

FIRE RESISTANCE TEST IN ACCORDANCE WITH BS EN 1634-1: 2008

On a Single-acting, Unequal Double-leaf Composite Timber Doorset

Test Report No.: R14D39

Identification No.: Q14D65

Issue Date: 13 August 2014

Testing Location:

RED Hong Kong Laboratory

DD 134, Lung Kwu Tan, Tuen Mun,

N.T., Hong Kong

FOR REFERENCE ONLY

Test Sponsor

Hong Kong Standard Fire Resisting Door Manufacturing Co., Limited

Unit D, 1/F Building B, Mercantile Industrial & Warehouse,

Building, 16 – 24 Ta Chuen Ping Street, Kwai Chung, N.T.

APPROVED SIGNATORY: _____



DATE: 13 AUG 2014

Ir. Dr. YUEN Sai-wing, MHKIE (FIRE)

Hong Kong Accreditation Service (HKAS) has accredited this laboratory (HOKLAS 091- TEST) under Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accreditation laboratories. The results shown in this test report were determined by this laboratory in accordance with its terms of accreditation. This report may not be reproduced except in full.

CONTENT

Section	Description	Page
1	SUMMARY	3
2	INTRODUCTION	4
3	TEST INFORMATION	4
4	EQUIPMENT	5
5	CONDITIONING	5
6	TEST SPECIMEN CONSTRUCTION	5
7	VERIFICATION OF TEST SPECIMEN	5
8	PRE-TEST MEASUREMENTS	6
9	TEST PROCEDURES	6
10	TEST DATA AND INFORMATION	7
11	RESULTS	8
12	LIMITATIONS	9
	APPENDIX A - PHOTOS AND TEST RECORD	10
	APPENDIX B - OBSERVATION	21
	APPENDIX C - DATE RECORD DURING THE TEST	23
	APPENDIX D - INFORMATION FROM TEST SPONSOR	27

FOR REFERENCE ONLY

1 SUMMARY

Fire Resistance test conducted in accordance with BS EN 1634-1: 2008 on a single-acting, unequal double-leaf composite timber doorset.

A specimen of a single-acting, unequal double-leaf composite timber doorset had been subjected to a test in accordance with BS EN 1634-1: 2008. As requested by the test sponsor, the specimen was mounted within concrete lined specimen holder by test sponsor such that the door leaves were swinging towards the heating conditions. The specimen was asymmetrical and only one side of the specimen was tested as per test sponsor's request.

The specimen had overall dimensions of 2,036 mm wide by 2,370 mm high. It was comprised of a composite timber door frame and unequal door leaves constructed with a nominal 41 mm thick vermiculite and perlite fireproof boards, sandwiched by nominal 6 mm thick fireproof boards with nominal 0.3 mm thick 'Brashing Lacquer' painting on surface on each side (refer to test sponsor's drawings). Left and right door leaves were with sizes of 712 mm wide and 1,247 mm wide respectively by 2,330 mm high by 53 mm thick. Each door leaf was hung to the door frame by 4 nos. of 'FOX'S' stainless steel butt hinges with sizes of 102 mm by 102 mm by 3 mm thick. Left door leaf was incorporated with one number of 49 mm thick 'HKSFRD' glazed panel with aperture sizes of 195 mm wide by 600 mm high. Right door leaf was incorporated with one number of 47 mm thick 'HKSFRD' glazed panel with aperture sizes of 463 mm wide by 662 mm high.

1 no. of 'Acton Fire' intumescent fire seal with sizes of 40 mm wide by 4 mm thick was installed at vertical and top edges of both door leaves. 1 no. of 'STARART' intumescent smoke seal with sizes of 12 mm wide by 9 mm thick was installed at jambs and head of door frame. 1 no. of 'STARART' intumescent smoke seal with sizes of 15 mm wide by 20 mm high was installed at bottom edges of door leaves. A 'POSSE' surface mounted overhead door closer was installed at the exposed and unexposed sides of left and right door leaves respectively. A 'FOX'S' lockset was installed on right door leaf and a surface mounted magnetic lock was installed at unexposed side of door frame. A surface mounted handle and a surface mounted key pad were installed at exposed and unexposed sides of right door leaf respectively. The doorset was unlocked and unlatched during the test.

The specimen satisfied the performance requirements specified in BS EN 1634-1: 2008 for the following periods:

Integrity:	Cotton Pad	132 Minutes (No failure)
	Gap Gauge	132 Minutes (No failure)
	Sustained Flaming	132 Minutes (No failure)
Insulation (I₂ excluding glazed panels):		129 Minutes
Insulation (left glazed panel):		132 Minutes
Insulation (right glazed panel):		132 Minutes

The test was discontinued after a heating period of 132 minutes.

2 INTRODUCTION

The objective of the test is to determine the fire resistance performance of specimen of a single-acting, unequal double-leaf composite timber doorset when tested in accordance with BS EN 1634-1: 2008, 'Fire resistance tests for door and shutter assemblies – Part 1: Fire doors and shutters'.

This test report should be read in conjunction with BS EN 1363-1: 2012, 'Fire resistance tests – Part 1: General requirements'.

3 TEST INFORMATION

3.1 Test Sponsor

Hong Kong Standard Fire Resisting Door Manufacturing Co., Limited

Unit D, 1/F Building B, Mercantile Industrial & Warehouse,
Building, 16 – 24 Ta Chuen Ping Street, Kwai Chung, N.T.

3.2 Testing Location

Research Engineering Development Façade Consultants Limited, Hong Kong Laboratory of
DD 134, Lung Kwu Tan, Tuen Mun, New Territories, Hong Kong.

3.3 Date of Test

14th May 2014

3.4 Witness of the test

The test was led by Mr. Solaris Chan of Research Engineering Development Façade Consultants Limited (RED) and was witnessed by Mr. S.L. Tang, the representative of the test sponsor.

4 EQUIPMENT

Nine (9) 'type K' thermocouples to monitor the temperature of the furnace, which were kept at 100 mm from the exposed face of the specimen (see Figure 1).

Thirty-four (34) 'type K' thermocouples to monitor the temperature of the unexposed face of the specimen (see Figure 2).

A 'type K' roving thermocouple to measure temperature on hot spots of unexposed surface.

A micro-manometer provided to monitor the furnace pressure.

Cotton pads, 6 mm and 25 mm gap gauges.

A steel ruler to monitor the lateral deflection of the specimen.

A radiometer placed at 1,000 mm away from the unexposed surface to measure the radiation of unexposed surface of the specimen.

5 CONDITIONING

The specimen's storage, construction, and test preparation took place in the test laboratory over a total, combined time of 6 days. Throughout this period of time, both of the temperature and humidity of the laboratory were measured and recorded as being within a range of 24 °C to 26 °C and 70 % to 82 % respectively.

6 TEST SPECIMEN CONSTRUCTION

A comprehensive description of the test specimen construction is presented in the appendix, which is based on a survey of the specimen and information supplied by the test sponsor.

7 VERIFICATION OF TEST SPECIMEN

In order to ensure the description of the test specimen, and in particular its construction, is on conformity with the test specimen, the laboratory shall either oversee the fabrication of the test specimens or request an additional test specimen.

In this case, RED's representative had visited the factory of the test sponsor to verify the construction of doorset. Other constructions details of the specimen were verified on site by RED as shown in 'Appendix D - Information from Test Sponsor'.

unexposed surface of specimen. Thermocouples S6 – S14 and S24 - S28 were fixed on the door leaves and door frame respectively for maximum temperature of the unexposed surface of specimen only. Thermocouples S15 - S23 were fixed on the door leaves 25 mm from the edges for additional information only. Thermocouples S29 - S31 and S32 - S34 were fixed on left and right glazed panels respectively for mean and maximum temperatures of the unexposed surface of left and right glazed panels. The mean and maximum temperatures were recorded.

The cotton pads and gap gauges were used, if considered appropriate, to determine compliance with the integrity criterion of the standard. The occurrence of sustained flaming on the unexposed surface was monitored to determine compliance with this criterion. The lateral deflection of the specimen were measured by a steel rule and recorded. The radiation of the specimen was measured and recorded.

10 TEST DATA AND INFORMATION

The ambient temperature of the test area during the test was 29 °C.

The furnace was controlled so that the mean furnace temperature complied with the requirements of Clause 4.5.1.1 of BS EN 1363-1: 2012. The temperature recorded is shown graphically in Figure 5.

The mean and maximum temperatures of the unexposed surface of the doorset, excluding the glazed panels are shown graphically in Figure 6.

The mean and maximum temperatures of the unexposed surface of left glazed panel are shown graphically in Figure 7.

The mean and maximum temperatures of the unexposed surface of right glazed panel are shown graphically in Figure 8.

The furnace pressure is shown graphically in Figure 9.

The radiation is shown graphically in Figure 10.

A summary of the observations made on the general behaviour of the specimen is given in the appendix.

The deflection obtained is summarized in Table 1.

The mean furnace temperature obtained is summarized in Table 2.

The temperature rises of specimen obtained are summarized in Tables 3 & 4.

The test was discontinued after a heating period of 132 minutes.

