

FIRE RESISTANCE TEST REPORT

SINGLE LEAF COMPOSITE TIMBER DOOR with GLAZED ELEMENT and METAL CLADDING

in accordance with **BS EN 1634-1: 2008**

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HOKLAS Approved Signatory:



Ir. Dr Chan Yuk Kit

1. Scope of Test

This report is a record of a fire resistance test conducted by Forte Testing and Consultants Co., Ltd, in conformity with requirements in *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"* and particular requirements in *BS EN 1363-1: 1999 "Fire resistance tests – Part 1: General requirements"*.

The test subjects were two doors: an unequal double leaf composite timber door with single glazed element, namely Door A; and a single leaf composite timber door with single glazed element, namely Door B.

This report only contains test results and details for Door B.

The specimen was manufactured and supplied for test by Leung's Wooden Company Limited.

The specimen achieved the following fire resistance:

INTEGRITY (E)		INSULATION (I ₁)			
Sustained Flaming	127 Minutes	Door Leaves & Framework	Average Temp. Rise	127	Minutes
Gap Gauge	127 Minutes		Max. Temp. Rise (I ₁)	127	Minutes
Cotton Pad	127 Minutes	Glazed Elements	Average Temp. Rise	127	Minutes
			Max. Temp. Rise	127	Minutes

2. Test Information

Test Laboratory:	FORTE Testing and Consultants Company Limited	
Test Location:	West Side of Huan Xiang Shan, Xin Yu Road, Shajin, Baoan District, Shenzhen, Guangdong Province, China.	
Test Sponsor:	Leung's Wooden Company Limited Garish Crown Fire Engineering & Consultancy	
ID no. of the specimen:	Door A: QT 13-203A;	
Date Received:	2013-07-20	
Test Number:	QT 13-203 *A total of two sets of report (Report no. IT13-128 and IT13-155) are issued on this report	
Date Tested:	2013-07-24	Start Time: 14:24
Approved Test Operator from FORTE:	Ms. Cheng San Mei, Sammi	
Witness of the Test:	Mr. C.K. Leung – Official Delegate of the Sponsor	

3. Construction Details of Specimen

3.1 Specimen Description

3.1.1 Framework and Sub-frame

The composite timber framework was overall sized 1286 mm (width) x 2447 mm (height). The sectional dimensions of the perimeter framework was 65 mm (w) x 110 mm (thick) with 25 mm single door stop rebate.

The sub-frame was made of film plywood sized 110 mm (w) x 18 mm (t). The sub-frame was fixed into the concrete supporting frame by M10 X 52 anchor bolts with metal plugs at 400 - 500 mm centre to centre.

The framework was fixed onto the sub-frame by corrugated fasteners at 400 - 500 mm centre to centre.

Wooden architraves sized 45 mm (w) x 15 mm (t) were fixed over the framework and sub-frame on both sides by wood nails at approximate 250 – 300 mm centre to centre.

Some parts of the timber frame were covered by 2 mm intumescent sheet and dual layers of 5 mm thick fire rated board.

1 number of 30 mm (w) x 4 mm (t) intumescent seal was fitted into the groove next to the rebate corner of the door frame. The seals were interrupted at door lock's and hinge's position.

The smoke seal was located at the rebate corner of the door frame.

The space between framework, sub-frame and concrete support frame was filled with back rods and fire sealant.

3.1.2 Door Leaf

The specimen comprised of sized 1200 mm (w) x 2400 mm (h) x 62 mm (t)

The stiles and rails were made from 2 numbers of 45 mm (w) x 34 mm (t) wooden slab and the mid rails were a 45 mm (w) wooden slab. The space between stiles and rails were filled with 34 mm (t) perlite board. Both sides of the core were covered by a dual layer of 5 mm (t) fireproof boards sub-facing and finished by a layer of 3 mm (t) plywood facing (unexposed fire side) and medium density fiber board facing (exposed fire side). The sub-facing was fixed onto the door core by glue and screws and the plywood facing was fixed onto the sub-facing by glue. 1 mm (t) galvanized mild steel plate with angle returned at the door edge were fixed on MDF facing by glue on exposed surface of the door leaf.

1 number of 30 mm (w) x 4 mm (t) intumescent seal was fitted into the groove along perimeter of the door edge except the bottom edge. 1 number of 10 mm (w) x 4 mm (t) intumescent seal was fitted into the groove at the bottom lipping with 9 mm away the door edge from exposed fire side. The seals were interrupted at door lock's and hinge's position.

The door lipping was made of wooden strip.

3.1.3 Glazed Element

The specimen comprised of single glazed element.

On the active leaf there was single glazed element overall sized 300 mm (w) x 1250mm (h) The glazed element consisted of a piece of 42 mm (t) interlayered glass pane. It were set and lined with ceramic fibre. The glazing was sandwiched by 1.5 mm thick steel angle and plate clad with wooden bead. The glazing beads were fixed onto the door leaf by screw at approximate 150 – 250 mm.

The edges of glass pane were caulked with fire sealant.

3.1.4 Ironmongery

Each door leaf was supported into the framework by 4 numbers of butt hinges.

A mortises lock was installed 1000 mm above the bottom of the active leaf.

1 number of surface mount door closer- was regular arm mounted at the top rim of door leaf on the exposed side.

1 number of conceal bottom seal was installed at the bottom edge of both door leaves.

Push Plate were installed at the both door leaves

Intumescent materials and fire sealant were applied to underneath of hinge blades and mortised area for ironmongeries.

3.2 Material Schedule

Parts specifications of Door B were summarized in the following tables.

A star mark "*" indicates those not being verified by FORTE.

Door Frame

Manufacturer:	Leung's Wooden Co., Ltd.
Materials:	Hardwood
Density:	550 - 700 kg/m ³ *
Overall Sizes:	1286 mm by 2447 mm
Section Dimensions:	65 mm by 110 mm
Rebate:	25 mm
Connection Method of Head to Jamb:	Mitered Joint with Groove and Tongue; Fixed by Wood Screws
Connection Method of Transom to Jamb:	Mortise and Tenon; Fixed by Wood Screws
Fixing Method to Sub-frame:	Screws with Metal Plug
Gap Filling between Door Frame and Sub-frame:	Fire Sealant

Door Sub-frame

Manufacturer:	Leung's Wooden Co., Ltd.
Material:	Film Plywood
Density:	350 kg/m ³ *
Sizes:	18 mm by 110 mm
Fixing Method to Concrete Sub-frame:	Screws with Metal Plug

Architraves

Manufacturer:	Leung's Wooden Co., Ltd.
Material:	Hardwood
Hardwood Density:	550 - 700 kg/m ³ *
Overall Sizes:	45 mm by 15 mm

Door Leaf

Manufacturer:	Leung's Wooden Co., Ltd.	
Overall Sizes:	1200 mm by 2400 mm	
Stiles and Rails	Material:	Wooden Strip
	Width:	45 mm
	Thickness:	34 mm
	Density:	350 - 450 kg/m ³ *
	Moisture Content:	12 - 17% *
Core	Supplier:	Leung's Wooden Co., Ltd.
	Material:	Perlite *
	Thickness:	34 mm
	Density:	380 kg/m ³ *

