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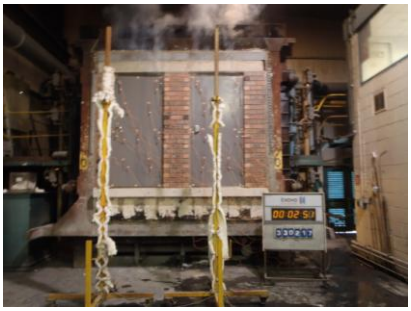
Testing. Advising. Assuring.

Title:

The Fire Resistance Performance Of Two Specimens Of Single-Acting, Single-Leaf Doorsets When Tested In Accordance With BS EN 1634-1: 2008

Report No:

330217



Prepared for:

Network Product Marketing

Unit 11,
Greenfield Farm Trading Estate,
Congleton,
Cheshire,
CW12 4TR

Date: 26th September 2013

Notified Body No:

0833

UKAS TESTING
0249

Summary

Objective	To determine the fire resistance performance of two specimens of single-acting, single-leaf doorsets mounted within a high density rigid supporting construction, when tested in accordance with BS EN 1634-1: 2008.
Test Sponsor	**Network Product Marketing,** Unit 11, Greenfield Farm Trading Estate, Congleton, Cheshire, CW12 4TR.
Summary Of Tested Specimens	For the purposes of the test, the doorsets were referenced Doorset A and Doorset B. The doorsets both had overall dimensions of 2075 mm high by 975 mm wide. The doorsets included a door leaf of overall dimensions 2008 mm high by 880 mm wide by 50 mm thick comprising a mild steel skin construction with a mineral fibre core. The leaves were hung within a mild steel door frame on four steel hinges referenced 'XDP-JL'. Doorset A was fitted with a multi-point lockset system referenced 'XD-6644', which was engaged for the test duration. Doorset B was fitted with a panic exit device referenced 'XDB5760/XDD5760', and an external locking attachment referenced 'XIA 5003 SV'. The doorset was rendered engaged for the test duration. Each doorset was installed such that the leaf opened away from the heating conditions of the test. Prior to testing, the doorsets were subjected to 25 manually operated opening and closing cycles as specified in EN 14600: 2005.

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	Sustained flaming	34 minutes	48 minutes
	Gap gauge	62 minutes*	62 minutes*
	Cotton Pad	34 minutes	48 minutes
Insulation performance		11 minutes	23 minutes

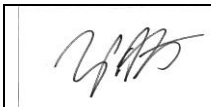
Radiation Performance	5 kW/m^2	10 kW/m^2	15 kW/m^2	20 kW/m^2	25 kW/m^2
Doorset A	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$
Doorset B	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$

* The test duration. The test was discontinued after a period of 62 minutes. $^{\#}$ Not exceeded during the test.

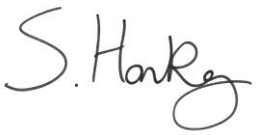
Date of Test	28th June 2013

Signatories

Responsible Officer
D. Yates*
Testing Officer



Approved
C. Abbott*
Senior Certification Engineer



Head of Department
S. Hankey*
Operations Manager

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

Report Issued

Date : 26th September 2013

CONTENTS **PAGE NO.**

Test Procedure

Introduction

The doorsets are required to provide a fire separating function and were therefore tested in accordance with BS EN 1634-1: 2008 'Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware - Part 1: Fire resistance tests for doors, shutters and openable windows'. This test report should be read in conjunction with that Standard and with BS EN 1363-1: 2012, 'Fire resistance tests - Part 1: General requirements' and BS EN 1363-2: 1999, 'Fire resistance tests - Part 2: Alternative and additional procedures'.

Prior to testing, the doorsets were subjected to 25 manually operated opening and closing cycles as specified in EN 14600: 2005.

The specimens were judged on their ability to comply with the performance criteria for integrity and insulation, as required by BS EN 1634-1: 2008. The radiation from the doorsets was measured in accordance with the requirements of BS EN 1363-2: 1999.

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 28th June 2013 on behalf of Network Product Marketing, the sponsor of the test.

Mr. A. Shatwell, a representative of the test sponsor witnessed the test.

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 specimens and information supplied by the sponsor of the test.

The doorset storage, installation, and test preparation took place in the test laboratory between the 26th and 27th June 2013.

Installation

The sponsor supplied the doorsets on the 26th June 2013.

The doorsets were mounted within apertures provided within a high density rigid supporting construction such that the door leaves opened away from the heating conditions of the test. Representatives of the test sponsor conducted installation on the 26th and 27th June 2013.

Sampling

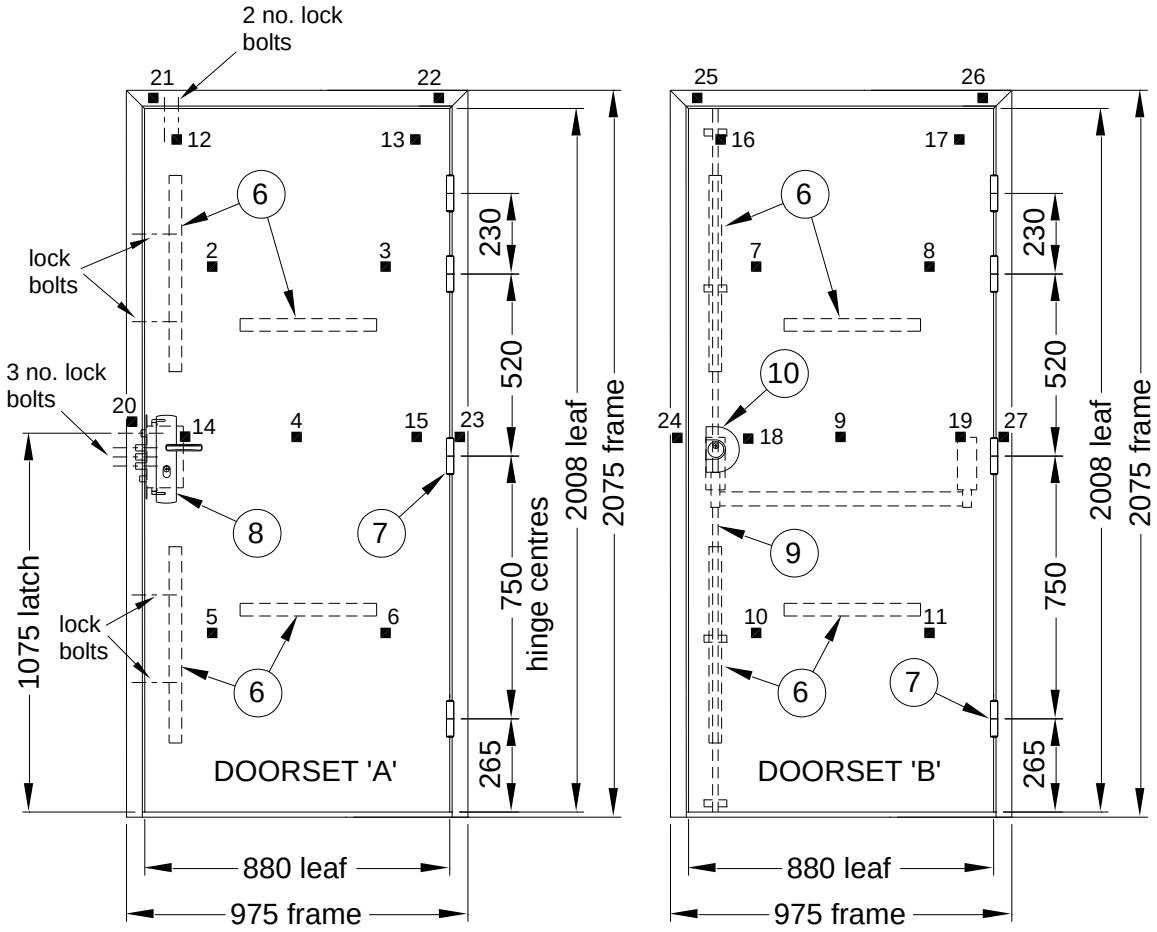
A representative of Warrington Certification Limited sampled the doorsets on the 11th March 2013. A copy of the sampling report is retained in the confidential file relating to this test.

