

Fire resistance test report

Issuing laboratory: Warringtonfire Testing and Certification Limited

Test standard: BS EN 1365-1:2012

Test sponsor: earth4Earth

Sheffield Technology Parks
Arundel Street
Sheffield
S1 2NS
United Kingdom

Product: Symmetrical, Loadbearing Wall Assembly

Report number: 557961/R

Test date: 15 June 2026

Issue: 1

Warringtonfire, accredited for compliance with ISO/IEC 17025:2017 – Testing

Registered Laboratory:
Warringtonfire
Holmesfield Road
Warrington
Cheshire
WA1 2DS
United Kingdom



Approved Body Number 0833



Summary of Tested Specimen

The specimen had overall nominal dimensions of 2800 mm high by 3000 mm wide by 215 mm thick and was formed from two courses of earth4Earth N10 Negative Carbon Brick with dimensions of 65 mm deep x 102.5 mm wide x 215 mm long.

The brick was lay in an English bond pattern and bonded together with sand and cement mortar (5:1 mix).

At the request of the test sponsor, the wall supported a total applied load of 30 kN. The load was applied via steel load spreader and hydraulic rams to the underside of the test specimen. The wall was unrestrained on both vertical edges.

Detailed drawings of the test specimen(s) and a comprehensive description of the test construction based on a detailed survey of the specimen(s) and information supplied by the sponsor of the test are included in the Test Specimen and Schedule of Components sections of this report.

Test Results

Loadbearing Capacity	The maximum allowable vertical contraction and the maximum rate of vertical contraction for the specimen, as specified by the Standard, are calculated as 28.00 mm and 8.4 mm per minute respectively. The deflection is taken at two locations with the average used to calculate the loadbearing capacity. The requirements were satisfied for:																			
	264 minutes	No failure*																		
Integrity	It is required that the specimen retains its separating function, without: - causing ignition of a cotton pad when applied - permitting the penetration of a gap gauge as specified in BS EN 1363-1: 2020 - sustained flaming on the unexposed surface - subsequent failure of loadbearing capacity These requirements were satisfied for the periods shown below: <table><tr><td>Sustained flaming</td><td>264 minutes</td><td colspan="3">No failure*</td></tr><tr><td>Gap gauge</td><td>264 minutes</td><td colspan="3">No failure*</td></tr><tr><td>Cotton pad</td><td>264 minutes</td><td colspan="3">No failure*</td></tr></table>					Sustained flaming	264 minutes	No failure*			Gap gauge	264 minutes	No failure*			Cotton pad	264 minutes	No failure*		
Sustained flaming	264 minutes	No failure*																		
Gap gauge	264 minutes	No failure*																		
Cotton pad	264 minutes	No failure*																		
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 the period shown below: <table><tr><td>264 minutes</td><td colspan="4">No failure*</td></tr></table>					264 minutes	No failure*													
264 minutes	No failure*																			
Radiation	BS EN 1363-2: 1999 requires that the time for the measured radiation to exceed 5, 10, 15, 20 and 25 kW/m² is reported. <table><tr><td>5 kW/m²</td><td>10 kW/m²</td><td>15 kW/m²</td><td>20 kW/m²</td><td>25 kW/m²</td></tr><tr><td>264 minutes</td><td>264 minutes</td><td>264 minutes</td><td>264 minutes</td><td>264 minutes</td></tr></table> *Test was discontinued after a period of 264 minutes.					5 kW/m²	10 kW/m²	15 kW/m²	20 kW/m²	25 kW/m²	264 minutes	264 minutes	264 minutes	264 minutes	264 minutes					
5 kW/m²	10 kW/m²	15 kW/m²	20 kW/m²	25 kW/m²																
264 minutes	264 minutes	264 minutes	264 minutes	264 minutes																

Date of Test 15 June 2026

Location of Test Element Materials Technology, 722 Birchwood Park, Warrington WA3 6FW, United Kingdom

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Quality Management

Issue No: 1		Issue Date: 30 June 2026	
Responsible Officer:	K. Brennan* Technical Officer	Approved By:	G. Edmonds* Senior Technical Officer
			

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

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Test Conditions

Standard	In accordance with BS EN 1365-1:2012 Fire resistance tests for loadbearing elements - Part 1: Walls.
Sampling	Warringtonfire was not involved in the sampling or selection of the tested specimen or any of the components. The results obtained during the test only apply to the test samples as received and tested by Warringtonfire.
Installation	The specimen was received on the 07 May 2026 and installed into a refractory concrete lined steel restraint frame, such that both vertical edges had freedom of movement. The specimen was installed by representatives of WarringtonFire between the 13 May 2026 and 15 May 2026.
Specimen Direction	Tested specimen was symmetrical . The Test Sponsor defined the direction in which the specimen was tested, and it is shown in the test specimen drawings section of this report.
Conditioning	The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 40 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 12.5°C to 29.0°C and 32.0% to 79.0% respectively.
Instruction to Test	The test was conducted on the 15 June 2026 at the request of earth4Earth, the Test Sponsor .
Ambient Temperature	The ambient air temperature in the vicinity of the test construction was 20°C at the start of the test with a maximum variation of +4°C during the test.
Furnace	The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2020 Clause 5.1 using nine plate thermometers, distributed over a plane 100 mm from the surface of the test construction.
Thermocouples	Thermocouples were provided to monitor the unexposed surface of the specimen. The output of all instrumentation was recorded at no less than one-minute intervals. The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.
Application of the load	The full test load was applied via hydraulic rams uniformly distributed over the test specimen 60 minutes before the commencement of the test.
Radiation	A water-cooled foil heat-flux meter was used to record the heat radiation from the specimen. The heat flux meter was positioned at a distance of 1 metre from the centre of the specimen.
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 EN 1363-1: 2020, clause 5.2.1 The calculated pressure differential relative to the laboratory atmosphere at the top of the specimen was 19.6 ($\pm$ 5) Pa between 5 and 10 minutes and 19.6 ($\pm$ 3) Pa thereafter.

