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Testing. Advising. Assuring.

Title:

The fire resistance performance of an uninsulated garbage chute doorset when tested in accordance with BS 476: Part 22: 1987, Clause 8.

WF Report No:

326520



Prepared for:

RNB Engineering Limited
Unit 16,
Highams Lodge Business Centre,
Blackhorse Lane,
London.
E17 6SH

Date:

29th April 2013

Notified Body No:

0833



0249

Summary

Objective	To determine the fire resistance performance an uninsulated garbage chute doorset when tested in accordance with BS 476: Part 22: 1987, Clause 8.
Sponsor	RNB Engineering Limited , Unit 16, Highams Lodge Business Centre, Blackhorse Lane, London. E17 6SH
Summary of the Tested Specimens	The specimen had overall nominal external dimensions of 635 mm high by 635 mm wide and incorporated a chute door nominally 345 mm high by 487 mm wide. The specimen was installed such that the chute opened out, away from the heating conditions of the test.

Test Results:

Integrity 264 minutes*

*The test was discontinued after a period of 264 minutes.

Date of Test 19th February 2013

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Signatories



Responsible Officer
S. Gilfedder*
Testing Officer



Approved
S. Hankey*
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* For and on behalf of **Exova Warringtonfire**.

Report Issued

Date : 29th April 2013

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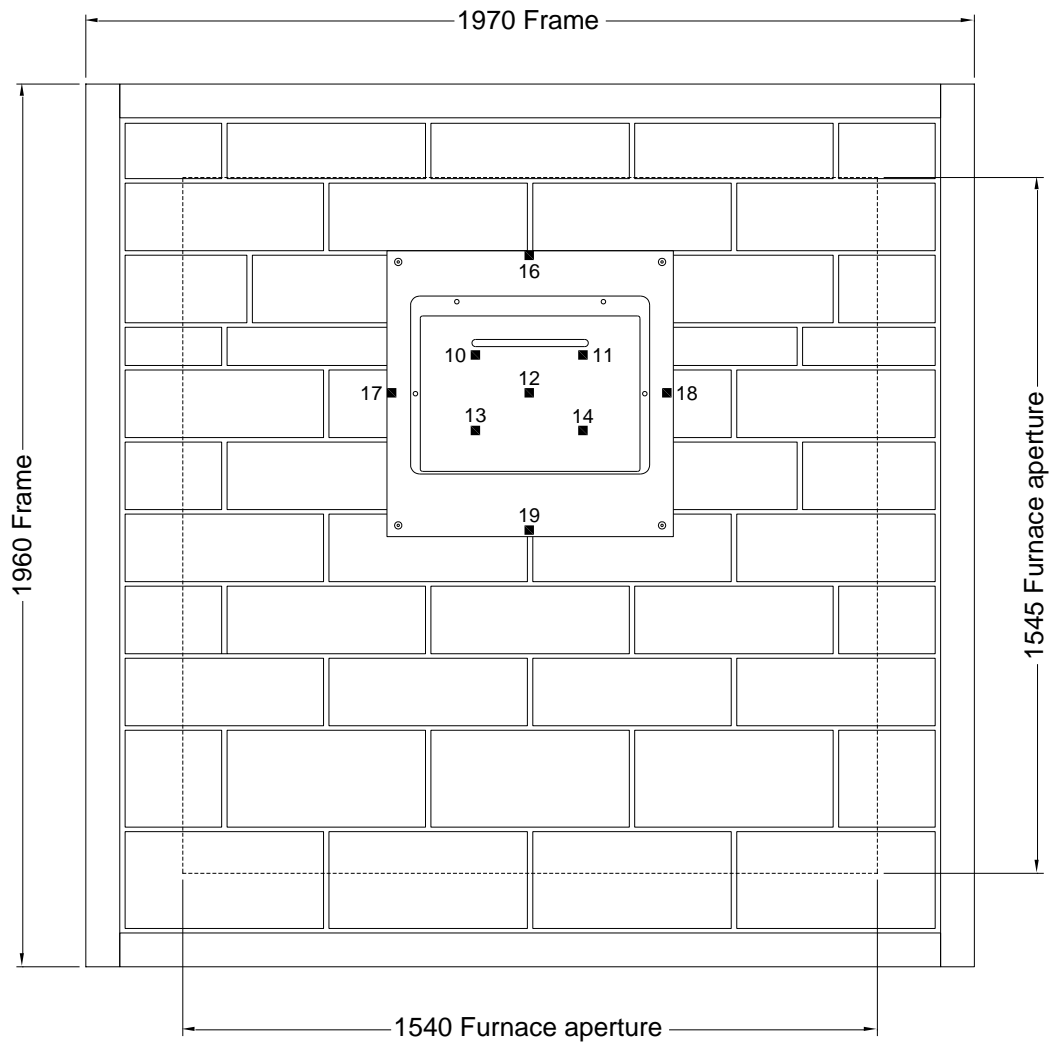
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Test Procedure