Conditioning

The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 3 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 17°C to 21°C and 44% to 75% respectively.

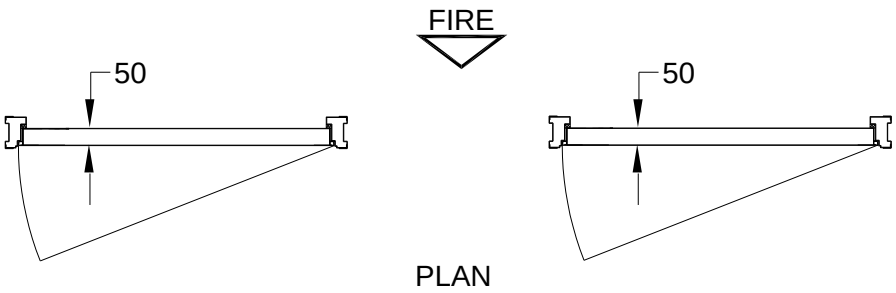
Test Specimen

Figure 1- General elevation of test specimens and unexposed face thermocouples



GENERAL ELEVATION
OF UNEXPOSED FACE

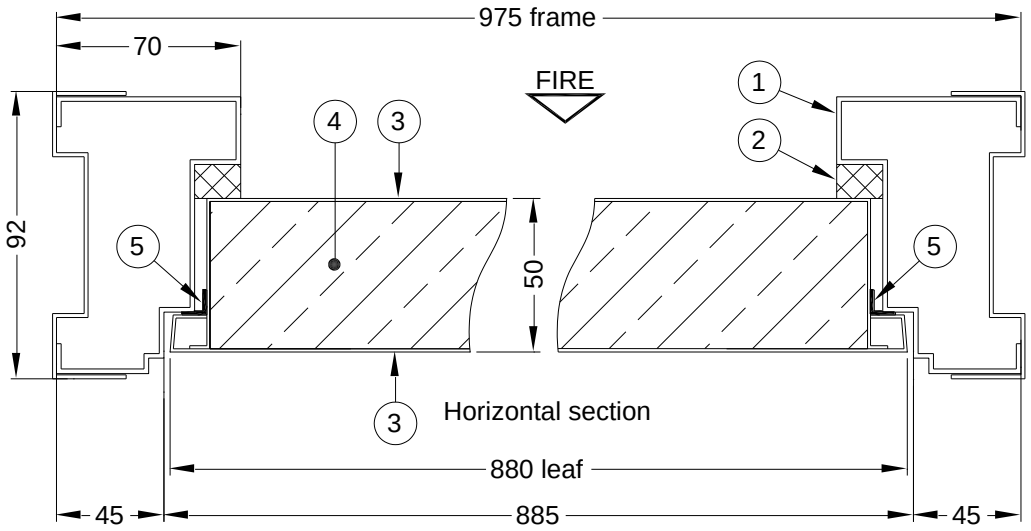
■ Positions of thermocouples

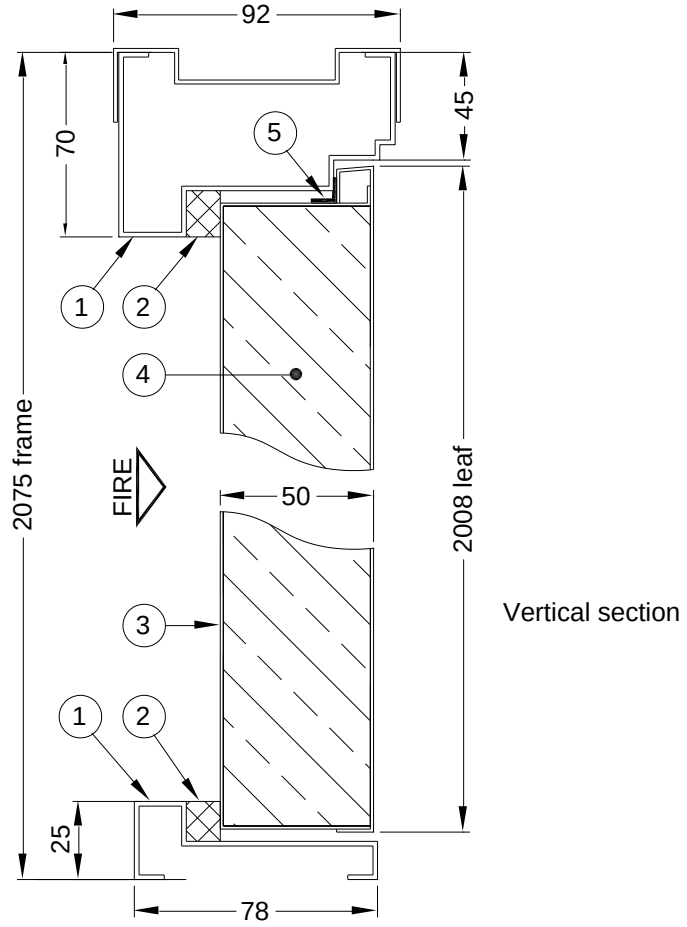


PLAN

Do not scale. All dimensions are in mm

Figure 2 – Typical details of both doorsets





Do not scale. All dimensions are in mm

Schedule of Components

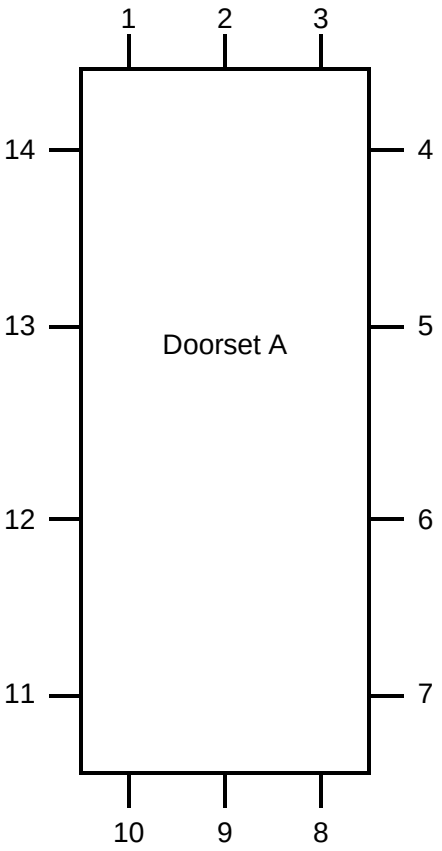
(Refer to Figures 1 & 2)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

