

Test Report

No. AJFS1910010752FF

Date: DEC.24, 2019

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LUCENT LIGHTING LIMITED

1345 HIGH ROAD, LONDON, N20 9HR

The following sample(s) 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. results apply to the sample as received.

Sample Description: LUCENT LIGHTING DOWNLIGHTS GROUP 1

Color: BLACK&WHITE

Density: VARIOUS

Thickness: 100mm

Composition: SILICONE LEDS, PLASTIC LENSES, STAINLESS STEEL CLIPS, PLASTIC COVERS, ALUMINIUM HEATSINKS, ALUMINIUM FIXTURES, STEEL FIXTURES, INTUMESCENT MATERIAL PLATES AND RINGS

Style/Item No.: L18-FT1

Supplier: LUCENT LIGHTING LIMITED

Manufacturer: LUCENT LIGHTING LIMITED

Buyer: LUCENT LIGHTING LIMITED

Country of Destination: UNITED KINGDOM

End use application: LUCENT LIGHTING LIMITED

Test Requested:

Fire Resistance Test of the Loadbearing Timber Floor Assembly Sample, Incorporating Nine Fire Rated Downlights Fittings, in accordance with EN 1365-2-2014 Fire resistance tests for loadbearing elements Part 2: Floors and roofs.

Test Results: -- See attached sheet --

Test Period:

Sample Receiving Date : OCT.28, 2019

Test Performing Date : OCT.28, 2019 TO NOV.27, 2019

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



Allen Zou
Lab Manager



AJFS1910010752FF



SGS-CSTC Inspection & Testing Services Co., Ltd.
Anji Branch Hardwares

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1. Introduction

Determine the fire resistance performance of 4500mmx3500mm floor sample in accordance with EN 1365-2:2014 Fire resistance tests for loadbearing elements Part 2: Floors and roofs. And the Conditions of Acceptance in accordance with EN 1363-1:2012 Fire resistance tests Part 1: General Requirements. The specified side of submitted sample was exposed to elevated temperatures as dictated by the EN 1363-1 time-temperature curve for a period of 61 minutes under loaded condition.

This test report should be read in conjunction with EN 1365-2:2014 Fire resistance tests for loadbearing elements Part 2: Floors and roofs and with EN 1363-1:2012 Fire resistance tests Part 1: General Requirements.

The test was conducted on NOV.27, 2019.

2. Test Sample

The timber floor had overall nominal dimensions of 4500 mm long by 3500 mm wide and comprised softwood timber joists at 562.5 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 12.5 mm thick Knauf plasterboard, the layers were screw fixed to the underside of the floor joists.

One layer of 50mm thick rock wool was filled within the cavity between the floor and the ceiling.

The floor supported an evenly distributed load of 23 kg/m².

The ceiling incorporated nine downlights referenced as follows:

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Specimen No.	Product name	Product code	Description
A	Pinhole Edge 90 Accent Trim	91413-A-LED-9000-PBZ	Dimensions: Ø92mm×H98mm, adjustable downlight, Ø83mm ceiling cut-out
B	Square Edge 90 Fixed Trimless	81433-F-LED-8000-PCZ-SQ	Dimensions: L90mm×W90mm×H100mm, fixed downlight, Ø83mm ceiling cut-out
C	Plus Mini Wallwash Trim	750+LED-TR-WW	Dimensions: Ø90mm×H103mm, wallwash downlight, Ø83mm ceiling cut-out
D	Plus Mini Accent Trim	753+A-LED-TR	Dimensions: Ø90mm×H105mm, adjustable downlight, Ø83mm ceiling cut-out
E	Square Edge 90 Accent Trim	81433-A-LED-8000-PBZ-SQ	Dimensions: L90mm×W90mm×H100mm, adjustable downlight, Ø83mm ceiling cut-out
F	Square Edge 90 Accent Trimless	81433-A-LED-8000-PCZ-SQ	Dimensions: L90mm×W90mm×H100mm, adjustable downlight, Ø83mm ceiling cut-out
G	Minitrim Wallwash	860-LED-WW	Dimensions: Ø86mm×H109mm, wallwash downlight, Ø81mm ceiling cut-out
H	Plus Mini Fixed Trimless	750+F-LED-TL	Dimensions: Ø80mm×H100mm, fixed downlight, Ø83mm ceiling cut-out
I	Square Edge 90 Fixed Trim	81433-F-LED-8000-PBZ-SQ	Dimensions: L90mm×W90mm×H100mm, fixed downlight, Ø83mm ceiling cut-out

To be continued...



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Schedule of Components

(Refer to Figures 1 to 10)

Timber floor assembly (items 1 to 4)

1. Floor Joists

Materials : Softwood Timber Joists
Over section size : 50 mm thick by 200 mm deep
Density of Joist : About 600 kg/m³
Joint centres : 562.5 mm

2. Floor boards

Manufacturer : Egger
Materials : Egger Chipboard, E1
Thick : 1 layer, 18 mm thick
Size : 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

Manufacturer : Knauf
Materials : Gypsum plasterboard
Thick : 2 layers, each 12.5 mm thick
Size : About 720 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.

To be continued....



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4. Rockwool

Materials : Rockwool
Thick : 50mm
Size : About 68 kg/m³
Fixing method : Filled into the cavity between the floor and the ceiling

5. Specimen "A"

Product Name : Fire-rated Pinhole Edge 90 Accent Trim
Product Code : 91413-A-LED-9000-PBZ
Type : Adjustable downlight
Overall dimensions and construction : See Figure 2
Hole size in ceiling boards : 83 mm diameter

6. Specimen "B"

Product Name : Fire-rated Square Edge 90 Fixed Trimless
Product Code : 81433-F-LED-8000-PCZ-SQ
Type : Fixed downlight
Overall dimensions and construction : See Figure 3
Hole size in ceiling boards : 83 mm diameter

7. Specimen "C"

Product Name : Fire-rated Plus Mini Wallwash Trim
Product Code : 750+LED-TR-WW
Type : Wallwash downlight
Overall dimensions and construction : See Figure 4
Hole size in ceiling boards : 83 mm diameter

To be continued....



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8. Specimen "D"

Product Name : Fire-rated Plus Mini Accent Trim
 Product Code : 753+A-LED-TR
 Type : Adjustable downlight
 Overall dimensions and construction : See Figure 5
 Hole size in ceiling boards : 83 mm diameter

9. Specimen "E"

Product Name : Fire-rated Square Edge 90 Accent Trim
 Product Code : 81433-A-LED-8000-PBZ-SQ
 Type : Adjustable downlight
 Overall dimensions and construction : See Figure 6
 Hole size in ceiling boards : 83 mm diameter

10. Specimen "F"

Product Name : Fire-rated Square Edge 90 Accent Trimless
 Product Code : 81433-A-LED-8000-PCZ-SQ
 Type : Adjustable downlight
 Overall dimensions and construction : See Figure 7
 Hole size in ceiling boards : 83 mm diameter

11. Specimen "G"

Product Name : Fire-rated Minitrim Wallwash
 Product Code : 860-LED-WW
 Type : Wallwash downlight
 Overall dimensions and construction : See Figure 8
 Hole size in ceiling boards : 81 mm diameter

To be continued....



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12. Specimen "H"

Product Name : Fire-rated Plus Mini Fixed Trimless
 Product Code : 750+F-LED-TL
 Type : Fixed downlight
 Overall dimensions and construction : See Figure 9
 Hole size in ceiling boards : 83 mm diameter

13. Specimen "I"

Product Name : Fire-rated Square Edge 90 Fixed Trim
 Product Code : 81433-F-LED-8000-PBZ-SQ
 Type : Fixed downlight
 Overall dimensions and construction : See Figure 10
 Hole size in ceiling boards : 83 mm diameter

The preparation of tested assembly took place in the test laboratory over a total combined time of 3 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 12°C to 19°C and 43% to 71% respectively. The tested sample was supported on the horizontal furnace with an opening of the 3000mm by 4200mm. 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 (plasterboard ceiling) towards to the heating conditions of the test.

