

Title:

The Fire Resistance
Performance Of A, Single-
Acting, Single-Leaf Steel
Riser Panel, When Tested
In Accordance With BS EN
1634-1:2014+A1:2018

Date Of Test:

12/08/2021

Issue 1

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WF Report No:

WF504120



Prepared for:

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Approved Body no. 1314



1762

Test Specimen

Summary of Tested Specimen

The specimen was mounted to the unexposed side of a low density blockwork and had overall nominal dimensions of 1250mm high x 750mm wide and incorporated a Steelco 2500 x 1250 x 1.2 ELECTRIC-ZINC BS EN 10152:2009 Zintec steel frame which included a Envirograph G10/10 self-adhesive intumescent strip. A Steelco 2500 x 1250 x 0.9 ELECTRIC-ZINC BS EN 10152:2009 leaf measuring 1200mm high x 700mm wide was hung opening away from the heating conditions of the test. The leaf was hung with a Bagshaw engineering Hinge-RF-R51 Spring Pin mild steel hinge at the top and a TR Fastenings Mild Steel Machine screw at the bottom. The specimen was locked for the duration of the test using a CRA international 18975 Stainless Steel Lockset, which was engaged at both points.

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

Performance Criteria and Test Results

Riser Panel

Integrity	
Cotton pad	132 (One Hundred and Thirty-Two) Minutes*
Sustained flaming	132 (One Hundred and Thirty-Two) Minutes*
Gap gauges	132 (One Hundred and Thirty-Two) Minutes*

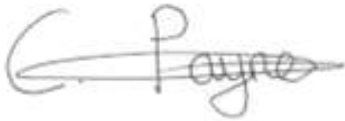
* No failure of this test criteria was observed at termination of the test at 132 minutes

Note: The riser panel was not evaluated for insulation

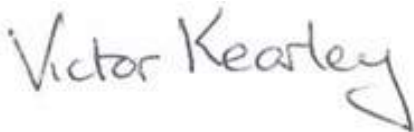
Date of Test 12/08/2021

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Test Conditions

Standard BS EN 1634-1:2014+A1:2018 Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows.

Sampling Warringtonfire was not involved in factory sampling of the products and materials used for the test specimen described in this report, and as such the results of this test apply to the sample as received.

Installation The riser panel was received during the month of August 2021 and installed within the pre-prepared apertures in a blockwork supporting construction such that the leaf opened away from the heating conditions of the test. Representatives of the Client conducted the installation with the help of **Warringtonfire** when necessary.

Conditioning The specimens' storage, construction, and test preparation took place in the test laboratory. **Warringtonfire** stored the specimen in climatic conditions approximate to those in normal service.

Pre-Test Conditioning Prior to testing, the riser panel was subjected to appropriate mechanical pre-test conditioning in accordance with the requirement of BS EN 16034. Specifically the pre-cycle requirement within Annex A.2.2.

Operability Pre-cycling

Minimum angle of opening:	90°
Number of operation cycles completed:	25

No closer has been fitted to the specimen

Ambient Temperature The ambient air temperature in the vicinity of the test construction was 17°C at the start of the test with a maximum variation of +8°C during the test.

Furnace The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2012 Clause 5.1 using four plate thermometers, distributed over a plane 100±50 mm from the surface of the test construction.

