

## Test Report

No. SDFS2311007061FR-01

Date: Jul.04, 2024

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### FACTORY DIRECT LIGHTING (2020) LTD

100 SHIELDS COURT , UNIT B, MARKHAM ONTARIO L3R 9T5

#### Sample Description: LED DOWNLIGHT

**Model Name:** FDLED-FR-3-8W-5CCT-120V, FDLED-FR-4-12W-5CCT-120V, FDLED-FR-6-15W-5CCT-120V, FDRGD-FR-4-9W-5CCT-120V, FDRGD-FR-3-7W-5CCT-120V, FDRS-FR-4-15W-5CCT-120V

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**SGS Ref No.:** GZES2311020113LM

**Sample Receiving Date:** Jul.12, 2023

**Test Performing Date:** Jul.12, 2023 to Sep.22, 2023

#### Test Requested:

The fire resistance performance of loadbearing timber floor assembly protected by a fiber reinforced calcium silicate board ceiling, incorporating six LED downlights, in accordance with UL 263:2022 /ASTM E119:2022 /CAN/ULC-S101-14-REV3(2021).

**Test Results:** -- See attached sheet --

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




Irvette 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 six LED downlights, when tested in accordance with UL 263:2022, Clause 10, Floor and Roof Assemblies Test./Floors and Roofs of ASTM E119:2022. / 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 Sep.16<sup>th</sup>, 2023.

### 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

Use a 2-hour fire rated ceiling assembly constructed refer to the construction specifications of UL Design No. L505. The fire rated ceiling assembly consisting of the following:

The timber floor had overall nominal dimensions of 4300 mm long by 4500 mm wide and comprised softwood timber joists spaced 406 mm.

The upper surface of the floor assembly one layer nominally 18 mm thick Egger chipboard flooring.

The underside of the floor assembly was protected by two layers 15mm thick ceiling boards with a 15.9mm high resilient channels installed between the two layers ceiling boards.

The floor supported an evenly distributed load of 100kg/m<sup>2</sup>.

Please refer to the component list on the next page.

Note: All materials used in above ceiling assembly are purchased in China.



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The ceiling incorporated six downlights referenced as follows:

Model	Description
FDLED-FR-3-8W-5CCT-120V	Size: 95 mm Ø by 51 mm Hight, fixed downlight, 82 mm cut-out
FDLED-FR-4-12W-5CCT-120V	Size: 127 mm Ø by 51 mm Hight, fixed downlight, 108 mm cut-out
FDLED-FR-6-15W-5CCT-120V	Size: 175 mm Ø by 51 mm Hight, fixed downlight, 158 mm cut-out
FDRGD-FR-4-9W-5CCT-120V	Size: 132 mm Ø by 48 mm Hight, fixed downlight, 95 mm cut-out
FDRGD-FR-3-7W-5CCT-120V	Size: 95 mm Ø by 50 mm Hight, fixed downlight, 72 mm cut-out
FDRS-FR-4-15W-5CCT-120V	Size: 115 mm Ø by 81 mm Hight, fixed downlight, 95 mm cut-out

### Schedule of Components

#### Timber floor assembly

##### 1. Floor boards

Manufacturer	: Egger
Materials	: Egger Chipboard, E1
Thickness	: 1 layer, 18 mm thick
Density	: About 700 kg/m <sup>3</sup>
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.

##### 2. Floor Joists

Materials	: Softwood Timber Joists
Over section size	: 50 mm thick by 254 mm deep
Density	: About 600 kg/m <sup>3</sup>
Joint centres	: 406 mm



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### 3. Resilient Channels

Materials : Glav steel

Spacing : 24 in.

Fixing method : The resilient channels installed between the two ceiling boards. Channels overlapped 1/2 in.(12.7mm) at splices and secured to each joist with screws. Min end clearance of channels to wall to be 3/4 in.(19.0mm).

### 4. Ceiling boards

Materials : Fiber reinforced calcium silicate board

Thickness : 2 layers, each 15mm thick

Density : About 1010 kg/m<sup>3</sup>

Fixing method : First layer installed with long dimension perpendicular to joists, and end joints of boards located at the joists. Nailed to joists with uncoated nails spaced 7 in. (177.8mm) OC. Second layer installed with long dimension perpendicular to the resilient channels and center line of boards located under a joist and so placed that the edge joint of this layer is not in alignment with the end joint of the first layer. Secured to resilient channels with 1 in. (25.4mm) long gypsum board screws 12 in.(304.8mm) OC.

### 5. Specimen "A"

Model : FDLED-FR-3-8W-5CCT-120V

Overall dimensions and construction : See Figure 2-1

Hole size in ceiling boards : 82 mm diameter

### 6. Specimen "B"

Model : FDLED-FR-4-12W-5CCT-120V

Overall dimensions and construction : See Figure 2-2

Hole size in ceiling boards : 108 mm diameter



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### 7. Specimen "C"

Model : FDLED-FR-6-15W-5CCT-120V  
Overall dimensions and construction : See Figure 2-3  
Hole size in ceiling boards : 158 mm diameter

### 8. Specimen "F"

Model : FDRGD-FR-4-9W-5CCT-120V  
Overall dimensions and construction : See Figure 2-6  
Hole size in ceiling boards : 95 mm diameter

### 9. Specimen "G"

Model : FDRGD-FR-3-7W-5CCT-120V  
Overall dimensions and construction : See Figure 2-7  
Hole size in ceiling boards : 72 mm diameter

### 10. Specimen "H"

Model : FDRS-FR-4-15W-5CCT-120V  
Overall dimensions and construction : See Figure 2-8  
Hole size in ceiling boards : 95 mm diameter

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 fiber 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.