Test Specimen Drawings

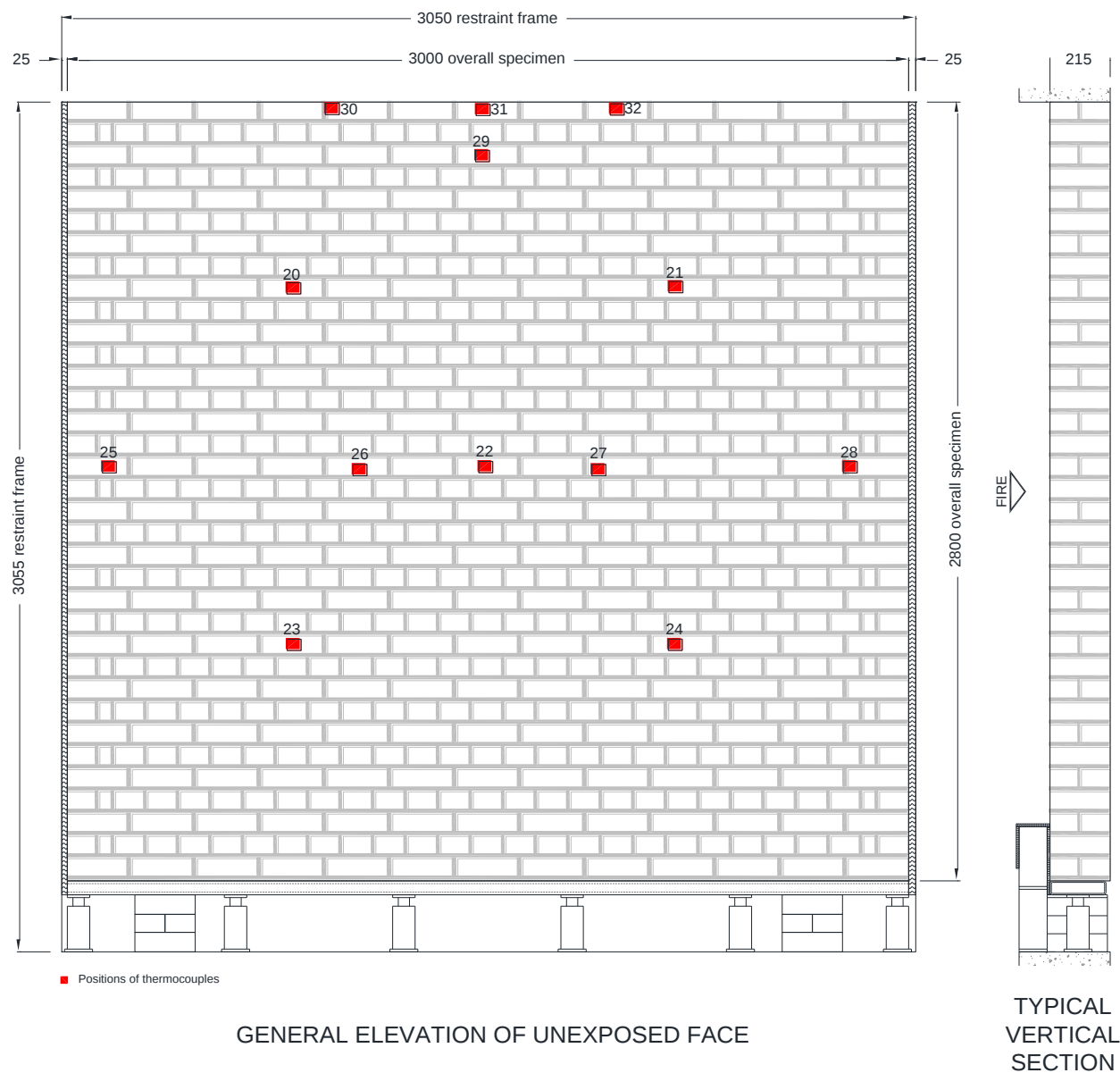


Figure 1. General elevation of unexposed face showing thermocouple positions & typical vertical section

Schedule of Components

Table 1. details the schedule of components which describes the test specimen and lists the components used in the construction of the test specimen. These were provided by the test sponsor and surveyed by Warringtonfire.

All measurements were verified by Warringtonfire unless stated otherwise in the schedule of components. All components marked with an “*” have not been verified by Warringtonfire.

Table 1: Schedule of Components

Double leaf brick wall (English bond)

1. Brick	
Manufacturer	earth4Earth
Reference	N10 Negative Carbon Brick
Material	Soil, sand, carbon-free lime
Overall size	102.5 mm wide x 65 mm high x 215 mm long
Density	1900 kg/m ³ (stated)
Fixing method	Sand / cement mortar, mix 5:1
Manufacturing date	01/10/25
Production codes	e4E-2025/10-N10132-01 e4E-2025/10-N10132-02 e4E-2025/10-N10132-03
Batch code	N10-BATCH-2025-10-30
2. Mortar	
Material	Sand / cement mortar, mix 5:1
Overall size	10 mm – 15 mm thick mortar to head joints 15 mm – 20 mm thick mortar to bed joints

Test Observations

Time All observations are from the unexposed face unless noted otherwise.

