

WFRC TEST REPORT NO. 143333

**The Fire Resistance Performance Of
A Loft Access Hatch Tested In
Accordance With BS 476:
Part 22: 1987**



Summary

Objective To determine the fire resistance performance of a loft access hatch tested in accordance with BS 476: Part 22: 1987 and in conjunction with BS 476: Part 20: 1987.

Sponsor **Timloc Building Products Limited.** Rawcliffe Road, Goole, East Yorkshire, DN14 6UQ

Summary of Tested Specimen The test construction had overall nominal dimensions of 1200 mm by 1200 mm and comprised a section of timber joisted, fireline board ceiling into which was installed the loft hatch assembly. The assembly had overall dimensions 745 mm long by 530 mm wide by 22 mm thick and provided a clear opening of dimensions 450 mm by 535 mm.

The assembly was constructed from a layer of mineral wool referenced 'Rocksil 45' sandwiched between a single sheet of zinc coated mild steel to the exposed face and a foil sheet to the unexposed face.

The assembly was positioned such that it formed the top horizontal face of a 1 metre cubed gas chamber, the temperature rise of which was controlled to conform with the relationship given in BS476: Part 20: 1987, Clause 3.1

Test Results:

Integrity 90 minutes

Insulation 13 minutes

The test was discontinued after a period of 90 minutes.

Date of Test 22nd November 2004

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Signatories



Responsible Officer
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* For and on behalf of Warrington Fire Research Centre.

Report Issued

Date : 15th December 2004

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CONTENTS	PAGE NO.
SUMMARY	2
SIGNATORIES	3
TEST PROCEDURE	5
TEST SPECIMEN	6
Figure 1- General Plan of Test Specimen and Unexposed Face Thermocouples	6
Figure 2 – Section A-A	7
Figure 3 – Section B-B	8
Figure 4 – Sectional Details	9
SCHEDULE OF COMPONENTS	10
INSTRUMENTATION	12
TEST OBSERVATIONS	13
TEST PHOTOGRAPHS	14
TEMPERATURE DATA	17
PERFORMANCE CRITERIA AND TEST RESULTS	21
ONGOING IMPLICATIONS	21
CONCLUSIONS	22

