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Testing. Advising. Assuring.

Title:

The fire resistance performance of a specimen of a non-loadbearing, wall assembly tested in accordance with BS 476: Part 22: 1987, Clause 5

WF Report No:

397322



Prepared for:

Poundfield Products Limited

The grove, Creeting ST.
Peter,
Ipswich,
Suffolk.
IP6 8QG.

Date:

23rd August 2018



Summary

Objective To determine the fire resistance performance of a non-loadbearing wall assembly when tested in accordance with Clause 5 of BS 476: Part 22: 1987.

Sponsor **Poundfield Products Limited**, The grove, Creeting ST. Peter, Ipswich, Suffolk. IP6 8QG.

Summary of Tested Specimen The test assembly had overall nominal dimensions of 3035 mm high by 3000 mm wide by 100 mm thickness and comprised three horizontally joined concrete panels. The edges of the panels were profiled such that they interlocked.

The specimen was fixed to the furnace restraint frame along the top and bottom and one vertical edge.

Test Results:

Integrity 132 minutes

Insulation 132 minutes

The test was discontinued after a period of 132 minutes.

Date of Test 13th May 2018.

Signatories



Responsible Officer
N. Howard*
Technical Officer



Approved
W. Drazkiewicz*
Senior Technical Officer

* For and on behalf of **Exova Warringtonfire**.

Report Issued

Date: 23rd August 2018

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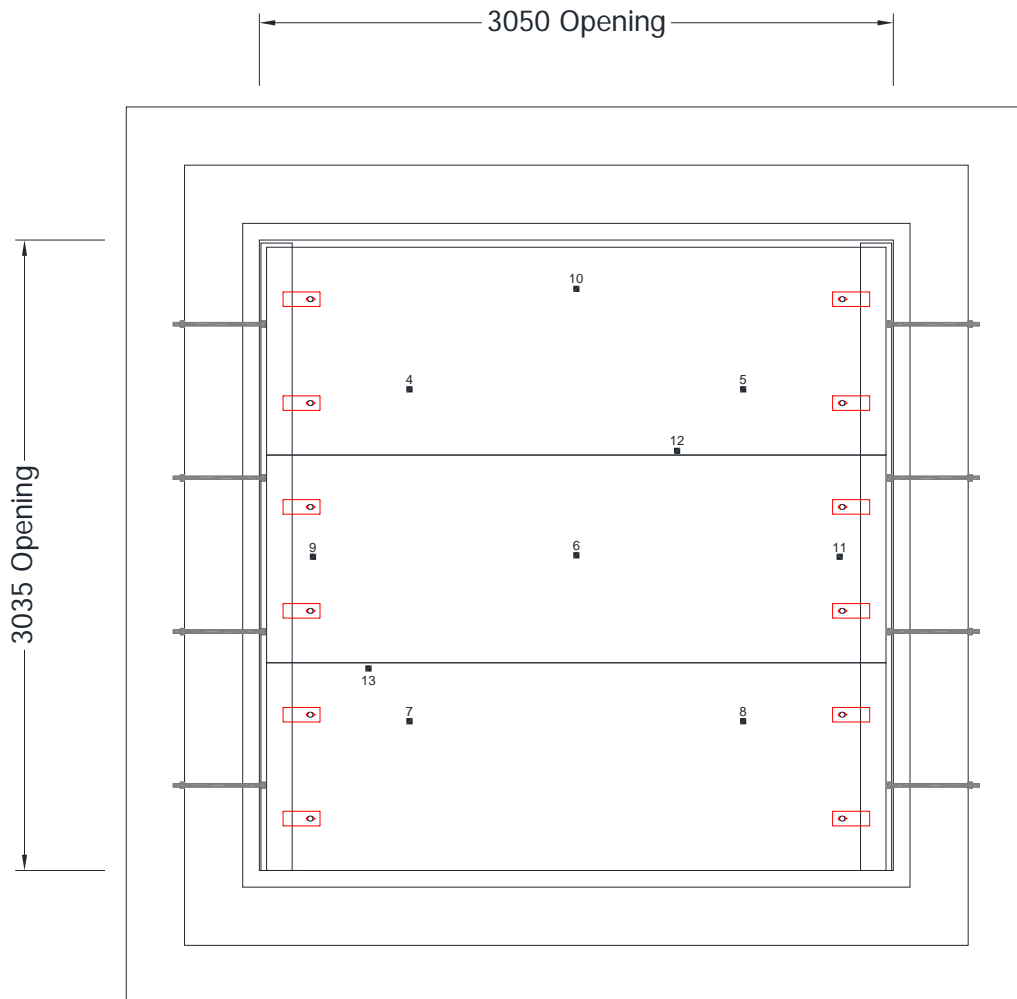
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Test Procedure