mins secs

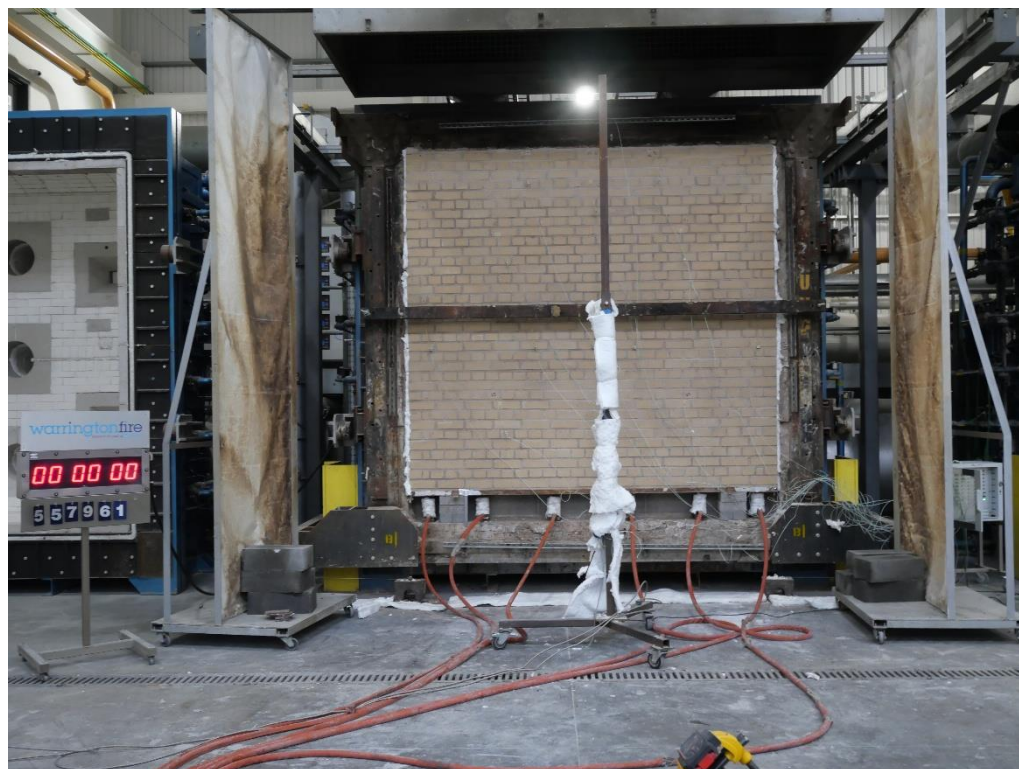
-60	00	Load applied and maintained
00	00	The Test Commences.
18	00	Multiple areas of moisture release in mortar joints on the unexposed face.
28	00	Moisture release through mortar joints developing across entire specimen on the unexposed face.
58	00	No significant visible change when viewed from exposed face.
60	00	Specimen maintaining all performance criteria.
61	00	Steam release around perimeter of specimen when view from the unexposed face.
90	00	No significant visible change to the unexposed face.
120	00	Specimen maintaining performance criteria.
132	00	No signs of deterioration in brickwork.
140	00	Brickwork darkened in colour on the unexposed face.
180	00	No significant visible change, specimen maintaining performance criteria.
264	00	The test is discontinued at the Sponsor's request.

Test Photographs

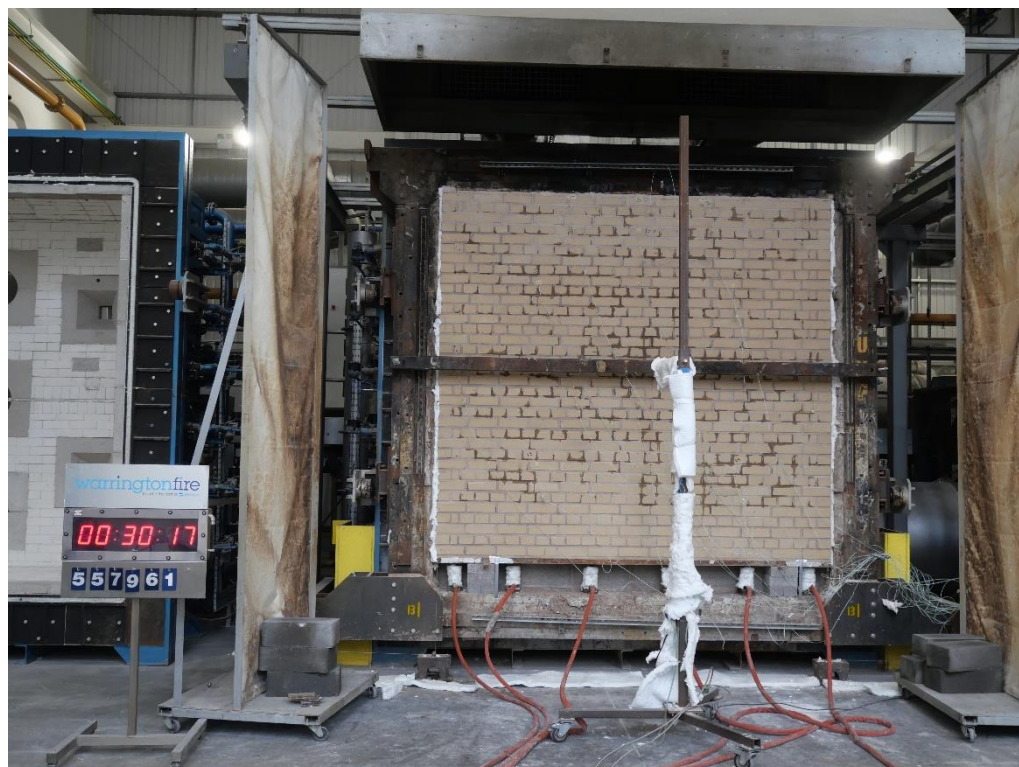
The exposed face of the wall assembly prior to testing



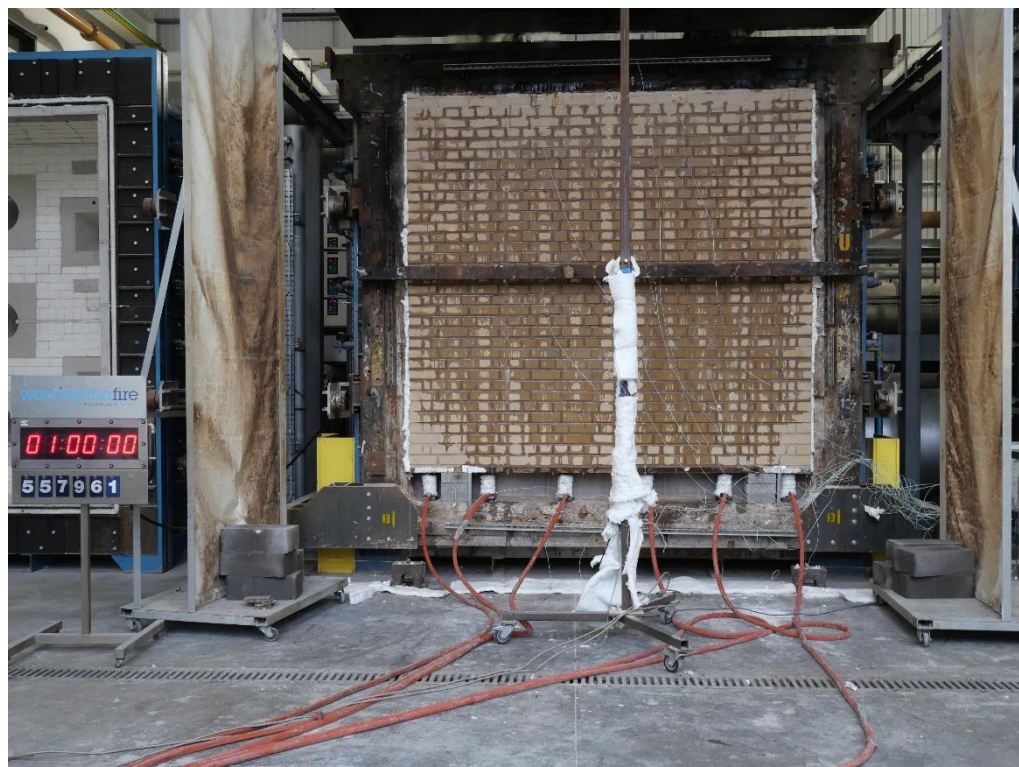
The unexposed face of the wall assembly prior to the start of the test



