





# **SMOKE CONTROL TEST REPORT**

SINGLE LEAF COMPOSITE TIMBER DOOR with SINGLE GLAZED ELEM

in accordance with BS EN 1634-3: 2004

**Test Sponsor:** 

Garish Crown Fire Engineering & Consultancy  $\Leftrightarrow^{\mathbb{C}}$ 

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**Test Laboratory:** 

Forte Testing and Consultants Company Limited

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Report Number:

IT 13-153

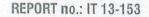
Date of Issue:

2013-08-09

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**HOKLAS Approved Signatory:** 

Ir. Dr Chan Yuk Kit





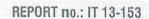
# Scope of Test

This report is a record of a smoke control test conducted by Forte Testing and Consultants Co., Ltd. in conformity with requirements in BS EN 1634-3: 2004 "Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware Part 3: Smoke control test for door and shutter assemblies". References were also made to the standards and documents given in the normative reference list in BS EN 1634-3: 2004.

The test subject was a single acting double leaf composite timber door with single glazed element. The specimen was installed with intumescent fire seals, door rebate smoke seal and concear bottom smoke seal. The specimen was supplied for test by Leung's Wooden Company Limited, the Sponsor single side exposure (outward movement). The Sponsors designated the specimen to be tested to procedures for ambient together with medium temperature.

# 2. Test Information

Test Laboratory:	FORTE Testing and Consultants Company Limited		
Testing 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		
ID no. of the Specimen:	Oy		
Date Received:	QT 13-090A 2013-06-15 2010-06-15 2010-06-15 2010-06-15		
Test Number:	Ambient: QT 13-090A; Medium: QT 13-090B *A total of two sets of report (Report no. IT13-068 and IT13-153) are issued on this test		
Date Tested:	2013-06-19		
Approved Test Operator from FORTE:	Ms. Sammi Cheng		
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 Door Frame

The timber door frame was single rebated type with an overall size 1266 (width) x 2337 mm (height) of a sectional dimension 50 mm (w) x 100 mm (thick) with 20 mm door stop rebate.

The film-plywood sub-frame was fixed onto the back of the door frame by wood screws.

The door frame together with the sub-frame was fixed into the opening on the drywall partition system by 10 x 112 mm self-tapping screws. There were 4 numbers of fixings on each jamb and 2 numbers on the head of door frame.

1 number of 10 mm (w) x 4 mm (t) intumescent strip and 1 number of 20 mm (w) x 4 mm (t) intumescent strip were fitted aside into grooves on the head and jambs. The 10 mm (w) intumescent strip was not interrupted whereas the 20 mm (w) seal was interrupted at hinge positions and the strike plate position.

1 number of rebate corner smoke seal was installed along the door stop rebate corner on the head and jambs. The rebate corner smoke seal was not interrupted.

The space between door frame, sub-frame and structural opening was fully filled with fire sealant and silicone sealant.

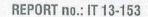
# 3.1.2 Door Leaf

The specimen comprised of a door leaf sized \$200 mm (w) x 2300 mm (h) x 50 mm (t).

The stiles and rails were made of 45 mm (w) x 38 mm (t) wooden slabs. The stiles and rails were fixed together by steel brackets and glue. The core between stiles and rails were filled with 38 mm (t) perlite board. The core was fixed to the stiles and rails by glue.

Both sides of the door core was covered with a layer of 3 mm (t) fire resistance board sub-facing and then finished with a layer of 3 mm (t) medium density fibreboard (MDF) facing. The sub-facing was fixed to the door core by M5 x 25 mm screws at approximate 250 mm centre to centre; whereas the fixing was fixed to the sub-facing by glue.

The door lipping was made of wooden strip.





### 3.1.3 Glazed Element

A glazed element of an overall size 325 mm (w) x 1227 mm (h) was installed 600 mm above the bottom edge and 167 mm away the leading edge of the door leaf.

The glazed element consisted of a piece of nominal 25 mm (t) interlayer glass pane. The glass pane was fined by ceramic fibre and fire sealant. The glass pane was pushed to and clamped by a pair of 1 mm (t) stainless steel (SS) angles, which were fixed onto the door leaf by Ø4 x 25 mm wood screws. Chamfered wooden glazed beads sized 25 mm (width, parallel to the glass) x 14.5 mm (thick, perpendicular to the glass) with bolection return were fixed onto the door leaf on both sides by wood nails at approximate 200 mm centre to centre.

The edges of glass pane were caulked with fire sealant.

# 3.1.4 <u>Ironmongeries</u>

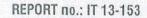
The door leaf was supported into the door frame by 4 numbers of butt hinges. The top hinge was installed approximate 150 mm away top edge, the second top hinge is 250 mm away from the top hinge and the bottom one at 200 mm above bottom edge.

1 number of lever handle was surface mounted 1040 mm above the bottom of the door leaf on the pull side.

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

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

Fire sealant was applied to mortised area for ironmongeries.