11 RESULTS

When tested in accordance with BS EN 1634-1: 2008, the requirements of the standard were satisfied for the following periods:

Integrity:	Cotton Pad	132 Minutes (No failure)
	Gap Gauge	132 Minutes (No failure)
	Sustained Flaming	132 Minutes (No failure)
Insulation (I₂ excluding glazed panels):		129 Minutes
Insulation (left glazed panel):		132 Minutes
Insulation (right glazed panel):		132 Minutes

Insulation (I₂) - It is required that the mean temperature rise of the unexposed surface shall not be greater than 140 °C and that maximum temperature rise shall not be greater than 180 °C (except 360 °C for door frame. Insulation failure also occurs simultaneously with integrity failure.

Doorset (I₂) excluding the glazed panels:

The 140 °C rise of the mean temperature of the unexposed surface of specimen did not reach during the test. The 180 °C rise of the maximum temperature of the unexposed surface of specimen reached and measured by thermocouple S9 after a heating period of 129 minutes. The 360 °C rise of the maximum temperature of the unexposed surface of door frame did not reach during the test. The maximum temperature rise was 184 °C measured by thermocouple S9 after a heating period of 132 minutes.

Left glazed panel:

The 140 °C rise of the mean temperature of the unexposed surface of left glazed panel did not reach during the test. The 180 °C rise of the maximum temperature of the unexposed surface of left glazed panel did not reach during the test. The maximum temperature rise of the glazed panel was 73 °C measured by thermocouple S29 after a heating period of 132 minutes.

Right glazed panel:

The 140 °C rise of the mean temperature of the unexposed surface of right glazed panel did not reach during the test. The 180 °C rise of the maximum temperature of the unexposed surface of right glazed panel did not reach during the test. The maximum temperature rise of the glazed panel was 80 °C measured by thermocouple S34 after a heating period of 132 minutes.

Integrity - It is required that there is no collapse for the specimen, no sustained flaming on the unexposed surface and no loss of impermeability.

No failure was observed regarding to the criteria of cotton pad, gag gauges and sustained flaming during the test.

The specimen met the integrity requirements after a heating period of 132 minutes.

12 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 EN 1363-1, and where appropriate EN 1363-2. 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.

The test results are valid only for the conditions under which the test was conducted.

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. Therefore, the results 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.

APPENDIX A – Photos and Test Record



FOR REFERENCE ONLY

Photo 1: The unexposed face of the specimen before the test.



Photo 2: The unexposed face of the specimen after a heating period of 60 minutes.



Photo 3: The unexposed face of the specimen after a heating period of 120 minutes.

FOR REFERENCE ONLY



Photo 4: The unexposed face of the specimen after the test.

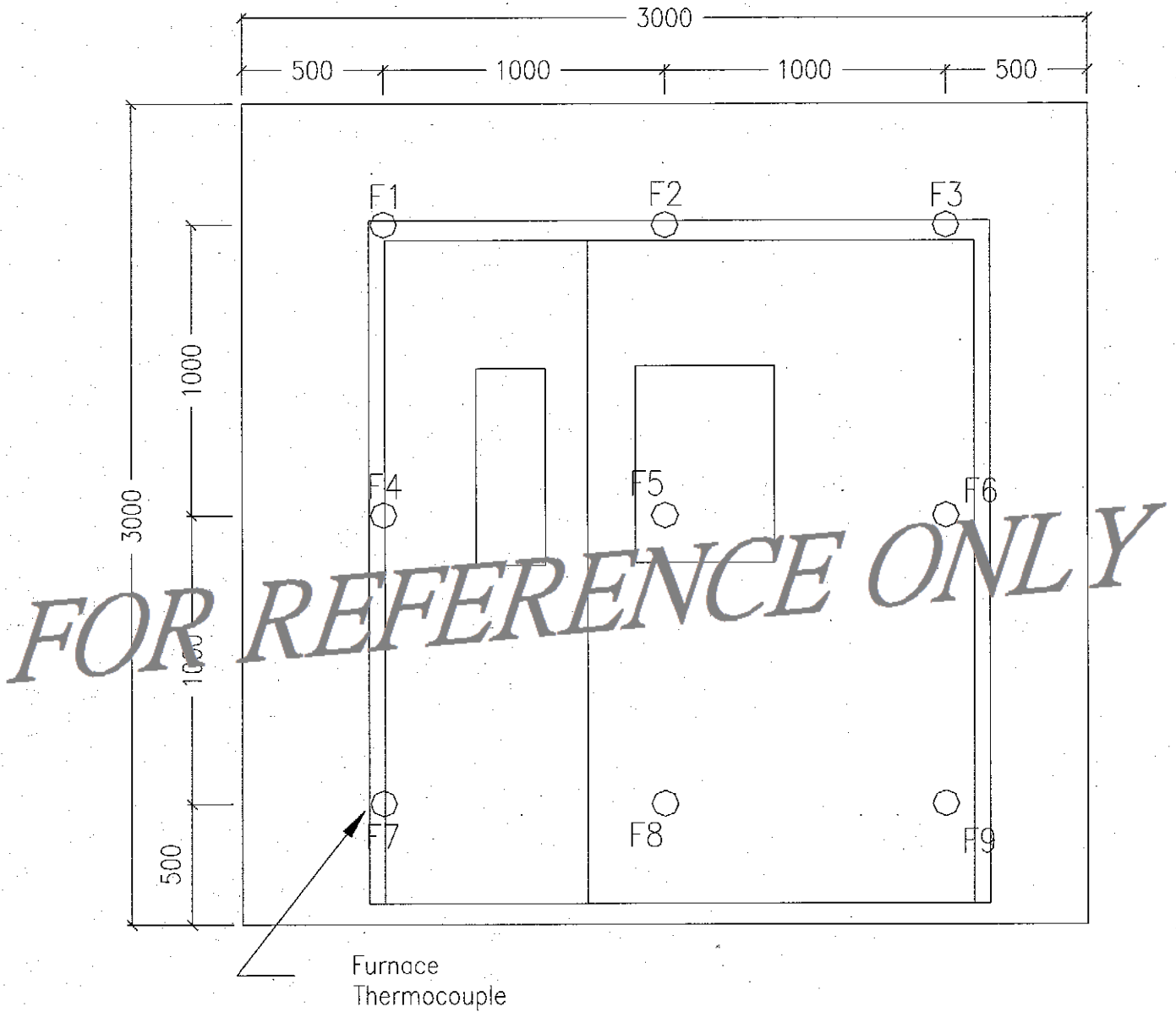
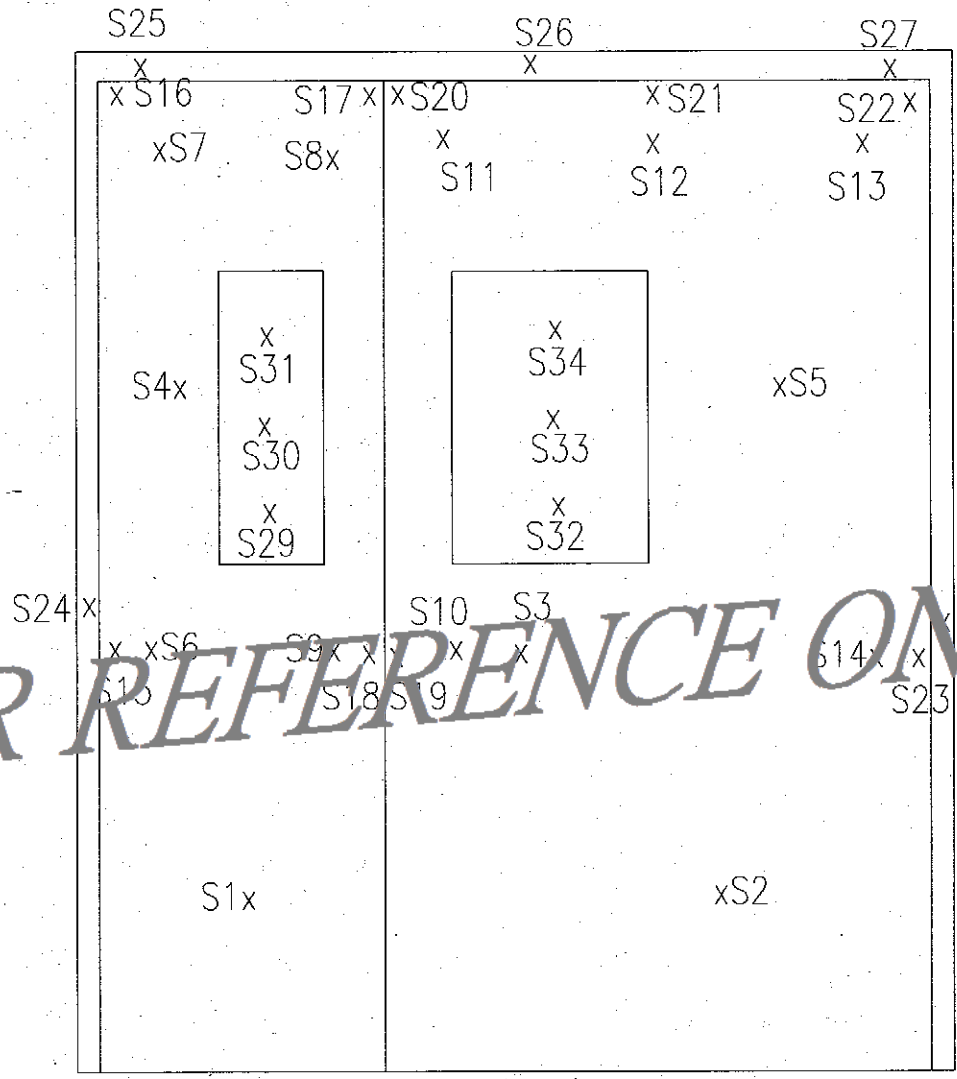


Figure 1 – Locations and reference numbers of furnace thermocouples.