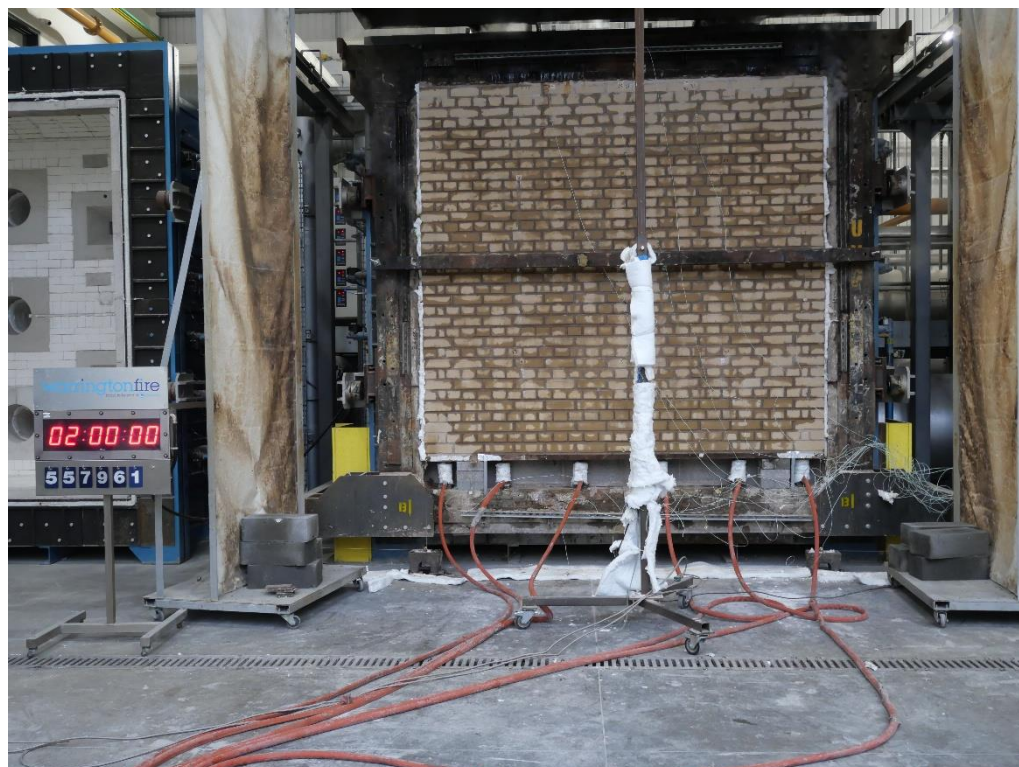
The unexposed face of the wall assembly after a test duration of 30 minutes



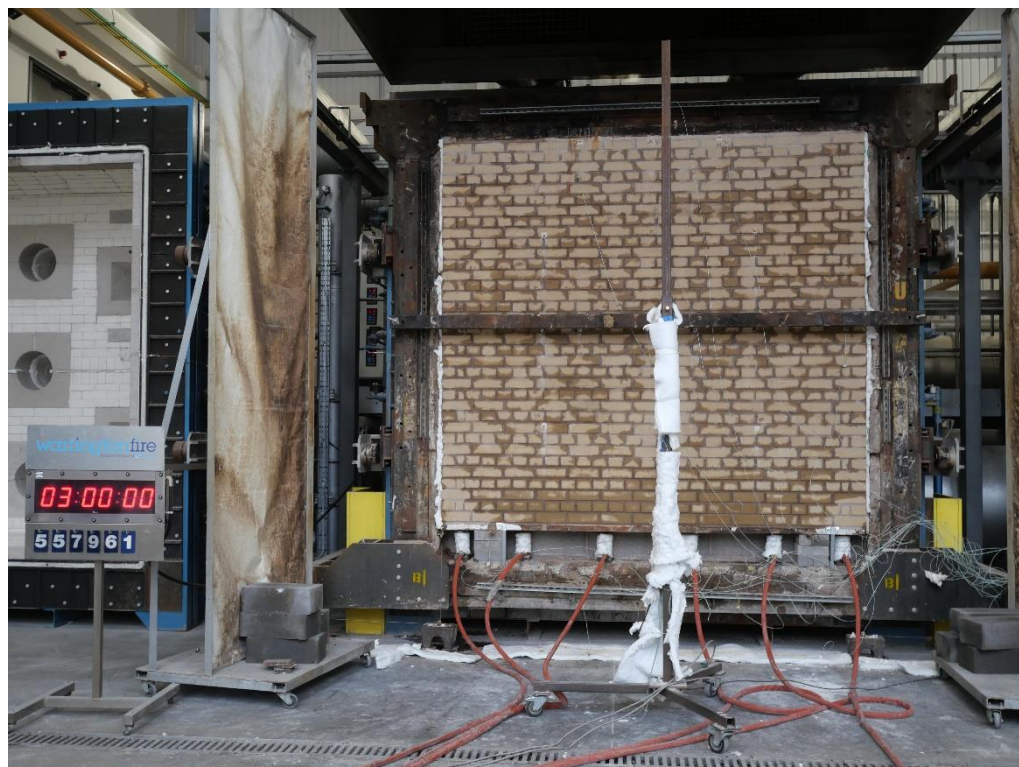
The unexposed face of the wall assembly after a test duration of 60 minutes