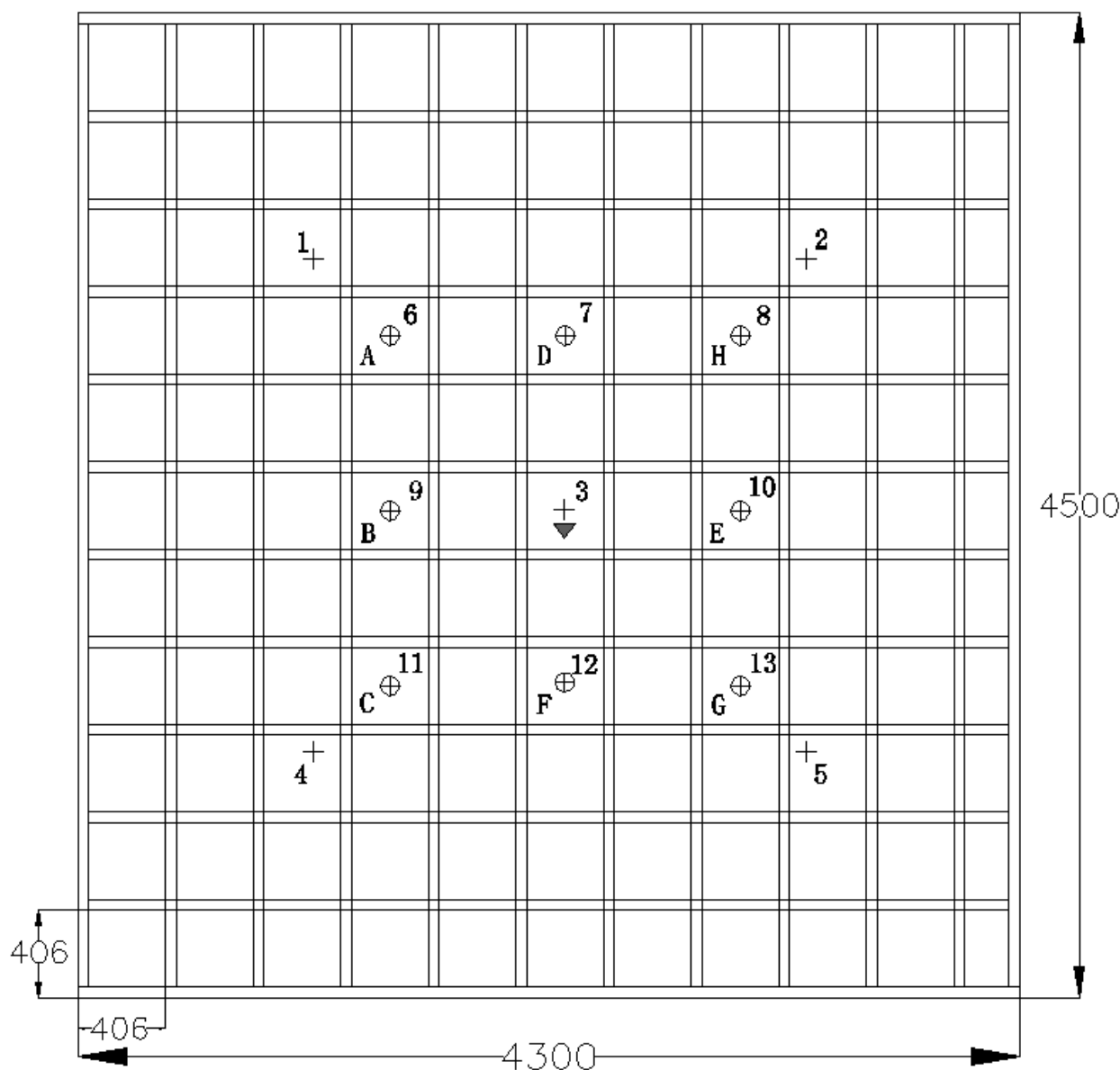


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+ - Unposed face thermocouple position

○ - Downlight position

▼ - Deflection measurement points

Figure 1 - General Plan of Test Sample from Unexposed Face and Thermocouple Positions (Unit: mm)



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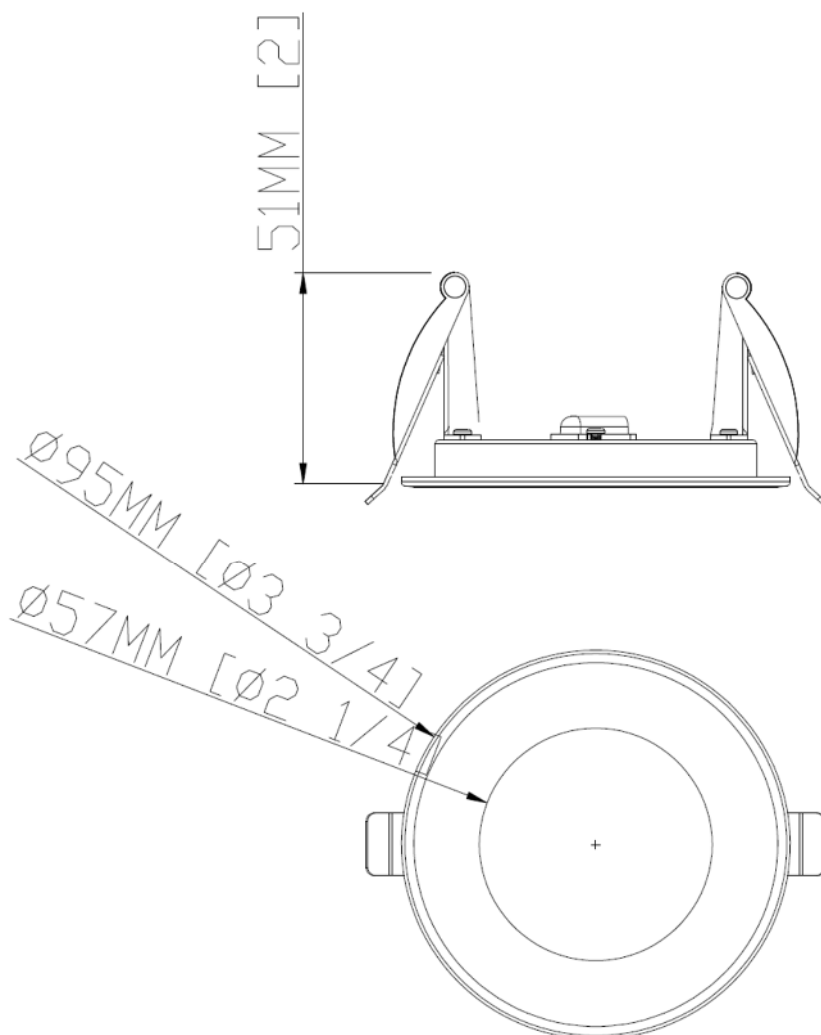


