





SINGLE-LEAF COMPOSITE TIMBER DOOR with an OVERHEAD PANEL; and Single-Leaf Composite Timber Door with Single GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR with SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE GLAZES TO THE SINGLE COMPOSITE TIMBER DOOR WITH SINGLE COMPOSITE TIMBER Fire Finging

in accordance with BS EN 1634-1:2008

Test Sponsor:

Garish Crown Fire Engineering & Consultancy

Unit 25, Upper G/F., Block B, Wah Lok Industrial Centre (Rhase 1),

37-41 Shan Mei Street, Fotan, Shatin, Hong Kong.

Tel: 852-2698 0801

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Test Laboratory:

Forte Testing and Consultants Company Limited

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Report Number:

IT14-047

Date of Issue:

2014-04-23ⁱloll

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HOKLAS Approved Signatory:

Ir. Dr Chan Yuk Kit





Scope of Test

This report is a record of a fire resistance test conducted by Forte Testing and Consultants Company Limited, in conformity with requirements in *BS EN1634-1: 2008"Fire resistance and smoke control tests for door, shutten 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 sets of composite timber doors: a single-leaf door with an overhead panel, namely Door A; and a single-leaf door with single glazed element, namely Door B.

The specimens were manufactured and supplied for test by Leung's Wooden Company Limited.

The specimens achieved the following fire resistance:

					0,		
DOOR A				DOOR B	NATION .		
INTEGRITY	(E)			INTEGRITY	(E) Sait Sill		
	Sustained Flaming	66	Minutes	call issued	Sustained Flaming	71	Minutes
	Gap Gauge	71	Minutes	1227	Gap Gauge	71	Minutes
	Cotton Pad	66	Minutes	. Excidio	Cotton Pad	71	Minutes
INSULATION	(1)			MSULATION	(1)	-8	
Door Frame	Max. Temp. Rise(I₂)	71	Minutes	Door Frame	Max. Temp. Rise(I ₁)	71	Minutes
Door Leaf	Average Temp. Rise	71	Minutes	Door Leaf	Average Temp. Rise	71	Minutes
	Max. Temp. Rise(I ₂)		Minutes	Door Lear	Max. Temp. Rise(I₁)	71	Minutes
Overhead Panel	Average Temp. Rise	TI	Minutes	Glazed Element	Average Temp. Rise	71	Minutes
	Max. Temp. Rise	71	Minutes	GIAZOA EIGITIGIT	Max. Temp. Rise	71	Minutes
overnead Panel	Sommatile						
· Majid							





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:	Leung's Wooden Company Limited Garish Crown Fire Engineering & Consultancy Shun Hing Fire Rated Building Materials Limited Leung's Wooden Company Limited
Specimens Manufacturer:	Leung's Wooden Company Limited
ID no. of the Specimens:	Door A: QT 14-015A; Door B: QT 14-015B
Date Received:	2014-01-16
Test Number:	A Total of three sets of report (Report no. IT + 006, IT14-008 and IT14-047) are issued on this test
Date Tested:	2014-01-20 Start Time : 10:50
Approved Test Operator from FORTE:	Ms. Cheng San Mei, Sammi
Witness of the Test:	Mr. C.K. Leung – Official Delegate of the Sponsor

3.1 Specimens Description
3.1.1 Door A
3.1.1.1 Door Frame

The four sided timber door frame; was overall sized 1276 (width) x 2950 mm (height) with a sectional dimension 50 mm (w) x 60 mm (thick). The door frame was with a 15 mm single door stop rebate.

The framework was made of a timber block sized 50 mm (w) x 54 mm (t) with 15 mm single door stop rebate. A layer of nominal 3 mm ceramic fibre and 5 mm (t) fire rated board was fixed onto the exposed surface of the timber block and finished with 0.6 mm wood veneer.

The sub-frame was made of film plywood sized 18 mm x 54 mm. The sub-frame was fixed onto the door frame by M5 x 72 mm (long) wood screws. The door frame together with sub-frame was fixed into the concrete supporting frame by M10 x 112 mm (I) anchor bolts. There were 4 numbers of fixings on each jamb and 2 numbers of fixings on head.

Wooden architraves sized 70 mm (w) x 25 mm (t) were fixed over the door frame on unexposed side, whiles architraves sized 45 mm (w) x 25 mm (t) were over the door frame on the exposed side. The architraves were fixed by pressure nails at 200 mm - 250 mm centre to centre.

1 number of 30 mm (w) x 4 mm (t) intumescent seal and 1 number of rebate corner smoke seal were fitted into the groove along the door stop at the head, the jambs and the bottom of the door frame. The rebate corner smoke seal was overlapped the intumescent seal at the door corner without interrupted. The intumescent seal was interrupted at hinge, strike plate and concealed door closer positions.

The space between the framework, sub-frame and concrete support frame filled with backer rod and fire sealant.





3.1.1.2 Door Leaf

The specimen comprised of a composite timber door leaf sized 1200 mm (w) x 2440 mm (h) x 54 mm (t). The main stiles and rails were made from 2 numbers of 45 mm (w) wooden slab and the mid rails were 45 mm (w) wooden slabs. The space between stiles and rails were filled with 38 mm (t) perlite boards. The exposed side of the core were covered by 2 layers of 2.5 mm (t) fire rated boards sub-facing and the unexposed side of the core were covered by 1 layer of 5 mm (t) fire rated board sub-facing. Both sides finished by a layer of 3 mm medium density fibreboard (MDF) facing. The sub-facing was fixed onto the door core by glue and screws and the facing was fixed onto the sub-facing by glue.

The door lipping was made of 8 mm wooden strips. The door leaf was with 15 mm single rebate so that the unexposed side was flush with the door frame.

1 number of 10 mm (w) x 4 mm (t) intumescent seal was fitted into the groove along the perimeter of the door leaf.

3.1.1.3 Overhead Panel

The specimen comprised of an overhead panel sized 1200 mps (w) x 431 mm (h) x 54 mm (t). The core construction of the overhead panel was same to door leaf. The overhead panel was flush with the door leaf with 15 mm rebate and fixed onto the framework by M5 x 75 mm wood screws. There were 2 numbers of fixing on the horizontal edges and 2 numbers of fixing on the vectoral edges.

1 number of 10 mm (w) x 4 mm (t) intumescent seal was fitted into the groove along the rebate of the overhead panel on the top edge and the vertical edges.

1 number of 30 mm (w) x 4 mm (t) into mescent seal and 1 number of smoke corner seal was fitted into the groove on the bottom edge of the overhead panel opposite to the head of the door leaf.

3.1.1.4 Ironmongery

The door leaf was supported onto the door frame by 3 numbers of concealed hinges.

1 number of mortised door lock with lever handle was installed 1000 mm above the bottom edge of the door leaf.

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

1 number of door viewer was installed 1460 mm above the bottom edge of the door leaf.

1 number of push plate was fixed onto the door leaf below the door lock on both sides. The push plates were fixed by screws.

1 number of conceal bottom smoke seal was installed at the bottom edge of the door leaf.

Intumescent material was applied to mortised area for ironmongeries.

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3.1.2 Door B

The timber door frame was overall sized 1266 (w) x 2720 mm (h). The overall sectional dimension of the timber door frame was 50 mm (w) x 100 mm (t)

The framework was made of a timber block sized 50 mm (w) x 94 mm (t) with 15 mm single door stop rebate. A layer of nominal 3 mm ceramic fibre and 5 mm thick fire rated board was fixed onto the exposed surface of the timber block and finished with 0.6 mm wood veneer.

The sub-frame sized 18 mm x 100 mm was fixed onto the door frame by M5 x 72 mm (\$\widetilde{x}\widetilde{v}\widetilde{o}\w door frame together with sub-frame was fixed into the concrete supporting frame by Nit x 112 mm (I) anchor bolts. There were 4 numbers of fixings on each jamb and 2 numbers of fixings on head.

Wooden architraves sized 45 mm (w) x 15 mm (t) was fixed over the door frame and supporting frame on both sides. The architraves were fixed by pressure nails at 200 mm - 250 mm. centre.

1 number of 30 mm (w) x 4 mm (t) intumescent seal and 1 number of smoke corner seal were fitted into the groove along the door stop at the head and the jambs of the door frame.

The space between the framework, sub-frame and concrete support frame filled with backer rod and fire sealant.

3.1.2.2 Door Leaf

The specimen comprised of a composite timber door feaf sized 1200 mm (w) x 2658 mm (h) x 54 mm (t).

The main stiles and rails of the door leaves were made of 2 numbers of 45 mm (w) x 38 mm (t) wooden slabs. The intermediate rails were made of single 45 mm (t) x 38 mm (t) wooden slab. The stiles and rails were fixed together by screws and glue. The space between stiles and rails were filled with 38 mm (t) perlite boards.

The exposed side of the core were covered by 2 layers of 2.5 mm (t) fire rated boards sub-facing and the unexposed side of the core were overed by 1 layer of 5 mm (t) fire rated board sub-facing. Both sides finished by a layer of 3 mm medium density fibreboard (MDF) facing. The sub-facing was fixed onto the door core by glue and screws and the facing was fixed onto the sub-facing by glue.

The door lipping was made of 8 mm wooden strips. in the port is invalid unless



3.1.2.3 Glazed Element

The specimen comprised of a glazed element visually sized 505 mm (w) x 1775 mm (h) installed 135 mm away the meeting edge and 200 mm below the top edge of the active leaf.

The glazed element comprised of a piece of nominal 25 mm (t) interlayered glass pane. It was set and lines with ceramic fibre tape and fire sealant on both sides. The glass pane was then fixed by a pair of 1.0 mm (t) steel angle sections. The steel angle sections were fixed onto the door core by screws. Chamfered wooden glazing beads sized 25 mm (width, parallel to the glass) x 8 mm (thick, perpendicular to the glass). The glazing beads were fixed onto the door leaf by wood nails at approximate 200 mm centre to centre.

The edges of the glass pane and the glazing beads were caulked by fire sealant.

3.1.2.4 Ironmongery

The door leaf was supported onto the door frame by 4 numbers of butt hinges.

1 number of knob lock was installed 1000 mm above the bottom edge of the door leaf.

1 number of concealed door closer was installed at the top edge of the door leaf.

1 number of concealed bottom smoke seal was fixed in the bottom edge of the door leaf.

1 number of push plate was fixed onto the door leaf below the door lock on both sides. The push plate was fixed by screws.

Intumescent material was applied to mortised area for ironmongeries.

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3.2 **Material Schedule**

Parts specifications were summarized in the following tables.

