

No. : XMIN2208008556CM

Date : Oct 14, 2022



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CUSTOMER NAME: JCC LIGHTING PRODUCTS CHICHESTER BUSINESS PARK, CITY FIELDS WAY, TANGMERE, ADDRESS: CHICHESTER, WEST SUSSEX, PO20 2FT

LED FIRE RATED DOWNLIGHT Sample Name •

Above information and sample(s) was/were submitted and confirmed by the client. SGS, however, assumes no responsibility to verify the accuracy, adequacy and completeness of the sample information provided by client.

Date of Receipt	:	Aug 30, 2022
Testing Start Date	:	Aug 30, 2022
Testing End Date	:	Sep 20, 2022
Test result(s)	:	For further details, please refer to the following page(s) (Unless otherwise stated the results shown in this test report refer only to the sample(s) tested)

Signed for SGS-CSTC Standards Technical Services Co., Ltd Xiamen Branch **Testing Center**

Bryan Hong Authorized signatory



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SUMMARY

Test Results:

To determine the fire resistance of a timber floor assembly protected by a plasterboard ceiling designed to provide 60 minutes fire resistance, incorporating 12 LED FIRE RATED DOWNLIGHT fittings, when tested in accordance with BS EN 1365-2: 2014, "Fire resistance tests for loadbearing elements Part 2: Floors and roofs".

Loadbearing Capacity:		60min (No failure)
Integrity:	sustained flaming:	60min (No failure)
	Gap gauge:	60min (No failure)
	Cotton pad:	60min (No failure)
Insulation:		60min (No failure)

Note: According to sponsor requirements, the test was discontinued after a period of 60 minutes.

Summary of Tested Assembly

The timber floor assembly had overall nominal dimensions of 4800 mm long by 3230 mm wide and comprised solid wood joists at 600mm centres. The depth of the solid wood joist was 195mm. The upper surface of the floor comprised nominally 22mm thick T&G chipboard and screwed fixed to the upside of the floor joists. The floor assembly was protected on its underside by a direct fixed ceiling, formed from two layer of 15mm thick Standard Gypsum Boards, the ceiling was screw fixed to the underside of the floor joists.

The floor supported a uniformly distributed load of 1080N/m². This load value was specified by the sponsor of the test.



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The ceiling incorporated 12 LED FIRE RATED DOWNLIGHT fittings referenced as follows:

Test Ref.	Product Name	Reference
A	Fireguard Next Generation	JC010023 WH/CH/BN/BLK
В	V50	JC1017
С	Fireguard Next Generation	JC010035 WH/CH/BN/BLK
D	V50	JC1002 with JC1004
E	V50	JC1010
F	V50	JC1013
G	V50	JC1015
Н	Fireguard Next Generation	JC010028 WH/CH/BN/BLK
I	V50	JC1019
J	V50	JC1026
К	V50	JC 1001 with JC1003
L	Fireguard Next Generation	JC010033 WH/CH/BN/BLK



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SCHEDULE OF COMPONENTS (Refer to Figures 1 to 14) (All values are nominal unless stated otherwise, all other details are as stated by the sponsor) ltem Description 1. Floor Joists Material : Solid Timber Joist, softwood Size : 195mm deep; 45mm thick Centres: : 600mm 2.Floorboards Material : Egger T&G chipboard Thickness : 1 No. layer, 22mm thick Fixing method : All board screw fixed to all joists using drywall steel screws, at 200 mm centers along joists and 150 mm centers along perimeter of floor. 3.Ceiling boards Material : Knauf Standard Gypsum Board Thickness : 2 No. layer, each 15mm thick Fixing method : All board screw fixed to all joists using Drywall steel screws at max.230mm c/c. The joints between the boards were filled with joint filler with was also used to cover the heads of the screws. 4. End Joists Material : Glulam Size : 195mm high x 50mm thick : Fitted across the ends of the joists and through screwed to each joist. Fixing method 5. Noggings : Glulam Material : 195mm high x 45mm thick, 45mm highx45mm thick Size Fixing method : Fitted between the joists.