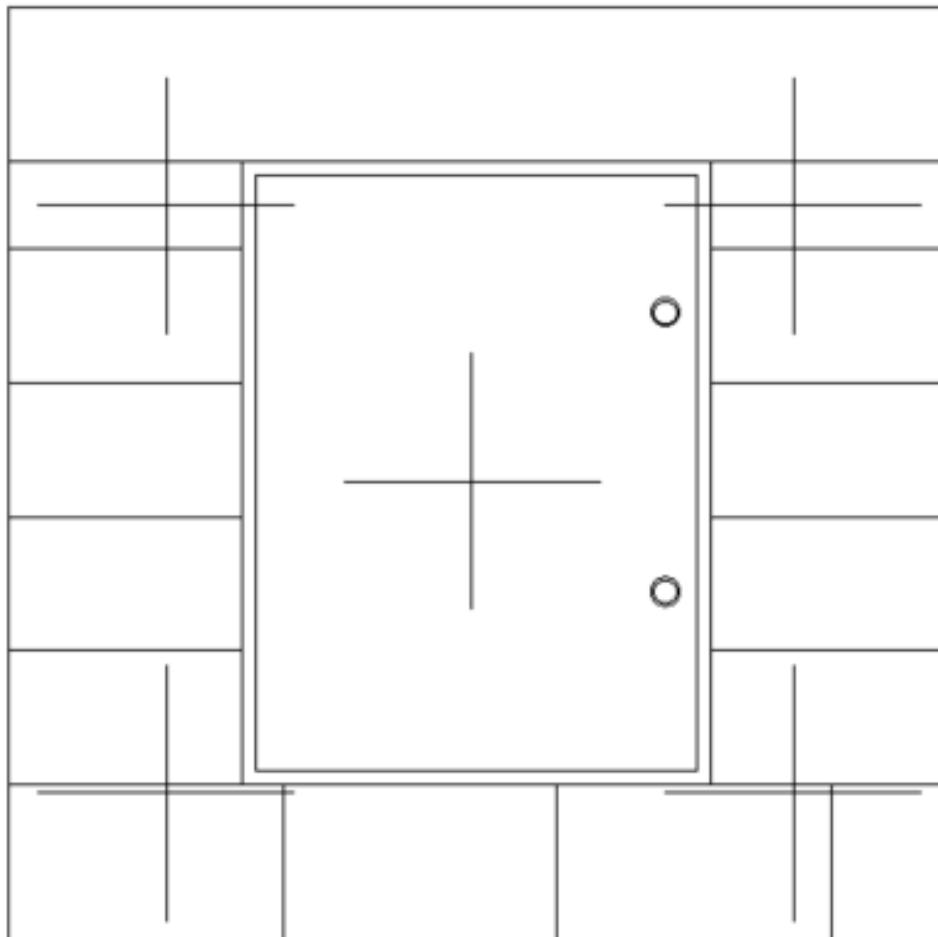
Thermocouples No Thermocouples were placed on the unexposed surface of the specimen.

Radiation A radiometer was not applied to the specimen.

Furnace Pressure After the first 5 minutes of the test, the furnace pressure was maintained at 4.2 ± 5 Pa and after 10 minutes was maintained at 4.2 ± 3 Pa with respect to atmosphere, at a point 1m from the notional floor level.