To be continued....

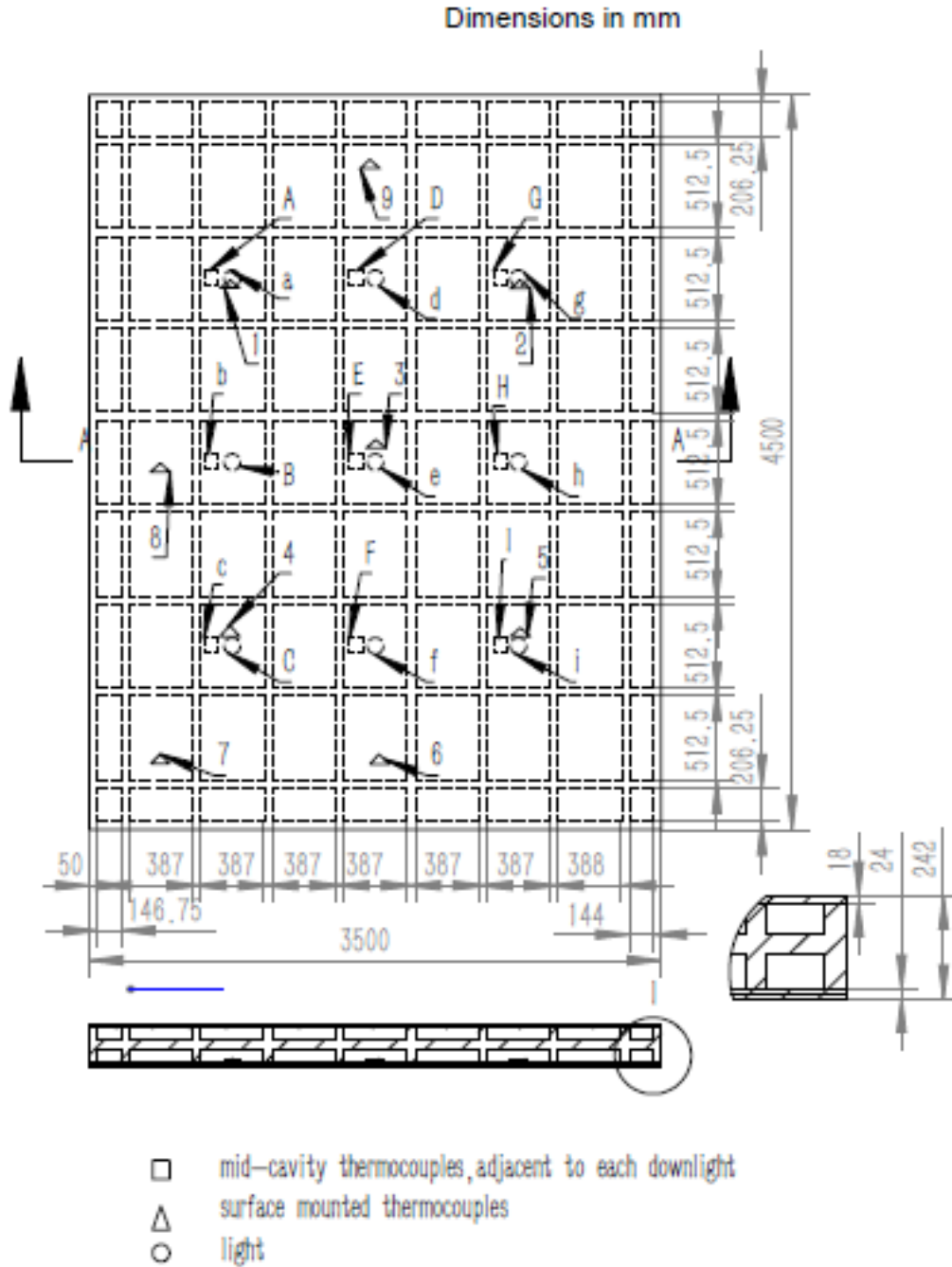


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Figure 1 - General Plan of Test Sample from Unexposed Face and Thermocouple Positions



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Figure 2 - Details of Specimen 'A' Downlight (Pinhole Edge 90 Accent Trim)

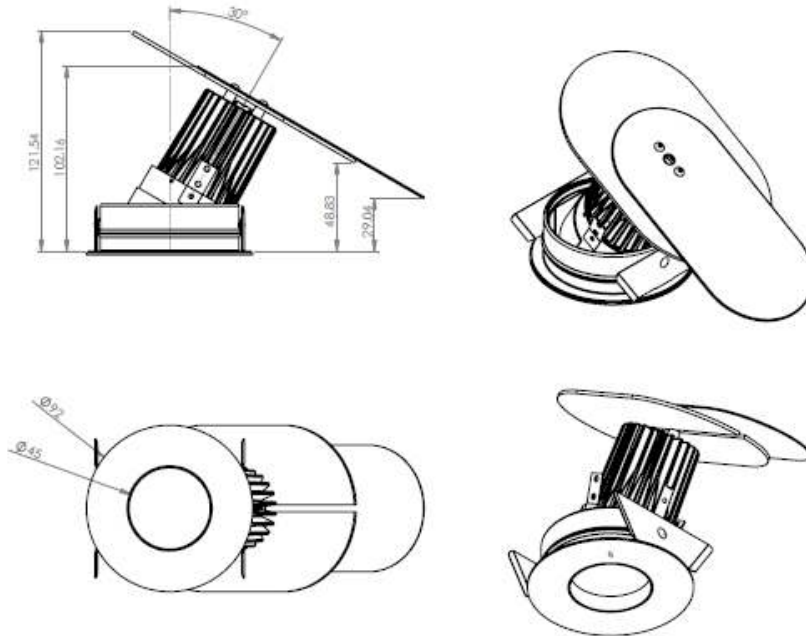
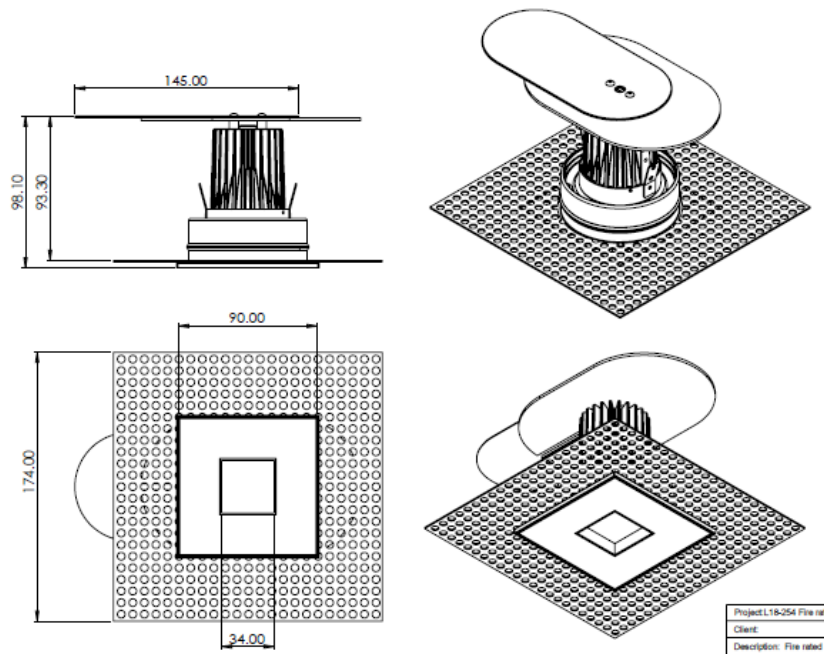


Figure 3 - Details of Specimen 'B' Downlight (Square Edge 90 Fixed Trimless)



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Figure 4 - Details of Specimen 'C' Downlight (Plus Mini Wallwash Trim)