Item		Description
1. Door frame jambs, head and sill		
Supplier	:	Simto Group (China)
Material	:	Cold rolled steel
Thickness	:	2 mm
Overall section size	:	See Figure 2
Jambs to head jointing method	:	Welded
Fixing method to masonry surround	:	Door frame jack-out channel friction fit along height of each jamb and used in conjunction with 3 off adjustable jack-out bolts per jamb. Door frame then screw fixed through each jack-out bolt to masonry surround.
2. Door frame gasket		
Supplier	:	Simto Group (China)
Reference	:	XDP-FHJT
Material	:	Intumescent seal
Overall section size	:	10 mm x 12 mm (uncompressed size)
Fixing method	:	Fitted along stop face of door frame jambs, head and sill.
3. Door leaf facing		
Supplier	:	Simto Group (China)
Material	:	Cold rolled steel
Thickness	:	1 mm
Fixing method	:	Door facings tack welded together at approx 160 mm maximum centres.
4. Door leaf core		
Supplier	:	Simto Group (China)
Reference	:	XDP-YMT
Material	:	Rock fibre insulation
Density	:	107 kg/m^3 (stated)
Thickness	:	48 mm (uncompressed)
Fixing method	:	Bonded with adhesive
Details of Adhesive		
i. reference	:	XD-JS
ii. material type	:	Polyurethane adhesive
5. Door leaf intumescent seal		
Supplier	:	Simto Group (China)
Reference	:	XD-FHJT
Material type	:	Graphite based
Fixing method	:	Bonded with adhesive
Details of Adhesive		
i. reference	:	XD-FHJS
ii. material type	:	Polyurethane adhesive

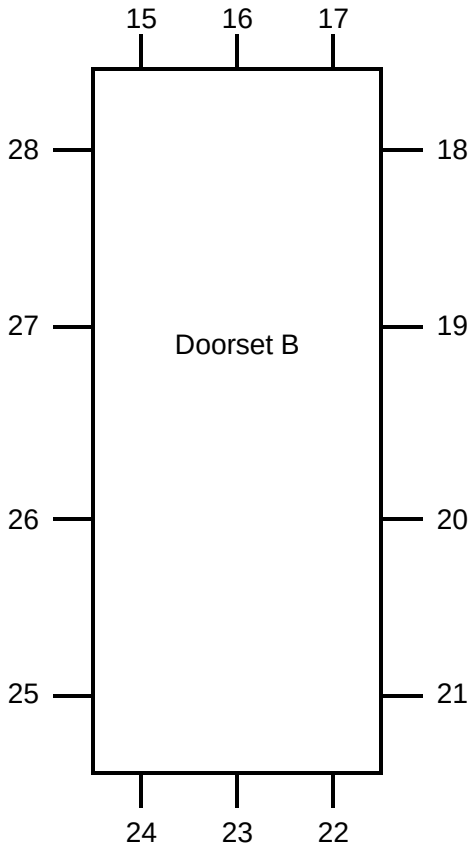
Item		Description
6. Door leaf internal stiffeners		
Supplier	:	Simto Group (China)
Material	:	Steel
Thickness	:	0.8 mm
Overall section size	:	50 mm wide x 48 mm deep channel
Fixing method	:	Welded
7. Hinges		
Supplier	:	Simto Group (China)
Reference	:	XDP-JL
Type	:	Crank type hinge
Material	:	Steel
Overall size	:	127 mm long (60 mm x 3.5 mm thick blade)
Quantity	:	4 no. hinges per doorset
Details of Fixings		
i. type	:	Machine screws
ii. material	:	Steel
iii. size	:	M6 x 12 mm long
iv. quantity	:	4 no. screws per blade
8. Multi-point lockset – Doorset 'A'		
Supplier	:	Simto Group (China)
Details of Lever handles		
i. reference	:	XD-6644
ii. material	:	Stainless steel
Details of cylinder		
i. reference	:	K1
ii. material	:	Copper
Details of main lock		
i. reference	:	A4
ii. material	:	Steel
Overall sizes		
i. main lock casing	:	241 mm long x 91 mm deep
ii. forend plates (in door leaf)	:	240 mm long x 25 mm wide (central plate). 85 mm long x 25 mm wide (upper and lower plates).
iii. strike plates (in door frame)	:	No strike plates. Lock bolts engage in holes shrouded with a steel back-box in door frame.
9. Panic exit device – Doorset 'B'		
Manufacturer	:	Eurospec
Reference	:	XDB5760/XDD5760
Type	:	'easi-exit' push bar panic bolt device fitted with external locking attachment (item 10).
Fixing method	:	Surface mounted to exposed face of doorset, with top locking bolt engaged in steel strike plate in door frame head, and bottom lock bolt engaged in slot in sill.
10. External locking attachment – Doorset 'B'		
Manufacturer	:	Eurospec
Reference	:	XIA 5003 SV
Type	:	'easi-exit' external locking attachment
Fixing method	:	Surface mounted to unexposed face of doorset

Item		Description
11. Dog bolts (not shown on Figures)		
Supplier	:	Simto Group (China)
Material	:	Steel
Overall size	:	Approx 12 mm diameter x 11 mm protruding length
Quantity	:	2 no. dog bolts per doorset, positioned along hinged edge of door leaf at 670 mm and 1420 mm from bottom edge of door leaf. The dog bolts engaged in holes shrouded with a steel back-box in door frame.

Doorset Clearance Gaps



View from unexposed face



View from unexposed face

Door Ref	Gap Dimension in mm at Positions													
A	1	2	3	4	5	6	7	8*	9*	10*	11	12	13	14
	5.9	6.3	5.8	2.7	2.1	2.3	2.5	5.8	3.6	3.2	2.6	2.1	1.8	2.5
B	15	16	17	18	19	20	21	22*	23*	24*	25	26	27	28
	3.8	4.9	4.5	1.7	2.4	3.0	3.5	3.0	2.8	2.7	3.4	2.4	2.4	3.0
A	Mean		3.3		Maximum			6.3		Minimum			1.8	
B	Mean		3.2		Maximum			4.9		Minimum			1.7	

Door Ref	Gap Between Face of Leaf and Doorstop in mm at Position													
A	1	2	3	4	5	6	7	8*	9*	10*	11	12	13	14
	5.7	6.5	6.7	2.8	2.0	2.1	2.6	n/a	n/a	n/a	2.7	3.4	2.6	5.2
B	15	16	17	18	19	20	21	22*	23*	24*	25	26	27	28
	4.0	5.2	5.3	1.9	2.2	3.1	3.7	n/a	n/a	n/a	2.5	3.1	4.2	3.0

* Dimension not included in calculations
# Readings not required

Instrumentation

General

The instrumentation was provided in accordance with the requirements of BS EN 1363-1: 2012.

Furnace

The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2012 Clause 5.1 using six plate thermometers, distributed over a plane 100 mm from the surface of the test construction.

General

Thermocouples were provided to monitor the unexposed surface of each specimen and the output of all instrumentation was recorded at no less than one minute intervals as follows:

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 integrity of the specimens.

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 unexposed surface of the doorset.

Furnace Pressure

The furnace atmospheric pressure was controlled so that it complied with the requirements of BS EN 1363-1: 2012. Clause 5.2. The calculated pressure differential relative to the laboratory atmosphere at the top of the specimens was 13.3 (±3) Pa.