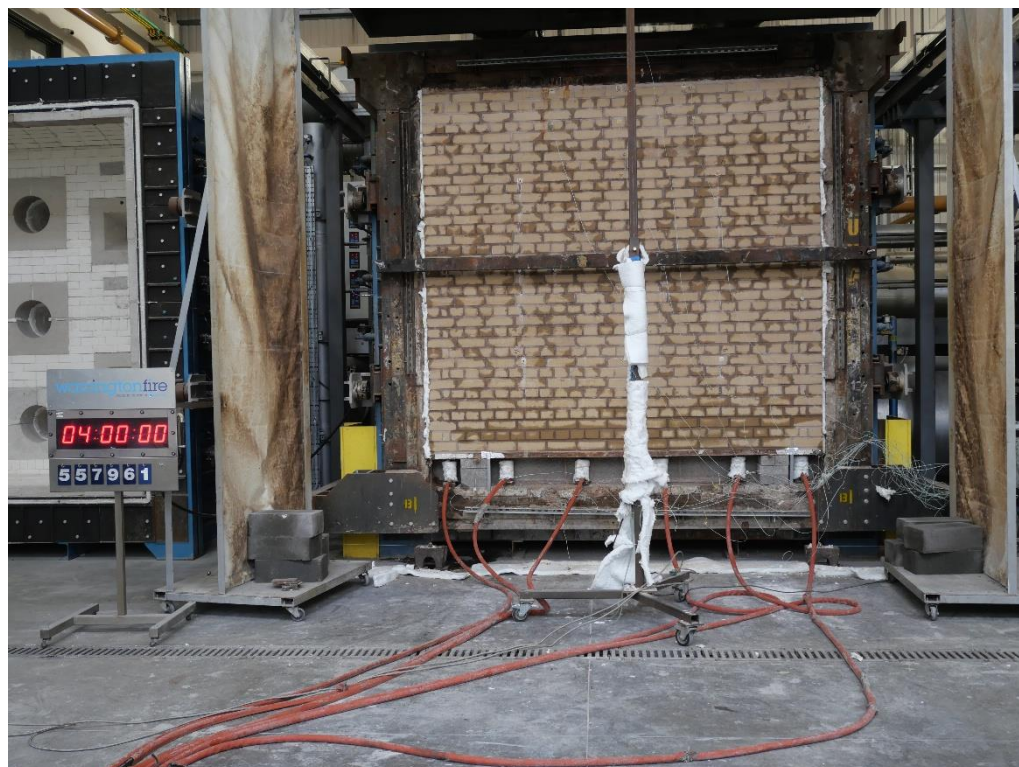
The unexposed face of the wall assembly after a test duration of 120 minutes



The unexposed face of the wall assembly after a test duration of 180 minutes



The unexposed face of the wall assembly after a test duration of 240 minutes



The unexposed face of the wall assembly at the termination of the test



Test Data

Mean furnace temperature, together with the temperature/time relationship specified in BS EN 1363-1: 2020

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	20
10	678	674
20	781	780
30	842	844
40	885	894
50	918	924
60	945	950
70	968	965
80	988	981
90	1006	999
100	1022	1016
110	1036	1033
120	1049	1047
130	1061	1061
140	1072	1074
150	1082	1087
160	1092	1098
170	1101	1109
180	1110	1112
190	1118	1119
200	1126	1126
210	1133	1133
220	1140	1139
230	1146	1146
240	1153	1152
250	1159	1159
260	1165	1166
264	1167	1168

Individual and mean temperatures recorded on the unexposed surface of the specimen

Time Mins	T/C Number 20 Deg. C	T/C Number 21 Deg. C	T/C Number 22 Deg. C	T/C Number 23 Deg. C	T/C Number 24 Deg. C	Mean Temp Deg. C
0	20	20	20	20	20	20
10	20	20	20	20	20	20
20	20	20	20	20	20	20
30	21	20	23	20	21	21
40	25	22	30	21	24	24
50	*	25	36	*	29	30
60	*	*	42	*	35	39
70	*	*	46	*	41	44
80	*	*	50	*	*	50
90	*	*	53	*	*	53
100	*	*	56	*	*	56
110	*	*	58	*	*	58
120	*	*	60	*	*	60
130	*	*	62	*	*	62
140	*	*	63	*	*	63
150	*	*	64	*	*	64
160	*	*	66	*	*	66
170	*	*	68	*	*	68
180	*	*	70	*	*	70
190	*	*	72	*	*	72
200	*	*	74	*	*	74
210	*	*	75	*	*	75
220	*	*	77	*	*	77
230	*	*	78	*	*	78
240	*	*	79	*	*	79
250	*	*	80	*	*	80
260	*	*	81	*	*	81
264	*	*	82	*	*	82

* Indicates Thermocouple Malfuction

Individual temperatures recorded on the unexposed surface of the specimen

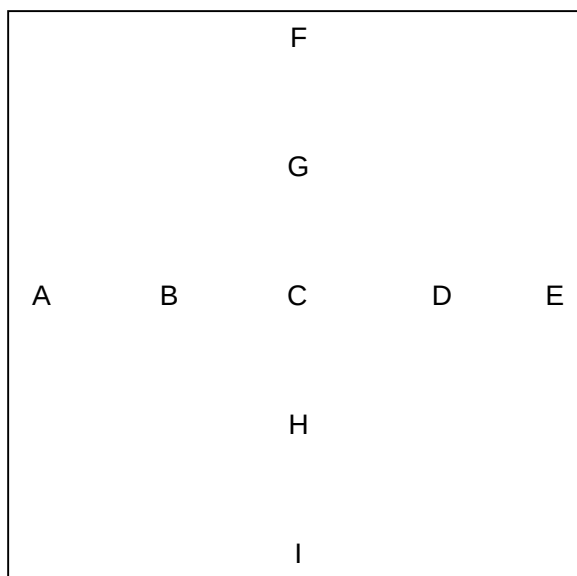
Time Mins	T/C Number 25 Deg. C	T/C Number 26 Deg. C	T/C Number 27 Deg. C	T/C Number 28 Deg. C	T/C Number 29 Deg. C	T/C Number 30 Deg. C	T/C Number 31 Deg. C	T/C Number 32 Deg. C
0	20	20	21	20	20	20	21	20
10	20	20	21	20	20	26	24	25
20	20	20	21	21	20	31	33	33
30	21	23	21	21	21	36	45	41
40	24	32	22	23	23	44	58	49
50	35	40	29	31	27	45	68	57
60	*	47	36	43	31	47	75	64
70	*	*	41	51	38	51	81	71
80	*	*	*	57	45	54	86	76
90	*	*	*	60	50	56	90	81
100	*	*	*	62	55	59	96	85
110	*	*	*	69	59	61	99	88
120	*	*	*	70	62	62	101	90
130	*	*	*	71	65	66	103	93
140	*	*	*	70	67	70	106	96
150	*	*	*	70	68	74	110	98
160	*	*	*	70	70	76	116	100
170	*	*	*	70	71	77	122	103
180	*	*	*	70	72	78	129	105
190	*	*	*	70	73	80	136	107
200	*	*	*	71	75	82	143	110
210	*	*	*	71	76	84	150	114
220	*	*	*	72	77	86	156	117
230	*	*	*	72	78	88	162	122
240	*	*	*	73	79	90	168	126
250	*	*	*	73	80	92	173	131
260	*	*	*	74	81	94	178	135
264	*	*	*	74	81	94	180	137

