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Client: Ansell Electrical Products Limited Unit 6B Stonecross Industrial Park Yew Tree Way Warrington WA3 3JD	

TEST REPORT


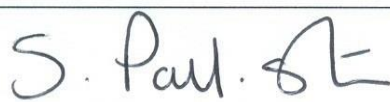
Title:

60 MINUTE FIRE TEST IN ACCORDANCE WITH BS 476 PART 21:1987 ON A LOADED CEILING FITTED WITH ANSELL ELECTRICAL PRODUCTS LIMITED FIRE HOODS.

TEST DATE 27TH JANUARY 2020

Official Issue

DARCHEM FLARE

ISSUE	B						
NAME				FUNCTION		DATE	
ISSUED BY				Engineering Technician		07/02/20	
G Elliott							
							
APPROVED BY				Senior Engineering Technician		07/02/20	
S Pallister							
							

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REVISION BETWEEN ISSUES

Pages Affected	Section	Date	Revision Summary	Revised By
1 & 5	Front sheet & Introduction	07/02/20	Report changed to reflect correct clients name and addition of Ansell Electrical Products Confirmation Letter.	G Elliott
All	Appendix H	07/02/20	Appendix H added – Ansell Electrical Products Confirmation Letter. Pages numbers changed due to the addition of extra pages.	G Elliott
All	All	07/02/20	Report changed from Issue A to Issue B	G Elliott



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SUMMARY

A 60 minute fire rated floor/ceiling construction built in accordance with details from the 12th edition of the British Gypsum White Book 2019 was fitted with eight fire hoods supplied by the client. The fire rated construction containing the fire hoods was tested to BS 476 Part 21:1987. The test was conducted on the 27th January 2020 with no witnesses present.

The furnace was controlled such that the mean of the eight furnace thermocouples followed the BS 476 Part 20:1987 cellulosic time/temperature firecurve.

The conditions of performance as detailed in BS 476 Parts 20 and 21 were applied.

The results were as follows:

Time (minutes)	Mean Unexposed Surface Temperatures °C		
	BS Thermocouples	Above Downlight	Area Without A Light
0	17	17	17
5	17	18	17
10	17	18	18
15	19	20	18
20	23	25	21
25	27	31	25
30	32	38	29
35	37	45	33
40	41	50	37
45	45	55	41
50	48	60	44
55	53	64	46
60	60	70	48

After 60 minutes test duration the highest unexposed surface temperature registered by a thermocouple was 92°C. The maximum deflection of the floor at its centre was 22mm.

The fire hoods which were installed in a 60 minute fire rated floor/ceiling construction maintained the criteria of BS 476 Part 21:1987 for the following period.

Load Bearing Capacity **60 minutes**

Integrity **60 minutes**

Insulation **60 minutes**

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.



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1 INTRODUCTION

A 60 minute fire test was performed on a loaded ceiling fitted with Ansell Electrical Products Limited Fire Hoods. The test was requested by Sealite Limited on behalf of Ansell Electrical Products Limited. A letter confirming this is contained in Appendix H.

The following Ansell fire hoods were supplied for the 60 minute fire test:

Test sample 1 - ADLC/0

Test sample 2 - ADLC/1

Test sample 3 - ADLC/2

Test sample 4 - ADLC/4

Test sample 5 - ADLC/6

Test sample 6 - ADLC/7

Test sample 7 - ADLC/8

Test sample 8 - ADLC/9

The following Ansell downlights were used in the test.

Test sample 1 - AULEDGCP3/CW

Test sample 2 - AUSQLED100D/CW

Test sample 3 - ATLD/MW

Test sample 4 - ATLD/MW

Test sample 5 - ABXLED190/CW

Test sample 6 - AULED175WW

Test sample 7 - AVEGLED/1/CW

Test sample 8 - AVEGLED/1/CW

The fire hoods and downlights were tested in the, as supplied condition and were fitted to the manufactures instructions, see Appendix A.



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2 SAMPLE DETAILS

2.1 Ceiling Construction

The fire hoods were fitted in a 60 minute fire rated standard ceiling/floor which was constructed using detail available from British Gypsum. The detail was taken from the 12th edition of the British Gypsum White Book 2019 Table 1b - Direct fix to new or existing solid timber joist floors. The System Reference was C016009. The solid timber joists were measured as 44mm x 195mm on 600mm centres. The joists spanned 4.2 metres across the furnace aperture. The ceiling lining was two layers of British Gypsum FireLine board 12.5mm thick secured to the timber joists by drywall screws. Noggins were used between the timber joists to support the board edges. The floor was constructed from 22mm thick tongue and groove chipboard screwed to the solid timber joists. The cavities were not insulated.

The downlights were supplied by the client and were fitted by Darchem personnel into the fire rated ceiling.

2.2 Fire Hoods

The following fire hoods were tested:

Test Sample	Product Code	Size (mm)
1	ADLC/0	150 x 150 x 120
2	ADLC/1	130 x 130 x 70
3	ADLC/2	130 x 130 x 100
4	ADLC/4	180 x 180 x 130
5	ADLC/6	260 x 260 x 120
6	ADLC/7	260 x 260 x 230
7	ADLC/8	300 x 300 x 170
8	ADLC/9	350 x 350 x 230

No other information was provided by the customer.



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3 DESCRIPTION OF THE TEST EQUIPMENT

The fire test furnace used was 4 metres long by 3 metres wide by 1.8 metres high (measured internally) and was constructed from a mild steel outer shell and structural steel members.

The furnace was lined with ceramic fibre of 150mm thickness and fired using 16 natural gas burners.

The burners were controlled individually from a central manifold, a pump and series of valves ensured a constant gas flow to the burners. The positive pressure within the furnace was monitored by an electronic manometer and adjusted by a system of dampers and forced air injection.



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4 INSTRUMENTATION

4.1 Data Recorder

The data was recorded using Datascan units (0001DF to 0007DF) relaying the signals to Orchestrator 128 data logging software on a computer.

4.2 Furnace Thermocouples

The furnace temperature was monitored and controlled by a total of eight thermocouples, 1.5mm diameter, metal sheathed type K, calibrated to meet the requirements of AMS2750E.

4.3 Test Sample Thermocouples

Glass sheathed C20KX thermocouple cable calibrated to BS4937 Part 30 was used to monitor test sample temperatures.

The test sample thermocouples were in the following positions:

Eight thermocouples, one per fire hood, were positioned in the cavity approximately 60mm above the fire hood.

Three thermocouples were positioned in a cavity without a fire hood.

Eight thermocouples were positioned 60mm from the base of the timber joist in a cavity with a fire hood.

Three thermocouples were positioned 60mm from the base of the timber joist in a cavity without a fire hood.

Eight thermocouples were positioned on the unexposed surface of the chipboard floor directly above a fire hood.

Three thermocouples were positioned on the unexposed surface of the chipboard floor directly above an area without a fire hood.

Five thermocouples were positioned on the unexposed surface of the chipboard floor as required by BS 476 Part. 20.

4.4 Differential Pressure Measurement

The differential pressure was measured by a Druck LP 1000 Series Pressure Sensor (0098 DF). Readings were manually recorded.



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4.5 Frequency of Readings

All temperature data was stored at 60 second intervals.



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5 CONTROL OF THE FIRE TEST

The furnace was controlled such that the mean of the eight furnace thermocouples followed the BS 476 Part 20 cellulosic time/temperature firecurve.

A graph showing the BS 476 Part 20 time/temperature curve and the actual curve achieved during the test is included in Appendix D.



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6 ACCEPTANCE / FAILURE CRITERIA

The conditions of performance as detailed in BS 476 Parts 20 and 21 were applied.

The sample performance, expressed in minutes, was the time taken for:

The mean unexposed surface temperature to rise by 140°C, or any individual unexposed face thermocouple to register a rise of 180°C.

or

For a Load bearing, Integrity or Stability failure to occur.



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7 TEST PROCEDURE

7.1 Installation of the Test Sample

The fire hoods and downlights were installed by Darchem Flare personnel. The holes for the downlights were as stated by the supplier. The floor assembly was then installed onto the furnace.

7.2 Loading of the Sample

The floor/ceiling assembly containing the test sample fire hoods, had a total load of 9.06kN (923.98kg) applied to 9 equally distributed loading points to represent 100% of the design load. This is the recommended load requirements for a 60 minute fire rated ceiling/floor which was constructed using detail available from British Gypsum. The detail was taken from the 12th edition of the British Gypsum White Book 2019, Table 1b - Direct fix to new or existing solid timber joist floors, system reference C016009. Due to difficulty in achieving the actual weight calculated in appendix C, a load closest to this was used. The loading calculation and a sketch of the loading points are included in Appendix C.

The following loads were applied,

Load A - 102.64 kg

Load B - 102.72 kg

Load C - 102.66 kg

Load D - 102.66 kg

Load E - 102.64 kg

Load F - 102.66 kg

Load G - 102.66 kg

Load H - 102.66 kg

Load I - 102.68 kg

7.3 Furnace Ignition

After the thermocouples had been checked for functionality, the data logging system was activated and the furnace ignited and the mean furnace temperature was controlled to match as closely as possible the BS 476 Part 20 Cellulosic fire curve.

7.4 Test Duration

The test was discontinued after 66 minutes duration.



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8 TEST RESULTS

The test was performed on 27th January 2020.

The Darchem Flare test team were:

Graeme Elliott
Stephen Pallister

The test results were as follows

Time (minutes)	Mean Unexposed Surface Temperatures °C		
	BS Thermocouples	Above Downlight	Area Without A Light
0	17	17	17
5	17	18	17
10	17	18	18
15	19	20	18
20	23	25	21
25	27	31	25
30	32	38	29
35	37	45	33
40	41	50	37
45	45	55	41
50	48	60	44
55	53	64	46
60	60	70	48

After 60 minutes test duration the highest unexposed surface temperature registered by a thermocouple was 92°C. The maximum deflection of the floor at its centre was 22mm.

The test was discontinued after 66 minutes duration.

The integrity of the floor/ceiling construction was maintained throughout the test.

Observations taken throughout the duration of the test are given in section 9.

The fire curve accuracy check data is contained in Appendix D.

Graphs of sample unexposed temperatures are contained in Appendix E.

Tabulated results are contained in Appendix F.

A photographic record of the test is contained in Appendix G.



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The following eight Fire Hoods:

Test sample 1 - ADLC/0

Test sample 2 - ADLC/1

Test sample 3 - ADLC/2

Test sample 4 - ADLC/4

Test sample 5 - ADLC/6

Test sample 6 - ADLC/7

Test sample 7 - ADLC/8

Test sample 8 - ADLC/9

Were installed in a 60 minute fire rated floor/ceiling construction maintained the criteria of BS 476 Part 21:1987 for the following period:

Load Bearing Capacity **60 minutes**

Integrity **60 minutes**

Insulation **60 minutes**

The test results relate only to the specimen/specimens tested. Application of the results to assemblies of different dimensions or incorporate different components, should be the subject of a design appraisal.



