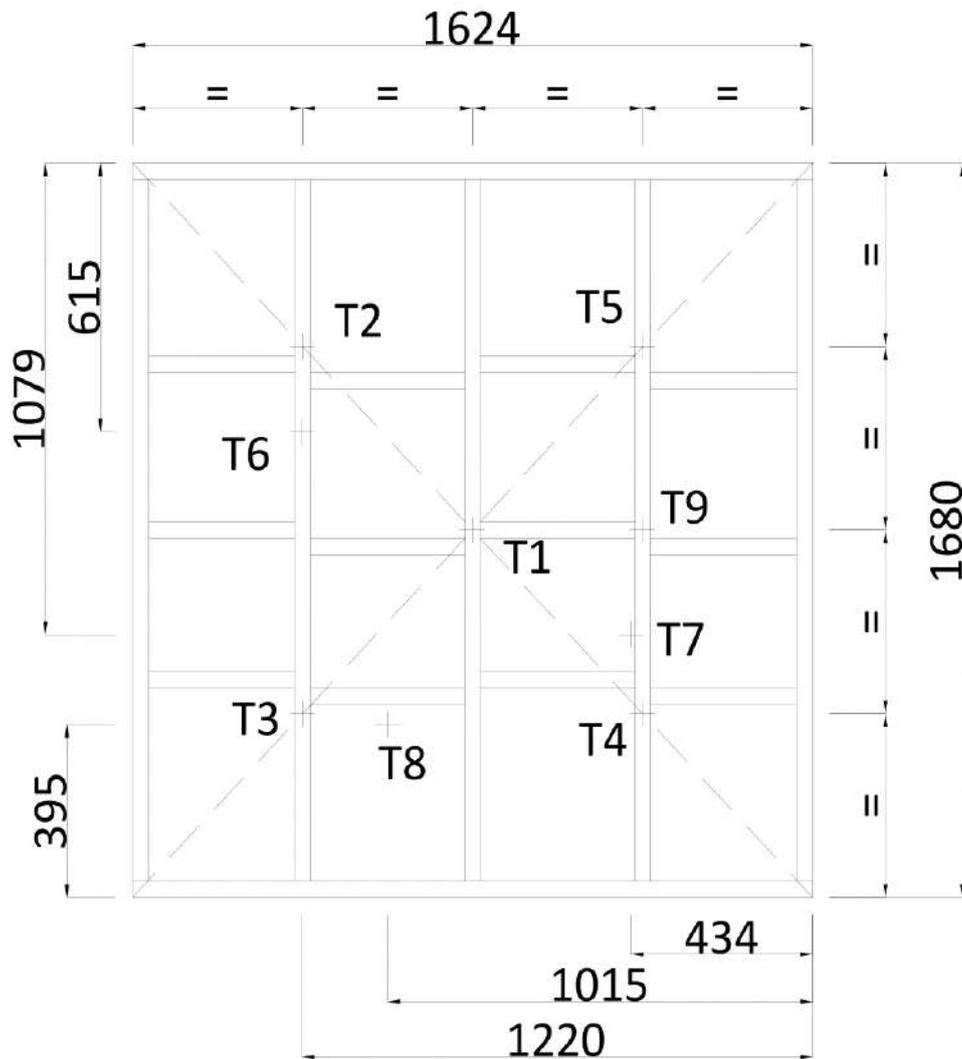
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### SECTION 7

#### TEST SPECIMEN INSTRUMENTATION

Nine 18 gauge, Type K thermocouples were covered by 6 in.by 6 in.by 0.4 in. thick dry felt pads and positioned on the unexposed surfaces of the specimens to measure heat transmission. Five of these were symmetrically disposed, one at approximately the center of the specimen and four at approximately the center of its quarter sections. The other four were to be located at the discretion of the testing body to obtain representative information on the performance of the construction under test.



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## SECTION 8

### TEST RESULT

#### Fire Endurance Test

The test was initiated on July 25, 2022. The ambient temperature at the time of the test was 34.2°C and the humidity was 56%R.H. Observations made during the test are listed below:

#### Test Observations:

Time		All observations are from the unexposed face unless noted otherwise.
Mins	Secs	
00	00	Test started.
20	00	No significant change.
40	00	No significant change.
60	00	No significant change.
80	00	No significant change.
100	00	No significant change.
120	00	Fire Endurance test was discontinued. The test assembly withstood the fire test without passage of flame or passage of gases hot enough to ignite a cotton pad on the unexposed side.

#### Correction Factor for the Fire Endurance Test

VARIABLE	DESCRIPTION	VALUE	UNIT
C	Correction Factor	-5.8	seconds
I	Indicated FR Period	120	minutes
A	Area under Indicated FR Period for first 3/4 of test period	73668	°C*min
A <sub>s</sub>	Area under Standard UL 263 Time vs. Temp. Curve for first 3/4 of test period	73760	°C*min
L	Lag Correction	1800	°C*min
<b>FR Period</b>	<b>Fire- Resistance Period</b>	<b>120</b>	<b>minutes</b>

Note: The standard specifies that the fire resistance shall be determined to the nearest integral minute. Consequently, if the correction factor is less than 30 seconds, and the test specimen met the criteria for the full indicated fire resistance period, no correction is deemed necessary.

Total Quality. Assured.

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### SECTION 9

#### CONCLUSION

Intertek Building Construction(B&C) has conducted testing for RENO LED LIGHTING INC. on the wood joist floor-ceiling assembly incorporating LED SLIM PANEL, model FR-LED-6-S15W-5CCT\*\*-PL, FR-LED-4-S9W-5CCT\*\*-PL and FR-LED-4-S12W-5CCT\*\*-PL; LED FLOATING GIMBAL, model FR-LED-6-S15W-5CCT-FG-\*\*, FR-LED-4-S9W-5CCT-FG-\*\*. Testing was conducted in accordance with the applicable criteria and following the standard methods of Modified UL 263-2011(R2022), Modified ASTM E119-20 and Modified CAN/ULC-S101-14.

Based on the result of this test, the wood joist floor-ceiling assembly incorporating LED SLIM PANEL, model FR-LED-6-S15W-5CCT\*\*-PL, FR-LED-4-S9W-5CCT\*\*-PL and FR-LED-4-S12W-5CCT\*\*-PL; LED FLOATING GIMBAL, model FR-LED-6-S15W-5CCT-FG-\*\*, FR-LED-4-S9W-5CCT-FG-\*\* described herein met the Conditions of Acceptance of Modified UL 263-2011(R2022), Modified ASTM E119-20 and Modified CAN/ULC-S101-14 when exposed to a fire resistance rating of 2-hour.