Figure 2-1 - Details of Specimens 'A'



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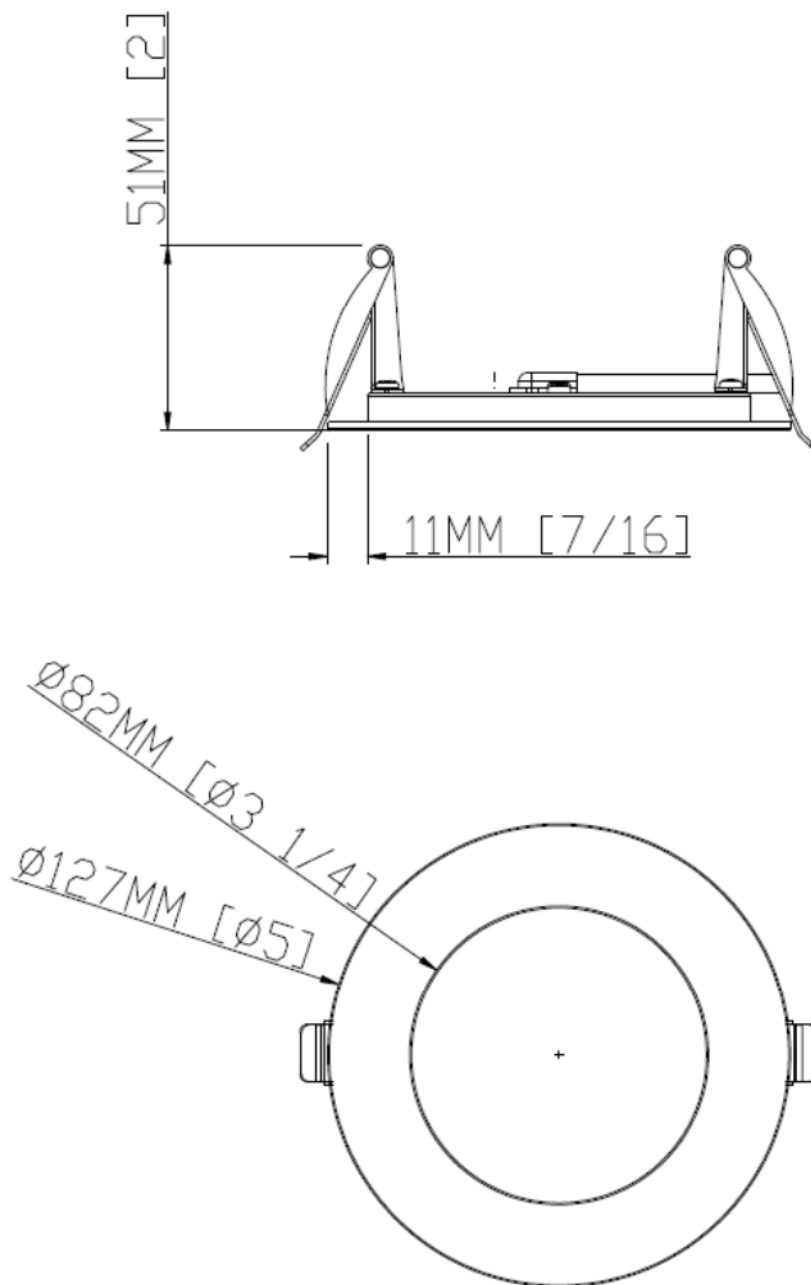


Figure 2-2 - Details of Specimens 'B'