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9 OBSERVATIONS

TEST DURATION (Minutes)	COMMENTS
5	Furnace pressure 9.0Pa.
10	Downlight 3 dropped from ceiling. Furnace pressure 9.2Pa.
15	Tapes dropped from ceiling joints. Furnace pressure 9.0Pa.
16	Downlight 4 flaming.
17	Downlight 4 dropped from ceiling.
20	Downlight 1, 2 and 6 dropped from ceiling. Furnace pressure 9.4Pa.
25	Downlight 5 dropped from ceiling. Furnace pressure 9.1Pa.
30	Plasterboard joint opening. Furnace pressure 8.7Pa.
35	Downlight 8 dropped from ceiling. Furnace pressure 8.7Pa.
40	Furnace pressure 8.8Pa.
45	Furnace pressure 9.0Pa.
50	Downlight 7 dropped from ceiling. Furnace pressure 8.4Pa.
55	Furnace pressure 8.1Pa.
60	Furnace pressure 8.0Pa.
66	Test Ended



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10 APPENDIX A

- 1 Fire Hood Fitting Instructions
- 2 Test Sample Thermocouple Locations
- 3 Furnace Thermocouple locations

(3 pages)



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Fire Hood Fitting Instructions

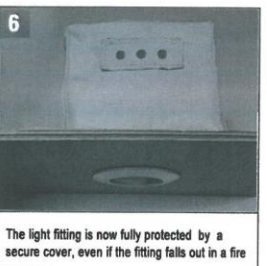
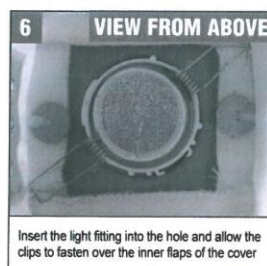
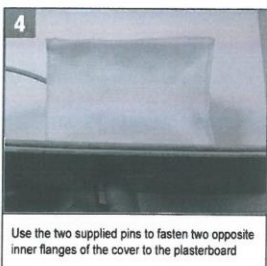
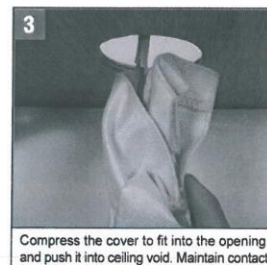
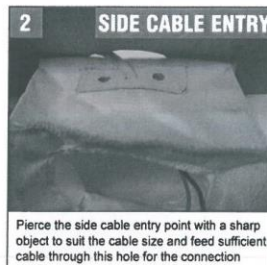
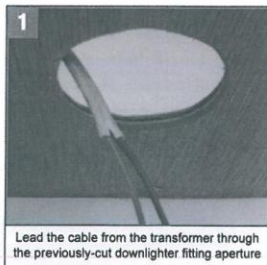


INTUMESCENT DOWNLIGHTER COVERS

MODEL: ADLC/0 ADLC/4 ADLC/5 ADLC/6 ADLC/7 ADLC/8 ADLC/9

STEP-BY-STEP FITTING INSTRUCTIONS

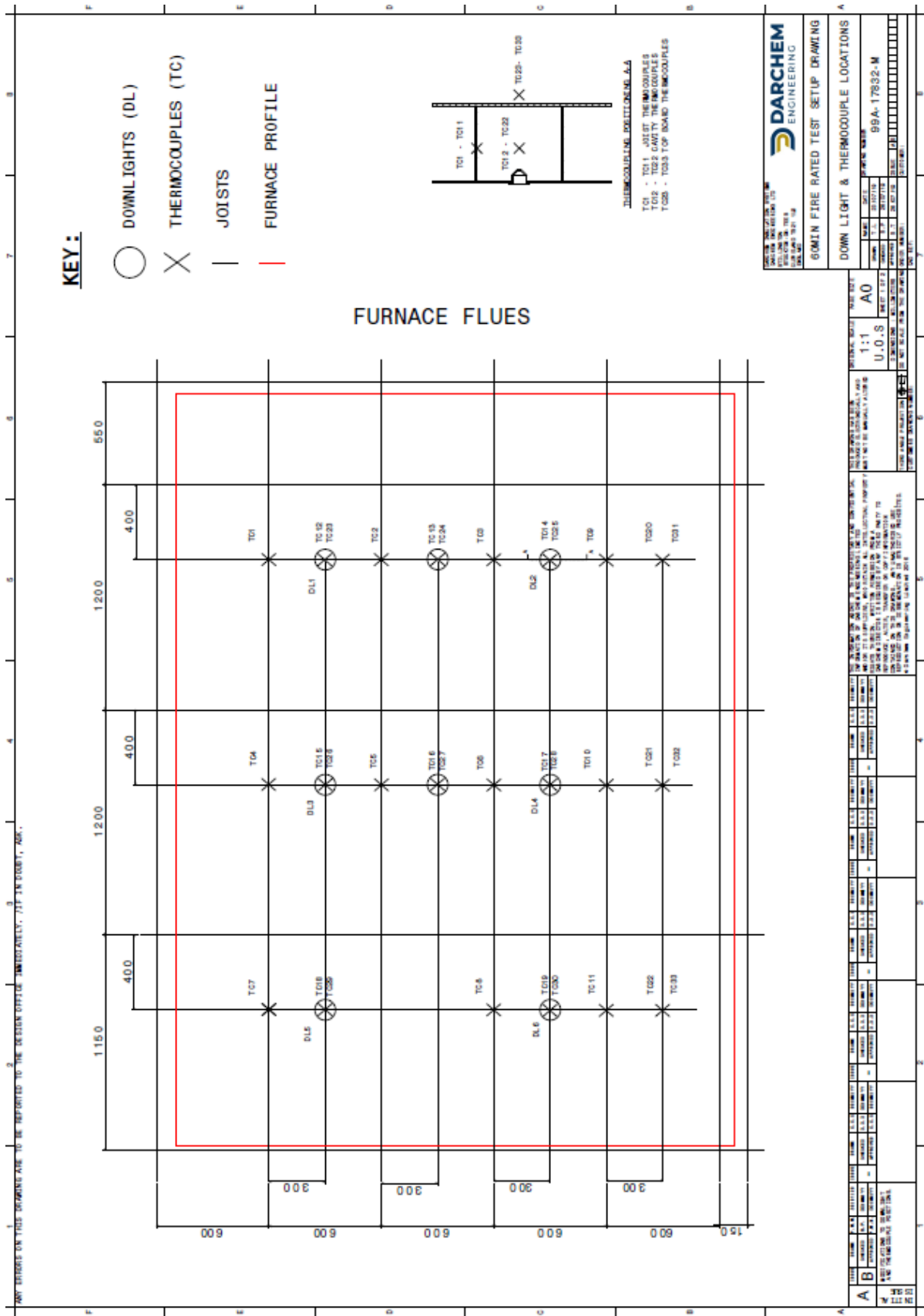
FOR DOWNLIGHTER COVERS IN PLASTERBOARD CEILINGS



IMPORTANT

PLEASE ENSURE THAT ANY FITTED CEILING INSULATION MATERIAL DOES NOT COMPRESS THE LIGHTING COVER





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60MIN FIRE RATED TEST SETUP DRAWING

DOWN LIGHT & THERMOCOUPLE LOCATIONS

NO.	DATE	BY	CHKD
001	27/01/20	AMK	AMK
002	27/01/20	AMK	AMK
003	27/01/20	AMK	AMK
004	27/01/20	AMK	AMK
005	27/01/20	AMK	AMK
006	27/01/20	AMK	AMK
007	27/01/20	AMK	AMK
008	27/01/20	AMK	AMK
009	27/01/20	AMK	AMK
010	27/01/20	AMK	AMK
011	27/01/20	AMK	AMK
012	27/01/20	AMK	AMK
013	27/01/20	AMK	AMK
014	27/01/20	AMK	AMK
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016	27/01/20	AMK	AMK
017	27/01/20	AMK	AMK
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020	27/01/20	AMK	AMK

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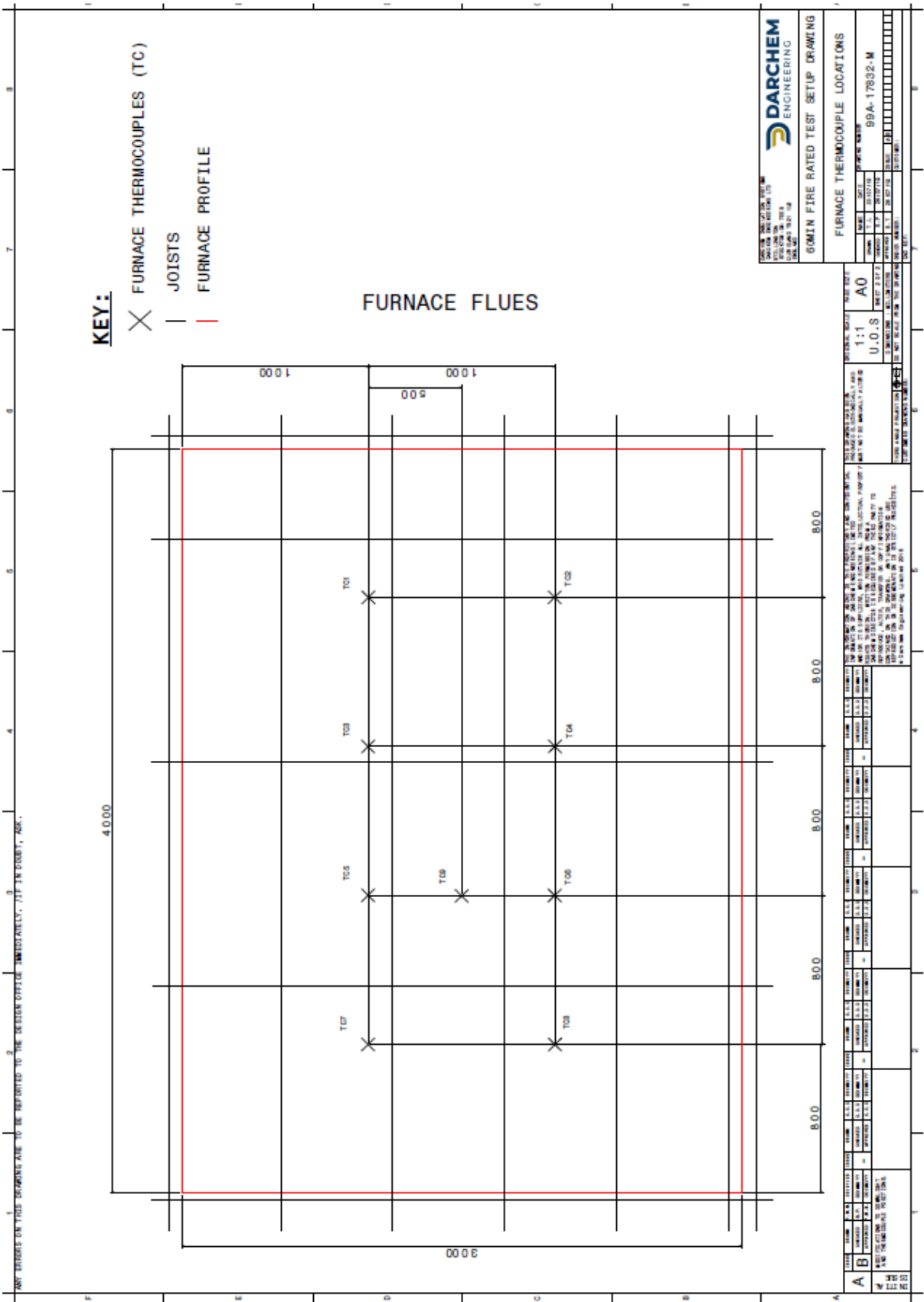


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11 APPENDIX B

12th Edition British Gypsum White Book 2019

(1 page)