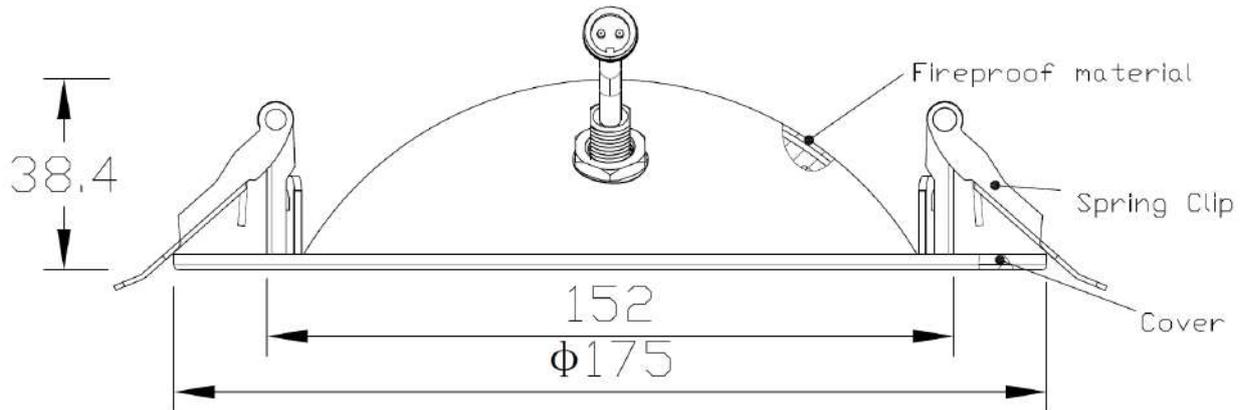
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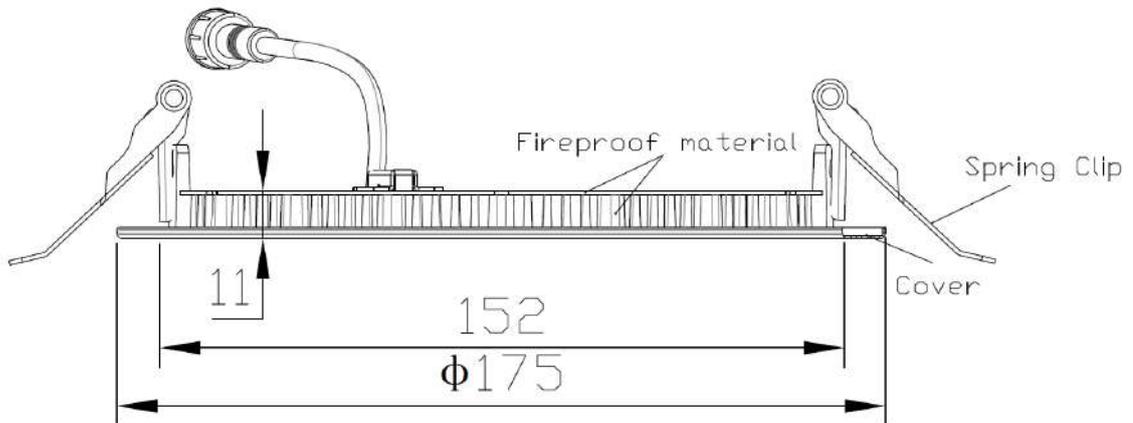
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### SECTION 10

### SPECIMEN DRAWING



Dimension Drawing of Model FR-LED-6-S15W-5CCT-FG-\*\*

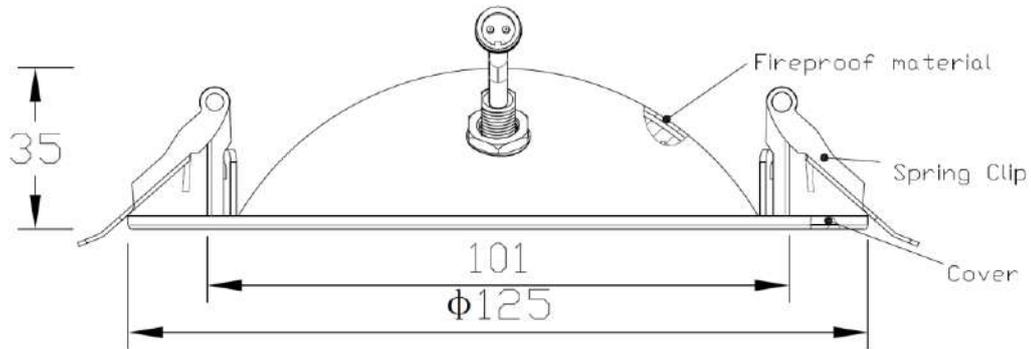


Dimension Drawing of Model FR-LED-6-S15W-5CCT\*\*-PL

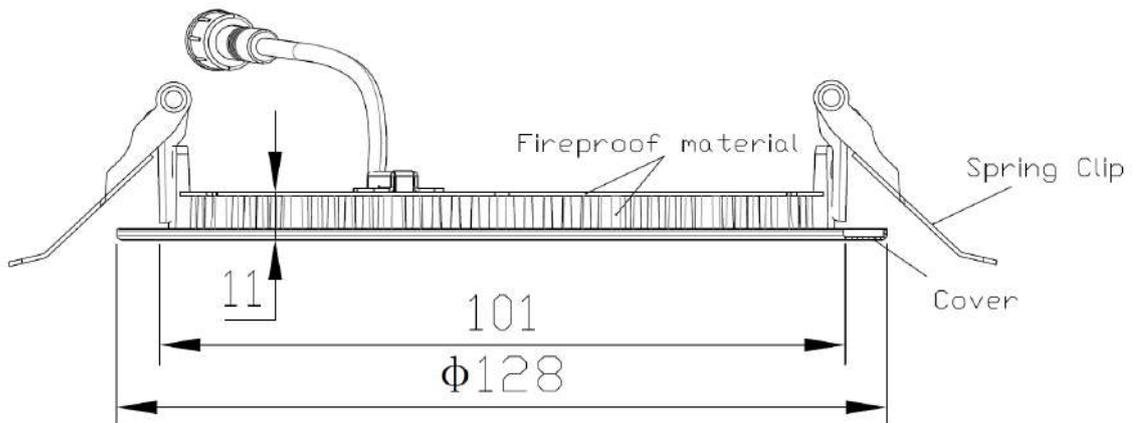
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Dimension Drawing of Model FR-LED-4-S9W-5CCT-FG-\*\*