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6.Specimen 'A'	
Product Name	: Fireguard Next Generation
Reference	: JC010023 WH/CH/BN/BLK Fireguard Tilt Downlight
Manufacturer	: JCC Lighting Products
Туре	: Fireguard Recessed Downlight
Overall dimensions and construction	: 101mm (H) x 100mm (୭), See figure 3
Hole size in ceiling boards	: 84mm ©
Materials	i: Casing: Mild Steel
	ii: Cover: Aluminum
	iii: Spring clip: Steel
	iv: Connection Block: Polycarbonate Housing
	Approx. weight: 0.261 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting Products
	ii: Type: Mild Steel 'can'
	iii: Thickness: 0.8mm
	iv: Location: Main chassis
7.Specimen 'B'	
Product Name	: V50
Reference	: V50 Slim Converter 72-165mm
Manufacturer	: JCC Lighting products
Туре	: JC1017
Overall dimensions and construction	: 63mm H x 170mm W, See figure 4
Hole size in ceiling boards	: 150mm
Materials	i: Casing: Mild Steel (can)
	ii: Cover: Aluminum (bezel)
	iii: Spring clip: Sprung Steel
	iv: Connection Block: Polycarbonate (housing)
	Approx. weight: 0.30 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting products
	ii: Type: Mild Steel (can)
	iii: Thickness: 1.1mm (painted)



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	iv: Location: Main chassis
Details of expanding material:	i: Manufacturer: JCC Lighting products
	ii: Type: Disc
	iii: Material: Graphite based intumescent
	iv: Thickness: 0.89mm
	v: Location: Top of steel can
8.Specimen 'C'	
Product Name	: Fireguard Next Generation
Reference	: JC010035 WH/CH/BN/BLK Fireguard Downlight
Manufacturer	: JCC Lighting Products
Туре	: Fireguard IP65 Recessed Downlight
Overall dimensions and construction	: 98mm (H) x 94mm (෧), See figure 5
Hole size in ceiling boards	: 80mm ©
Materials	i: Casing: Mild Steel
	ii: Cover: Aluminum
	iii: Spring clip: Steel
	iv: Connection Block: Polycarbonate Housing
	Approx. weight: 0.261 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting Products
	ii: Type: Mild Steel 'can'
	iii: Thickness: 0.8mm
	iv: Location: Main chassis
9.Specimen 'D'	
Product Name	: V50
Reference	: V50 Converter plate for use with JC1002
Manufacturer	: JCC Lighting Products
Туре	: JC1002 with JC1004
Overall dimensions and construction	: 46mm H x 170mm W, See figure 6
Hole size in ceiling boards	: 140mm
Materials	i: Casing: Mild Steel (can)
	ii: Cover: Aluminum (bezel)



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	iii: Spring clip: Sprung Steel
	Approx. weight: 0.32 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting Products
	ii: Type: Intumescent Material
	iii: Thickness: 0.89mm
	iv: Location: Main chassis
Details of expanding material:	i: Manufacturer: JCC Lighting Products
	ii: Type: Disc
	iii: Material: Graphite based intumescent
	iv: Thickness: 0.89mm
	v: Location: Rear of main chassis
10.Specimen 'E'	
Product Name	: V50
Reference	: V50 Fire rated downlight
Manufacturer	: JCC Lighting products
Туре	: JC1010
Overall dimensions and construction	: 54mm H x 84mm W, See figure 7
Hole size in ceiling boards	: 70mm
Materials	i: Casing: Mild Steel (can)
	ii: Cover: Aluminum (bezel)
	iii: Spring clip: Sprung Steel
	iv: Connection Block: Polycarbonate (housing)
	Approx. weight: 0.29 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting products
	ii: Type: Mild Steel (can)
	iii: Thickness: 1.1mm (painted)
	iv: Location: Main chassis
Details of expanding material:	i: Manufacturer: JCC Lighting products
	ii: Type: Disc
	iii: Material: Graphite based intumescent
	iv: Thickness: 0.89mm



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v: Location: Top of steel can