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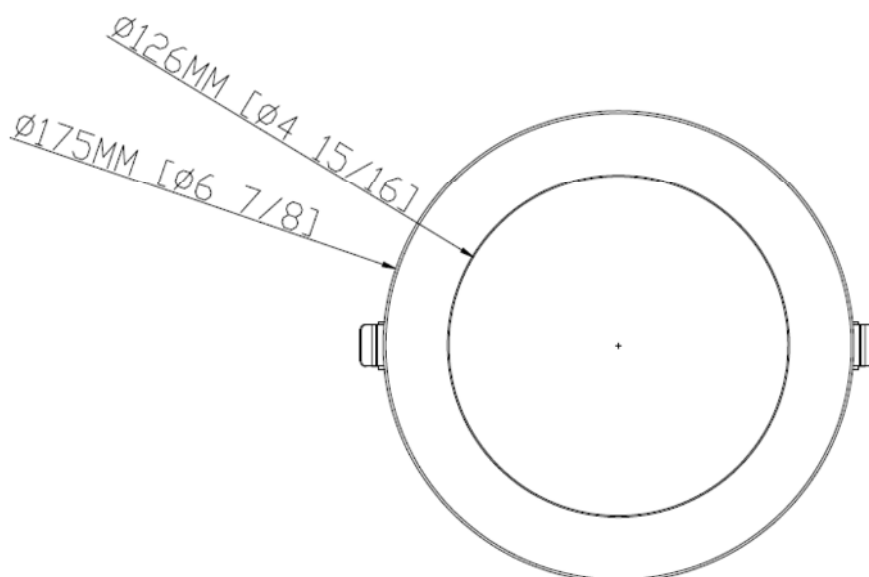
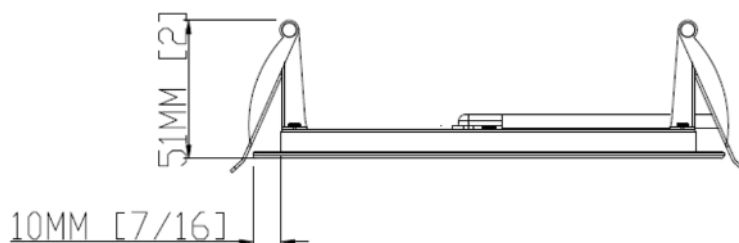


Figure 2-3 - Details of Specimens 'C'



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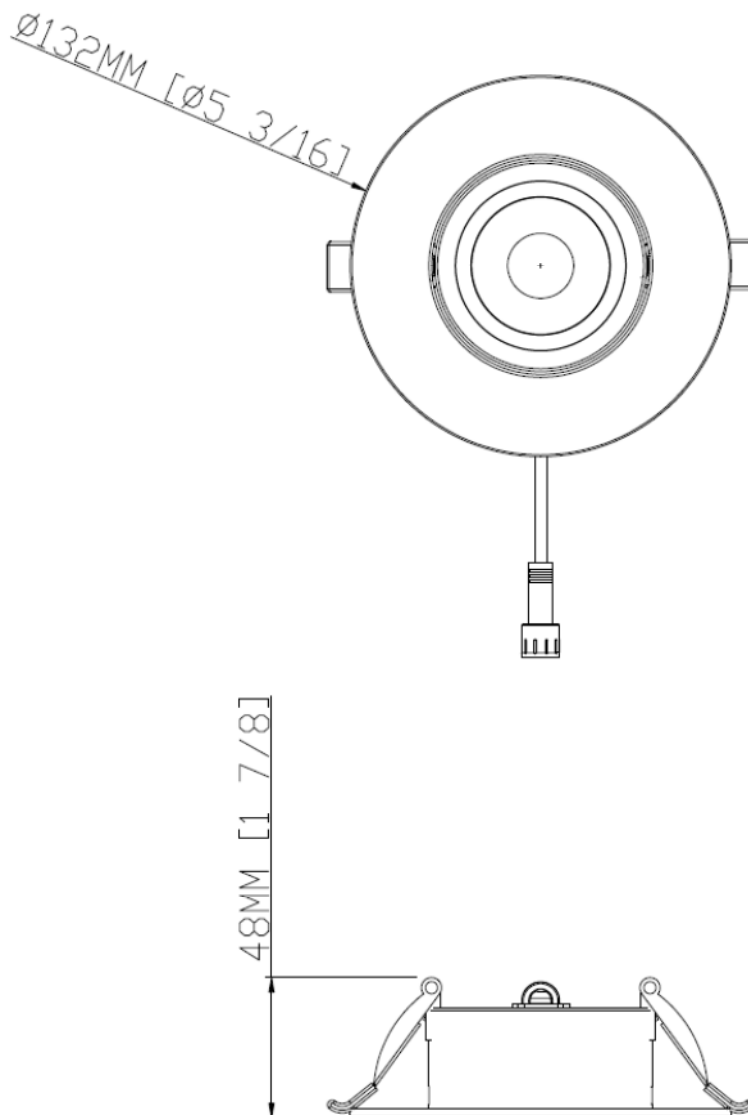


Figure 2-6 - Details of Specimens 'F'



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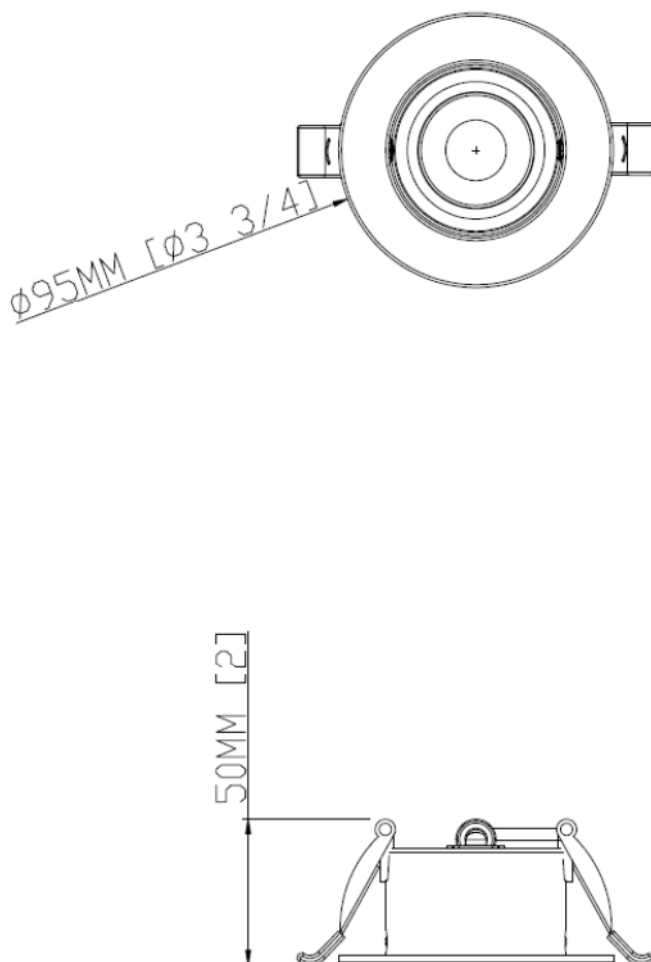


