

Test Report

No. SDFS2303001454FR-03

Date: Jun.13, 2024

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SATCO PRODUCTS INC

110 HEARTLAND BLVD EDGEWOOD, NY 11717-8364 UNITED STATES

Sample Description: LED RECESSED DOWNLIGHT

Model Name: S*, S11864, S11866, S*

Rating: 120V

Other info: S11865, S11868, S11867, S11869

The above data and information was / were submitted and identified on behalf of the client. SGS is not responsible for the authenticity, integrity and results of the data and information and / or the validity of the conclusion.

SGS Ref No.: SHES2206011633LM

Sample Receiving Date: Jun.29, 2022

Test Performing Date: Jun.29, 2022 to Jul.15, 2022

Test Requested:

The fire resistance performance of a non-loadbearing timber floor assembly protected by a fiber reinforced calcium silicate board ceiling, incorporating four Fire Downlights, in accordance with UL 263:2020 /ASTM E119:2020 /CAN/ULC-S101-14-REV3(2021).

Test Results: -- See attached sheet --

Signed for and on behalf of
Shunde Branch
SGS-CSTC Co., Ltd.



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Verification:
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Ivette Zhang
Approved signatory



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1. Introduction

Determine the fire resistance performance of a timber floor assembly protected by a fiber reinforced calcium silicate board ceiling, incorporating four led recessed downlights, when tested in accordance with UL 263:2020, Clause 10, Floor and Roof Assemblies Test./Floors and Roofs of ASTM E119:2020. /CAN/ULC-S101-14-REV3(2021) Section 11. Floor and Roof Assemblies.

The specified side (under side) of floor sample was exposed to elevated temperatures as dictated in standard time-temperature curve for a period of 120 minutes.

The test was conducted on July 08, 2022.

2. Summary

The performance of the sample was judged against the criteria for integrity and insulation as specified in Standards for horizontal construction, and the results obtained were as follows:

Integrity	Insulation
≥ 120 minutes	≥ 120 minutes

The test was terminated after a period of 121 minutes as requested by the client.

3. Test Sample

The timber floor had overall nominal dimensions of 4400 mm long by 4600 mm wide and comprised softwood timber joists at 600 mm centres. The upper surface of the floor comprised one layer nominally 18 mm thick Egger chipboard flooring.

The floor assembly was protected on its underside by a direct fixed ceiling, formed from two layers of 15 mm thick fiber reinforced calcium silicate board, the layer was screw fixed to the underside of the floor joists.

One layer of 100mm thick rock wool was filled within the cavity between the floor and the ceiling.

The ceiling incorporated four downlights referenced as follows:

Model	Description
S*	Size: 90 mm Ø by 60 mm Hight, fixed downlight, 71 mm cut-out
S11864	Size: 120 mm Ø by 60 mm Hight, fixed downlight, 99 mm cut-out
S11866	Size: 172.5 mm Ø by 60 mm Hight, fixed downlight, 149 mm cut-out
S*	Size: 225.5 mm Ø by 60 mm Hight, fixed downlight, 195 mm cut-out



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Schedule of Components

(Refer to Figures 1 to 2)

Timber floor assembly (items 1 to 8)

1. Floor Joists

Materials : Softwood Timber Joists
Over section size : 50 mm thick by 240 mm deep
Density : About 600 kg/m³
Joint centres : 600 mm

2. Floor boards

Manufacturer : Egger
Materials : Egger Chipboard, E1
Thickness : 1 layer, 18 mm thick
Density : About 700 kg/m³
Fixing method : All board screw fixed to all joists using drywall steel screws 55 mm long by 3.9 mm diameter screws, at 200 mm centres along joints and 150 mm centres align perimeter of floor.

3. Ceiling boards

Materials : Fiber reinforced calcium silicate board
Thickness : 2 layers, each 15mm thick
Density : About 1010 kg/m³
Fixing method : All board joints staggered with respect to adjacent layer and screw fixed to all joists using drywall steel screws, 35 mm long by 3.9 mm diameter screws for first layer and 55 mm long by 3.9 mm diameter screws for second layer, at 200 mm centres along joints and 150 mm centres align perimeter of ceiling.



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4. Rockwool

Materials : Rockwool
 Thickness : 100mm
 Density : About 68 kg/m³
 Fixing method : Filled into the cavity between the floor and the ceiling

5. Specimen "3 inch"

Product Name : LED RECESSED DOWNLIGHT
 Model : S*
 Overall dimensions and construction : See Figure 2-1
 Hole size in ceiling boards : 71 mm diameter

6. Specimen "4 inch"

Product Name : LED RECESSED DOWNLIGHT
 Model : S11864
 Overall dimensions and construction : See Figure 2-2
 Hole size in ceiling boards : 99 mm diameter

7. Specimen "6 inch"

Product Name : LED RECESSED DOWNLIGHT
 Model : S11866
 Overall dimensions and construction : See Figure 2-3
 Hole size in ceiling boards : 149 mm diameter

8. Specimen "8 inch"

Product Name : LED RECESSED DOWNLIGHT
 Model : S*
 Overall dimensions and construction : See Figure 2-4
 Hole size in ceiling boards : 195 mm diameter



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The tested sample was supported on the horizontal furnace with an opening of the 4000 mm by 4200 mm. The all around of the furnace wall was covered by ceramic fibre cotton. The tested sample was asymmetrical. At the request of client, the sample was mounted such that underside (Fiber reinforced calcium silicate board ceiling) towards to the heating conditions of the test.