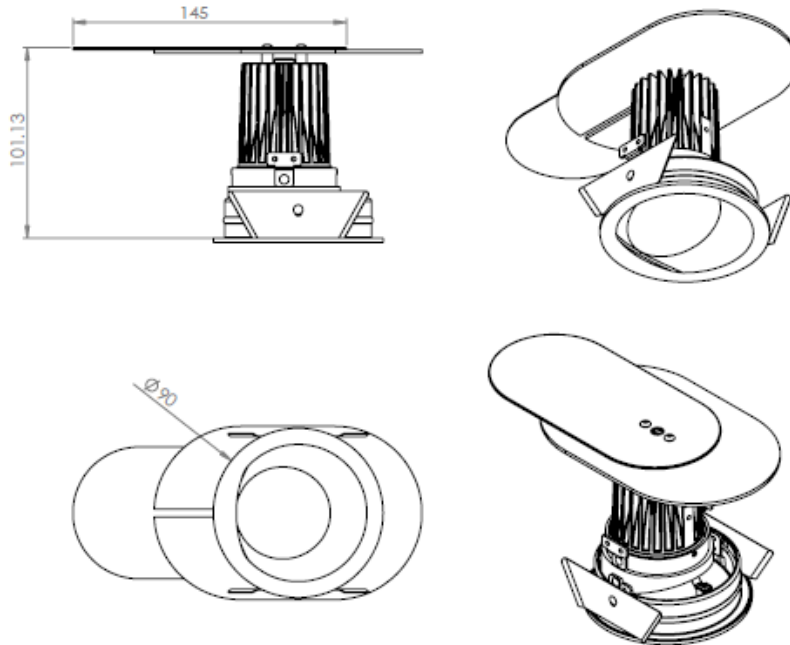
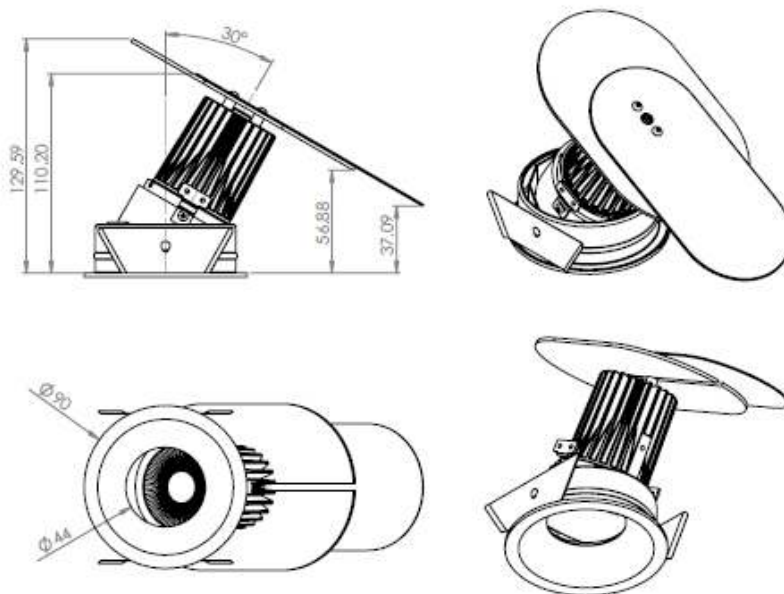


Figure 5 - Details of Specimen 'D' Downlight (Plus Mini Accent Trim)



To be continued....

Figure 6 - Details of Specimen 'E' Downlight (Square Edge 90 Accent Trim)

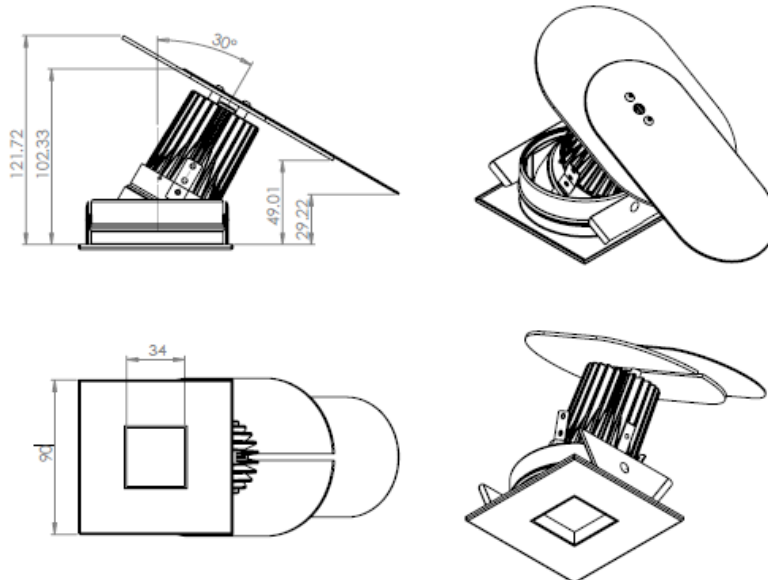
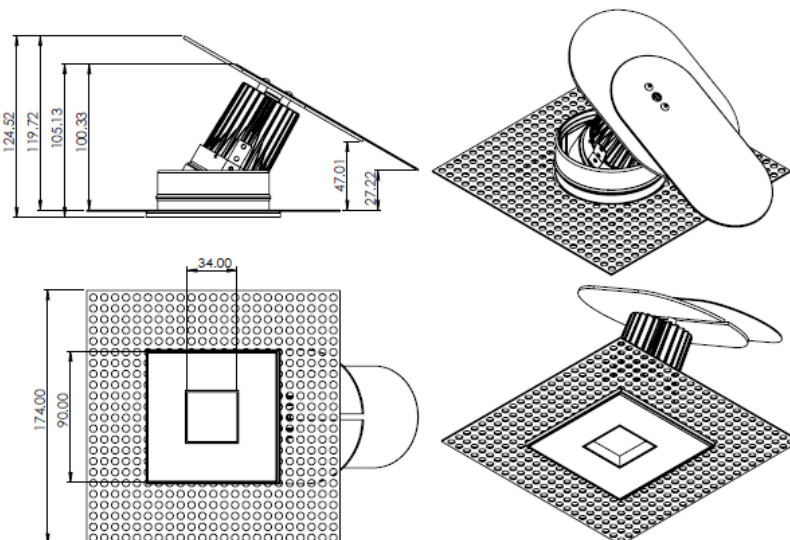


Figure 7 - Details of Specimen 'F' Downlight (Square Edge 90 Accent Trimless)



To be continued....

Figure 8 - Details of Specimen 'G' Downlight (Minitrim Wallwash)

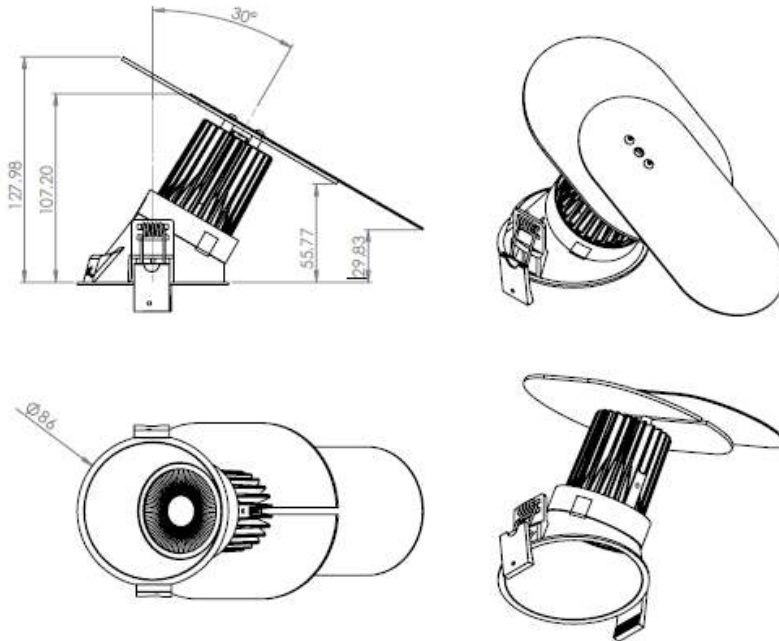
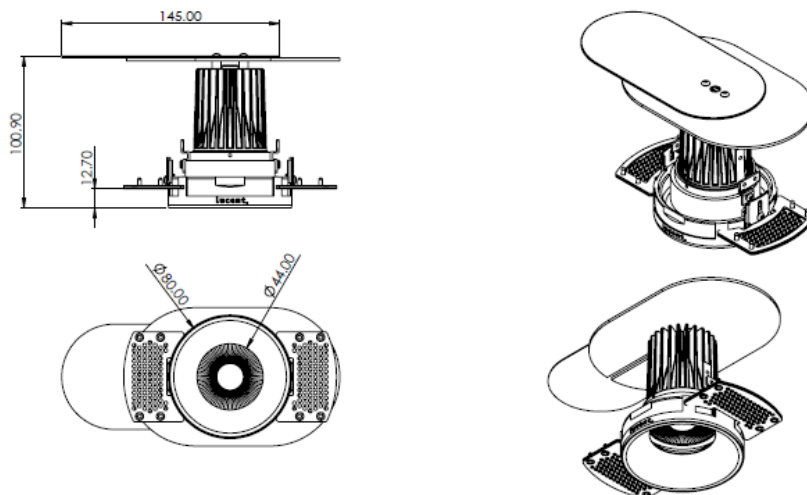