Dimension Drawing of Model FR-LED-4-S12W-5CCT\*\*-PL

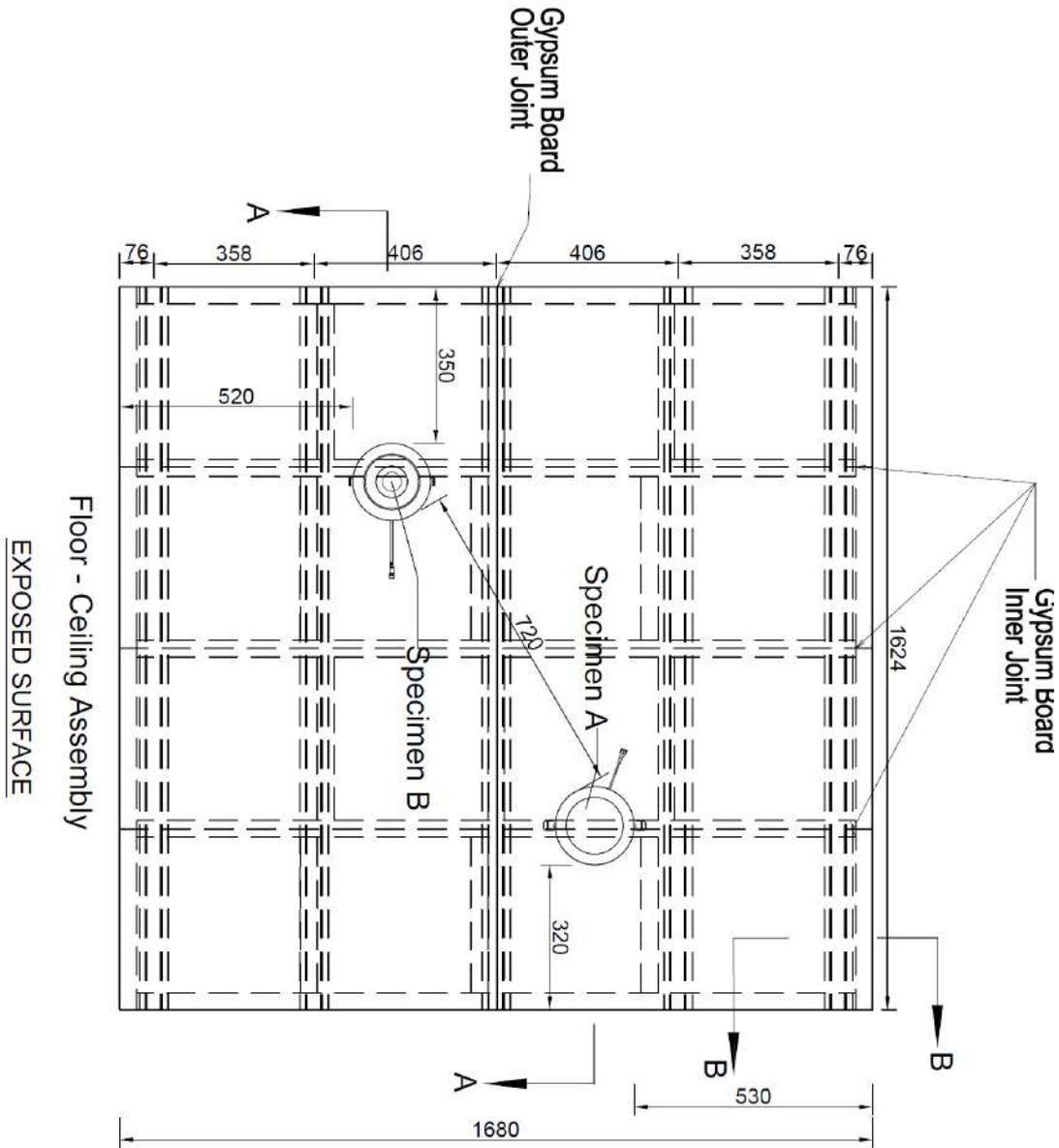
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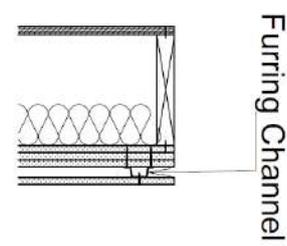
### SECTION 11

### TEST ASSEMBLY DRAWINGS



Dimensions are in millimeters

SECTION B - B



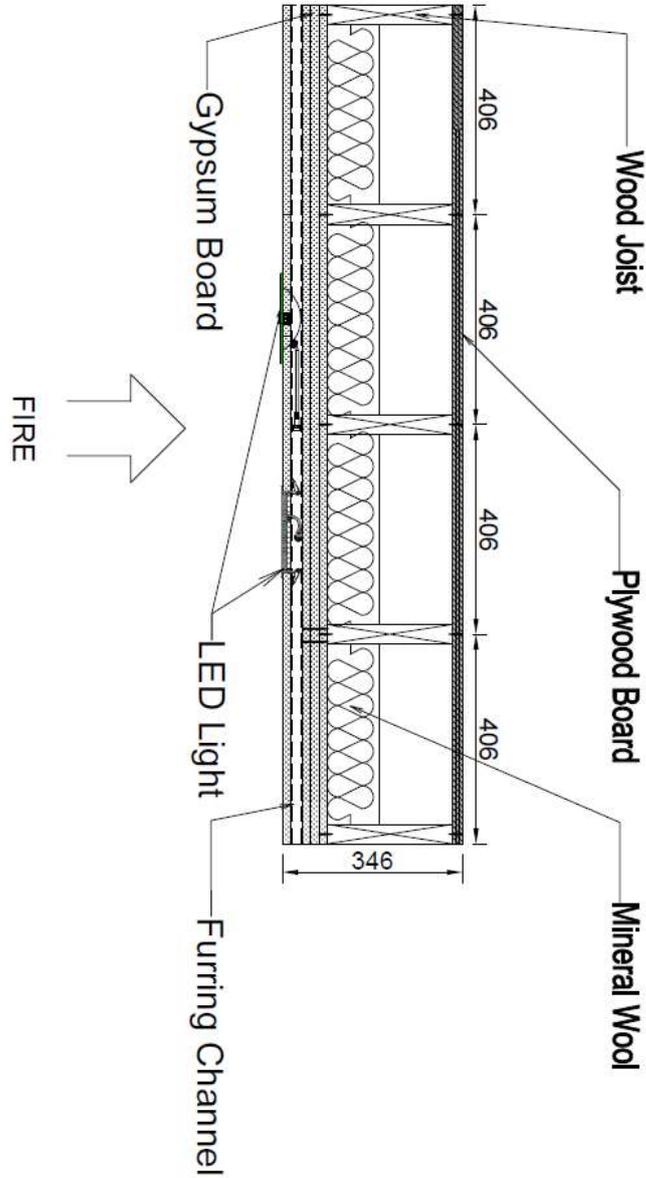
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SECTION A - A