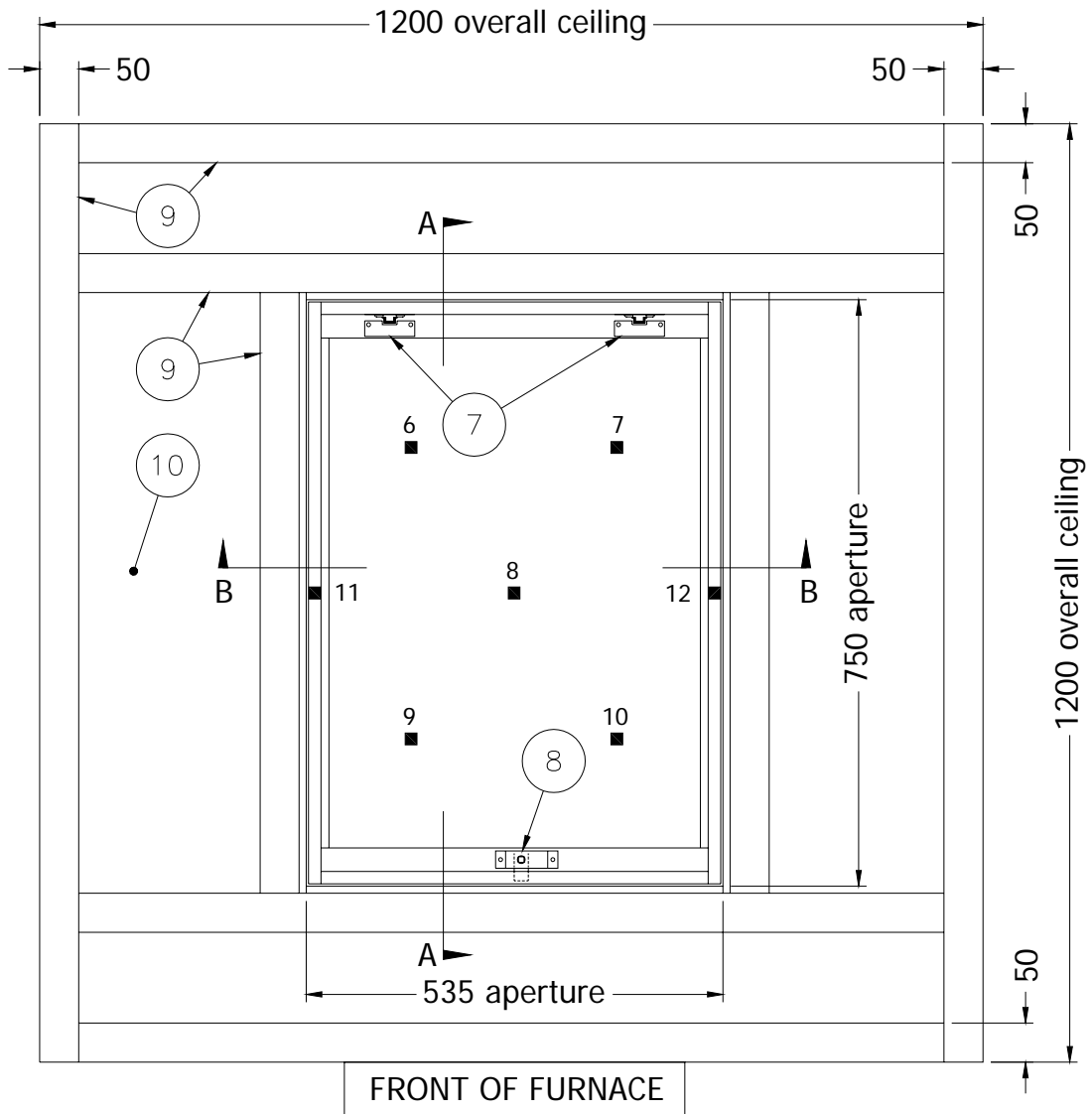
Test Procedure

- Introduction** The specimen was of a glass fibre polyurethane coated fabric, the test was conducted generally 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)'.

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 6.
- Fire Test Study Group/EGOLF** 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.
- Instruction To Test** The test was conducted on the 22nd November 2004 at the request of Timloc Building Products Limited the test sponsor.
- Test Specimen Construction** 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.
- Installation** The assembly was installed into a refractory concrete lined, steel restraint frame on the 19th November 2004.