Door Leaf Lippings

Manufacturer:	Leung's Wooden Co., Ltd.
Material:	Hardwood *
Density:	550 - 700 kg/m ³ *
Thickness:	6 mm

Door Leaf Facings

Manufacturer:	Leung's Wooden Co., Ltd.
Material:	1) Plywood / MDF 2) Galvanized Mild Steel Sheet
Density:	1) 350 - 450 kg/m ³ *
Thickness	1) 3.5 ± 0.5mm 2) 1 mm

Door Leaf Sub-facings

Supplier:	Leung's Wooden Co., Ltd.
Brand:	Gemtree
Material:	Magnesium Oxide *
Density:	900 kg/m ³ *
Thickness:	5 mm

Glazed Element – Glass Pane

Supplier:	Leung's Wooden Co., Ltd.
Brand:	Hengbao *
Nominal Thickness:	42 mm
Full Sizes:	300 mm by 1250 mm
Visual Sizes:	210 mm by 1160 mm
Depth of Cover of Glass Edge:	20 mm
Fixing Method:	Lined by Mineral Wool, Clamped by 1.5 mm thick Steel Angles/Plate and Wooden Glazed Beads on Both Sides

Glazed Element – Fixing Angles/Plate

Supplier:	Leung's Wooden Co., Ltd.
Material:	Stainless Steel *
Sizes:	Angel - 1.5 mm by 44 mm by 28 mm Plate - 1.5 mm by 35 mm

Glazed Element – Mineral Wool

Supplier:	Garish Crown Fire Engineering & Consultants
Material:	Fire Resistant Wool (Ceramic Fiber Tape) *
Density:	200 kg/m ³ *
Locations of Application:	Glass Pane Liner

Glazed Element – Glazing Beads

Manufacturer:	Leung's Wooden Co., Ltd.
Material:	Hardwood *
Density:	550 - 700 kg/m ³ *
Sizes:	45 mm by 18 mm
Fixing Method:	Adhesive

Butt Hinges

Supplier:	Leung's Wooden Co., Ltd.
Brand:	ADECO
Model:	3045BB
Sizes:	114 mm by 114 mm by 3 mm

Door Closer

Supplier:	Leung's Wooden Co., Ltd.
Brand:	BONCO
Model:	B3-1500 (3~6)

Door Lock

Supplier:	Leung's Wooden Co., Ltd.
Brand:	BONCO
Model:	B2-LF-009-4636
Sizes:	85 mm by 172 mm by 25 mm

Push Plate

Supplier:	Leung's Wooden Co., Ltd.
Material:	Stainless Steel *
Thickness:	1 mm
Sizes:	100 mm by 220 mm

Conceal Bottom Smoke Seal

Supplier:	Garish Crown Fire Engineering & Consultants
Brand:	Ying Mu
Model:	BSS
Locations of Application:	Bottom Edge of the Leaf

Rebate Corner Smoke Seal

Supplier:	Garish Crown Fire Engineering & Consultants
Brand:	Ying Mu
Model:	Seal 1212
Material:	PVC
Locations of Application:	Framework Rebate Corner

Intumescent Material

Supplier:	Leung's Wooden Co., Ltd.	
Sizes (Brand):	Door Frame and ironmongery protection	2 mm Thickness (Ying Mu)
	Bottom Edge	10 mm by 4mm (Lorient)
	Framework and Perimeter of leaf	30 mm by 4 mm (Lorient)

Fixing – Door Frame

Supplier:	Leung's Wooden Co., Ltd.
Brand:	Howin - HMF
Size:	10 by 112 mm Screws with Metal Plug

Fire Sealant

Supplier:	Garish Crown Fire Engineering & Consultants
Brand:	FIREMATE
Model:	Not Provided

Glue

Supplier:	Leung's Wooden Co., Ltd.
Brand:	Not Provided
Type:	木膠粉 *

This report is invalid unless accompanied with authorization letter or certificate issued by Garish Crown Fire Engineering & Consultants

4. Specimen Condition

4.1 Selection of the Specimen

The specimen was selected by the Sponsor and submitted to the Test Location. FORTE did not involve in the selection of the specimen.

All the components of the test specimen was supplied by the Sponsor.

4.2 Verification of the Specimen

Sample of components of the specimen was prepared by the Sponsor.

In *section 3.2* of this report, items which had been verified by FORTE was clearly identified and distinguished from those relying on Sponsor's declaration.

4.3 Supporting Construction

The specimen was fixed into a supporting construction made of fully cured reinforced normal density concrete slabs provided by FORTE. The concrete slabs formed a structural opening 1629 mm (w) x 2460 mm (h) for Door A.

4.4 Installation of the Specimen

The specimen was assembled and installed by workers delegated by the Sponsor on 2013-07-20

4.5 Specimen Conditioning

The specimen was stored in the Test Location from 2013-07-20, the date which specimen was received, to 2013-07-24, the date which fire resistance test performed.

The average environment parameters in the Test Location within this period were:

Ambient Temperature (°C)	Relative Humidity (%)
30 ± 5	75 ± 10

4.6 Direction of Fire Side and Others

The Sponsor has designated and installed the specimen that door leaf could only be swung inwards the furnace. With reference to *Clause 13; BS EN 1634-1: 2008*, hinged timber leaf timber frame door tested opening into the furnace may cover the opposite direction on both integrity and insulation criteria.

Door A: The door lock and flush bolts were NOT locked and NOT latched during the test.

5. Test Method

5.1 Pre-test Conditioning

The pre-test conditionings of the specimen were carried out on 2012-07-23 prior to the fire test with reference to *BS EN 1634-1: 2008* and *clause 5.1, BS EN 14600: 2005*.

5.2 Ambient Temperature

The ambient temperature was measured by mineral insulated metal sheathed type K thermocouple. The measuring junction was screened by two concentric plastic pipes from radiated heat and draught, at a position approximate 1500 mm away the test construction.

5.3 Heating Condition

The average temperature inside the furnace was monitored and controlled throughout the test according to the standard heating curve stated in *BS EN 1363-1:1999* given by the equation:

$$T = 345 \log_{10} (8t+1) + 20$$

Where,

T is the average furnace temperature, in degree Celsius

t is the time, in minutes

The temperature inside the furnace was measured in conformity with *BS EN 1363-1: 1999* by 9 numbers of plate thermometers. These thermometers were evenly distributed over a vertical plane approximately 100 mm from the exposed surface of the test construction.

The positions of furnace thermocouples are shown in *Figure 1*.

5.4 Unexposed Surface Temperature

The unexposed surface temperatures of the specimen were measured by 20 numbers of type K thermocouples. These thermocouples were positioned and fixed on unexposed surface of the test specimen in conformity with *BS EN 1634-1: 2008*.

The specimen was evaluated against the maximum temperature rise criterion given by supplementary procedure – Classification I₁ at the request of the Sponsor.