Dimensions are in millimeters



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## SECTION 12

### TEST DATA

#### Temperature Data:

Mean furnace temperature together with temperature-time relationship specified in the standard

Time Mins	Furnace Mean Temp./ °C	Specified Furnace Temp./ °C	Area Above 20°C Base of Furnace Average (°C • min)	Area Above 20°C Base of Std Average (°C • min)	Error %
0	27	20	0	0	0.00%
1	32	124	9	52	-82.37%
2	67	227	39	208	-81.44%
3	152	331	128	467	-72.59%
4	289	434	328	829	-60.43%
5	433	538	669	1295	-48.37%
6	544	571	1137	1830	-37.86%
7	617	604	1697	2397	-29.19%
8	663	638	2317	2998	-22.70%
9	691	671	2974	3633	-18.12%
10	712	704	3656	4300	-14.98%
11	729	715	4356	4990	-12.70%
12	743	726	5072	5690	-10.86%
13	757	738	5802	6402	-9.37%
14	769	749	6546	7126	-8.14%
15	781	760	7301	7860	-7.11%
16	792	767	8067	8604	-6.23%
17	802	774	8845	9354	-5.45%
18	812	781	9632	10112	-4.74%
19	822	788	10429	10876	-4.11%
20	829	795	11235	11648	-3.54%
21	828	800	12044	12425	-3.07%
22	827	805	12851	13208	-2.70%
23	822	811	13656	13996	-2.43%
24	816	816	14454	14789	-2.26%
25	813	821	15248	15588	-2.18%
26	813	825	16041	16391	-2.13%
27	820	830	16837	17198	-2.10%
28	831	834	17643	18010	-2.04%
29	839	839	18458	18827	-1.96%
30	845	843	19280	19648	-1.87%

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Time Mins	Furnace Mean Temp./ °C	Specified Furnace Temp./ °C	Area Above 20°C Base of Furnace Average (°C • min)	Area Above 20°C Base of Std Average (°C • min)	Error %
31	850	847	20107	20473	-1.78%
32	855	851	20940	21302	-1.70%
33	859	854	21777	22134	-1.61%
34	863	858	22618	22970	-1.53%
35	867	862	23463	23810	-1.46%
36	870	865	24311	24654	-1.39%
37	873	868	25163	25500	-1.32%
38	876	872	26018	26350	-1.26%
39	880	875	26876	27204	-1.20%
40	882	878	27737	28060	-1.15%
41	885	881	28601	28920	-1.10%
42	888	884	29467	29782	-1.06%
43	890	886	30336	30647	-1.02%
44	892	889	31207	31515	-0.98%
45	895	892	32080	32385	-0.94%
46	897	895	32956	33259	-0.91%
47	899	897	33834	34135	-0.88%
48	901	900	34714	35013	-0.85%
49	903	902	35596	35894	-0.83%
50	905	905	36480	36778	-0.81%
51	907	907	37366	37664	-0.79%
52	908	909	38254	38552	-0.77%
53	910	912	39143	39442	-0.76%
54	914	914	40035	40335	-0.74%
55	920	916	40932	41230	-0.72%
56	922	918	41833	42127	-0.70%
57	922	920	42735	43026	-0.68%
58	924	923	43638	43928	-0.66%
59	926	925	44543	44832	-0.64%
60	928	927	45450	45738	-0.63%
61	931	929	46359	46646	-0.61%

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62	934	931	47272	47556	-0.60%
63	936	933	48187	48468	-0.58%
64	937	935	49103	49382	-0.56%
65	938	937	50021	50298	-0.55%
66	939	939	50940	51216	-0.54%
67	940	941	51859	52136	-0.53%
68	941	942	52779	53057	-0.52%
69	946	944	53703	53980	-0.51%
70	950	946	54631	54905	-0.50%
71	954	948	55563	55832	-0.48%
72	957	950	56499	56761	-0.46%
73	960	951	57437	57692	-0.44%
74	963	953	58379	58624	-0.42%
75	966	955	59324	59558	-0.39%
76	968	957	60271	60494	-0.37%
77	970	958	61219	61431	-0.34%
78	972	960	62170	62370	-0.32%
79	973	961	63122	63311	-0.30%
80	976	963	64077	64253	-0.27%
81	978	965	65034	65197	-0.25%
82	980	966	65992	66142	-0.23%
83	982	968	66953	67089	-0.20%
84	982	969	67915	68038	-0.18%
85	981	971	68876	68988	-0.16%
86	981	972	69837	69939	-0.15%
87	980	974	70797	70892	-0.13%
88	977	975	71756	71847	-0.13%
89	976	977	72712	72803	-0.12%
90	976	978	73668	73760	-0.12%
91	975	979	74624	74719	-0.13%