Test Specimen

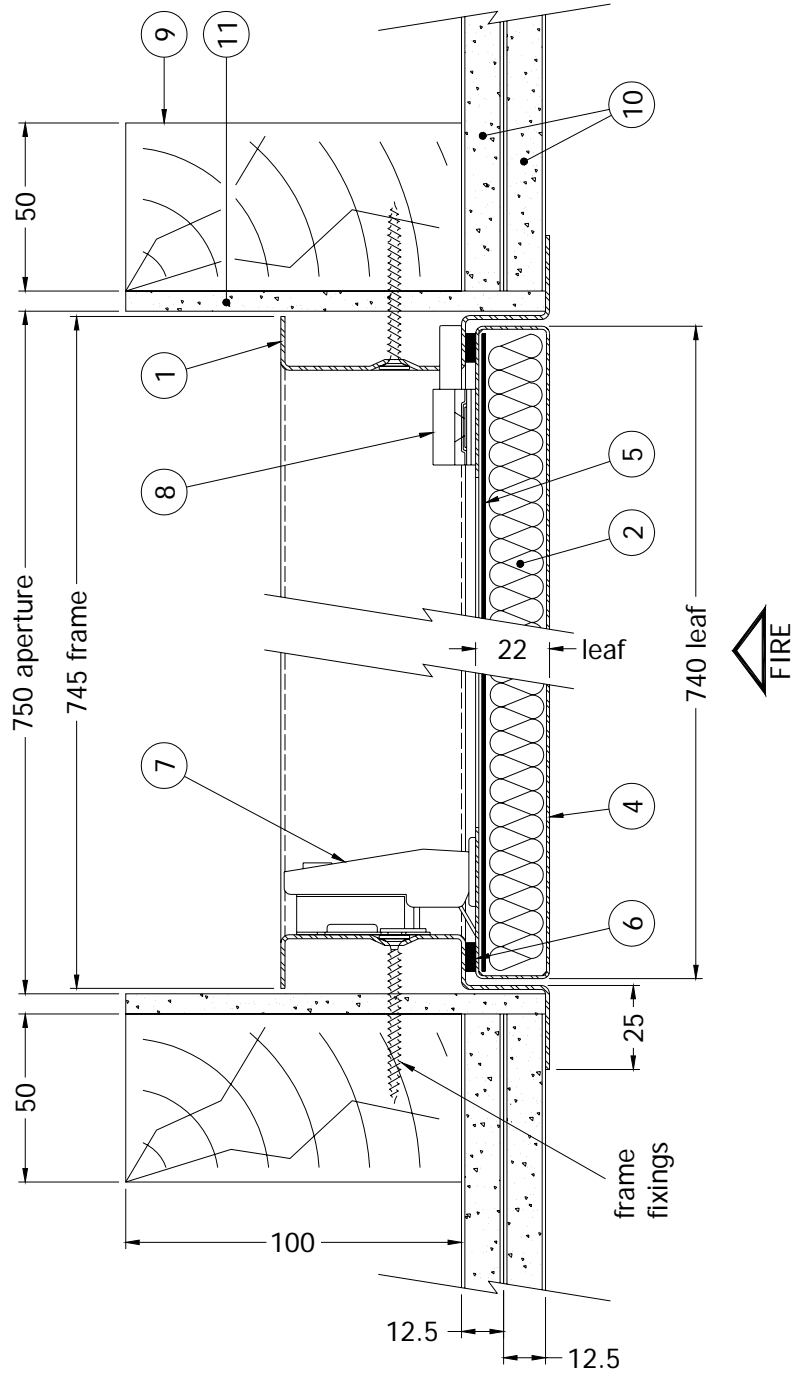
Figure 1- General Plan of Test Specimen and Unexposed Face Thermocouples



■ Positions of thermocouples.