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

Door A

Door Frame

Manufacturer:	Leung's Wooden Company Limited
Material:	Hardwood and Fire Rated Board *
Overall Sizes:	1276 mm (w) by 2950 mm (h)
Density:	Hardwood - 550 kg/m³ - 700 kg/m³ * Fire Rated Board - 950 kg/m³ ± 1000 kg/m³*.
Dimensions:	50 mm by 60 mm
Door Stop Rebate:	15 mm
Connection Method of Head to Jamb:	Mitred Joint with Tongue and Groove and Fixed by Wood Screws
Fixing Method to Sub-frame:	Wood Screws and Metal Pins
Gap Filling between Door Frame and Sub-frame:	Fire Sealant

Door Sub-frame

Manufacture		Leung's Wooden Company Limited	
Material:		Film Plywood *	
Density:		350 kg/m³ *	
Sizes:		18 mm by 54 mm	
Fixing Meth	od to	Concrete M10 x 112 mm Anchor Bolts, 4 N	Numbers of Fixings on Each Jamb and 2

Support Frame:

Numbers of Fixings on Head

Architraves

Manufacturer:	Leung's Wooden Company Limited	
Material:	Hardwood *	
Density:	550 kg/m ³ - 700 kg/m ³ *	
Size: Unexposed Side	70 mm by 25 mm	
Exposed Side	45 mm by 25 mm	
Fixing method:	Fixed by Wood Nails	

- Lybosod oldo	45 mm by 25 mm	
Fixing method:	Fixed by Wood Nails	
Door Leaf and Overhead Pan	el Linnings	
Manufacturer:	Leung's Wooden Company Limited	
Material:	Hardwood *	-
Thickness:	8 mm	
Density:	550 kg/m ³ - 700 kg/m ³ *	***************************************
	Fixing method: Door Leaf and Overhead Pan Manufacturer: Material: Thickness:	Fixing method: Fixed by Wood Nails Door Leaf and Overhead Panel Lippings Manufacturer: Leung's Wooden Company Limited Material: Hardwood * Thickness: 8 mm



Door Leaf and Overhead Panel

Man	ufacturer:		Leung's Wooden Company Limited
Overall Sizes:	Door Leaf	1200 mm (w) by 2440 mm (h) 1200 mm (w) by 431 mm (h)	
Over	all Sizes.	Overhead Panel	1200 mm (w) by 431 mm (h)
S	Material:		Softwood *
Ra	Width:	-1 1	45 mm
Material: Width: Thickness: Density: Moisture Co	Thicknes	s:	45 mm
		350 kg/m³ - 450 kg/m³ *	
	Content:	10 170/ 4	
	Supplier:		Leung's Wooden Company Limited
Material: Thicknes Density:	Material:		Perlite *
	s:	38 mm	
	Density:		380 kg/m³*

Door Leaf and Overhead Panel Facing

Manufacturer:	Leung's Wooden Company Limited	
Material:	Medium Density Fibreboar (MDF) *	
Thickness:	3 mm ± 0.5 mm	
Density:	350 kg/m³ - 450 kg/m³ *	

Door Leaf and Overhead Panel Sub-facing

Supplier:	Leung's Wooden Company Limited
Brand:	Gemtiee *
Material:	Fixe Rated Board (Magnesium Oxide) *
Thickness:	5 mm
Density:	950 kg/m³ ± 1000 kg/m³*

Rutt Hinge

Supplier:	Leung's Wooden Company Limited	
Brand:	SDH	
Model:	CH140-97-ST-Anls *	
Material; (1)	Stainless Steel *	
Sizes:	140 mm by 35 mm by 49 mm	

Door Closer

Supplier:	Leung's Wooden Company Limited	
Brand:	ECO	
Model:	7S-50-EN *	

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Door Lock

Supplier:		Tung Fat Ho Building Material Limited
ا اد	Brand:	MIWA
Lock	Model:	LA*
ان الــ	Material:	Stainless Steel *
اده اح	Brand:	MIWA
Lever	Model:	6401 *
의 열	Material:	Stainless Steel *

Door Viewer

1 (b) (1 (c) 1 (d)	×,
Supplier:	Shanghai Gallford Fire Sealing Company Limited
Brand:	Gallford *
Model:	FDV9025 *
Body Material:	Steel *
Body Diameter:	25 mm

Push Plate

Supplier:	Leung's Wooden Company Limited	
Material:	Stainless Steel *	
Thickness:	1 mm	
Height:	220 mm	

Concealed Bottom Smoke Seal

Supplier:	Shanghai Gallford Fire Sealing Company Limited	
Brand:	Gallford *	
Model:	GF-B09 *	

Intumescent Material - Foor Frame and Door Leaf

Supplier:	WID'O.	Leung's Wooden Company Limited	
Brand:	50,	Lorient	
Door Frame	Model:	LP3004	
	Size:	30 mm by 4 mm	T v in
Door	Model	LP1004	y -
Door Leaf	Size:	10 mm by 4 mm	



Supplier:	Shanghai Gallford Fire Sealing Company Limited		
Brand:	Gallford *		
Model:	AD003T		
Material	PVC *		
Fixing – Anchor Bolts	PVC * Leung's Wooden Company Limited Hilti		
Supplier:	Leung's Wooden Company Limited		
Brand:	Hilti		
Model:	HT*		
Sizes:	Hilti HT * M10 by 112 mm		
Fire Sealant	Hilti (Hong Kong) Limited		
Supplier:	Hilti (Hong Kong) Limited		
Brand:	CP606		
Locations of Application:	Gap between the Door Frame and Sub-frame and Edges of the Glass Pane and the Glazing Beads		
Intumescent Pad	Certific		
Supplier:	Leung's Wooden Company Limited		
Model:	CT56019 ***		

Glue

Thickness:

Manufacturer:	Lei	ing's Wooden Compan	y Limited	
Type:	水池	膠粉 *		
	J. M.	90) 31 13000		527





Door B

Framework		
Manufacturer:	Leung's Wooden Company Limited	Ž3
Material:	Hardwood and Fire Rated Board *	CO112
Overall Sizes:	1266 mm x 2720 mm	8
Density:	Hardwood - 550 kg/m 3 - 700 kg/m 3 * Fire Rated Board - 950 kg/m 3 \pm 1000 kg/m 3 *	te fingine eting
Dimensions:	50 mm x 100 mm	CHELL
Rebate:	15 mm	·62
Connection Method of Head to Jamb:	Mitred Joint with Groove and Tongue and Fixed by Wo	Υ
Connection Method of Transom to Jambs:	Wood Screws and Metal Pins	
Fixing Method to Sub-frame:	Wood Screws and Metal Pins	
Gap Filling between Framework and Sub-frame:	Wood Screws and Metal Pins Fire Sealant Catilificate is State of the Sealant	
Door Sub-frame	Certifica	
Manufacturer:	Leung's Wooden Company Limited	
Material:	Film Plywgod *	- 300 P
Density:	350 kg/m³ *	
Sizes:	18 mm by 54 mm	
Fixing Method to Concrete	. ()'	on Each Jamb and C
Support Frame:	M10 x 112 mm Anchor Bolts, 4 Numbers of Fixings Numbers of Fixings on Head	on Lacii Jailib aliu 2
Support Frame: Architraves Manufacturer:	Training of Training	
Manufacturer:	Leung's Wooden Company Limited	
Material:	Hardwood *	
Density:	500 kg/m ³ - 700 kg/m ³ *	
Size: NITTE	45 mm x 15 mm	
Size: 507 Fixing method:	Fixed by Wood Nails	7
Door Leaf Lippings		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Manufacturer:	Leung's Wooden Company Limited	
Material:	Hardwood *	
Thickness:	8 mm	
Density:	550 kg/m ³ - 700kg/m ³ *	

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Door	Leaf
DOOL	Loui

Man	ufacturer:	Leung's Wooden Company Limited
Over	all Sizes:	1200 mm x 2658 mm
S	Material:	Softwood *
and Rails	Width:	45 mm
ano	Thickness:	38 mm ::11 ⁹
Stiles	Density:	38 mm 350 kg/m³ - 450 kg/m³ * 12 - 17 % *
St	Moisture Content:	12 - 17 % *
	Supplier:	Leung's Wooden Company Limited Perlite *
Core	Material:	Perlite *
	Thickness:	38 mm
	Density:	380 kg/m³ *
	Moisture Content:	- N/A

Door Leaf Facing

3	30	
Manufacturer:	Leung's Wooden Company Limited	
Material:	Medium Density Fibreboard (MDF) *	
Thickness:	3 mm ± 0.5 mm	
Density:	350 kg/m³ - 450 kg/m³ *	

Door Leaf Sub-facing

Supplier:	Leung's Wooden Company Limited	
Brand:	Gemtiee	
Thickness:	5-inm	
Material:	Fire Rated Board (Magnesium Oxide) *	
Density:	$950 \text{ kg/m}^3 \pm 1000 \text{ kg/m}^3 *$	

Glazed Pane

Supplier:	Kwok Shing Construction Limited	
Brand:	Keymax	
Thickness:	25 mm	
Full Sizes	555 mm x 1825 mm	
VisualSizes:	505 mm x 1775 mm	
Depth of Cover of Glass Edge:	15 mm - 20 mm	
Fixing Method:	Lined by Ceramic Fiber Tape, Clamped by Wooden Glazing Beads on Both Sides	y Stainless Steel Angles and





Glazed	Aperture	Lining
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Supplier:	Leung's Wooden Company Limited	id
Brand:	Ying Mu	1/3
Material:	Fire Resistant Wool (Ceramic Fiber Tape) *	0700
Density:	200 kg/m ³ *	21
Thickness:	3 mm	. 20

Glazing Beads

Manufacturer:	Leung's Wooden Company Limited
Material:	Hardwood *
Hardwood Density:	550 kg/m³ - 700 kg/m³ *
Moisture Content:	N/A
Overall Sizes:	25 mm x 19.5 mm
Fixing Method:	Fixed by Wood Nails

Butt Hinges

Supplier:	Leung's Wooden Company Elmited	
Brand:	Best	
Model:	3544-2BB *	
Material:	102 mm x 102 ຫຼືກາ	

Concealed Door Closer

Supplier:	Leung's Wooden Company Limited
Brand:	DORMA
Model:	4FS 96 *
Casing Material:	Stainless Steel *
Locations of Application:	The Top Edge of the Door Leaf

Door Lock

Supplier: OTAL	Leung's Wooden C	Leung's Wooden Company Limited		
Brand:	Fox's			
Model: ్లో	BB 870 SS			
Material?	Stainless Steel *			

Prich Plates

Charles and Administration of the Control of the Co		
Supplier:	Leung's Wooden Company Limited	
Material:	Stainless Steel *	
Thickness:	1 mm	
Sizes:	80 mm x 220 mm	