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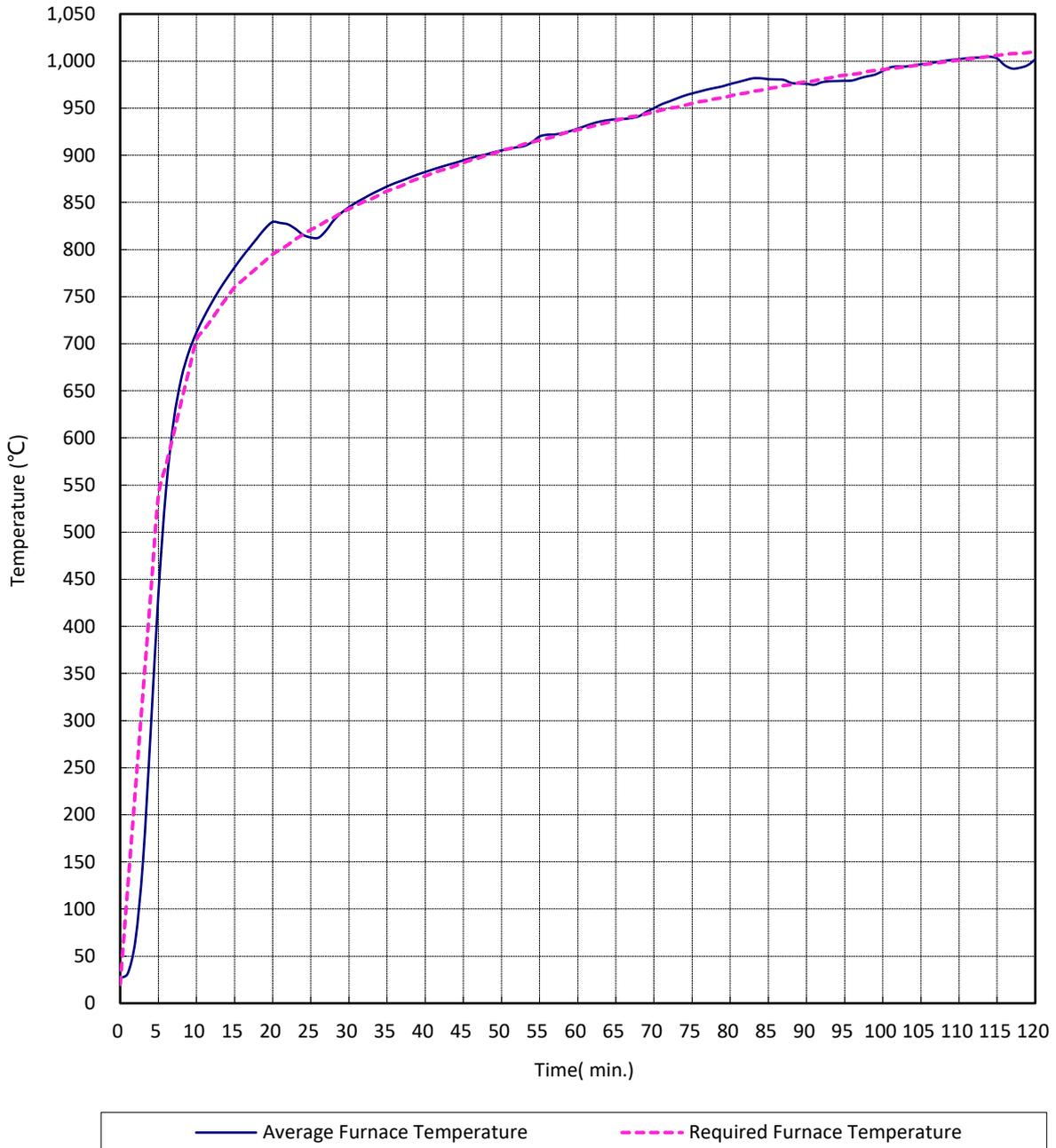
Time Mins	Furnace Mean Temp./ °C	Specified Furnace Temp./ °C	Area Above 20°C Base of Furnace Average (°C • min)	Area Above 20°C Base of Std Average (°C • min)	Error %
92	978	981	75580	75679	-0.13%
93	979	982	76538	76640	-0.13%
94	979	984	77497	77603	-0.14%
95	979	985	78456	78568	-0.14%
96	979	986	79415	79533	-0.15%
97	982	987	80376	80500	-0.15%
98	984	989	81338	81468	-0.16%
99	986	990	82303	82437	-0.16%
100	990	991	83271	83408	-0.16%
101	993	992	84242	84379	-0.16%
102	994	993	85216	85352	-0.16%
103	994	994	86190	86325	-0.16%
104	995	995	87165	87300	-0.15%
105	997	996	88141	88275	-0.15%
106	998	997	89118	89252	-0.15%
107	999	998	90097	90229	-0.15%
108	1000	999	91076	91208	-0.14%
109	1001	1000	92057	92187	-0.14%
110	1002	1001	93038	93168	-0.14%
111	1003	1002	94021	94149	-0.14%
112	1004	1003	95004	95132	-0.13%
113	1004	1004	95988	96115	-0.13%
114	1005	1005	96972	97100	-0.13%
115	1003	1006	97956	98085	-0.13%
116	996	1007	98935	99072	-0.14%
117	992	1008	99909	100059	-0.15%
118	993	1008	100882	101047	-0.16%
119	996	1009	101856	102036	-0.18%
120	1002	1010	102835	103025	-0.18%

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Graph for mean furnace temperature and temperature - time curve specified in the standard



Total Quality. Assured.

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### Unexposed surface temperatures of fire endurance test

Time Mins	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	T6 (°C)	T7 (°C)	T8 (°C)	T9 (°C)
0	36	35	35	36	35	35	36	36	35
1	36	35	35	36	36	35	36	36	35
2	36	35	35	35	36	35	36	36	35
3	36	35	35	35	35	35	36	36	35
4	36	35	35	35	35	35	36	36	35
5	36	35	36	36	35	35	36	36	35
6	36	35	35	36	36	35	36	36	35
7	36	35	35	36	36	35	36	36	35
8	36	35	36	36	36	35	36	36	35
9	36	35	36	36	36	35	36	36	35
10	36	35	36	36	36	35	36	36	35
11	36	36	36	36	36	35	36	36	35
12	36	36	36	36	36	35	36	36	35
13	36	36	36	36	36	35	36	36	35
14	36	36	36	36	36	35	36	36	35
15	36	36	36	36	36	35	36	36	35
16	36	36	36	36	36	35	36	36	35
17	36	36	36	36	36	35	36	36	35
18	36	36	36	36	36	35	36	36	35
19	36	36	36	36	36	35	36	36	35
20	36	36	36	36	36	35	36	36	36
21	36	36	36	36	36	35	36	36	35
22	36	36	36	36	36	35	36	36	35
23	36	36	36	36	36	35	36	36	36
24	36	36	36	36	36	35	36	36	35
25	36	36	36	36	36	35	36	36	35
26	36	36	36	36	36	35	36	36	35
27	36	36	36	36	36	35	36	36	35
28	36	36	36	36	36	35	36	36	35
29	36	36	36	36	36	35	36	36	35
30	36	36	36	36	36	35	36	36	35

Total Quality. Assured.

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### Unexposed surface temperatures of fire endurance test

Time Mins	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	T6 (°C)	T7 (°C)	T8 (°C)	T9 (°C)
31	36	36	36	36	36	35	36	36	35
32	36	36	36	36	36	35	36	36	36
33	36	36	36	36	36	35	36	36	35
34	36	36	36	36	36	35	36	36	36
35	36	36	36	36	36	35	36	36	35
36	36	36	36	36	36	35	36	36	35
37	36	36	36	36	36	35	36	36	36
38	36	36	36	36	36	35	36	36	36
39	36	36	36	36	36	35	36	36	36
40	36	36	36	36	36	36	36	37	36
41	36	36	36	36	36	36	36	37	36
42	36	36	36	36	36	36	36	37	36
43	36	36	36	36	36	36	36	37	36
44	36	36	36	36	36	36	36	37	36
45	36	36	36	36	36	36	37	37	36
46	36	36	36	36	36	36	37	37	36
47	36	36	36	36	36	36	37	37	36
48	36	36	36	36	36	36	37	38	36
49	37	36	36	36	36	36	37	38	37
50	37	37	36	36	37	37	37	38	37
51	37	37	36	36	37	37	37	38	37
52	37	37	37	36	37	37	37	39	37
53	37	37	37	37	37	37	38	39	38
54	37	37	37	37	37	37	38	39	38
55	38	37	37	37	37	37	38	40	38
56	38	38	37	37	38	38	38	40	38
57	38	38	37	37	38	38	38	40	39
58	38	38	38	38	38	38	38	40	39
59	38	38	38	38	38	38	39	41	39
60	39	38	38	38	39	38	39	41	39

Total Quality. Assured.