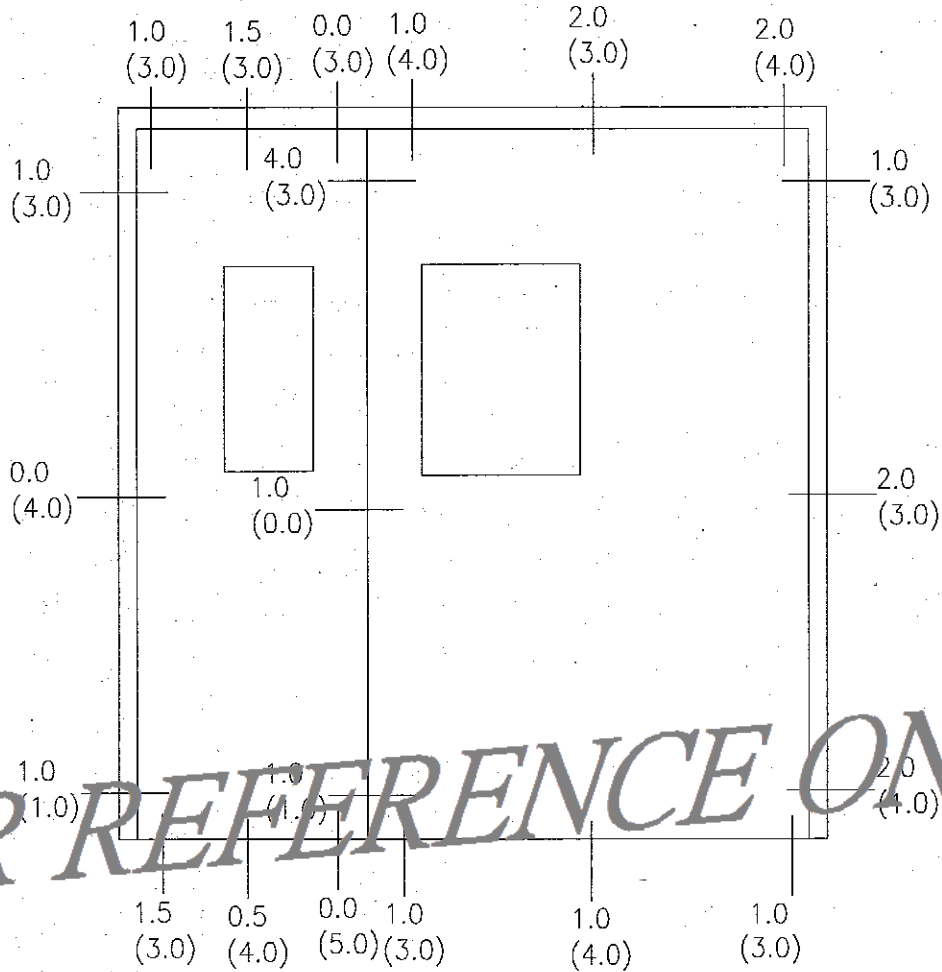
(This figure is not to scale and all dimensions are in millimetres.)



FOR REFERENCE ONLY

Figure 2 – Locations and reference number of thermocouples to monitor the temperature of unexposed surface of the specimen.

(This figure is not to scale.)



FOR REFERENCE ONLY

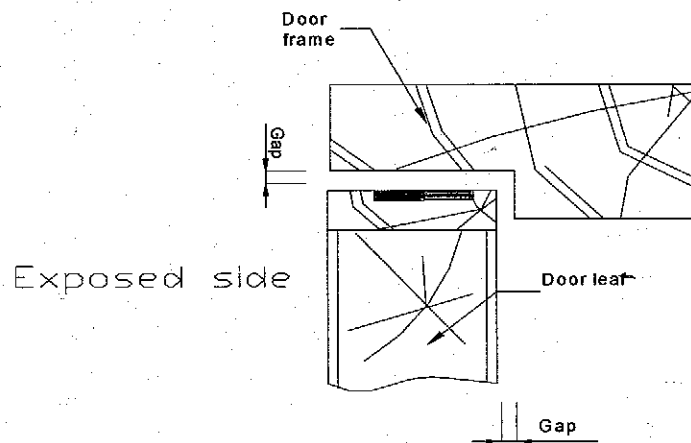


Figure 3 – Door gaps in mm, measured from unexposed face.

(Measurements from exposed face are in brackets)

(This figure is not to scale.)

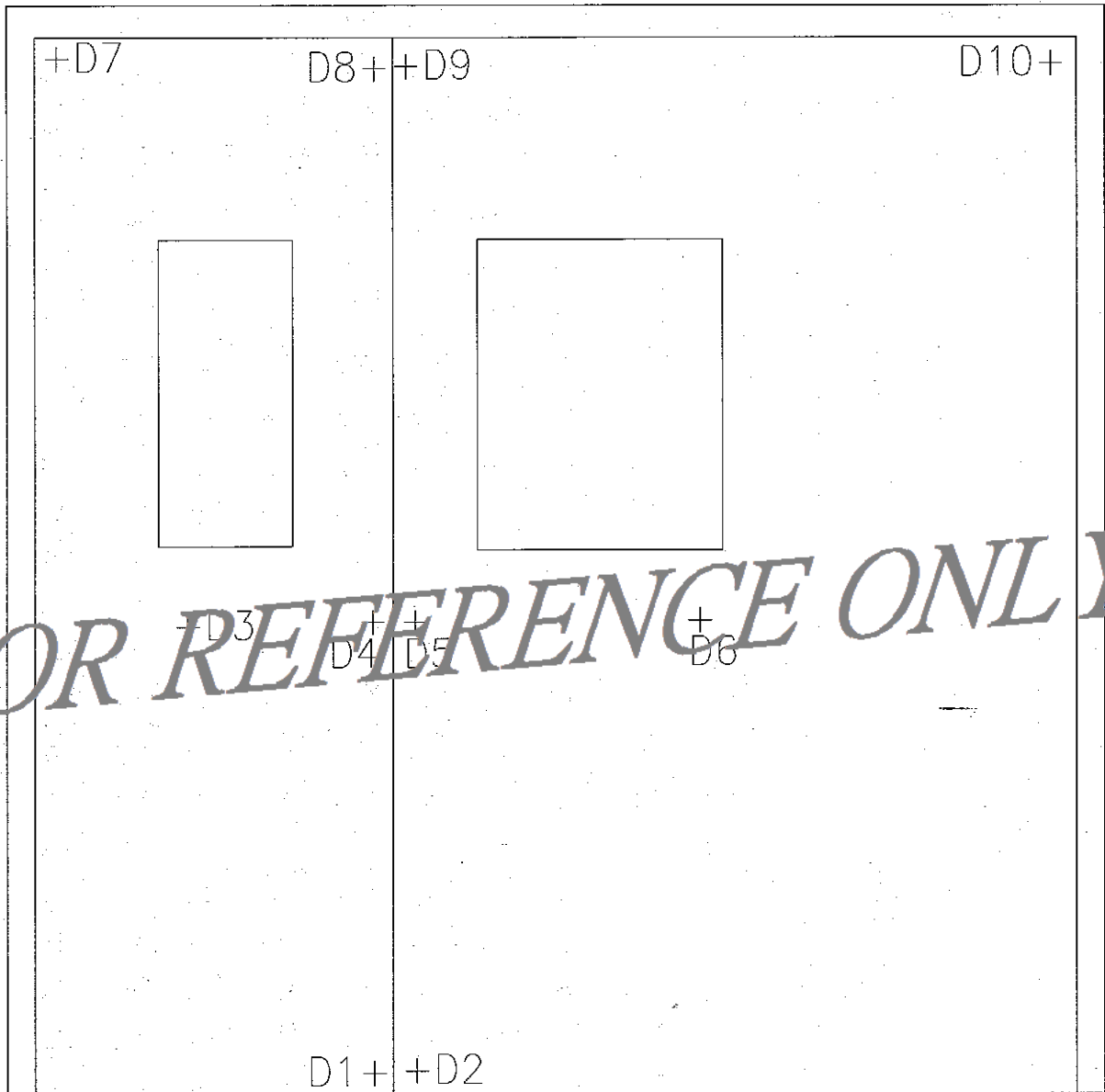


Figure 4 – Locations and reference numbers of displacement measurement.