Figure 2-7 - Details of Specimens 'G'



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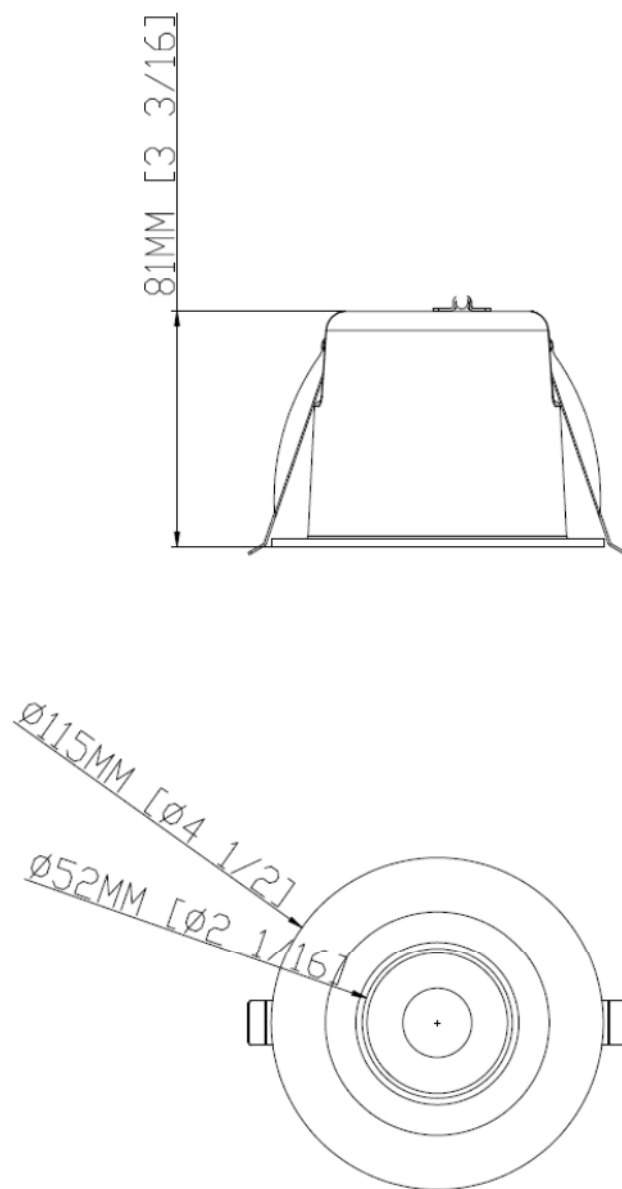


Figure 2-8 - Details of Specimens 'H'



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#### 4. Test Procedure

The test was conducted in accordance with the procedure specified in UL 263:2022, Clause 10, Floor and Roof Assemblies Test /Floors and Roofs of ASTM E119:2022 / CAN/ULC-S101-14-REV3(2021) Section 11. Floor and Roof Assemblies.

The ambient air temperature in the vicinity of the test construction was 29.0 °C at the start of the test with variation of +4.9 °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.

Thirteen 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) Deflections have been measured and recorded was shown in Table 3.
- d) Observations made during the test was given in Table 3.