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### Unexposed surface temperatures of fire endurance test

Time Mins	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	T6 (°C)	T7 (°C)	T8 (°C)	T9 (°C)
61	39	39	38	38	39	39	39	41	40
62	39	39	39	38	39	39	39	42	40
63	39	39	39	39	39	39	40	42	40
64	40	40	39	39	39	40	40	43	41
65	40	40	39	39	40	40	40	43	41
66	40	40	40	39	40	40	40	43	41
67	41	41	40	40	40	41	41	44	42
68	41	41	40	40	41	41	41	44	42
69	41	41	40	40	41	41	41	45	42
70	42	42	41	40	41	42	41	46	43
71	42	42	41	41	42	42	42	46	43
72	42	43	42	41	42	43	42	47	43
73	43	44	42	41	42	43	42	48	44
74	43	44	43	42	42	44	43	48	44
75	44	45	43	42	43	45	43	49	45
76	44	46	44	42	43	45	43	50	45
77	45	46	44	43	43	46	44	51	45
78	46	47	45	43	44	47	44	52	46
79	46	48	46	43	44	48	44	53	46
80	47	49	47	44	45	49	45	54	46
81	48	50	47	44	45	49	45	55	47
82	48	51	48	44	45	50	45	56	47
83	49	51	49	45	46	51	46	57	48
84	50	52	50	45	46	52	46	58	48
85	51	53	51	46	46	53	47	59	49
86	51	54	52	46	47	54	47	60	49
87	52	55	53	46	47	55	47	61	50
88	53	56	54	47	48	56	48	62	50
89	54	57	55	47	48	57	48	63	50
90	55	58	56	48	48	58	49	64	51

Total Quality. Assured.

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### Unexposed surface temperatures of fire endurance test

Time Mins	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	T6 (°C)	T7 (°C)	T8 (°C)	T9 (°C)
91	55	59	57	48	49	59	49	65	52
92	56	59	58	49	49	59	49	66	52
93	57	60	59	49	50	60	50	66	53
94	58	61	60	50	50	61	50	67	53
95	58	62	61	50	51	62	51	68	54
96	59	63	62	51	51	63	51	68	54
97	60	63	62	52	52	64	52	69	55
98	61	64	63	52	53	64	52	69	56
99	61	65	64	53	53	65	53	70	56
100	62	65	65	53	54	66	53	70	57
101	63	66	65	54	54	66	54	71	58
102	63	66	66	55	55	67	54	71	58
103	64	67	67	55	56	67	55	72	59
104	65	67	67	56	56	68	56	72	60
105	65	68	68	57	57	68	56	73	61
106	66	68	68	57	57	69	57	73	61
107	66	69	69	58	58	69	57	73	62
108	67	69	69	59	59	70	58	74	63
109	67	70	70	60	60	70	59	74	63
110	68	70	70	60	60	71	59	74	64
111	69	70	71	61	61	71	60	75	65
112	69	71	71	62	62	71	61	75	66
113	69	71	72	62	62	72	61	75	66
114	70	72	72	63	63	72	62	76	67
115	71	72	73	64	64	73	63	76	68
116	71	72	73	64	64	73	63	76	68
117	71	73	73	65	65	73	64	77	69
118	72	73	74	65	66	74	65	77	70
119	72	73	74	65	66	74	65	77	70
120	73	73	74	66	67	74	66	77	71

Total Quality. Assured.

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### Unexposed surface temperatures of fire endurance test

Time Mins	Mean temperature of T1 ~ T9 (°C)	Maximum temperature of T1 ~ T9 (°C)
0	35	36
1	36	36
2	35	36
3	35	36
4	35	36
5	36	36
6	36	36
7	36	36
8	36	36
9	36	36
10	36	36
11	36	36
12	36	36
13	36	36
14	36	36
15	36	36
16	36	36
17	36	36
18	36	36
19	36	36
20	36	36
21	36	36
22	36	36
23	36	36
24	36	36
25	36	36
26	36	36
27	36	36
28	36	36
29	36	36
30	36	36

Total Quality. Assured.

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### Unexposed surface temperatures of fire endurance test

Time Mins	Mean temperature of T1 ~ T9 (°C)	Maximum temperature of T1 ~ T9 (°C)
31	36	36
32	36	36
33	36	36
34	36	36
35	36	36
36	36	36
37	36	36
38	36	36
39	36	36
40	36	37
41	36	37
42	36	37
43	36	37
44	36	37
45	36	37
46	36	37
47	36	37
48	36	38
49	37	38
50	37	38
51	37	38
52	37	39
53	37	39
54	37	39
55	38	40
56	38	40
57	38	40
58	38	40
59	39	41
60	39	41

Total Quality. Assured.

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### Unexposed surface temperatures of fire endurance test

Time Mins	Mean temperature of T1 ~ T9 (°C)	Maximum temperature of T1 ~ T9 (°C)
61	39	41
62	39	42
63	40	42
64	40	43
65	40	43
66	40	43
67	41	44
68	41	44
69	41	45
70	42	46
71	42	46
72	43	47
73	43	48
74	44	48
75	44	49
76	45	50
77	45	51
78	46	52
79	46	53
80	47	54
81	48	55
82	48	56
83	49	57
84	50	58
85	51	59
86	51	60
87	52	61
88	53	62
89	53	63
90	54	64

Total Quality. Assured.