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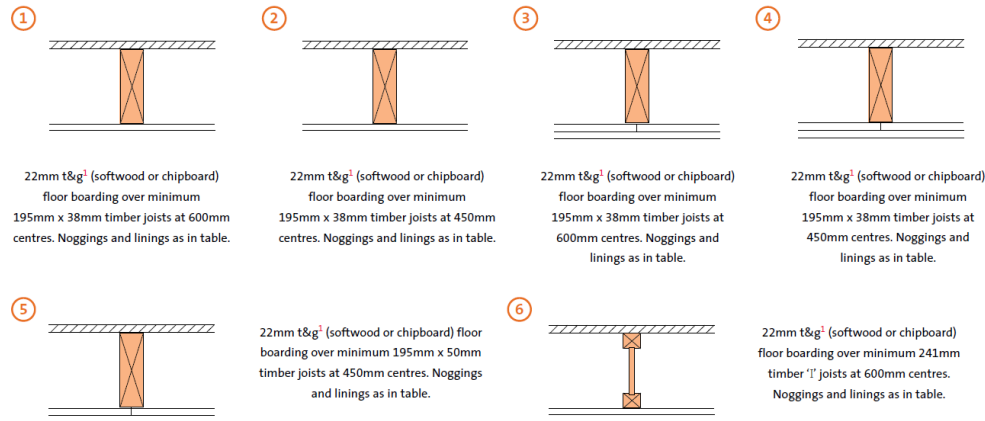
Loadbearing timber joist floors performance (continued)

Ceiling directly fixed to new or existing solid timber joist floors

For details of when to specify fire resistance using BS
Refer to C02. S01. P05



Table 1b - Solutions to satisfy the requirements of BS 476: Part 8: 1972 or BS 476: Part 21: 1987



Detail	Nominal floor depth mm	Board type	Ceiling lining thickness mm	Noggings required	Maximum loadbearing ratio	Sound insulation		System reference
						Airborne R _w dB	Impact L _{n,w} dB	
30 minutes fire resistance (BS)								
2	230	Gyproc WallBoard	1 x 12.5	Yes ²	60%	36	-	C014003
1	230	Gyproc FireLine	1 x 12.5	Yes ²	60%	38	-	C016004
1	232	Gyproc WallBoard	1 x 15	Yes ²	100%	40	-	C106029
6	278	Gyproc WallBoard	1 x 15	Yes ²	60% ⁴	41	-	C206015
60 minutes fire resistance (BS)								
3	242	Gyproc FireLine	2 x 12.5	Yes ²	100%	40	76	C016009
4	245	Gyproc WallBoard (inner layer) + Gyproc FireLine (outer layer)	1 x 12.5 + 1 x 15	Yes ²	100%	40	76	C016008
5	247	Gyproc WallBoard	2 x 15	Yes ²	60%	40	76	C016006
5	249	Gyproc Plank (inner layer) + Gyproc WallBoard (outer layer)	1 x 19 + 1 x 12.5	Yes ²	60%	40	75	C016007
90 minutes fire resistance (BS)								
5	247	Gyproc FireLine	2 x 15	Yes ²	60%	40	78	C014011

► For further assistance in choosing the right solution for your project, try the White Book System Selector; an online tool that enables quick and easy filtering by performance criteria. It provides system specific information downloads including BIM (Revit) objects. Go to british-gypsum.com

¹ For non t&g floors, overlay with 6mm plywood and ensure all joints are staggered.

² At ceiling perimeter only.

³ At ceiling perimeter and to support outer layer ceiling board joints.

⁴ This value is based on a test with a typical 'I' joist. Consult manufacturers directly for information on specific 'I' joists.

(NB) The fire resistance and sound insulation performances are for imperforate partitions, walls and ceilings incorporating boards with all joints taped and filled, or skimmed according to British Gypsum's recommendations. The quoted performances are achieved only if British Gypsum and Saint-Gobain Isover components are used throughout, and the Company's fixing recommendations are strictly observed. Any variation in the specifications should be checked with British Gypsum.

(NB) Where boards are fixed direct to timber joists, British Gypsum Drywall Screws should be used as opposed to nail-fixing to minimise the risk of fixing defects occurring.

(NB) All the 30 and 60 minute specifications in table 1b can be used on the underside of an existing lath and plaster ceiling provided the existing ceiling is supported by chicken wire securely fixed to the joists and counter battened with minimum 38mm x 38mm timber at 600mm centres, with noggings to support the long edges of the outer layer board.

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12 APPENDIX C

Loading Calculations

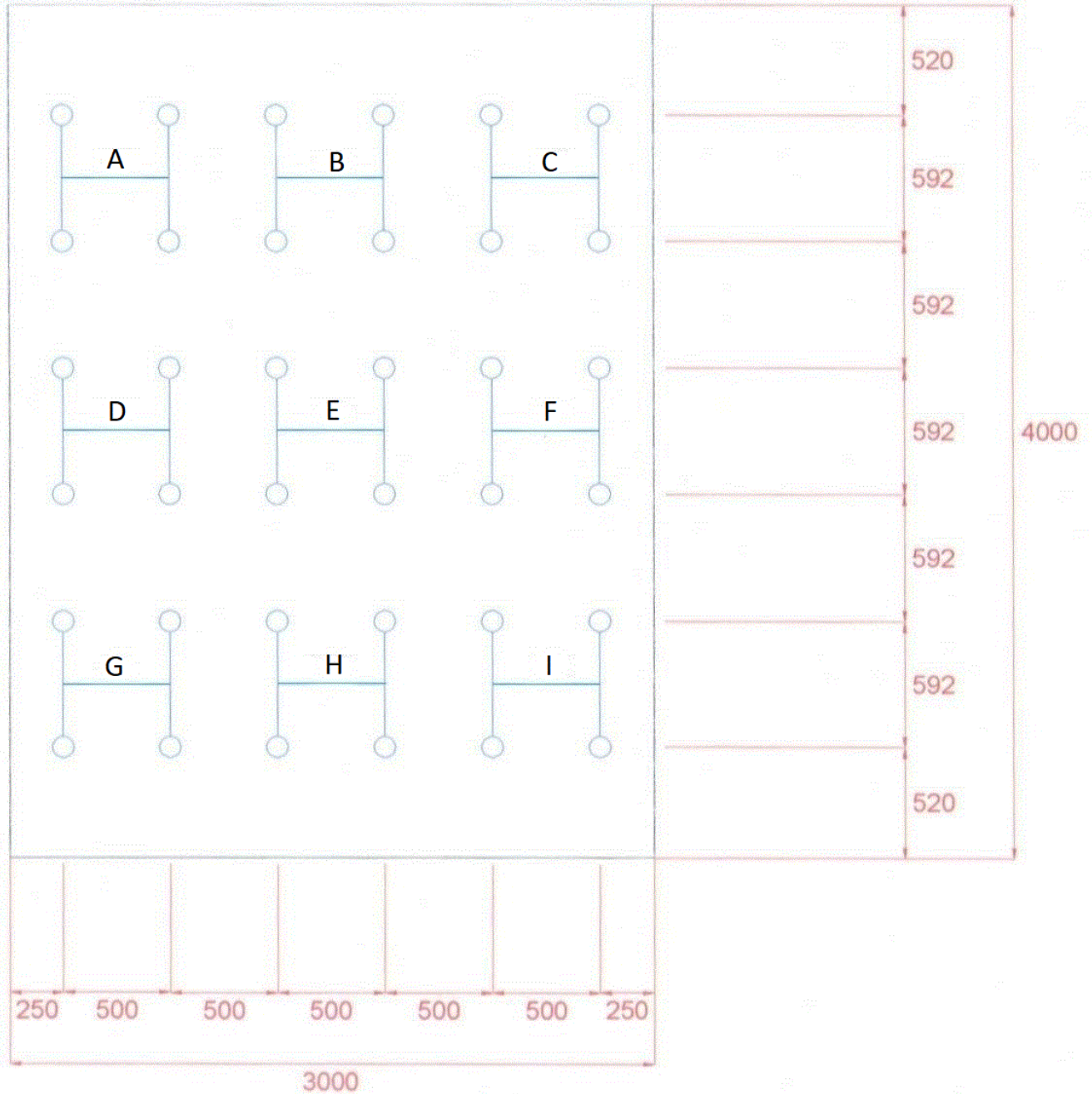
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Loading Arrangement



Loading Calculations

Dead load is applied by dividing the floor area of 4m x 3m into a 6 x 6 matrix creating 36 uniformly distributed point loads. This takes no account of joist position. The test load is calculated on the joist carrying the heaviest load being subject to the maximum allowable stress in accordance with BS 5268 Part 2: 2002.

1. Weights and density of materials used in construction

Joist Data:

Actual Joist breadth (mm)	b	44mm	Noggins/Joist	6
Actual Joist depth (mm)	d	196mm	Breadth	44
Nominal Joist spacing (mm)	s	600mm	Depth	196
Clear span (mm)	L	4200mm	Length	556
Rows of load points		6	Weight of Noggins	11.19 kg

Total length	jl	4380.00 mm	each end sits in channel of 90mm
Weight	wt	14.69 kg/m ³	per joist
Density	rho	389.00 kg/m ³	
Weight per unit length	jwu	5.91 kg	

Walking Surface

Weight per unit area	wsw	22 kg/m ²	x
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Ceiling

Weight per unit area	cwa	19.6 kg/m ²	x
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2. Load/Deflection Calculation

Permissible Deflection		12.60 mm	Grade Bending Stress	5.30
			k	1.20
Modulus of Elasticity	E	8800.00 N/mm ²	Load Duration K3	1.00
Modulus of Rigidity	G	550.00 N/mm ²	Depth K7	1.11
Section Modulus	Z	281717.33 mm ³	Load Sharing K8	1.10
Moment of Inertia	I	27608298.67 mm ⁴	Permissible Bending Stress	6.48 N/mm ²
Max Total Load	W	0.73 kN/m	Applied Bending Stress	6482.96 kN/m ²
			Maximum Bending Moment	1.83 kNm
			Shear Deflection	0.46 mm

3. Self Load

Joists	57.98 N/m
Walking Surface	129.49 N/m
Ceiling	115.37
Total Self Load	0.30 kNm

4. Applied Load

Applied Load Required	0.425 kN/m
P	0.340 kN/m
6P	2.040 kN/m
Total Floor Load	8.935 kN
9 Distributed Weights	101.203 kg

5. Bearing Compression

Grade Compression Stress	2.20 N/mm ²
Load on most highly stressed Joist	10.26 kN
Total Bearing Area	17248.00 mm ²
Actual Bearing Stress	0.59 N/mm ²