Test Specimen Drawings

Figure 1 – General Elevation of the Test Construction and Opening Direction



+ : Furnace Thermocouples
Viewed From Unexposed Face

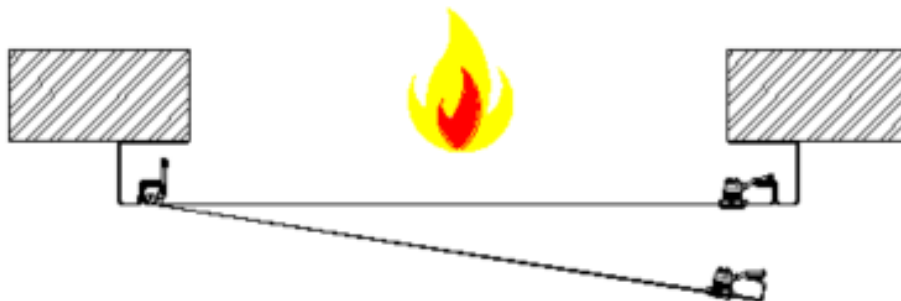


Figure 2 – General Elevation of the Test Construction

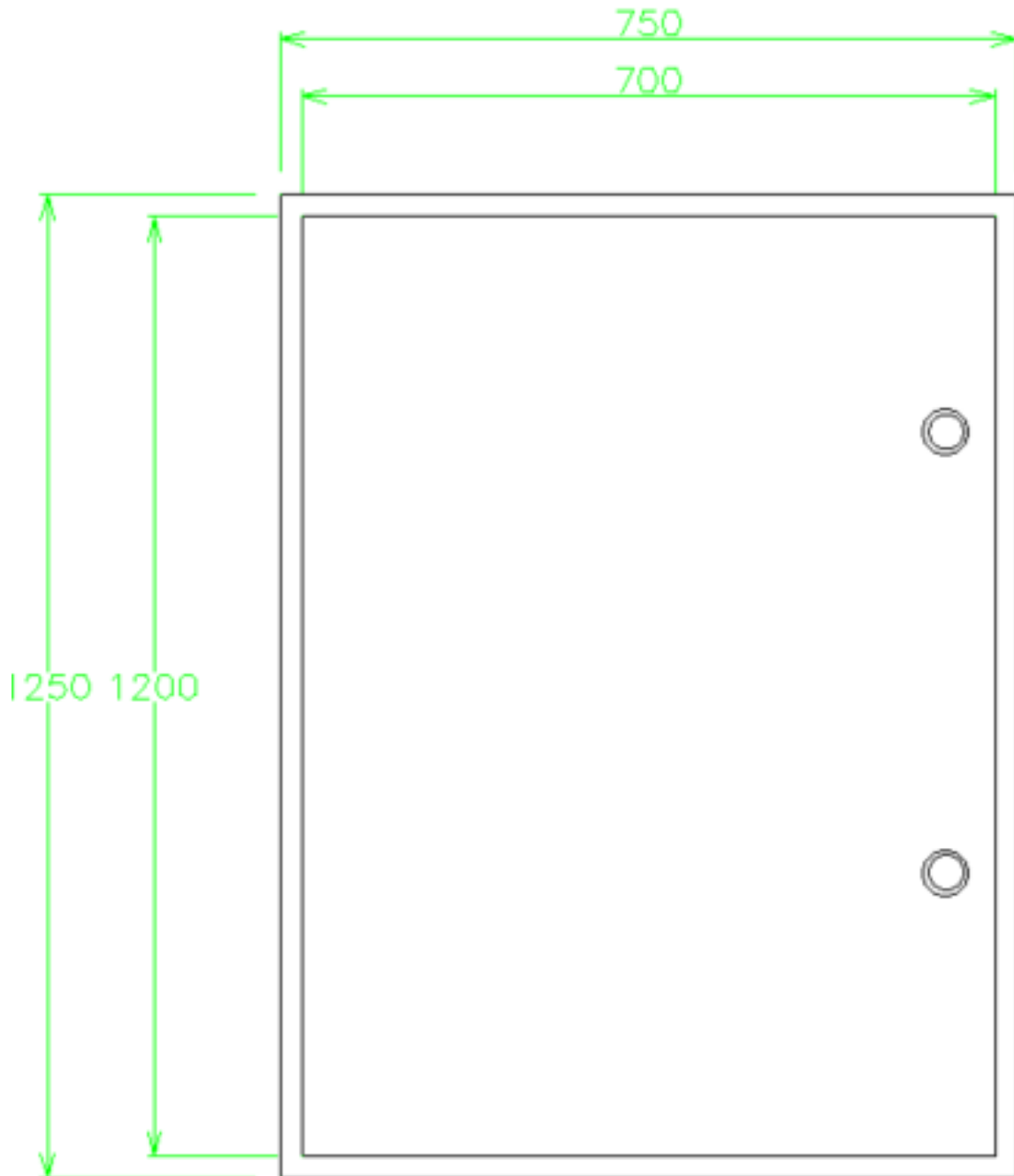


Figure 3 – Horizontal Cross Section Of Riser Panel

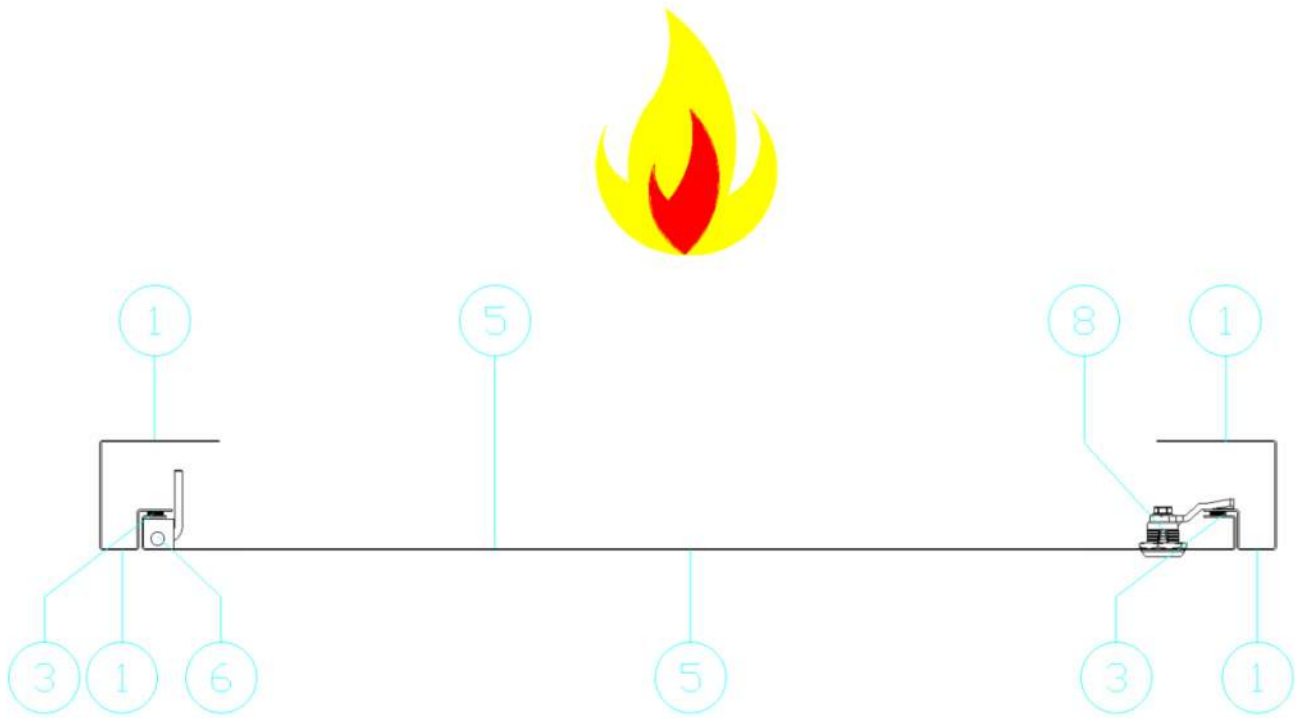


Figure 4 – Vertical Cross Section of Riser panel

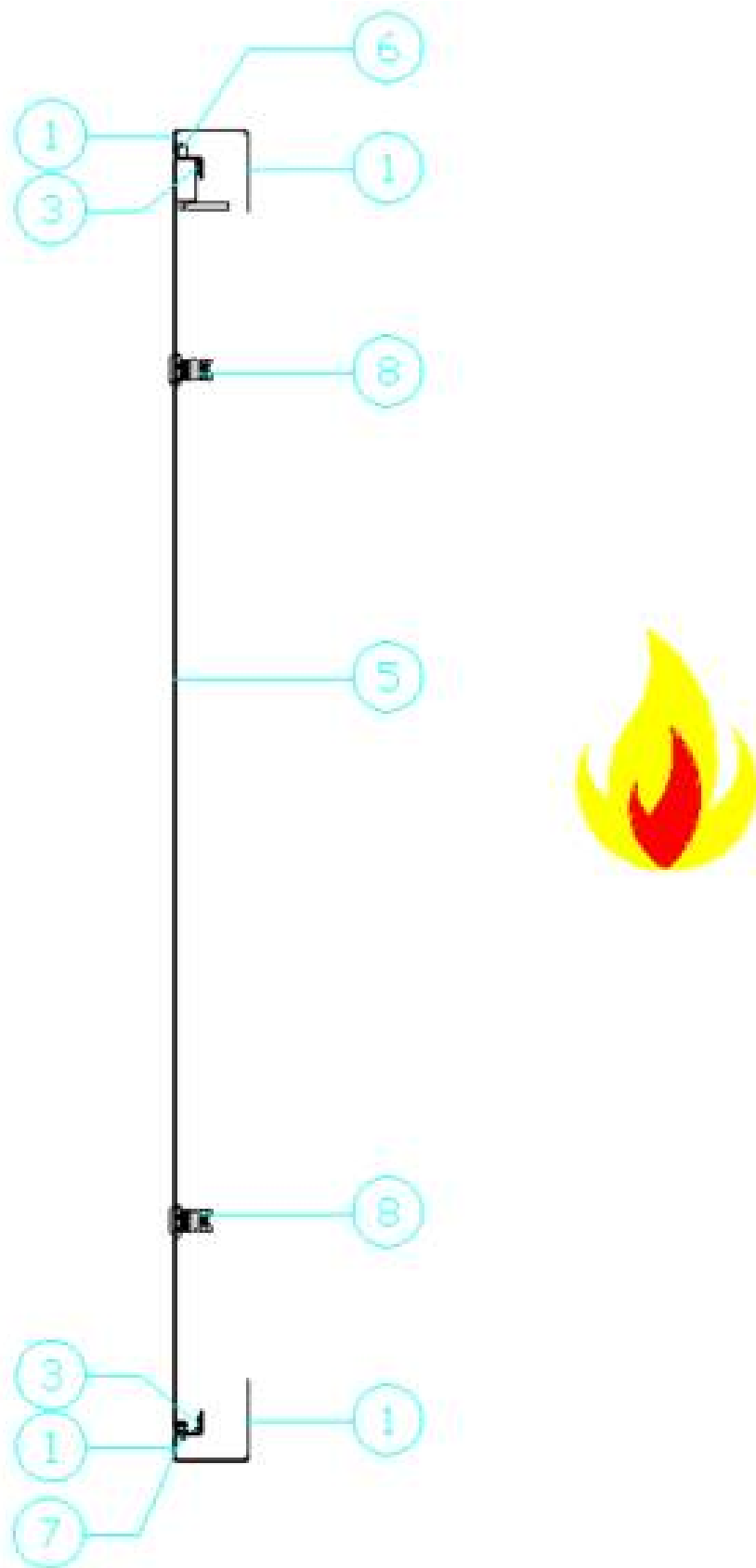
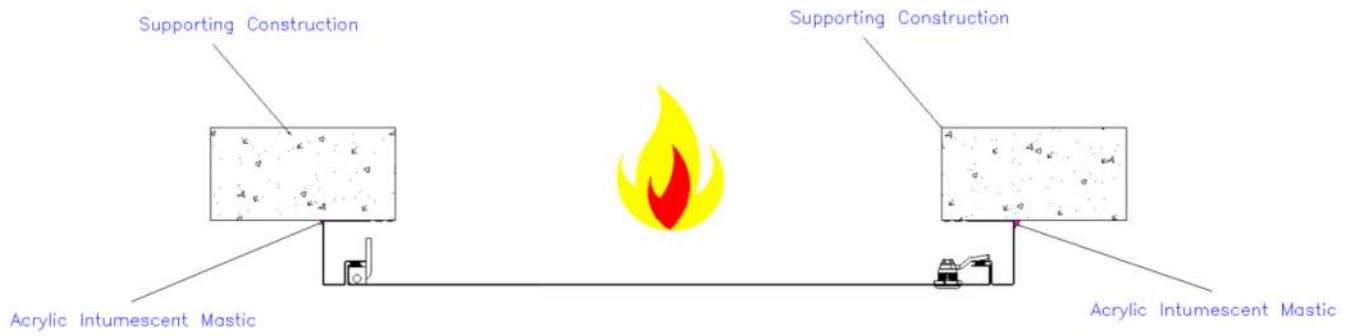