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### Unexposed surface temperatures of fire endurance test

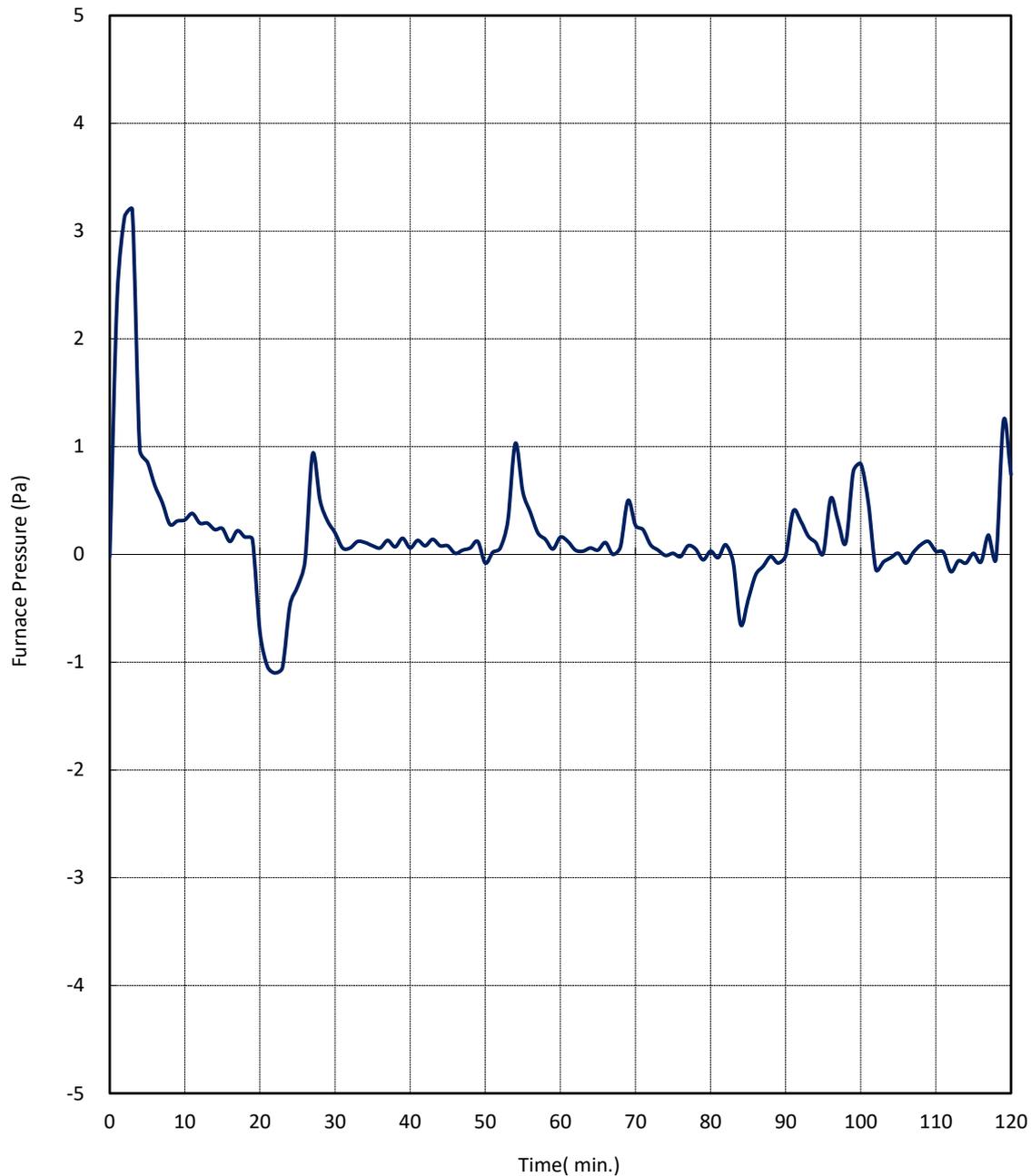
Time Mins	Mean temperature of T1 ~ T9 (°C)	Maximum temperature of T1 ~ T9 (°C)
91	55	65
92	55	66
93	56	66
94	57	67
95	57	68
96	58	68
97	59	69
98	59	69
99	60	70
100	61	70
101	61	71
102	62	71
103	62	72
104	63	72
105	64	73
106	64	73
107	65	73
108	65	74
109	66	74
110	66	74
111	67	75
112	68	75
113	68	75
114	69	76
115	69	76
116	69	76
117	70	77
118	71	77
119	71	77
120	71	77

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### Furnace pressure



— P1: Pressure at 100 mm below the underside of the test assembly

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### SECTION 13

### PHOTOGRAPHS



Photo No. 1

Front View of Specimen FR-LED-6-S15W-5CCT\*\*-PL



Photo No. 2

Back View of Specimen FR-LED-6-S15W-5CCT\*\*-PL

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**Photo No. 3**

**Front View of Specimen FR-LED-6-S15W-5CCT-FG-\*\***



**Photo No. 4**

**Back View of Specimen FR-LED-6-S15W-5CCT-FG-\*\***

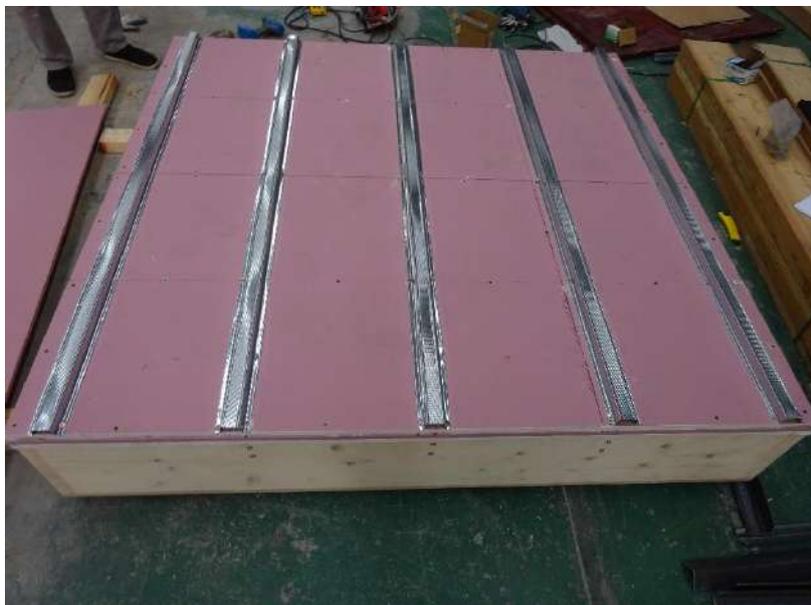
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**Photo No. 5**  
**Ceiling Assembly Being Constructed**



**Photo No. 6**  
**Furring Channel Installed on Ceiling Assembly**

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**Photo No. 7**  
**LED light Installed on Ceiling Assembly**

