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CHENG San Mei, Sammi

1. Scope of Test

This report was 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 subject was single-acting single-leaf composite timber sliding door with two air transfer grilles namely Door A, louver systems, namely louver B and louver C. The specimens were supplied for test by Garish Crown Fire Engineering & Consultancy, the Sponsor.

This report only contained test results and details for Door A.

Door A achieved the following fire resistance:

INTEGRITY (E)	
Sustained Flaming	48 Minutes
Gap Gauge	53 Minutes
Cotton Pad	53 Minutes
INSULATION (I)	
Door Frame	Max. Temp. Rise (I₂) 53 Minutes
Door Leaf	Average Temp. Rise 53 Minutes
	Max. Temp. Rise (I₂) 53 Minutes
Air Transfer Grilles	Average Temp. Rise 53 Minutes
	Max. Temp. Rise 53 Minutes

* The earliest elapsed time before any integrity or insulation failure occurrence was bolded above.

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 Sponsors:	Garish Crown Fire Engineering & Consultancy	
ID no. of the Specimen:	QT19-148A	
Date Received:	2019-10-08	
Test Number:	QT19-148	
Date Tested:	2019-10-16	Start Time: 10:11
Test Operator from FORTE:	Ms. Michelle DONG	
Witness of the Test:	Mr. Ho Siu Ping – Official Delegate of the Sponsor	
Report Issue Record:	Version 1 - 2019-12-18	

3. Construction Details of Specimen

3.1 Door A

3.1.1 Door Frame

The timber door frame with clear opening sizes were 906 mm (width) x 2233 mm (height). The sectional dimension of the head and the vertical flush jamb were 47 mm (w) x 100 mm (thick).

The door frame fixed to the concrete support frame by door frame anchor bolts. There were 3 numbers of fixings at each jamb. 30 mm (w) x 4 mm (t) intumescent seal was fixed on the door frame facing to the door leaf. L-shape or the door stop was fixed at the vertical door jamb.

The space between the door frame and concrete support frame filled with ceramic fibre and lifted up with fire sealant.

3.1.2 Sliding Door Leaf

The specimen comprised of a door leaf sized 1000 mm (w) x 2400 mm (h) with nominal 62 mm thick.

The stiles and rails of the door leaf were made of timber slabs sized 150-200 mm (w) x 38 mm (t), whereas the mid-rails were made of a timber slab sizes 60 mm (w) x 38 mm (t). The stiles, rails and mid-rails were fixed together by steel staples. The space between stiles and rails were filled with 38 mm (t) perlite core. Both sides of the core were covered by triple layers of 3 mm (t) fire board sub-facing and 3 mm (t) medium density fabric (MDF) board facing. The sub-facing was fixed onto the stiles and rails by nails and glue; the MDF facing was fixed onto the sub-facing by glue. The door lippings were made of 10 mm (t) timber strips. 40 mm (w) x 4 mm (t) intumescent seal was centrally fitted into the groove along the top edge of door leaf and the grooves opposite the head and the vertical flush jamb. 2 numbers of 10 mm (w) x 4 mm (t) intumescent seal with plastic fins were equally fitted into the groove along the bottom edge of the door leaf. There was a groove at the bottom edge of the door leaf for fitting a floor guide.

3.1.3 Air Transfer Grilles

The specimen comprised of 2 air transfer grilles at the door leaf.

The air transfer grilles sized 600 mm (w) x 300 mm (h) x 62 mm (t) & 400 mm (w) x 1400 mm (h) x 62 mm (t) and fixed in the apertures of the door leaf. Each air transfer grilles was made of 1 mm (t) steel plates and multi-layer of intumescent pads. Each blade was Z-shape sized 41 mm x 62 mm.

Fire sealant was caulked along the outer perimeter of the fire louver. The top fire louver was installed 300 mm below the top edge of the door leaf and 200 mm away from the leading edge. The bottom fire louver was installed 200 mm above the bottom edge of the door leaf and 200 mm away from the leading edge.

3.1.4 Ironmongery

The door leaf was mounted onto the testing frame by sliding system with mechanical self-closing function. Two door hangers fixed on the top edge of the door leaf at 150 mm away the vertical edge of the door leaf and were suspended from the aluminium track. The sliding system was covered by a 25 mm (t) composite panel on fire exposed. The composite panel was made of 9 mm (t) fire rated board and plywood facing. Steel angle holding system with intumescent materials was applied on the top and vertical edge of the doorset. Interlock was installed 950 mm above the bottom edge of the door leaf. Decoration plate was applied at both sides of door leaf.

3.2 Material Schedule

Parts Specifications were provided by the Sponsor.

Italics: Information checked by FORTE.

Door Frame

Supplier:	Garish Crown Fire Engineering & Consultancy
Material:	Timber (Hardwood)
Overall Sizes:	1000 mm x 2280 mm
Sectional Dimensions:	47 mm x 100 mm
Density:	550 - 700 kg/m ³
Connection Method of Head to Jamb:	Mitred Joint with Tongue and Groove and Fixed by Wood Screws
Gap Filling between Door Frame and Sub-frame:	Ceramic Fibre and Lined Up with Fire Sealant
Fixing method to Concrete Supporting Frame:	M10 x 120 mm Steel Anchor Bolt

Intumescent and Smoke Seal - Door Frame

Supplier:	Garish Crown Fire Engineering & Consultancy	
Brands:	Ying Mu	
Model and Size:	YM3002 - 30 mm x 4 mm	YM2002 - 20 mm x 4 mm
Location:	Frame Head and Jambs	Frame Head

Door Leaf

Supplier:		Garish Crown Fire Engineering & Consultancy
Overall Sizes:		1000 mm x 2400 mm
Nominal Thickness:		62 mm
Measured Thickness:		63.45 mm
Stiles and Rails	Material:	Timber (Softwood)
	Width:	Main Stiles and Rails – 180 mm - 200 mm Mid Rails – 45 mm
	Thickness:	38 mm
	Density:	350 - 400 kg/m ³
	Moisture Content:	12 – 17 %
Core	Material:	Perlite
	Brand:	Jintemei
	Thickness:	38 mm
	Density:	380 kg/m ³
	Moisture Content:	12 – 17 %

Door Leaf Lipping

Supplier:	Garish Crown Fire Engineering & Consultancy
Material:	Timber (Hardwood)
Thickness:	10 mm
Density:	550 - 700 kg/m ³

Intumescent and Smoke Seal - Door Leaf

Supplier:	Garish Crown Fire Engineering & Consultancy		
Brands:	Ying Mu		
Model and Size:	YM3002 – 30 mm x 4 mm	YM1002 – 10 mm x 4 mm	YM1002 -10 mm x 4 mm
Location:	Groove Opposite the Door Frame	Leading and Top Edge of Door Leaf	Bottom Edge of the Door Leaf

Interlock

Supplier:	Garish Crown Fire Engineering & Consultancy
Brand:	ABS
Model:	Not Provide
Material:	GMS
Sizes:	NA

Fire Board

Supplier:	Garish Crown Fire Engineering & Consultancy
Brand:	Ying Mu
Description	Magnesium Oxide Board
Nominal Thickness:	3 mm
Density:	950 - 1050 kg/m ³
Location Applied:	Door Leaf Sub-facing

Door Leaf Facing

Supplier:	Garish Crown Fire Engineering & Consultancy
Material:	Medium Density Fibreboard (MDF)
Thickness:	3 mm
Density:	450 - 550 kg/m ³

Fire Louver

Supplier:	Garish Crown Fire Engineering & Consultancy
Brand:	Ying Mu
Sizes:	Upper: 600 mm x 300 mm x 62 mm Lower: 400 mm x 1400 mm x 62 mm
Configuration	1 mm G.M.S. Z-Profile + Multi-layers of 2 mm Intumescent Pads + Fire Sealant

Sliding Track

Supplier:	ABS Building Products Company Limited
Brand:	ABS
Model:	Magneto
Material:	Steel + Aluminium Alloy

Decoration Plate

Supplier:	Garish Crown Fire Engineering & Consultancy
Brand:	Stainless Steel
Thickness:	1.2 mm