Figure 9 - Details of Specimen 'H' Downlight (Plus Mini Fixed Trimless)



To be continued....

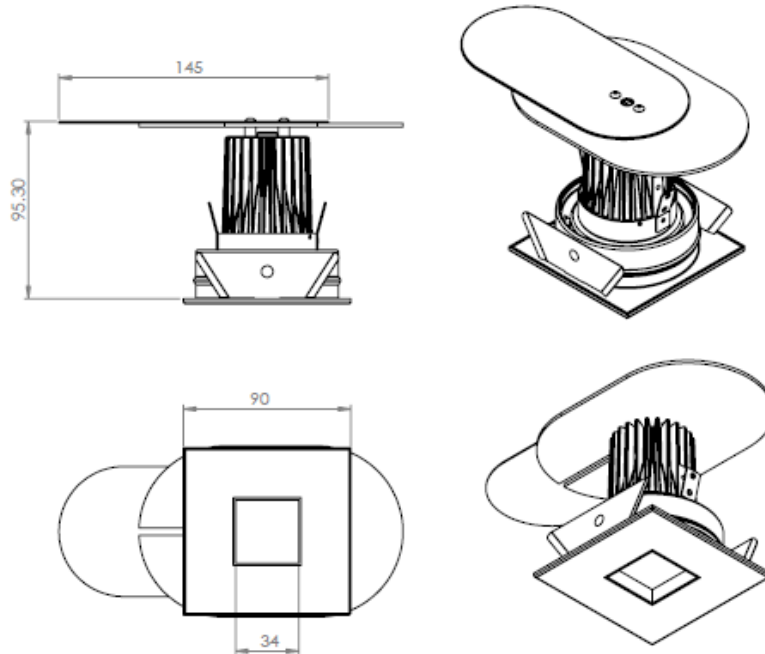
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Figure 10 - Details of Specimen 'I' Downlight (Square Edge 90 Fixed Trim)



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3. Test Procedure

The test was conducted in accordance with the procedure specified in EN 1363-1:2012, Clause 10.

The furnace was controlled so that the mean furnace temperature, deviation from the mean furnace temperature and uniformity of temperature distribution complied with the requirement of EN 1365-2. Fourteen furnace thermocouples were used to determine the mean furnace temperature.

The temperature of the unexposed face was monitored by means of 9 thermocouples fixed to the unexposed surface of the sample. No.1-5 thermocouples will be used to calculate the mean temperature rise of the sample. No.1-9 thermocouples were used to determine the maximum temperature of the unexposed surface of the sample.

The locations and reference numbers of the various unexposed surface and internal thermocouples are shown in Figure 1.

A roving thermocouple was available to measure temperatures on the unexposed surface of the sample at any position which might appear to be hotter than the temperatures indicated by the fixed thermocouples.

Cotton pads and gap gauges were available to evaluate the compliance with the integrity criterion of the sample to hot gases. The occurrence of sustaining flaming on the unexposed surface was also checked to determine compliance with the integrity criterion.

Based on the requested of client, the total load about 363 kg was applied by weights (Frame and Weights), uniformly distributed over the unexposed surface of test sample.

The deflection, D, was measured from the commencement of heating by distance meter recorded at least one reading per minute, which placed in the centre of the unexposed surface of the tested sample.

During the test, the temperatures, pressures and deflection were continuously monitored and were recorded at one minute intervals.

To be continued....



4. 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 11. The mean temperatures recorded within the furnace were shown in Table 1.

b) The mean and maximum temperature rise of the unexposed surface of the sample was shown in Figure 12. The individual temperatures recorded on the unexposed surface of the sample were shown in Table 2.

c) The individual temperatures recorded adjacent to the downlight fittings at the mid-height of the cavity were shown in Table 3.

d) The deflection of the centre of the unexposed surface of the tested sample was shown in Figure 13. The individual deflections recorded on the unexposed surface of the sample were shown in Table 4.

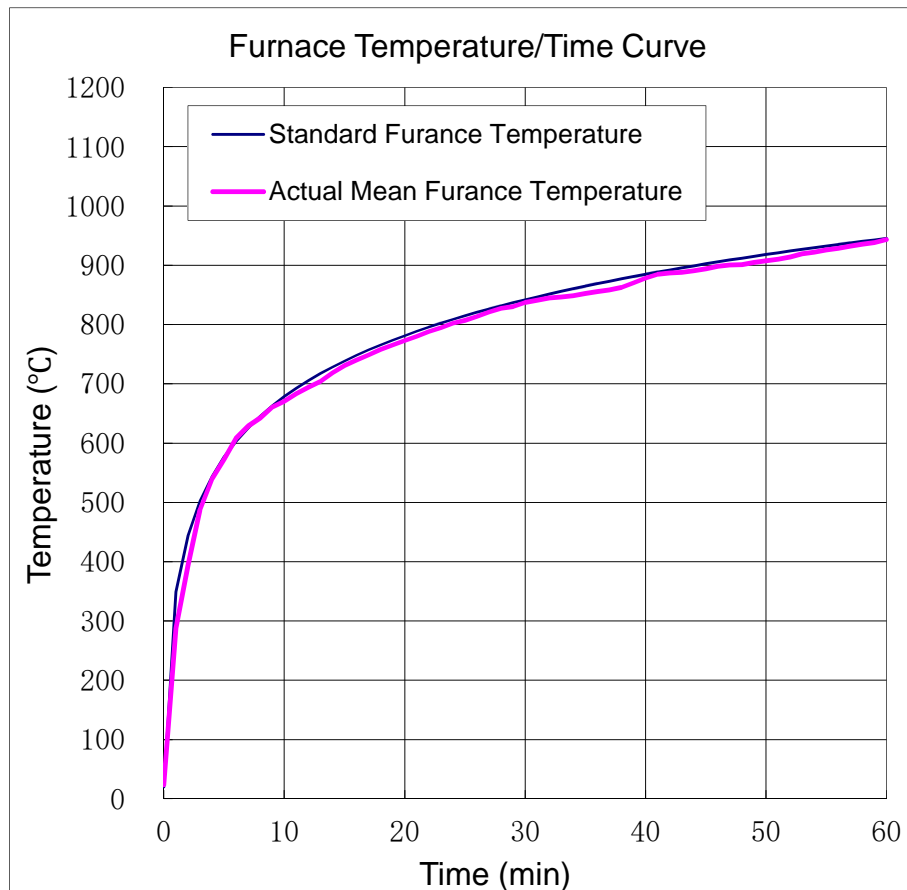
The ambient air temperature in the vicinity of the test construction was 14°C at the start of the test with variation of 0°C during the test.

A summary of the observations made on the general behavior of the sample was given in Table 5.

To be continued....