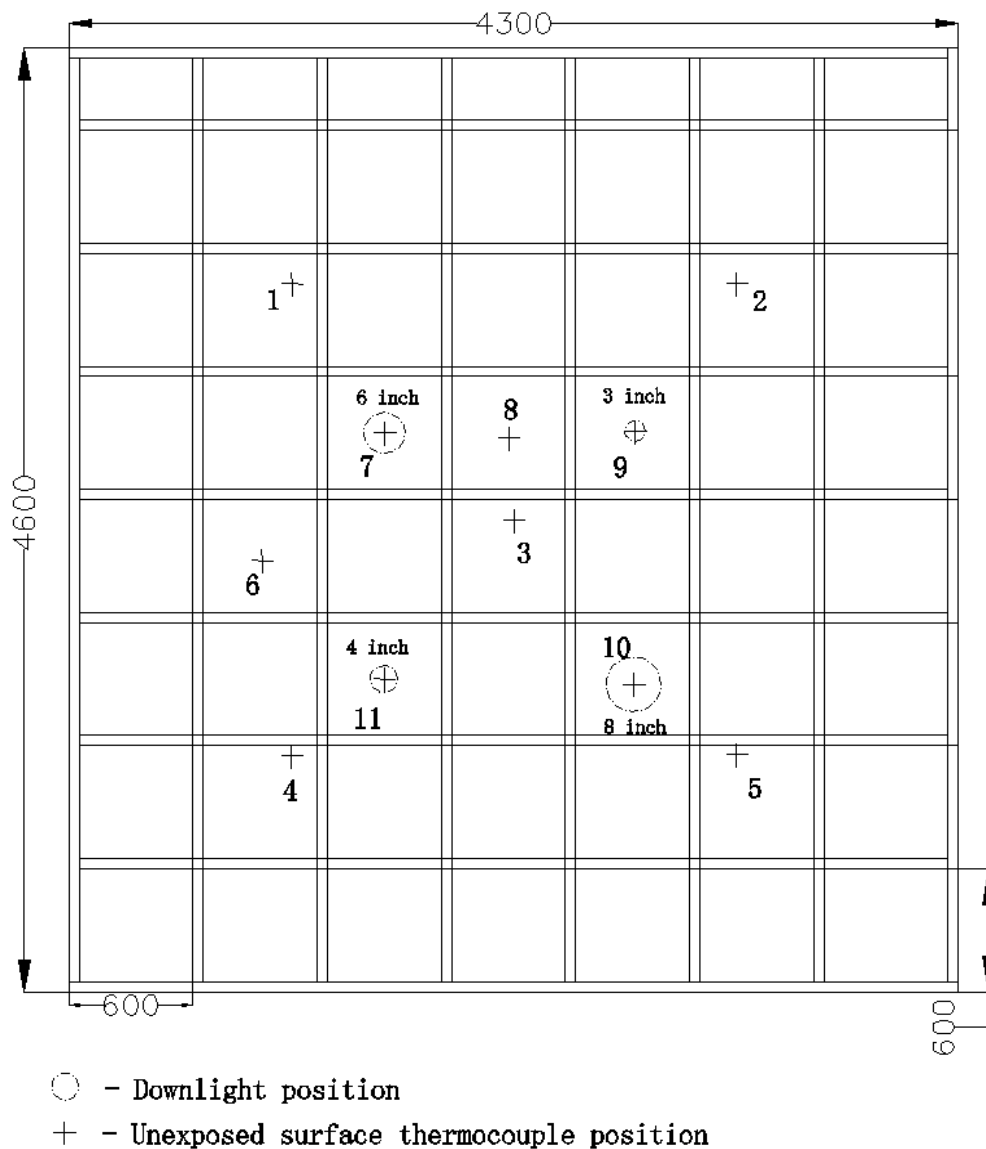


Figure 1 - General Plan of Test Sample from Unexposed Face and Thermocouple Positions



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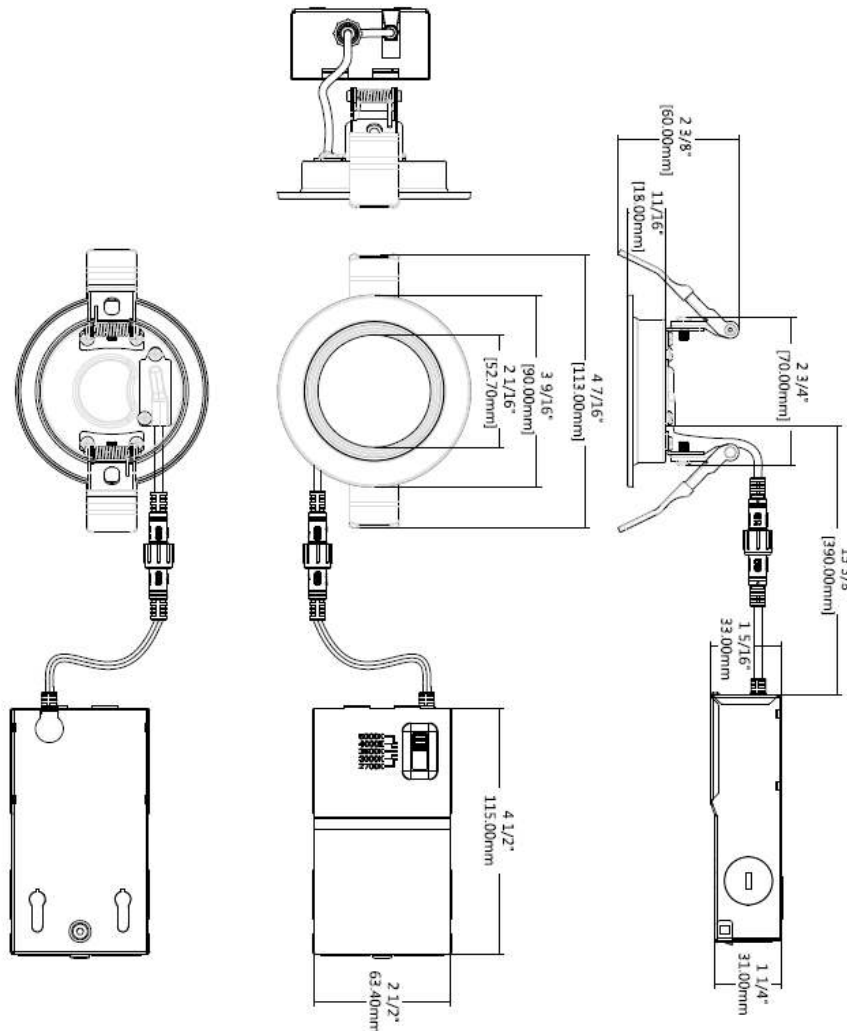