Intumescent Pad

Supplier:	Garish Crown Fire Engineering & Consultancy
Brand:	Ying Mu
Thickness:	2 mm

Fire Sealant

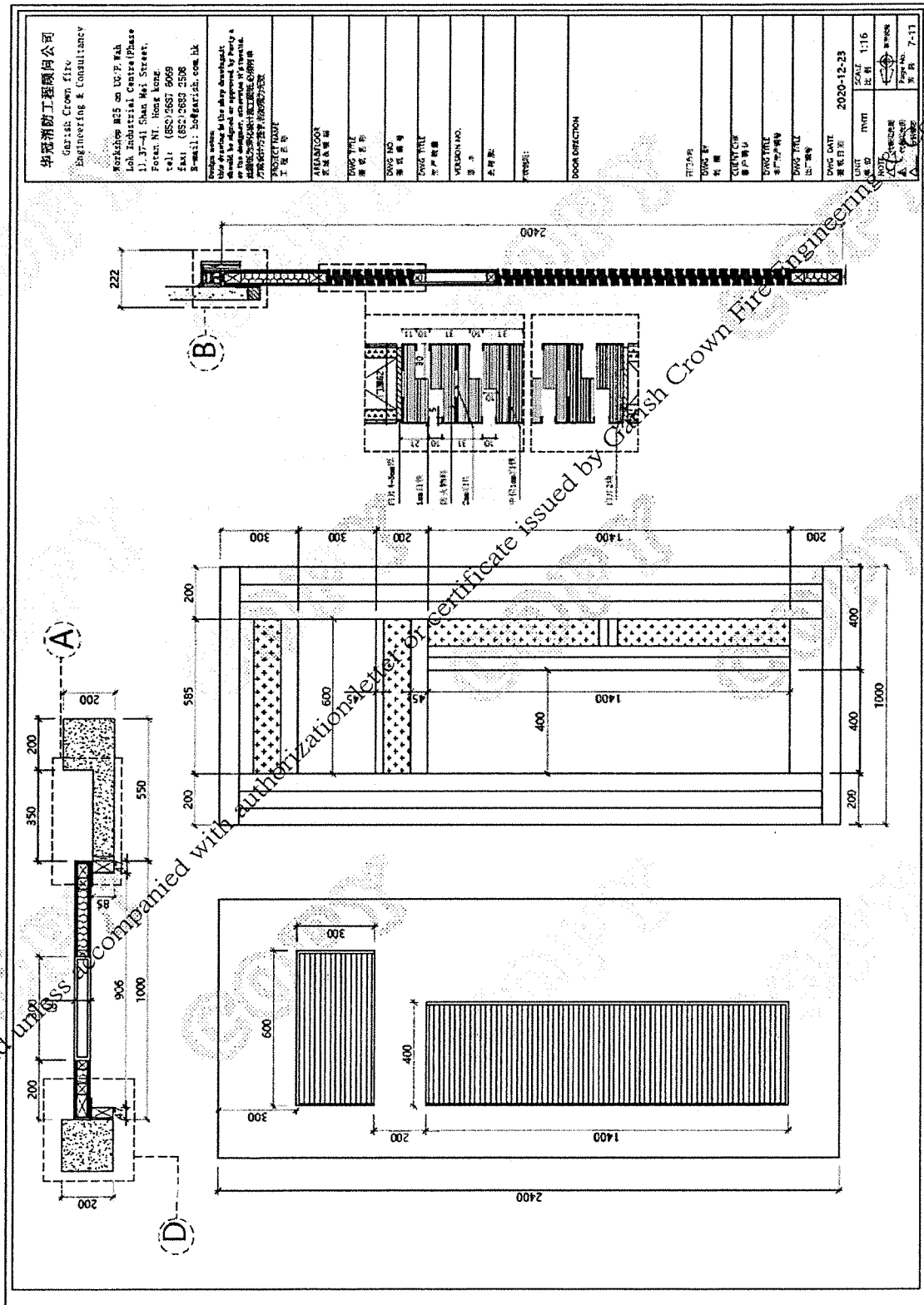
Supplier:	Garish Crown Fire Engineering & Consultancy
Brand:	Firemate
Location Applied:	Between the Gap Along the Door Frame and the Test Frame and Fill Up the Louver Blade

Glue

Supplier:	Garish Crown Fire Engineering & Consultancy
Type:	木膠粉

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3.3 Drawings on the Specimen provided by the Sponsor (Total 2 pages)



Drawings provide by the Sponsor (1)

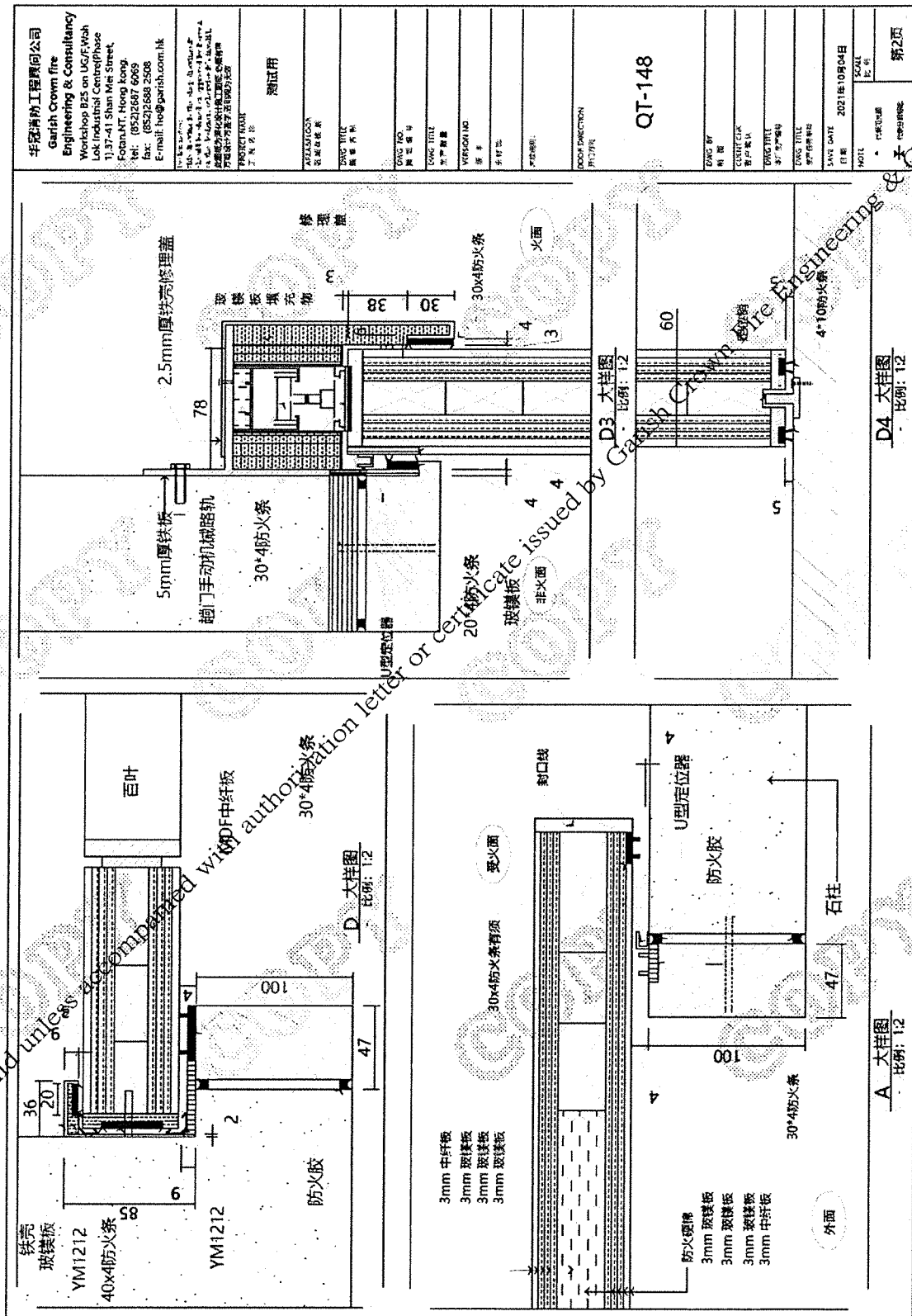


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REPORT no.: IT19-129

Drawings provide by the Sponsor (2)



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

A specimen was transferred to the Test Location on 2019-10-08 by the Sponsor.