* Indicates Thermocouple Malfunction

Recorded heat radiation intensity from the specimen

Time Mins	Radiation Intensity kW/m ²
0	0.000
10	-0.007
20	0.001
30	0.006
40	0.015
50	0.037
60	0.057
70	0.086
80	0.106
90	0.114
100	0.124
110	0.130
120	0.142
130	0.158
140	0.162
150	0.168
160	0.174
170	0.186
180	0.189
190	0.200
200	0.198
210	0.224
220	0.234
230	0.234
240	0.234
250	0.230
260	0.247
264	0.249

Deflection of the specimen during the test



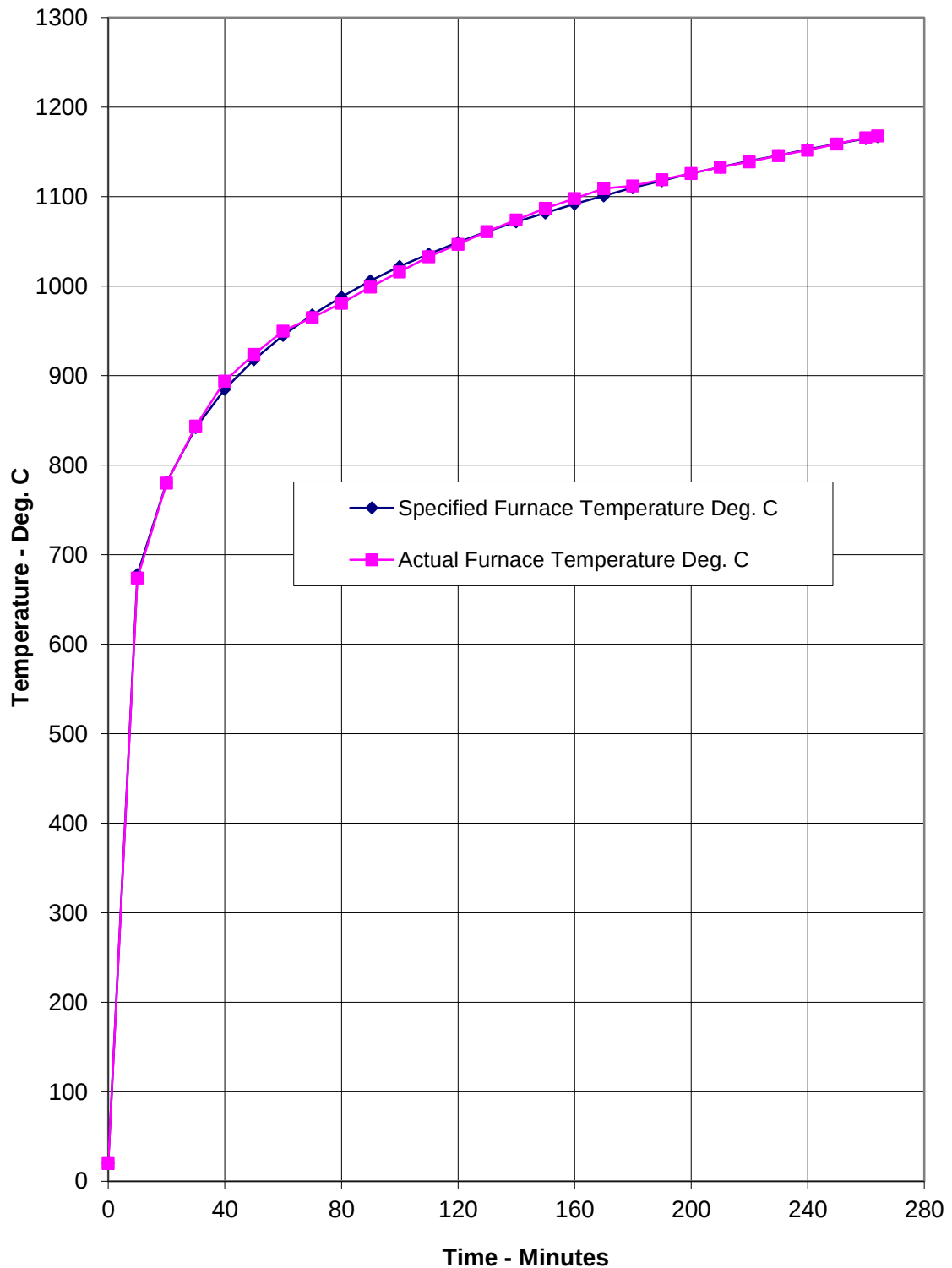
TIME mins	A	B	C	D	E	F	G	H	I
0	0	0	0	0	0	0	0	0	0
10	0	7	5	7	4	10	4	6	0
20	1	12	14	8	2	3	9	10	-1
30	4	15	18	15	2	2	13	14	0
40	2	14	19	15	3	3	12	15	2
50	2	15	20	15	1	1	12	14	3
60	-2	15	17	14	0	0	11	13	3
70	2	17	18	13	0	3	12	13	1
80	-3	17	20	13	-2	4	11	14	4
90	1	17	19	15	-2	3	9	14	3
100	-8	18	19	15	-1	7	12	15	2
110	0	19	21	16	0	2	10	15	4
120	-1	20	20	14	-1	3	12	16	4
140	-3	19	21	15	0	6	14	16	3
160	0	22	22	18	1	4	14	18	4
180	1	21	24	16	0	4	13	18	4
200	1	22	25	19	-1	2	16	18	4
220	1	23	23	19	1	3	15	19	4
240	0	22	25	20	1	4	10	19	4
260	1	23	25	20	3	4	8	18	4