Figure 2-1 - Details of Specimens '3 inch'

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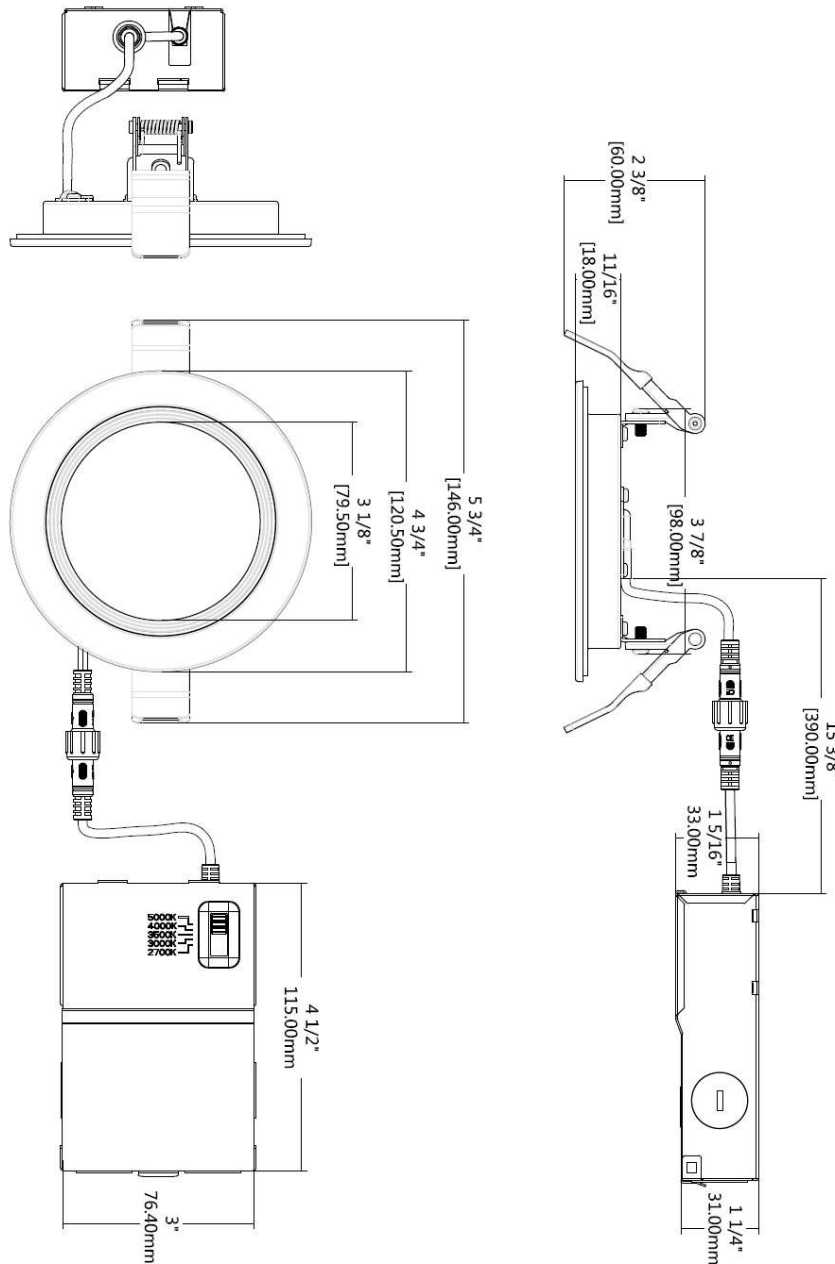


Figure 2-2 - Details of Specimens '4 inch'

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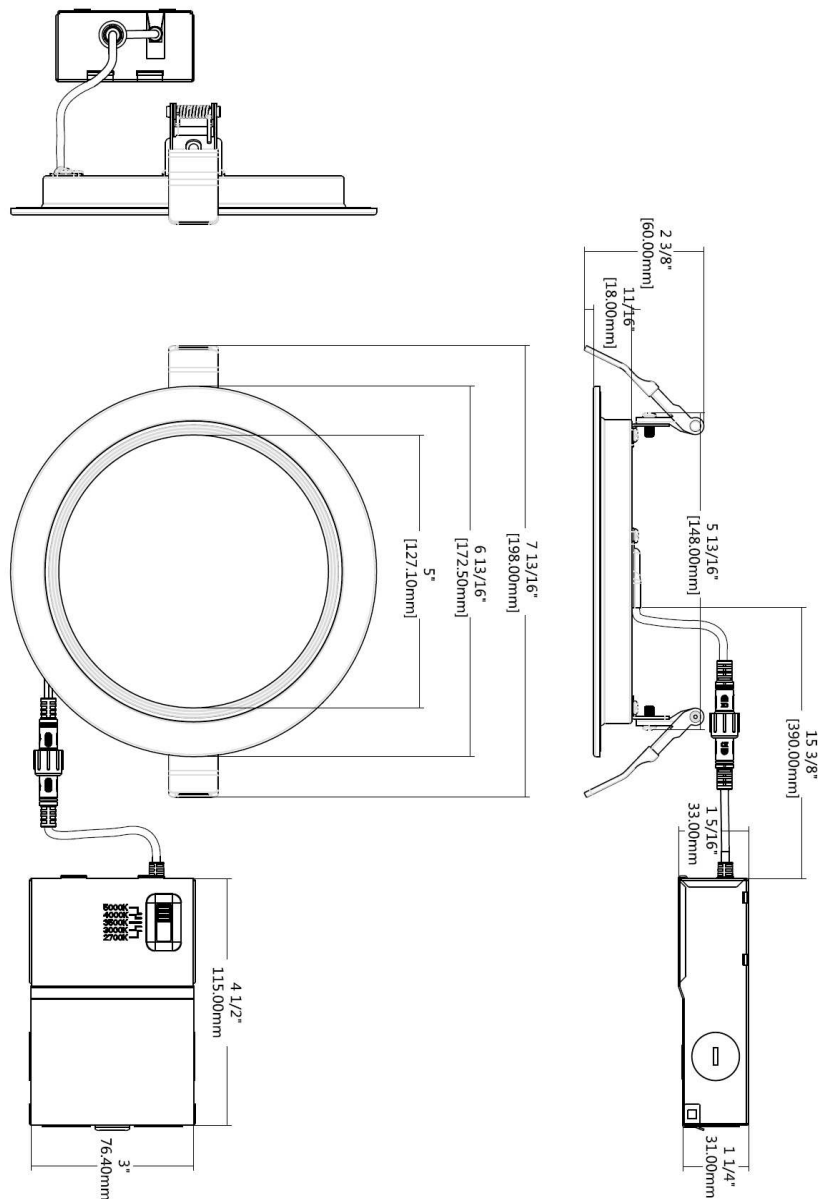