Introduction	<p>The specimen was of a non-loadbearing wall construction and the test was conducted in accordance with Clause 5 of BS 476: Part 22: 1987 'Methods for determination of the fire resistance of non-loadbearing elements of construction'. This test report should be read in conjunction with that Standard and with BS 476: Part 20: 1987, 'Methods for determination of the fire resistance of elements of construction (general principles)'.</p> <p>The specimen was judged on its ability to comply with the performance criteria for integrity and insulation, as required by BS 476: Part 22: 1987, Clause 5.</p>
Fire Test Study Group/EGOLF	<p>Certain aspects of some fire test specifications are open to different interpretations. The Fire Test Study Group and EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.</p>
Instruction To Test	<p>The test was conducted on the 13th May 2018 at the request of Poundfield Products Limited, the test sponsor.</p>
Test Specimen Construction	<p>A comprehensive description of the test construction is given in the Schedule of Components. The description is based on a detailed survey of the specimen and information supplied by the sponsor of the test.</p>
Installation	<p>The assembly was installed into a refractory concrete lined, steel restraint frame. Representatives of the test sponsor conducted the installation between the 10th and 12th May 2018.</p>
Sampling	<p>Exova Warringtonfire was not involved in any selection or sampling procedures of the tested specimen.</p>
Conditioning	<p>The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 4 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 16°C to 23°C and 47% to 69% respectively.</p>