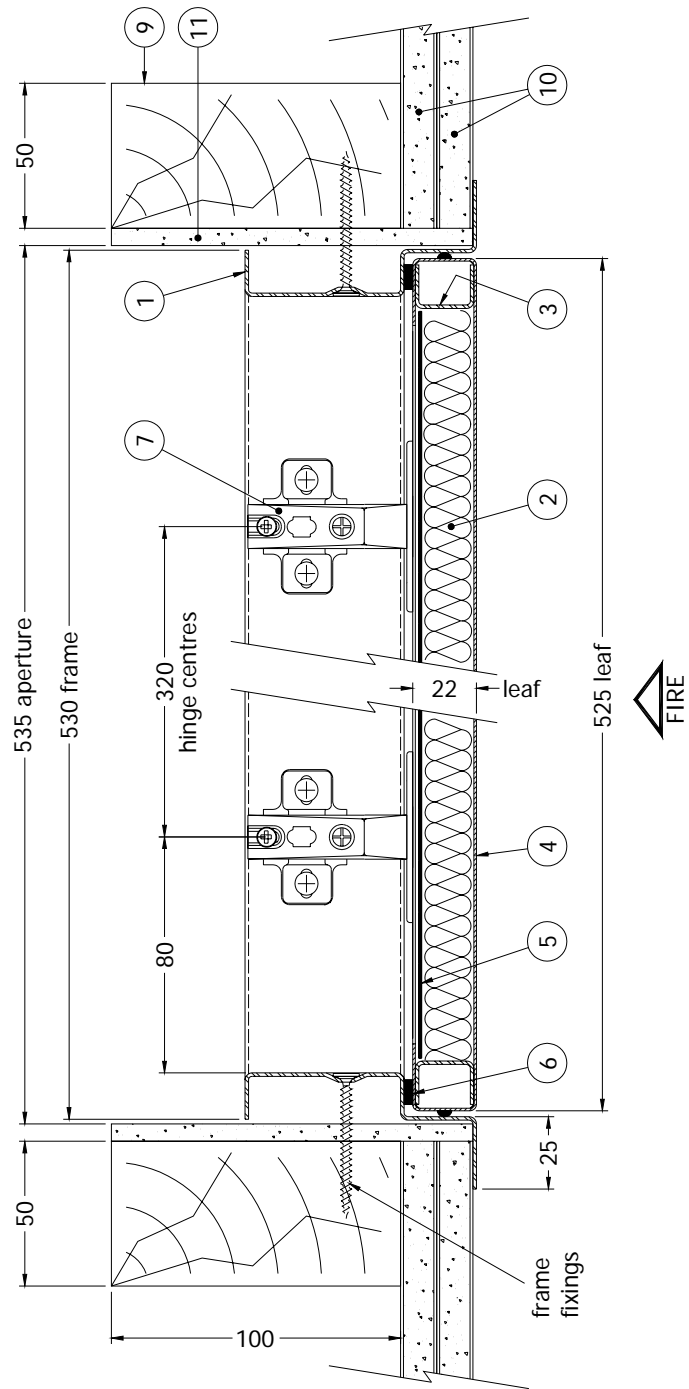
Do not scale. All dimensions are in mm

Figure 2 – Section A-A



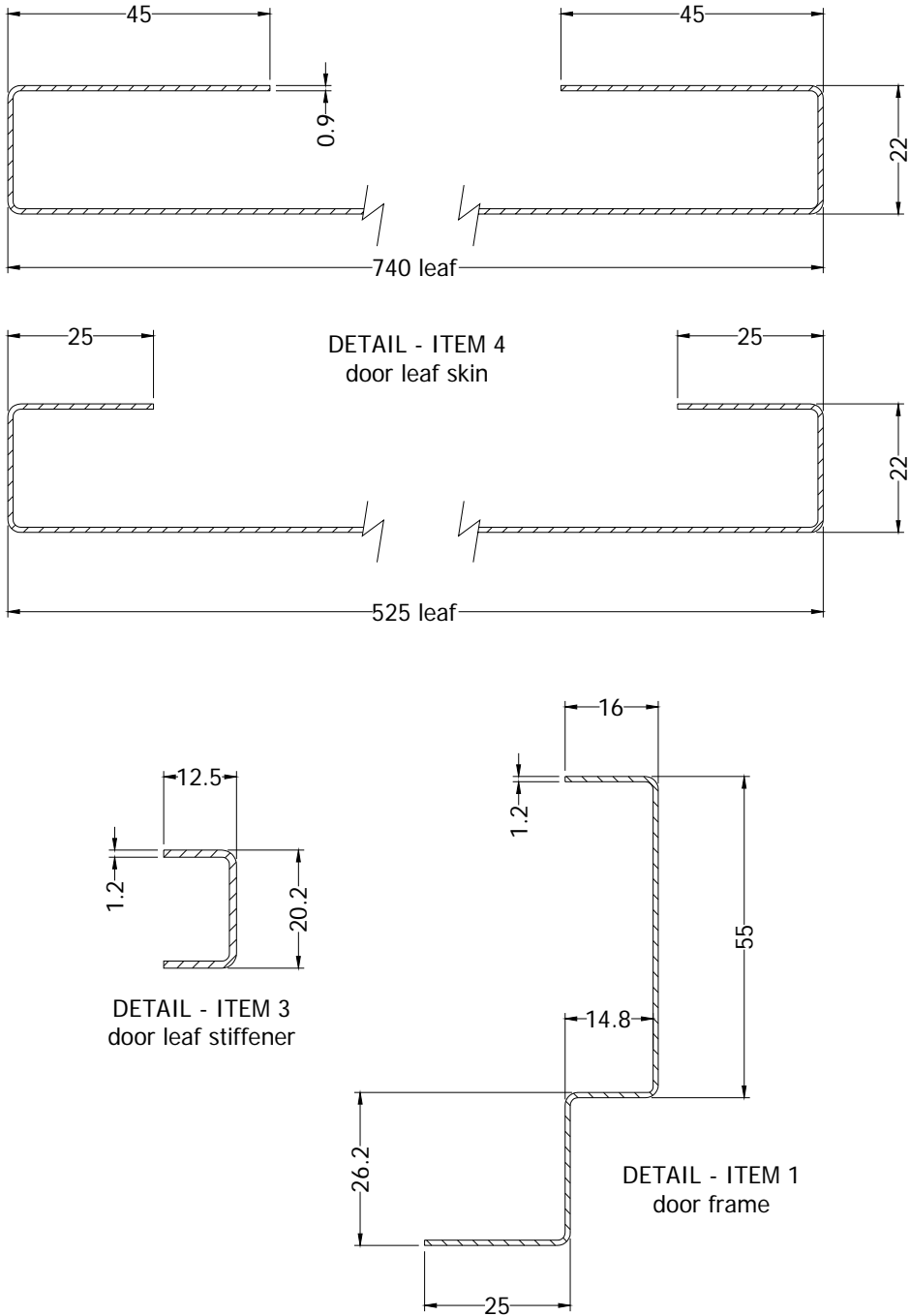
Do not scale. All dimensions are in mm

Figure 3 – Section B-B



Do not scale. All dimensions are in mm

Figure 4 – Sectional Details



Do not scale. All dimensions are in mm

Schedule of Components

(Refer to Figures 1 to 4)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

Item	Description
1. Door Frame	
Material	: Zinc coated mild steel
Thickness	: 1.2 mm
Overall section size	: See Figure 4
Corner Jointing method	: Welded
Fixing method to ceiling aperture joists	: Screws
Details of screws	
i. type	: Woodscrews
ii. size	: 4.7 mm diameter x 50 mm long
iii. spacings	: 150 mm nominal centres all round frame
2. Door Leaf Core	
Manufacturer	: Knauf
Reference	: Rocksil 45
Material	: Mineral wool
Density	: 45 kg/m ³ (stated)
Thickness	: 25 mm (uncompressed)
3. Door Leaf Stiffeners	
Material	: Zinc coated mild steel formed channel
Thickness	: 1.2 mm
Overall section size	: 20.2 mm x 12.5 mm
Fixing method to door leaf skin (item 4)	: 3 no. equi-spaced MIG welds per channel
4. Door Leaf Skin	
Material	: Zinc coated mild steel
Thickness	: 0.9 mm
5. Foil Sheet	
Thickness	: 0.01mm
6. Door Seal	
Manufacturer	: CB Frost
Reference	: CF6
Material	: PU Foam Strip + 2461 Backing
Overall section size	: 8 x 6 mm
Fixing method	: Gasket has an adhesive back

Item	Description
7. Hinges	
Manufacturer	: DTC Shunde Huatai Metal Goods Co.,Ltd.