(This figure is not to scale.)

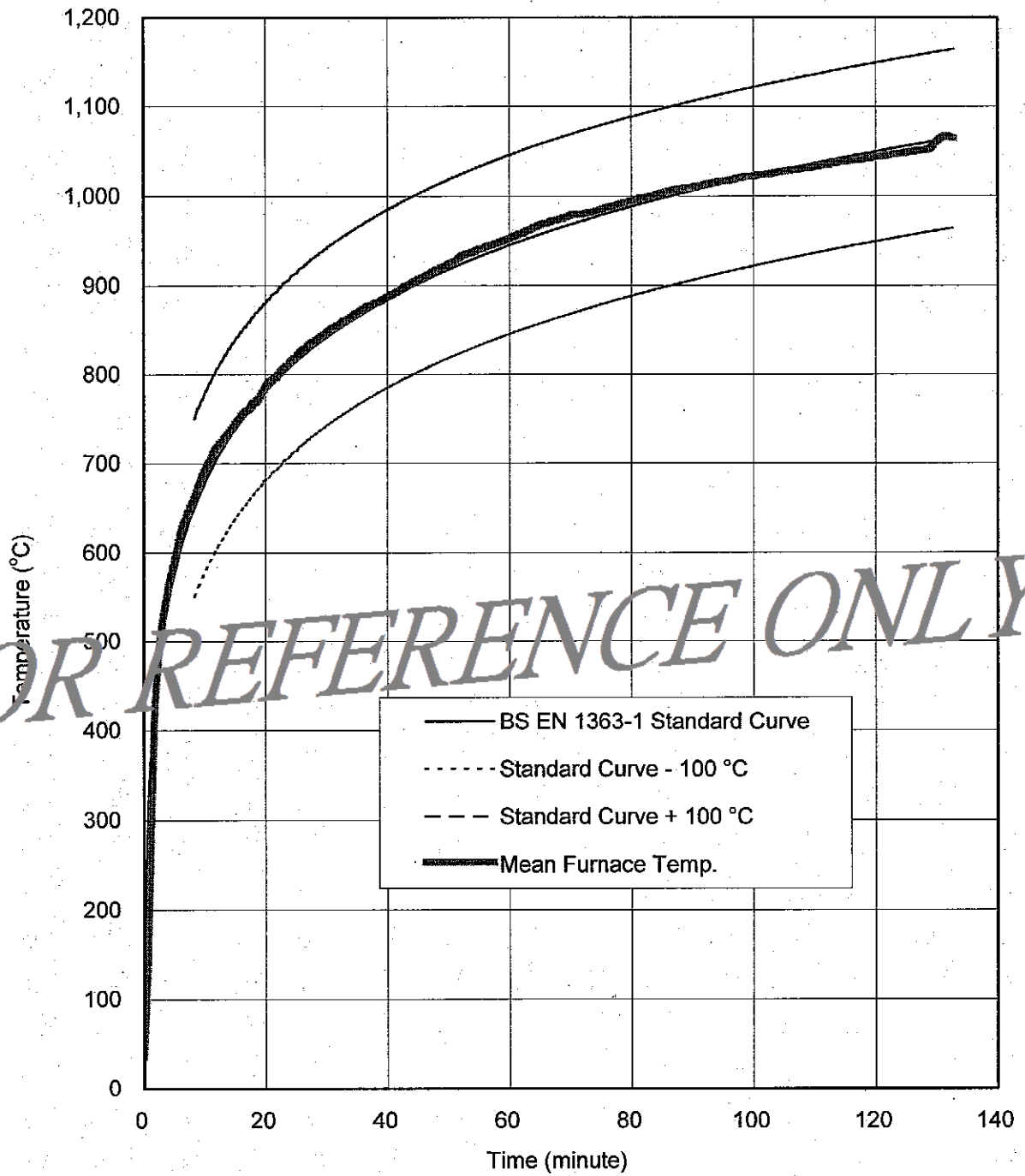


Figure 5 – Mean furnace temperature.

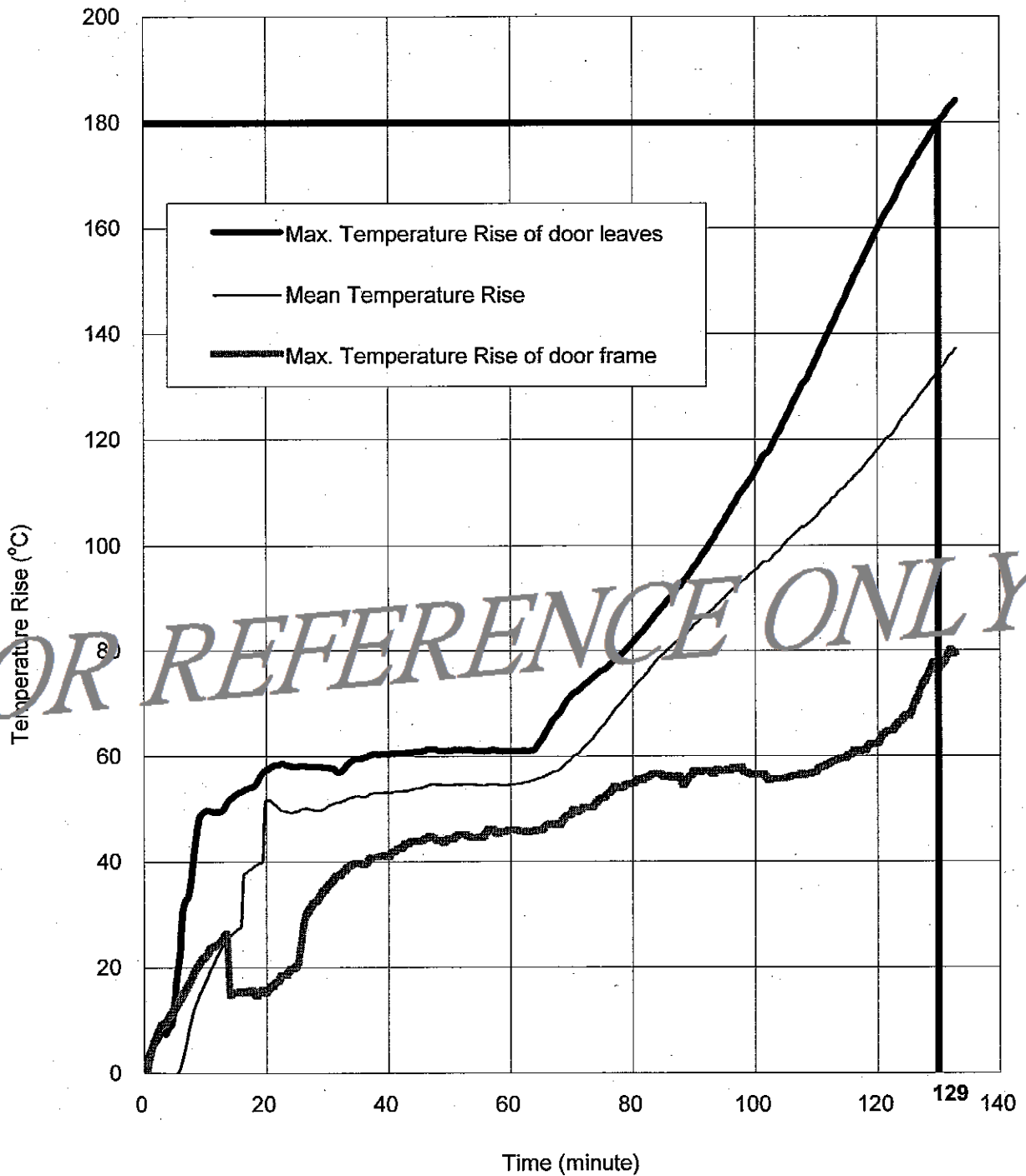


Figure 6 – Temperature rises of unexposed surface of doorset excluding the glazed panel.