Test Specimen

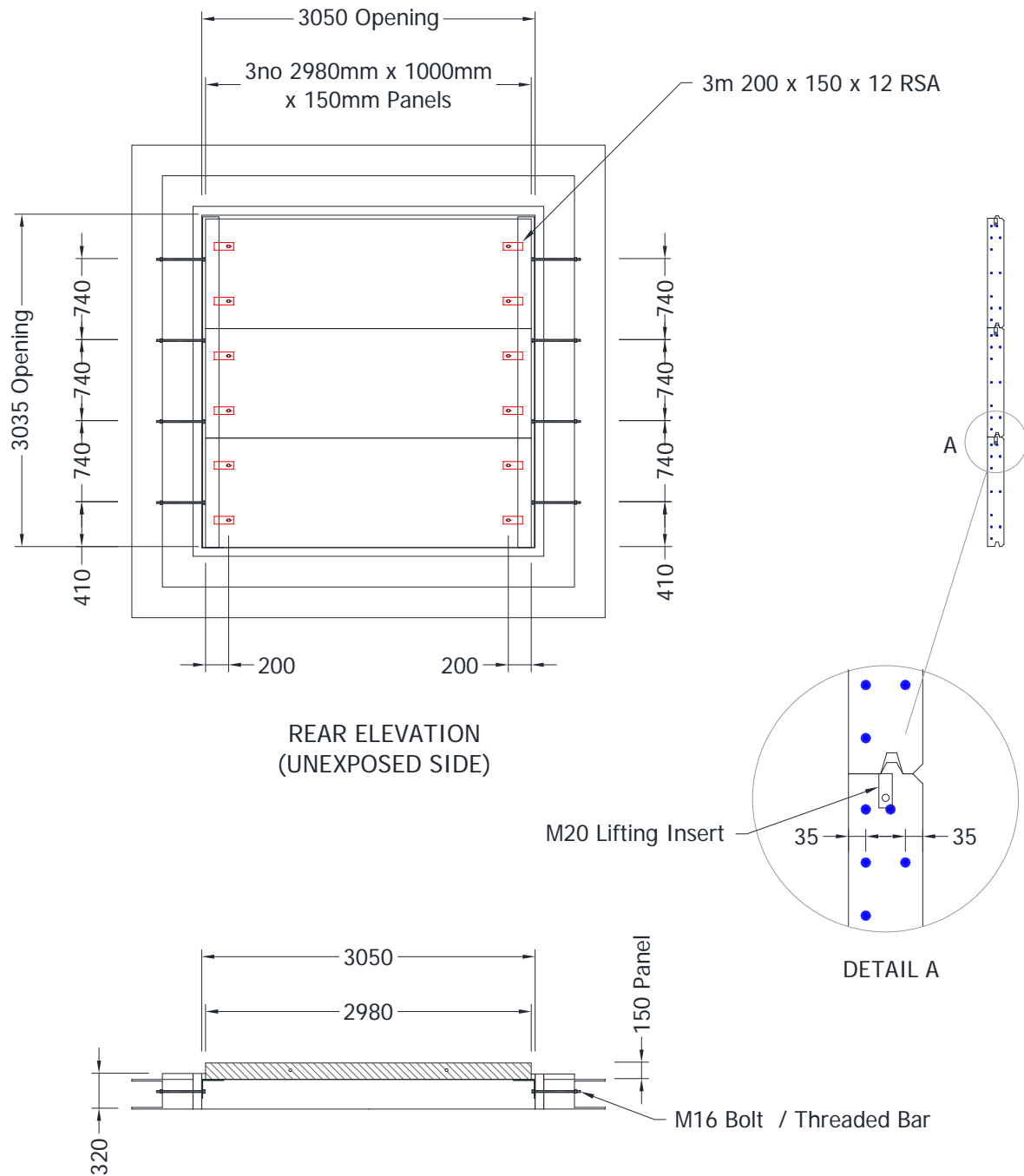
Figure 1- General Elevation of the Unexposed Face of the Test Construction



GENERAL ELEVATION SHOWING
THERMOCOUPLE LOCATIONS
AT UNEXPOSED FACE

Do not scale. All dimensions are in mm

Figure 2 – General Elevation and Sections Showing Specimen Detail



Do not scale. All dimensions are in mm

Instrumentation

General	The instrumentation was provided in accordance with the requirements of the Standard.
Furnace	The furnace was controlled so that its mean temperature complied with the requirements of BS 476: Part 20: 1987, Clause 3.1. Using nine mineral insulated thermocouples distributed over a plane 100 mm from the surface of the test construction.
Thermocouple Allocation	Thermocouples were provided to monitor the unexposed surface of the specimen and the output of all instrumentation was recorded at no less than one minute intervals as follows:
Thermocouples 4 to 8	At five positions, one approximately at the centre and one at approximately the centre of each quarter section of the assembly.
Thermocouple 9	At one position at approximately mid-width, near to the head of the assembly.
Thermocouples 10 and 11	At two positions adjacent to the horizontal joints, at approximately three-quarters the height of the specimen. The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.
Roving Thermocouple	A roving thermocouple was available to measure temperatures on the unexposed surface of the specimen at any position, which might appear to be hotter than the temperatures indicated by the fixed thermocouples.
Integrity criteria	Cotton pads and gap gauges were available to evaluate the impermeability of the specimen to hot gases.
Furnace Pressure	After the first five minutes of testing and for the remainder of the test, the furnace atmospheric pressure was controlled so that it complied with the requirements of BS 476: Part 20: 1987, Clause 3.2.2. The calculated pressure differential relative to the laboratory atmosphere at the top of the specimen was 17 (± 2) Pa.