Test Observations

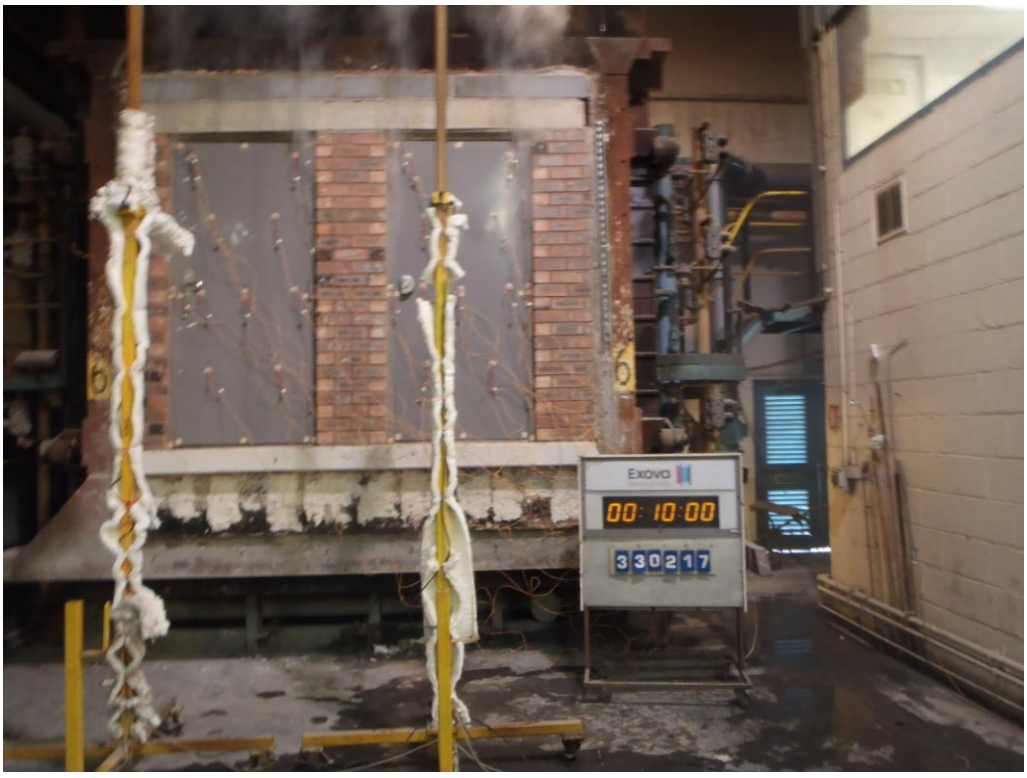
Time		All observations are from the unexposed face unless noted otherwise.
mins	**secs**	The ambient air temperature in the vicinity of the test construction was 17ºC at the start of the test with a maximum variation of ±1ºC during the test.
00	**00**	**The test commences.**
01	**13**	Smoke release issues briefly from the head of each doorset.
02	**40**	Smoke release recommences briefly from the head of each doorset.
05	**28**	Smoke release appears to have increased slightly around the upper half perimeter edges of each doorset.
11	**15**	Both doorsets have visibly bowed away from the furnace chamber at the top and bottom leading edge corners.
17	**20**	Smoke release has increased slightly from the upper half perimeter edges of each doorset and also around the latch position of Doorset A. Doorset A has discoloured along the leading edge. Doorset B has discoloured along the trailing edge.
25	**00**	Viewed from the exposed face, both doorsets radiate a dull orange colour. The lever handle of Doorset A has melted and fallen away. The push bar hardware of Doorset B has melted away causing the panic device top rod to detach and fall away.
30	**05**	A sustained flame issues from the upper leading edge corner of Doorset A. The flame stops after approximately 7 seconds.
32	**50**	Intermittent flames continue briefly from the upper leading edge corner of Doorset A.
34	**18**	A cotton pad is applied to the upper leading edge corner of Doorset A. The cotton pad ignites. **Cotton pad integrity failure of Doorset A is deemed to occur.**
34	**43**	Sustained flames issue from the upper leading edge corner of Doorset A. **Sustained flaming integrity failure of Doorset A is deemed to occur.**
39	**55**	Smoke release is evident at the head of the trailing edge of Doorset B.
45	**40**	Small through gaps have formed at the top and bottom leading edge corners of Doorset A as the leaf continues to bow away from the furnace chamber.
48	**15**	Sustained flames issue from the head of Doorset B at mid width. **Sustained flaming and cotton pad integrity failure of Doorset B is deemed to occur.**
52	**00**	Discolouration is evident across the width of each door leaf at 1/3 and 2/3 heights, as the internal stiffeners begin to scorch the surface of the leaves.

Time		
mins	**secs**	
60	**00**	Doorset A continues to bow away from the furnace chamber at the top and bottom leading edge corners.
62	**30**	No significant visible change. **The test is discontinued at the sponsor's request.**

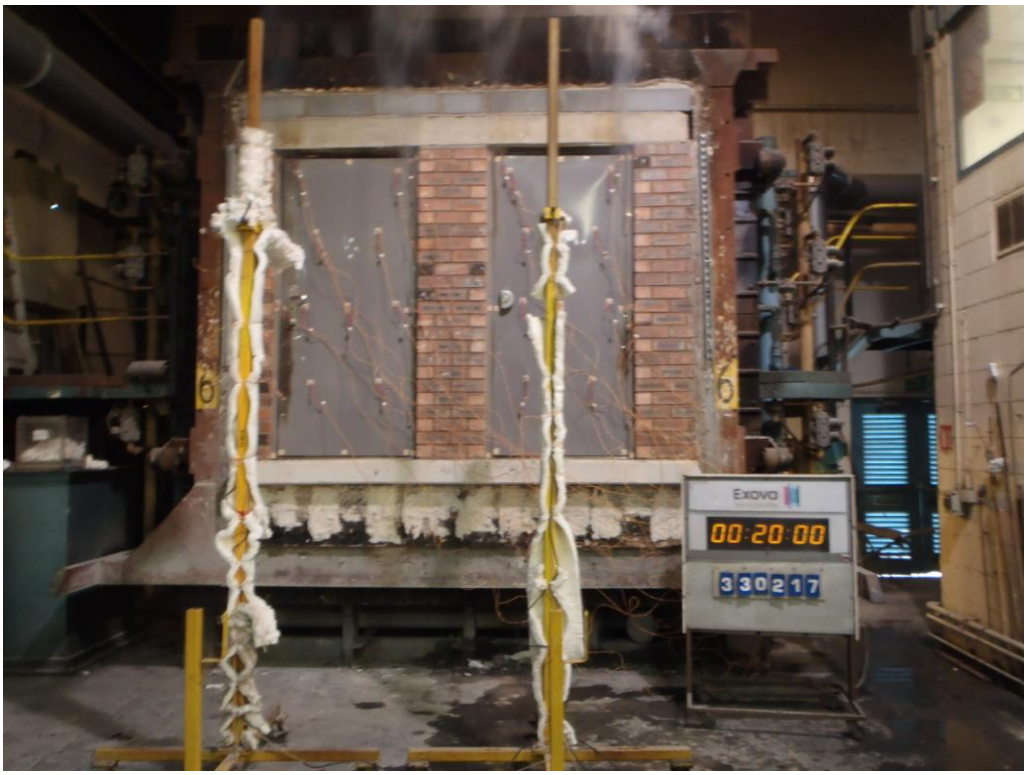
Test Photographs

The exposed face of the doorsets prior to testing

The unexposed face of the doorsets after 10 minutes of testing



The unexposed face of the doorsets after 20 minutes of testing



The unexposed face of the doorsets after 30 minutes of testing

Sustained flaming integrity failure of Doorset A after 34 minutes of testing

Sustained flaming integrity failure of Doorset B after 48 minutes of testing

The unexposed face of the doorsets after 50 minutes of testing

The unexposed face of the doorsets after 60 minutes of testing

The exposed face of the doorsets immediately after testing

Temperature, Radiation & Deflection Data

Mean furnace temperature, together with the temperature/time relationship specified in BS EN 1363-1: 2012