Figure 2-3 - Details of Specimens '6 inch'

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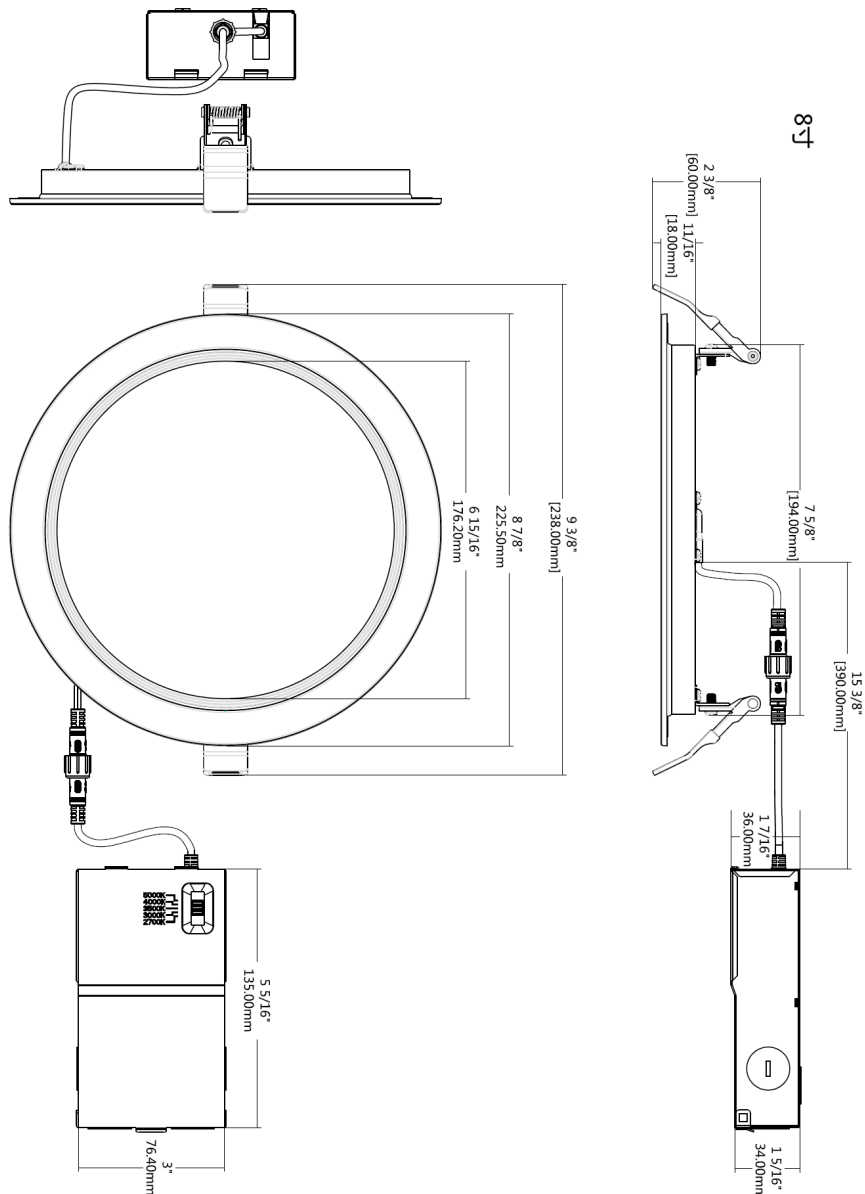


Figure 2-4 - Details of Specimens '8 inch'

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4. Test Procedure

The test was conducted in accordance with the procedure specified in UL 263:2020, Clause 10, Floor and Roof Assemblies Test /Floors and Roofs of ASTM E119:2020 /CAN/ULC-S101-14-REV3(2021) Section 11. Floor and Roof Assemblies.

The ambient air temperature in the vicinity of the test construction was 32.9 °C at the start of the test with variation of +3.9 °C during the test.

The furnace temperature was measured by means of nine thermocouples distributed evenly in the furnace, with their measuring junctions 305mm away from the exposed surface of the specimen. The furnace temperature was controlled so that the mean of the nine thermocouple readings followed as closely as possible standard time- temperature curve. The furnace temperatures read at intervals not exceeding 5 min during the first 2 h.

Eleven thermocouples were provided to monitor the unexposed surface of the test specimen.

5. Test Results

The following data were recorded during the test:

- a) The actual mean furnace temperature/time curve as well as the standard furnace temperature/ time curve, which were shown in Figure 3. The standard temperature and the actual mean temperature within the furnace were shown in Table 1.
- b) Individual temperatures recorded on the unexposed surface of the specimen were shown in Table 2.
- c) Observations made during the test was given in Table 3.