Reference	: C92A207+H00AG - Concealed Hinge(C92A207)
Material	: Zinc Plated Mild Steel
Quantity	: 2 no. hinges
Fixing method to door frame and leaf	: Machine screws into rivet nuts
Details of machine screws	
i. to door frame	: 2 no. 12 mm long x 3.7 mm diameter screws
ii. to door leaf	: 2 no. 12 mm long x 3.7 mm diameter screws
8. Lock Assembly	
Manufacturer	: Albill Engineering
Reference	: HSL010
Material	: Zinc Plated Mild Steel
Overall sizes	
i. lock bar	: 18 mm wide x 5 mm thick
ii. bracket	: Formed by two plates, each 22 mm wide x 80 mm long x 1.5 mm thick
Fixing method of bracket to door leaf	: Machine screws into rivet nuts
Details of machine screws	: 2 no. 15 mm long x 4.7 mm diameter screws
Operation	: Lock bar engaged in a slot within the door frame
9. Ceiling Joists	
Material	: Timber, Softwood Grade C16
Overall section size	: 100 mm deep x 50 mm wide
Jointing method	: Joists butt jointed and nailed together
Details of nails	
i. type	: Ringshank nails
ii. size	: 100 mm long x 3.5 mm diameter
iii. quantity	: 6 no. per joint
10. Ceiling Boards	
Material	: Fireline board
Thickness	: 2 no. layers, each 12.5 mm thick
Fixing method to all joists	
i. first layer	: 38 mm long x 3.5 mm diameter screws
ii. second layer	: 45 mm long x 3.5 mm diameter screws at 150 mm nominal centres.
11. Aperture Lining	
Material	: Calcium silicate board
Thickness	: 9 mm
Fixing method to joists	: 38 mm long x 3.5 mm diameter screws at 150 mm nominal centres.