Time Mins	Specified Furnace Temperature Deg. C	Actual Furnace Temperature Deg. C
0	20	25
2	445	440
4	544	538
6	603	593
8	646	638
10	678	675
12	706	700
14	728	720
16	748	748
18	766	764
20	781	776
22	796	796
24	809	810
26	820	820
28	832	835
30	842	845
32	852	855
34	860	862
36	869	872
38	877	882
40	885	889
42	892	890
44	899	898
46	906	907
48	912	917
50	918	924
52	924	932
54	930	924
56	935	917
58	940	945
60	945	950
62	950	957

Individual and mean temperatures recorded on the unexposed surface of Doorset A

Time Mins	T/C Number 2 Deg. C	T/C Number 3 Deg. C	T/C Number 4 Deg. C	T/C Number 5 Deg. C	T/C Number 6 Deg. C	Mean Temp Deg. C
0	18	19	19	19	19	19
2	18	19	19	19	21	19
4	19	21	20	21	34	23
6	23	30	24	29	53	32
8	32	43	30	41	78	45
10	43	56	37	53	101	58
12	52	68	45	65	122	70
14	60	81	54	79	144	84
16	66	97	64	100	167	99
18	73	113	76	121	190	115
20	85	129	91	142	210	131
22	102	145	109	160	227	149
24	117	160	127	174	244	164
26	131	171	145	187	260	179
28	144	180	160	197	273	191
30	154	187	172	205	284	200
32	163	192	182	212	293	208
34	170	196	190	217	300	215
36	175	200	195	222	305	219
38	180	204	199	224	311	224
40	183	207	201	225	315	226
42	185	210	202	226	318	228
44	187	212	202	227	323	230
46	189	214	202	228	326	232
48	191	216	203	229	330	234
50	194	218	204	232	334	236
52	196	221	205	234	339	239
54	197	224	206	236	343	241
56	199	226	207	237	342	242
58	201	227	207	237	342	243
60	202	228	208	238	346	244
62	203	229	209	239	351	246

Individual and mean temperatures recorded on the unexposed surface of Doorset B

Time Mins	T/C Number 7 Deg. C	T/C Number 8 Deg. C	T/C Number 9 Deg. C	T/C Number 10 Deg. C	T/C Number 11 Deg. C	Mean Temp Deg. C
0	20	21	21	21	20	21
2	20	21	21	22	22	21
4	21	22	25	27	32	25
6	28	26	31	43	51	36
8	38	34	40	60	67	48
10	49	44	47	75	81	59
12	59	53	54	90	99	71
14	67	60	60	106	116	82
16	75	64	66	124	133	92
18	88	69	75	145	152	106
20	106	75	86	165	169	120
22	123	83	98	184	183	134
24	140	99	114	200	195	150
26	155	116	128	213	204	163
28	166	131	143	223	212	175
30	175	144	155	231	218	185
32	181	154	165	240	223	193
34	185	161	172	248	228	199
36	189	167	178	255	232	204
38	194	170	183	261	237	209
40	198	172	186	266	241	213
42	201	171	187	270	246	215
44	204	170	188	276	250	218
46	208	167	188	282	254	220
48	213	168	189	287	260	223
50	218	170	190	293	264	227
52	222	172	192	298	269	231
54	224	175	194	303	273	234
56	227	177	195	303	273	235
58	227	179	196	305	274	236
60	229	181	197	309	277	239
62	231	183	199	312	280	241

Individual temperatures recorded on the unexposed surface of the Doorset A

Time Mins	T/C Number 12 Deg. C	T/C Number 13 Deg. C	T/C Number 14 Deg. C	T/C Number 15 Deg. C
0	20	20	21	17
2	33	22	21	17
4	55	27	23	18
6	96	41	31	25
8	133	58	44	34
10	173	73	57	44
12	204	85	69	53
14	230	95	81	63
16	254	104	97	76
18	273	114	116	95
20	290	125	135	115
22	305	136	155	133
24	319	147	174	151
26	333	157	189	167
28	345	166	202	179
30	355	174	213	189
32	363	181	223	196
34	368	188	232	201
36	376	194	240	206
38	386	200	247	210
40	401	205	252	213
42	409	208	255	216
44	419	209	257	216
46	429	212	259	217
48	429	217	261	219
50	431	222	264	221
52	442	226	265	223
54	449	231	267	225
56	455	234	268	226
58	449	239	269	227
60	453	241	270	226
62	454	244	271	227

Individual temperatures recorded on the unexposed surface of the Doorset B

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	17	17	17	17
2	18	18	18	17
4	25	23	22	19
6	38	31	31	26
8	53	45	41	36
10	66	61	51	46
12	78	73	59	55
14	88	83	66	65
16	97	91	75	77
18	107	100	89	94
20	118	110	104	111
22	131	121	120	129
24	145	134	138	146
26	157	146	155	161
28	168	157	169	173
30	178	167	179	183
32	185	174	187	191
34	190	180	193	197
36	195	185	198	199
38	201	189	202	201
40	206	194	208	203
42	210	197	212	205
44	213	200	215	208
46	215	201	219	210
48	217	203	221	211
50	218	205	224	214
52	221	207	228	216
54	224	210	231	218
56	227	212	234	220
58	230	214	235	221
60	233	216	238	222
62	237	218	240	224

Individual temperatures recorded on the door frame of Doorset A

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
0	18	17	19	20
2	19	42	33	21
4	28	95	72	29
6	45	150	127	44
8	67	193	172	65
10	92	223	208	91
12	116	263	235	118
14	143	308	260	146
16	171	347	287	173
18	197	376	311	199
20	220	399	332	221
22	241	416	350	248
24	262	432	367	278
26	281	445	382	294
28	299	459	396	304
30	313	475	409	314
32	327	486	421	324
34	341	500	432	336
36	353	521	443	346
38	363	527	453	355
40	371	531	461	364
42	378	538	469	372
44	384	543	477	380
46	390	549	485	388
48	395	558	494	395
50	400	565	504	402
52	406	565	512	408
54	410	572	519	414
56	415	575	522	419
58	418	582	526	424
60	421	589	531	428
62	425	596	539	433

Individual temperatures recorded on the door frame of Doorset B

Time Mins	T/C Number 24 Deg. C	T/C Number 25 Deg. C	T/C Number 26 Deg. C	T/C Number 27 Deg. C
0	20	20	20	20
2	22	40	34	21
4	31	72	59	30
6	47	112	92	47
8	70	151	127	70
10	97	189	158	98
12	127	229	194	130
14	157	261	234	168
16	187	289	269	191
18	*	312	303	136
20		334	333	151
22		365	362	175
24		393	387	205
26		415	406	237
28		431	424	252
30		443	439	258
32		453	451	257
34		460	462	263
36		468	473	260
38		475	483	267
40		482	503	267
42		487	511	275
44		495	517	277
46		505	530	279
48		516	542	286
50		526	548	294
52		532	555	300
54		538	562	304
56		540	564	305
58		546	564	308
60		552	568	320
62		560	577	326