Figure 5 – Details of Supporting Construction to Frame, Fire Stopping



Schedule of Components

Refers to Figures 1 to 5
(All values are nominal unless stated otherwise)
*Stated by client, not verified by laboratory

Frame

1. Frame	
Manufacturer	Steelco*
Reference	2500 x 1250 x 1.2 ELECTRIC-ZINC BS EN 10152:2009*
Material	Zintec Steel Head and Zintec Steel Jambs*
Density	7870 kg/m ³ *
Moisture content	0%*
Overall size	
Frame (Head)	76 mm wide x 70mm deep x 0.9 mm thick with 25mm deep rebate*
Frame (Jambs)	76 mm wide x 70mm deep x 0.9 mm thick with 25mm deep rebate *
Stop	22mm wide x 25mm deep*
Jamb to Head jointing method, fixing detail and location	Welded
Stop to Frame jointing method, fixing detail and location	Integral
Presence of Adhesives	None*

2. Frame Fixing Method to Supporting Construction	
Manufacturer	Easydrive Countersunk concrete screws*
Reference	1066H*
Type & material	Steel*
Overall size	7.5mm diameter x 50mm long *
Spacing	100mm in from both corners at the head and base of the panel. 60mm, 560mm and 1070mm from the bottom of each jamb
Does the fixing penetrate intumescent seal within frame reveal	No*
Packing Material	None*

3. Intumescent to frame reveal	
Quantity	1No (Perimeter of Frame)
Manufacturer	Envirograph*
Reference	G10/10*
Material	Graphite*
Overall section size	10mm x 2mm*
Application method	Self-Adhesive Tape on the back of the intumescent strip*
Location	Full length Of Frame Rebate
Presence of Adhesives	None

Fire stopping

4. Frame to supporting construction fire stopping detail	
Manufacturer	Mann McGowan
Reference	Pyromas A
Material	Intumescent Mastic
Overall dimension	Bead of mastic to the rear of the frame sealing to the structural opening
Application method	Mastic Gun

Leaf

5. Leaf	
Manufacturer	Steelco*
Reference	2500 x 1250 x 0.9 ELECTRIC-ZINC BS EN 10152:2009*
Quantity of leaves on doorset	1No
Overall leaf size	697mm wide x 1198mm high x 0.9mm thick*

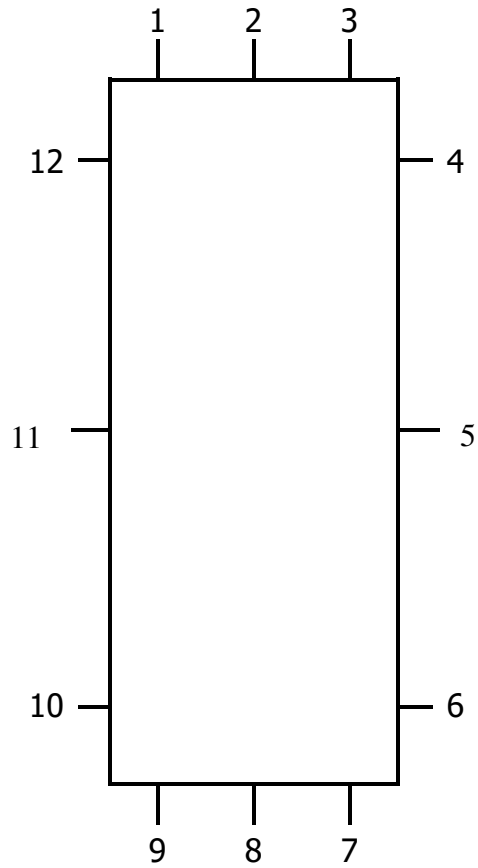
Hardware

6. Hinge	
Supplier	Bagshaw Engineering*
Reference	HINGE-RF-R51*
Quantity	1no*
Primary material	Mild Steel*
Type	Spring Pin Hinge*
Size	19.1mm x 19.1mm x 40mm, 8mm Pin*
Fixings	Welded in door tray*
type	Welded*
material	BZP Steel*
Location of Welding	Door upstand*
Position of the hinge	Top of leaf.
Details of intumescent protection	None
Interruptions to Intumescent within the frame reveal	None