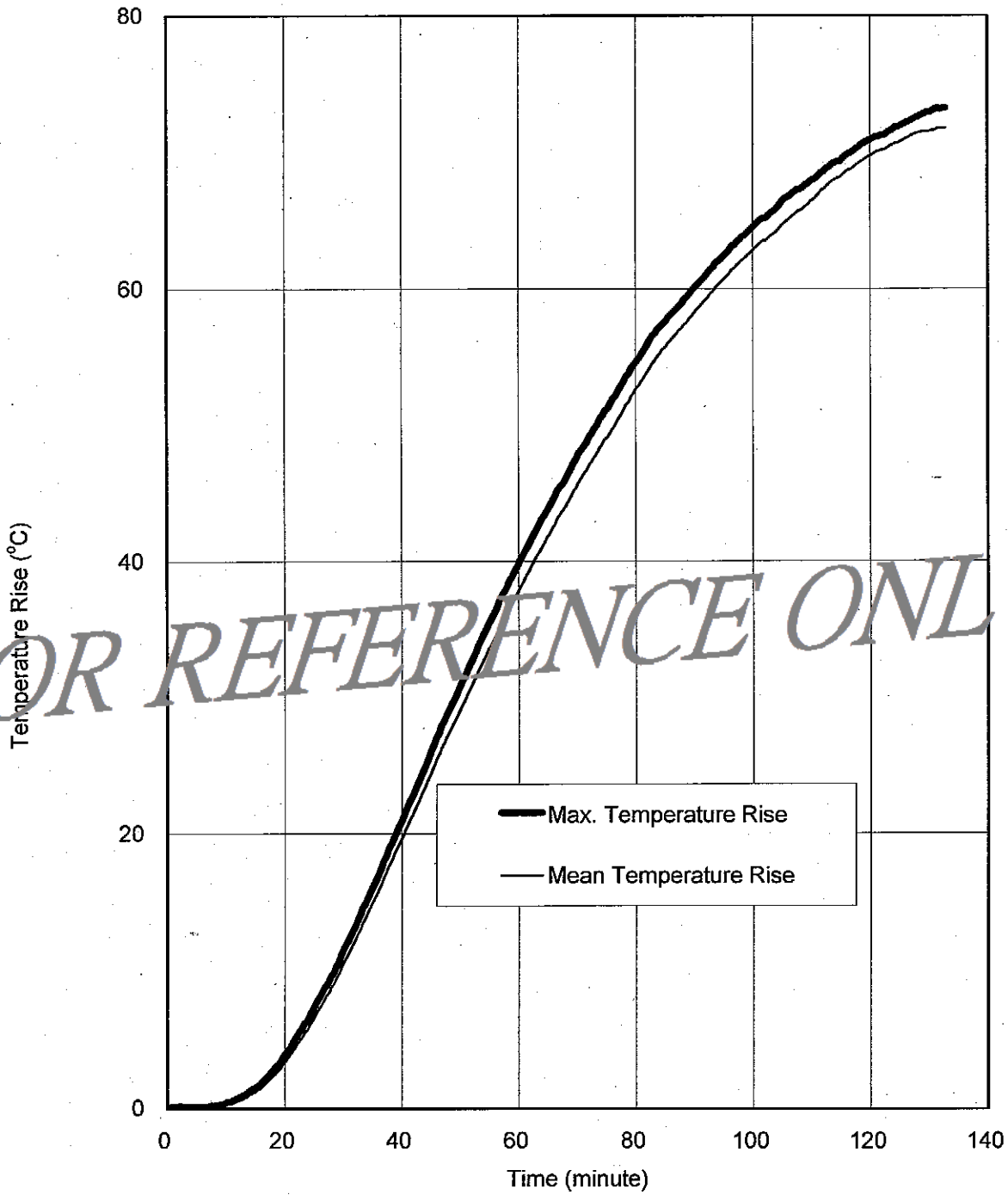


Figure 7 – Temperature rises of unexposed surface of left glazed panel.

After the first 5 minutes of the test, the furnace pressure was maintained at 0 ± 3 Pa relative to atmosphere, at 500 mm from the notional floor level.

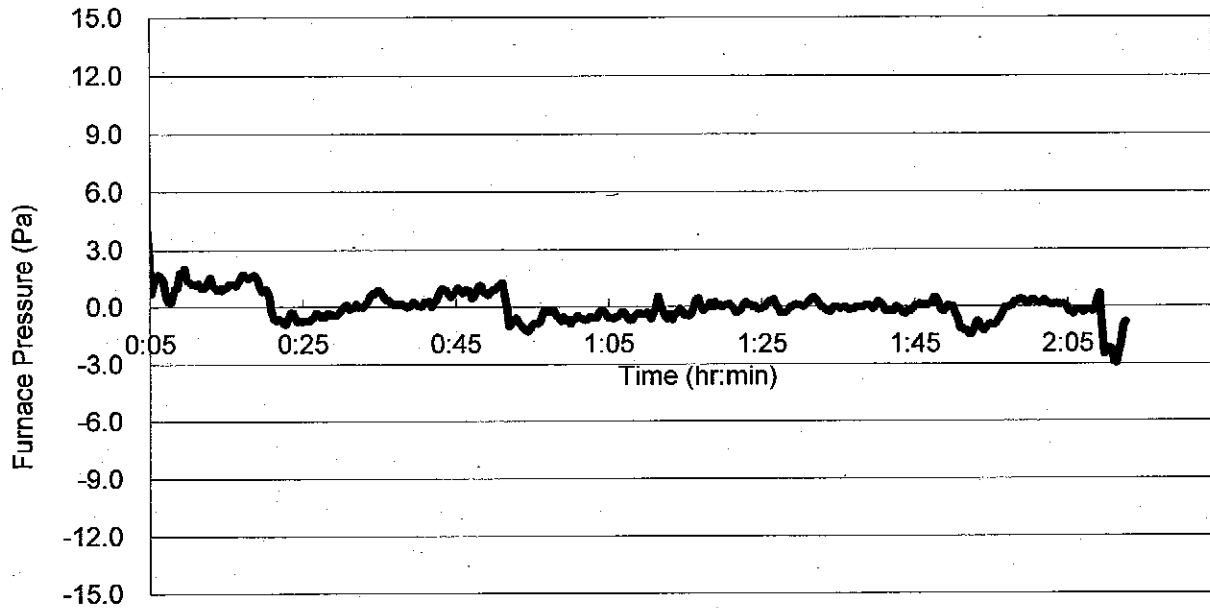


Figure 9 - Furnace pressure.

FOR REFERENCE ONLY

A radiometer placed at 1,000 mm away from the unexposed surface to measure the radiation of unexposed surface of the specimen.

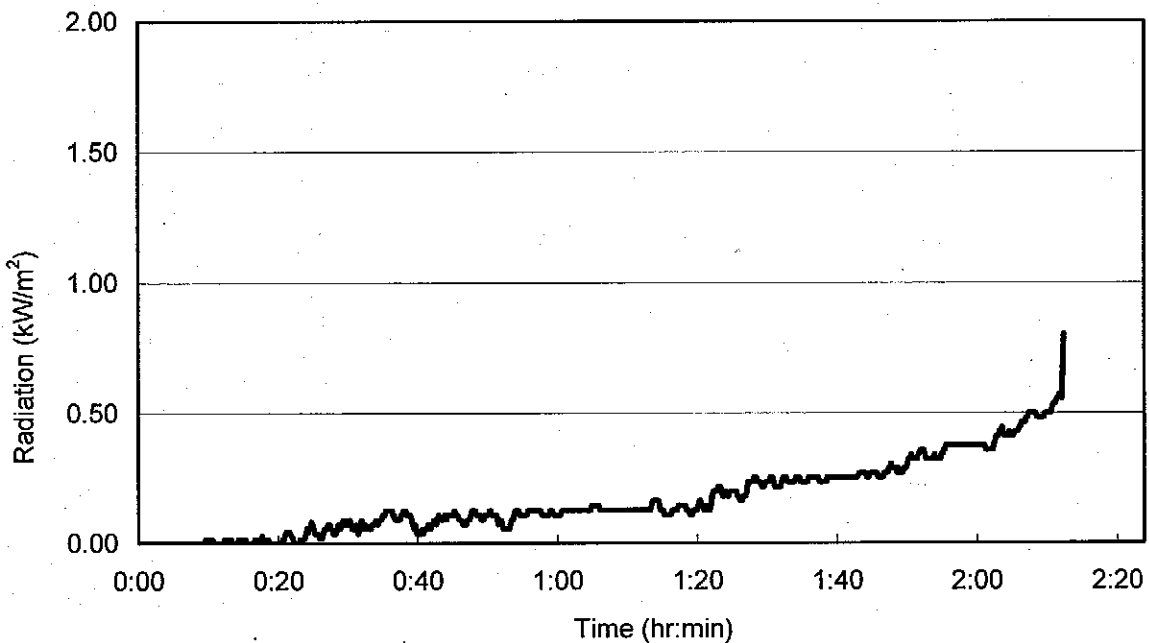


Figure 10 - Radiation.

APPENDIX B – Observation

Time (min.sec)	Exposed (E) or Unexposed (U)	Observation
00.00	-	Test started.
00.22	U	Smoke started releasing from the specimen.
01.06	U	Cracks developed on the glazed panels.
01.56	U	The glazed panels turned white.
05.17	U	Smoke release increased from the specimen.
14.39	U	Smoke release decreased from the specimen.
18.10	E	The surface of specimen turned grey.
30.00	U	The specimen satisfied the integrity and insulation requirements performance.
33.42	U	Right vertical edge of right door leaf turned dark.
45.59	U	Visible deformation was observed from the door leaves.
47.55	E	The surface of specimen turned white.
54.48	U	Roving thermocouple applied at top portion of right vertical edge of right door leaf away 25 mm from the edge and 272 °C was measured.
57.41	U	Cotton pad test applied at top portion of right vertical edge of right door leaf and the test passed.
58.57	U	Cotton pad test applied at centre portion of meeting edge of door leaves and the test passed.
59.54	U	Cotton pad test applied at top left corner of left door leaf and the test passed.
60.00	U	The specimen satisfied the integrity and insulation requirements performance.
67.23	U	Area at centre portion of meeting edge of door leaves around the lockset turned dark.
74.25	U	The top left corner of left door leaf turned dark.
88.05	U	Cotton pad test applied at top right corner of right door leaf and the test passed.
89.27	U	Cotton pad test applied at top meeting edge of door leaves and the test passed.
90.00	U	The specimen satisfied the integrity and insulation requirements performance.
96.55	U	Top meeting edge of door leaves and top right corner of specimen turned red.
98.15	U	The key pad detached.
104.17	U	Further deformation was observed from the door leaves.
115.45	U	The fire seal at top of specimen detached.