Test Observations

Time		All observations are from the unexposed face unless noted otherwise.
mins	secs	
		The ambient air temperature in the vicinity of the test construction was 14C at the start of the test with a maximum variation of +3°C during the test.
00	00	The test commences.
07	00	Loud popping sounds are heard as the exposed face of the concrete slabs begin to spall.
15	30	Steam release from the left side of the upper horizontal joint. The exposed surface of the slabs continue to spall.
17	00	The Steam/Smoke release travels along the upper horizontal joint. Moisture descends from its left side.
21	00	Steam release is evident from the lower horizontal joint with a build up of moisture descending.
30	00	The specimen continues to spall but continues to satisfy the integrity and insulation criteria of the test.
40	00	The spalling on the exposed face of the concrete has stopped.
45	00	The specimen distorts at its mid-axis towards the heating conditions.
60	00	The specimen continues to satisfy the integrity and insulation criteria.
90	00	The specimen continues to satisfy the integrity and insulation criteria.
92	00	A large horizontal fissure is evident at the right side of the lower panel. A smaller crack appears at each side of each panel.
120	00	The specimen continues to satisfy the integrity and insulation criteria.
132	00	Test discontinued.

Test Photographs

The exposed face of the test specimen prior to testing



The unexposed face of the test specimen prior to testing



The unexposed face of the test specimen after 20 minutes of testing



The unexposed face of the test specimen after 30 minutes of testing



The unexposed face of the test specimen after 60 minutes of testing



The unexposed face of the test specimen after 90 minutes of testing



The unexposed face of the test specimen after 130 minutes of testing



The exposed face of the test specimen immediately after the test



Temperature and Deflection Data

Mean furnace temperature, together with the temperature/time relationship
Specified in the Standard

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	82
5	576	563
10	678	674
15	739	741
20	781	774
25	815	823
30	842	838
35	865	864
40	885	879
45	902	916
50	918	925
55	932	941
60	945	953
65	957	956
70	968	975
75	979	986
80	988	989
85	998	991
90	1006	1009
95	1014	1020
100	1022	1025
105	1029	1026
110	1036	1032
115	1043	1038
120	1049	1049
125	1055	1055
130	1061	1061
132	1063	1066

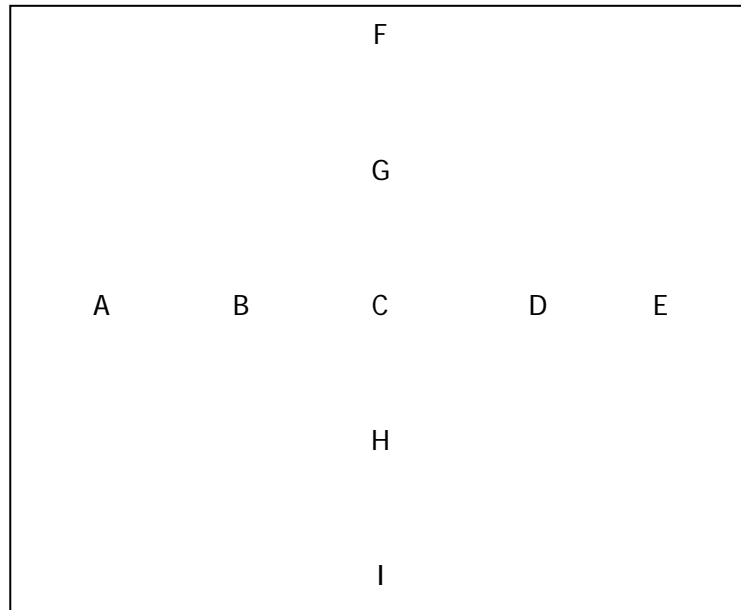
Individual and mean temperatures recorded on the unexposed surface