Parts of the manufacturing processes were over seen by FORTE delegates.

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. Door A was installed into one sized 1020 mm (w) x 2450 mm (h).

4.4 Installation of the Specimen

The specimen was assembled and installed by workers delegated by the Sponsor from 2019-10-08 to 2019-10-14.

4.5 Specimen Conditioning

The specimen was stored in the Test Location from 2019-10-08, the date which specimen was received, to 2019-10-16, the date which fire resistance test performed.

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

Ambient Temperature (°C)	Relative Humidity (%)
25.9 ± 5	65 ± 5

4.6 Direction of Fire Side and Others

The Sponsor designated and installed that door leaves on specimen with the following orientation.

Door A The Sponsor had designated and installed the specimen that hanging system located at fire side and it was UNLOCKED and UNLATCHED during the test.

5. Test Method

5.1 Pre-test Conditioning

The pre-test conditioning of Door A was carried out on 2019-10-14 prior to the fire test with reference to *BS EN 1634-1: 2008* and *clause 5.1.1.1 of BS EN 14600: 2005*.

Operability test of the specimen:

Each specimen should be tested for operability in the fire test frame by operating from fully closed to fully open at 90 degrees for 25 cycles. Where this is not possible due to furnace or product size restrictions (for example large sliding doors) a minimum movement of 300 mm per cycle is necessary.

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 were shown in *Figure 1*.

5.4 Door Gaps

The widths of frame-to-leaf or leaf-to-leaf gaps were measured after the door assembly and prior to the test. Measurement positions were shown in *Figure 2*.

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5.5 Unexposed Surface Temperature

The unexposed surface temperatures of the specimen were measured by 31 numbers of type K thermocouples. The temperature rise was calculated by subtracting the initial average temperature from the unexposed temperature measured.

Door A was evaluated against the maximum temperature rise criterion given by normal procedure – Classification I₂, at the request of the Sponsor. These thermocouples were positioned and fixed on unexposed surface of the test specimen in conformity with *BS EN 1634-1: 2008*.

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

Thermocouple	Area	Description
U1 – U5	Door Leaf	For average and maximum unexposed surface temperature rise
U15 – U18	Door Leaf	For maximum unexposed surface temperature rise (Normal Procedure, I ₂)
U37 – U40	Door Leaf	For additional information only (Data shown in Appendix A)
U19 – U22	Door Frame	For maximum unexposed surface temperature rise
U23 – U27 U30 – U34	Air Transfer Grilles	For average and maximum unexposed surface temperature rise
U28 – U29 U35 – U36	Air Transfer Grilles	For maximum unexposed surface temperature rise

5.6 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.

5.7 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 were shown in *Figure 4*.

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

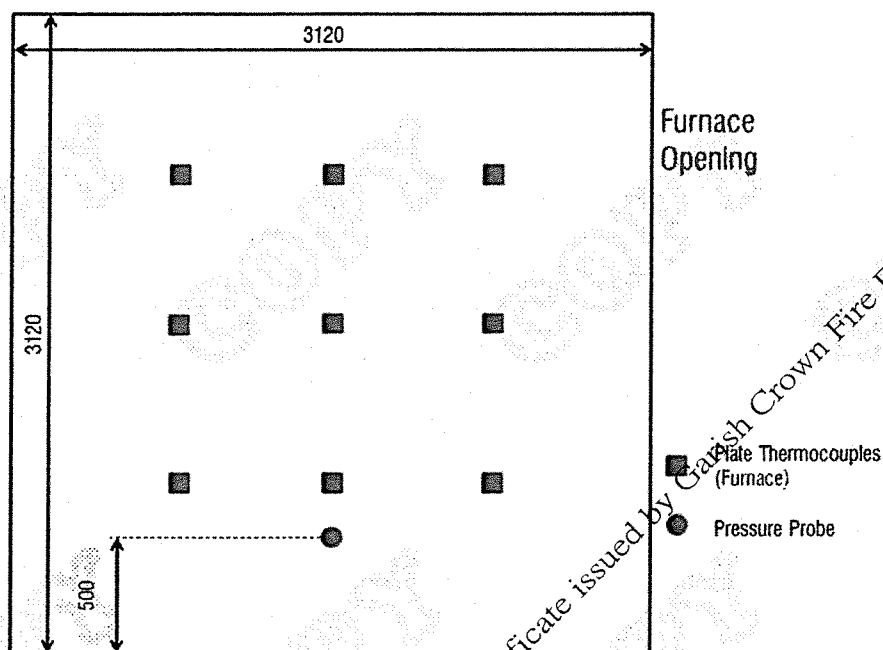


Figure 2. Primary gaps measurement positions on Door A.

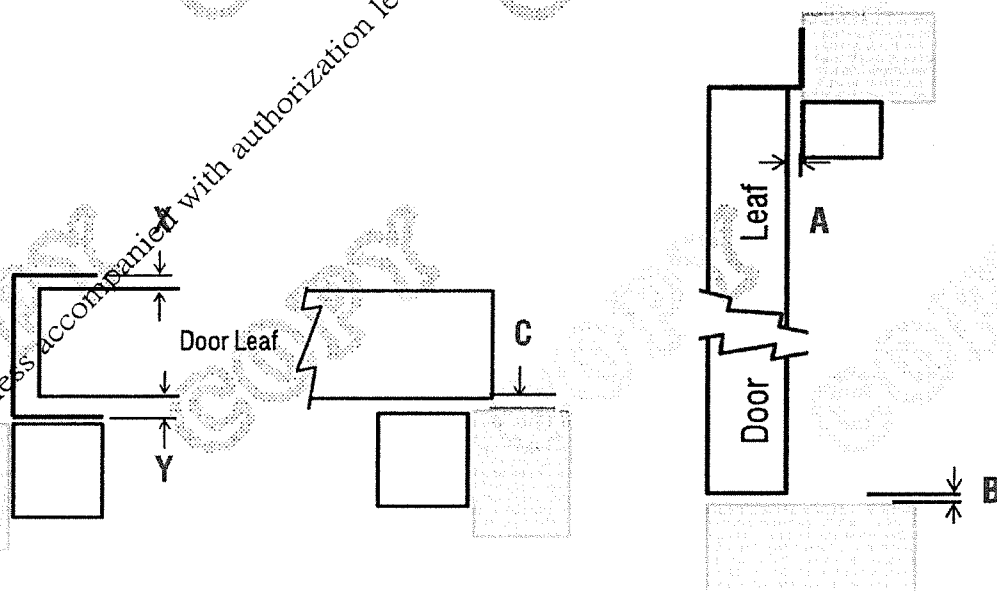


Figure 3. Positions of fixed surface thermocouples (U) on Door A.