The positions of unexposed surface temperature measurement points are shown in *Figure 3*. The locations of thermocouples are explained in the following table.

Thermocouple	Area	Description
U30 – U34	Door Leaf	For average and maximum unexposed surface temperature rise
U35 – U38; U46 – U49	Door Leaf	For maximum unexposed surface temperature rise (Supplementary Procedure, I₁)
U39 – U42	Framework	For maximum unexposed surface temperature rise
U43 – U45	Glazed Element	For average and maximum unexposed surface temperature rise

5.5 Pressure Condition

The pressure inside the furnace was continuously monitored in compliance with *BS EN 1363-1: 1999* during the whole test. The pressure at a point 500 mm above the notional floor level was to be maintained 0 ± 5 Pa by five minutes from commencement of the test and 0 ± 3 Pa that from ten minutes onwards with respect to the atmosphere.

5.6 Deflection Measurements

Measurements of the deflection of the test specimen were taken with a steel rule from cross line laser across the top, mid-height and bottom of the specimen.

The positions of deflection measurement points are shown in *Figure 3*.

Figure 1. Position of thermocouples and pressure measuring probe inside the furnace.

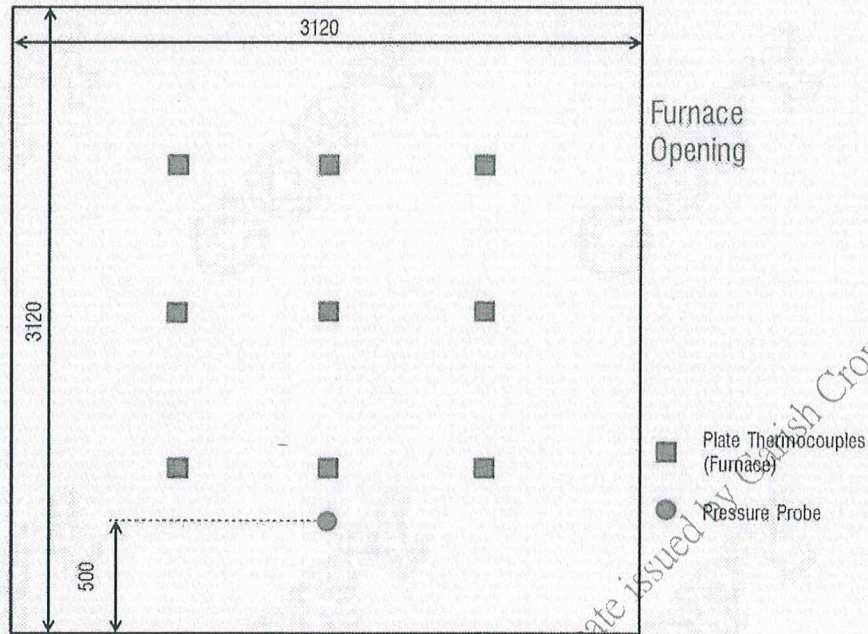


Figure 2. Primary gaps measurement positions.

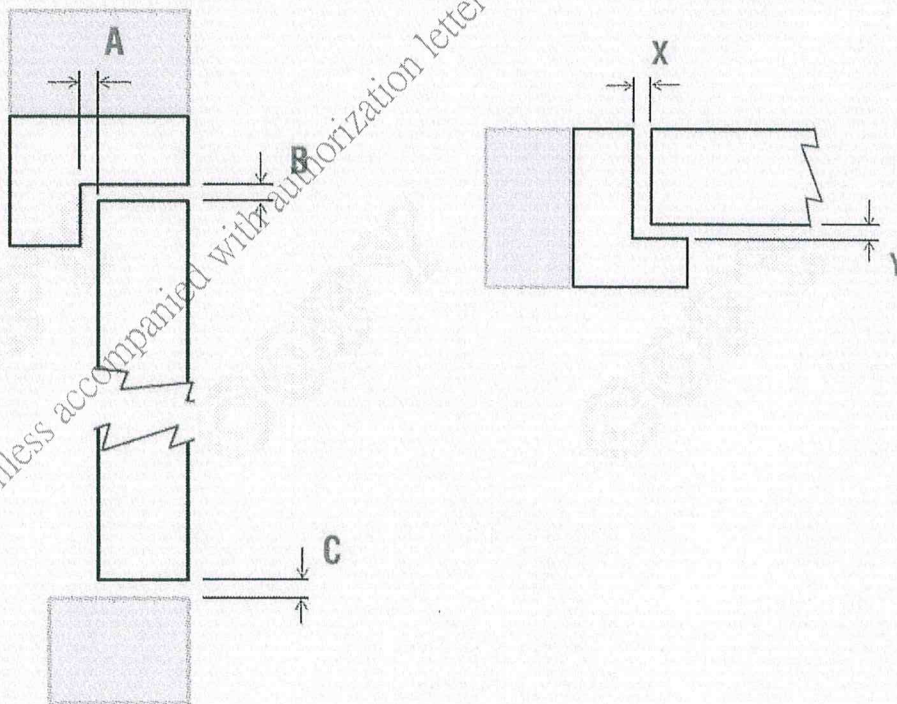


Figure 3a. Positions of fixed surface thermocouples (U) on Door B.