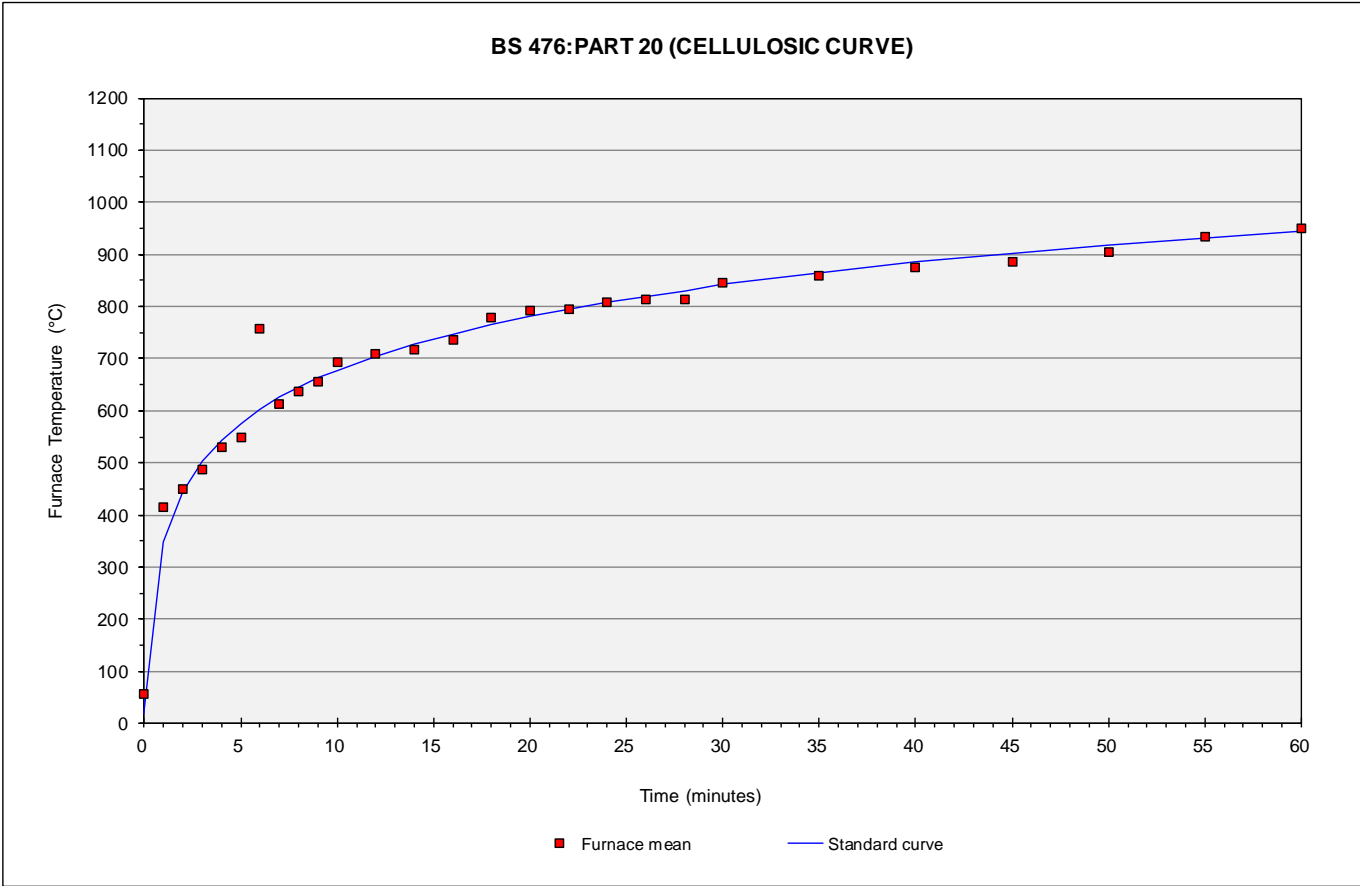
60 MINUTE FIRE TEST IN ACCORDANCE WITH BS 476 PART 21:1987 ON A LOADED CEILING FITTED WITH ANSELL ELECTRICAL PRODUCTS LIMITED FIRE HOODS. TEST DATE 27TH JANUARY 2020	Document No. DFR/20/01	
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13 APPENDIX D

Graph of the BS 476 Part 20 Fire Curve and Achieved Furnace Temperature Fire Curve Accuracy Check Data

(2 pages)





Simpson's Rule Numerical Integration					
	TEST DATA		BS 476:1987 Part 20		
Time, min.	Temp.	Cum. °C-min.	Temp.	Cum. °C-min.	limits
0	57		20		
1	415		349		
2	449		444		
3	488		502		
4	530		544		
5	548		576		
6	758		603		
7	614		626		
8	636		645		
9	655		663		4543
10	694	5459	678	5345	
12	708		705		6146
14	718		728		
16	735		748		
18	780		766		
20	791		781		
22	795		795		
24	808		808		
26	814		820		
28	813		831		18748
30	845	20908	842	20831	
35	858		865		22914
40	876		885		
45	886		902		
50	904		918		
55	935		932		45422
60	950	47693	945	47813	
65	970		956		50204



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14 APPENDIX E

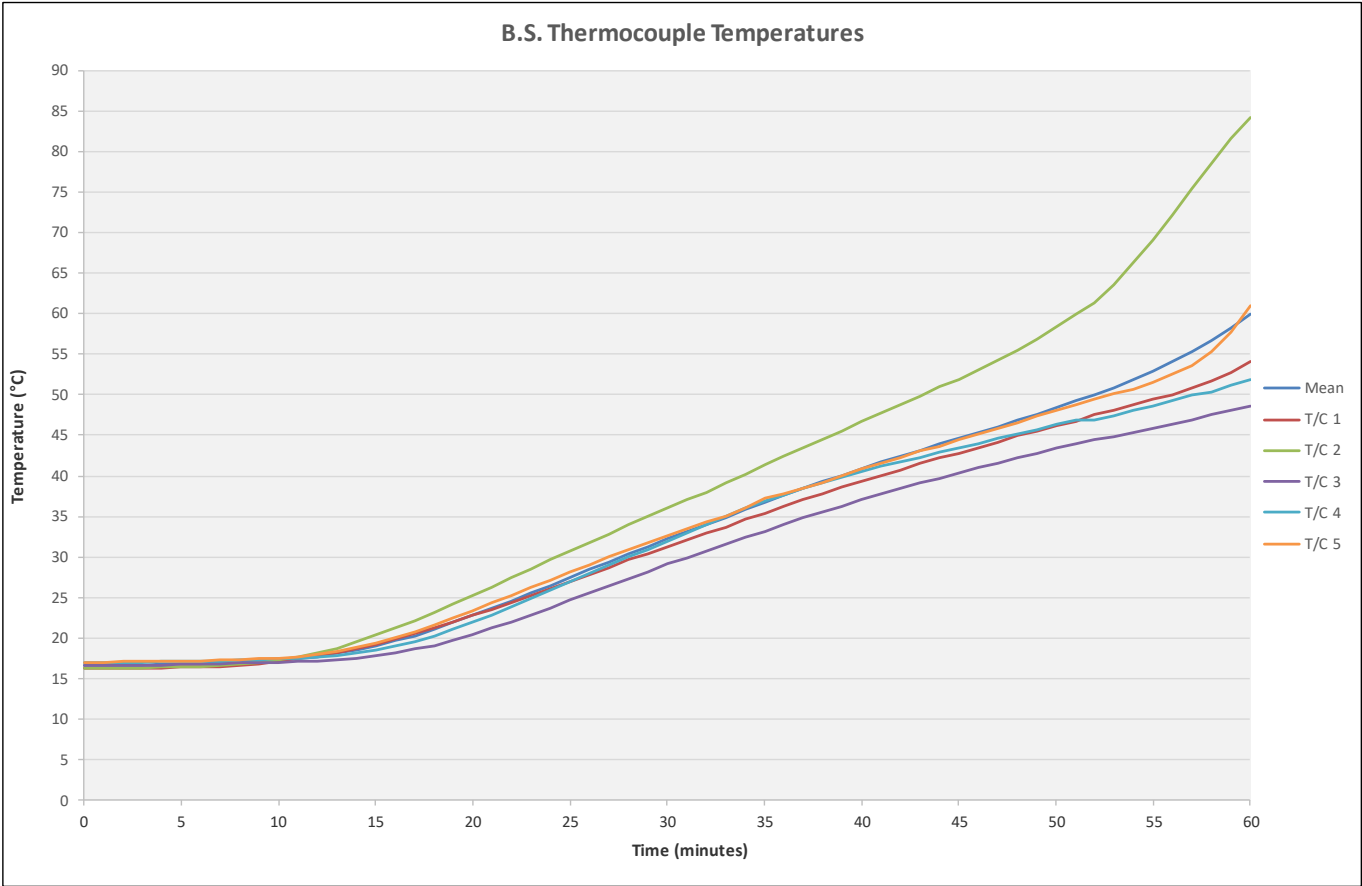
Graphs of Thermocouple Temperatures

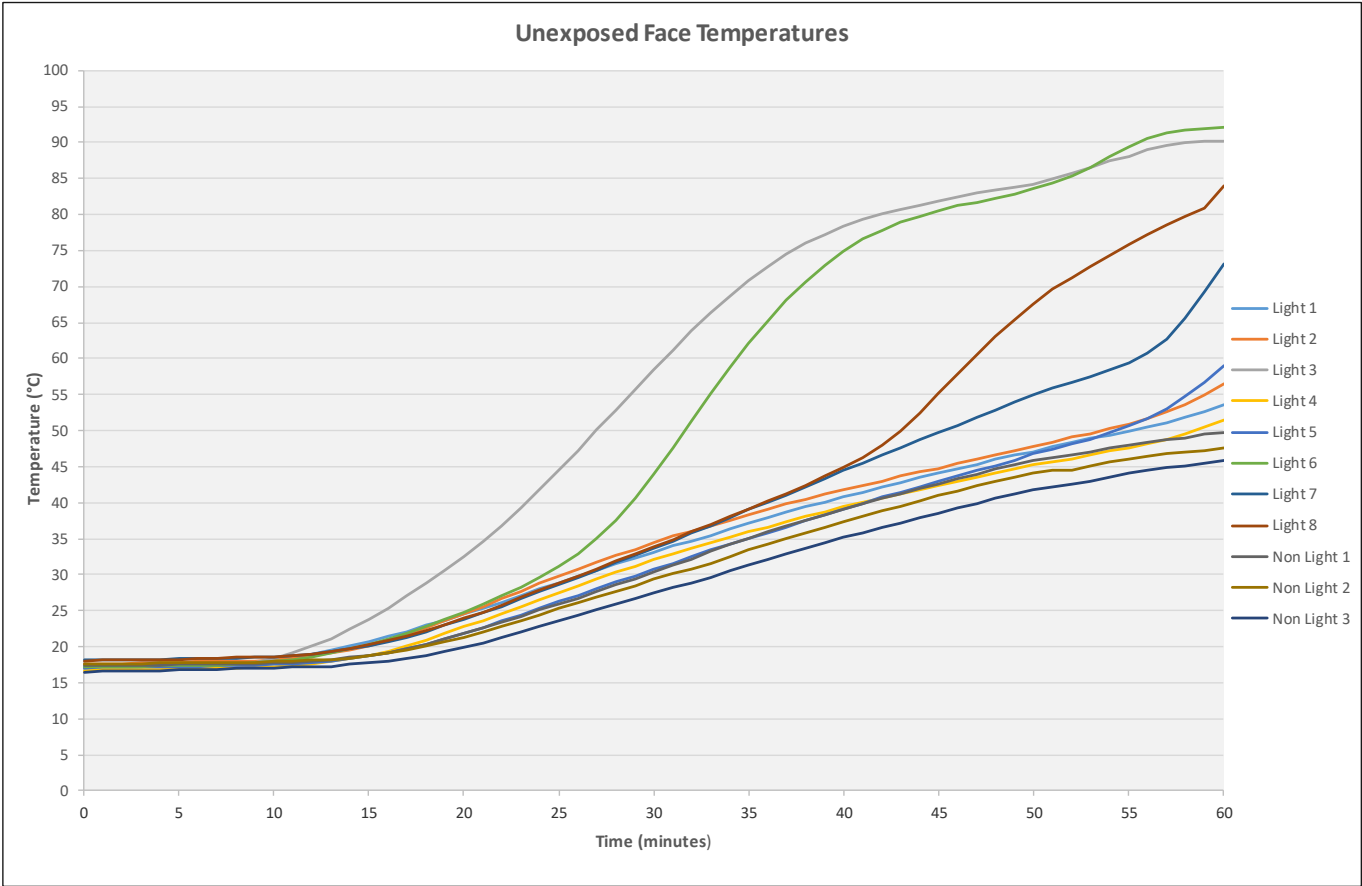
(5 pages)