7. Hinge	
Supplier	TR Fastenings*
Reference	M5 x 12mm Pan Pozi Head Machine Screw*
Quantity	1no*
Primary material	Mild Steel*
Type	Machine Screw*
Size	M5 x 12mm*
Fixings	
type	M5 Rivet Nut*
material	BZP Steel
sizes	M5*
Position of each hinge relative to the head of the leaf	Bottom of leaf*
Details of intumescent protection	None
Interruptions to Intumescent within the frame reveal	None

8. Lockset	
Manufacturer	CRA International*
Reference	18975*
Material	Stainless Steel*
Overall sizes	28mm x 37mm*
Fixing method	Bolted on *
Location of centre of the spindle relative to the bottom of the leaf	200mm and 800mm*

Steel Riser Panel Clearance Gaps



View from unexposed face

Gap Dimension in mm at Positions												
1	2	3	4	5	6	7*	8*	9*	10	11	12	
2.6	2.6	2.6	2.0	1.5	1.7	1.6	1.7	1.5	1.9	2.0	2.7	
Mean			2.2		Maximum			2.7		Minimum		1.5

Test Observations

Time (minutes)	All observations are from the unexposed face unless noted otherwise.
00:00	The test has started.
03:23	There is smoke issuing at the top closing corner, at the head, and at the top hanging corner.
15:00	No visible change.
30:00	No visible change.
45:00	No visible change.
60:00	No visible change.
75:00	No visible change.
90:00	No visible change.
105:00	No visible change.
120:00	No visible change.
132:00	Test terminated.

Test Photographs

The unexposed face of the steel riser panel prior to testing



The unexposed face of the steel riser panel after a test duration of 15 minutes



The unexposed face of the steel riser panel after a test duration of 30 minutes



The unexposed face of the steel riser panel after a test duration of 45 minutes



The unexposed face of the steel riser panel after a test duration of 60 minutes



The unexposed face of the steel riser panel after a test duration of 75 minutes



The unexposed face of the steel riser panel after a test duration of 90 minutes



The unexposed face of the steel riser panel after a test duration of 105 minutes



The unexposed face of the steel riser panel after a test duration of 120 minutes



Temperature and Deflection Data

Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In BS EN 1363-1: 2012

Time	Mean Furnace Temperature	ISO 834
min	°C	°C
0	20	20
1	269	349
2	397	445
3	516	502
4	559	544
5	582	576
6	598	603
7	623	626
8	647	645
9	665	663
10	677	678
11	693	693
12	707	705
13	716	717
14	724	728
15	740	739
16	750	748
17	761	757
18	766	766
19	773	774
20	780	781
21	786	789
22	792	796
23	796	802
24	806	809
25	816	815
26	821	820
27	827	826
28	835	831
29	839	837
30	843	842
31	848	847
32	850	851
33	855	856
34	860	860
35	862	865
36	866	869
37	870	873
38	873	877
39	878	881

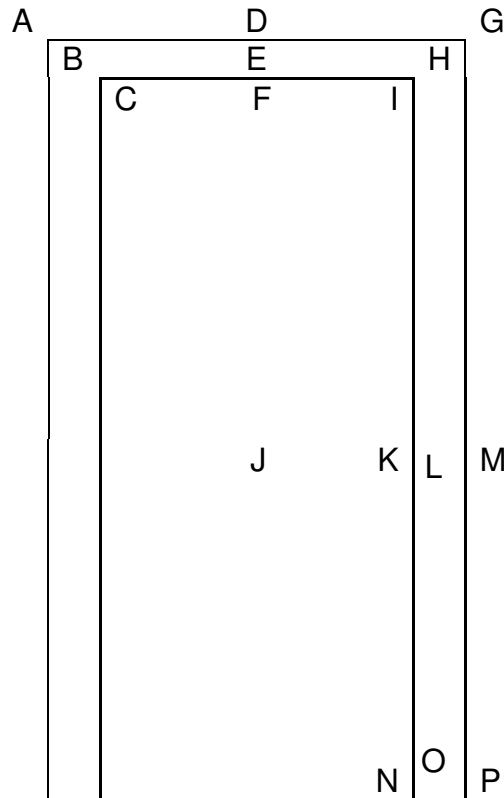
Time	Mean Furnace Temperature	ISO 834
min	°C	°C
40	881	885
41	885	888
42	887	892
43	892	896
44	897	899
45	900	902
46	905	906
47	908	909
48	911	912
49	915	915
50	915	918
51	919	921
52	921	924
53	926	927
54	928	930
55	930	932
56	932	935
57	935	938
58	939	940
59	940	943
60	943	945
61	945	948
62	947	950
63	951	953
64	952	955
65	953	957
66	960	960
67	962	962
68	963	964
69	966	966
70	967	968
71	970	971
72	971	973
73	974	975
74	977	977
75	977	979
76	979	981
77	981	983
78	982	985
79	993	986