(to be continued)

APPENDIX C - Date Record During the Test

Table 1 - Lateral deflection of the specimen during the test, as viewed from the unexposed face.

Location \ Time (mins)	0	10	30	45	70	90	105	120
D1	0	7	7	13	12	14	16	--
D2	0	0	18	10	9	11	12	--
D3	0	10	6	10	15	27	34	50
D4	0	15	18	9	15	33	45	74
D5	0	17	10	13	15	35	44	74
D6	0	16	8	11	17	35	42	56
D7	0	9	9	8	11	15	16	--
D8	0	4	9	11	14	16	20	--
D9	0	3	1	7	9	10	14	--
D10	0	4	9	13	16	19	20	--

Positive deflection indicates movement towards the furnace (see also Figure 3 for the locations).

The maximum deflection of the specimen occurred at locations D4 and D5 was 74 mm moving towards the furnace after a heating period of 120 minutes.

FOR REFERENCE ONLY

Table 2- Mean furnace temperature

Time (minute)	BS EN 1363-1 Standard Temp. Curve (°C)	Actual Mean Furnace Temp. (°C)
0	20	35
5	576	593
10	678	695
15	739	747
20	781	783
25	815	820
30	842	848
35	865	871
40	885	886
45	902	906
50	918	924
55	932	941
60	945	954
65	957	967
70	968	978
75	979	985
80	988	995
85	997	1003
90	1006	1009
95	1014	1017
100	1022	1022
105	1029	1028
110	1036	1032
115	1043	1038
120	1049	1043
125	1055	1048
130	1061	1062
132	1063	1064

FOR REFERENCE ONLY

Notes: Locations of furnace thermocouples are shown in Figure 1.

The test was terminated as requested by the test sponsor after a heating period of 132 minutes.

Table 3 - Time and related temperature rise measured by thermocouples S1 – S17.

Time (min)	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	1	0	13	0	0	0	0	1	12	1	2	19	2
10	41	6	0	39	0	50	41	25	29	30	36	24	38	49	24	41	57
15	53	35	0	47	0	50	46	47	44	43	38	39	44	51	32	47	62
20	55	47	51	49	55	49	43	51	47	48	43	45	46	57	36	51	63
25	55	36	53	48	56	48	42	52	47	49	46	49	49	58	42	60	64
30	54	41	52	49	57	49	45	51	48	48	48	53	53	58	47	65	66
35	55	48	52	50	57	53	49	51	50	48	53	56	60	57	46	65	67
40	56	51	53	49	56	58	53	54	50	49	55	58	60	58	52	70	67
45	56	53	54	50	56	59	56	57	50	51	56	59	61	59	56	71	69
50	56	55	57	50	56	59	57	61	51	55	55	59	61	57	58	74	70
55	55	56	56	50	56	59	57	60	54	56	56	59	61	56	59	89	71
60	54	57	56	49	56	59	57	60	56	56	57	60	61	57	60	84	71
65	54	61	56	49	58	59	56	61	63	57	59	61	61	57	60	86	75
70	55	69	53	57	61	61	56	62	72	60	61	64	62	58	62	87	78
75	64	75	59	58	73	64	57	63	76	62	63	69	62	59	64	90	82
80	75	81	64	65	80	70	59	63	82	67	69	78	63	60	66	94	86
85	84	87	70	72	85	77	60	64	89	73	74	85	65	61	68	100	91
90	90	94	76	76	89	83	61	66	96	78	80	89	68	62	71	104	96
95	94	101	81	79	94	86	63	69	105	83	85	95	72	64	75	109	102
100	100	106	87	83	100	89	66	73	114	88	90	102	77	67	79	114	108
105	105	112	93	88	105	92	71	77	124	93	97	110	82	74	83	121	116
110	109	119	98	91	110	95	77	81	135	100	103	116	88	82	87	128	126
115	115	129	104	97	116	99	83	85	148	107	110	125	96	90	91	138	139
120	120	140	109	101	122	103	89	89	160	114	117	133	104	98	96	150	152
125	125	152	116	106	129	106	94	94	171	121	124	141	113	108	101	166	166
130	131	161	123	112	138	110	100	100	180	130	132	152	122	118	106	183	180
132	135	165	128	116	142	111	103	103	184	136	137	157	128	124	109	193	186

Notes: Locations of thermocouples S1 – S17 are shown in Figure 2.

The test was terminated as requested by the test sponsor after a heating period of 132 minutes.

Table 4 - Time and related temperature rise measured by thermocouples S18 - S34.

Time (min)	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32	S33	S34
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	1	0	14	2	1	36	1	12	1	11	0	0	0	0	0	0	0
10	19	3	37	10	6	18	1	13	4	22	1	0	0	0	2	3	1
15	30	12	54	17	--	26	1	15	4	--	1	2	1	1	3	3	2
20	33	19	58	23	--	32	2	15	4	--	2	4	3	3	7	6	5
25	37	27	61	30	--	44	2	21	6	--	2	8	7	6	13	11	11
30	42	34	66	46	--	47	3	22	8	36	2	12	11	10	19	16	17
35	47	46	69	53	95	48	4	24	9	40	3	16	15	14	25	22	23
40	50	51	72	56	100	49	5	25	11	41	5	21	20	19	31	27	30
45	52	55	74	58	104	49	7	26	11	44	6	26	25	23	36	32	36
50	54	56	77	59	111	50	9	30	13	44	7	31	29	27	42	37	42
55	55	58	80	60	113	52	13	36	14	45	8	35	34	31	47	42	47
60	55	59	84	61	121	56	17	42	16	46	10	40	38	35	51	46	51
65	56	60	89	62	126	62	20	45	17	46	13	44	43	39	55	50	56
70	58	61	95	64	131	71	21	47	19	50	17	48	47	43	59	55	60
75	62	62	101	66	138	80	27	49	22	52	20	51	50	46	62	58	64
80	64	64	107	68	150	88	29	50	27	55	23	55	54	50	65	62	67
85	66	65	115	71	161	93	32	51	32	56	26	58	57	53	67	65	70
90	68	68	124	75	176	99	34	51	38	57	28	60	59	56	69	67	71
95	71	70	134	79	193	105	37	53	45	57	31	62	62	58	71	68	72
100	75	74	146	83	212	111	38	54	50	57	33	65	64	60	72	69	73
105	79	78	162	88	233	116	40	56	50	56	35	66	65	62	74	70	74
110	83	83	180	94	265	117	41	57	52	57	38	68	67	64	75	70	75
115	88	89	199	100	278	118	42	58	53	60	39	70	69	66	74	71	75
120	94	96	221	107	296	124	43	61	53	63	41	71	71	68	74	72	76
125	99	104	238	115	323	132	44	63	56	68	41	72	72	69	75	72	78
130	104	112	256	130	351	146	45	65	58	77	42	73	72	70	75	73	80
132	108	116	263	140	373	160	45	66	60	80	43	73	72	70	76	73	80

Notes: Locations of thermocouples S18 - S34 are shown in Figure 2.

Thermocouple S22 malfunctioned between a heating period of 13 and 31 minutes.

Thermocouple S27 malfunctioned between a heating period of 14 and 25 minutes.

The test was terminated as requested by the test sponsor after a heating period of 132 minutes.

APPENDIX D – Information from Test Sponsor

(The information provided by the test sponsor, which was not verified by RED or unless specified.)

Item	Description
1 Door Frame	
Material	: Hardwood and 6 mm thick fireproof boards.
Density	: 500 - 550 kg/m ³ .
Overall sizes	: 2,036 mm wide x 2,370 mm high.*
Section sizes	: 50 mm by 105 mm thick.*
Rebate	: 15 mm.*
Architrave	: 38 mm wide by 12 mm thick hardwood architrave.
Jambs to head jointing method	: Screws fixing.
Frame to concrete lining fixing method	: M6 by 80 mm long screws at each jamb of door frame with max. 650 mm c/c spacing.
Gap insulation between door frame and concrete lining	: Cement sand grouting.
2 Door Leaf Core	
Material	: Vermiculite and perlite fireproof board
Density	: 500 - 550 kg/m ³ .
Thickness	: 41 mm thick.*
Fixing method	: Nailing.
3 Door Leaves	
Overall Thickness	: 53 mm.*
Overall sizes of door leaves	: Left door leaf: 712 mm wide by 2,330 mm high.* Right door leaf: 1,247 mm wide by 2,330 mm high.*
4 Fire-rated Board	
Material	: Fireproof board.
Density	: 900 kg/m ³ .
Thickness	: 6 mm.*
Applied location	: 2 layers of boards sandwiched the stiles and rails and 1 layer sandwiched the core.
Fixing method	: Glued.