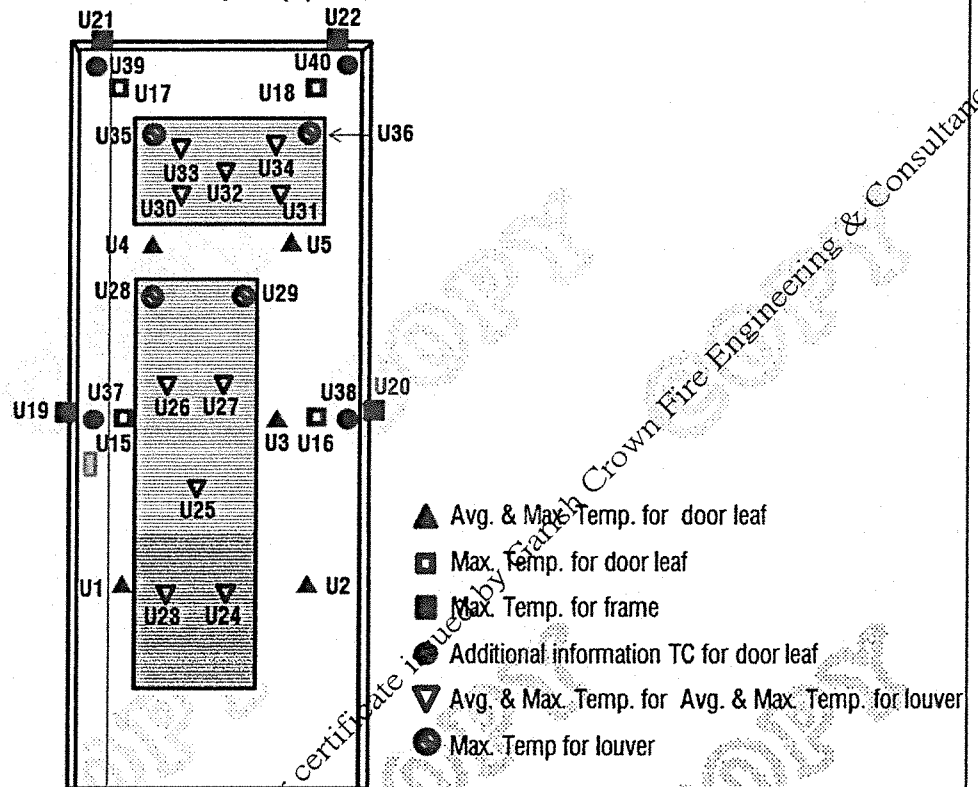
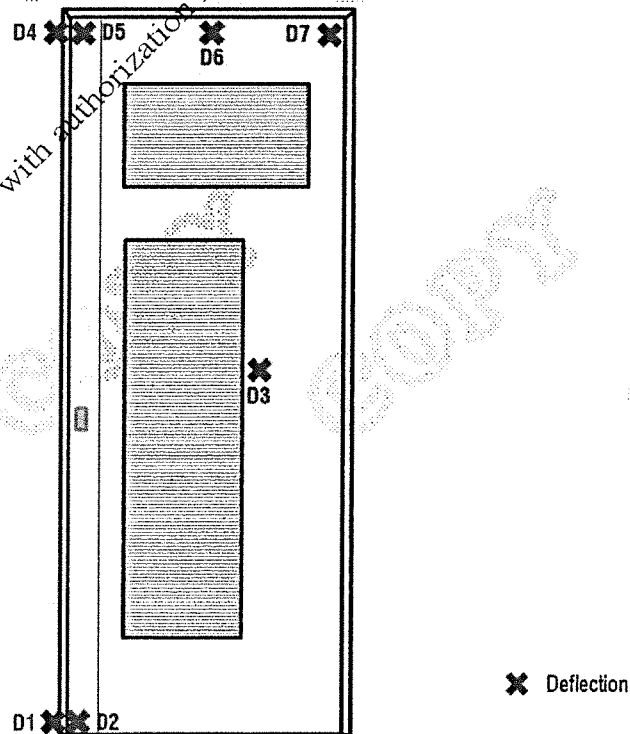


Figure 4. Positions of deflection measurement points (D) on Door A.



6. Test Data

6.1 Retention Forces and Pre-Conditioning of the Specimen

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

Push	Pull
137.6 N	120.8 N

Operability test of the specimen:

Specimen had been tested for operability in the fire test frame by operating from fully closed to fully open at 90 degrees for 25 cycles.

6.2 Gaps Measurement

Primary gaps of the specimen were measured according to *BS EN 1634-1: 2008* clause 10.1.2 "There shall be minimum of three measurements made along each side, top and bottom of each leaf. Measurements to determine the gaps shall be made at distances not greater than 750 mm apart."

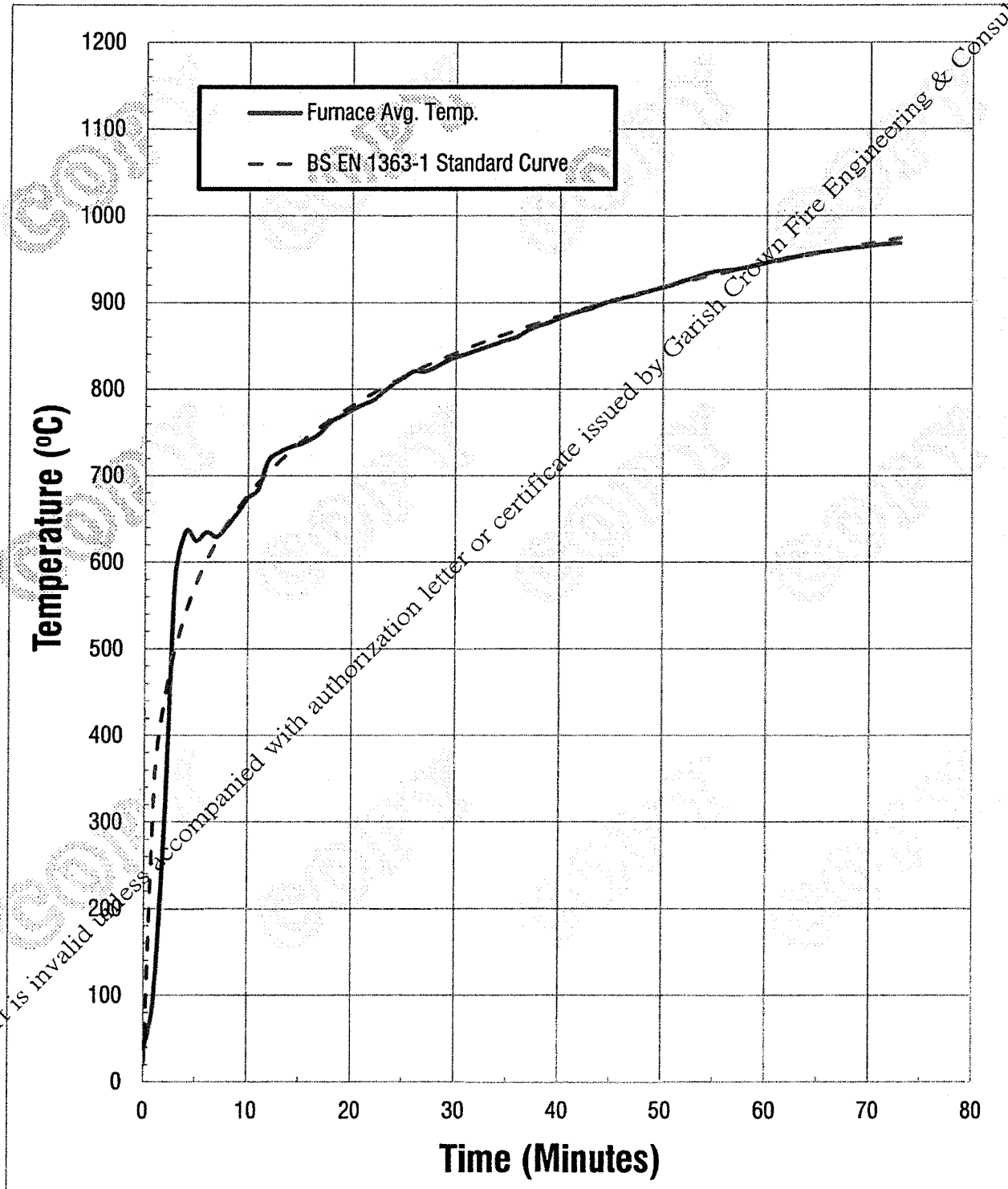
The measured record was summarized to the minimum, maximum and average value in the following table. Measurements were taken in mm.

Gap	Measured		
	Minimum	Maximum	Average
A	6.0	8.0	7.0
B	4.3	5.5	4.9
C	6.0	7.0	6.3
X	6.4	8.5	7.4
Y	2.0	15.0	7.1

6.3 Furnace Temperature

The furnace average temperature over the test period was shown in *Figure 5*.

Figure 5. Furnace average temperature over the test period.