Time	Mean Furnace Temperature	ISO 834
min	°C	°C
80	999	988
81	1004	990
82	1007	992
83	1006	994
84	998	996
85	994	997
86	995	999
87	996	1001
88	997	1003
89	1000	1004
90	998	1006
91	999	1008
92	1000	1009
93	1002	1011
94	1004	1012
95	1007	1014
96	1009	1016
97	1010	1017
98	1011	1019
99	1012	1020
100	1014	1022
101	1016	1023
102	1018	1025
103	1018	1026
104	1021	1028
105	1021	1029
106	1023	1030

Time	Mean Furnace Temperature	ISO 834
min	°C	°C
107	1022	1032
108	1025	1033
109	1027	1035
110	1027	1036
111	1029	1037
112	1030	1039
113	1031	1040
114	1034	1041
115	1034	1043
116	1036	1044
117	1037	1045
118	1038	1047
119	1040	1048
120	1042	1049
121	1043	1050
122	1042	1052
123	1044	1053
124	1044	1054
125	1047	1055
126	1049	1056
127	1048	1058
128	1051	1059
129	1050	1060
130	1052	1061
131	1053	1062
132	1054	1063

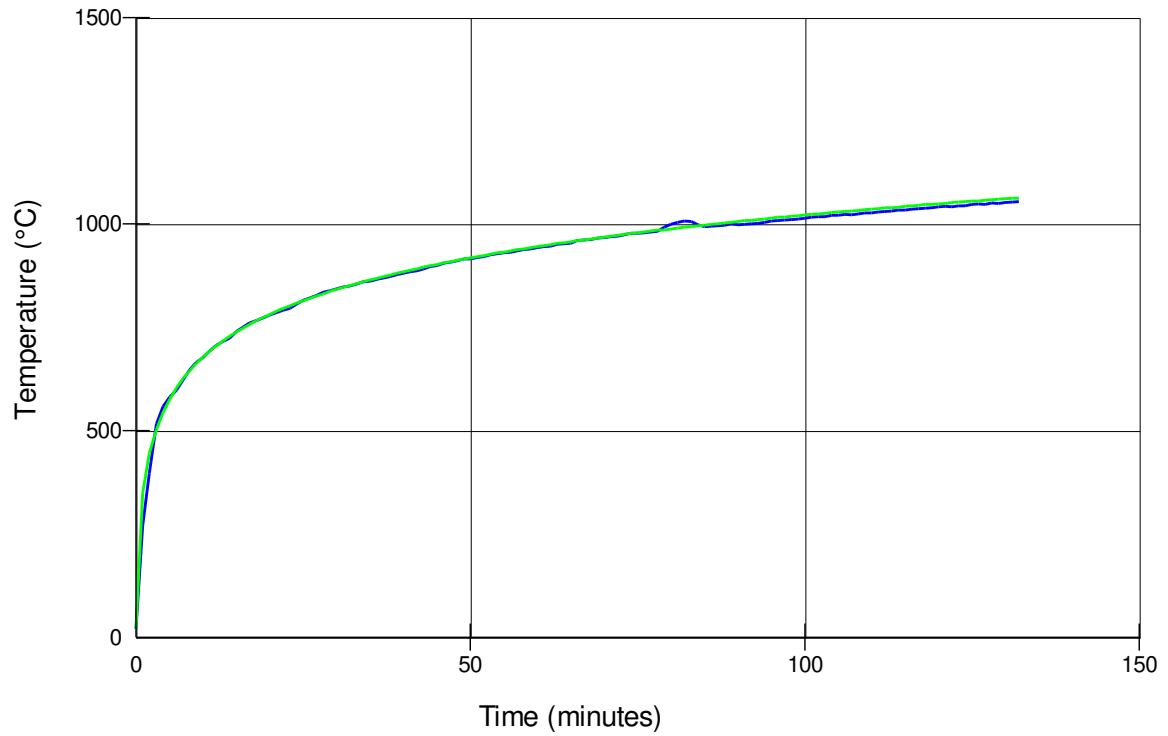
Horizontal Deflections Of The Riser Panel

The following tables show the distortion in mm with an accuracy of ± 1 mm. A positive measurement indicates distortion towards the furnace. A negative measurement indicates distortion away from the furnace.