Notes: * Verified on site by RED.

As shown on the test construction.

APPENDIX D - Information from Test Sponsor (Con't)

(The information provided by test sponsor, which is not verified by RED or unless specified.)

Item	Description
5	Door Leaf Stiles / Rails
	Material : Hardwood.
	Density : 500 - 550 kg/m ³ .
	Sizes of Stiles & Rails : 73 mm wide by 29 mm thick.
	Fixing method : Nailing.
6	Door Leaf Facings
	Material : Brashing Lacquer painting.
	Thickness : 0.3 mm on both sides.
7	Door Leaf Lippings
	Material : Hardwood.
	Density : 500 - 550 kg/m ³ .
	Sizes : 10 mm wide by 53 mm thick.
	Fixing method : Nailing.
8	Grazing Bead
	Material : Hardwood.
	Density : 500 - 550 kg/m ³ .
	Section sizes : 5 mm by 30 mm.
	Fixing method : Nailing.
9	Glazed panels
	Brand : HKSFRD.#
	Thickness : Left glazed panel: 47 mm; Right glazed panel: 49 mm.*
	Aperture sizes : Left glazed panel: 200 mm wide by 665 mm high;*
	Right glazed panel: 465 mm wide by 665 mm high.*
	Vision sizes : Left glazed panel: 170 mm wide by 630 mm high;*
	Right glazed panel: 430 mm wide by 630 mm high.*
	Fixing details : 15 mm wide by 3 mm thick ceramic tape.#

FOR REFERENCE ONLY

* and # refer to page 27

APPENDIX D - Information from Test Sponsor (Con't)

(The information provided by test sponsor, which is not verified by RED or unless specified.)

Item	Description
10a	Intumescent Fire Seal – Vertical and top edges of door leaves Brand : Acton Fire. Reference / Model : 4004FS. Sizes : 1 no. of 40 mm wide by 4 mm thick.*
10b	Intumescent Smoke Seal – Jamb and head of door frame Brand : STARART. Reference / Model : A1. Sizes : 1 no. of 12 mm wide by 9 mm thick.
10c	Intumescent Smoke Seal – Bottom edge of door leaves Brand : STARART. Reference / Model : A2 Sizes : 1 no. of 15 mm wide by 20 mm high.*
11	Intumescent Pad Brand : STARART Thickness : 7 mm. Applied location : Backed on hinges.
12	Intumescent Sealant Brand : FireMate. Applied location : Glazing bead.
13	Butt Hinges Brand : FOX'S.# Material : Stainless steel. Overall sizes : 102 x 102 x 3 mm thick. Fixing method : 4 numbers for each door leaf fixed by screws.

FOR REFERENCE ONLY

* and # refer to page 27

APPENDIX D - Information from Test Sponsor (Con't)

(The information provided by test sponsor, which is not verified by RED or unless specified.)

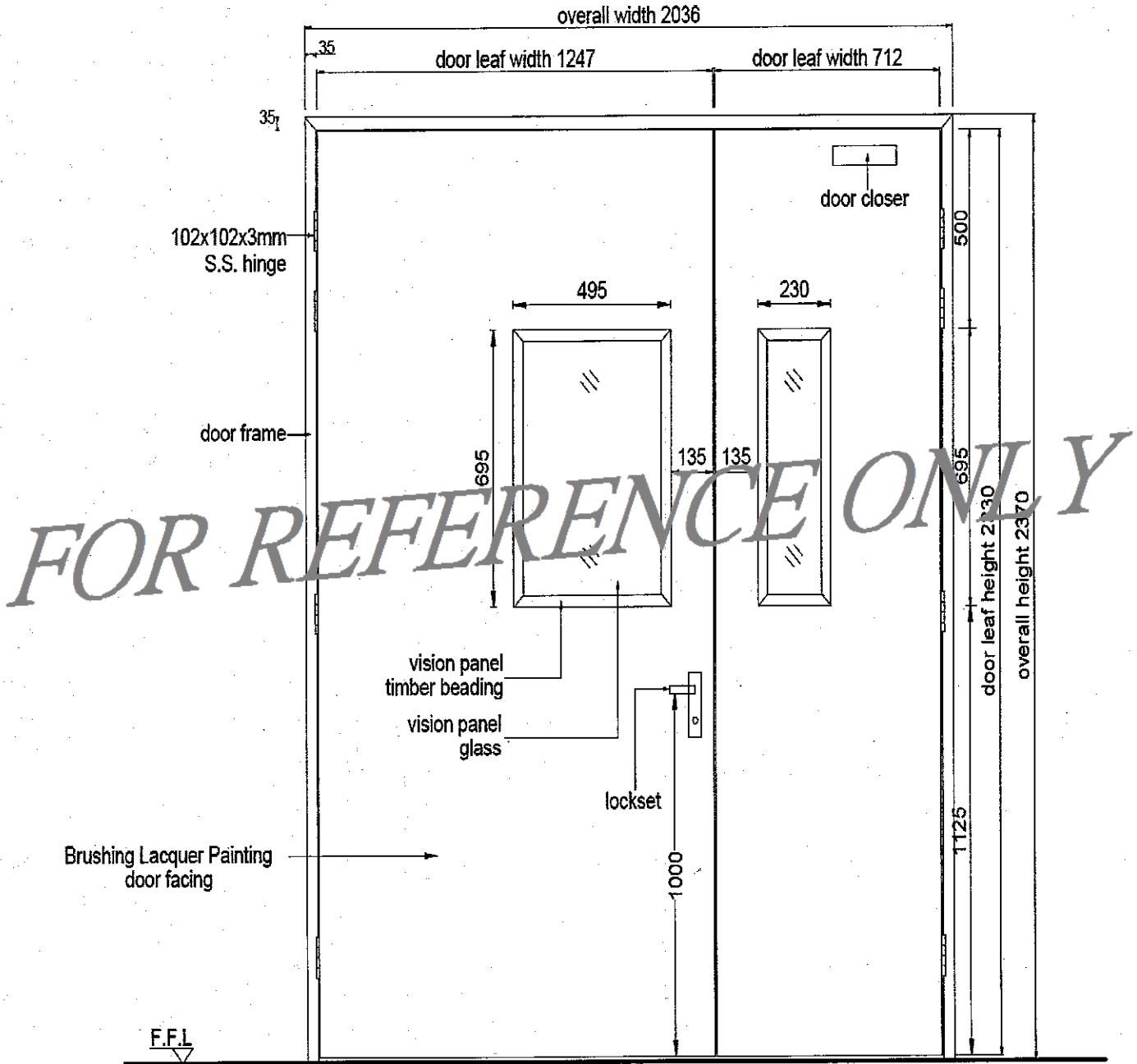
Item	Description
<p>14</p>	<p>Surface Mounted Overhead Door Closer Brand : POSSE.# Applied Location : Exposed and unexposed sides of left and right door leaves respectively.#</p>
<p>15</p>	<p>Lockset Brand : FOX'S. Material : Stainless steel. Overall sizes : 18 mm by 115 mm wide by 180 mm high. Applied location : Right door leaf above the sill level 1,000 mm.#</p>
<p>16</p>	<p>Surface Mounted Handle Brand : FOX'S. Material : Stainless steel. Overall sizes : 18 mm by 300 mm Applied location : Exposed side of right door leaf.#</p>
<p>17</p>	<p>Magnetic lock Brand : HKS. Material : Steel. Overall sizes : 90 mm by 60 mm by 280 mm. Applied location : Surface mounted on unexposed side of door frame above right door leaf.#</p>
<p>18</p>	<p>Key pad Brand : Material : Plastic. Overall sizes : 150 mm by 150 mm. Applied location : Unexposed side of right door leaf.#</p>

FOR REFERENCE ONLY

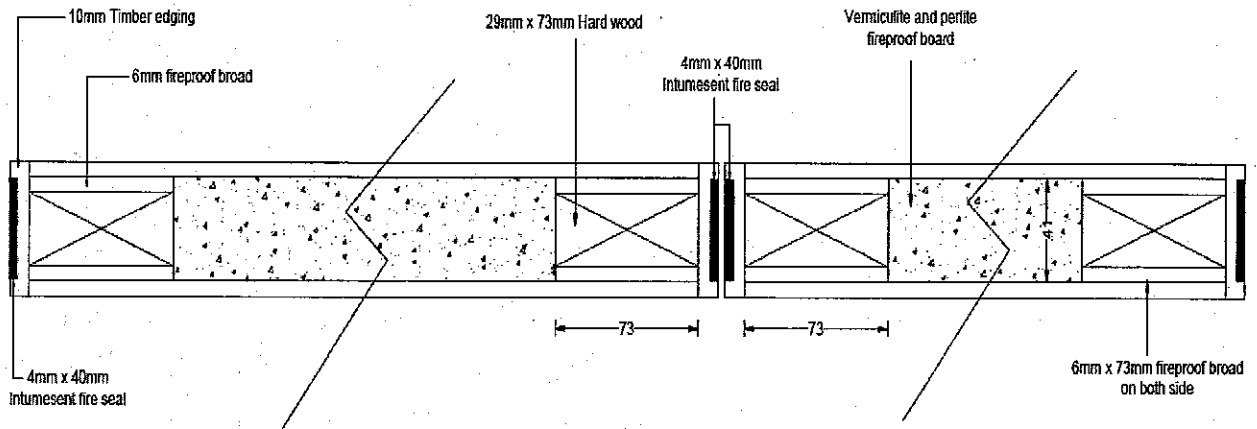
* and # refer to page 27

Drawings from Test Sponsor

(The drawings provided by test sponsor, which was not verified by RED, except those specified and described in 'information from test sponsor'.)