Intumescent Material - Door Frame

Supplier:	-1 11 11 = 1	Leung's Wooden Company Limited	Α.
Brand:		Lorient	11/2
Head and	Model:	LP3004	COTO
Jambs	Size:	30 mm x 4 mm	82

Conceal Bottom Smoke Seal

Supplier:	Shanghai Gallford Fire Sealing Company Limited
Brand:	Gallford
Model:	GF-B09 *

Rebate Corner Smoke Seal

ALTERNATION CASE AND AND ADDRESS OF THE PARTY OF THE PART	
Supplier:	Shanghai Gallford Fire Sealing Company Limited
Brand:	Gallford
Model:	AD003T *
Material:	PVC *

Fixing – Anchor Bolts

Supplier:	Leung's Wooden Company Limited	
Brand:	Hilti	
Model:	HT * E	
Sizes:	M10 x 012 mm	

Fire Sealant

Supplier:	Hilti (Hong Kong) Limited	2
Brand:	Hilti	
Locations of Application:	Gap between the Door Frame and Sub Frame	33.00

Intumescent Pad

Supplier:	Leung's Wooden Company Limited	
Model: \est of the second	CT56019 *	
Thickness:	3 mm	

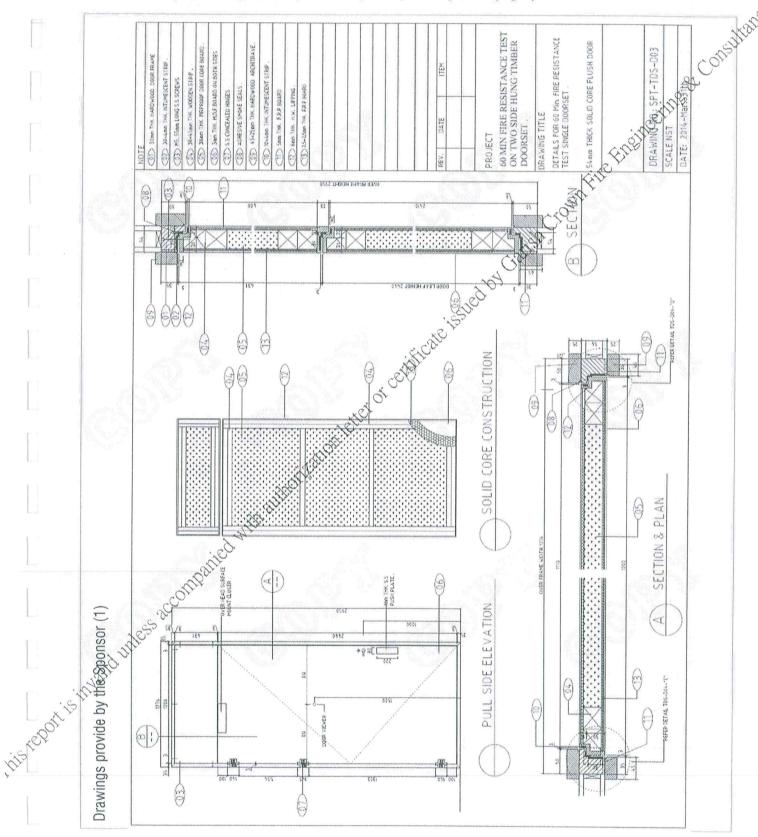
Glue

Supplier/Manufacturer:	Leung's Wooden Company Limited	
Type:	木膠粉	





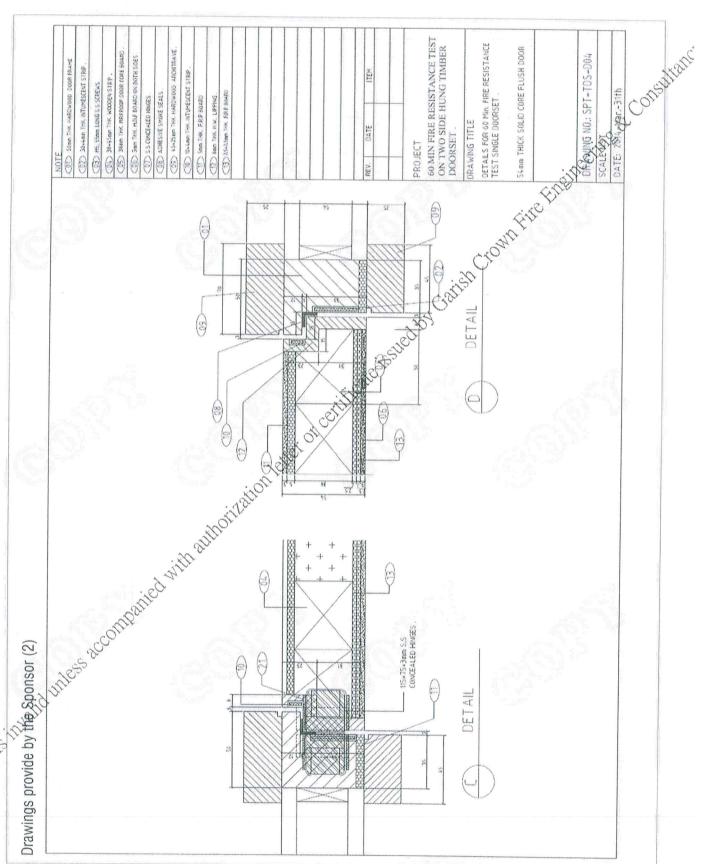
3.3 Drawings on the Specimen provided by the Sponsor (Total 4 pages)



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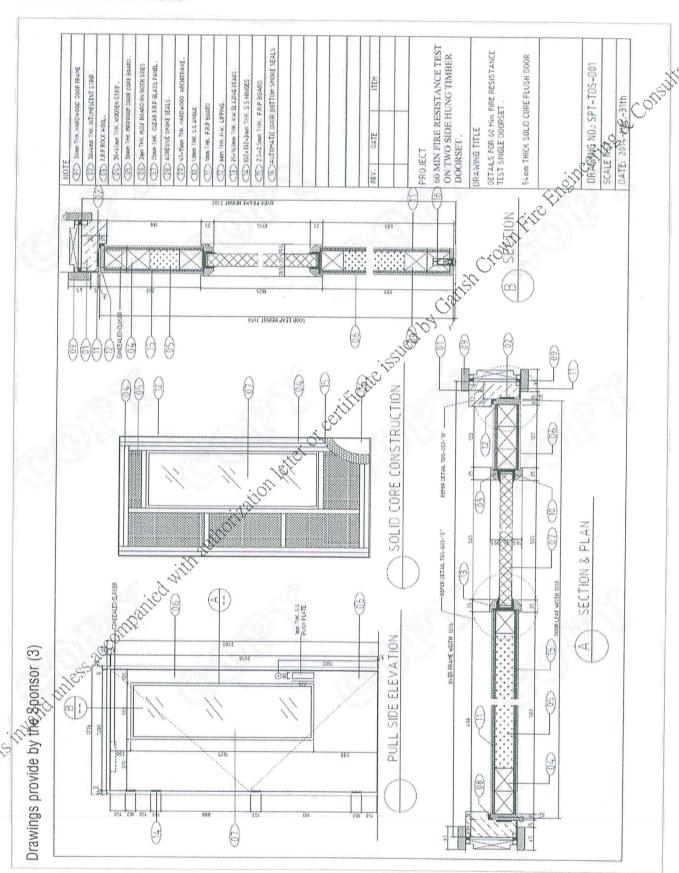






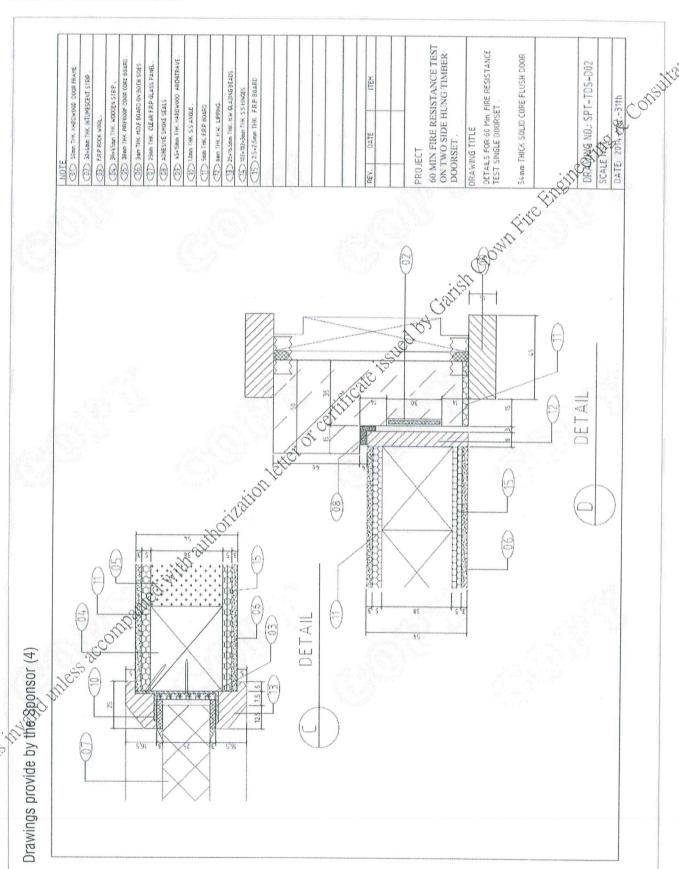












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Specimens Condition

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

All the components of the test specimens were supplied by the Sponsor.

4.2 Verification of the Specimens

Two specimens were transferred to the Test Location on 2014-01-16 by the Sponsor.

In section 3.2 of this report, items with the section of the specimens.

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 specimens were fixed into a supporting construction made of fully cured reinforced normal density concrete slabs provided by FORTE. Door A was installed into one sized 1320 mm (w) x 2995 mm (h); whereas Door B was installed into one sized 1320 mm (w) x 2775 mm (h)

4.4 Installation of the Specimens

The specimens was assembled and installed by workers delegated by the Sponsor from 2014-01-16 to 2013-01-17

4.5 Specimens Conditioning

The specimens were stored in the Test (Sociation from 2014-01-16, the date which specimens were received, to 2014-01-20, the date which fire resistance test performed.

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

Ambient Temperature (*\$)	Relative Humidity (%)
20 ± 5 stile 1	50 ±10

4.6 Direction of Fire Side and Others

The Sponser designated and installed that door leaves on specimens could only be swung outwards the furnace.

Door A The door lock was NOT locked and NOT latched during the test.

Door B: The door lock was NOT locked during the test.



5. **Test Method**

Pre-test Conditioning

The pre-test conditioning of the specimens was carried out on 2014-01-19 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 the mocouple. 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.