Introduction	<p>The specimen was of an uninsulated construction, the test was therefore conducted in accordance with Clause 8 of BS 476: Part 22: 1987 'Methods for determination of the fire resistance of non-loadbearing elements of construction' respectively. 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, as required by BS 476: Part 22: 1987, Clause 8.</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 19th February 2013 at the request of RNB Engineering 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 specimen was mounted within an aperture in a blockwork wall construction such that it opened away from the heating conditions of the test. Representatives of Exova Warringtonfire conducted the installation work on the 19th February 2013.</p>
Conditioning	<p>The specimen's storage, construction, and test preparation took place in the test laboratory over a total combined time of 1 day. Throughout this period both the temperature and the humidity of the laboratory were measured and recorded as being within a range of 5°C to 10°C and 49% to 64% respectively.</p>

Test Specimen

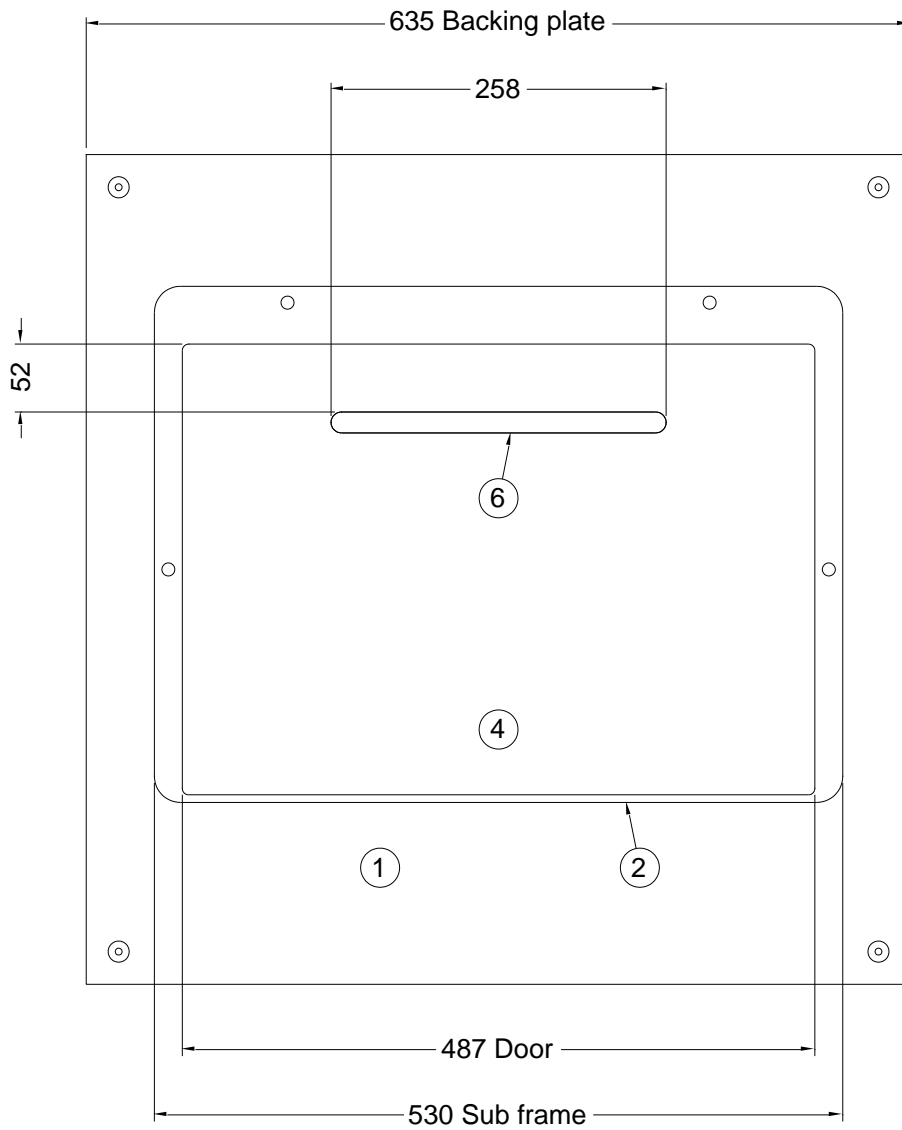
Figure 1- General Elevation of Test Specimen