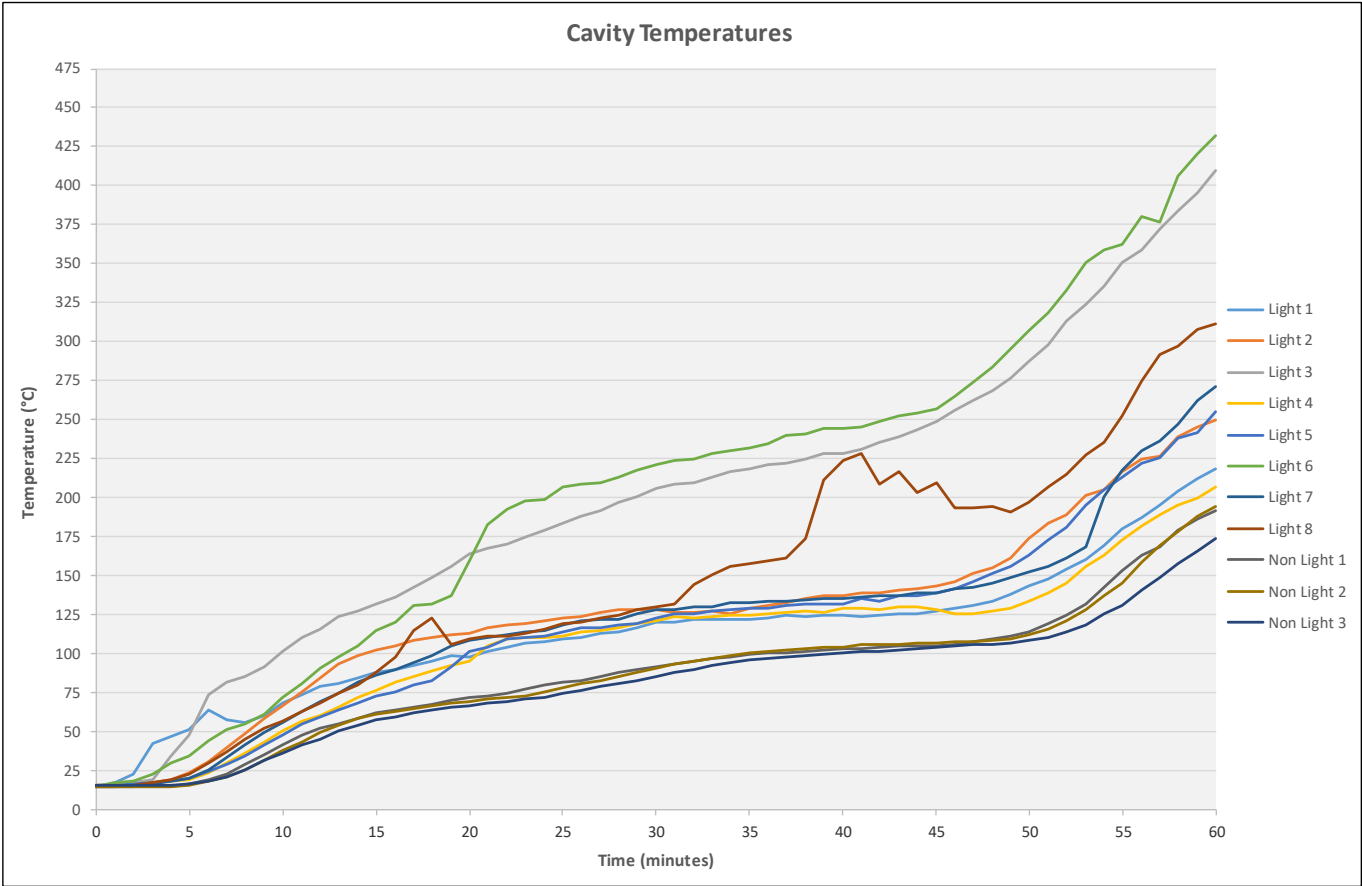


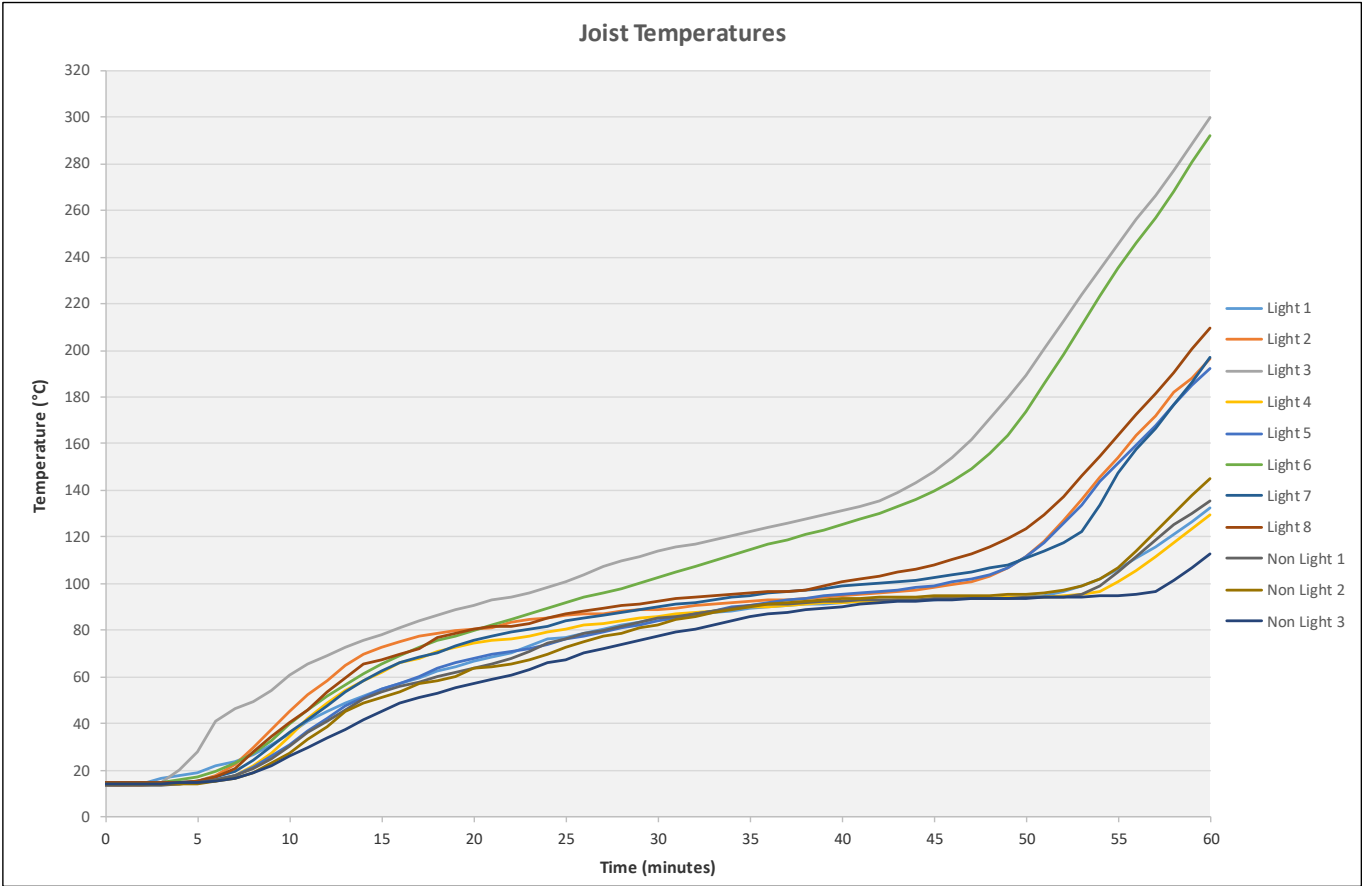
0666

Darchem Flare



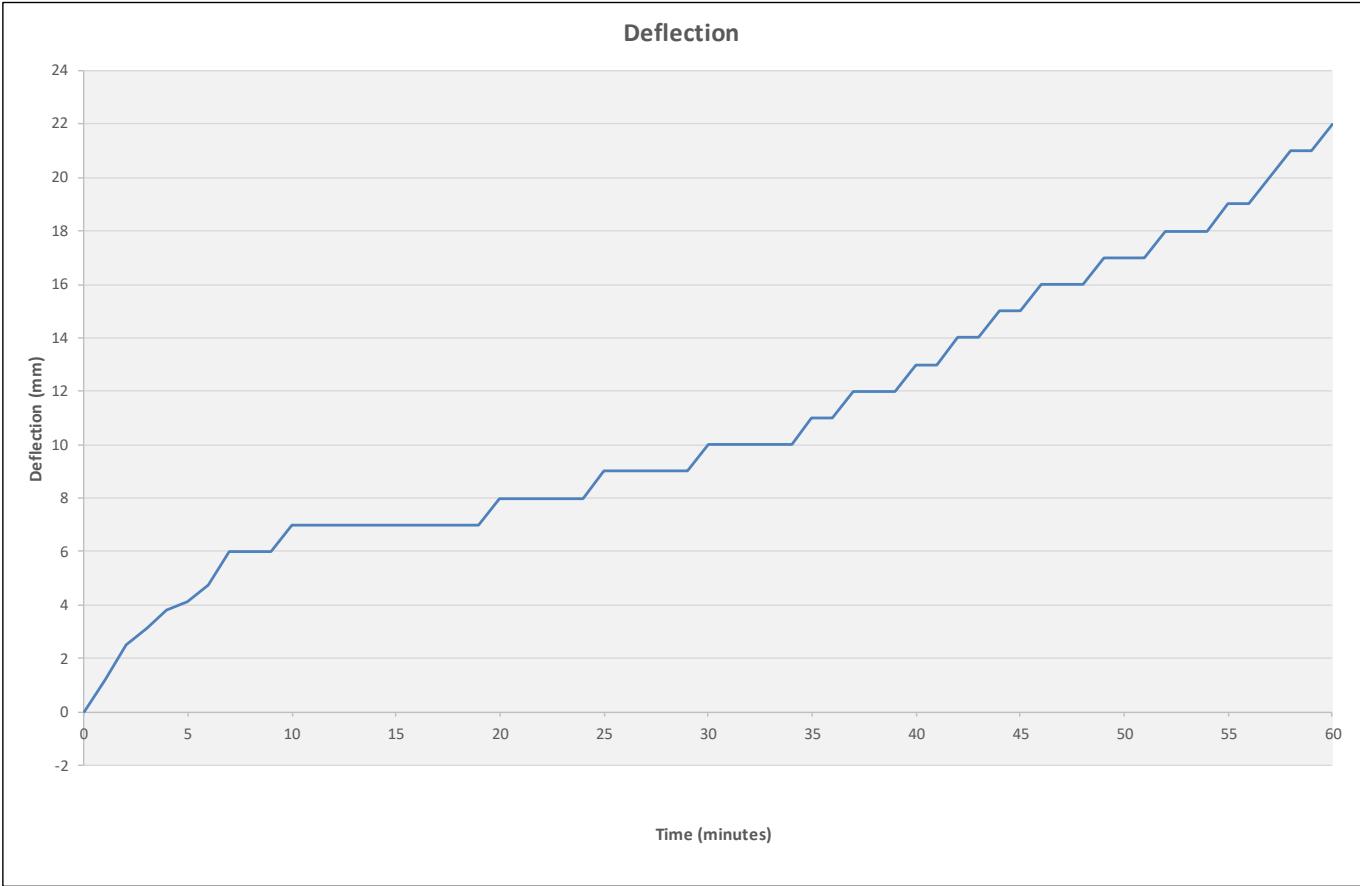






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15 APPENDIX F

Tabulated Temperature Results

(5 pages)