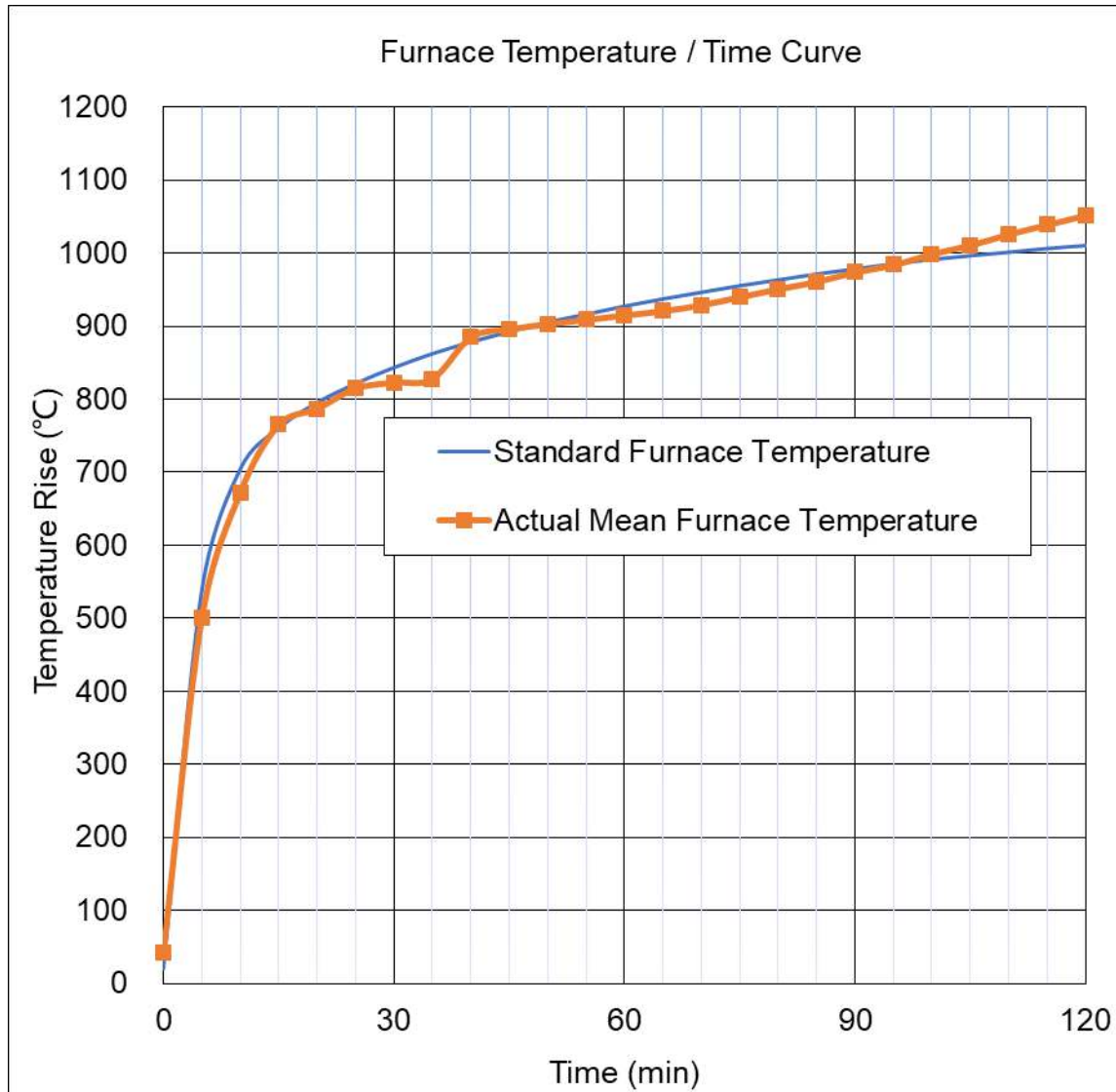
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Figure 3 - Standard and actual Mean Furnace Temperature/Time Curve



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Table 1 The standard temperature and the actual mean temperature within the furnace

Time (min)	Standard Temperature (°C)	Actual Mean Temperature (°C)
0	20	42
5	538	500
10	704	672
15	760	765
20	795	787
25	821	815
30	843	823
35	862	828
40	878	885
45	892	896
50	905	903
55	916	909
60	927	915
65	937	921
70	946	929
75	955	940
80	963	951
85	971	961
90	978	974
95	985	984
100	991	999
105	996	1011
110	1001	1026
115	1006	1039
120	1010	1052



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Table 2 Individual Temperatures Recorded on the Unexposed Surface of the Specimen