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 four 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 6 to 10	<p>At five positions, one approximately at the centre and one at approximately the centre of each quarter section of the assembly.</p> <p>The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.</p>
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. (i.e a maximum of 18 Pa \pm 2 Pa, at the head of the specimen)

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 16°C at the start of the test with a maximum variation of 1°C during the test.
00	00	The test commences.
03	00	Slight smoke release from the perimeter of the specimen.
06	30	Smoke release continues from the perimeter of the specimen.
13	00	Continued smoke release from the perimeter of the specimen. A temperature rise in excess of 180°C is recorded by Thermocouple 7. Insulation failure deemed to occur.
20	00	Smoke release has now decreased from the specimen.
30	00	Integrity of the specimen remains intact.
41	00	Slight cracks have appeared to the exposed face of the fireline board.
45	00	No further significant visible change.
48	00	Smoke release has started to increase slightly from the perimeter of the specimen.
60	00	Integrity remains intact.
71	00	Smoke release has started to increase, discolouration of fireline board to unexposed face adjacent to joists is evident.
73	00	The lining board to aperture has discoloured at corners of specimen. Smoke release is evident.
80	00	The joists have continued to discolour; smoke release continues to increase from joists positions and perimeter of specimen.
85	00	Smoke release continues to increase from specimen.
90	00	Integrity of the specimen remains intact.
90	30	The test is discontinued.

Test Photographs

The unexposed face of the test construction prior to testing



The unexposed face of the test construction during testing



The unexposed face of the test construction during testing



The unexposed face of the test construction during testing



The unexposed face of the test construction during testing



The unexposed face of the test construction during testing



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	23
3	502	468
6	603	618
9	663	653
12	705	706
15	739	732
18	766	765
21	789	789
24	809	804
27	826	831
30	842	842
33	856	864
36	869	868
39	881	881
42	892	886
45	902	909
48	912	918
51	921	929
54	930	931
57	938	939
60	945	952
63	953	952
66	960	967
69	966	966
72	973	976
75	979	985
78	985	986
81	990	995
84	996	1001
87	1001	1003
90	1006	1014

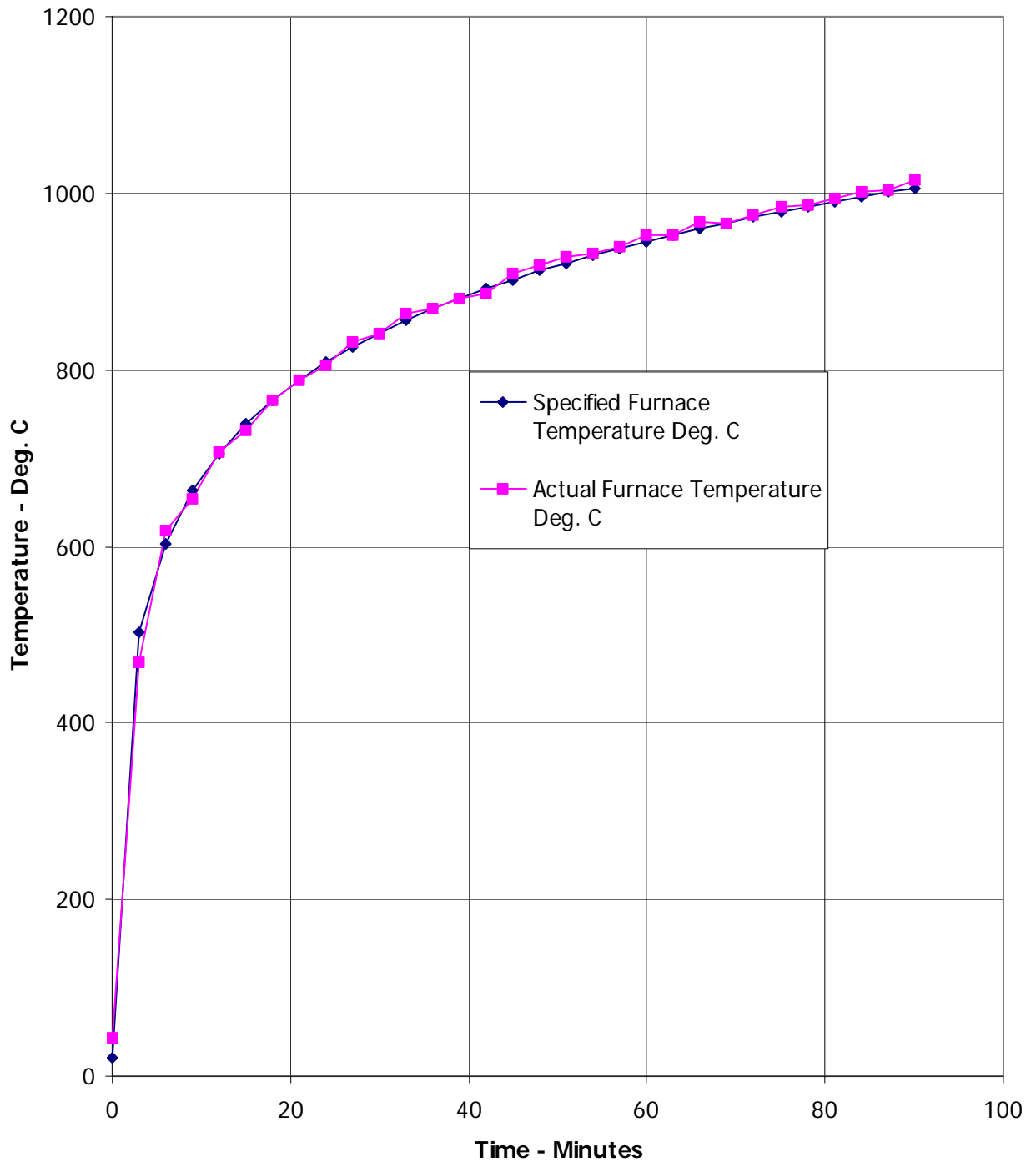
Individual and mean temperatures recorded on the unexposed surface