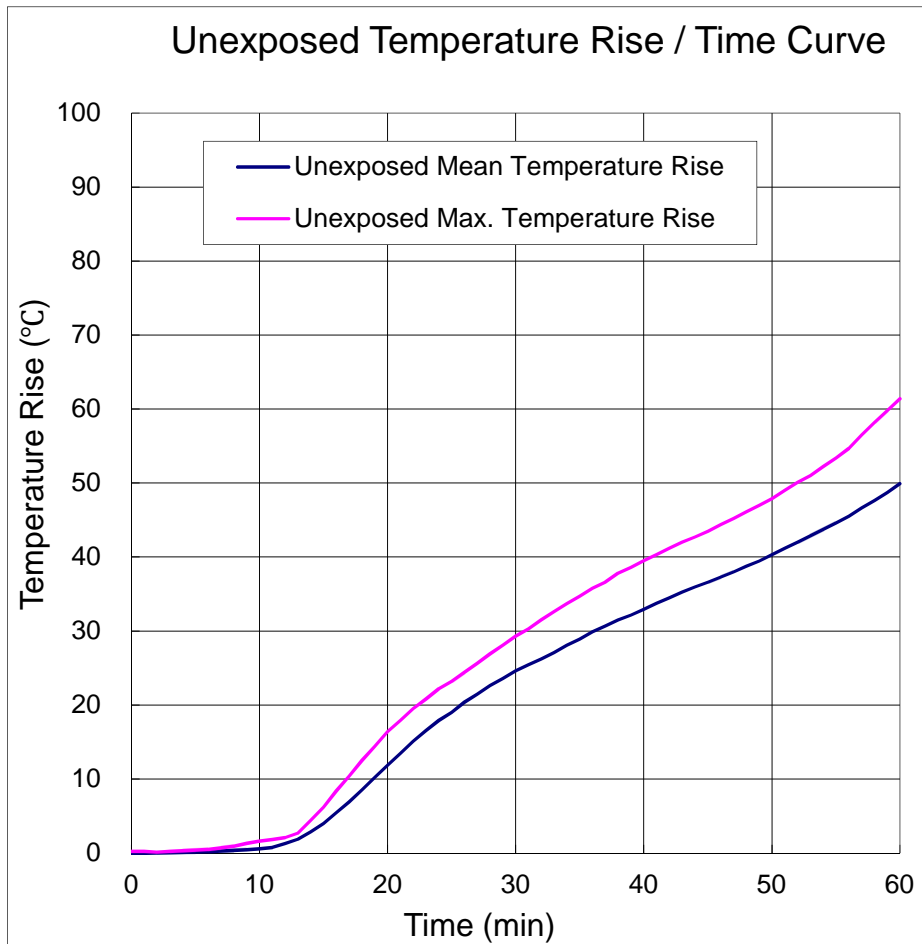


Figure 11 - Standard and actual Mean Furnace Temperature/Time Curve



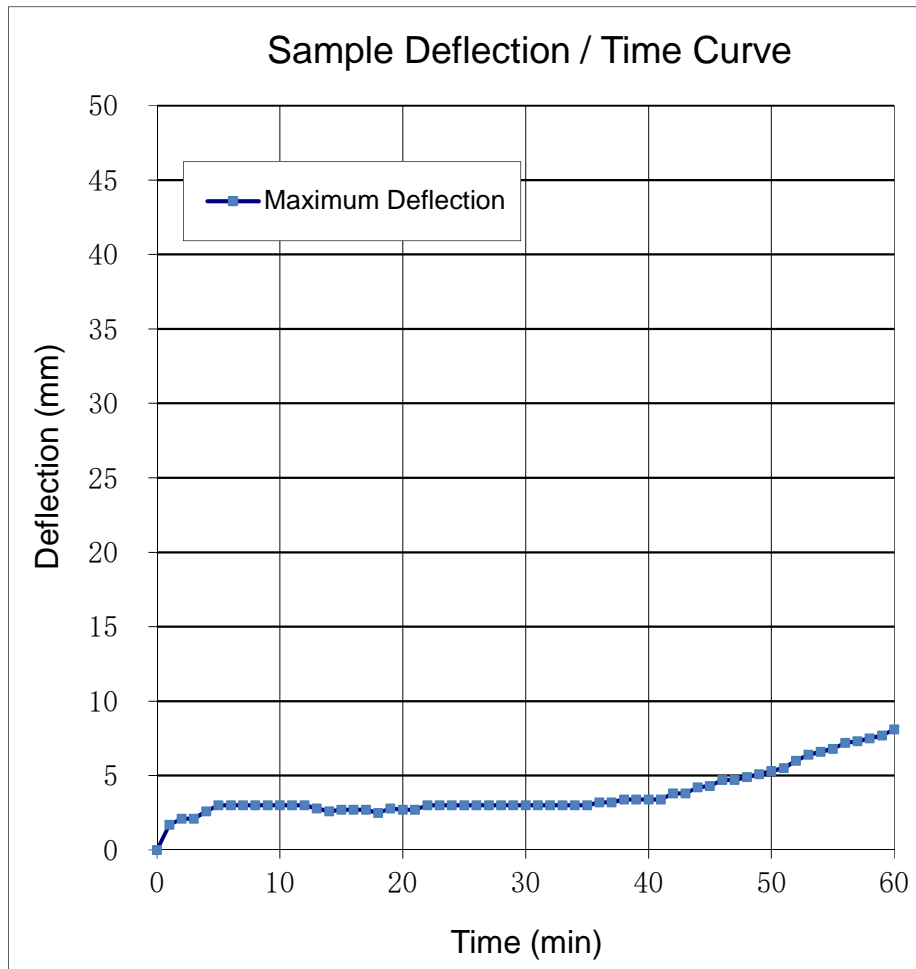
To be continued....

Figure 12 - Unexposed Surface Mean and Maximum Temperature Rise / Time Curve



To be continued....

Figure 13 - Sample Deflection (At the centre of the sample)



To be continued...

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Table 1 Average Temperatures Recorded within the Furnace

Time (min)	EN 1363-1 Std Average (°C)	Furnace Average (°C)	Error (%)	Time (min)	EN 1363-1 Std Average (°C)	Furnace Average (°C)	Error (%)
0	20.0	23.5		31	837.6	841.3	-1.4%
1	349.2	287.9	-17.6%	32	842.1	845.1	-1.4%
2	444.5	394.6	-15.6%	33	846.5	846.5	-1.4%
3	502.3	487.2	-11.8%	34	851.7	848.7	-1.4%
4	543.9	539.6	-8.5%	35	856.5	852.5	-1.4%
5	576.4	572.3	-6.4%	36	860.6	855.6	-1.4%
6	603.1	608.3	-5.0%	37	865.1	858.4	-1.4%
7	625.8	628.8	-3.9%	38	868.6	862.7	-1.4%
8	645.5	642.4	-3.3%	39	872.3	870.3	-1.4%
9	662.8	660.9	-2.9%	40	876.5	878.3	-1.4%
10	678.4	670.7	-2.6%	41	880.8	884.7	-1.4%
11	692.5	683.3	-2.5%	42	883.8	886.8	-1.3%
12	705.4	694.1	-2.4%	43	886.1	888.1	-1.3%
13	717.3	703.8	-2.3%	44	890.9	890.8	-1.3%
14	728.3	718.7	-2.2%	45	893.6	893.8	-1.3%
15	738.6	731.1	-2.2%	46	896.3	898.3	-1.3%
16	748.2	740.3	-2.1%	47	900.1	900.6	-1.3%
17	757.2	748.9	-2.0%	48	902.4	901.1	-1.3%
18	765.7	757.8	-1.9%	49	904.5	904.9	-1.3%
19	773.7	765.4	-1.9%	50	907.6	907.6	-1.3%
20	781.4	772.8	-1.8%	51	909.2	910.2	-1.3%
21	788.6	780.3	-1.8%	52	912.2	914.2	-1.3%
22	795.6	787.9	-1.8%	53	915.3	919.3	-1.3%
23	802.2	794.7	-1.7%	54	918.7	922.0	-1.2%
24	808.5	802.2	-1.7%	55	920.9	925.9	-1.2%
25	814.6	807.1	-1.6%	56	923.4	928.4	-1.2%
26	820.5	813.6	-1.6%	57	926.3	932.3	-1.2%
27	826.1	820.9	-1.6%	58	928.3	935.3	-1.2%
28	831.5	826.8	-1.5%	59	932.3	938.3	-1.2%
29	836.7	830.5	-1.5%	60	936.2	943.2	-1.2%
30	841.8	837.1	-1.4%				

To be continued....