■ Positions of thermocouples

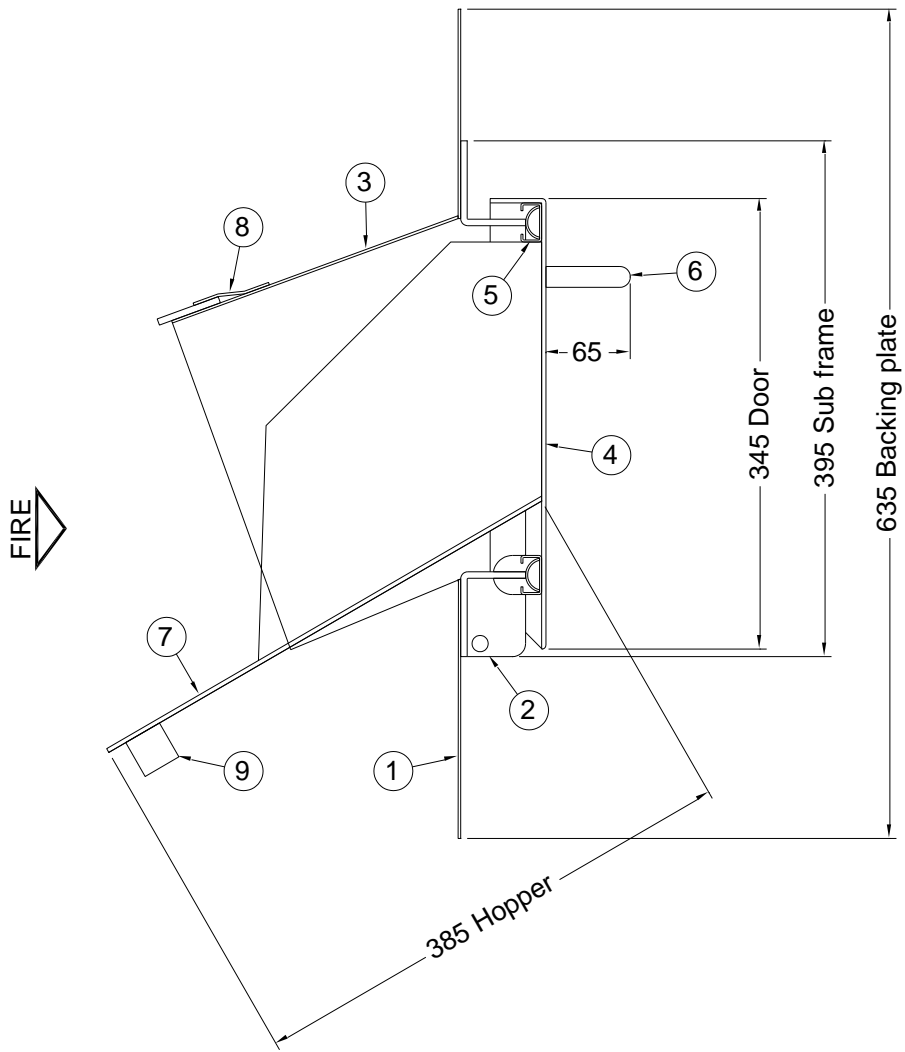
Do not scale. All dimensions are in mm

Figure 2 – Front View



Do not scale. All dimensions are in mm

Figure 3 – Side View of Door & Chute Hopper



Do not scale. All dimensions are in mm

Schedule of Components

(Refer to Figures 2 & 3)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

<u>Item</u>	<u>Description</u>
1. Backing Plate	
Material	: Mild steel
Thickness	: 2 mm
Overall size	: 635 mm x 635 mm
Fixing method	: Through fixed to blockwork wall using 100 mm long x 8 mm concrete fixings
2. Sub Frame	
Material	: Mild steel angles
Thickness	: 5 mm
Overall size	: 65 mm x 50 mm
Jointing method	
i. top and sides	: Mitred and seam welded
ii. base and sides	: Butted and seam welded
Fixing method	: Through bolted to backing plate using 6 off M10 bolts with suitable nuts
3. Chute Canopy	
Material	: Mild steel
Thickness	: 2 mm
Overall size	: 390 mm wide x 220 mm deep
Fixing method	: Weld fixed to the back face of the sub frame, item 2
4. Chute Door	
Material	: Mild steel
Thickness	: 3.3 mm
Overall size	: 487 mm wide x 345 mm high x 43 mm deep
Jointing method	
i. top and sides	: Mitred and seam welded
ii. base and sides	: Butted and seam welded
Fixing method	: Through bolted to backing plate using 6 off M10 bolts with suitable nuts
5. Chute Door Back Seal	
Material	
i. housing	: Mild steel channel
ii. seal	: Rubber
Overall size of housing	: 30 mm wide x 16 mm deep with 6 mm returned edges
Jointing method	: Mitred
Fixing method	: Welded to the back face of the chute door, item 3
6. Chute Door Handle	
Material	: Mild steel
Overall size	: 258 mm long x 16 mm diameter with 65 mm projection
Fixing method	: Welded to the front face of the chute door, item 3

Item

Description

7. Chute Hopper

Material	:	Mild steel
Thickness	:	3.3 mm
Overall size	:	348 mm wide x 195 mm deep x 385 mm long
Fixing method	:	Welded to the back face of the Chute door, item 4

8. Chute Hopper Stop

Material		
i. housing	:	Mild steel
ii. seal	:	Rubber
Overall sizes		
i. housing	:	60 mm wide x 2 mm thick x 370 mm long
ii. seal	:	50 mm wide x 5 mm thick x 370 mm long
Fixing methods		
i. housing	:	Seam welded to top of
ii. seal	:	Butted and seam welded
	:	Through bolted to backing plate using 6 off M10 bolts with suitable nuts

9. Counter Balance

Material	:	Mild steel
Overall size	:	30 mm x 30 mm
Fixing method	:	Welded to the under side of the Chute hopper, item 7