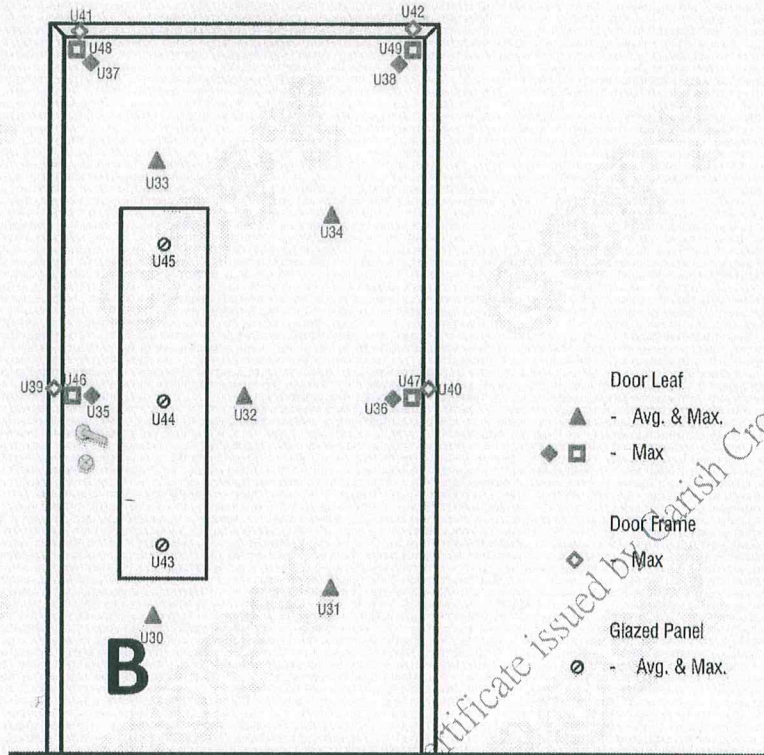
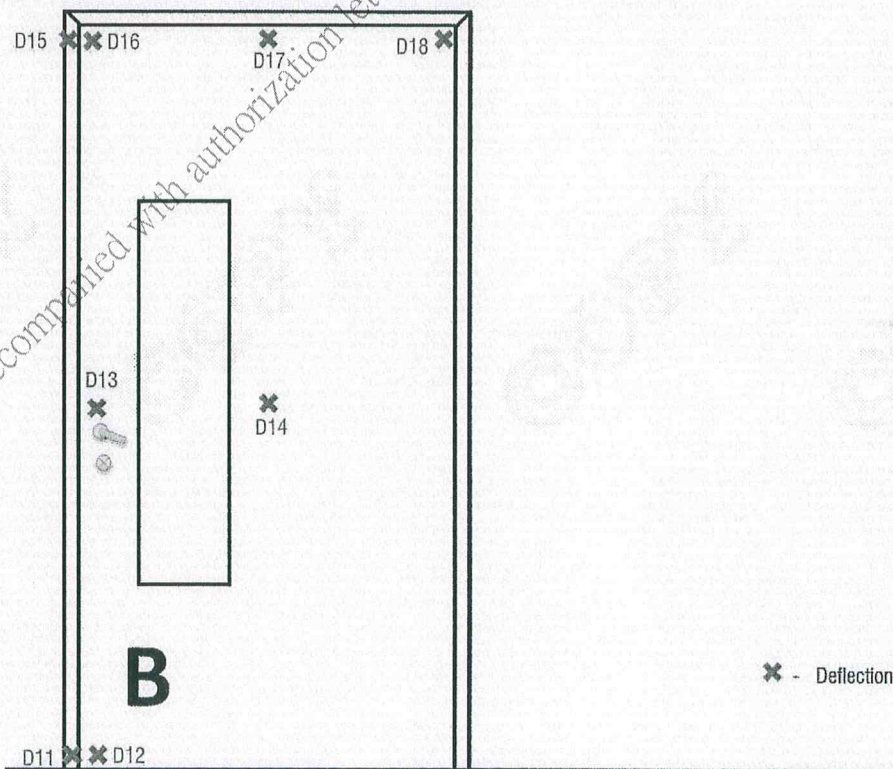


Figure 3b. Positions of deflection measuring points (D) on Door B.



6. Test Data

6.1 Retention Forces

The retention forces on door leaf of the specimen for each direction of opening were determined. The respective highest gauge measurements are summarized in the following table.

Push	Pull
181.2N	238.6N

6.2 Gaps Measurement

Primary gaps of the specimen were measured and subsequently processed in accordance with BS EN 1634-1: 2008 and summarized in the following table.

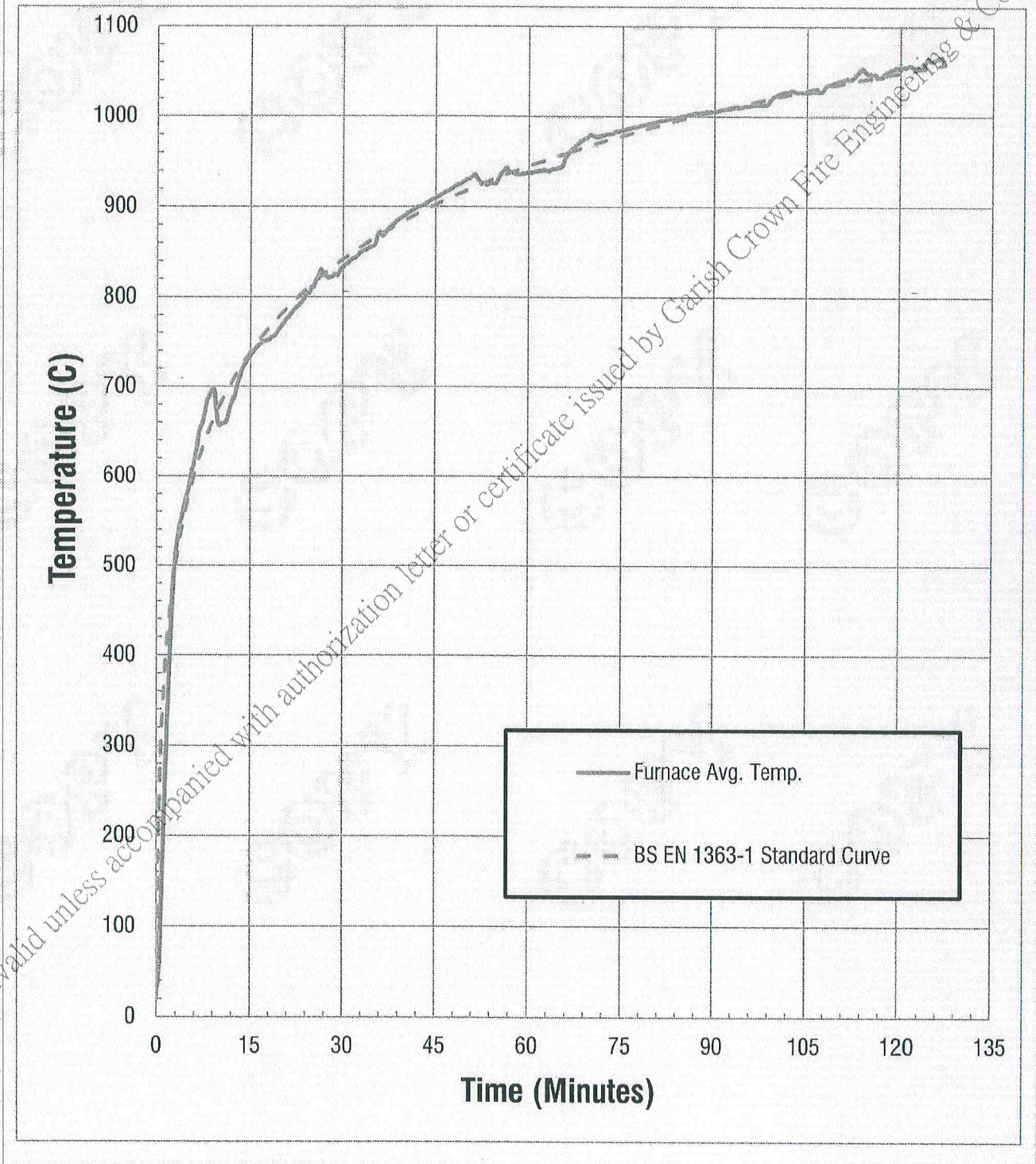
Measurements were taken in mm.

Gap		Measured		
		Minimum	Maximum	Average
Door B	A	0.8	2.7	1.8
	B	1.0	3.0	2.0
	C	0.5	1.3	0.9
	X	0.5	3.0	1.8
	Y	1.3	4.5	2.9

6.3 Furnace Temperature

The furnace average temperature over the test period is shown in *Figure 4*.

Figure 4. Furnace average temperature over the test period.