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Table 2 Individual Temperatures on the Unexposed Surface of the Sample

Time (min)	Thermocouples temperatures (°C)								
	1#	2#	3#	4#	5#	6#	7#	8#	9#
0	12.6	13.1	13.0	12.9	13.2	12.2	12.7	12.6	12.6
1	12.7	13.1	13.0	12.9	13.2	12.2	12.7	12.7	12.6
2	12.8	13.1	13.1	12.9	13.1	12.2	12.7	12.7	12.6
3	12.8	13.1	13.2	13.0	13.1	12.2	12.7	12.7	12.6
4	12.9	13.3	13.2	13.0	13.0	12.3	12.8	12.8	12.7
5	12.9	13.4	13.3	13.0	13.0	12.3	12.8	12.8	12.8
6	12.9	13.5	13.5	13.1	12.9	12.4	12.9	12.9	12.8
7	13.0	13.6	13.7	13.2	12.8	12.4	12.9	13.0	12.9
8	13.1	13.8	13.9	13.2	12.7	12.5	13.0	13.0	12.9
9	13.1	13.8	14.3	13.2	12.7	12.6	13.0	13.1	13.0
10	13.2	13.9	14.6	13.2	12.9	12.6	13.0	13.2	13.1
11	13.2	14.1	14.8	13.2	13.3	12.6	13.2	13.2	13.1
12	13.2	14.6	15.1	13.9	14.4	12.7	13.2	13.2	13.2
13	13.2	15.1	15.5	14.8	15.7	12.8	13.2	13.2	13.2
14	13.3	16.0	16.6	16.0	17.4	12.8	13.3	13.2	13.2
15	13.9	17.0	17.5	17.4	19.2	12.9	13.4	13.3	13.3
16	14.7	18.3	18.7	19.2	21.4	12.9	13.4	13.7	13.4
17	15.6	19.5	19.9	21.0	23.4	12.9	13.5	14.1	13.8
18	16.9	21.1	21.1	23.1	25.5	12.9	13.8	14.5	14.2
19	18.1	22.6	22.9	25.0	27.4	13.2	14.0	14.9	14.7
20	19.6	24.3	23.7	27.2	29.4	13.5	14.4	15.4	15.3
21	20.9	25.8	25.6	29.0	30.9	13.8	14.7	15.7	15.9
22	22.4	27.5	27.3	30.9	32.5	14.2	15.0	16.2	16.5
23	23.8	28.9	28.5	32.6	33.8	14.6	15.5	16.7	17.2
24	25.3	30.6	29.4	34.1	35.2	15.1	15.9	17.3	17.9
25	26.5	31.9	29.8	35.6	36.2	15.6	16.3	17.6	18.7
26	27.9	33.7	30.8	37.2	37.4	16.2	16.8	18.3	19.6
27	29.1	35.2	31.2	38.6	38.2	16.6	17.5	19.0	20.4
28	30.2	36.7	32.5	39.9	38.9	17.2	18.1	19.7	21.2
29	31.2	38.2	32.7	41.1	39.7	17.7	18.6	20.4	22.1
30	32.2	39.7	33.3	42.3	40.5	18.4	19.2	21.1	22.9

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Time (min)	Thermocouples temperatures (°C)								
	1#	2#	3#	4#	5#	6#	7#	8#	9#
31	32.9	40.9	33.8	43.3	41.3	19.0	19.8	21.6	23.7
32	33.8	42.6	33.5	44.5	41.8	19.8	20.6	22.3	24.7
33	34.3	44.1	34.1	45.6	42.4	20.5	21.3	22.9	25.5
34	35.2	45.7	34.7	46.7	43.0	21.3	22.1	24.0	26.6
35	36.0	47.1	35.3	47.7	43.5	22.0	23.0	24.7	27.6
36	36.9	48.4	36.1	48.8	44.3	22.8	23.8	25.8	28.8
37	37.7	49.4	36.9	49.6	44.7	23.6	24.9	26.8	29.9
38	38.3	50.3	37.7	50.8	45.3	24.6	26.2	27.6	30.9
39	39.0	51.1	38.5	51.6	45.6	25.4	26.9	28.8	31.9
40	39.7	51.9	39.6	52.5	46.0	26.3	28.2	30.1	33.1
41	40.6	52.6	40.8	53.3	46.5	27.1	29.6	31.1	34.2
42	41.2	53.2	42.0	54.2	46.9	28.0	30.8	32.0	35.4
43	41.9	53.6	43.3	55.0	47.4	28.9	32.2	33.1	36.7
44	42.6	54.0	44.5	55.7	47.9	30.0	33.5	34.0	38.0
45	43.0	54.4	45.8	56.5	48.3	31.1	34.8	35.2	38.9
46	43.5	54.7	47.0	57.4	48.8	32.3	36.2	36.3	39.9
47	44.0	55.2	48.2	58.2	49.4	33.6	37.8	37.2	40.9
48	44.4	55.6	49.7	59.1	50.0	34.9	38.9	38.1	41.8
49	44.9	56.0	50.9	60.0	50.5	36.2	40.2	39.0	43.2
50	45.6	56.6	52.4	60.9	51.2	37.4	41.5	40.2	44.4
51	46.2	57.0	53.9	62.0	51.8	38.8	42.9	41.1	45.7
52	46.7	57.5	55.5	63.1	52.3	40.2	44.1	42.5	46.1
53	47.1	58.1	57.3	64.0	52.9	41.7	45.6	43.8	47.4
54	47.8	58.5	58.8	65.2	53.5	43.1	47.1	45.1	48.9
55	48.4	59.2	60.0	66.4	54.1	44.9	48.7	46.4	50.2
56	48.9	59.8	61.4	67.7	54.8	46.7	50.1	47.7	51.6
57	49.5	60.6	63.0	69.5	55.5	49.0	51.6	48.9	53.1
58	49.9	61.3	64.6	71.2	56.2	50.8	53.2	50.1	54.9
59	50.6	61.9	66.2	72.8	57.1	53.6	54.8	51.5	57.1
60	51.5	62.6	67.9	74.4	58.2	56.1	56.9	52.9	59.6

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Table 3 Individual Temperatures Recorded Adjacent to
the Downlight Fittings at Mid-height of the Cavity and Additional (Client's requirement)