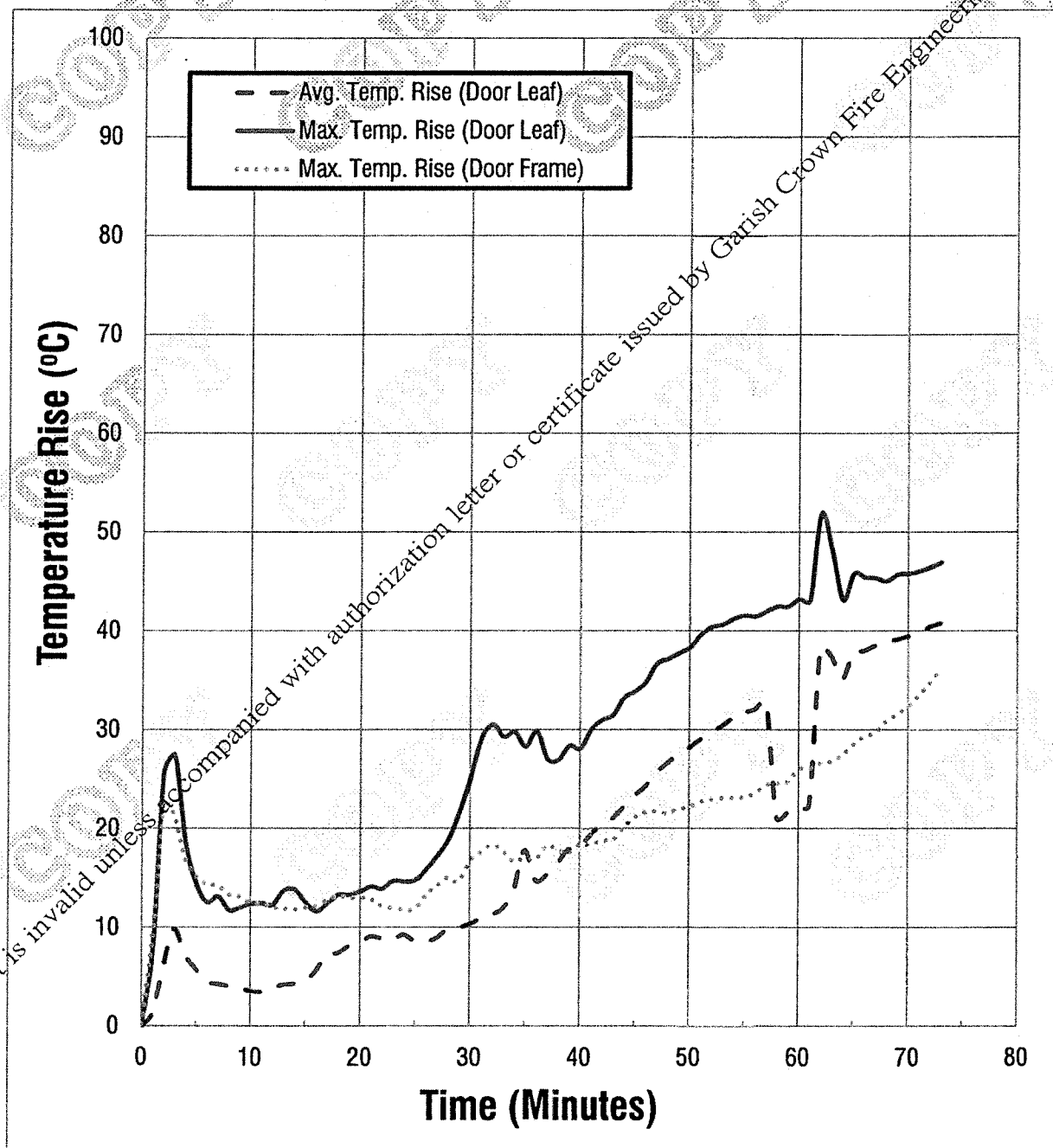
6.4 Unexposed Surface Temperature Rise

6.4.1 Door A

6.4.1.1 Fixed Surface Thermocouples – Door Leaf and Door Frame

The temperature rises of unexposed surface on door leaf and door frame of Door A measured by fixed surface thermocouples over the test period were shown in Figure 6.

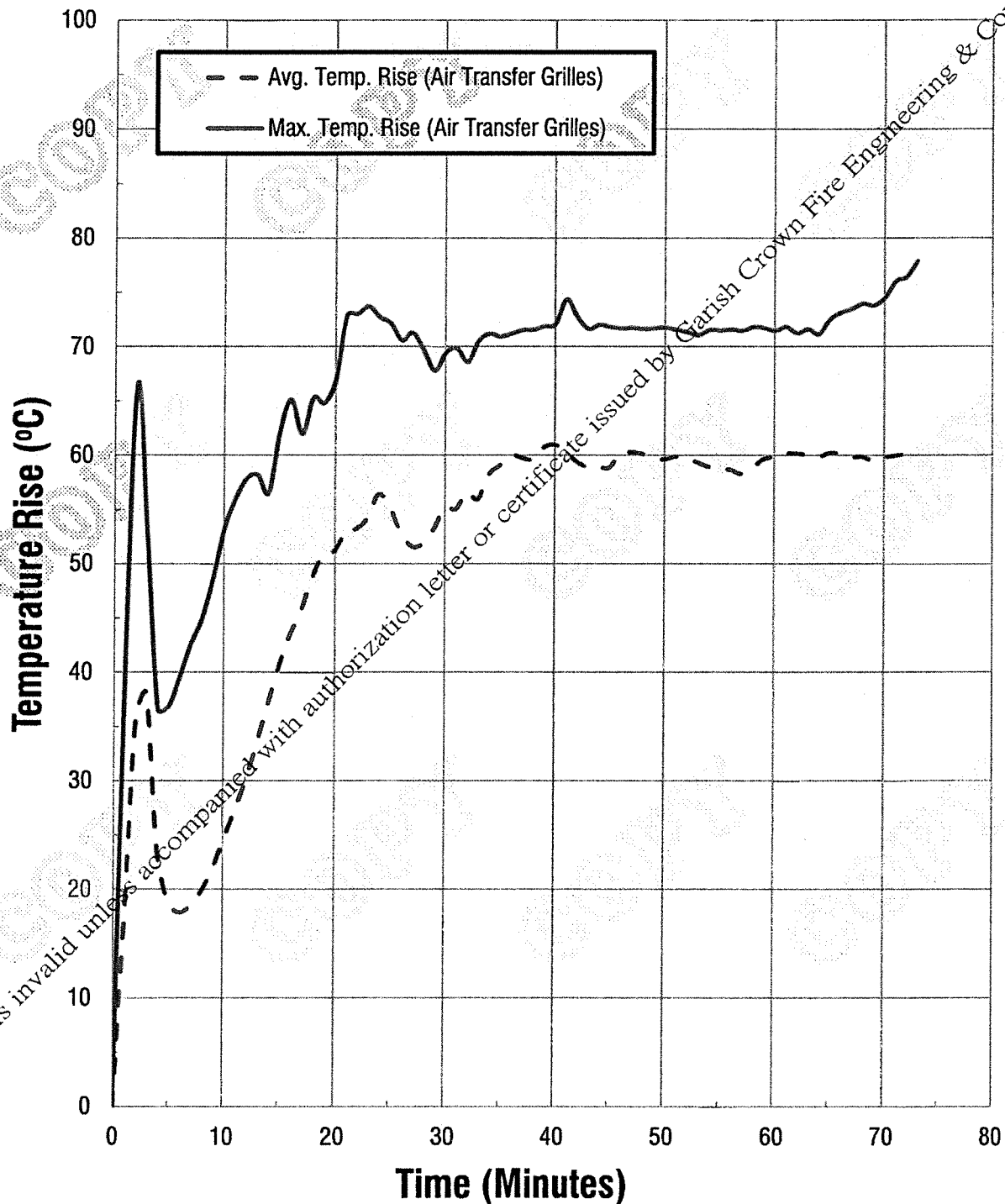
Figure 6. Average and maximum temperature rise on door leaf and door frame of Door A over the test period.



6.4.1.2 Fixed Surface Thermocouples – Air Transfer Grilles

The temperature rises of unexposed surface of air transfer grilles of Door A measured by fixed surface thermocouples over the test period were shown in Figure 7.