Doorset																
Deflections – mm																
TIME mins	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	-1	-1	1	0	-2	1	-4	-5	-24	-2	1	1	-3	0	1

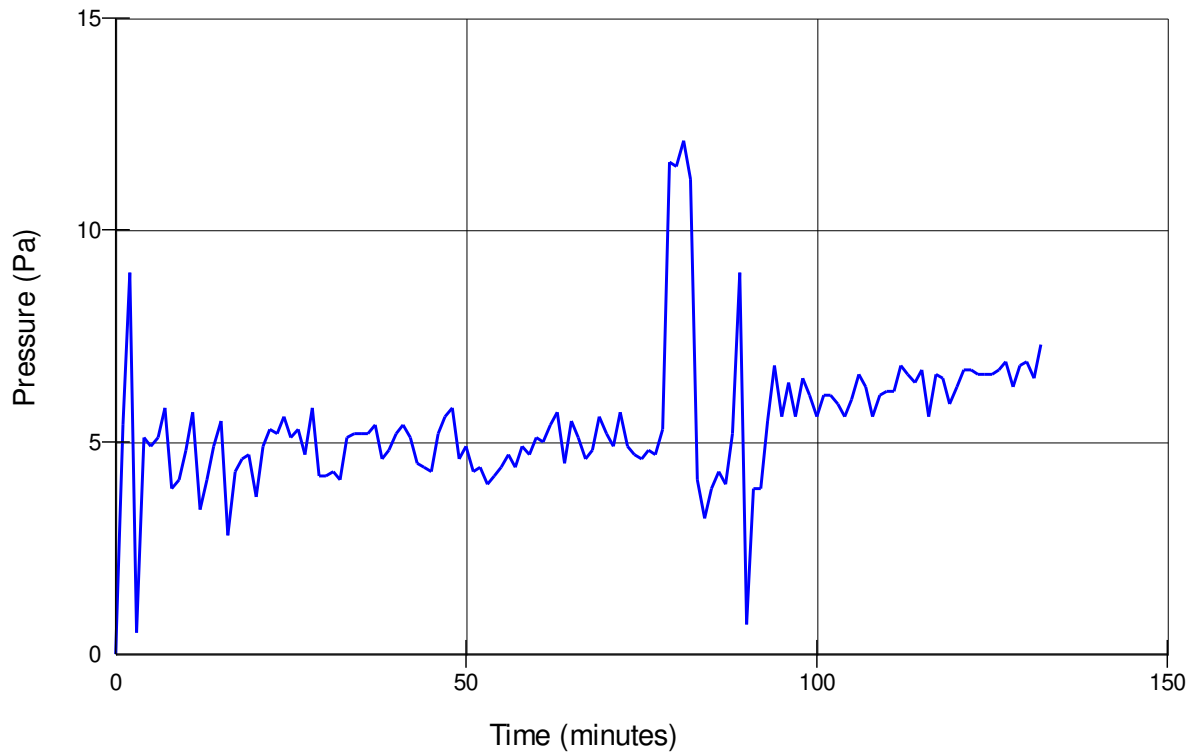
Graph Showing Mean Furnace Temperature, Together With The Temperature/Time Relationship Specified In BS EN 1363-1: 2012



Blue Line – Mean Furnace Temperature
Green Line – BSEN Curve

Graph Showing Recorded Furnace Pressure At 1m From The Notional Floor Level

Due to necessary adjustments of the gas and air input to control the furnace, pressures outside the specified tolerances were recorded sporadically at short intervals. As the pressure fluctuations recorded at those intervals did not represent the pressure conditions throughout the test, their effect on the test results can be disregarded.



On-going 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 1634-1, BS EN 1363-1, and where appropriate BS EN 1363-2. Any significant deviation with respect to size, construction 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, provides guidance information on the application of fire resistance tests and the interpretation of test data.

The results only relate to the behaviour 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 results of this test were obtained using the leaf to frame gaps recorded within this report. The fire resistance performance of doors of this design may change if substantially different gaps are employed.

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 5 years old should be considered by the user. Warringtonfire will be able to offer, on behalf of the test sponsor, 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.

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.

Field of Direct Application

BS EN 1363-1:2012, Fire resistance tests - Part 1: General requirements, states within Section 12.1, Clause v) that "The field of direct application of the results for the specimen being evaluated, either in the form of the full text from the appropriate standard, or only those clauses which are relevant for the specimen tested" shall be included within the test report. The full text of the field of direct application for the results of the specimen being evaluated herein, can be found within the appropriate test standard, which is referenced on the front cover of this report.