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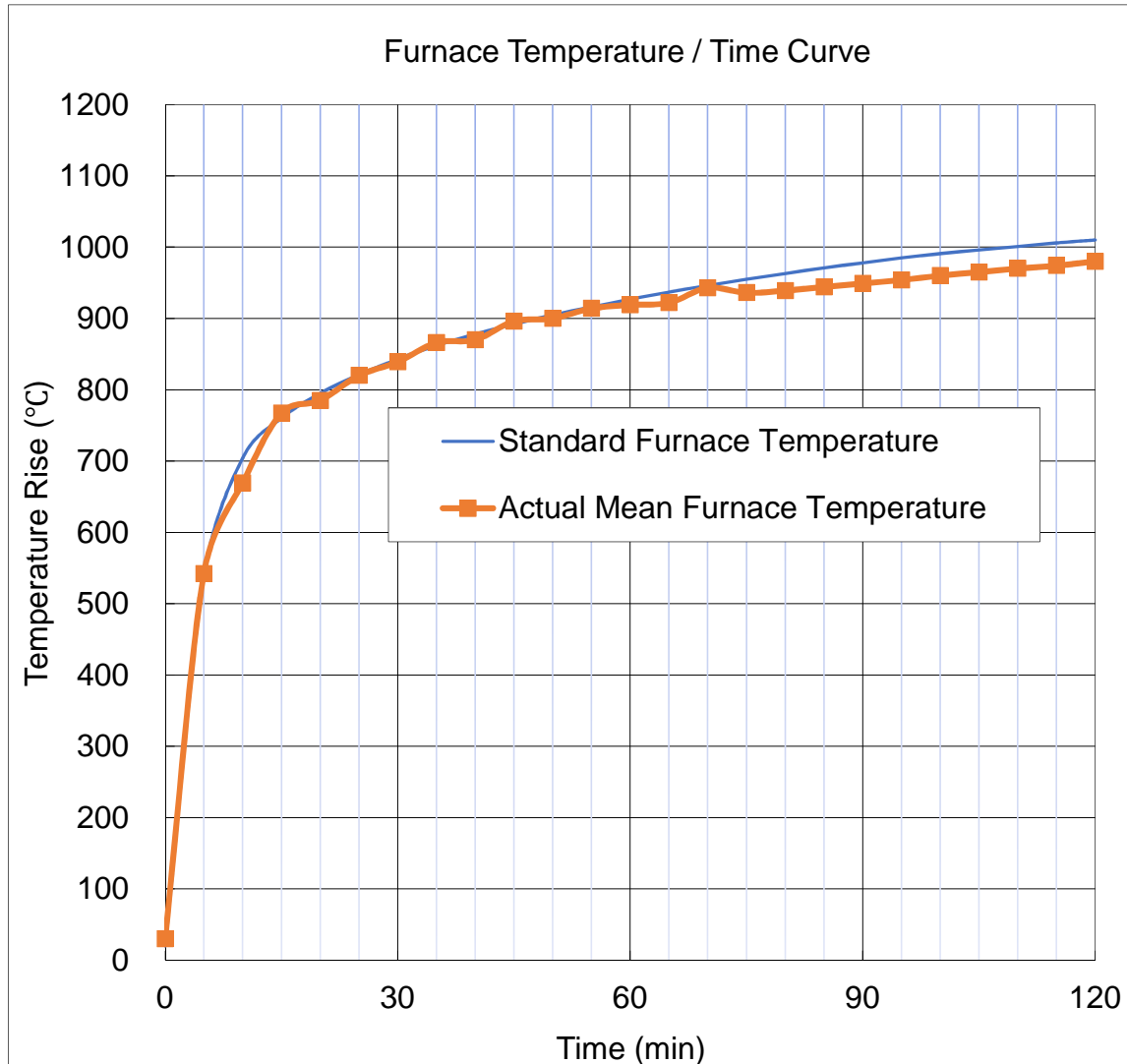


Figure 3 - Standard and actual Mean Furnace Temperature/Time Curve



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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	30
5	538	542
10	704	669
15	760	767
20	795	785
25	821	820
30	843	839
35	862	866
40	878	870
45	892	896
50	905	900
55	916	914
60	927	919
65	937	922
70	946	943
75	955	936
80	963	939
85	971	944
90	978	949
95	985	954
100	991	960
105	996	965
110	1001	970
115	1006	974
120	1010	980



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

Time (min)	Temperature (°C)													
	1#	2#	3#	4#	5#	6#	7#	8#	9#	10#	11#	12#	13#	Avg. Tem.
0	30.5	31.0	30.2	29.4	29.9	30.5	30.1	30.8	31.2	30.9	31.1	30.8	30.5	30.5
5	30.6	31.0	30.2	29.4	29.9	30.7	30.1	30.8	31.4	31.1	31.3	30.8	30.5	30.6
10	30.6	31.0	30.2	29.4	29.9	33.9	33.5	31.9	34.2	36.0	36.8	34.0	33.1	32.7
15	31.4	31.8	31.0	29.9	35.3	43.2	46.3	39.3	44.3	47.4	50.4	47.3	45.3	40.2
20	33.3	33.7	32.8	31.1	45.3	53.4	57.9	48.1	55.7	60.0	65.7	59.8	58.3	48.9
25	35.5	36.0	34.9	32.7	53.5	63.0	68.3	56.1	67.7	76.2	84.1	71.7	71.3	57.8
30	38.4	38.1	37.0	34.6	60.5	72.6	78.1	62.8	80.3	91.7	94.8	82.8	83.3	65.8
35	41.3	40.0	39.5	37.2	66.0	81.6	84.8	67.7	88.8	98.4	98.1	89.2	90.3	71.0
40	44.2	42.3	43.7	41.5	70.6	89.0	88.7	72.1	92.8	101.3	100.3	91.6	93.4	74.7
45	48.0	45.8	49.5	46.8	74.6	93.9	90.5	76.7	94.3	104.8	103.9	92.4	94.8	78.2
50	52.5	50.3	56.3	52.9	77.9	96.6	91.6	80.7	95.3	109.4	108.6	92.5	95.7	81.6
55	57.6	55.0	63.7	59.6	80.6	97.7	92.7	82.5	96.2	114.9	114.1	92.6	95.8	84.8
60	63.7	60.6	71.4	66.6	82.8	99.3	93.6	83.5	97.6	121.1	120.2	92.8	96.1	88.4
65	70.0	67.2	78.3	74.3	84.1	100.8	94.3	85.7	99.0	127.9	126.5	93.3	96.3	92.1
70	75.6	75.0	84.1	82.4	85.1	102.2	94.9	88.4	101.0	134.8	133.1	93.9	96.4	95.9
75	81.4	84.0	88.0	88.4	85.7	103.5	95.8	91.9	102.7	141.2	139.9	94.3	96.6	99.5
80	88.0	88.7	90.2	91.3	86.1	104.5	96.6	94.7	104.3	146.4	146.8	94.5	96.5	102.2
85	92.8	90.0	91.2	92.2	86.3	105.3	97.4	97.3	106.3	150.7	153.9	94.7	96.3	104.2
90	94.4	90.2	91.7	92.8	86.7	106.0	98.2	99.8	108.6	154.6	161.4	95.0	96.2	105.8
95	94.5	90.1	92.0	93.1	87.1	106.8	99.2	102.9	110.9	158.6	169.4	95.4	96.3	107.4
100	94.4	90.2	92.4	93.3	87.7	107.7	100.3	105.8	113.5	162.4	177.5	96.1	96.6	109.1
105	94.3	90.4	92.7	93.5	88.3	108.8	101.5	109.3	116.6	166.5	185.6	96.8	96.9	110.9
110	94.3	90.7	93.0	93.5	88.9	110.1	102.8	112.5	119.7	170.7	193.5	97.5	97.3	112.7
115	94.4	91.1	93.2	93.5	89.3	111.5	104.3	115.2	123.1	174.8	200.9	98.4	97.8	114.4
120	94.3	91.3	93.3	93.3	89.6	112.8	105.6	118.1	126.4	178.9	207.8	99.0	98.1	116.0