11.Specimen 'F'	
Product Name	: V50
Reference	: V50 Slim 72-100mm Converter Bezel
Manufacturer	: JCC Lighting products
Туре	: JC1013
Overall dimensions and construction	: 54mm H x 100mm W, See figure 8
Hole size in ceiling boards	: 80mm
Materials	i: Casing: Mild Steel (can)
	ii: Cover: Aluminum (bezel)
	iii: Spring clip: Sprung Steel
	iv: Connection Block: Polycarbonate (housing)
	Approx. weight: 0.32 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting products
	ii: Type: Mild Steel (can)
	iii: Thickness: 1.1mm (painted)
	iv: Location: Main chassis
Details of Expanding material	i: Manufacturer: JCC Lighting products
	ii: Type: Disc
	iii: Material: Graphite based intumescent
	iv: Thickness: 0.89mm
	v: Location: Top of steel can
12.Specimen 'G'	
Product Name	: V50
Reference	: V50 Pro Retrofit 135mm Firerated LED Downlight
Manufacturer	: JCC Lighting Products
Туре	: JC1015
Overall dimensions and construction	: 54mm H x 135mm W, See figure 9
Hole size in ceiling boards	: 100mm
Materials	i: Casing: Mild Steel (can)
	ii: Cover: Aluminum (bezel)



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	iii: Spring clip: Sprung Steel
	iv: Connection Block: Polycarbonate (housing)
	Approx. weight: 0.37 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting products
	ii: Type: Mild Steel (can)
	iii: Thickness: 1.1mm (painted)
	iv: Location: Main chassis
Details of Expanding material	i: Manufacturer: JCC Lighting products
	ii: Type: Disc
	iii: Material: Graphite based intumescent
	iv: Thickness: 0.89mm
	v: Location: Top of steel can
13.Specimen 'H'	
Product Name	: Fireguard Next Generation
Reference	: JC010028 WH/CH/BN/BLK
Manufacturer	: JCC Lighting Products
Туре	: Fireguard IP65 Recessed Downlight
Overall dimensions and construction	: 85mm (H) x 86mm (୭), See figure 10
Hole size in ceiling boards	: 74mm ©
Materials	i: Casing: Mild Steel
	ii: Cover: Aluminum
	iii: Spring clip: Steel
	iv: Connection Block: Polycarbonate Housing
	Approx. weight: 0.2 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting Products
	ii: Type: Mild Steel 'can'
	iii: Thickness: 0.8mm
	iv: Location: Main chassis
14.Specimen 'l'	
Product Name	: V50
Reference	: V50 Slim Anti-Glade LED Downlight



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Manufacturer	: JCC Lighting Products
Туре	: JC1019
Overall dimensions and construction	: 107mm H x 85mm W, See figure 11
Hole size in ceiling boards	: 80mm
Materials	i: Casing: Mild Steel (can)
	ii: Cover: Aluminum (bezel)
	iii: Spring clip: Sprung Steel
	iv: Connection Block: Polycarbonate (housing)
	Approx. weight: 0.32 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting products
	ii: Type: Mild Steel (can)
	iii: Thickness: 1.1mm (painted)
	iv: Location: Main chassis
Details of Expanding material	i: Manufacturer: JCC Lighting products
	ii: Type: Disc
	iii: Material: Graphite based intumescent
	iv: Thickness: 0.89mm
	v: Location: Top of steel can
15.Specimen 'J'	
Product Name	: V50
Reference	: V50 Pro Tilt Fire-rated LED Downlight
Manufacturer	: JCC Lighting Products
Туре	: JC1026
Overall dimensions and construction	: 63mm H x 100mm W, See figure 12
Hole size in ceiling boards	: 80mm
Materials	i: Casing: Mild Steel (can)
	ii: Cover: Aluminum (bezel)
	iii: Spring clip: Sprung Steel
	iv: Connection Block: Polycarbonate (housing)
	Approx. weight: 0.36 Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting products