Time (min)	Thermocouples temperatures (°C)								
	A	B	C	D	E	F	G	H	I
0	23.9	21.4	24.7	28.1	24.7	25.3	24.3	26.2	23.6
1	37.1	23.4	26.7	31.4	29.9	33.9	24.4	30.4	23.6
2	34.3	31.4	30.8	37.4	32.6	42.5	27.5	33.4	26.2
3	39.5	40.0	38.2	42.9	41.4	52.5	32.6	44.7	30.7
4	46.8	42.4	43.7	58.0	46.7	62.0	39.7	57.0	36.3
5	59.2	43.5	48.4	70.5	51.1	66.4	44.3	66.1	41.6
6	73.1	46.8	51.7	78.7	59.6	74.8	52.2	73.0	55.7
7	80.3	47.9	58.6	82.0	68.4	80.5	58.6	78.4	64.4
8	83.4	65.9	64.1	84.4	77.7	86.5	65.4	80.9	71.8
9	86.9	75.8	69.8	84.7	88.8	90.8	71.8	82.7	78.5
10	89.2	83.9	74.4	85.1	90.3	93.9	75.5	87.1	83.3
11	90.3	89.1	80.2	87.0	92.4	95.2	79.3	91.3	86.2
12	91.9	92.4	84.3	89.0	91.0	96.7	83.8	95.8	87.4
13	93.1	93.8	89.8	89.2	91.8	103.7	87.4	98.2	89.6
14	95.3	92.9	90.9	91.9	92.8	107.7	91.2	101.0	91.3
15	96.6	91.8	93.4	94.9	93.3	110.5	95.5	102.8	93.4
16	97.8	90.4	96.2	99.9	96.1	114.3	98.1	109.0	96.2
17	99.5	90.7	97.7	105.4	99.2	118.3	103.5	116.4	98.5
18	101.6	88.7	99.0	115.4	103.2	123.5	108.6	122.3	100.6
19	103.4	86.3	100.6	126.9	108.4	131.9	112.2	126.8	103.1
20	106.8	87.1	103.1	128.5	115.0	135.7	117.4	134.2	107.2
21	109.7	88.2	106.4	129.5	121.3	141.9	123.6	138.7	112.2
22	113.4	88.4	108.9	134.2	129.7	147.9	130.5	143.9	116.6
23	115.5	87.5	112.3	140.2	137.8	151.2	136.1	153.7	121.1
24	108.6	86.8	115.8	150.2	147.6	155.6	143.8	156.9	126.7
25	111.3	85.2	118.7	161.3	157.9	159.8	148.6	156.2	133.9
26	114.2	85.4	122.4	173.4	169.4	163.2	153.3	161.3	139.2
27	119.3	86.1	126.7	184.3	179.0	166.1	158.6	155.1	144.7
28	122.4	86.2	130.3	186.0	194.9	168.2	163.3	143.5	149.6
29	126.7	88.4	135.5	190.9	205.1	171.0	170.7	147.3	155.5
30	130.7	93.2	140.6	190.9	213.3	174.6	177.9	156.2	166.3

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Time (min)	Thermocouples temperatures (°C)								
	A	B	C	D	E	F	G	H	I
31	139.4	98.1	144.8	183.9	217.9	176.9	182.3	167.1	174.8
32	145.7	102.4	151.6	169.4	224.5	176.9	188.1	174.1	180.7
33	150.3	105.2	157.8	166.2	229.1	176.8	193.6	174.3	185.4
34	155.6	107.5	162.5	165.8	233.6	178.6	202.8	173.8	190.1
35	159.3	109.2	167.7	163.8	237.4	180.7	210.3	176.1	196.5
36	164.0	111.3	174.8	166.4	240.4	183.9	217.6	181.6	202.6
37	169.8	113.3	181.1	170.5	244.5	189.0	224.7	187.7	210.1
38	175.5	116.1	188.9	179.0	250.8	195.7	233.3	192.6	217.7
39	181.1	120.2	195.6	189.0	257.1	200.0	242.2	202.3	226.6
40	186.5	126.0	202.3	193.8	265.8	208.2	255.5	209.7	235.8
41	192.3	132.5	209.7	204.8	274.6	219.5	265.7	220.9	244.2
42	198.8	142.8	221.2	224.4	285.3	234.4	277.6	232.9	252.8
43	208.6	153.7	236.8	238.9	294.5	249.3	290.4	243.3	260.8
44	219.2	167.5	340.1	253.6	307.5	262.9	303.8	260.6	269.9
45	230.4	180.3	256.6	265.0	321.8	274.5	315.2	274.6	277.5
46	242.9	195.7	269.9	278.6	335.1	287.1	328.1	290.3	286.4
47	256.0	209.1	284.4	289.1	356.8	297.8	339.4	302.4	295.1
48	273.1	224.3	297.3	301.9	369.2	319.5	353.6	319.4	306.5
49	290.9	237.3	303.1	313.5	382.9	362.5	367.2	330.0	317.8
50	308.7	252.8	320.6	333.9	396.0	393.1	388.5	345.3	331.4
51	325.5	266.1	334.8	382.1	408.3	421.5	405.5	362.7	345.6
52	348.2	280.2	358.7	406.5	414.0	443.3	425.8	377.4	358.4
53	360.6	294.0	373.5	420.4	430.6	460.2	437.1	392.5	373.5
54	375.2	311.9	397.7	442.5	449.9	482.4	450.4	408.5	389.1
55	389.5	328.9	416.2	461.5	461.2	505.1	463.5	431.3	406.7
56	406.2	346.1	439.4	487.4	479.9	539.7	478.0	457.8	432.6
57	429.7	376.9	472.7	510.4	506.5	561.2	499.6	487.2	452.7
58	457.9	404.2	500.8	552.9	533.8	599.5	523.2	514.5	483.8
59	480.7	443.3	542.5	594.5	576.9	633.2	551.1	542.1	523.9
60	515.6	479.6	577.6	634.5	622.7	679.2	586.6	592.2	572.1

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Table 4 Deflection Recorded on the Unexposed Surface of the Sample

Time (min)	Deflection (mm)	Rate of Deflection (mm/min)	Time (min)	Deflection (mm)	Rate of Deflection (mm/min)
0	0.0	---	31	3.0	0.0
1	1.7	1.7	32	3.0	0.0
2	2.1	0.4	33	3.0	0.0
3	2.1	0.0	34	3.0	0.0
4	2.6	0.5	35	3.0	0.0
5	3.0	0.4	36	3.2	0.2
6	3.0	0.0	37	3.2	0.0
7	3.0	0.0	38	3.4	0.2
8	3.0	0.0	39	3.4	0.0
9	3.0	0.0	40	3.4	0.0
10	3.0	0.0	41	3.4	0.0
11	3.0	0.0	42	3.8	0.4
12	3.0	0.0	43	3.8	0.0
13	2.8	-0.2	44	4.2	0.4
14	2.6	-0.2	45	4.3	0.1
15	2.7	0.1	46	4.7	0.4
16	2.7	0.0	47	4.7	0.0
17	2.7	0.0	48	4.9	0.2
18	2.5	-0.2	49	5.1	0.2
19	2.8	0.3	50	5.3	0.2
20	2.7	-0.1	51	5.5	0.2
21	2.7	0.0	52	6.0	0.5
22	3.0	0.3	53	6.4	0.4
23	3.0	0.0	54	6.6	0.2
24	3.0	0.0	55	6.8	0.2
25	3.0	0.0	56	7.2	0.4
26	3.0	0.0	57	7.3	0.1
27	3.0	0.0	58	7.5	0.2
28	3.0	0.0	59	7.7	0.2
29	3.0	0.0	60	8.1	0.4
30	3.0	0.0			

To be continued....



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Table 5 Observations Made during the Test

Time (min:sec)	Observations
00:00	Furnace Fired
02:55	Slight smoke released from the joints between the joists and flooring
05:30	The downlights surface was carbonized and discolored.
12:30	Some parts melted and fell from the downlights.
13:20	The outer layer plasterboard cracked.
22:30	The outer layer plasterboard cracked seriously.
32:50	The outer layer plasterboard began to fall off.
38:40	The outer layer plasterboard on exposed face detached increased, and some flame was issued from the joints at the centre of flooring.
46:30	The second layer plasterboard began to fall off.
55:15	Big flame was issued from the joints at the centre of flooring internally.
60:00	The sample maintained the loadbearing capacity and kept integrity and insulation.
61:00	Test was terminated as per client requirement.

5. Performance Criteria (EN1363-1:2012, Clause 11)

The performance of the sample was assessed against the criteria for integrity and insulation in accordance with EN1363-1:2012, Clause 11.

Loadbearing Capability:

Failure to support the load is deemed to have occurred when both of the following criteria have been exceeded.

Limiting deflection, $=L^2/400d = 181.2 \text{ mm}$,

And,

Limiting rate of deflection, $=L^2/9000d = 8.07 \text{ mm/min}$,

Where,

L is the clear span of the test sample, in millimetres; L=4200 mm

d is the distance from the extreme fibre of the design compression zone to the extreme fibre of the design tensile zone of the structural section, in millimetres. d=243 mm

To be continued....