Time Mins	T/C Number 4 Deg. C	T/C Number 5 Deg. C	T/C Number 6 Deg. C	T/C Number 7 Deg. C	T/C Number 8 Deg. C	Mean Temp Deg. C
0	16	16	16	16	15	16
5	16	16	16	16	15	16
10	16	16	16	16	15	16
15	16	16	16	16	16	16
20	17	17	17	17	16	17
25	19	20	18	18	18	19
30	23	24	21	20	21	22
35	30	29	26	24	26	27
40	38	35	33	29	35	34
45	46	42	42	36	49	43
50	54	49	51	44	61	52
55	61	53	58	52	71	59
60	68	56	65	61	79	66
65	74	59	73	71	86	73
70	80	61	79	77	92	78
75	85	64	85	80	97	82
80	89	71	90	87	98	87
85	93	80	95	95	102	93
90	96	88	99	100	111	99
95	98	93	102	104	120	103
100	100	97	106	109	128	108
105	103	100	110	114	134	112
110	107	104	114	119	141	117
115	111	107	119	124	147	122
120	114	111	123	129	154	126
125	118	115	128	134	161	131
130	122	119	132	138	168	136
132	123	121	134	140	172	138

Individual temperatures recorded on the unexposed surface

Time Mins	T/C Number 9 Deg. C	T/C Number 10 Deg. C	T/C Number 11 Deg. C	T/C Number 12 Deg. C	T/C Number 13 Deg. C
0	16	13	16	17	16
5	16	14	16	17	16
10	16	13	16	17	16
15	16	14	16	17	16
20	16	13	17	21	17
25	18	*	18	35	20
30	22	15	20	48	30
35	28	15	24	58	35
40	37	15	31	66	41
45	46	15	38	68	49
50	54	15	46	78	52
55	60	15	53	77	54
60	66	15	59	79	55
65	71	15	64	83	57
70	75	15	68	85	60
75	79	15	71	88	65
80	82	15	75	90	73
85	85	15	79	95	79
90	87	15	84	98	86
95	90	16	86	103	92
100	92	15	89	107	98
105	94	16	92	111	103
110	96	16	95	116	107
115	98	16	98	121	112
120	99	16	100	124	117
125	100	16	102	128	122
130	103	16	104	132	126
132	104	16	106	134	128

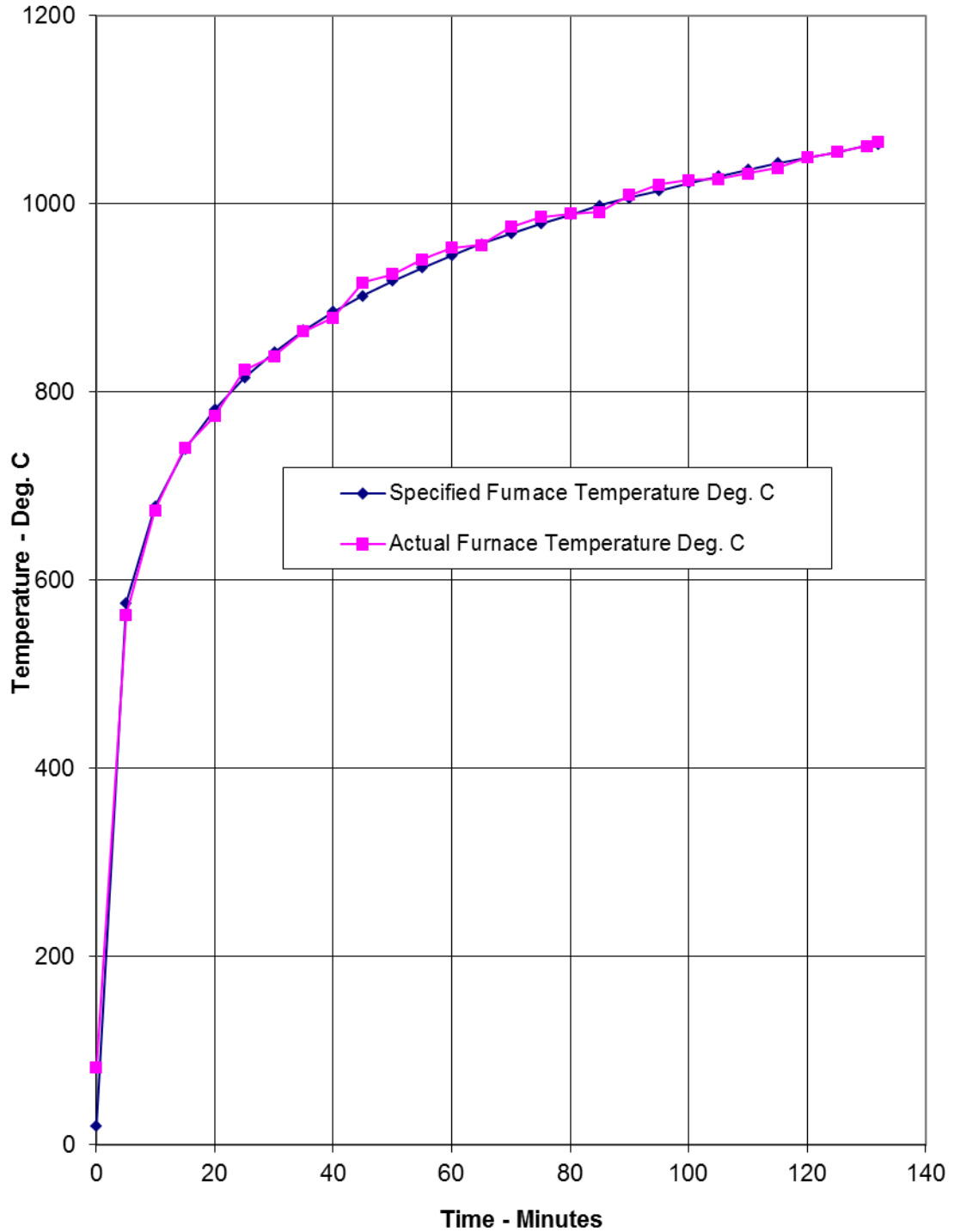
Deflection Of The Specimen During The Test