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 six 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 specimens. The output of all instrumentation was recorded at no less than one minute intervals as follows:
Thermocouples 10 to 14	At five positions on the unexposed surface of the doorset, one approximately at the centre and one at approximately the centre of each quarter section of the doorset.
Thermocouples 16 to 19	At four positions on the unexposed surface of the frame, one at the approximate mid-height/span of each of the frame members. 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 specimens 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 specimens where relevant.
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 was 2.0 (± 2) Pa at the head of each Doorset.

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 11°C at the start of the test with a maximum variation of +6°C during the test.
00	00	The test commences.
06	32	Slight flaming visible on the exposed face of the chute.
08	31	Slight smoke release visible around the chute.
10	00	The centre of the chute door starts to discolour.
20	00	The centre of chute door continues to discolour; the frame just above the chute door has also discoloured at mid-span.
26	08	The paint finish starts to blister at the centre of chute door and is starting to crack and peel away.
30	00	The specimen continues to satisfy the integrity criteria of the test.
47	08	Intermittent flaming seen at the top edge of the chute door.
49	27	Intermittent flaming continues.
54	35	The intermittent flaming has subsided.
63	36	A small gap is opening up between the base plate and sub-frame above the top of the chute door (mid-span). No through gap is evident.
72	55	The base plate bows away from the wall at mid-span in between its fixings.
80	00	Slight smoke release now visible from the bottom edge of the chute door.
90	00	The chute door glows a dull red. Paint peels away from the chute door, the Sub-frame and base plate discolour black.
120	00	A gap has developed between the base plate and wall; however, it's not possible to get a gap gauge to penetrate into the furnace through this gap.
150	00	The paint finish continues to peel away and discolour from around the top 2/3 of the chute assembly.
180	00	No significant visible change.
240	00	The specimen continues to satisfy the integrity criteria of the test.
264	00	No significant visible change. The test is discontinued at the request of the sponsor.