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T is the average furnace temperature, in degree Celsiin

is the time, in minutes

The temperature inside the furnace was measured in conformity with BS EN 1363-1: 1999by 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 specimens were measured by 57 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, and

Door B was evaluated against the maximum temperature rise criterion given by supplementary procedure – Classification I_1 at the request of the Sponsor.

These thermocouples were positioned and fixed on unexposed surface of the test specimens in conformity with BS EN 1634-1: 2008.

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

Ther	mocouple	Area	Description
	U1 – U5	Door Leaf	For average and maximum unexposed surface temperature rise
	U6 – U9;	Door Leaf	For maximum unexposed surface temperature rise (Normal Procedure, I ₂)
	U10 – U13	Door Leaf	For additional information only
Door A	U14 – U15 U18 – U19	Door Frame	For maximum unexposed surface temperature rise
	U20 – U25	Overhead Banel	For average and maximum unexposed surface temperature rise
	U22 – U25	Overnead Panel	For maximum unexposed surface temperature rise (Normal Procedure, I ₂)
	U26 – U29	Overhead Panel	For additional information only
	U30 - U345777	Door Leaf	For average and maximum unexposed surface temperature rise
Door B	U35 = U38 U39 – U42	Door Leaf	For maximum unexposed surface temperature rise (Supplementary Procedure, I ₁)
10	U43 – U46	Framework	For maximum unexposed surface temperature rise
10	U47 – U57	Glazed Element	For average and maximum unexposed surface temperature rise





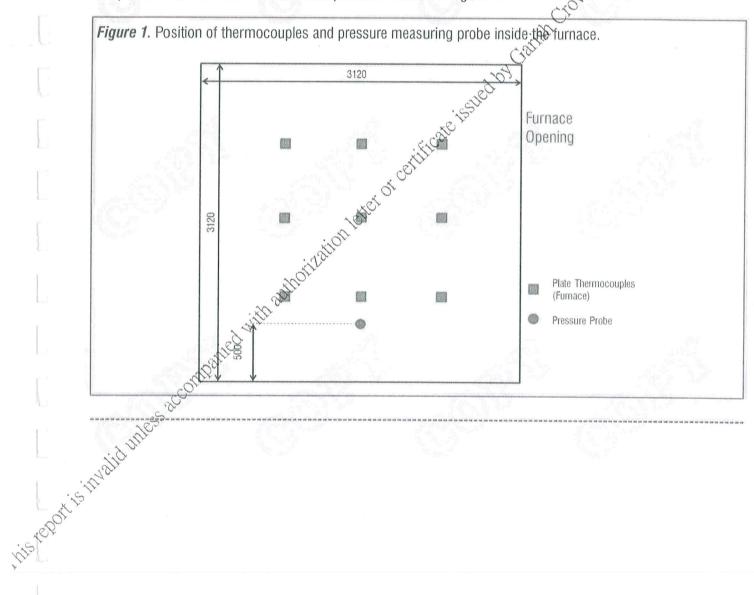
5.5 **Pressure Condition**

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

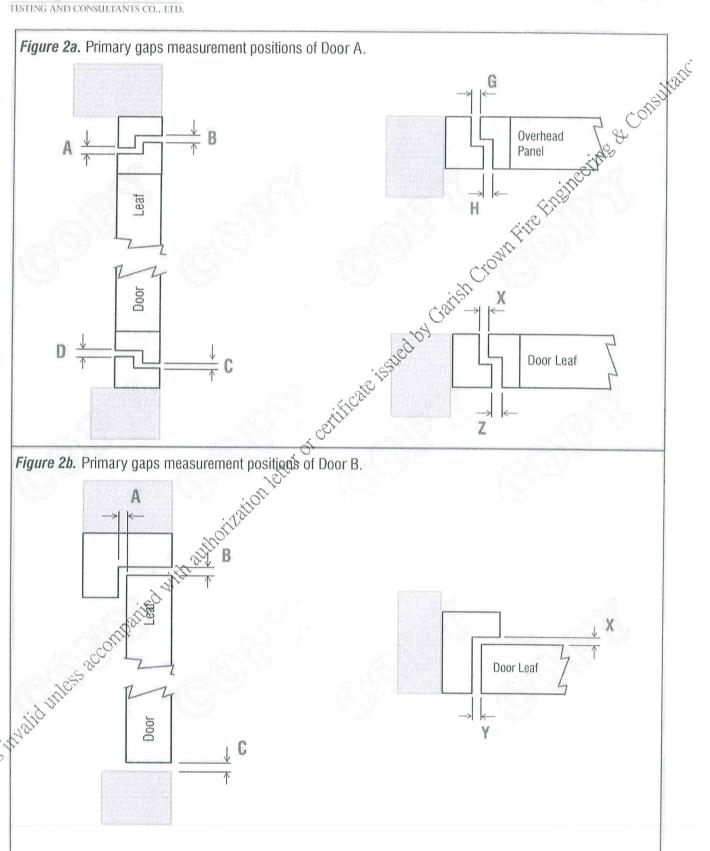
5.6 **Deflection Measurements**

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

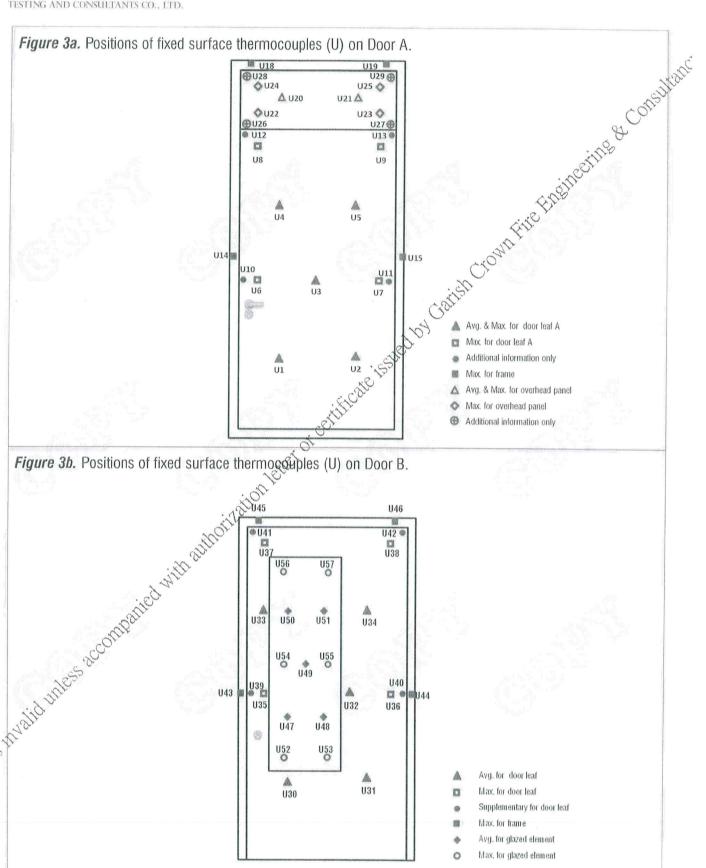
The positions of deflection measurement points are shown in *Figure 4*.



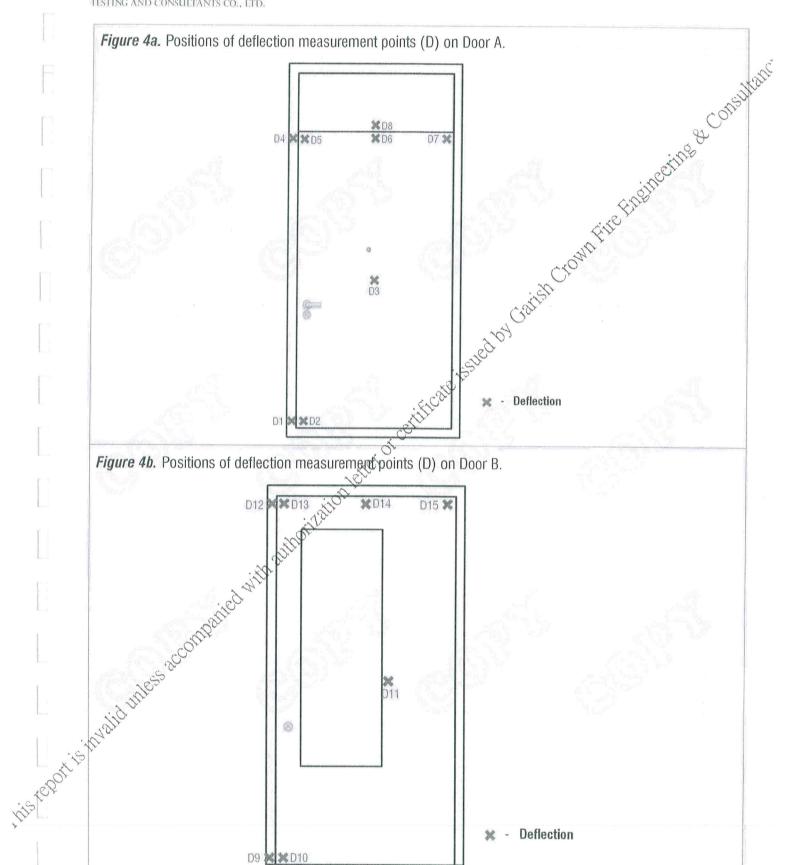












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6. **Test Data**

Door	Push	Pull
Door A	109.8 N	190.2 N
Door B	90.0 N	113.7 N

5. 7	est	Data		
6.1	Ret	ention Forces		
The re	etentic	ention Forces on forces on enighest gauge Push 109.8 N 90.0 N s Measurements of the speciments were taken	each door le	af of the spec
respec	uveı	lighest gauge	measuremer	its are summ
Doo	or	Push	Pull	
Door	r A	109.8 N	190.2	N
Door	r B	90.0 N	113.7	N
5.2	Gap	s Measureme	ent	
^o rimar	y gap	s of the speci	mens were n	Average 3.8 5.2 1.8
Measu	remei	nts were taken	ı in mm.	
Ga			Measured	
ua	۳,	Minimum	Maximum	Average
ANN SERVICE STATE OF	Α	2.7	4.9	3.8
	В	3.5	6.2	5.2
	С	1.2	3.0	1.8
Door A	D	1.4	5.3	2.7
Do	G	2.0	4.1	3,4
4,353.8	Н	1.2	2.5	V 2 1
	X	1.1	4.0	2.1
	Υ	1.5	4.0	2.4
	A	2.5	34.9	3.5
22	В	2.3	3.4	2.7
Door B	C	0.63011	2.9	1.5
	X	2:5	5.5	4.1
	Υ	2.6	4.8	3.4
	760			