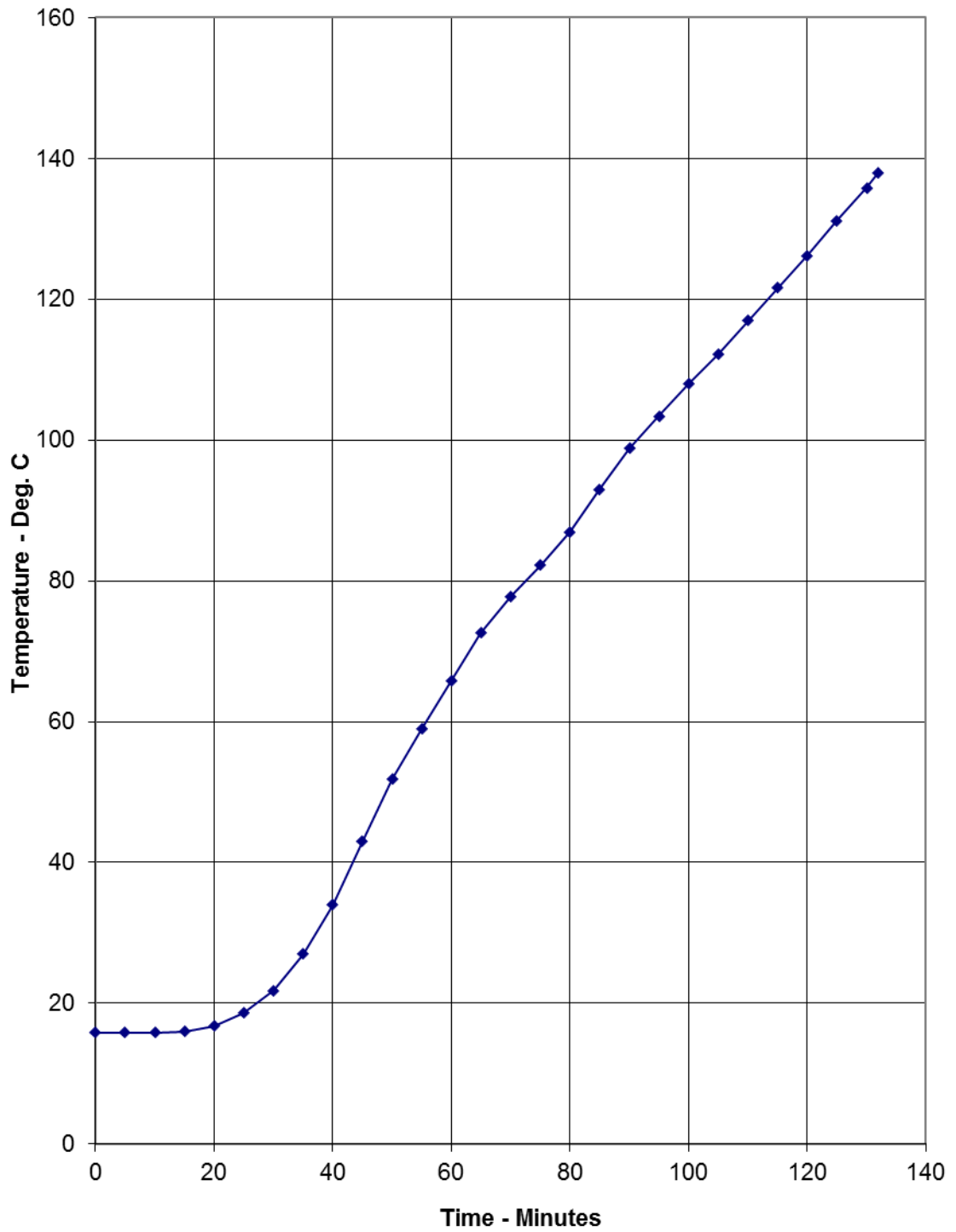
Deflections - mm									
TIME mins	A	B	C	D	E	F	G	H	I
0	0	0	0	0	0	0	0	0	0
10	7	16	17	16	5	16	17	11	9
20	11	24	26	25	8	26	29	24	15
30	21	40	44	41	20	35	39	31	20
40	28	50	57	53	24	38	48	37	25
50	34	59	67	59	29	41	57	49	31
60	34	65	69	62	34	42	63	53	31
70	90	72	82	71	35	50	70	56	34
80	42	75	85	74	39	53	75	*	35
90	43	75	87	78	39	53	80		38
100	41	80	91	82	42	53	88		39
110	39	79	114	82	40	58	88		36
120	48	89	113	89	42	56	89		37
130	62	90	105	92	43	60	94		40