Figure 7. Average and maximum temperature rise on Air Transfer Grilles of Door A over the test period.



6.4.2 Fixed Surface Thermocouples – Detailed Temperature Records

The outputs of the unexposed surface thermocouples on the specimen were summarized in the following tables. Measurements were taken in °C.

Temperature outputs from unexposed surface temperature U1 to U5, U15 to U20

Time (min)	U1	U2	U3	U4	U5	U15	U16	U17	U18	U19	U20
0	25.8	25.6	25.7	26.0	26.0	25.1	24.3	25.1	24.6	25.8	25.4
5	31.1	27.5	30.4	40.3	29.3	35.1	26.9	39.4	34.6	34.4	26.4
10	29.1	27.0	28.4	34.0	28.4	30.1	26.0	38.2	31.4	31.2	26.5
15	30.6	27.5	30.4	34.7	28.9	34.0	26.0	38.4	34.2	30.7	26.6
20	33.7	30.1	33.5	38.5	35.7	36.4	27.7	39.4	39.2	30.4	27.1
25	30.8	30.8	34.3	40.6	36.1	34.8	27.4	39.9	40.2	29.8	27.2
30	33.8	32.3	33.2	45.9	35.4	33.7	27.3	50.9	42.5	29.5	27.7
35	53.1	37.7	37.5	50.2	39.7	33.1	28.2	54.1	40.7	30.1	28.7
40	37.3	40.4	40.9	53.9	47.2	35.1	31.0	51.9	44.6	30.4	29.9
45	38.3	48.0	45.3	59.7	54.3	35.6	32.2	49.9	48.9	29.9	31.5
50	41.0	54.2	50.4	64.1	60.2	38.3	35.2	50.3	58.8	30.1	34.0
55	42.9	59.4	54.3	67.4	64.1	41.4	38.3	49.2	57.4	30.8	35.7
60	46.0	0.0	58.1	69.0	67.1	43.7	40.8	48.3	60.6	31.3	35.9
65	48.9	71.6	59.6	69.3	68.6	47.1	43.9	47.6	64.0	31.7	36.4
69	51.0	71.5	62.9	70.0	69.1	49.5	46.9	48.1	66.9	32.0	36.7
70	51.6	71.6	63.2	70.6	69.3	50.1	47.4	48.3	67.5	32.2	36.8
71	52.2	71.9	64.3	70.3	69.5	50.9	48.0	48.6	68.4	32.5	36.9
72	52.9	72.3	65.3	70.7	69.8	51.7	48.9	49.0	69.4	32.4	37.0
73	53.4	72.7	65.8	70.9	70.0	52.4	49.4	49.5	70.4	32.5	37.1

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Temperature outputs from unexposed surface temperature U21 to U30

Time (min)	U21	U22	U23	U24	U25	U26	U27	U28	U29	U30
0	26.0	24.2	24.4	23.8	26.8	27.1	27.0	28.4	27.3	28.0
5	41.0	33.1	45.4	41.3	48.3	48.9	47.1	63.7	50.7	48.2
10	38.3	33.3	45.6	43.9	60.4	51.0	50.9	80.1	67.7	49.7
15	37.8	34.0	60.2	68.9	85.4	64.7	64.9	89.0	81.8	66.1
20	38.8	35.3	88.3	70.5	87.6	77.0	78.3	93.8	54.4	68.9
25	37.6	37.4	85.2	76.0	81.9	84.4	79.0	88.7	54.8	72.0
30	38.3	42.5	90.4	83.1	85.7	88.2	53.9	83.1	51.8	74.2
35	39.4	42.9	78.7	92.8	92.1	90.3	58.5	77.9	52.2	89.2
40	38.6	44.2	94.8	89.8	98.9	97.9	60.2	75.8	51.0	95.2
45	39.1	46.9	96.1	93.4	98.7	91.1	62.1	69.3	55.2	94.6
50	39.5	48.0	96.8	95.1	98.6	92.9	57.9	88.3	56.9	94.0
55	40.1	49.0	96.9	95.9	98.3	92.0	57.9	89.4	53.7	93.1
60	40.4	51.8	96.9	96.0	98.3	94.2	65.3	97.6	56.0	92.7
65	41.1	54.3	97.2	97.9	97.5	99.3	61.6	85.8	59.0	92.6
69	51.5	57.4	97.0	100.2	96.9	100.6	60.8	82.4	57.0	94.7
70	51.5	58.2	96.7	100.3	96.7	101.4	60.0	89.9	57.9	97.5
71	50.8	59.3	96.5	102.1	96.7	102.9	59.3	92.6	57.1	98.0
72	51.5	60.5	96.9	103.2	96.6	102.7	60.7	80.2	66.7	99.0
73	51.6	62.0	96.7	104.7	96.7	103.2	60.1	89.4	73.8	99.4

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Temperature outputs from unexposed surface temperature U31 to U36

Time (min)	U31	U32	U33	U34	U35	U36
0	27.8	27.5	28.4	27.6	27.7	26.5
5	40.1	47.0	48.4	43.4	56.8	52.9
10	42.0	63.8	53.7	50.9	65.6	77.8
15	50.8	83.2	65.4	62.6	74.8	81.0
20	56.9	92.2	73.5	87.1	88.9	91.1
25	62.2	99.0	86.1	95.1	90.5	92.6
30	67.8	96.3	87.4	93.7	84.3	95.3
35	73.8	97.8	90.8	95.3	95.1	95.8
40	76.4	90.9	98.0	76.2	97.7	85.7
45	78.4	85.2	97.8	60.0	98.1	96.9
50	77.8	96.5	97.3	57.7	98.0	96.1
55	76.9	94.9	97.3	53.1	95.9	95.7
60	78.1	95.1	97.3	53.0	95.2	96.6
65	80.5	93.8	97.0	52.7	94.9	96.8
69	80.1	84.3	96.8	52.2	93.5	96.4
70	80.6	83.7	95.9	52.8	92.5	95.2
71	80.9	83.7	94.6	53.2	91.8	95.9
72	80.5	81.1	94.6	53.7	90.7	93.9
73	79.7	80.1	92.9	53.7	90.7	92.4

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6.5 Pressure

The furnace pressure differential with respect to the atmosphere at 500 mm above notional floor level over the test period was summarized in the following table.

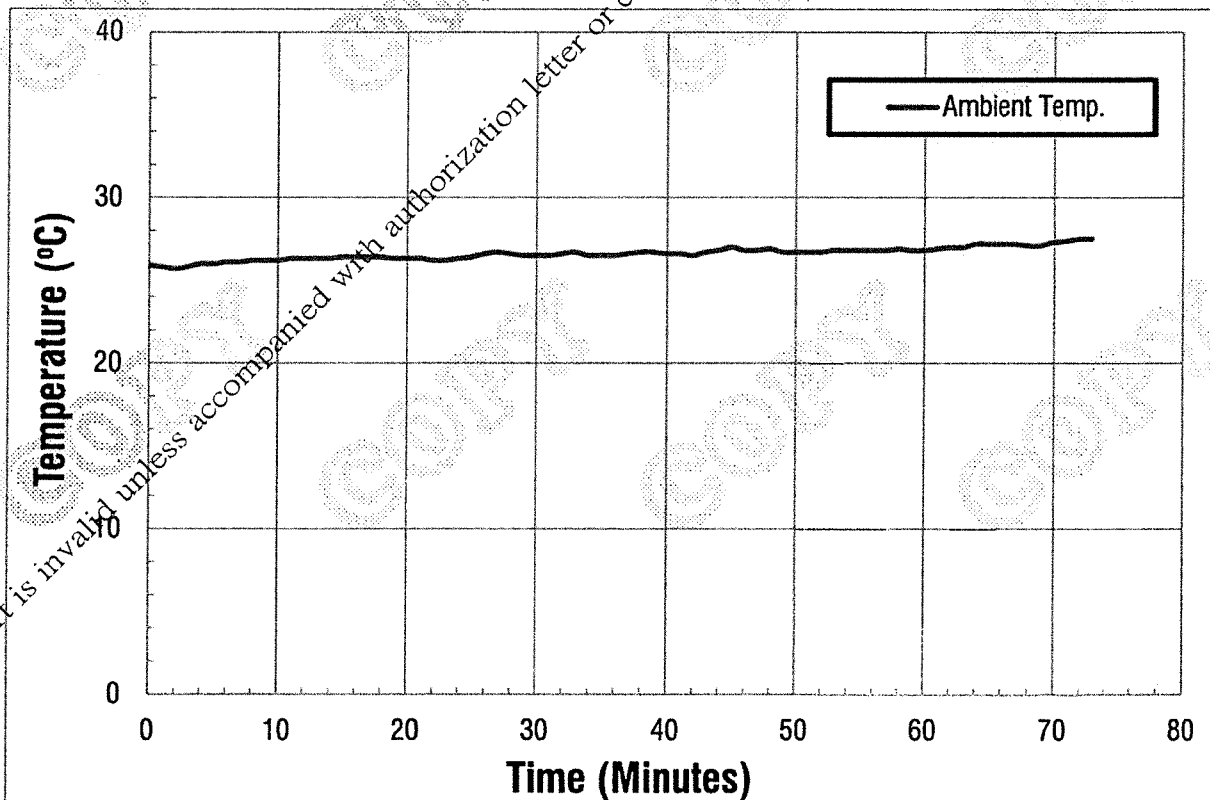
Time (min)	Pressure (Pa)	Time (min)	Pressure (Pa)
6	0.9	45	0.6
10	-2.1	50	-0.1
15	-0.1	55	-0.9
20	-1.8	60	0.7
25	0.9	65	0.3
30	1.0	70	0.7
35	-2.2	73	-0.4
40	0.1		