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Darchem Flare

60 MINUTE FIRE TEST IN ACCORDANCE WITH BS 476
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Test Duration (minutes)	BS Mean Temp (°C)	BS T/C 1 (°C)	BS T/C 2 (°C)	BS T/C 3 (°C)	BS T/C 4 (°C)	BS T/C 5 (°C)	Deflection (mm) (°C)	Ambient Temp (°C)
0	17	16	16	17	17	17	0	21
1	17	16	16	17	17	17	1	22
2	17	16	16	17	17	17	3	22
3	17	16	16	17	17	17	3	22
4	17	16	16	17	17	17	4	22
5	17	16	16	17	17	17	4	22
6	17	16	17	17	17	17	5	22
7	17	16	17	17	17	17	6	22
8	17	17	17	17	17	17	6	22
9	17	17	17	17	17	17	6	22
10	17	17	17	17	17	18	7	22
11	17	17	18	17	17	18	7	22
12	18	18	18	17	18	18	7	22
13	18	18	19	17	18	18	7	22
14	19	19	19	18	18	19	7	22
15	19	19	20	18	18	19	7	22
16	20	20	21	18	19	20	7	22
17	20	21	22	19	20	21	7	22
18	21	21	23	19	20	22	7	22
19	22	22	24	20	21	22	7	22
20	23	23	25	20	22	23	8	22
21	24	24	26	21	23	24	8	22
22	25	24	27	22	24	25	8	22
23	26	25	29	23	25	26	8	22
24	26	26	30	24	26	27	8	22
25	27	27	31	25	27	28	9	22
26	28	28	32	26	28	29	9	22
27	29	29	33	26	29	30	9	22
28	30	30	34	27	30	31	9	22
29	31	30	35	28	31	32	9	22
30	32	31	36	29	32	33	10	22
31	33	32	37	30	33	33	10	22
32	34	33	38	31	34	34	10	22
33	35	34	39	32	35	35	10	22
34	36	35	40	32	36	36	10	22
35	37	35	41	33	37	37	11	22
36	38	36	42	34	38	38	11	22
37	38	37	43	35	38	38	12	22
38	39	38	45	36	39	39	12	22
39	40	39	46	36	40	40	12	22
40	41	39	47	37	40	41	13	22
41	42	40	48	38	41	42	13	22
42	42	41	49	38	42	42	14	22
43	43	42	50	39	42	43	14	22
44	44	42	51	40	43	44	15	22
45	45	43	52	40	43	44	15	22
46	45	43	53	41	44	45	16	22
47	46	44	54	42	45	46	16	22
48	47	45	55	42	45	47	16	22
49	48	46	57	43	46	47	17	22
50	48	46	58	43	46	48	17	22
51	49	47	60	44	47	49	17	22
52	50	48	61	44	47	49	18	22
53	51	48	64	45	47	50	18	22
54	52	49	66	45	48	51	18	21
55	53	49	69	46	49	52	19	22
56	54	50	72	46	49	52	19	22
57	55	51	75	47	50	54	20	22
58	57	52	79	47	50	55	21	22
59	58	53	82	48	51	58	21	21
60	60	54	84	49	52	61	22	21



**60 MINUTE FIRE TEST IN ACCORDANCE WITH BS 476
PART 21:1987 ON A LOADED CEILING FITTED WITH
ANSELL ELECTRICAL PRODUCTS LIMITED FIRE
HOODS.
TEST DATE 27TH JANUARY 2020**

Test Duration (minutes)	Unexposed Light 1 (°C)	Unexposed Light 2 (°C)	Unexposed Light 3 (°C)	Unexposed Light 4 (°C)	Unexposed Light 5 (°C)	Unexposed Light 6 (°C)	Unexposed Light 7 (°C)	Unexposed Light 8 (°C)	Unexposed Non Light 1 (°C)	Unexposed Non Light 2 (°C)	Unexposed Non Light 3 (°C)
0	17	18	17	17	17	17	18	18	17	18	17
1	17	18	17	17	17	17	18	18	17	18	17
2	17	18	17	17	17	17	18	18	17	18	17
3	17	18	17	17	17	17	18	18	17	18	17
4	17	18	17	17	17	17	18	18	17	18	17
5	17	18	17	17	17	17	18	18	18	18	17
6	17	18	17	17	17	17	18	18	18	18	17
7	17	18	17	17	17	18	18	18	18	18	17
8	18	18	18	17	17	18	18	18	18	18	17
9	18	18	18	17	17	18	19	19	18	18	17
10	18	18	18	17	18	18	19	19	18	18	17
11	19	18	19	17	18	18	19	19	18	18	17
12	19	19	20	18	18	19	19	19	18	18	17
13	20	19	21	18	18	19	19	19	18	18	17
14	20	20	22	18	18	20	20	20	18	18	18
15	21	20	24	19	19	20	20	20	19	19	18
16	21	21	25	19	19	21	21	21	19	19	18
17	22	22	27	20	20	22	21	21	20	20	18
18	23	23	29	21	20	23	22	22	20	20	19
19	24	24	31	22	21	24	23	23	21	21	19
20	25	25	33	23	22	25	24	24	22	21	20
21	25	26	35	24	23	26	25	25	23	22	21
22	26	27	37	25	24	27	26	26	23	23	21
23	27	28	39	26	24	28	27	27	24	24	22
24	28	29	42	27	25	30	28	28	25	24	23
25	29	30	44	28	26	31	29	29	26	25	24
26	30	31	47	28	27	33	30	30	27	26	24
27	31	32	50	29	28	35	31	31	28	27	25
28	31	33	53	30	29	38	32	32	29	28	26
29	32	33	56	31	30	41	33	33	29	29	27
30	33	34	58	32	31	44	34	34	30	29	27
31	34	35	61	33	32	48	35	35	31	30	28
32	35	36	64	34	33	51	36	36	32	31	29
33	35	37	66	34	33	55	37	37	33	32	30
34	36	38	69	35	34	59	38	38	34	33	31
35	37	38	71	36	35	62	39	39	35	33	31
36	38	39	73	37	36	65	40	40	36	34	32
37	39	40	74	37	37	68	41	41	37	35	33
38	39	41	76	38	38	71	42	42	38	36	34
39	40	41	77	39	38	73	43	44	38	37	34
40	41	42	78	39	39	75	44	45	39	37	35
41	41	42	79	40	40	77	46	46	40	38	36
42	42	43	80	41	41	78	47	48	41	39	37
43	43	44	81	41	42	79	48	50	41	40	37
44	44	44	81	42	42	80	49	52	42	40	38
45	44	45	82	42	43	81	50	55	43	41	39
46	45	45	82	43	44	81	51	58	43	42	39
47	45	46	83	44	44	82	52	61	44	42	40
48	46	47	83	44	45	82	53	63	45	43	41
49	47	47	84	45	46	83	54	65	45	44	41
50	47	48	84	45	47	84	55	68	46	44	42
51	48	48	85	46	48	84	56	70	46	44	42
52	48	49	86	46	48	85	57	71	47	45	43
53	49	50	87	47	49	87	58	73	47	45	43
54	49	50	87	47	50	88	58	74	48	46	44
55	50	51	88	48	51	89	59	76	48	46	44
56	50	52	89	48	52	91	61	77	48	46	45
57	51	53	90	49	53	91	63	79	49	47	45
58	52	54	90	50	55	92	66	80	49	47	45
59	53	55	90	51	57	92	69	81	49	47	46
60	54	56	90	51	59	92	73	84	50	48	46



0666

**60 MINUTE FIRE TEST IN ACCORDANCE WITH BS 476
PART 21:1987 ON A LOADED CEILING FITTED WITH
ANSELL ELECTRICAL PRODUCTS LIMITED FIRE
HOODS.
TEST DATE 27TH JANUARY 2020**

Test Duration (minutes)	Cavity Light 1 (°C)	Cavity Light 2 (°C)	Cavity Light 3 (°C)	Cavity Light 4 (°C)	Cavity Light 5 (°C)	Cavity Light 6 (°C)	Cavity Light 7 (°C)	Cavity Light 8 (°C)	Cavity Non Light 1 (°C)	Cavity Non Light 2 (°C)	Cavity Non Light 3 (°C)
0	15	15	16	15	15	15	15	15	14	15	15
1	18	15	16	16	16	17	15	15	14	15	15
2	23	16	17	16	16	18	15	15	14	15	15
3	42	17	19	17	17	23	16	17	14	15	15
4	47	19	34	18	18	29	18	19	15	15	15
5	51	24	48	19	20	34	20	23	16	16	16
6	64	30	74	24	24	44	25	30	19	18	18
7	57	40	82	30	29	51	34	37	23	21	21
8	56	49	85	36	34	55	41	45	29	26	26
9	61	58	91	43	41	61	50	52	35	31	31
10	68	66	101	50	48	71	56	57	41	38	36
11	73	75	110	56	54	81	63	62	47	43	41
12	79	84	116	61	60	91	69	68	52	49	45
13	81	93	123	66	64	98	75	75	55	54	50
14	84	99	128	72	68	105	81	80	59	58	54
15	87	102	131	77	73	115	86	88	62	61	57
16	89	105	136	81	76	120	90	98	64	63	60
17	92	108	143	85	80	131	94	114	65	65	62
18	95	111	148	89	82	131	99	123	67	66	64
19	98	112	156	92	92	137	105	106	70	68	65
20	98	113	163	95	101	159	108	109	71	69	66
21	101	116	167	105	104	183	111	111	73	70	68
22	104	119	170	110	109	192	112	111	75	72	69
23	106	119	175	110	110	198	113	113	77	73	71
24	108	121	179	110	111	199	115	115	80	75	72
25	109	122	183	111	113	207	118	119	82	78	74
26	110	124	188	113	116	209	121	120	83	80	76
27	113	126	191	114	116	210	122	122	85	83	79
28	114	128	197	116	118	213	122	125	88	85	80
29	116	128	200	119	119	218	126	128	90	88	82
30	120	128	206	121	123	221	128	130	91	90	85
31	120	127	209	123	125	224	128	132	93	93	88
32	122	126	210	122	125	224	130	144	95	95	90
33	122	127	213	123	127	228	130	151	97	97	93
34	122	126	216	124	128	230	132	156	98	98	94
35	122	129	218	125	129	232	132	157	99	100	96
36	123	131	221	125	129	235	133	159	100	101	97
37	124	133	222	126	131	240	133	161	101	102	98
38	124	135	225	128	131	240	134	174	102	103	99
39	125	137	228	126	132	244	136	211	102	104	99
40	125	137	228	129	132	244	136	224	103	104	100
41	124	138	231	129	135	245	136	228	103	106	101
42	125	139	235	128	133	249	137	208	104	105	102
43	126	141	239	130	137	252	137	217	105	106	103
44	126	142	243	130	137	254	139	203	105	106	103
45	127	144	249	128	139	257	139	209	105	107	104
46	129	146	256	126	141	264	142	194	106	108	104
47	131	151	262	126	146	274	142	194	107	108	106
48	134	155	268	127	151	284	145	194	109	108	106
49	138	161	277	129	156	295	149	191	111	109	107
50	144	174	287	134	163	307	152	197	114	112	108
51	147	183	298	138	173	319	156	207	119	115	110
52	154	189	313	145	181	333	161	215	125	121	114
53	160	201	324	155	195	351	169	227	132	128	118
54	169	205	335	163	205	359	200	236	142	137	126
55	180	217	351	173	213	362	217	252	153	145	131
56	187	225	359	182	222	381	230	275	163	159	140
57	195	227	372	189	226	377	236	292	168	169	149
58	204	239	384	195	238	407	247	297	179	178	157
59	212	245	395	200	242	420	262	308	186	188	166
60	218	250	410	207	255	432	272	312	191	194	173