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Table 3 Sample Deflection (At the centre of the sample)

Time (mins)	Deflection(mm)
0	0.0
5	0.9
10	1.7
15	2.6
20	2.8
25	3.9
30	4.4
35	4.6
40	6.4
45	8.0
50	8.3
55	8.3
60	8.9
65	9.3
70	9.1
75	8.9
80	9.4
85	9.1
90	9.2
95	9.0
100	9.6
105	9.8
110	9.5
115	9.8
120	10.2



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Table 4 Observations Made during the Test

Time(min:s)	Observation (All observations are from the unexposed face)
00:00	Furnace fired and test was started.
05:12	A slight amount of smoke released from the ends of the floor assembly.
10:04	Some smoke released from the seam on the unexposed face of the floor assembly.
70:00	No obvious change on the unexposed face of the floor assembly.
90:00	No flames were found emitting from all downlight positions.
100:02	No obvious change on the unexposed face of the floor assembly.
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 E119:2022, 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 85.5°C. The maximum temperature rise of unexposed surface is 177.3°C.

## 7. Conclusion

The test specimen was found to **comply with** the conditions of acceptance of UL 263:2022/ ASTM E119:2022 / 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.



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### Photo Appendix:



Front view of specimen A



Side view of specimen A



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Front view of specimen B



Side view of specimen B





Front view of specimen C



Side view of specimen C



Front view of specimen F



Side view of specimen F





Front view of specimen G



Side view of specimen G



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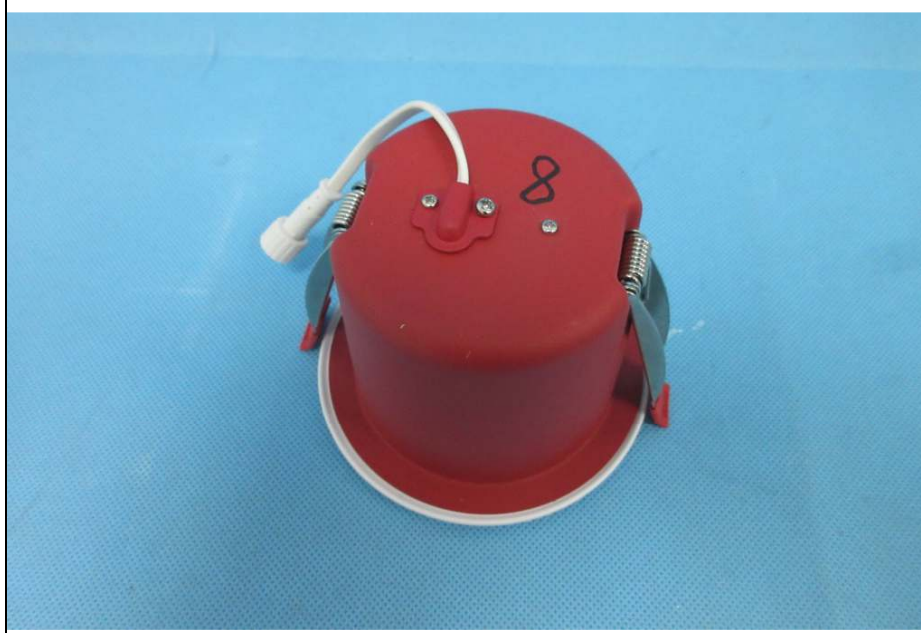
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Front view of specimen H