Test Photographs

The exposed face of the specimen prior to testing



The unexposed face of the specimen prior to testing



The unexposed face of the specimen after 10 minutes of testing



The unexposed face of the specimen after 30 minutes of testing



The unexposed face of the specimen after 60 minutes of testing



The unexposed face of the specimen after 120 minutes of testing



The unexposed face of the specimen after 180 minutes of testing



The unexposed face of the specimen after 264 minutes of testing



The exposed face
of the specimen
immediately after
test.



Temperature 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	17
10	678	729
20	781	784
30	842	845
40	885	880
50	918	926
60	945	954
70	968	971
80	988	989
90	1006	1004
100	1022	1032
110	1036	1037
120	1049	1045
130	1061	1064
140	1072	1076
150	1082	1084
160	1092	1096
170	1101	1101
180	1110	1110
190	1118	1111
200	1126	1119
210	1133	1124
220	1140	1140
230	1146	1153
240	1153	1161
250	1159	1166
260	1165	1169
261	1165	1172
262	1166	1168
263	1167	1167
264	1167	1168

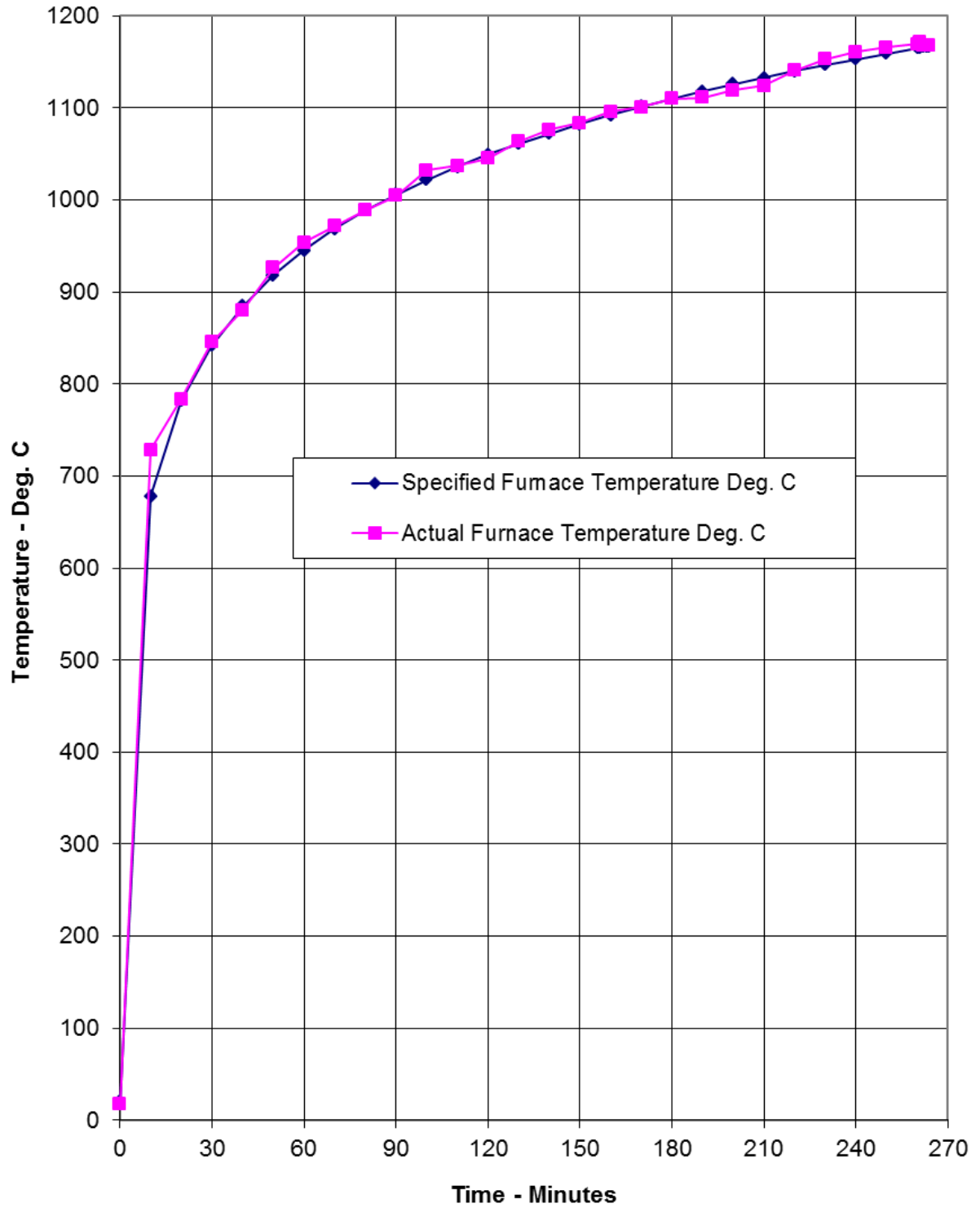
Individual And Mean Temperatures Recorded On The Unexposed Surface Of The Chute