Time Mins	T/C Number 6 Deg. C	T/C Number 7 Deg. C	T/C Number 8 Deg. C	T/C Number 9 Deg. C	T/C Number 10 Deg. C	Mean Temp Deg. C
0	15	16	17	16	17	16
3	17	18	18	18	19	18
6	33	51	41	36	43	41
9	86	116	103	89	91	97
12	110	162	118	114	99	121
15	148	226	157	163	129	165
18	188	238	194	197	178	199
21	217	257	215	215	203	222
24	227	264	226	230	217	233
27	230	272	237	241	229	242
30	248	272	245	244	238	249
33	246	292	259	262	251	262
36	259	290	275	284	264	274
39	268	294	278	282	269	278
42	270	292	281	298	283	285
45	270	305	288	317	295	295
48	282	313	303	320	301	304
51	286	305	302	335	316	309
54	292	318	312	338	315	315
57	299	326	324	347	325	324
60	304	334	331	357	332	332
63	315	337	346	373	343	343
66	327	355	358	385	354	356
69	345	365	360	400	359	366
72	356	373	373	404	381	377
75	364	377	377	409	389	383
78	398	425	383	438	400	409
81	418	467	386	449	400	424
84	425	469	406	464	419	436
87	444	466	401	471	381	433
90	443	481	421	479	406	446

Individual temperatures recorded on the unexposed surface of the frame

Time	T/C	T/C
Mins	Number	Number
	11	12
	Deg. C	Deg. C
0	17	16
3	20	20
6	58	73
9	103	163
12	173	224
15	219	224
18	238	237
21	257	248
24	275	260
27	283	282
30	286	307
33	296	303
36	310	315
39	315	320
42	325	320
45	330	326
48	337	329
51	342	340
54	345	343
57	342	348
60	343	351
63	349	356
66	358	358
69	369	361
72	378	365
75	381	366
78	387	373
81	387	375
84	382	382
87	390	376
90	390	382

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



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 90 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 13 minutes after which time the maximum temperature rise criteria was exceeded.

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 loft access hatch tested in accordance with BS 476: Part 22: 1987, Clause 6 and in conjunction with BS 476: Part 20: 1987.

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

Test Results:

Integrity 90 minutes

Insulation 13 minutes

The test was discontinued after a period of 90 minutes