*Thermocouple detachment

Furnace pressure recorded at the head of the doorsets during the test

Time Mins	Recorded Pressure Pascals
0	0.0
2	0.0
4	12.3
6	12.5
8	12.0
10	13.0
12	15.9
14	15.7
16	14.5
18	14.7
20	13.2
22	12.0
24	13.0
26	12.0
28	12.2
30	13.2
32	11.9
34	12.2
36	15.3
38	13.0
40	14.4
42	14.5
44	12.6
46	12.5
48	15.4
50	17.1
52	13.3
54	12.5
56	11.3
58	14.7
60	15.8
62	15.0

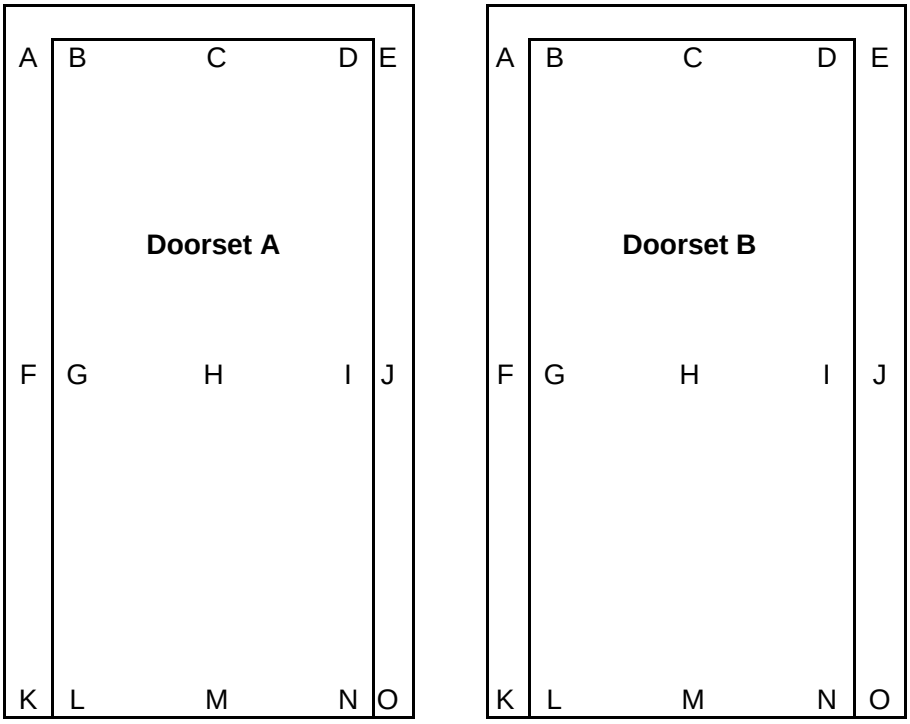
Recorded Radiation Intensity Doorset A

Time Mins	Radiation Intensity At 1M kW/m^2
0	0.1
2	0.0
4	0.1
6	0.0
8	0.1
10	0.2
12	0.3
14	0.5
16	0.6
18	0.6
20	0.8
22	0.8
24	1.1
26	1.2
28	1.1
30	1.4
32	1.5
34	1.4
36	1.7
38	1.7
40	1.7
42	1.8
44	1.9
46	1.8
48	2.0
50	2.1
52	2.2
54	2.2
56	2.2
58	2.2
60	2.3
62	2.3

Recorded Radiation Intensity Doorset B

Time Mins	Radiation Intensity At 1M kW/m^2
0	0.0
2	0.0
4	0.0
6	0.0
8	0.0
10	0.0
12	0.0
14	0.0
16	0.0
18	0.1
20	0.0
22	0.0
24	0.1
26	0.2
28	0.2
30	0.0
32	0.3
34	0.3
36	0.2
38	0.4
40	0.2
42	0.2
44	0.2
46	0.4
48	0.3
50	0.5
52	0.5
54	0.3
56	0.5
58	0.4
60	0.3
62	0.3

Horizontal deflections of the doorsets

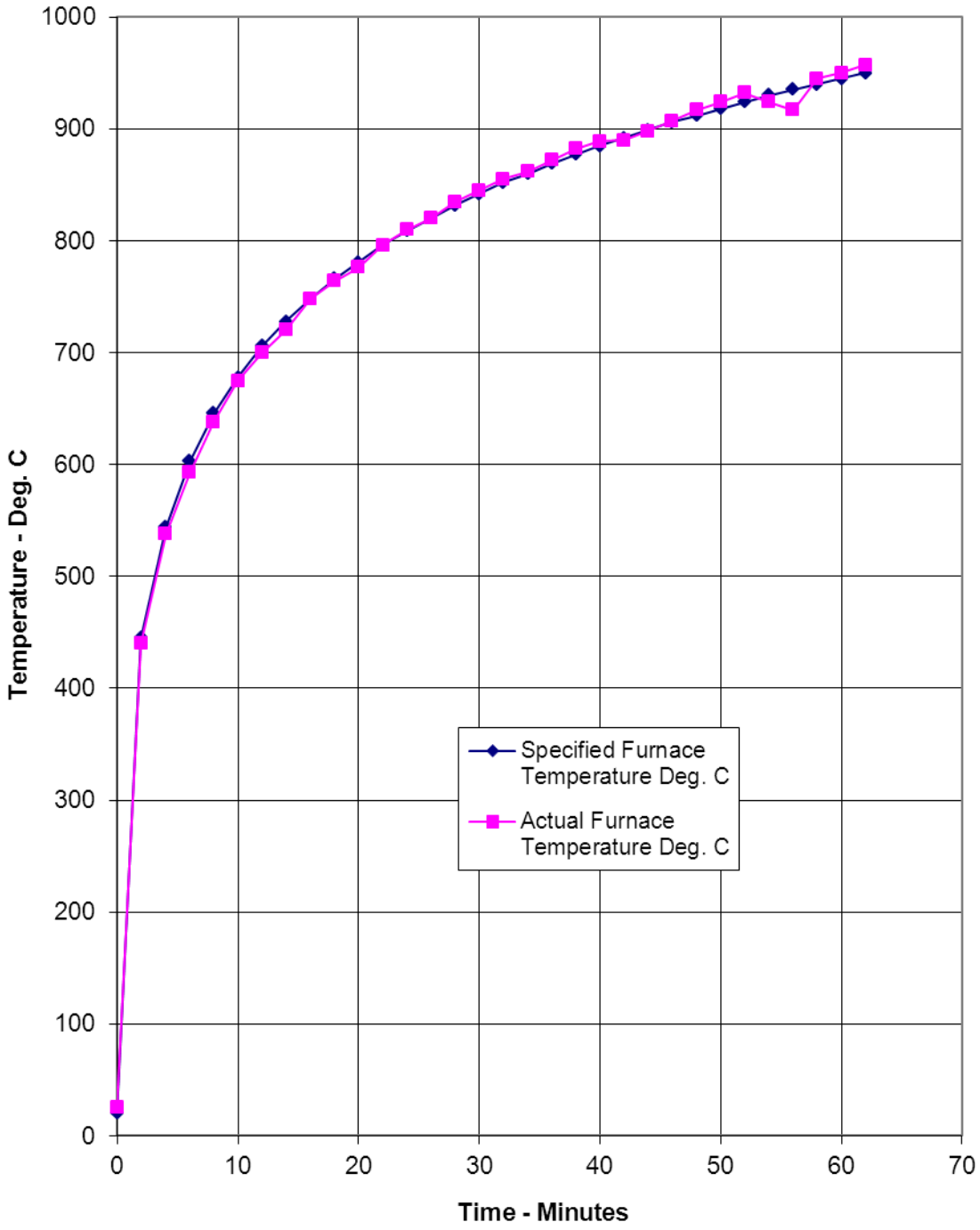


Doorset A															
Deflections – mm															
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	-5	-37	-7	-16	-5	4	10	6	12	12	-25	-30	-14	-10	-5
20	-9	*	-8	-17	-7	7	15	-1	13	15	-10	-37	-12	-11	-4
30	-10	*	-9	-12	-6	7	*	-5	17	7	-8	-41	-12	-10	-2
40	-7	-36	-8	-12	2	8	17	-5	18	*	-8	-39	-10	-8	0
50	-3	-35	-6	-11	-2	8	20	-8	20	23	-9	-43	-7	-8	-1
60	-1	-35	-10	-14	-1	8	21	-9	24	23	-6	-43	-8	-9	2