**60 MINUTE FIRE TEST IN ACCORDANCE WITH BS 476
PART 21:1987 ON A LOADED CEILING FITTED WITH
ANSELL ELECTRICAL PRODUCTS LIMITED FIRE
HOODS.
TEST DATE 27TH JANUARY 2020**

Test Duration (minutes)	Joist Light 1 (°C)	Joist Light 2 (°C)	Joist Light 3 (°C)	Joist Light 4 (°C)	Joist Light 5 (°C)	Joist Light 6 (°C)	Joist Light 7 (°C)	Joist Light 8 (°C)	Joist Non Light 1 (°C)	Joist Non Light 2 (°C)	Joist Non Light 3 (°C)
0	13	14	14	14	14	14	15	15	14	14	14
1	14	14	14	14	14	14	15	15	14	14	14
2	14	14	14	14	14	14	15	15	14	14	14
3	16	14	15	14	14	15	15	15	14	14	14
4	18	14	20	14	14	16	15	15	14	14	14
5	19	15	28	14	15	17	16	16	15	14	15
6	22	18	41	15	16	20	17	17	16	15	15
7	23	23	46	17	18	23	20	21	18	16	17
8	27	30	50	22	21	27	24	28	21	19	19
9	31	37	54	27	26	33	30	34	25	23	22
10	36	45	61	35	31	40	36	40	30	27	26
11	41	52	65	42	37	46	42	46	36	33	29
12	45	58	69	49	42	52	48	54	41	39	34
13	49	65	72	54	47	57	53	60	46	45	38
14	52	69	75	58	51	61	58	65	51	49	42
15	55	72	78	62	55	65	62	68	54	51	45
16	57	75	81	66	57	69	66	70	56	54	49
17	60	77	84	68	60	73	68	72	58	57	51
18	62	79	87	71	63	75	70	77	60	58	53
19	65	80	89	73	66	78	73	78	62	60	55
20	67	81	91	75	68	80	75	81	64	63	57
21	69	81	93	76	69	82	78	82	66	64	59
22	70	83	94	76	71	84	79	82	68	66	61
23	73	85	96	78	72	87	81	83	71	68	63
24	76	86	98	79	74	90	82	85	74	70	66
25	77	86	101	81	76	92	84	87	76	73	68
26	79	87	104	82	78	94	85	88	79	75	70
27	81	87	107	83	79	96	87	89	80	77	72
28	82	88	109	84	81	98	88	90	82	79	74
29	84	89	112	85	82	100	89	91	83	81	76
30	85	89	114	86	84	102	90	92	85	83	77
31	86	90	116	87	86	105	91	93	86	85	79
32	87	90	117	88	87	107	92	94	87	86	81
33	88	91	119	88	88	110	93	95	88	88	82
34	89	92	120	89	90	112	94	95	90	89	84
35	89	92	122	90	91	114	95	96	91	90	86
36	90	93	124	90	92	117	96	96	91	91	87
37	90	93	126	91	93	119	97	97	91	92	88
38	91	94	127	91	94	121	97	97	92	93	89
39	91	94	129	92	95	123	98	99	92	93	90
40	92	95	131	92	95	125	99	101	92	93	90
41	92	95	133	92	96	128	99	102	93	94	91
42	92	96	136	93	97	130	100	103	93	94	92
43	93	97	139	93	97	133	101	105	93	94	92
44	93	97	143	93	98	136	101	106	93	94	93
45	93	98	148	93	99	140	103	108	93	95	93
46	93	99	154	94	101	144	104	110	94	95	93
47	94	101	162	94	102	149	105	113	94	95	93
48	94	103	171	94	104	156	107	116	94	95	94
49	94	107	180	94	107	163	108	119	94	95	94
50	94	112	189	94	112	174	111	123	94	95	94
51	95	118	201	94	118	185	114	129	94	96	94
52	97	127	212	95	126	198	117	137	94	97	94
53	99	136	224	95	134	211	122	146	95	99	94
54	102	145	235	97	144	224	134	154	99	102	95
55	106	154	245	101	152	235	147	164	105	107	95
56	111	164	256	105	159	246	158	173	112	114	96
57	116	172	266	111	168	257	166	181	118	122	97
58	121	182	277	118	177	268	177	190	125	130	101
59	127	188	288	124	185	281	186	200	130	138	107
60	132	196	300	129	192	292	197	210	136	145	113



60 MINUTE FIRE TEST IN ACCORDANCE WITH BS 476
PART 21:1987 ON A LOADED CEILING FITTED WITH
ANSELL ELECTRICAL PRODUCTS LIMITED FIRE
HOODS.
TEST DATE 27TH JANUARY 2020

Test Duration (minutes)	Furnace Mean (°C)	Furnace T/C 1 (°C)	Furnace T/C 2 (°C)	Furnace T/C 3 (°C)	Furnace T/C 4 (°C)	Furnace T/C 5 (°C)	Furnace T/C 6 (°C)	Furnace T/C 7 (°C)	Furnace T/C 8 (°C)
0	57	83	45	53	44	43	52	60	79
1	415	471	462	440	419	394	361	374	399
2	449	500	489	468	451	429	404	417	435
3	488	587	531	518	500	462	430	431	445
4	530	671	573	578	539	508	466	451	452
5	548	588	552	535	511	514	537	539	610
6	758	747	736	772	791	778	783	730	727
7	614	676	661	645	613	591	605	557	566
8	636	725	693	677	625	618	620	572	554
9	655	734	712	678	673	634	641	588	576
10	694	656	731	724	735	696	706	656	648
11	703	668	740	738	742	702	713	667	656
12	708	675	752	749	750	703	719	657	663
13	712	673	760	749	754	703	723	663	668
14	718	689	763	752	761	706	726	671	673
15	725	714	771	765	766	706	731	670	677
16	735	704	770	755	784	731	739	685	708
17	767	735	783	787	805	780	763	745	741
18	780	741	796	808	816	781	783	755	758
19	787	747	806	812	823	796	786	762	764
20	791	755	803	814	816	812	789	766	773
21	789	746	789	808	818	815	793	767	776
22	795	754	793	816	822	820	805	777	777
23	801	761	801	816	827	825	808	783	788
24	808	768	813	829	830	830	816	791	789
25	813	774	816	826	839	834	821	797	794
26	814	782	821	827	840	824	827	786	803
27	806	778	815	810	832	815	817	784	794
28	813	784	824	823	836	826	819	791	802
29	830	808	839	833	854	818	832	818	838
30	845	822	848	837	862	839	844	849	860
31	844	826	848	852	863	847	842	837	834
32	846	832	853	851	867	844	849	835	837
33	849	839	857	853	868	854	849	838	837
34	855	840	863	856	875	859	856	850	842
35	858	843	863	856	879	864	858	850	850
36	864	852	869	870	881	868	865	853	854
37	868	855	876	869	888	872	873	857	857
38	870	858	877	869	887	877	868	861	861
39	877	867	883	880	893	876	876	874	868
40	876	865	876	882	895	875	876	872	869
41	879	871	884	878	896	877	882	872	870
42	880	873	890	885	899	876	880	870	870
43	883	876	888	886	900	883	882	879	872
44	882	870	886	886	901	879	885	868	880
45	886	878	895	883	901	883	886	879	882
46	892	888	899	890	908	889	897	881	885
47	891	885	899	894	907	888	890	879	884
48	896	889	905	894	908	899	895	890	890
49	900	895	908	904	917	900	897	891	888
50	904	899	909	909	920	903	905	893	893
51	921	912	920	915	929	912	916	931	935
52	924	914	922	924	934	914	921	930	933
53	927	921	928	926	937	916	925	931	934
54	931	926	933	931	943	917	928	931	939
55	935	929	937	932	944	925	931	938	940
56	922	920	935	928	938	918	920	902	911
57	927	924	935	931	943	920	924	918	920
58	929	926	939	928	942	922	928	922	922
59	942	936	948	941	953	928	938	932	956
60	950	946	952	943	960	930	948	956	962



16 APPENDIX G

Photographic Record

(14 pages)

- Frame 1: Downlight 1 exposed face pre-test
- Frame 2: Fire hood 1 pre-test
- Frame 3: Fire hood 1 post test
- Frame 4: Downlight 2 exposed face pre-test
- Frame 5: Fire hood 2 pre-test
- Frame 6: Fire hood 2 post test
- Frame 7: Downlight 3 exposed face pre-test
- Frame 8: Fire hood 3 pre-test
- Frame 9: Fire hood 3 post test
- Frame 10: Downlight 4 exposed face pre-test
- Frame 11: Fire hood 4 pre-test
- Frame 12: Fire hood 4 post test
- Frame 13: Downlight 5 exposed face pre-test
- Frame 14: Fire hood 5 pre-test
- Frame 15: Fire hood 5 post test
- Frame 16: Downlight 6 exposed face pre-test
- Frame 17: Fire hood 6 pre-test
- Frame 18: Fire hood 6 post test
- Frame 19: Downlight 7 exposed face pre-test
- Frame 20: Fire hood 7 pre-test
- Frame 21: Fire hood 7 post test
- Frame 22: Downlight 8 exposed face pre-test
- Frame 23: Fire hood 8 pre-test
- Frame 24: Fire hood 8 post test
- Frame 25: Joist identification
- Frame 26: Plasterboard identification
- Frame 27: Calibrated weights pre-test
- Frame 28: Deflection meter pre-test



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Frame 1: Downlight 1 exposed face pre-test



Frame 2: Fire hood 1 pre-test



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Frame 3: Fire hood 1 post test



Frame 4: Downlight 2 exposed face pre-test



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Frame 5: Fire hood 2 pre-test