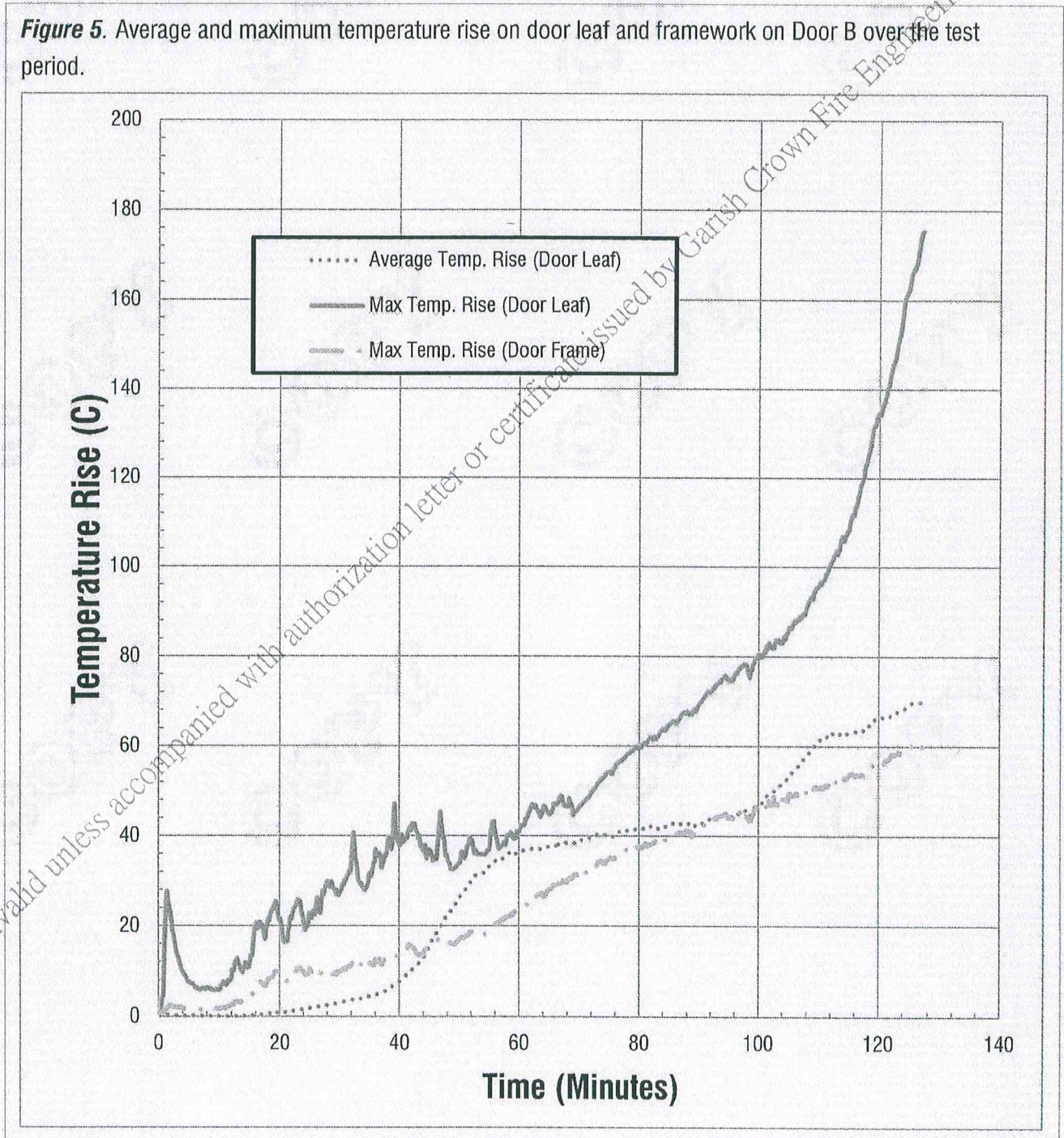
Unexposed Surface Temperature Rise

6.3.1 Door B

6.3.1.1 Fixed surface thermocouples – Door Leaves and Framework

The temperature rises of unexposed surface of Door B measured by fixed surface thermocouples on door leaf and framework over the test period are shown in *Figure 5*.

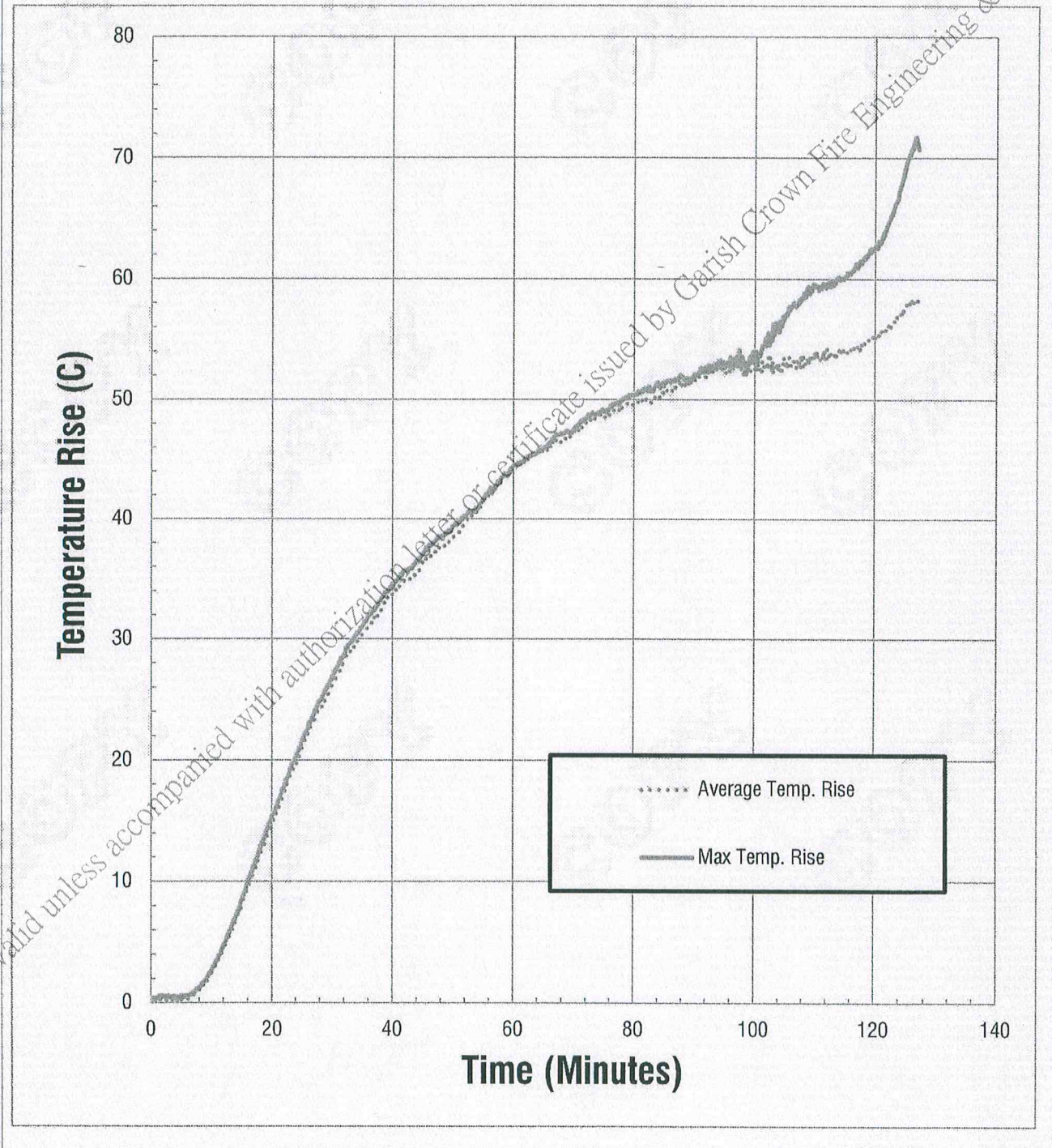
Figure 5. Average and maximum temperature rise on door leaf and framework on Door B over the test period.