6.3 **Furnace Temperature**

E isoled of Carish Committee Endineering & Consultance The furnace average temperature over the test period is shown in Figure 5. Figure 5. Furnace average temperature over the test period. 1100 1000 900 800 700 -Furnace Average Temperature (BS EN 1363-1 Standard Cruve 400 300 ris report is invalid unless

40

Time (Minutes)

50

60

70

30

10

20

80



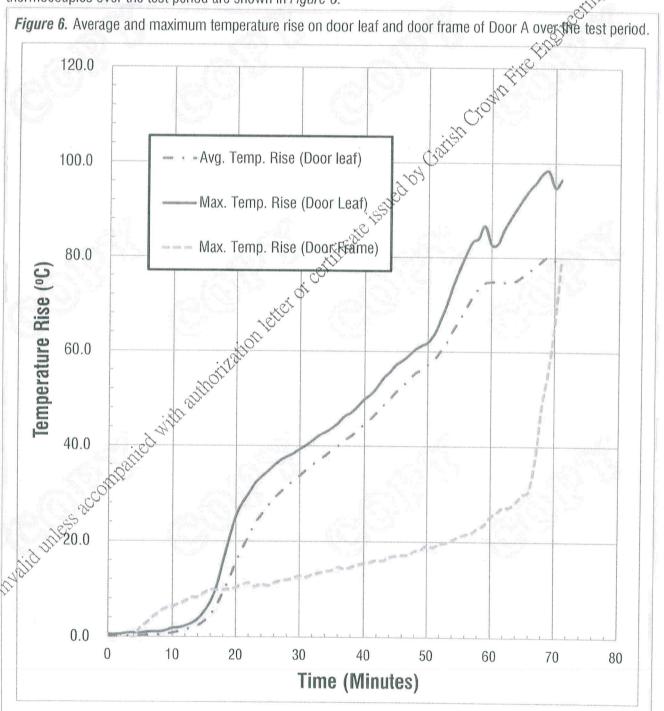


6.4 Unexposed Surface Temperature Rise

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 are shown in *Figure 6*.

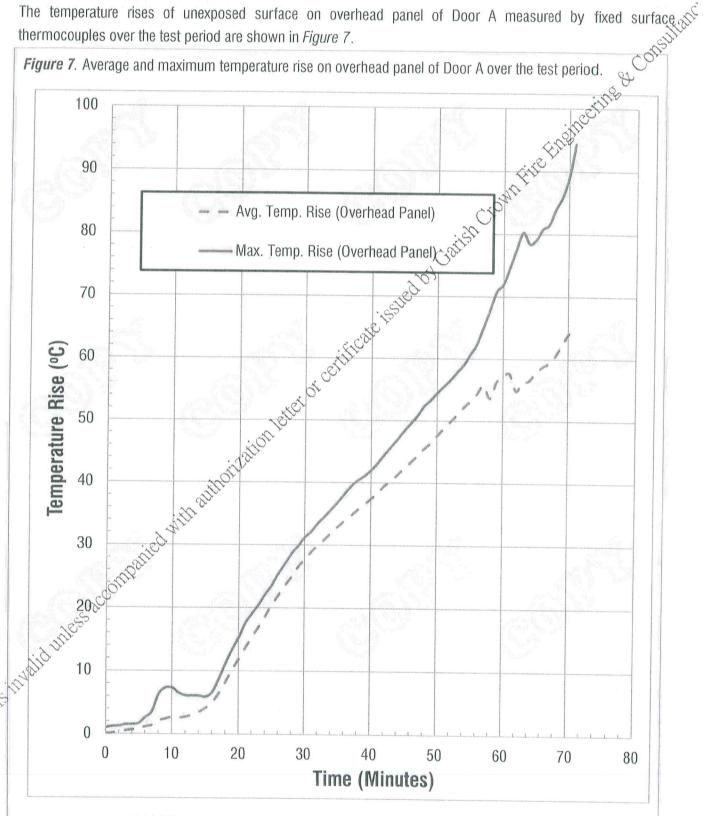






6.4.1.2 Fixed Surface Thermocouples - Overhead Panel

The temperature rises of unexposed surface on overhead panel of Door A measured by fixed surface thermocouples over the test period are shown in Figure 7.



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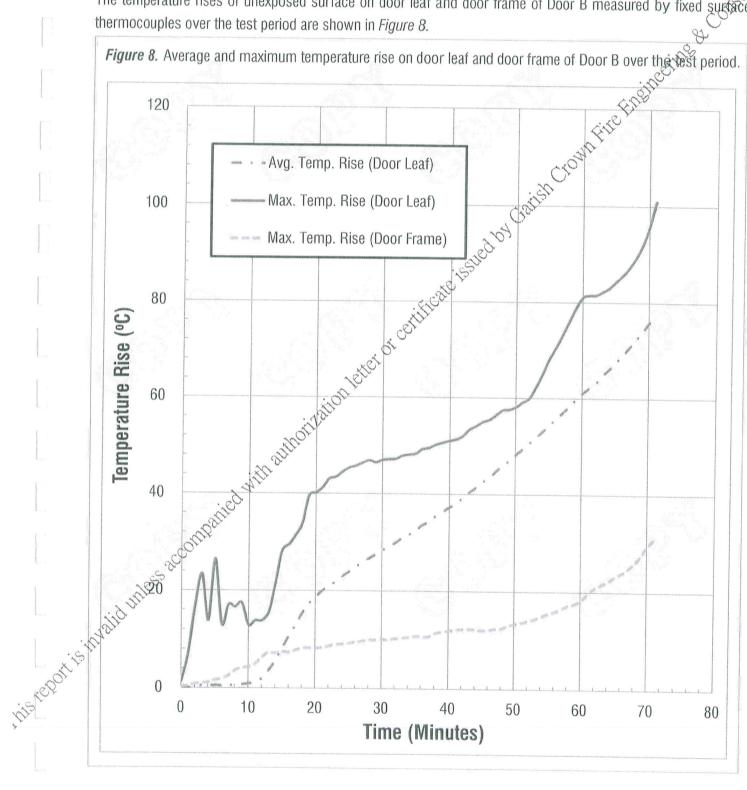




6.4.2 Door B

6.4.2.1 Fixed Surface Thermocouples - Door Leaf and Door Frame

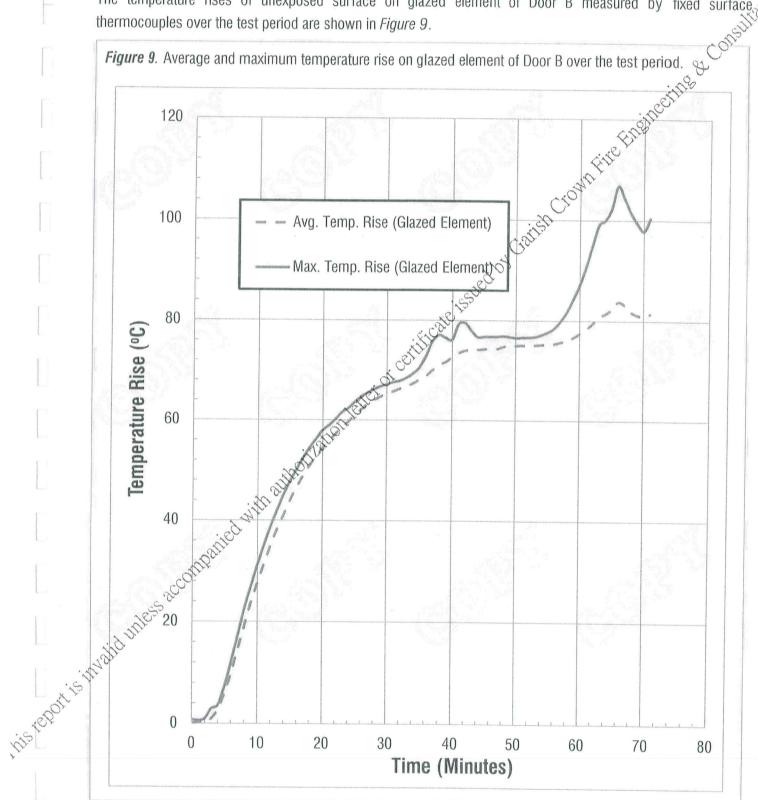
The temperature rises of unexposed surface on door leaf and door frame of Door B measured by fixed surface thermocouples over the test period are shown in Figure 8.





6.4.2.2 Fixed Surface Thermocouples - Glazed Element

The temperature rises of unexposed surface on glazed element of Door B measured by fixed surface thermocouples over the test period are shown in Figure 9.



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6.4.3 Fixed Surface Thermocouples –Detailed Temperature Records

The outputs of the unexposed surface thermocouples on the specimens are summarized in the following tables. Detached means no record obtained from specimen thermocouple due to the thermocouple was detached of the compensature outputs from unexposed surface temperature U1 to U9

Temperature outputs	from unexposed	surface temp	perature U1 to U9
---------------------	----------------	--------------	-------------------

Time (min)	U1	U2	U3	U4	U5	U6	U7	U8	ns2
0	15.4	15.5	15.6	15.7	16.1	14.9	14.4	14.2	55.3
5	15.5	15.7	15.7	15.7	16.5	15.1	14.5	14.35	15.9
10	16.0	16.4	16.5	16.4	17.2	16.5	15.1	<17.5	17.0
15	18.0	19.5	18.5	17.8	21.0	18.7	17.23	17.4	19.4
20	28.7	40.9	26.5	23.7	37.0	24.4	25.7	26.6	32.5
25	42.9	50.4	40.0	34.7	47.3	33.25	39.4	38.2	44.3
30	49.2	55.0	47.6	42.2	53.4	AN.3	47.0	46.9	50.5
35	54.4	59.4	53.2	48.0	58.8	46.8	52.9	53.4	55.4
40	59.2	65.6	58.7	53.5	64.5	52.7	58.6	58.4	60.7
45	65.0	72.9	66.0	59.4	72.3	59.1	65.2	62.8	66.7
50	70.9	77.4	73.1	65.2	77.6	66.4	71.2	68.1	72.2
55	80.4	93.1	82.3	65.7	90.1	74.3	78.8	72.2	80.9
56	83.3	96.3	84.7	66.1	93.6	75.6	81.5	73.5	83.0
57	86.0	99.0	587.4	66.8	96.8	77.1	84.2	74.4	85.5
58	89.2	96.3	90.5	69.5	99.8	78.5	86.5	75.6	87.7
59	92.2	91.4	93.0	72.2	102.4	80.5	89.1	77.7	89.6
60	953	88.6	95.7	74.7	98.4	83.4	91.4	79.3	91.4
61	\$96.8	87.6	98.6	77.1	92.8	86.6	94.6	80.9	93.2
62 Dalis	93.0	87.3	101.6	79.4	90.7	90.1	96.9	83.0	94.8
63	88.8	87.6	104.0	81.3	90.3	92.5	98.9	84.7	96.8
<u></u> 64	87.0	88.3	106.1	82.4	90.3	95.1	100.1	87.1	98.3
65	86.7	89.1	108.2	83.7	91.3	97.2	101.1	89.7	100.1
66	86.9	90.3	110.1	85.1	92.1	99.8	102.9	91.8	102.0
67	87.6	91.2	111.6	85.9	92.8	101.4	104.5	94.6	103.5
68	88.88	92.2	113.4	87.0	93.6	103.8	106.8	97.2	105.2
69	89.8	93.3	113.9	88.1	94.6	105.8	108.6	99.9	107.0
70	89.8	94.8	105.9	89.1	95.8	107.7	110.5	101.5	108.9
71	90.0	96.1	100.1	89.8	97.1	109.6	112.2	103.7	110.5