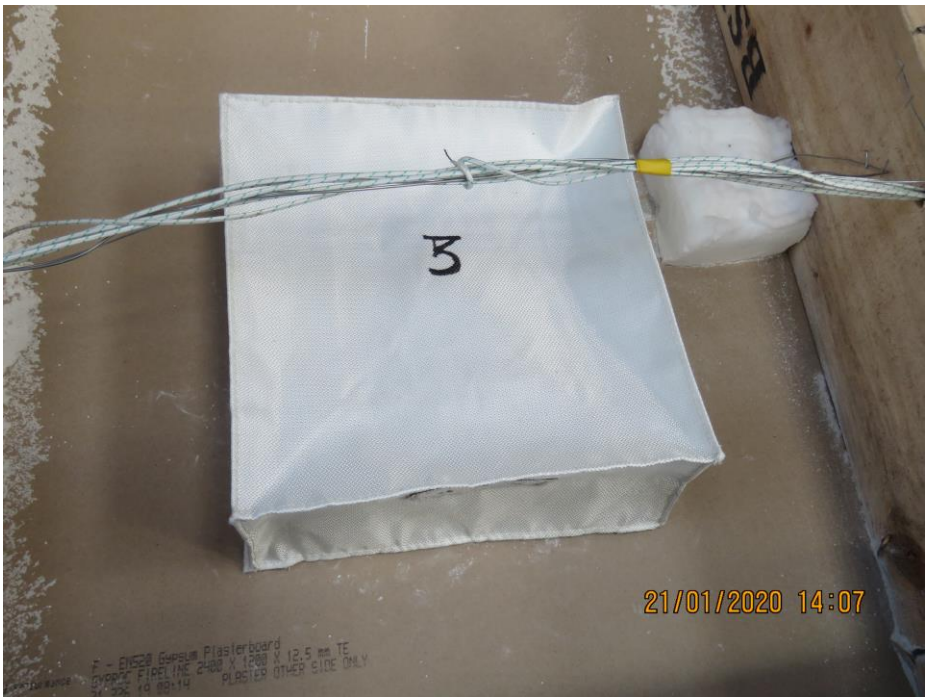
Frame 6: Fire hood 2 post test



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Frame 7: Downlight 3 exposed face pre-test



Frame 8: Fire hood 3 pre-test



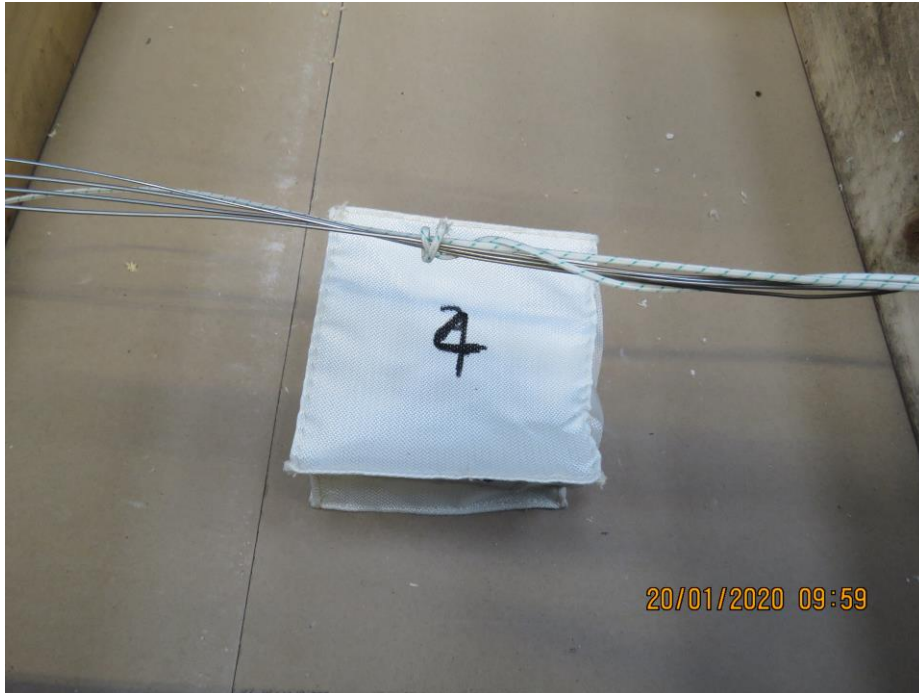


Frame 9: Fire hood 3 post test



Frame 10: Downlight 4 exposed face pre-test





Frame 11: Fire hood 4 pre-test



Frame 12: Fire hood 4 post test



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Frame 13: Downlight 5 exposed face pre-test



Frame 14: Fire hood 5 pre-test



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Frame 15: Fire hood 5 post test



Frame 16: Downlight 6 exposed face pre-test



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Frame 17: Fire hood 6 pre-test



Frame 18: Fire hood 6 post test



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Frame 19: Downlight 7 exposed face pre-test



Frame 20: Fire hood 7 pre-test



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Frame 21: Fire hood 7 post test



Frame 22: Downlight 8 exposed face pre-test



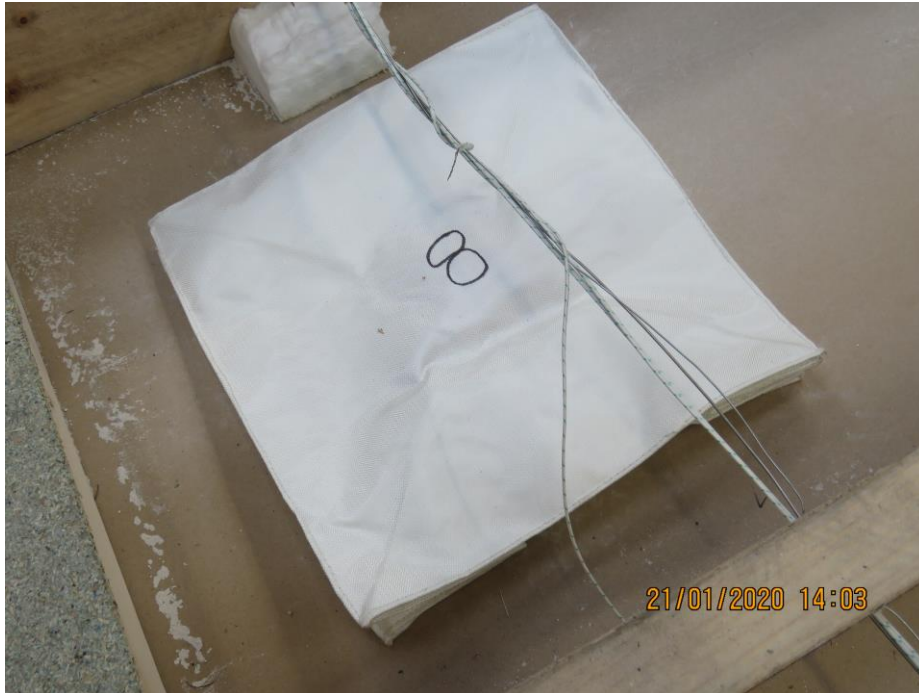
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Frame 23: Fire hood 8 pre-test



Frame 24: Fire hood 8 post test



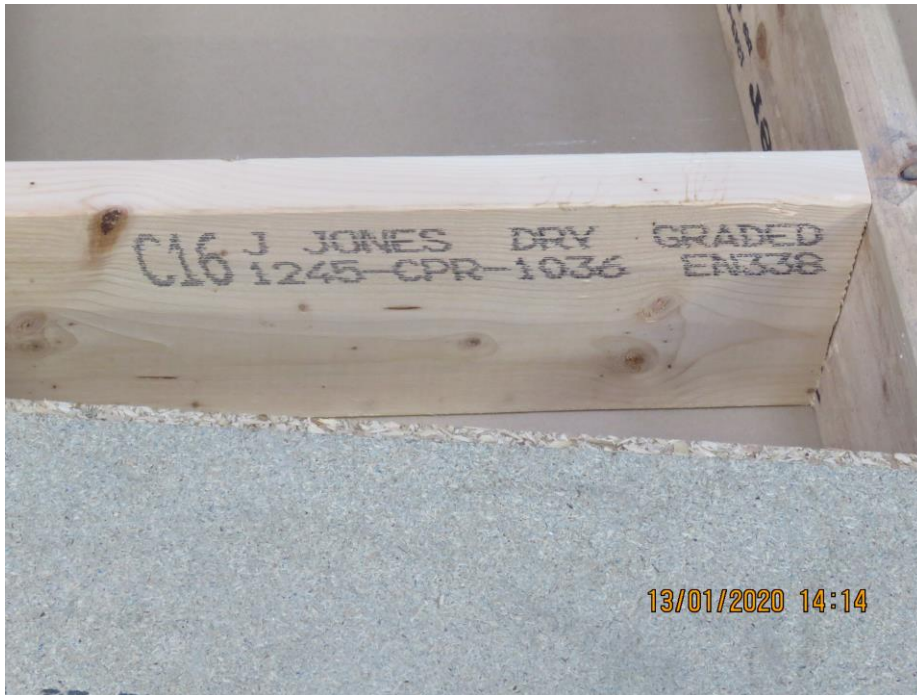
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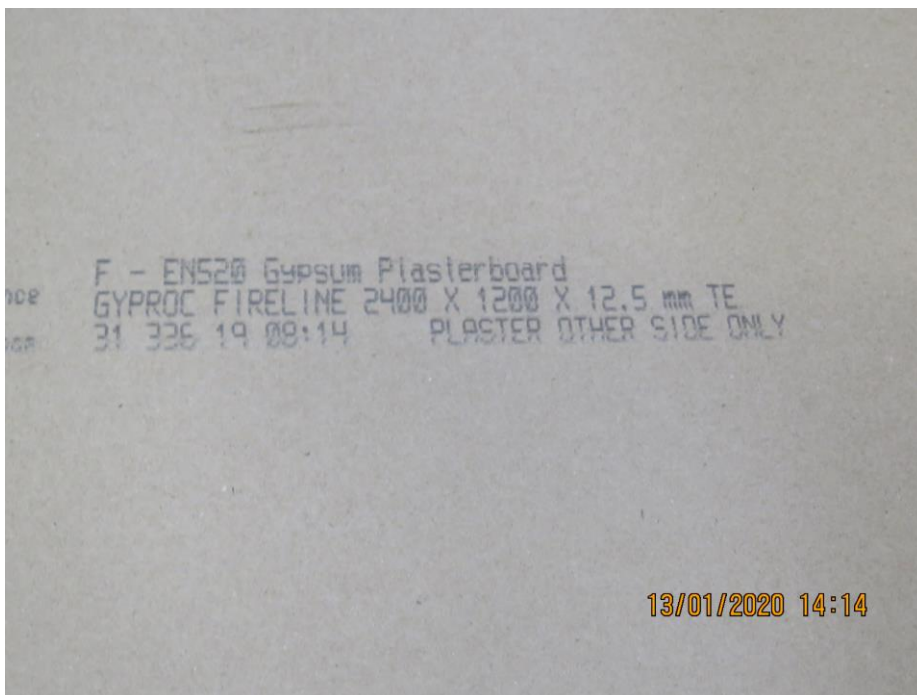
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Frame 25: Joist identification



Frame 26: Plasterboard identification



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Frame 27: Calibrated weights pre-test



Frame 28: Deflection meter pre-test



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17 Appendix H

Ansell Electrical Products Confirmation Letter

(1 page)



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Ansell Fire Hoods Testing

The purpose of this letter is to confirm that Ansell have commissioned Sealite to conduct a 60-minute fire test on the below listed products on Ansell's behalf.

Fire Hood Cover	Size
ADLC/0	150 x 120
ADLC/1	130 x 70
ADLC/2	130 x 100
ADLC/4	180 x 130
ADLC/6	260 x 120
ADLC/7	260 x 230
ADLC/8	300 x 170
ADLC/9	350 x 230

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