6.3.1.2 Fixed surface thermocouples – Glazed Element

The temperature rises of unexposed surface of Door B measured by fixed surface thermocouples on glazed element over the test period are shown in *Figure 6*.

Figure 6. Average and maximum temperature rise on glazed element on Door B over the test period.



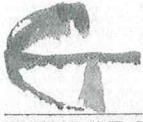
6.3.2 Fixed surface thermocouples – Detailed Temperature Records

The outputs of the unexposed surface thermocouples on Door B are summarized in the following tables.

Measurements were taken in °C.

Temperature outputs from unexposed surface temperature U30 – U39

Time (min)	U30	U31	U32	U33	U34	U35	U36	U37	U38	U39
0	24.9	24.3	24.1	25.6	25.5	25.8	25.8	26.2	25.5	24.9
5	25.1	24.4	24.1	25.7	25.5	27.5	25.9	26.8	25.5	25.2
10	24.9	24.3	24.3	25.6	25.5	26.8	25.8	26.5	25.4	25.1
15	25.0	24.4	24.3	25.9	25.5	26.9	25.8	26.8	25.4	25.3
20	25.5	24.9	25.1	27.2	26.0	27.6	26.1	28.0	25.8	25.8
25	26.6	25.8	26.2	28.2	26.8	28.8	26.8	29.4	26.5	26.3
30	27.6	26.8	27.4	29.4	27.8	29.7	27.7	30.0	27.4	27.3
35	28.7	27.9	29.6	30.9	29.1	30.5	28.9	30.9	28.6	28.5
40	30.9	29.6	30.0	32.7	30.6	49.5	32.2	33.8	30.6	30.9
45	40.4	36.1	51.5	38.6	36.6	56.1	42.9	42.3	45.9	34.8
50	50.7	47.1	58.2	49.7	49.9	58.7	52.8	49.7	55.7	38.5
55	57.1	55.1	61.8	58.0	59.0	61.2	57.5	53.3	60.5	43.6
60	60.5	58.5	63.7	62.0	62.5	63.5	59.3	56.1	61.7	48.8
65	61.6	59.7	63.8	63.3	63.6	64.3	59.7	59.2	63.9	53.0
70	63.4	61.3	65.4	64.3	64.9	66.2	61.6	61.1	63.6	56.8
75	64.9	62.4	66.7	66.1	66.1	67.7	62.3	64.2	64.2	59.8
80	65.5	63.6	67.7	67.8	67.5	69.6	63.3	67.9	66.8	62.4
85	66.8	64.4	68.7	68.9	68.2	71.3	63.5	70.9	67.0	65.0
90	66.9	64.4	68.9	69.2	68.2	72.3	64.5	71.9	67.8	65.3
95	67.4	65.5	72.6	70.5	69.9	74.8	65.8	75.0	70.1	66.6
100	68.0	66.3	81.7	74.4	70.2	85.1	66.1	80.6	71.1	67.2
105	72.7	69.7	89.9	83.4	74.1	96.1	66.6	89.8	77.4	68.1
110	81.7	78.2	96.1	91.7	83.4	104.1	71.8	98.4	86.1	68.5
115	82.3	81.0	95.9	93.4	86.5	109.4	76.7	105.2	93.1	70.5
120	85.6	85.9	98.5	96.0	90.5	109.5	85.7	111.5	99.9	71.2
125	86.6	87.2	102.4	102.4	91.8	113.5	86.6	115.2	105.2	71.8
126	87.1	87.2	103.0	103.7	91.5	114.1	85.7	116.5	105.6	72.2
127	87.3	86.3	103.4	103.9	91.1	113.8	84.7	117.0	106.3	71.7



Temperature outputs from unexposed surface temperature-U40 – U49

Time (min)	U40	U41	U42	U43	U44	U45	U46	U47	U48	U49
0	24.3	25.8	25.6	25.8	25.9	26.2	25.2	24.5	24.5	25.6
5	24.4	26.4	25.8	26.1	26.0	26.2	32.4	24.6	26.5	25.5
10	24.4	26.5	25.8	28.3	28.3	28.5	30.8	24.6	28.0	25.8
15	24.3	29.2	25.7	34.0	34.3	34.0	33.5	24.7	37.0	26.5
20	24.4	33.7	26.0	40.7	41.3	40.4	41.0	25.2	46.5	28.5
25	24.5	35.3	26.0	46.9	47.4	46.4	44.1	26.1	47.7	31.4
30	24.6	34.8	26.8	52.1	52.7	51.2	49.6	27.5	52.1	40.9
35	25.1	37.1	28.0	56.2	56.9	55.4	44.1	29.4	56.4	46.3
40	25.7	38.9	30.3	59.5	60.5	58.8	43.8	32.3	63.0	61.6
45	26.7	40.8	34.6	62.2	62.9	61.3	47.3	36.2	61.6	61.2
50	28.2	42.0	37.6	64.3	65.3	64.1	50.2	41.7	58.2	55.0
55	30.1	44.5	41.1	67.2	67.3	67.6	61.0	46.5	57.3	61.3
60	32.4	47.6	44.1	70.3	69.6	70.0	60.9	51.6	54.8	65.8
65	35.0	51.4	48.4	71.6	71.8	71.4	65.9	54.4	60.3	69.6
70	38.5	53.8	50.2	73.1	73.5	73.0	71.5	59.0	63.2	68.5
75	41.8	57.7	53.8	74.5	74.9	74.5	79.2	63.2	63.7	71.8
80	44.6	61.8	59.2	75.4	76.3	75.4	84.7	66.1	64.9	71.7
85	47.4	64.8	62.2	76.4	77.2	75.8	89.6	69.7	66.3	72.4
90	51.0	66.2	64.8	77.5	77.7	75.8	94.3	73.4	69.0	76.1
95	54.3	68.9	68.1	78.2	78.8	76.6	99.9	77.0	81.1	87.7
100	56.9	70.8	70.2	78.3	79.8	78.5	104.8	80.0	95.7	99.1
105	59.2	72.6	73.0	78.7	81.2	82.7	110.8	83.6	105.0	109.7
110	62.2	74.9	75.5	79.7	83.8	85.2	119.7	86.4	114.6	120.8
115	63.4	76.8	78.3	79.7	86.0	84.8	133.5	89.5	122.3	131.3
120	65.9	79.8	80.9	81.2	88.3	84.9	159.3	95.1	135.3	141.8
125	68.6	84.5	84.4	83.6	94.9	88.2	188.3	103.2	148.9	151.1
126	68.9	84.6	83.5	84.2	96.5	88.3	192.9	104.6	151.0	151.6
127	69.0	84.7	84.1	84.0	96.8	88.2	200.2	106.0	154.9	154.4

6.6 Lateral Deflections

Measured lateral deflections over the test period are summarized in the following table. A positive measurement indicates a movement towards into the furnace and vice versa.