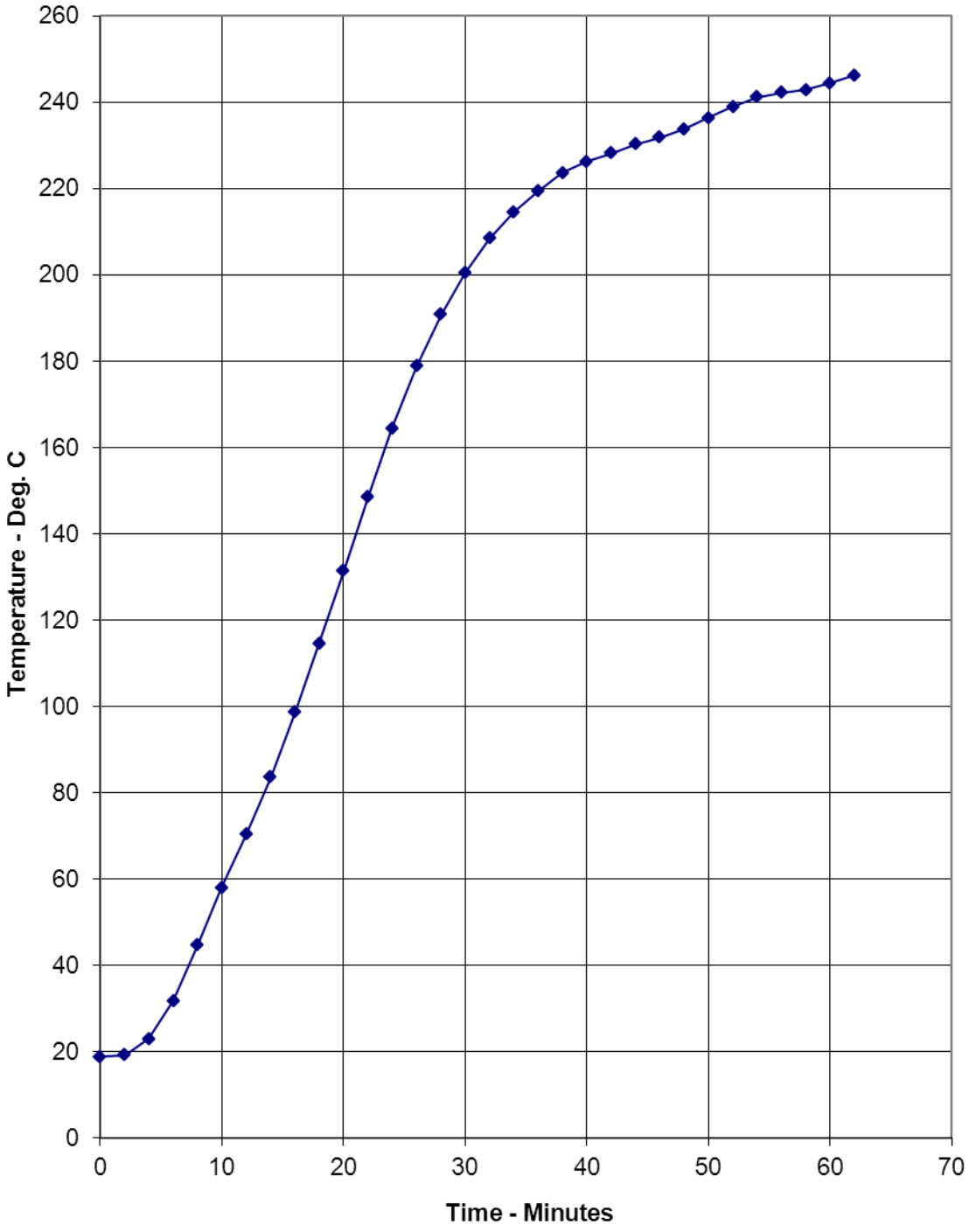
Doorset B															
Deflections – mm															
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	-6	-17	-5	-20	-11	16	16	6	11	9	-5	-15	-4	-12	-5
20	-9	-23	-2	-15	-7	19	18	5	14	4	-3	-24	-7	-13	-3
30	*	-24	0	-17	-6	17	18	3	16	*	-4	-25	-8	-14	-2
40	*	-21	3	-16	-7	*	20	4	16	9	0	-25	-4	-13	1
50	-3	-19	1	-19	-3	29	19	1	20	9	-2	-24	-3	-12	0
60	-2	-20	3	-18	-1	25	21	-1	18	14	-3	-28	-5	-18	2

Negative values indicate movement away from the furnace chamber

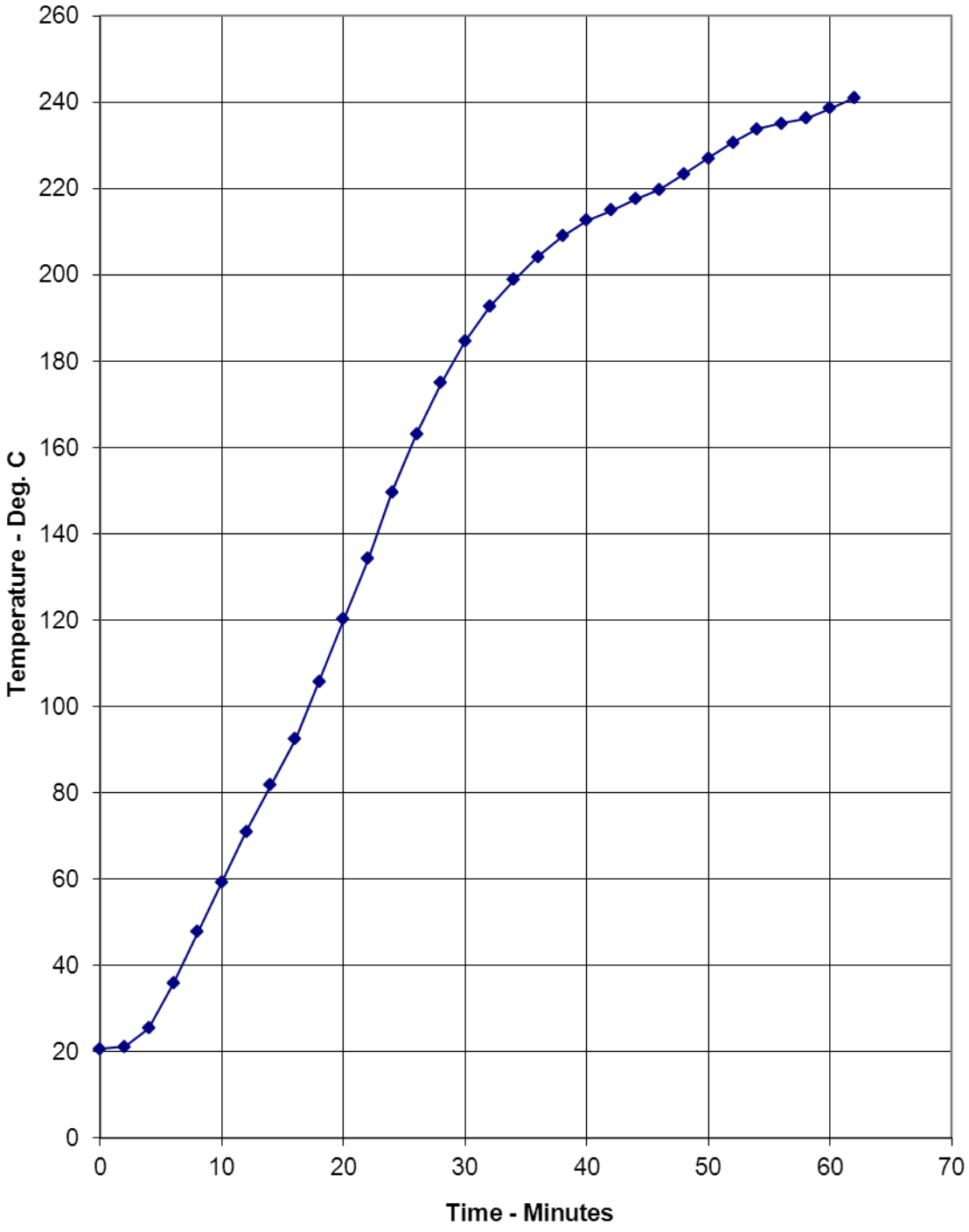
Graph showing mean furnace temperature, together with the temperature/time relationship specified in BS EN 1363-1: 2012