Positive deflections indicate movement towards the furnace chamber

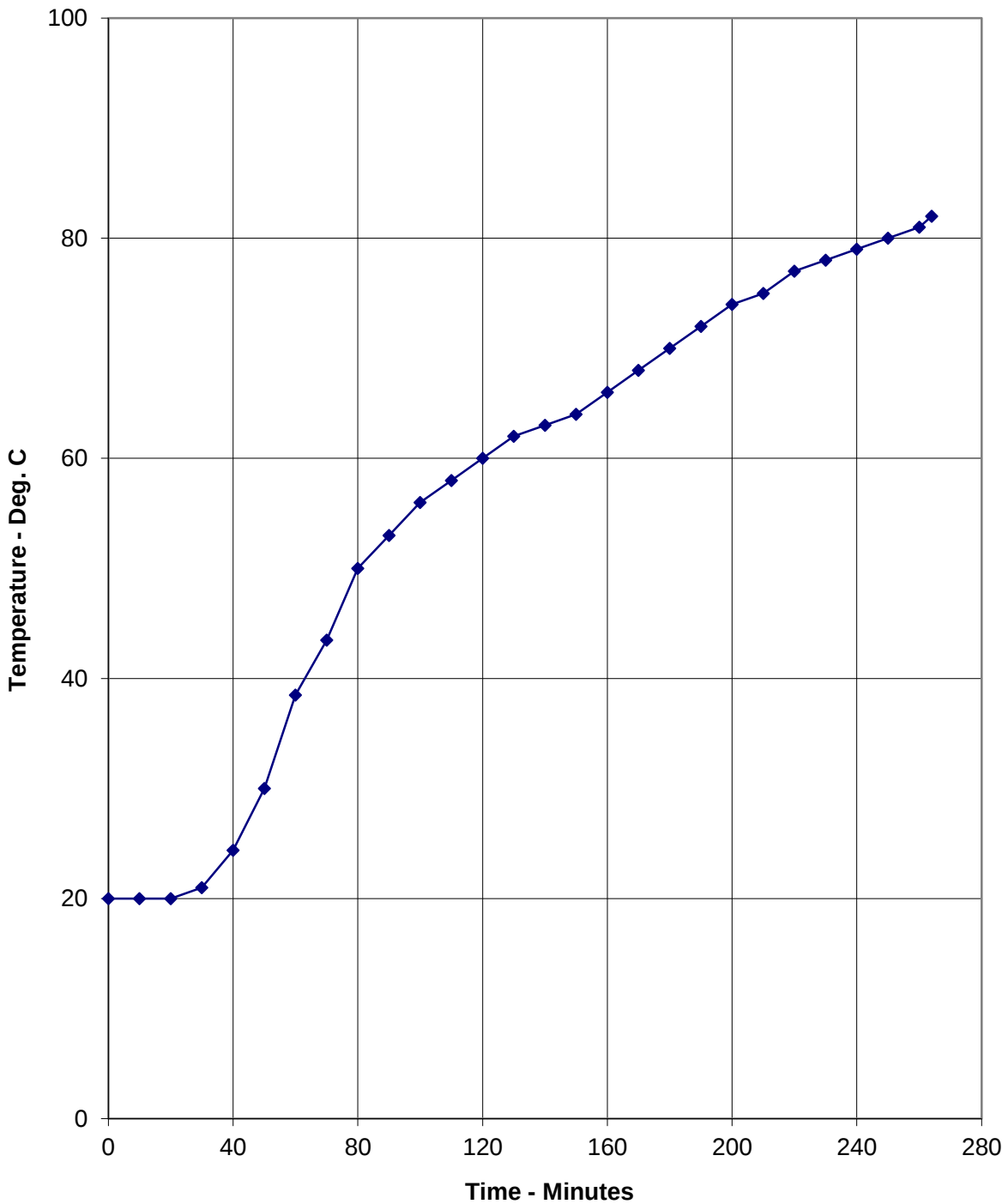
Individual and mean recorded vertical contraction of specimen during the test

Time Mins	Left Vertical Contraction mm	Right Vertical Contraction mm	Mean Vertical Contraction mm	Rate Of Contraction mm/min
0	0.000	0.000	0.000	0.000
10	0.038	0.081	0.060	-0.002
20	-0.381	-0.199	-0.290	-0.067
30	-0.823	-0.730	-0.777	-0.021
40	-1.038	-0.794	-0.916	-0.018
50	-1.372	-0.965	-1.169	-0.019
60	-1.581	-1.124	-1.353	-0.017
70	-1.801	-1.329	-1.565	-0.025
80	-1.993	-1.445	-1.719	-0.020
90	-2.047	-1.516	-1.782	-0.002
100	-2.047	-1.549	-1.798	-0.001
110	-2.049	-1.568	-1.809	0.000
120	-2.060	-1.569	-1.815	0.000
130	-2.061	-1.569	-1.815	0.000
140	-2.062	-1.569	-1.816	0.000
150	-2.063	-1.570	-1.817	0.000
160	-2.065	-1.569	-1.817	0.000
170	-2.067	-1.568	-1.818	0.000
180	-2.068	-1.569	-1.819	0.000
190	-2.069	-1.569	-1.819	0.000
200	-2.070	-1.569	-1.820	0.000
210	-2.070	-1.570	-1.820	0.000
220	-2.070	-1.573	-1.822	0.000
230	-2.071	-1.595	-1.833	-0.002
240	-2.071	-2.606	-2.339	0.000
250	-2.072	-2.627	-2.350	-0.003
260	-2.072	-2.681	-2.377	0.000
264	-2.073	-2.699	-2.386	-0.003