Measurements were taken in mm.

Maximum deflection measured on Door B was +60 mm at D10 at 110 minute of test.

Position \ Time (min)	0	20	40	80	100	110
D11	+0	+2	+4	+4	+4	+4
D12	+0	+4	+5	+12	+6	+7
D13	+0	+18	+25	+50	+57	+60
D14	+0	+16	+12	+37	+50	+51
D15	+0	+13	+22	+22	+22	+20
D16	+0	+12	+24	+31	+40	+39
D17	+0	+9	+14	+38	+30	+33
D18	+0	+4	+6	+20	+21	+20

6.8 Photos

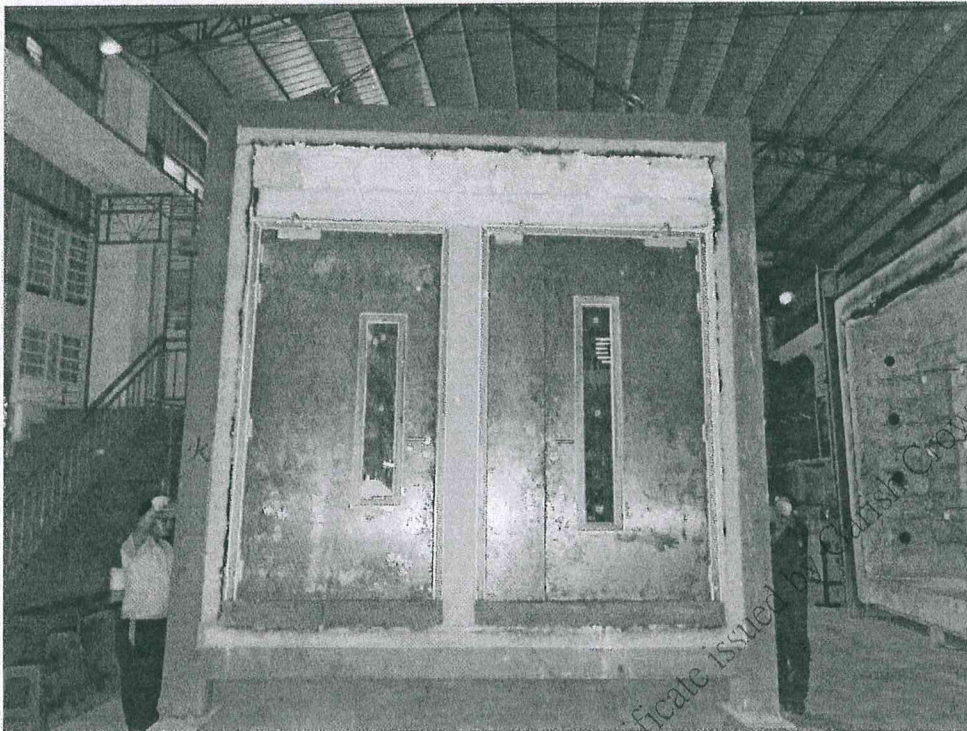


Photo 1. Exposed surface of the specimen before test. (Left: Door B; Right: Door A)

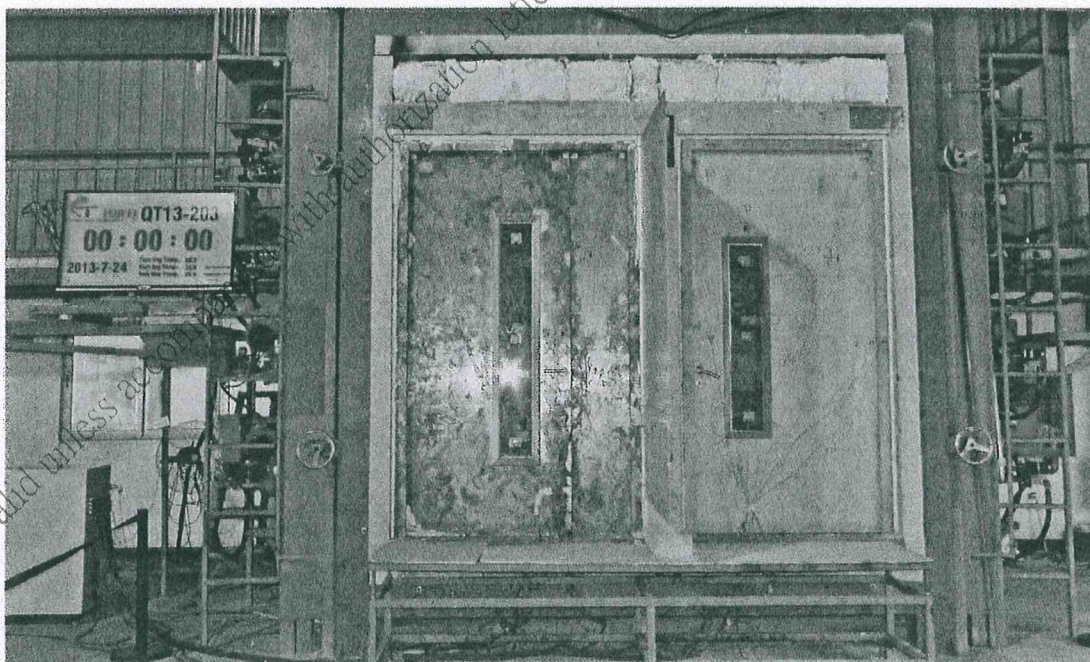


Photo 2. Unexposed surface of the before the test. (Left: Door A; Right: Door B)



Photo 3. Unexposed surface of the specimen at 30 minute of test. (Left: Door A; Right: Door B)



Photo 4. Unexposed surface of the specimen at 60 minute of test. (Left: Door A; Right: Door B)