6.6 Ambient Temperature

The ambient temperature over the test period was recorded and shown in Figure 8.

The ambient temperature at the commencement of test was 25.9 °C.

Figure 8. Ambient temperature over the test period.



6.7 Lateral Deflections

Measured lateral deflections over the test period were 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 of each specimen was **BOLDED** in the following table.

Position \ Time (min)	0	10	20	30	40	50	55	60	65	70
D1	+0	+1	+2	+3	+3	+3	+3	+3	+3	+3
D2	+0	+0	+1	+0	+0	+0	+1	+1	+1	+1
D3	+0	+10	+13	+14	+15	+10	+12	+10	+10	+10
D4	+0	+0	+5	+5	+8	+5	+10	+13	+17	+18
D5	+0	+0	+4	+11	+14	+6	+16	+16	+21	+19
D6	+0	+3	+10	+20	+20	+22	+25	+28	+30	+32
D7	+0	+7	+10	+18	+23	+25	+30	+30	+30	+35

6.8 Observations

Significant behaviours of the specimen during the test period were summarized in the following table. Photos taken during the test period were also attached.

Time (min.sec)	Observation (from unexposed side)
00.00	Test Started.
01.21	Smoke released at air transfer grills.
02.20	Smoke released at door edges.
09.35	Smoke release at top left corner and top edge of the door leaf.
18.57	Yellowish brown staining mark appeared at top left corner of the door leaf.
19.19	Water mark could be observed on the door leaf facing. Intumescent material reacted at the air transfer grills and expanded out from the gaps.
25.12	Smoke release reduced from the leading edge. Dark stain marks on the surface of door leaf near the leading edge was observed.
27.03	Cotton fibre pad test was carried out on the top corner of door leaf. No flaming or glowing on the cotton pad was observed.
30.00	No integrity failure had occurred.
32.36	No water mark observed from the door leaf facing. Smoke released from the door lock.
48.07	Sustain flaming over 10 seconds was observed at the top right corner of the door leaf. Integrity failure had occurred.
53.45	Ceramic fibre was applied at the top edge of the door leaf at request of the sponsor. FIRE RESISTANCE EVALUATION ON DOOR CEASED.
58.46	Smoke released increased at the leading edge and top corners of the door leaf.
62.34	Dark stain marks on the surface near top corners of door leaf was observed.
72.30	No integrity failure on the air transfer grills was observed.
73.09	Test was terminated at request of the Sponsor.

6.9 Photos



Photo 1. Exposed surface of the specimens before test. (Left: Louver B; Right: Door A and Louver C)

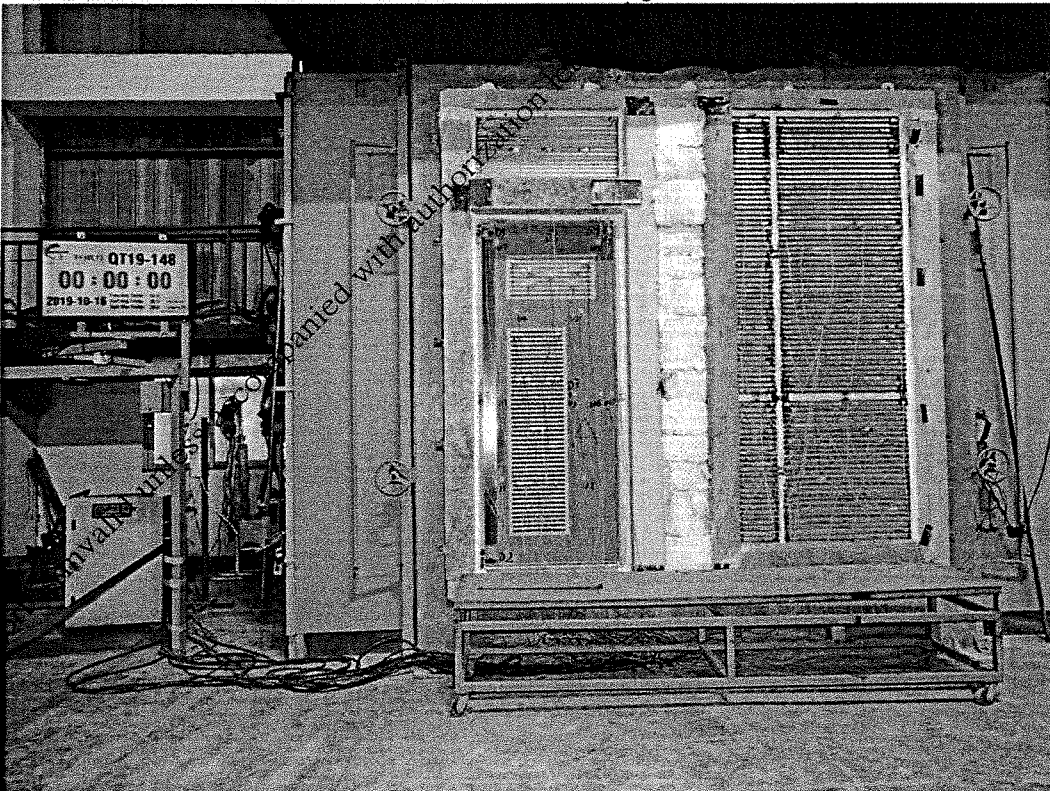


Photo 2. Unexposed surface of the specimens before test. (Left: Door A and Louver C; Right: Door B)