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Temperature outputs from unexposed surface temperature U14 to U15 and U18 to U25

Time (min)	U14	U15	U18	U19	U20	U21	U22	U23	U24	U25
0	14.0	13.3	13.5	13.6	16.0	16.2	15.0	14.6	14.0	15.5
5	14.1	13.5	17.6	15.1	16.4	16.9	16.3	15.5	14.7	16.1
10	15.9	13.8	21.9	17.5	17.1	17.4	22.6	16.1	17.4 🔆	\$216.7
15	15.3	14.1	24.9	20.9	19.2	19.6	21.1	17.9	14.7 17.4 18.4 26.1	20.1
20	16.1	15.2	26.0	25.0	27.2	27.7	26.1	25.0	\$26.1	30.5
25	17.0	16.5	26.4	25.4	37.8	38.8	29.8	33.18	35.8	38.8
30	17.8	17.9	28.5	26.1	45.9	46.5	37.6	39.8	44.5	43.1
35	18.6	19.4	29.6	27.4	51.4	52.1	44.35	44.9	49.5	46.6
40	19.9	21.1	31.0	29.4	56.2	57.2	49.6	50.1	52.6	50.2
45	20.9	22.5	32.6	29.8	62.4	63.5	55.0	54.4	56.2	53.6
50	22.8	24.0	34.8	30.8	68.2	69.7	60.7	59.3	61.3	57.8
55	24.3	26.2	36.7	31.8	74.00	76.0	66.9	64.8	66.9	62.0
56	25.0	26.6	37.2	32.7	×34.9	77.8	68.2	65.9	68.0	62.8
57	25.2	27.4	37.5	32,55	76.4	80.5	69.1	67.0	68.8	63.9
58	25.7	28.0	38.5	33.2	78.7	83.2	70.2	68.1	Detached	64.8
59	26.4	28.8	39,30	35.2	80.7	86.1	72.6	69.0	Detached	65.5
60	26.8	29.5	O.YAO	34.7	83.2	87.2	73.2	69.7	Detached	66.6
61	27.0	30.60	41.8	34.2	86.2	89.9	74.8	70.1	Detached	67.5
62	27.5	331.1	42.9	34.9	89.0	92.8	75.3	71.2	Detached	68.5
63	27.5 28.5 528.5	31.9	42.9	35.4	91.2	95.5	76.5	71.9	Detached	69.6
64	528.5	32.7	44.1	35.8	93.7	90.7	78.5	73.2	Detached	70.3
65 8	29.3	33.7	45.5	36.5	94.4	87.2	83.3	74.2	Detached	71.3
64 65 366	29.7	34.7	46.4	38.1	96.1	86.1	84.0	76.3	Detached	73.0
67	30.2	35.6	52.7	38.5	96.8	86.1	88.5	77.5	Detached	74.3
68	30.6	36.4	63.8	39.1	99.2	86.4	95.8	78.8	Detached	76.4
69	31.3	37.2	71.3	40.1	100.7	87.1	101.1	80.6	Detached	77.9
70	31.7	38.2	81.1	40.7	103.1	88.2	104.3	82.1	Detached	80.1
71	32.1	38.8	95.2	42.4	103.1	89.0	109.6	83.8	Detached	82.1

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Temperature outputs from unexposed surface temperature U30 to U39

Time (min)	U30	U31	U32	U33	U34	U35	U36	U37	U38	U39
0	14.1	14.7	14.3	14.5	16.1	14.7	15.6	15.2	14.9	13.6
5	14.4	14.9	14.6	16.0	16.1	23.8	15.9	16.0	25.9	41.2
10	14.6	15.5	15.4	15.5	16.9	16.7	16.5	16.2	27.7	×20.2
15	15.4	26.6	35.4	16.8	19.7	18.3	19.1	17.4	29,10	21.4
20	17.5	53.4	50.5	19.3	26.1	22.7	31.1	19.7	31.0	24.4
25	20.6	60.1	54.3	23.0	35.2	28.1	48.4	23.4	37.5	25.4
30	25.2	61.8	57.5	28.0	42.7	34.3	54.0~	28.0	42.5	29.1
35	30.4	63.1	60.2	33.3	48.9	39.7	572	33.5	46.6	33.1
40	36.6	65.8	63.1	39.5	54.9	46.3	60.4	39.3	50.5	38.1
45	42.1	69.8	66.9	44.8	62.5	52.8	65.1	45.4	55.7	43.9
50	48.7	72.9	70.6	51.4	71.0%	60.3	69.3	50.7	61.3	50.7
55	54.5	76.2	74.5	57.6	82 .9	66.7	74.0	55.6	68.4	58.8
56	56.3	76.2	74.6	59. ŁÓ	85.3	68.5	74.2	56.6	69.5	59.8
57	57.5	76.8	75.2	60.7	88.0	69.8	74.9	57.8	70.8	61.5
58	58.9	77.8	75.50	61.7	90.7	71.1	75.5	58.5	71.8	62.9
59	60.2	79.0	\$5.9	63.3	93.6	72.8	76.0	59.7	73.2	64.1
60	61.8	88.60	76.1	64.6	95.8	74.1	76.6	61.2	74.4	65.7
61	62.6 _{. x}	7.74	76.7	65.6	96.2	74.9	77.3	62.1	75.6	67.5
62	64.0	85.6	76.9	66.7	96.3	76.2	77.9	63.3	77.3	69.0
63	S66.0	89.0	77.2	68.2	97.0	77.9	78.3	64.8	79.3	70.4
64,000	67.4	91.7	77.7	69.4	97.8	79.1	78.7	66.0	81.0	71.6
~ 65°	68.8	94.2	78.7	70.6	99.2	80.1	79.3	67.4	83.0	73.5
63 64cono 66 66	70.0	96.6	79.8	71.8	100.4	81.2	80.1	68.7	84.9	74.7
67	71.4	98.7	81.5	72.8	101.9	82.2	82.0	70.1	86.7	76.6
68	72.6	101.7	83.8	73.6	103.0	83.0	84.7	71.8	88.7	78.6
69	74.5	103.5	86.3	74.6	104.2	84.1	86.9	72.8	90.4	80.0
70	75.6	105.4	89.9	75.6	105.8	85.1	89.6	73.9	91.9	81.7
71	76.7	107.5	93.1	76.1	107.4	85.3	93.2	75.8	94.0	83.6





Temperature outputs from unexposed surface temperature U40 to U49

Time (min)	U40	U41	U42	U43	U44	U45	U46	U47	U48	U49
0	12.5	13.8	13.9	15.0	14.7	14.6	13.9	13.1	13.0	13.9
5	13.0	15.5	17.9	15.8	15.1	15.7	16.4	20.3	18.3	20.00
10	13.4	16.3	22.5	16.5	15.3	15.8	19.1	43.9	39.6	42,8
15	14.8	21.4	43.0	17.8	15.7	16.9	22.2	60.3	56.4 _C	4
20	17.8	27.7	55.0	18.9	16.8	18.4	22.9	70.1	66.7	69.6
25	21.7	34.8	53.5	18.6	17.2	20.1	23.9	76.表	² 73.6	75.7
30	26.6	41.6	56.0	19.3	17.8	22.0	24.8	80.0	77.7	80.1
35	32.2	48.2	60.0	20.1	18.4	23.1	25.4	83.8	79.8	82.5
40	38.4	53.9	58.5	21.3	19.3	24.5	28.6	89.4	82.4	89.1
45	44.9	60.9	56.4	22.1	20.2	26.10	26.7	89.7	87.6	90.2
50	51.3	67.2	57.7	23.5	21.3	<u></u> 28.1	27.7	89.7	87.6	90.0
55	57.7	73.6	64.4	24.5	22,10	29.8	30.2	91.2	87.2	90.5
56	59.0	74.2	69.2	24.7	22.5	30.2	30.6	92.0	87.0	90.5
57	60.3	76.0	69.4	25.32°	22.8	30.8	31.3	93.4	87.0	90.6
58	61.6	77.5	71.9	\$25.2	22.8	31.1	31.9	95.2	87.0	91.1
59	63.1	80.5	7336	25.4	23.0	31.8	32.2	97.7	87.0	91.6
60	64.5	85.7	J75.8	25.8	23.2	33.0	32.8	100.6	86.9	92.5
61	66.2	8936	76.8	26.0	23.7	34.2	33.0	104.3	87.1	93.4
62	67.4	89.9	78.4	26.0	23.8	35.4	33.8	108.4	87.2	94.7
63	68.7	91.4	79.8	26.5	24.1	36.2	34.4	112.5	87.4	96.6
64 65 55	70.5	93.2	80.1	26.7	24.3	36.9	34.2	113.5	87.4	98.7
65	72.2	95.0	80.9	27.1	24.6	37.8	34.6	115.8	87.6	100.6
111266 67	73.8	98.3	81.4	27.4	24.9	38.5	35.1	120.3	87.8	102.6
67	75.3	102.0	81.9	27.8	25.2	39.4	35.4	117.8	87.8	101.9
68	77.2	104.0	82.2	28.1	25.6	40.5	35.8	115.0	88.2	97.3
69	78.6	106.7	82.5	28.4	25.8	42.1	36.3	112.8	88.4	95.7
70	79.7	110.4	83.1	28.9	26.1	44.0	36.7	111.3	88.6	95.0
71	81.1	115.7	83.3	29.2	26.7	45.6	37.5	113.9	88.7	95.0