Time Mins	T/C Number 10 Deg. C	T/C Number 11 Deg. C	T/C Number 12 Deg. C	T/C Number 13 Deg. C	T/C Number 14 Deg. C	Mean Temp Deg. C
0	12	10	11	10	10	11
10	225	236	302	111	125	200
20	333	335	412	204	208	298
30	399	402	496	255	255	361
40	448	444	547	286	287	402
50	489	493	581	315	316	439
60	537	518	612	339	346	470
70	556	532	640	361	368	491
80	578	570	670	382	391	518
90	600	597	697	407	420	544
100	623	619	722	428	440	566
110	640	639	740	445	457	584
120	649	648	750	452	465	593
130	663	663	767	462	476	606
140	681	680	784	475	491	622
150	694	696	799	487	503	636
160	703	706	809	494	512	645
170	711	715	819	502	519	653
180	721	724	826	510	526	661
190	727	730	830	514	528	666
200	732	737	836	516	532	671
210	738	743	839	516	531	673
220	748	754	850	523	538	683
230	764	773	868	535	555	699
240	767	781	875	550	568	708
250	773	788	880	558	576	715
260	773	789	881	556	571	714
261	773	789	882	556	571	714
262	774	791	883	556	571	715
263	775	790	883	556	572	715
264	775	792	883	556	572	716