Time (min)	1#	2#	3#	4#	5#	6#	7#	8#	9#	10#	11#	Avg. Tem.
0	35.3	34.6	34.4	34.8	33.4	33.9	35.5	35.0	36.1	35.4	35.4	34.9
5	35.4	34.6	34.4	34.8	33.5	34.0	35.5	35.1	36.1	35.5	35.4	34.9
10	35.5	34.8	34.8	35.0	33.5	34.2	35.9	35.1	36.7	35.8	37.5	35.3
15	38.5	37.6	41.5	39.2	33.6	37.9	42.1	36.1	46.1	44.2	49.4	40.6
20	47.0	47.6	52.1	48.9	33.8	46.8	51.5	40.1	57.6	56.8	61.2	49.4
25	55.6	57.3	61.7	58.2	34.4	57.1	59.7	45.9	66.0	67.0	69.7	57.5
30	62.6	65.0	69.6	65.7	37.5	68.0	66.2	53.4	71.7	73.6	75.0	64.4
35	68.6	73.3	76.3	72.7	44.5	78.7	71.9	62.7	75.5	77.6	77.8	70.9
40	73.8	79.2	81.3	78.1	52.1	82.2	76.3	71.1	78.1	79.7	79.2	75.6
45	77.0	82.1	84.2	81.1	59.5	82.3	79.3	77.5	79.8	80.7	79.8	78.5
50	78.5	83.2	85.7	82.7	67.8	82.8	81.5	82.0	81.1	81.5	80.6	80.7
55	79.5	83.5	85.9	83.2	76.2	83.6	83.0	84.0	81.9	82.6	81.3	82.2
60	79.9	83.7	86.0	83.5	79.7	84.0	84.0	84.3	82.6	83.9	82.0	83.1
65	80.2	83.8	86.2	83.5	79.9	84.0	84.8	84.6	83.4	85.2	82.2	83.4
70	80.5	84.1	86.2	83.7	80.2	84.0	85.4	84.6	83.9	86.3	82.3	83.7
75	80.9	84.4	86.3	83.7	80.3	84.2	86.0	84.6	84.0	87.4	82.3	84.0
80	80.9	84.4	86.3	83.8	80.7	84.3	86.1	84.8	84.1	88.5	82.3	84.2
85	81.1	84.4	86.3	83.8	81.1	84.4	86.2	85.1	84.4	89.2	82.3	84.4
90	81.1	84.5	86.3	83.9	81.7	84.4	86.4	85.5	84.4	89.6	82.4	84.6
95	81.3	84.6	86.3	84.0	82.0	84.5	86.4	85.5	84.5	89.9	82.4	84.7
100	81.4	84.6	86.3	84.0	82.4	84.6	86.4	85.9	84.7	90.1	82.4	84.8
105	81.5	84.6	86.3	84.1	82.7	84.7	86.6	85.9	84.8	90.1	82.5	84.9
110	81.6	84.7	86.3	84.1	82.9	84.9	86.6	86.1	84.8	90.1	82.5	85.0
115	81.7	84.7	86.4	84.2	83.1	84.9	86.7	86.1	84.9	90.1	82.6	85.0
120	81.7	84.9	86.4	84.2	83.2	85.1	86.7	86.2	84.9	90.2	82.6	85.1



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Table 3 Observations Made during the Test

Time(min:s)	Observation (All observations are from the unexposed face)
00:00	Furnace fired and test was started.
05:40	A slight amount of smoke released from the unexposed face of the floor assembly.
10:00	Flaming now visible on the surface of the downlights
15:00	Flaming extinguished on the surface of the downlights.
20:00	Smoke release continues to increase on the unexposed face of the floor assembly.
30:02	Intermittent flaming seen around 8inch downlight in the ceiling.
60:00	The floor assembly was maintaining its integrity and insulation.
80:15	Flaming seen around all light fittings noticeably.
90:30	The floor assembly was maintaining its integrity and insulation.
110:00	6inch downlight falls off from the ceiling.
120:00	The floor assembly was maintaining its integrity and insulation.
121:00	Test was terminated as per client requirement.



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6. Conditions of Acceptance and Test Results

According to the conditions of acceptance in UL 263:2022, Clause 3.3.8 & 10.6.1 and ASTM E119:2020, Clause 7.3.1.4 & 8.6.6 and CAN/ULC-S101-14-REV3(2021), Clause 11.7, the specimen shall have sustained the applied load during the classification period without developing unexposed surface conditions which will ignite cotton waste, Transmission of heat through the test specimen throughout the fire endurance test shall not raise the average temperature measured by the stationary thermocouples on its unexposed surface more than 139°C above its initial average temperature; nor shall the temperature rise at any individual point exceed 180°C including a temperature measured by the roving thermocouple.

Test Results Summary	
Items	Test Results
Ignition of cotton	Meet Not ignition of cotton
Temperature rise of unexposed surface	Meet The average temperature rise of unexposed surface is 50.2°C. The maximum temperature rise of unexposed surface is 55.3°C.

7. Conclusion

The test specimen was found to comply with the conditions of acceptance of UL 263:2020/ ASTM E119:2020 /CAN/ULC-S101-14-REV3(2021) for 120 minutes fire resistance rating.

8. Limitation

The results only relate to the behaviour of the sample of the element of construction under the particular conditions of the test. They are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

The test results relate only to the sample tested. The fire resistance performance of sample of this design may change if different dimensions, different gaps, incorporating different components, or mounted within different construction.

SGS is not responsible for the authenticity, integrity and results of the information which provided by client and / or the validity of the conclusion.



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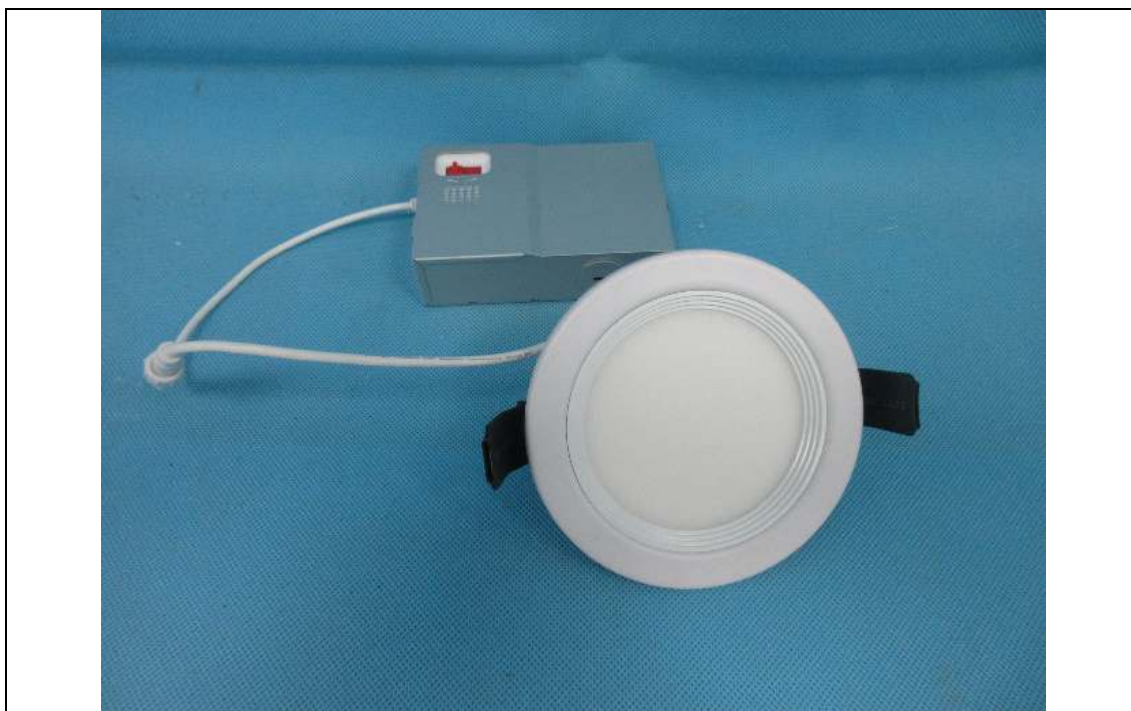
Photo Appendix:



Front view of specimen 3inch



Side view of specimen 3inch



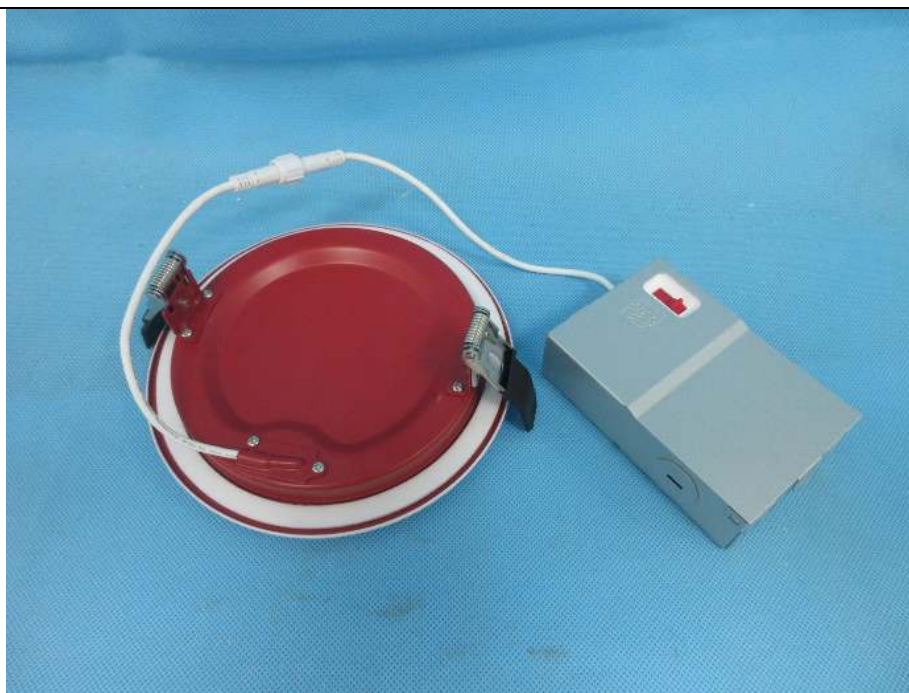
Front view of specimen 4inch



Side view of specimen 4inch



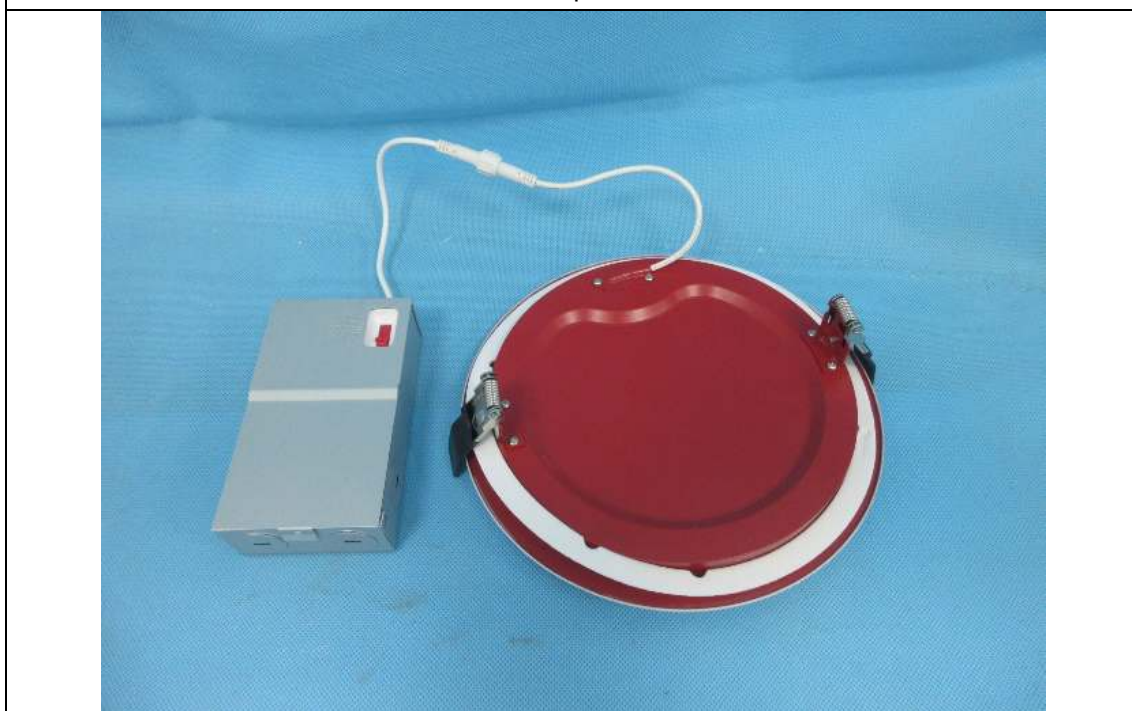
Front view of specimen 6inch



Side view of specimen 6inch



Front view of specimen 8inch



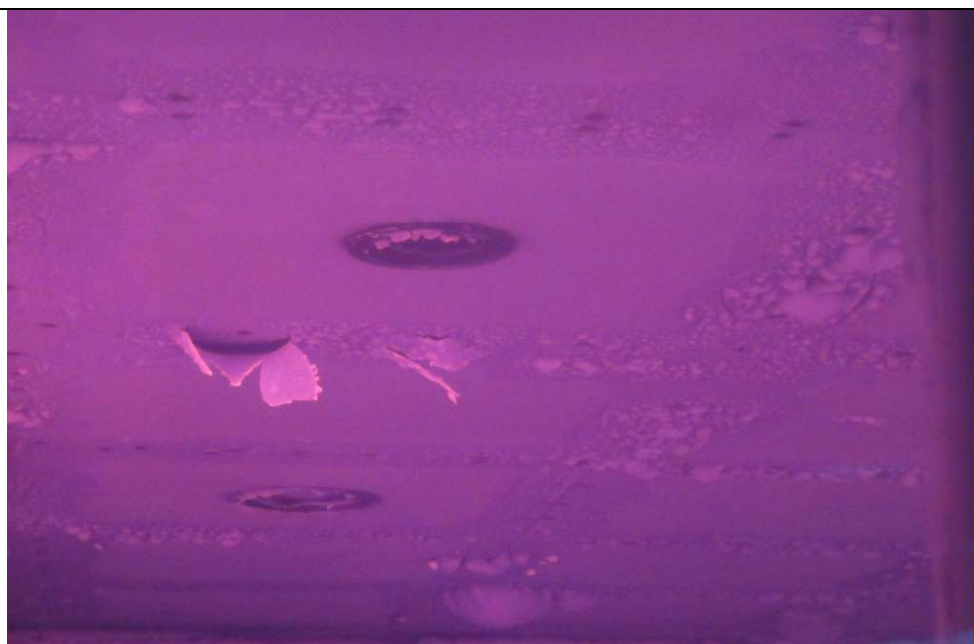
Side view of specimen 8inch



The exposed face before the test



The unexposed face before the test



The exposed face after test duration of 15 minutes



The exposed face after test duration of 15 minutes



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The unexposed face after test duration of 30 minutes



The exposed face after test duration of 30 minutes



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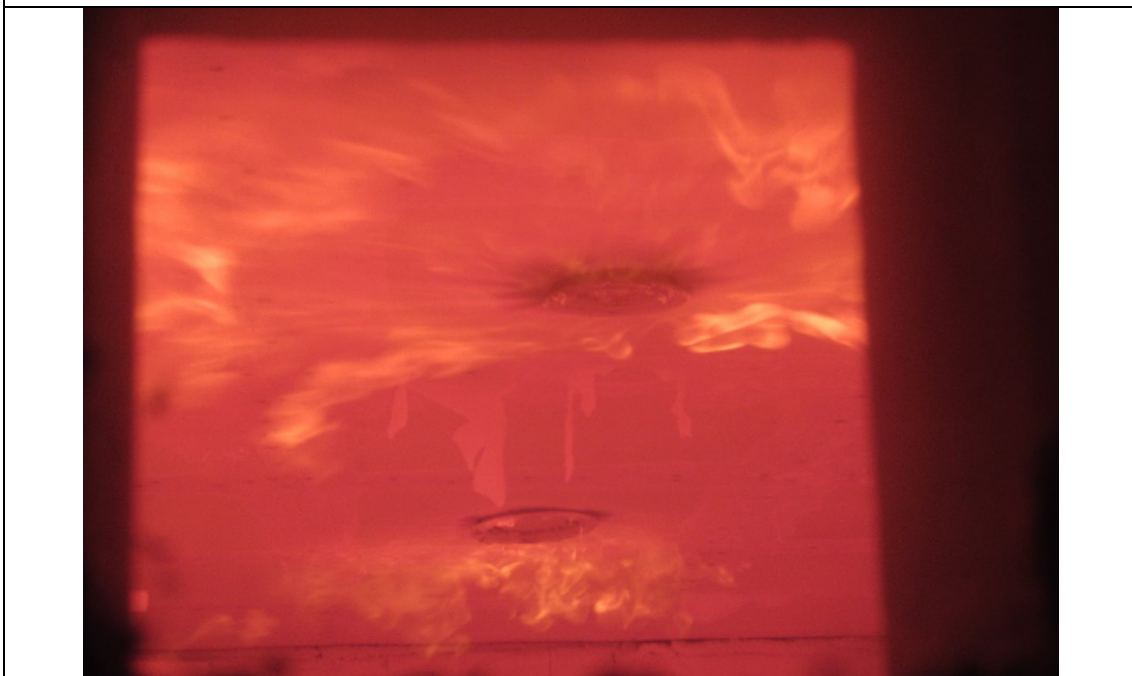
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The unexposed face after test duration of 60 minutes



The exposed face after test duration of 92 minutes



The exposed face after test duration of 110 minutes



The exposed face after test duration of 120 minutes



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The unexposed face after test duration of 120 minutes

SGS authenticate the photo on original report only

Remark:

1. This test report is issued based on the modification of the original No. SDFS2206004204FR-03 test report issued on Jun.13, 2024. And the original report is still valid. According to applicant's requirements, following changes are included:

- Change of applicant's name.
- Change of applicant's address.
- Change of model name.
- Change of other info.
- Delete the manufacturer.
- Delete the factory.

2. This test report is to supersede No. SDFS2303001454FR-02 test report which was issued on Jun.19, 2023. And the original test reports (paper and electronic) are invalid.

End of Report



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