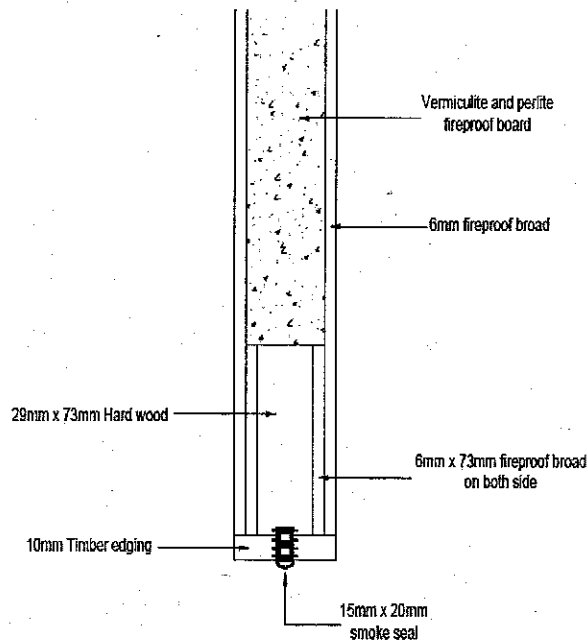
Pull Side Elevation

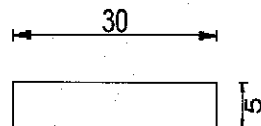
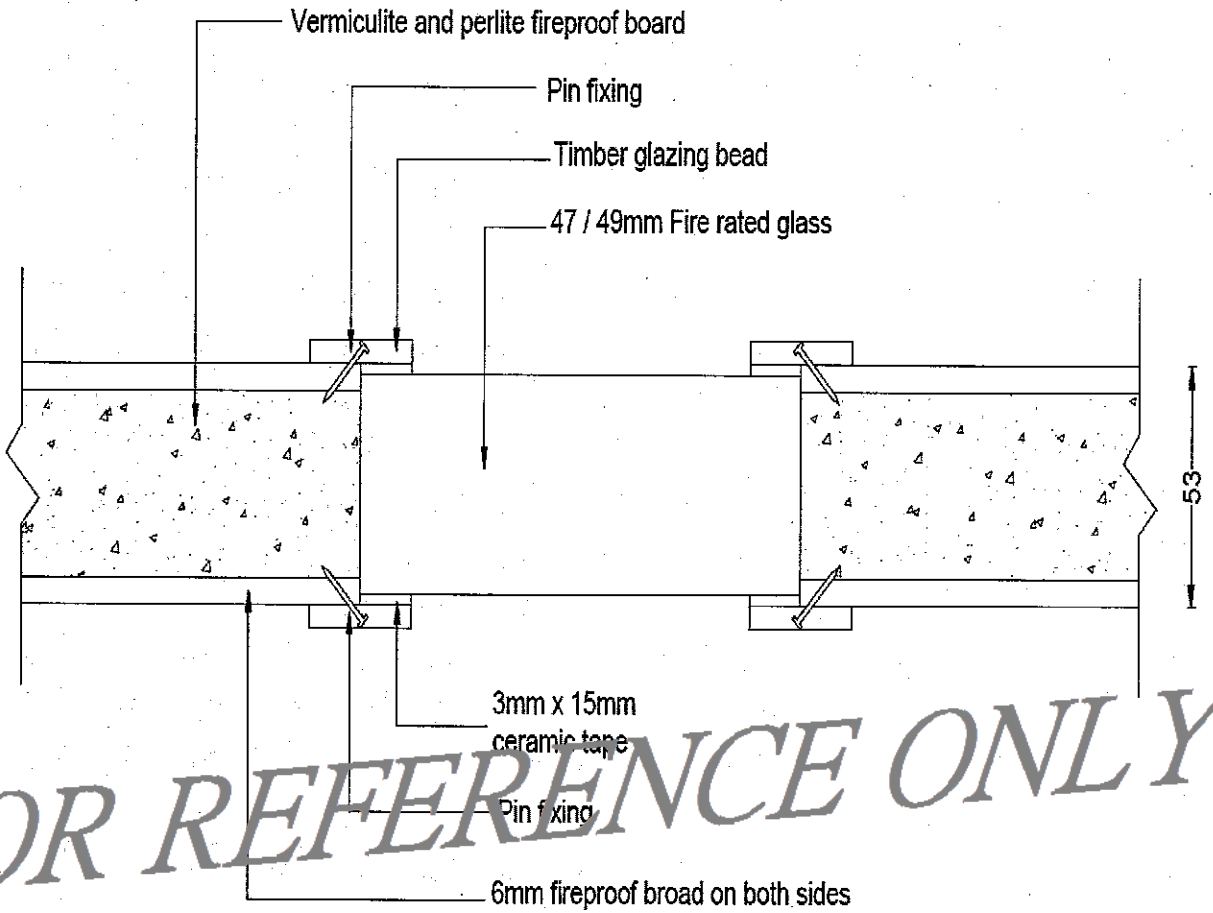


Meeting Stile

FOR REFERENCE ONLY

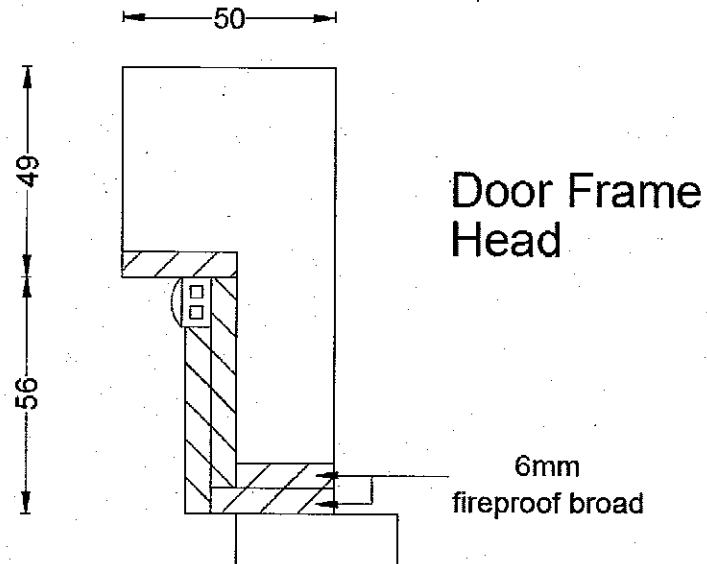
Smoke seal



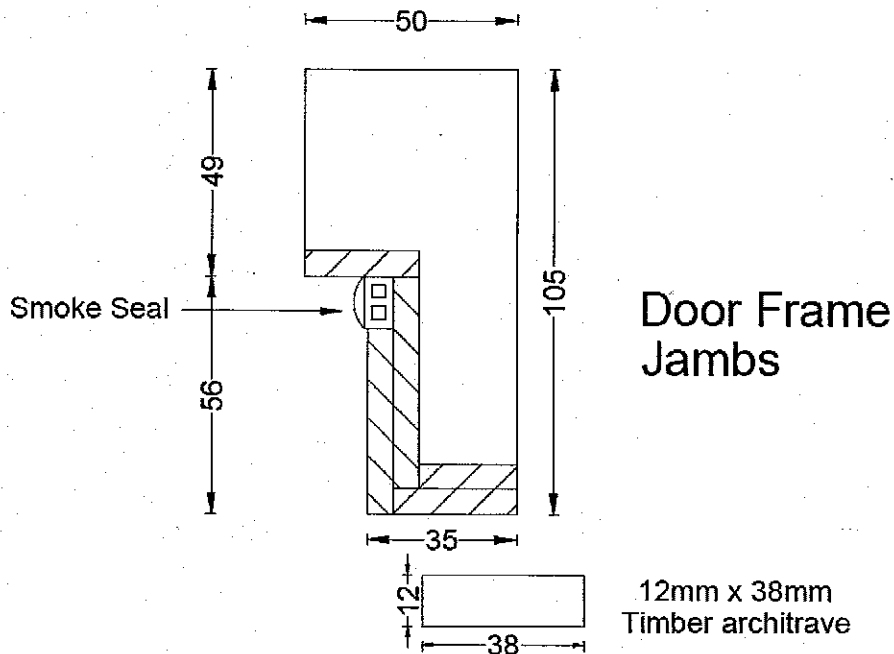


Detail of Vision Panel

Door Frame Details



FOR REFERENCE ONLY



- End of report -