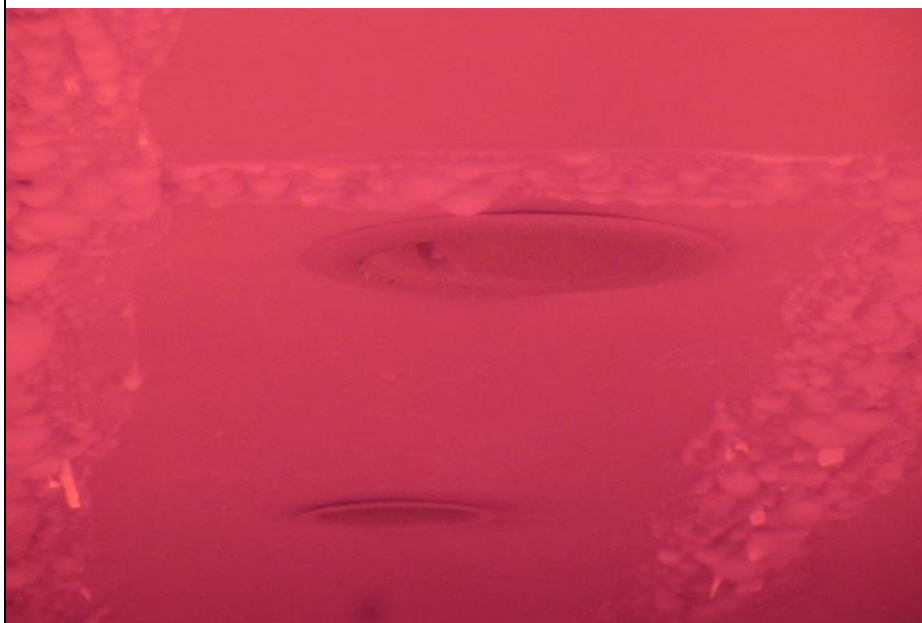


Side view of specimen H





The exposed face before the test



The exposed face after test duration of 31 minutes

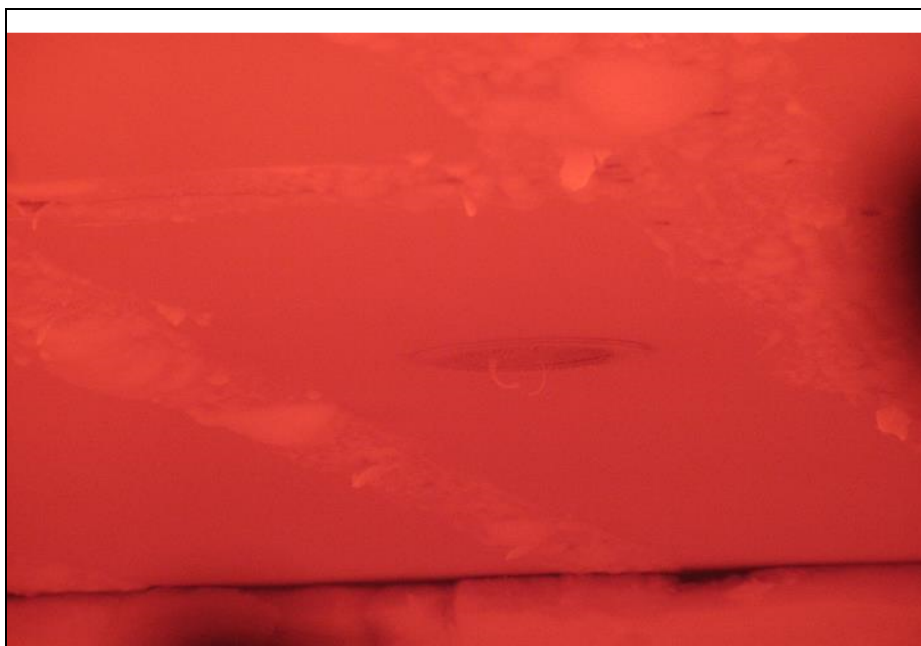


The unexposed face after test duration of 40 minutes



The unexposed face after test duration of 92 minutes





The exposed face after test duration of 112 minutes



The exposed face after test duration of 112 minutes



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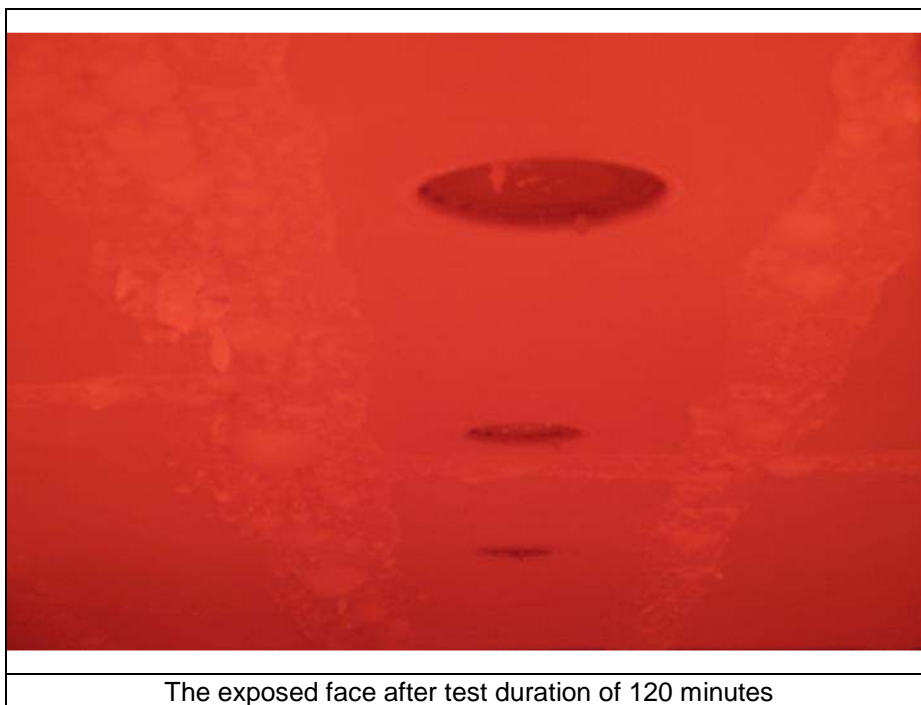
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The exposed face after test duration of 120 minutes



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. SDFS2307004007FR-01 test report issued on May 28, 2024. And the original report is still valid. According to applicant's requirements, following changes are included:

- a. Change of applicant's name.
- b. Change of applicant's address.
- c. Change of model name.
- d. Delete the other information.
- e. Delete the manufacturer.
- f. Delete the factory.

2. This test report is to supersede No. SDFS2311007061FR test report which was issued on Nov.24, 2023. And the original test reports (paper and electronic) are invalid.

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



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