Temperature outputs from unexposed surface temperature U50 to U57

	ON HE SELVE IN				2013			
Time (min)	U 50	U51	U52	U53	U54	U55	U56	U57
0	13.8	13.2	14.0	14.2	13.1	12.7	12.4	13.7
5	20.6	17.1	20.0	19.2	20.7	16.7	19.8	18.3
10	43.9	35.7	42.5	42.6	44.7	36.6	43.5	37.9
15	60.4	51.7	58.9	58.3	61.5	53.0	60.1	54.00
20	70.2	63.0	68.7	68.1	71.4	64.3	69.9	54.6° \$64.6
25	76.8	69.8	74.8	73.9	77.1	71.1	75.8	71.2
30	80.6	75.0	78.1	77.6	79.8	75.1	.079.0	75.4
35	83.7	77.7	80.3	80.4	83.9	77.6	80.9	77.7
40	89.6	79.7	83.7	81.0	89.4		81.5	79.2
45	89.5	81.4	88.1	83.0	89.4	87.1	87.4	82.1
50	88.8	86.0	87.5	86.0		87.8	88.5	86.0
55	88.5	86.2	87.9	85.6	90.5	88.2	88.5	87.1
56	88.8	85.8	87.8	85.6	90.8	88.1	88.6	86.8
57	89.0	85.5	87.9	85.6	91.2	88.1	88.4	86.9
58	89.0	85.2	87.9	85.9	92.1	88.2	88.5	86.9
59	89.1	84.9	88.1	86.2	93.1	88.3	88.3	86.8
60	89,30	84.9	88.2	86.0	95.2	88.3	88.4	86.6
61	89.2	84.9	88.6	86.4	97.0	88.5	88.3	86.7
62 2	89.2	84.5	88.9	86.5	99.5	88.7	88.4	86.6
631	89.7	84.6	88.9	86.8	102.0	89.0	88.88	86.6
577 64	90.0	84.6	89.1	87.0	104.9	89.3	89.0	86.6
65	90.2	84.4	89.1	87.1	108.1	89.7	89.5	86.5
66	90.8	84.4	89.4	87.3	104.3	90.3	90.2	86.5
67	91.3	84.4	89.7	87.7	101.2	91.0	90.8	86.4
68	91.5	84.4	90.2	87.9	100.1	92.4	92.0	86.7
69	91.7	84.5	90.1	88.2	99.5	93.6	93.1	86.7
70	91.7	84.5	90.2	88.3	100.2	95.0	94.5	86.9
71	91.8	84.9	90.3	88.5	100.6	94.7	95.8	87.1
	5 10 15 20 25 30 35 40 45 50 55 56 57 58 59 60 61 62 61 62 63 64 65 66 67 68 69 70	0 13.8 5 20.6 10 43.9 15 60.4 20 70.2 25 76.8 30 80.6 35 83.7 40 89.6 45 89.5 50 88.8 57 89.0 58 89.0 59 89.1 60 89.3 61 89.2 63 89.2 63 89.7 56 90.8 67 91.3 68 91.5 69 91.7 70 91.7	0 13.8 13.2 5 20.6 17.1 10 43.9 35.7 15 60.4 51.7 20 70.2 63.0 25 76.8 69.8 30 80.6 75.0 35 83.7 77.7 40 89.6 79.7 45 89.5 81.4 50 88.8 86.0 55 88.5 86.2 56 88.8 85.8 57 89.0 85.5 58 89.0 85.2 59 89.1 84.9 61 89.2 84.9 62 89.2 84.5 63 89.7 84.6 64 90.0 84.6 65 90.2 84.4 66 90.8 84.4 67 91.3 84.4 69 91.7 84.5 70 91.7 84.5	0 13.8 13.2 14.0 5 20.6 17.1 20.0 10 43.9 35.7 42.5 15 60.4 51.7 58.9 20 70.2 63.0 68.7 25 76.8 69.8 74.8 30 80.6 75.0 78.1 35 83.7 77.7 80.3 40 89.6 79.7 83.7 45 89.5 81.4 88.1 50 88.8 86.0 87.5 55 88.5 86.2 87.9 56 88.8 85.8 87.9 58 89.0 85.5 87.9 59 89.1 84.9 88.1 60 89.3 84.9 88.2 61 89.2 84.5 88.9 62 89.2 84.5 88.9 64 90.0 84.6 89.1 65 90.2 84.4 89.1 66 90.8 84.4 89.4	0 13.8 13.2 14.0 14.2 5 20.6 17.1 20.0 19.2 10 43.9 35.7 42.5 42.6 15 60.4 51.7 58.9 58.3 20 70.2 63.0 68.7 68.1 25 76.8 69.8 74.8 73.9 30 80.6 75.0 78.1 77.6 35 83.7 77.7 80.3 80.4 40 89.6 79.7 83.7 81.0 45 89.5 81.4 88.1 83.0 50 88.8 86.0 87.5 86.0 55 88.5 86.2 87.9 85.6 57 89.0 85.5 87.9 85.6 58 89.0 85.2 87.9 85.9 59 89.1 84.9 88.2 86.0 61 89.2 84.9 88.6 86.4 62 89.2 84.5 88.9 86.5 64 90.0	0 13.8 13.2 14.0 14.2 13.1 5 20.6 17.1 20.0 19.2 20.7 10 43.9 35.7 42.5 42.6 44.7 15 60.4 51.7 58.9 58.3 61.5 20 70.2 63.0 68.7 68.1 71.4 25 76.8 69.8 74.8 73.9 77.1 30 80.6 75.0 78.1 77.6 79.8 35 83.7 77.7 80.3 80.4 83.9 40 89.6 79.7 83.7 81.0 89.4 45 89.5 81.4 88.1 83.0 89.4 45 89.5 81.4 88.1 83.0 89.4 50 88.8 86.2 87.9 35.6 90.5 56 88.8 85.8 87.8 85.6 90.8 57 89.0 85.2 87.9 85	0 13.8 13.2 14.0 14.2 13.1 12.7 5 20.6 17.1 20.0 19.2 20.7 16.7 10 43.9 35.7 42.5 42.6 44.7 36.6 15 60.4 51.7 58.9 58.3 61.5 53.0 20 70.2 63.0 68.7 68.1 71.4 64.3 25 76.8 69.8 74.8 73.9 77.1 71.1 30 80.6 75.0 78.1 77.6 79.8 75.1 35 83.7 77.7 80.3 80.4 83.9 72.5 40 89.6 79.7 83.7 81.0 89.4 80.4 45 89.5 81.4 88.1 83.0 89.4 87.1 50 88.8 86.0 87.5 86.0 90.5 88.2 55 88.5 86.2 87.9 85.6 90.8 88.1	0 13.8 13.2 14.0 14.2 13.1 12.7 12.4 5 20.6 17.1 20.0 19.2 20.7 16.7 19.8 10 43.9 35.7 42.5 42.6 44.7 36.6 43.5 15 60.4 51.7 58.9 58.3 61.5 53.0 60.1 20 70.2 63.0 68.7 68.1 71.4 64.3 69.9 25 76.8 69.8 74.8 73.9 77.1 71.1 75.8 30 80.6 75.0 78.1 77.6 79.8 75.1 79.0 35 83.7 77.7 80.3 80.4 83.9 75.1 79.0 35 83.7 77.7 80.3 80.4 83.9 75.1 80.9 40 89.6 79.7 83.7 81.0 89.4 87.1 87.4 50 88.8 86.0 87.5 86.0

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6.5 Pressure

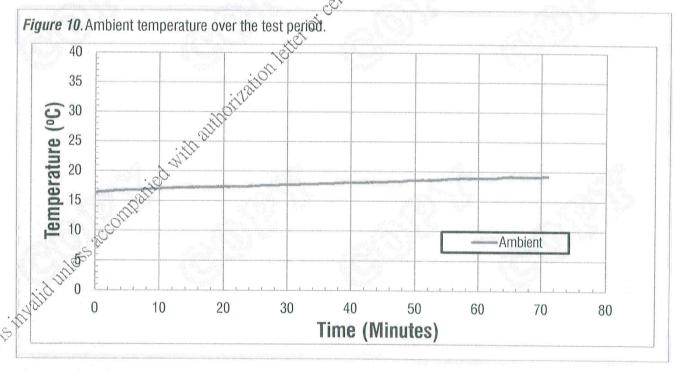
The furnace pressure differential with respect to the atmosphere at 500 mm above notional floor level over the test period is summarized in the following table.

Time (min)	Pressure (Pa)	Time (min)	Pressure (Pa)
6	0.2	45	0.5
10	-0.2	50	-1.5 :10 ⁰
15	-0.9	55	-0.5 ¢;X.8
20	-0.8	60	Q:8;°C
25	1.2	65	30.5
30	-0.1	70	-0.3
35	1.8	71	0.7
40	0.4		30

6.6 Ambient Temperature

The ambient temperature over the test period was recorded and shown in Figure 10.

The ambient temperature at the commencement of testivas 16.4°C.





6.7 **Lateral Deflections**

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

Measurements were taken in mm.

Positions refer to Figure 4a & 4b.

Maximum deflection on Door A measured was +57 mm at D3 at 60 minute of test; whereas the maximum deflection on Door B measured was +45 mm at D11 at 60 minute of test.

	tion \ Time (min)	0	10	20	30	40	50	File 55	60
	D1	+0	+0	+1	+2	+2	£30000	+4	+4
	D2	+0	-2	-3	-1	+1	151+2	+3	+6
A	D3	+0	+12	+14	+27	+383	+49	+52	+57
Door	D4	+0	+0	+5	+7	+380	+12	+15	+15
	D5	+0	+3	+8	+14 .,	\$ +17	+17	+19	+19
	D6	+0	+2	+12	+1.80	+21	+24	+24	+27
	D7	+0	-1	+2	+180	+6	+6	+7	+8
Door B	D8	+0	+4	+7 💉	°+11	+11	+11	+10	+10
	D9	+0	+1	**************************************	+3	+3	+4	+5	+4
	D10	+0	+1	X971	+2	+3	+3	+3	+4
	D11	+0	+6,3	+13	+26	+31	+35	+38	+45
	D12	+0	+6	+9	+14	+18	+20	+22	+28
	D13	+0	2017-2	+9	+19	+24	+31	+35	+43
	D14	+0;	+2	+5	+9	+10	+13	+13	+15





6.8 Observations

Significant behaviours of the specimens during the test period are summarized in the following table.

Photos taken during the test period are also attached.