Graph showing mean temperatures recorded on the unexposed surface of Doorset A



Graph showing mean temperatures recorded on the unexposed surface of Doorset B



Performance Criteria and Test Results

Integrity

It is required that the specimen retains its separating function, without either causing ignition of a cotton pad when applied, or permitting the penetration of a gap gauge as specified in BS EN 1634-1: 2008, or resulting in sustained flaming on the unexposed surface.

These requirements were satisfied for the periods shown below:

Integrity performance	Doorset A	Doorset B
Sustained flaming	34 minutes	48 minutes
Gap gauge	62 minutes*	62 minutes*
Cotton pad	34 minutes	48 minutes

Insulation

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 (except on the door frame, where the maximum temperature rise shall not exceed 360°C). Insulation failure also occurs simultaneously with integrity failure as specified in BS EN 1634-1: 2008.

These requirements were satisfied for the period shown below:

Insulation performance		
	11 minutes	23 minutes

*The test duration. The test was discontinued after a period of 62 minutes.

Radiation

BS EN 1363-2: 1999 requires that the time for the measured radiation to exceed 5, 10, 15, 20 and 25 kW/m^2 be reported. The readings given below are the average readings for each of the specimens.

Radiation Performance	5 kW/m^2	10 kW/m^2	15 kW/m^2	20 kW/m^2	25 kW/m^2
Doorset A	62 minutes#	62 minutes#	62 minutes#	62 minutes#	62 minutes#
Doorset B	62 minutes#	62 minutes#	62 minutes#	62 minutes#	62 minutes#

Not exceeded during the test.

Ongoing Implications

Limitations

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 1363-1: 2012, 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. Annex A of BS EN 1363-1: 2012, provides guidance information on the application of fire resistance tests and the interpretation of test data.

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.

Conclusions

Evaluation against objective

Two specimens of single-acting, single-leaf doorset have been subjected to a fire resistance test in accordance with BS EN 1634-1: 2008, 'Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware - Part 1: Fire resistance tests for doors, shutters and openable windows', BS EN 1363-1: 2012, General requirements and BS EN 1363-2: 1999, Alternative and additional procedures.

The evaluation of the doorsets against the requirements of BS EN 1634-1: 2008 showed that the doorsets satisfied the requirements for the following periods:

Test Results:		**Doorset A**	**Doorset B**
Integrity performance	Sustained flaming	34 minutes	48 minutes
	Gap gauge	62 minutes*	62 minutes*
	Cotton Pad	34 minutes	48 minutes
Insulation performance		11 minutes	23 minutes

Radiation Performance	5 kW/m^2	10 kW/m^2	15 kW/m^2	20 kW/m^2	25 kW/m^2
Doorset A	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$
Doorset B	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$	62 minutes$^{\#}$

*The test duration. $^{\#}$ Not exceeded during the test.

Field of Direct Application

General	The field of direct application of results is restricted to governing the allowable changes to the test specimen following a successful fire resistance test. These variations can be introduced automatically without the need for the sponsor to seek additional evaluation, calculation or approval.
Materials And Constructions, General	Unless otherwise stated in the following text the construction of the door assemblies shall be the same as that tested. The number of leaves and the mode of operation (e.g. sliding, swinging, single action or double action) shall not be changed.
Specific Restrictions On Materials And Construction	The thickness of the door leaves shall not be reduced but may be increased. The door leaf thickness and/or density may be increased provided the total increase in weight is not greater than 25%.
Decorative Finishes	Paint finishes are acceptable and may be added to the door leaf or frame products.
Frames	The number of fixings used to attach the doorset to the supporting constructions may be increased but shall not be decreased and the distance between fixings may be reduced but shall not be increased.
Hardware	Changes in hardware are permitted provided the alternative hardware has been demonstrated in another doorset of similar configuration. The number of any movement restrictors such as locks, latches and hinges may be increased but shall not be decreased.
Permissible Size Variations	Doors of sizes different from those of tested specimens are permitted within certain limitations but variations are dependent on the product type and the length of time that the performance criteria are fulfilled.
Specific Size Variations Of The Doorset	Unlimited size reduction is permitted for the doorsets. Size increase may be permitted, depending on the required classification period, in line with Section 13.3 of BS EN 1634-1: 2008.
Other Changes	For smaller door sizes the relative positioning of movement restrictors (e.g. hinges, latches, etc.) shall remain the same as tested or any change to the distances between them will be limited to the same percentage reduction as the decrease of specimen size.
Asymmetrical Door Assemblies General	BS EN 1363-1 states that for separating elements required to be fire resisting from both sides, two specimens shall be tested (one from each direction) unless the element is fully symmetrical. However, in some cases it is possible to develop rules whereby the fire resistance of an asymmetrical door assembly tested in one direction can apply when the fire exposure is from the other direction. The possibility to develop such rules increases if the consideration is limited to certain types of door assembly and on the criteria being applicable, e.g. integrity only doors. The following rules represent the minimum level of common agreement which shall be followed. The rationale behind the rules is given in Annex C of BS EN 1634-1: 2008.

Specific Rules

The doorset was asymmetrical and was tested such that it opened away from the furnace chamber. The doorset conformed to the specific rules given in 13.4.2 of BS EN 1634-1: 2008 which gives details of the applicability of the test results of doorsets tested in one direction to cover the opposite opening direction.

Supporting Constructions

The fire resistance of a door assembly tested in one form of standard supporting construction may or may not apply when it is mounted in other types of construction. In some cases it is possible for the result of a test on a particular type of door assembly tested in one form of standard supporting construction to be applicable to that door assembly when mounted in a different type of standard supporting construction.