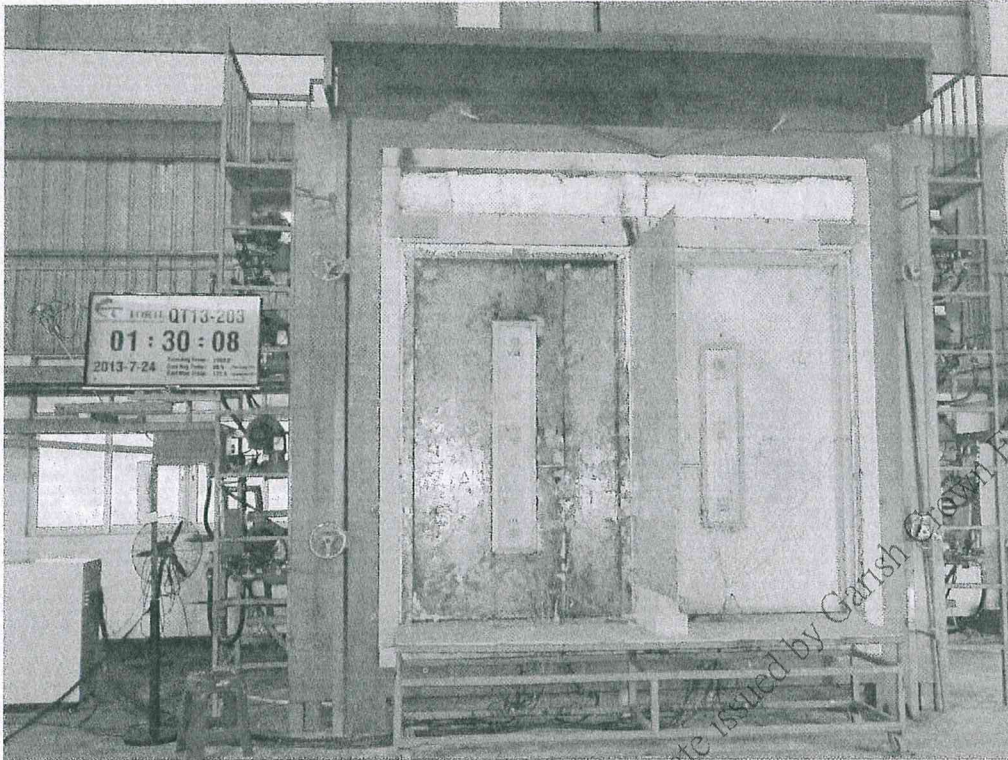
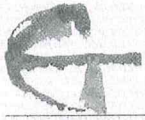


Photo 5. Unexposed surface of the specimen at 90 minute of test. (Left: Door A; Right: Door B)



Photo 6. Unexposed surface of the specimen at 120 minute of test. (Left: Door A; Right: Door B)

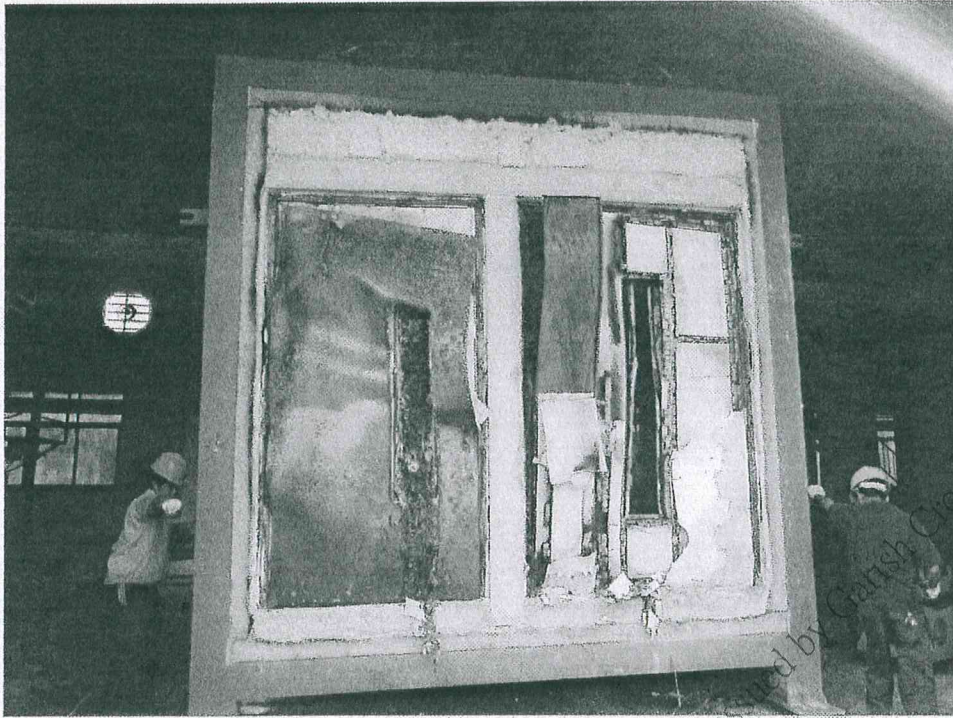


Photo 7. Exposed surface of the specimen after test. (Left: Door B; Right: Door A)

7. Test Results

The test on Door B was terminated after a test period of 127 minutes at request of the Sponsor.

The test data obtained from the fire resistance test was assessed against performance criteria given in BS EN 1634-1: 2008. The test results are summarized in the following table.

Performance Criteria		Elapsed Time before Failure Occurrence	
Integrity (E)			
Criteria of Failure	Description	Elapsed Time before Failure Occurrence	
Sustained Flaming	Continuous flaming for a period of time greater than 10 seconds on unexposed surface	127 minutes (No Failure)	
Gap Gauge	Ø6 mm Penetration of the gauge into the furnace through the specimen and movable along a 150 mm gap	127 minutes (No Failure)	
	Ø25 mm Penetration of the gauge into the furnace through the specimen		
Cotton Pad	Ignition of the cotton pad	127 minutes (No Failure)	
Performance Criteria		Elapsed Time before Failure Occurrence	
Insulation (I)			
Criteria of Failure	Description	Elapsed Time before Failure Occurrence	
Integrity Failure	The performance criterion "insulation" shall automatically be assumed not to be satisfied when the "integrity" criterion ceases to be satisfied	127 minutes (No Failure)	
Average Temperature Rise	An increase of the average temperature of unexposed surface of the specimen above the initial average temperature by more than 140 °C	[Door Leaf and Door Frame]	127 minutes (No Failure)
		[Glazed Elements]	127 minutes (No Failure)
Maximum Temperature Rise [Supplementary Procedure, I ₁]	An increase of temperature at any other point of the specimen above the initial average temperature by more than 180 °C	[Door Leaf and Door Frame]	127 minutes (No Failure)
		[Glazed Elements]	127 minutes (No Failure)

8. 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*, 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.

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.

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9. Field of Direct Application

The field of direct application defines 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.

The series of rules and guidelines are defined in *Clause 13 "Field of direct application of test results"*, *BS EN 1634-1: 2008* and relevant clauses and annexes. Permitted variations away from the test specimen include 1) materials and construction, 2) size variations, 3) coverage of asymmetrical doorsets and 4) supporting constructions.

The field of direct applications may only be defined following the identification of classification(s). The field of direct and, where applicable, extended application will be included in classification relevant documents.

END OF REPORT