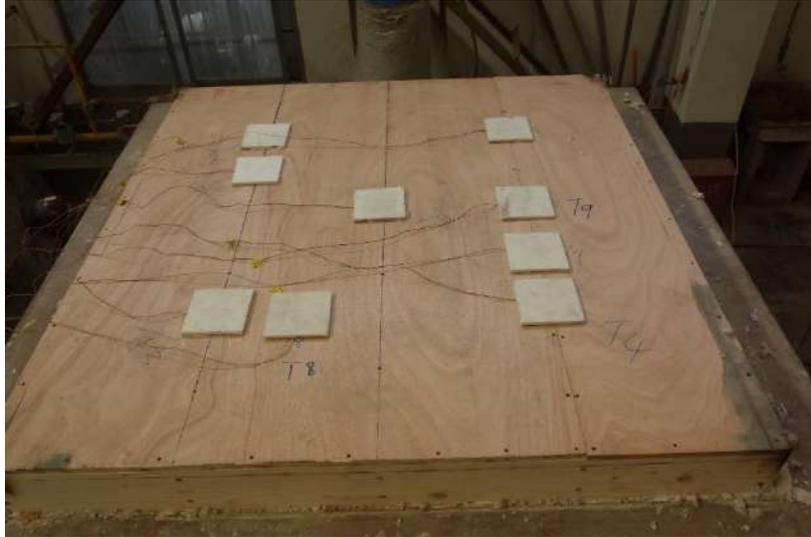


**Photo No. 8**  
**Completed Assembly - Exposed Surface before Fire Endurance Test**

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**Photo No. 9**

**Completed Assembly - Unexposed Surface before Fire Endurance Test**



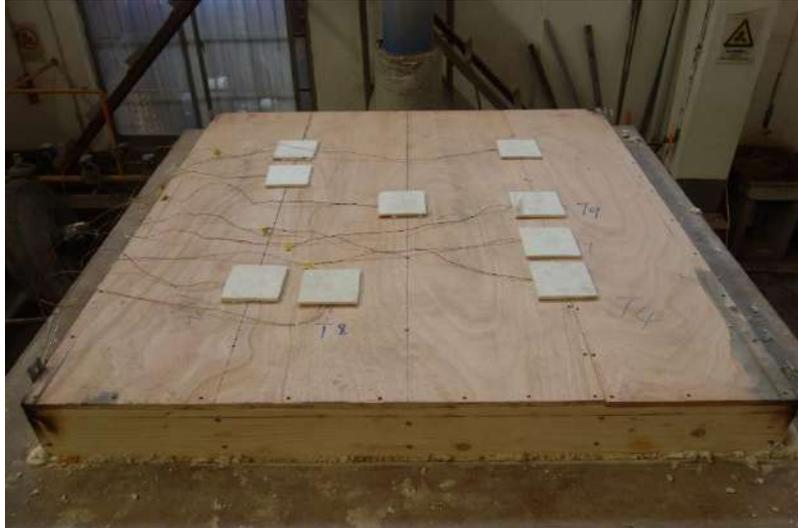
**Photo No. 10**

**Unexposed Surface after Fire Endurance Test (30 minutes)**

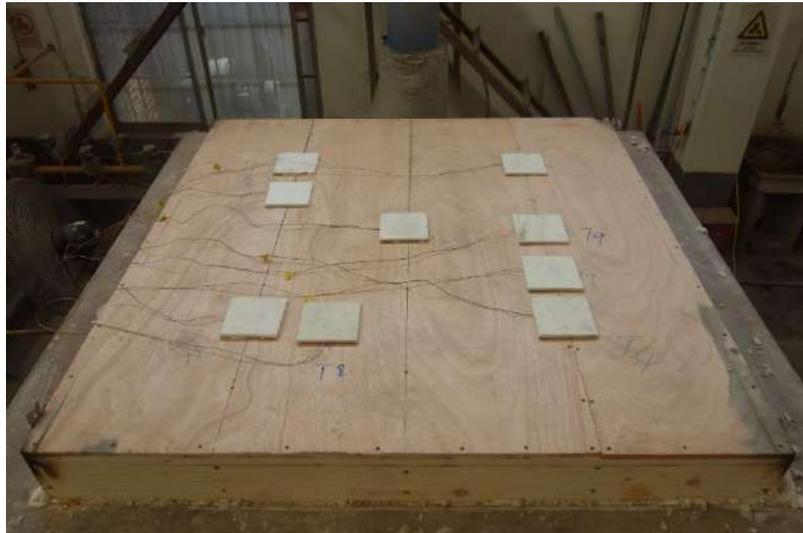
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**Photo No. 11**  
**Unexposed Surface after Fire Endurance Test (60 minutes)**

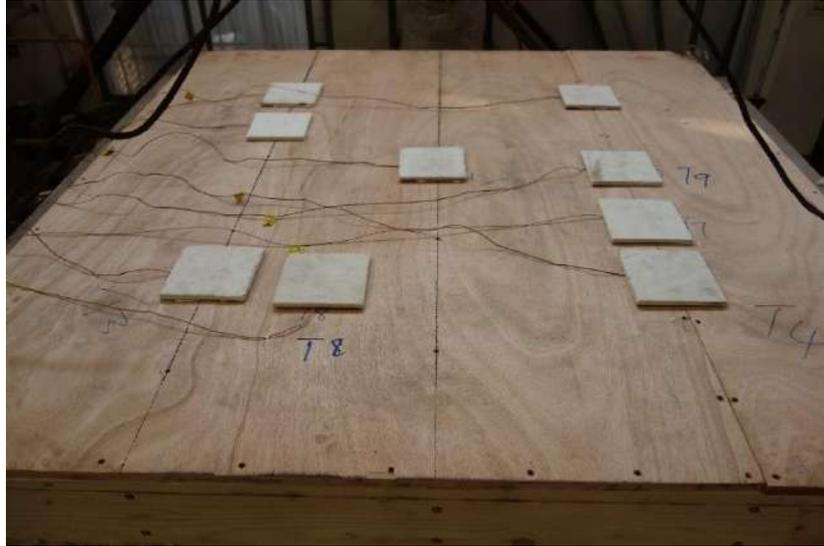


**Photo No. 12**  
**Unexposed Surface after Fire Endurance Test (90 minutes)**

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**Photo No. 13**

**Unexposed Surface after Fire Endurance Test (120 minutes)**



**Photo No. 14**

**Exposed Surface after Fire Endurance Test (120 minutes)**

Total Quality. Assured.

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## SECTION 14

### REVISION LOG

Revision No.	Date	PAGES	REVISION
0	2023-03-22	N/A	Original Report Issue

\*\*\*\*\*End of Report\*\*\*\*\*