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	ii: Type: Mild Steel (can)
	iii: Thickness: 1.1mm (painted)
	iv: Location: Main chassis
Details of Expanding material	i: Manufacturer: JCC Lighting products
	ii: Type: Disc
	iii: Material: Graphite based intumescent
	iv: Thickness: 0.89mm
	v: Location: Top of steel can
16.Specimen 'K'	
Product Name	: V50
Reference	: V50 Converter plate for use with JC1001
Manufacturer	: JCC Lighting Products
Туре	: JC 1001 with JC1003
Overall dimensions and construction	: 46mm H x 170mm W, See figure 13
Hole size in ceiling boards	: 115mm
Materials	i: Casing: Mild Steel (can)
	ii: Cover: Aluminum (bezel)
	iii: Spring clip: Sprung Steel
	Approx. weight: 0.29Kg
Details of fireproof material:	i: Manufacturer: JCC Lighting Products
	ii: Type: Intumescent Material
	iii: Thickness: 0.89mm
	iv: Location: Main chassis
Details of Expanding material	i: Manufacturer: JCC Lighting Products
	ii: Type: Disc
	iii: Material: Graphite based intumescent
	iv: Thickness: 0.89mm
	v: Location: Rear of main chassis
17.Specimen 'L'	
Product Name	: Fireguard Next Generation
Reference	: JC010033 WH/CH/BN/BLK Fireguard Downlight





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Manufacturer Type Overall dimensions and construction Hole size in ceiling boards Materials

Details of fireproof material:



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TEST PROCEDURE

The ambient temperature at the beginning of the test was 28 °C.

The furnace temperature was measured by means of nine thermocouples distributed evenly in the furnace, and each thermocouple shall be (100 ± 50) mm from the nearest point of exposed face of the specimen. The furnace was controlled so that the mean of the nine thermocouple readings followed as closely as possible the time/temperature relationship specified Clause 5.1 of BS EN 1363-1: 2020. The pressure distribution over the height of a furnace is mainly influenced by natural buoyancy effect of the gases. For the purpose of controlling the pressure, it can be assumed that the pressure gradient will be approximately 8.5 Pa per meter height of furnace. The furnace shall be operated so that the neutral pressure plane (a pressure of zero) is established 500 mm above nominal floor level. Thermocouples were provided to monitor the unexposed surface of the floor assembly and the output of all instrumentation was recorded at no less than one-minute intervals. The locations and reference numbers of the various unexposed surface and internal thermocouples are shown in Figure 1..

TEST DATA AND INFORMATION

Details of the specimen structure are shown in Figure 1 to 14. The photographs of the LED FIRE RATED DOWNLIGHT are shown in Photo 1 to 24

Photographs of the test are shown in Photos 25 to 34. A summary of the observations made on the general behavior of the specimen is given in Appendix 1.

The mean furnace temperature records are shown in Appendix 2, and the actual time-temperature curve of furnace in relation to the specified time-temperature curve is shown in Figure 15. The unexposed surface temperature records are shown in Appendix 3, and the individual temperatures recorded adjacent to the spotlight fittings at mid-height of the cavity are shown in Appendix 4. The unexposed surface maximum and mean temperature curve are shown in Figure 16. The vertical deflection at the centre of the floor assembly was continuously measured during the test, and the data records are given in Appendix 5. The deflection curve is shown in Figure 17.



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PERFORMANCE CRITERIA

This test was according to performance criteria which specified in BS EN 1365-2: 2014, section 11 to determine the loadbearing capacity, integrity and insulation of the specimen:

Loadbearing capacity:

The following definitions are used for flexural loaded elements:

Limiting deflection

$$D_{\text{limit}} = \frac{L^2}{400d} mm$$

Limiting rate of deflection

$$\left(\frac{\mathrm{dD}}{\mathrm{dt}}\right)_{\mathrm{limit}} = \frac{L^2}{9000d} \, mm \,/\,\mathrm{min}$$

Where

L is the clear span of the test specimen, in millimetres;

d is the distance from the extreme fibre of the cold design compression zone to the extreme fibre of the cold design tension zone of the structural section, in millimetres.