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Integrity: Failure is deemed to occur:

- a) When collapse occurs; or
- b) When sustained flaming for not less than 10s on the unexposed surface occurs; or
- c) For situations where the cotton pad is suitable, when flames and/or hot gases cause flaming or glowing of the cotton fibre pad; or
- d) For situations where the cotton pad is not suitable, when either:
 - i) the 6 mm diameter gap gauge can penetrate a through gap such that the end of the gauge projects into the furnace and the gauge can be moved in the gap for a distance of at least 150 mm; or
 - ii) the 25 mm diameter gap gauge can penetrate a through gap such that the end of the gauge projects into the furnace.

Insulation: Failure is deemed to occur:

- a) When the mean unexposed surface temperature rise more than 140 K; or
- b) When the temperature rise recorded at any position on the unexposed surface, either by a fixed thermocouple or by the roving thermocouple is in excess of 180 K; or
- c) When integrity failure occurs.

6. Conclusion

The tested sample has been subjected to a fire resistance test in accordance with EN 1365-2:2014 Fire resistance tests for loadbearing elements Part 2: Floors and roofs.

During the heating period of 60 minutes, the maximum deflection was 8.1 mm and the maximum rate of deflection was 1.7 mm/min. No collapse and sustained flaming were occurred. The mean temperature rise of unexposed surface was 49.9°C and the maximum temperature rise was 61.4°C.

The fire resistance performance of the sample was judged against the criteria for insulation and integrity as specified in EN 1363-1:2012 clause 11, and the sample satisfied the performance requirements for the following period:

Loadbearing capacity	Integrity	Insulation
≥ 60 minutes	≥ 60 minutes	≥ 60 minutes

The test was terminated after a period of 61 minutes as requested by the test client.

To be continued....



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7. 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 wall construction.

The sample was asymmetrical and was tested such that the specified surface towards the heating conditions of the test. The test result may not be appropriate to situation other side towards the heating conditions.

Appendix - Photographs



Photo 1: Front view of specimen A



Photo 2: Side view of specimen A

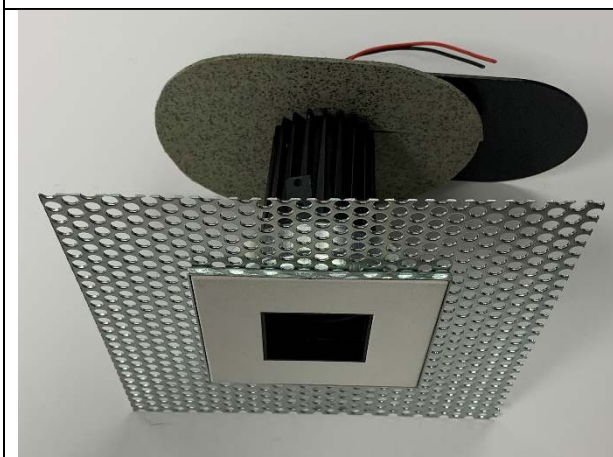


Photo 3: Front view of specimen B

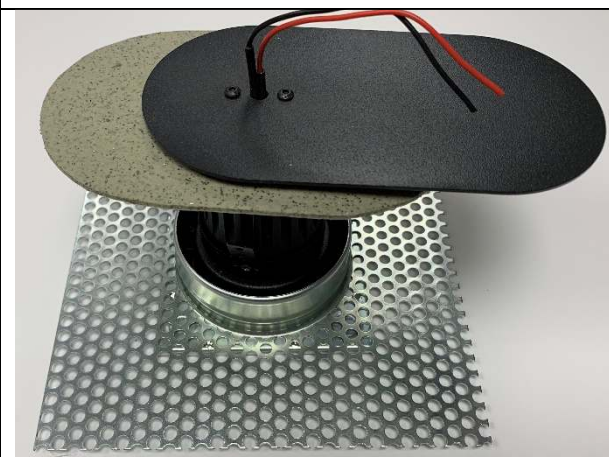


Photo 4: Side view of specimen B

To be continued....



Photo 5: Front view of specimen C



Photo 6: Side view of specimen C



Photo 7: Front view of specimen D



Photo 8: Side view of specimen D

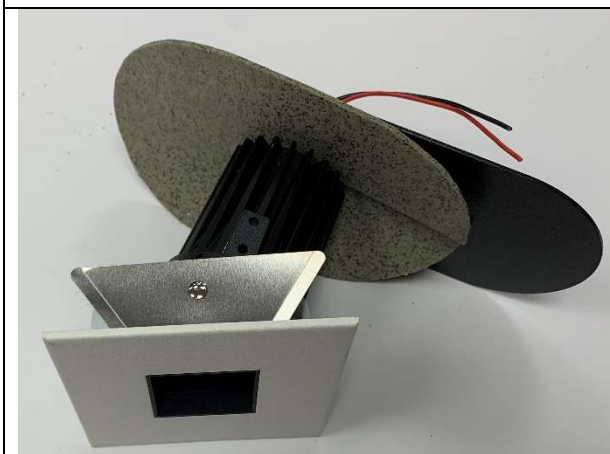


Photo 9: Front view of specimen E



Photo 10: Side view of specimen E

To be continued....

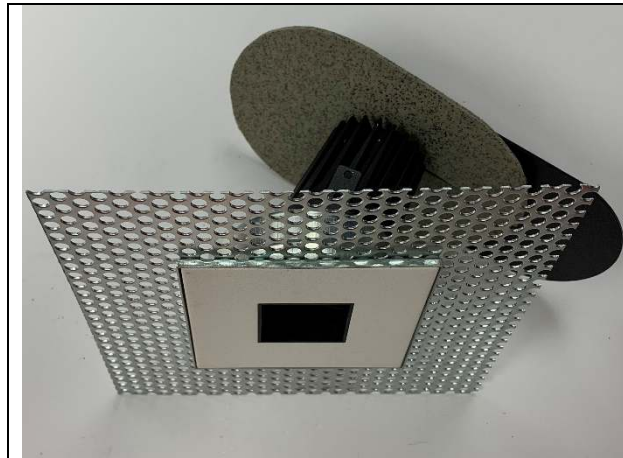


Photo 11: Front view of specimen F

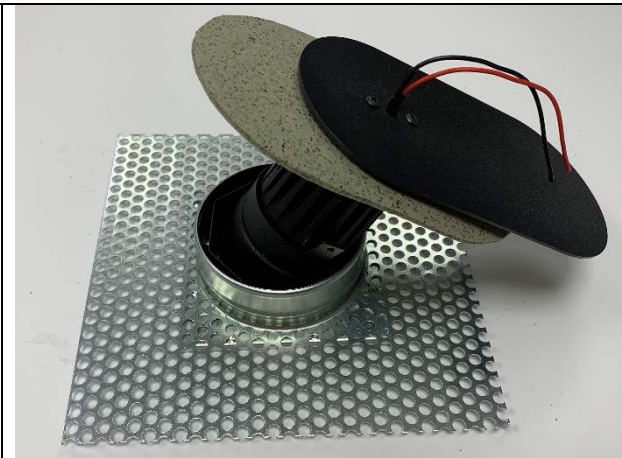


Photo 12: Side view of specimen F



Photo 13: Front view of specimen G



Photo 14: Side view of specimen G



Photo 15: Front view of specimen H



Photo 16: Side view of specimen H

To be continued....



Photo 17: Front view of specimen I



Photo 18: Side view of specimen I



Photo 19: The unexposed face before the test



Photo 20: The exposed face before the test



Photo 21: The unexposed face of sample
(Test start)



Photo 22: The exposed face of sample
(After test duration of 13 & 20 minutes)

To be continued...



Photo 23: The unexposed face of sample
(After test duration of 20 minutes)



Photo 24: The exposed face of sample
(After test duration of 32 & 43 minutes)



Photo 25: The unexposed face of sample
(After test duration of 30 minutes)



Photo 26: The exposed face of sample
(After test duration of 51 & 56 minutes)



Photo 27: The unexposed face of sample
(After test duration of 50 minutes)



Photo 28: The unexposed face of sample
(After test)

SGS authenticate the photo on original report only

End of Report