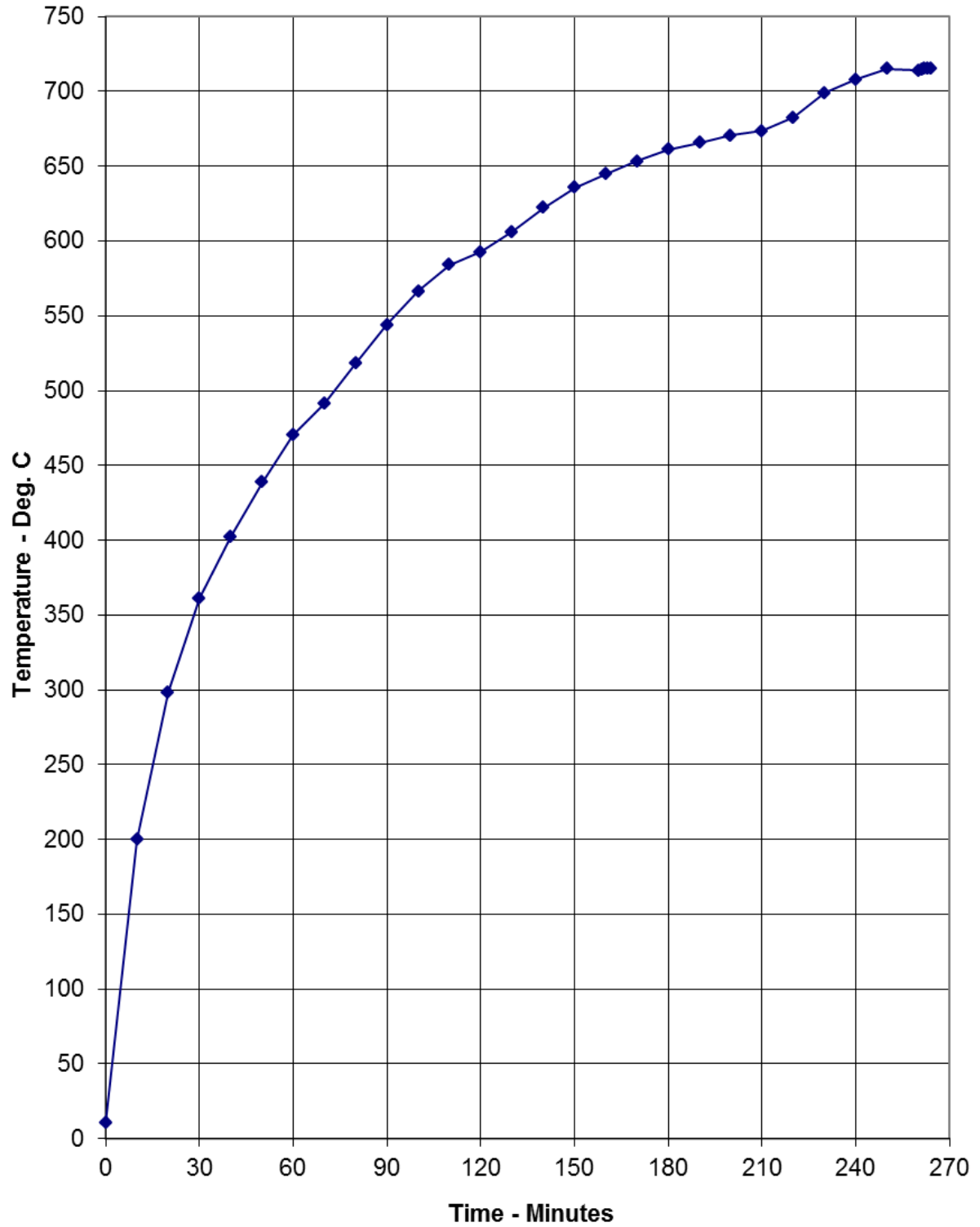
Individual Temperatures Recorded On The Frame Of The Specimen

Time Mins	T/C Number 16 Deg. C	T/C Number 17 Deg. C	T/C Number 18 Deg. C	T/C Number 19 Deg. C
0	9	9	9	8
10	35	28	37	11
20	92	71	83	21
30	134	102	115	34
40	172	132	150	48
50	203	163	179	63
60	245	197	227	77
70	276	232	278	93
80	365	270	327	108
90	452	301	371	128
100	463	320	392	138
110	461	323	390	143
120	462	331	389	143
130	475	340	421	150
140	487	361	445	162
150	496	376	462	169
160	500	381	470	172
170	509	397	482	177
180	516	409	494	185
190	517	402	487	180
200	524	398	486	178
210	527	387	475	172
220	538	411	499	180
230	553	439	527	198
240	563	459	545	218
250	571	467	551	225
260	567	432	521	204
261	569	435	525	203
262	569	438	528	202
263	569	439	531	203
264	570	440	531	203

Graph Showing Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In The Standard



Graph Showing Mean Temperature Recorded On The Unexposed Surface Of The Specimen



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 a period of 264 minutes after which the test was discontinued.

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 specimens 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 result to doorsets of different dimensions or supported other than by a blockwork wall or incorporating different components should be the subject of a design appraisal.

The tested assembly was asymmetrical and was tested such that the chute opened away from the heating conditions of the test. The test results may not be appropriate to situations where the chute opens towards the heating conditions.

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 fully insulated doorset and a partially insulated, single-acting single-leaf doorsets, mounted within a masonry wall, have been subjected to a fire resistance test in accordance with BS 476: Part 22: 1987, Clause 6 and 7, respectively.

The evaluation of the doorsets against the requirements of BS 476: Part 22: 1987, Clause 6 and 7 showed that they satisfied the requirements for the periods stated below:

Test Results:

Integrity 264 minutes*

*The test was discontinued after a period of 264 minutes.