For the purposes of this standard, failure to support the test load is deemed to have occurred when:

(i) measured deflection $\ge 1,5 \times D_{\text{limit}}$; or (ii) D_{limit} and $(dD/dt)_{\text{limit}}$ are exceeded In this test:

Limiting deflection
$$D_{limit} = \frac{(4500)^2}{400 \times 247} = 205(mm)$$
,Limiting rate of deflection $(\frac{dD}{dt})_{limit} = \frac{(4500)^2}{9000 \times 247} = 9.1(mm/min)$ 1.5 X limiting deflection $1.5D_{limit} = 1.5 \times 205 = 307.5(mm)$ Integrity:

These are the times in completed minutes for which the test specimen continues to maintain its separating function during the test without.

a) causing the ignition of cotton pad.

b) permitting the 6 mm diameter gap gauge to be passed through the test specimen, such that the gauge projects into the furnace, and can be moved a distance of 150 mm along the gap; orc) permitting the 25 mm diameter gap gauge to be passed through the test specimen such that the gauge projects into the furnace.

d) resulting in sustained flaming.





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Insulation:

This is the time in completed minutes for which the test specimen continues to maintain its separating function during the test without developing temperatures on its unexposed surface which:

a) increase the average temperature above the initial average temperature by more than 140°C; or

b) increase at any location (including the roving thermocouple) above the initial average temperature by more than 180°C.

CONCLUSIONS

A specimen of a timber floor assembly protected by a plasterboard ceiling incorporating 12 LED FIRE RATED DOWNLIGHT fittings has been subjected to a fire resistance test in accordance with BS EN 1365-2: 2014.

At the heating period of 60 minutes, the maximum deflection was 60.5mm; the rate of deflection was 3.4 mm/min. The loadbearing capacity was satisfied.

At the heating period of 60 minutes, there was no collapse of the specimen, no sustained flaming on the unexposed surface and no loss of impermeability. The integrity requirement was satisfied. At the heating period of 60 minutes, the mean temperature rise of the unexposed face was 36.0° C, the max temperature rise of the unexposed face was 41.9° C. The insulation requirement was satisfied. The floor assembles satisfied the performance requirements specified in Clause 7 of BS EN 1365-2: 2014, for the following periods:

Loadbearing Capac	city:	60min (No failure)
Integrity:	sustained flaming:	60min (No failure)
	Gap gauge:	60min (No failure)
	Cotton pad:	60min (No failure)
Insulation:		60min (No failure)

Note:

According to sponsor requirements, the test was discontinued after a period of 60 minutes.



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TEST PHOTOGRAPHS





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Photo 19: Front view of specimen 'J'



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after test duration of 18 minutes, some lamp cups fell out from the light can.

Photo 30: The unexposed surface of the specimen after test duration of 30 minutes.

Photo 31: The exposed surface of the specimen after test duration of 33 minutes, large areas of coating of the plasterboard ceiling fell away.

Photo 32: The unexposed surface of the specimen after test duration of 45 minutes.

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Photo 33: The unexposed surface of the specimen after test duration of 60 minutes.

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Photo 34: The unexposed surface of the specimen after the test.

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DETAILS OF TEST SPECIMEN

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Figure 15 - Furnace Temperature Curve

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Figure 16 - Unexposed Face Mean and Maximum Temperature Curve

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Figure 17 - Deflection Curve

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Time (min)	Observation (All observations are from the exposed face unless noted otherwise)			
0	Test started.			
2	Some lens of specimen was fusing.			
10	Coating of the plasterboard ceiling fell away.			
18	Some lamp cup fell out from the light can.			
31	Large areas of coating of the plasterboard ceiling fell away.			
47	The plasterboard ceiling started to sag slightly and joints began to open.			
60	Test terminated at sponsor's request.			

Appendix 1 – Test Observations

Time min	Specified Furnace Temperature $^{\circ}C$	Actual Furnace Mean Temperature
0	20	34
5	576	522
10	678	681
15	739	741
20	781	786
25	815	810
30	842	827
35	865	852
40	885	871
45	902	900
50	918	913
55	932	932
60	945	960