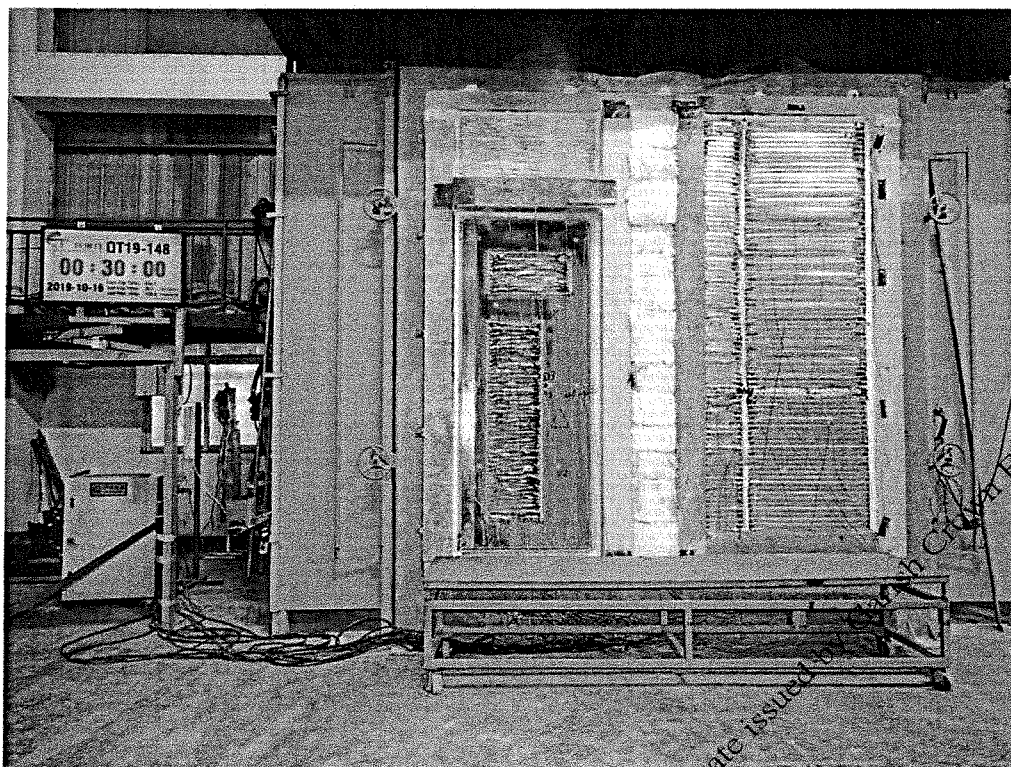


Photo 3. Unexposed surface of the specimens at 30 minutes of test.

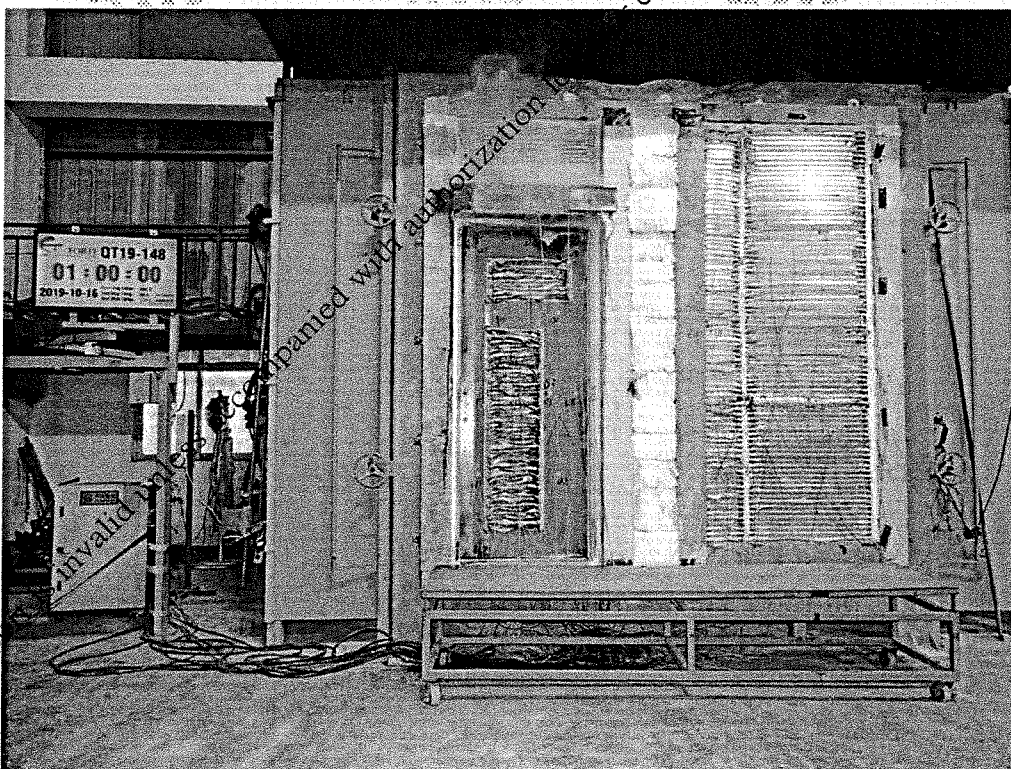


Photo 4. Unexposed surface of the specimens at 60 minutes of test.



Photo 5. Unexposed surface of the specimens at the end of test.

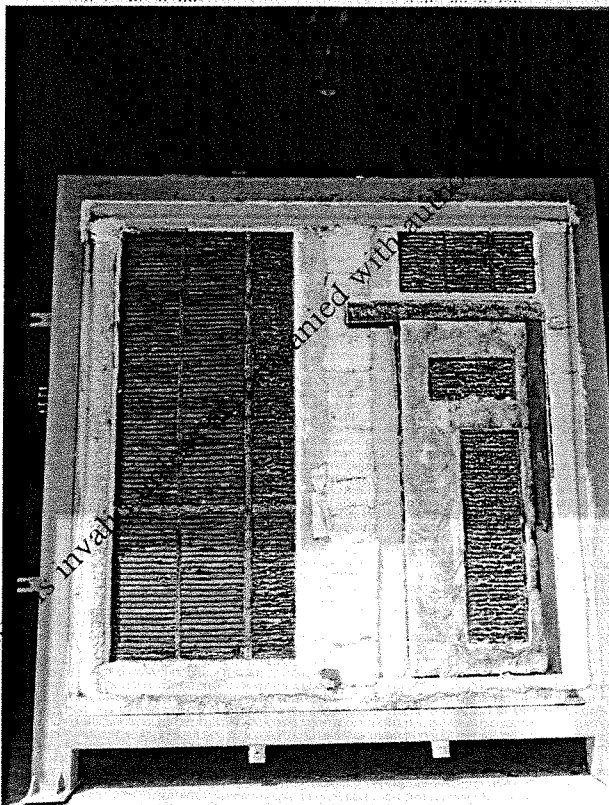


Photo 6. Exposed surface of the specimens at after test.

7. Test Results

The test on Door A was terminated after a test period of 73 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 were summarized in the following table.

The earliest elapsed time before any integrity or insulation failure occurrence was bolded.

Performance Criteria			
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	48 minutes
Gap Gauge	Ø6 mm	Penetration of the gauge into the furnace through the specimen and movable along a 150 mm gap	53 minutes (No Failure)
	Ø25 mm	Penetration of the gauge into the furnace through the specimen	
Cotton Pad		Ignition of the cotton pad	53 minutes (No Failure)
Performance Criteria			
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	48 minutes
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] 53 minutes (No Failure)
			[Air Transfer Grilles] 53 minutes (No Failure)
Maximum Temperature Rise [Supplementary Procedure, I ₂]	An increase of temperature at perimeter frame of the doorset or openable window above the initial average temperature by more than 360 °C; and any other point of the specimen above the initial average temperature by more than 180 °C		[Door Leaf] 53 minutes (No Failure)
			[Door Frame] 53 minutes (No Failure)
			[Air Transfer Grilles] 53 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, and edge or end conditions other than those allowed under the field of direct application in the relevant test method was 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 was 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 were 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.

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Appendix A

Fixed Additional Surface Thermocouples – Detailed Temperature Records

The outputs of the additional unexposed surface thermocouples were summarized in the following tables.

Temperature outputs from unexposed surface temperature U37 to U40

Time (min)	U37	U38	U39	U40
0	24.9	24.7	23.8	23.3
5	35.5	32.0	44.8	57.3
10	30.1	28.9	50.1	58.5
15	30.9	29.2	57.1	62.1
20	51.7	31.0	61.8	71.3
25	48.4	31.6	60.3	88.0
30	43.2	33.1	66.0	114.5
35	46.4	36.5	62.9	132.2
40	49.6	39.6	67.0	180.9
45	53.2	45.1	71.7	245.9
50	55.6	78.4	77.6	285.3
55	56.4	79.2	79.3	208.5
60	57.7	82.9	38.4	216.9
65	60.5	87.5	44.1	237.3
69	63.3	86.8	43.5	255.3
70	63.8	86.3	43.5	261.1
71	64.1	86.6	43.1	266.7
72	65.1	87.7	43.2	273.2
73	65.9	89.2	43.7	279.8

END OF REPORT

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