All deflections are in mm
 Positive readings indicate movement towards the furnace
 *Reading malfunction

Graph showing mean furnace temperature, together with the temperature/time relationship specified in the Standard



Graph showing mean temperatures recorded on the unexposed surface



Performance Criteria and Test Results

Integrity It is required that there is no collapse of the specimen, no sustained flaming on the unexposed surface and no loss of impermeability. These requirements were satisfied for 132 minutes the test duration.

Insulation It is required that the mean temperature rise of the unexposed surface shall not be greater than 140°C and that the maximum temperature rise shall not be greater than 180°C. Insulation failure also occurs simultaneously with integrity failure. These requirements were satisfied for a period of 132 minutes.

Ongoing Implications

Limitations The results relate only to the behaviour of the specimen of the element of construction under the particular conditions of 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 specimen tested. Appendix A of BS 476: Part 20: 1987 provides guidance information on the application of fire resistance tests and the interpretation of test data. Application of the results to assemblies of different dimensions or incorporating different components should be the subject of a design appraisal.

Review The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

Conclusions

**Evaluation
against
objective**

A specimen of a non-loadbearing, wall assembly has been subjected to a fire resistance test in accordance with BS 476: Part 22: 1987, Clause 5.

The specimen satisfied the performance requirements specified in the Standard for the periods stated below:

Test Results:

Integrity 132 minutes*

Insulation 132 minutes*

*The test duration. The test was discontinued after a period of 132 minutes.