Appendix 2 – Furnace Temperature Records

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Time min	TC No.201 ℃	TC No.202 ℃	TC No.203 ℃	TC No.204 ℃	TC No.205 ℃	TC No.206 ℃	TC No.207 ℃	TC No.208 ℃	TC No.209 ℃	Mean Temp ℃	Mean Temp Rise °C	Max Temp Rise ℃
0	31.4	31.6	31.5	31.5	31.3	31.1	31.4	31.9	31.4	31.4	0.0	0.4
5	31.6	31.8	31.6	31.7	31.4	31.2	31.5	32.0	31.6	31.6	0.2	0.5
10	31.7	31.9	31.6	31.7	31.5	31.3	31.7	32.2	31.7	31.7	0.3	0.7
15	33.8	33.6	33.3	34.0	31.9	32.0	33.4	34.6	34.2	33.3	1.9	3.2
20	39.4	38.0	38.2	38.3	33.6	34.9	37.8	40.4	39.7	37.5	6.1	9.0
25	46.6	43.2	45.9	44.0	36.9	39.7	44.5	47.6	46.4	43.3	11.9	16.2
30	52.0	48.1	52.5	49.1	41.6	46.7	49.3	53.3	51.8	48.6	17.2	21.9
35	55.9	52.8	58.2	52.0	46.0	53.0	53.2	57.5	55.8	53.0	21.5	26.7
40	59.5	57.0	63.7	56.4	50.5	60.5	57.5	61.5	59.7	57.4	26.0	32.3
45	62.3	60.2	67.1	60.6	54.3	60.9	60.9	65.3	63.0	60.9	29.4	35.6
50	63.8	62.3	69.3	63.4	58.1	61.5	63.6	67.7	65.8	63.4	31.9	37.8
55	64.9	64.1	70.9	65.6	61.7	62.9	65.9	69.7	68.3	65.4	34.0	39.5
60	66.7	65.4	73.4	68.3	63.7	63.7	68.8	72.6	69.4	67.5	36.0	41.9

Appendix 3 – Unexposed Surface Temperature Records

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TC TC TC TC тс TC TC TC TC TC TC тс No. Time 210 211 212 213 214 215 216 217 218 219 220 221 min °C 0 34.9 34.4 34.2 34.8 34.4 35.0 34.3 34.4 34.6 34.7 34.7 33.2 38.9 40.3 38.6 35.3 38.3 51.4 38.5 37.7 38.5 5 40.6 46.2 37.3 10 72.4 88.1 70.7 78.6 44.4 69.4 88.4 83.1 69.9 70.2 68.9 74.1 15 92.9 98.4 85.7 84.8 107.0 104.4 84.2 84.7 88.2 96.2 55.0 86.5 20 99.2 105.2 92.7 103.7 58.4 95.4 109.6 114.1 90.1 94.3 94.9 94.8 100.1 98.4 25 109.8 106.0 60.3 99.4 112.1 118.7 91.8 97.0 98.8 96.8 100.7 101.1 100.5 30 111.9 109.1 61.3 102.1 112.6 120.6 94.2 100.1 101.6 103.1 114.9 102.7 111.2 63.0 102.9 113.1 123.4 94.8 103.0 102.4 103.3 35 40 104.8 117.8 104.4 112.4 63.4 104.8 113.6 124.6 95.3 106.1 104.0 106.7 45 107.2 120.9 105.7 114.3 65.4 105.8 114.2 126.2 96.7 106.8 105.3 109.8 50 108.0 125.3 105.9 115.4 66.9 106.8 117.5 129.8 97.4 107.3 106.5 111.2 55 109.2 133.0 106.3 116.2 79.4 110.3 119.2 133.1 98.5 108.2 109.7 113.9 60 112.2 150.5 107.1 117.8 87.2 117.6 130.3 135.5 103.9 117.2 117.3 122.1

Appendix 4 - Individual Temperatures Recorded Adjacent to the Spotlight Fittings at Mid-height of the

Cavity

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Time min	Central Vertical Deflection mm	Rate of Deflection mm/min			
0	0.0	0.0			
5	5.7	0.6			
10	8.8	0.5			
15	10.1	0.2			
20	10.9	0.1			
25	12.3	0.3			
30	13.1	0.2			
35	16.7	0.5			
40	20.3	0.9			
45	23.9	0.7			
50	28.6	1.1			
55	42.0	4.6			
60	60.5	3.4			

Note: 1. A positive value indicates deflection towards to the furnace

Appendix 5 – Deflection of the floor assembly during the test

2. The above test project/method was carried out by subcontractors.

******** End of report*******

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