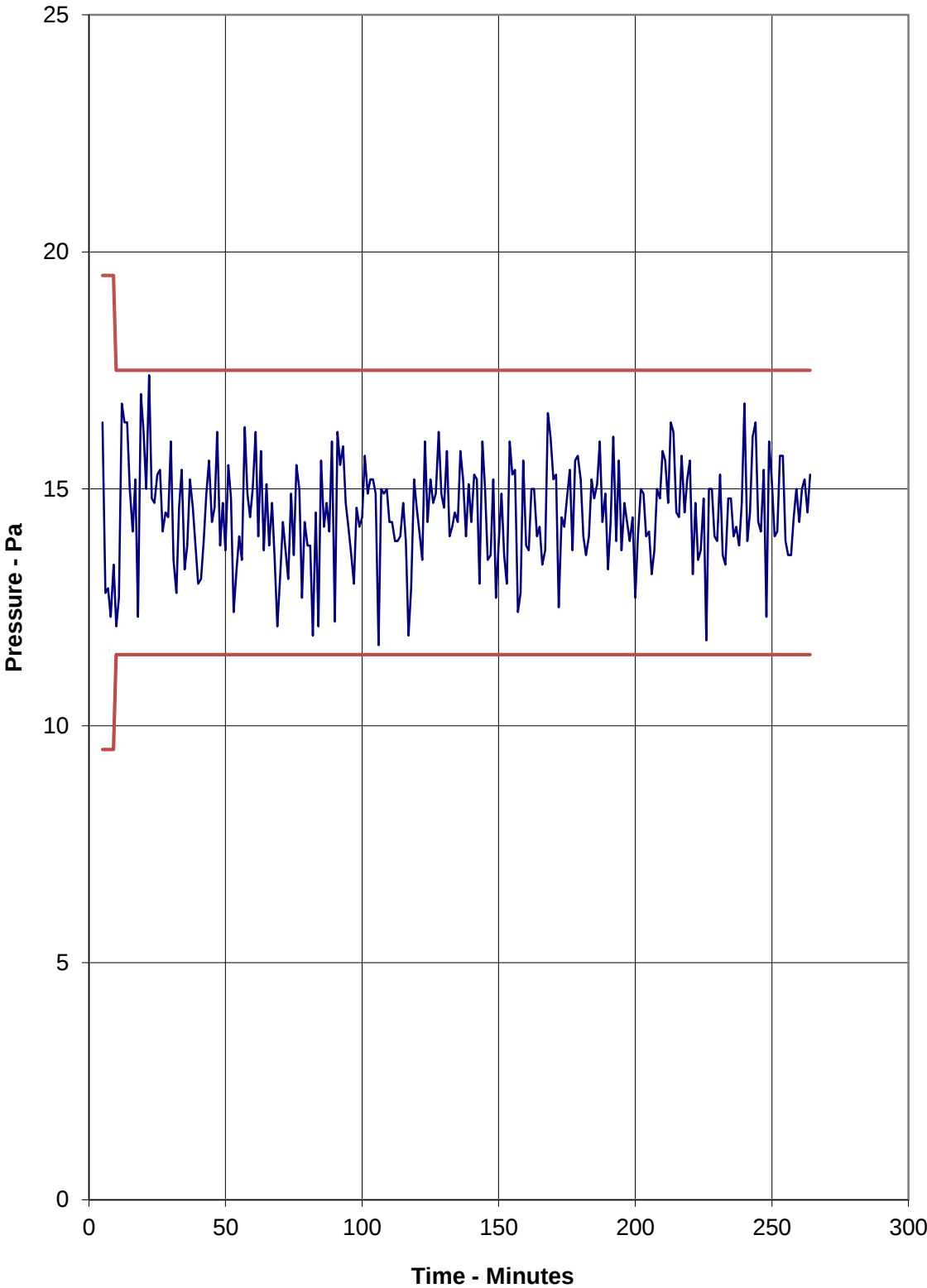
Graph showing mean furnace temperature, together with the temperature/time relationship specified in BS EN 1363-1: 2020



Graph showing mean temperature recorded on the unexposed surface of the specimen



Graph showing recorded furnace pressure 500 mm below the head of the wall assembly



On-going Implications

Validity

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The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criteria for assessing the potential fire hazard of the product in use, nor can the results be extrapolated and applied to other products.

Reports are statements of fact(s) prepared in accordance with the referenced version of the standard(s). Reports are based upon the information provided to Warringtonfire. Warringtonfire takes no responsibility for the accuracy or completeness of such information.

The results stated in this report apply to the test specimens as received. The results relate only to the behaviour of the specimens 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.

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in BS EN 1365-1:2012, BS EN 1363-1:2020, and where appropriate BS EN 1363-2:1999.

Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

Any differences in relation to the aforementioned characteristics may significantly affect the performance and will therefore invalidate the application of the test results to the variant product. It is recommended that any proposed variation to the tested configuration or product should be referred to the test sponsor. The test sponsor should then obtain appropriate documentary evidence of compliance from Warringtonfire or another accredited testing authority. The supplier of the product is responsible for ensuring that the product which is supplied for use is identical to the test specimens that were tested.

The specification and the interpretation of fire test methods are both the subject of ongoing development and refinement. Changes in the applicability of the results of tests in relation to associated legislation may also occur. For these reasons the currency and the relevance of test reports should be considered by the user.

The test report also relates only to the sample(s) of the product submitted to the test. The laboratory accepts no responsibility for the representativeness of the test specimens unless so stated in the test report.

Confidence that the product that is supplied to the market will have the performance indicated in the test report can be supported by use of third-party certification schemes.

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Uncertainty of measurements

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.

EGOLF

Certain aspects of some fire test specifications are open to different interpretations. 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:

020-2018 - Average temperature thermocouples moved away from stiffeners, joints, through components, features and hotspots

025-2018 - Procedures for temperature measurement in fire resistance tests

028-2018 - Disregarding unexposed thermocouples

050-2018 - Deduction of the insulation performance criteria

061-2021 - Harmonization of pressure measurement, processing and reporting

062-2022 V2 - Reporting test results

Revision history N/A

Note: The field of direct application may only be defined following the identification of classification(s). The field of direct and, where applicable, extended application will be included in the classification report.

Sample Report

Not applicable.



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Tisselt, Belgium
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Heywood, United Kingdom
a UKAS accredited testing laboratory No.0249
T: +44 (0) 1925 655 116

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