Time (min.sec)	Observation (from unexposed side)
00.00	Test Started.
00.54	Door B: Smoke released from glazing beads and leading edge.
01.30	Door A: Smoke released from vertical edges of the door leaf.
02.32	Observation (from unexposed side) Test Started. Door B: Smoke released from glazing beads and leading edge. Door A: Smoke released from vertical edges of the door leaf. Door A & B: The amount of smoke release increased. Door B: Ignition on the exposed side of the specimen was observed through the glazed glazing panel.
03.19	Door B: "Pop" sound was heard from the glazing panet Shner glass pane detached and the interlayer of glass pane was reacting and turning white.
04.28	Door A & B: The amount of smoke release reduced
04.52	Door A: Smoke released from the leading edge at lock position, hinge edge and the top edge of the overhead panel.
05.54	Door A: Smoke release increased again from the vertical edges and the top edge of the overhead panel. Door B: Smoke released from the top edge of the door leaf. The glazing panel turned light brown.
09.06	Door A: Smoke staining mark was observed at lower left corner of overhead panel and hinge positions. Door B: Smoke staining mark was observed along the top edge of the door leaf.
14.23	Door A: Smoke released from the top edge of the overhead panel.
23.24	Door A: Smoke staining mark was observed at the overhead panel above the top edge in the door leaf. Light smoke staining mark was observed above the door viewer. Door B: The door leaf turned dark at the door closer position.
28.13	Door B: Cotton fibre pad test was carried out at the top of the door leaf. No flaming or glowing on the cotton pad was observed.
nyalidainin	Door A: Cotton fibre pad test was carried out at the top of the door leaf which was between overhead panel and the door leaf. No flaming or glowing on the cotton pad was observed.
30.00	Door A & B: No integrity failure had occurred.
32.10	Door B: Smoke released from the lock hole.
37.20	Door A: Light smoke released from the top edge of the door leaf.





Tme (min.sec)	Observation (from unexposed side)
51.12	Door B: Oil leakage was observed at door closer position. Glass pane turned white again. Smoke released from the lock and the head of the door leaf.
54.19	Door A: Smoke released from gaps around the overhead panel and leading edge at logic position.
58.01	Door A: Cotton fibre pad test was carried out at the top of the door leaf which was between overhead panel and the door leaf. No flaming or glowing on the cotton pad was observed. Door A & B: No integrity failure had occurred.
60.00	Door A & B: No integrity failure had occurred.
60.19	Door A: Cotton fibre pad test was carried out at the top left corner of the door leaf. No flaming or glowing on the cotton fibre pad was observed.
62.39	Door A: Glowing could be observed at lower corner of everhead panel.
64.05	Door A: Cotton fibre pad test was carried out at the top left corner of the door leaf. No flaming or glowing on the cotton pad was observed.
64.46	Door B: Cotton fibre pad test was carried out at the top left corner of the door leaf. No flaming or glowing on the cotton pad was observed.
65.49	Door A: Cotton fibre pad test was carried out at the top left corner of the door leaf. No flaming or glowing on the cotton bre pad was observed.
66.36	Door A: Sustainable flaming was observed at the left top corner of the door leaf. Integrity failure was decimed to occur.
67.54	Door A: Cotton fibre pad test was carried out at the flaming corner of the door leaf. The cotton fibre pad was ignited. Integrity failure was deemed to occur.
71.07	Test was terminated at request of the Sponsor.

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6.9 **Photos**



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

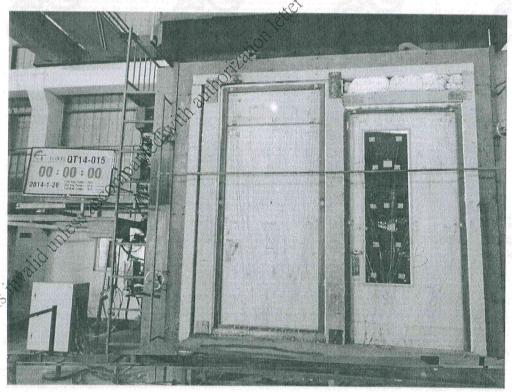


Photo 2. Unexposed surface of the specimens just after the commencement of test. (Left: Door A; Right: Door B)

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

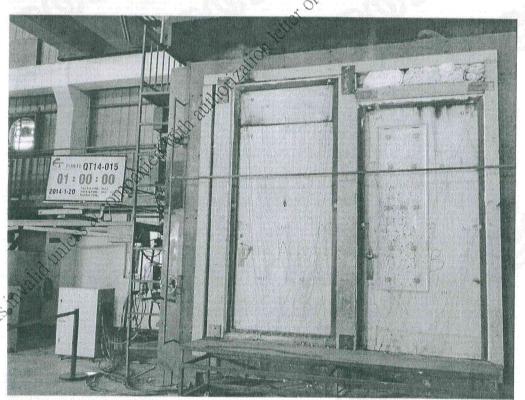


Photo 4. Unexposed surface of the specimens at 60 minute of test.

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

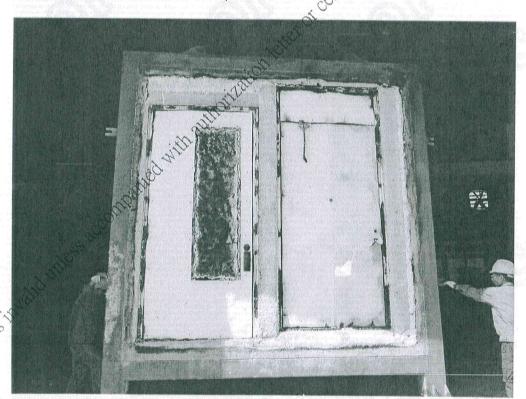
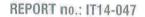


Photo 6. Exposed surface of the specimens after test. (Left: Door B; Right: Door A)

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7. **Test Results**

Door A 7.1

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

Performa Integrity	ance Criteria (E)	professional of the control of the c	Fighteet		
Criteria of Failure Sustained Flaming		Description	Elapsed Time before Failure Occurrence 66 minutes		
		Continuous flaming for a period of time greater than 10 seconds on unexposed surface			
Gap	Ø6 mm	Penetration of the gauge into the furnace through the specimen and movable along a 150 mm gap			
Gauge	Ø25 mm	Penetration of the gauge into the furnace through the specimen	71 minutes (No Failure)		
Cotton Pad		Ignition of the cotton pad	66 minutes		

Insulation (I)								
Criteria of Failure	Description Description	Elapsed Time before Failure Occurrence 66 minutes						
Integrity Failure	The performance criterion "insulation" shall automatically be assumed not to be satisfied when the "integrity" criterion ceases to be satisfied							
Average On Tail	An increase of the average temperature of unexposed surface of the specimen above the initial average	[Door Leaf]	71 minutes (No Failure)					
Temperature Rise	temperature by more than 140°C	Overhead Panel	71 minutes (No Failure)					
Maximum Temperature Rise [Supplementary	An increase of temperature at perimeter frame of the doorset or openable window above the initial average	[Door Frame]	71 minutes (No Failure)					
	temperature by more than 360 °C; and any other point of the specimen above the initial average temperature by	[Door Leaf]	71 minutes (No Failure)					
Procedure, I ₂]	more than 180 °C	Overhead Panel 71 min (No Fai						





Door B 7.2

The test on Door A was terminated after a test period of 71 minutes at request of the Sponsor.

The test data obtained from the fire resistance test was assessed against performance criteria given in the following table.

Perform: Integrity	ance Criteria (E)			Sing Col	
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	minutes (No Failure)		
Gap	Ø6 mm	Penetration of the gauge into the furnace through the specimen and movable along a 150 mm gap	74		
Gauge	Ø25 mm	Penetration of the gauge into the furnace through the specimen	71 minutes (No Failure		
Cotton Pag	b	specimen Ignition of the cotton pad	71 minutes (No Failure)		
Criteria of Failure		Description	Elapsed Time before Failure Occurrence		
Integrity Failure		The performance exterion "insulation" shall automatically be assumed not to be satisfied when the "integrity" criterion ceases to be satisfied	71 minutes (No Failure)		
Average		An increase of the average temperature of unexposed surface of the specimen above the initial average	[Door Leaves]	71minutes (No Failure	
Temperature Rise		temperature by more than 140°C	[Glazed element]	71minutes (No Failure)	
Maximum Temperature Rise [Supplementary Procedure, I ₁]		An increase of temperature at any other point of the		71 minutes (No Failure)	
		specimens above the initial average temperature by more than 180 °C	[Door Leaves] 71minu (No Faile		
		The state of the s		71 minutes	

[Glazed element]



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, toads, 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.

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Appendix A - Temperature outputs from Unexposed Surface. (Additional information only)

Supplementary Temperature outputs from unexposed surface temperature U10 to U13 and U26 to U29

Time (min)	U10	U11	U12	U13	U26	U27	U28	U29
0	14.1	13.7	14.6	14.5	15.2	14.8	14.2	14.6
5	14.2	13.9	17.2	15.9	56.7	17.3	20.5	16.5
10	24.4	15.1	26.5	19.0	76.3	22.2	26.7	19.7
15	21.2	16.3	30.2	23.2	58.7	33.9	30.8	24.8
20	22.7	19.1	39.1	31.9	73.1	43.9	34.9	30.2
25	25.2	22.8	48.4	40.2	83.0	47.2	41.8	33.2
30	30.3	28.0	58.6	47.1	91.8	45.5	, 34.7	37.0
35	34.8	33.8	66.0	53.4	93.2	49,0	48.0	41.4
40	37.5	41.0	71.6	59.7	95.6	C54.5	52.4	47.5
45	41.5	47.8	76.3	65.5	106.10	58.6	56.2	52.6
50	47.1	54.5	82.3	70.7	123.8	62.0	61.6	57.7
55	53.0	61.0	89.0	77.0×2	756.1	67.5	66.1	62.0
56	54.7	62.5	91.5	77.8	162.4	69.0	67.8	63.4
57	55.7	64.0	93.4	्रे78.3	166.2	73.3	68.2	64.4
58	56.8	65.4	95,6	78.6	175.2	78.1	70.4	65.8
59	58.2	67.1	\$99.3	79.2	188.8	78.4	71.1	66.5
60	59.3	68.80	101.1	80.0	209.7	80.8	72.7	67.9
61	60.6	8.05	105.6	80.9	271.5	81.4	73.8	68.2
62	62.60	72.2	108.4	81.1	327.7	82.9	75.4	69.6
63	63.7	74.1	111.8	82.2	384.4	82.1	75.6	71.2
64	66.2	75.7	116.4	82.7	436.6	81.2	77.8	72.7
6500	68.4	77.7	124.2	83.5	499.8	81.6	79.2	73.7
	69.4	79.4	129.0	84.5	536.2	82.0	0.08	74.6
63 64 65 66 67 68	71.3	81.0	138.1	85.4	602.2	83.2	85.6	75.4
		82.4	146.5	86.6	634.6	85.1	100.5	76.6
69	74.5	83.8	155.7	87.3	626.6	88.0	109.7	78.1
70 .	76.7	85.8	166.1	88.7	626.2	96.1	121.2	79.6
71	79.8	86.9	180.8	90.1	634.4	101.3	136.3	81.8

END OF REPORT