### 3.2 Material Schedule

Parts specifications were summarized in the following tables.

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

Intumescent	Material -	Door	Edges
-------------	------------	------	-------

Supplier:	Leung's Wooden Co., Ltd.	
Brand:	Ying Mu	
Model and Sizes:	IS 20X4	20 mm by 4 mm
	IS 10X4	10 mm by 4 mm 🚕 🖰

# **Rebate Corner Smoke Seal**

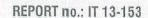
Supplier:	Garish Crown Fire Engineering and Consultants		
Brand:	Ying Mu		
Model:	Seal 1212		
Sizes:	Door Frame Rebate Corner		
Material:	PVC		

# **Conceal Bottom Smoke Seal**

Supplier:	Garish Crown Fire Engineering and Consultants		
Brand:	Ying Muz		
Model:	BSSO		
Sizes:	Bottom Edge of Door Leaf		

### **Door Sub-Frame**

Leung's Wooden Co., Ltd.
Film Plywood
350 kg/m³ *
18 mm by 100 mm
Screws with Metal Plug





<b>Door Frame</b>
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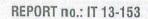
Supplier:	Leung's Wooden Co., Ltd.	
Material:	Hardwood *	
Overall Sizes:	1266 mm by 2337 mm	
Density:	550 – 700 kg/m³ *	
Dimensions:	100 mm by 50 mm	
Rebate:	20 mm	
Connection Method of Head and Jambs:	Mitered Joint with Groove and Tongue; Fixed by Wood Screws	
Fixing Method to Structural Opening: Self-Tapping Screws with Metal Plug		

# **Door Leaf Lippings**

Supplier:	Leung's Wooden Co., Ltd.	Constitution of the consti
Material:	Hardwood *	
Density:	550 - 700 kg/m³ * 🐰	
Thickness:	8 mm	Programme and the second of th

# **Door Leaf Facing**

plier:	Leung's Wooden Co., Ltd.	
erial:	Medium Density Fiberboard (MDF)	
sity:	350 - 450 kg/m³ *	
ckness:	3 mm	
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Door	Leaf	Sub-	fac	ing
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Supplier:	Leung's Wooden Co., Ltd.
Brand:	Gemtree
Material:	Magnesium Oxide *
Density:	950 ± 100 kg/m <sup>3</sup> *
Thickness:	3 mm ± 0.5 mm

# **Door Leaf**

Suppl	ier:	Leung's Wooden Co., Ltd.
Overa	II Sizes:	1200 mm by 2300 mm by 50 mm
SI	Material:	Wooden Slabs
Rai	Width:	45 mm
Stiles and Rails	Thickness:	38 mm
tiles	Density:	350 - 450 kg/m <sup>3</sup> *
SI	Moisture Content:	12 - 17%*
	Supplier:	Leung's Wooden Co., Ltd
asi	Material:	Perlite *
Core	Thickness:	38 mm
	Density:	380 kg/m³ * 5
	Moisture Content:	12 - 17%

# Glass Pane - Glazed Element

Supplier:	Leung's Wooden Co., Ltd.
Brand:	Hangbao
Nominal Thickness:	25 mm *
Composition:	Not Provided
Full Sizes:	325 mm by 1227 mm
Visual Sizes:	275 mm by 1177 mm
Depth of Cover of Glass Edge:	10 - 15 mm
Fixing Method:	Lined by Mineral Wool, Clamped by Stainless Steel Angles and Wooden Glazing Beads on Both Sides



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Ceramic	Fibre -	Glazed	Element
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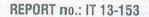
Gerainic Fibre – Glazed Elem	
Supplier:	Garish Crown Fire Engineering and Consultants
Material:	Fire Resistant Wool (Ceramic Fiber Tape)
Density:	200 kg/m³ *
Sizes:	3 mm
Glazing Beads – Glazed Elem	a mm  ent  Leung's Wooden Co., Ltd.  Hardwood *
Supplier:	Leung's Wooden Co., Ltd.
Material:	Hardwood *  550 - 700 kg/m <sup>3</sup> *
Density:	550 - 700 kg/m <sup>3</sup> *
Moisture Content:	550 - 700 kg/m³ *  12 - 17% *
Sizes:	25 mm by 14.5 mm
Fixing Method:	25 mm by 14.5 mm Wood Nails
Hinges	Leung's Wooden Co., Ltd.  Valance  3044-2BB-ST
Supplier:	Leung's Wooden Co., Ltd
Brand:	Valance . Scott
Model:	Valance 3044-2RB-ST
Material:	Stainless Steel
Sizes:	102 mm by 102 mm by 3 mm
Lever Handle	izlation
Supplier:	Ceung's Wooden Co. Ltd.
Model:	Not Provided
Model: Material:	Stainless Steel *
Sizes:	ø20 mm by 150 mm
Material: Sizes:  Door Closer Supplier: State of the stat	
Supplier: 35	Leung's Wooden Co., Ltd.
Brand:	ECO ECO
Model:	TS-20
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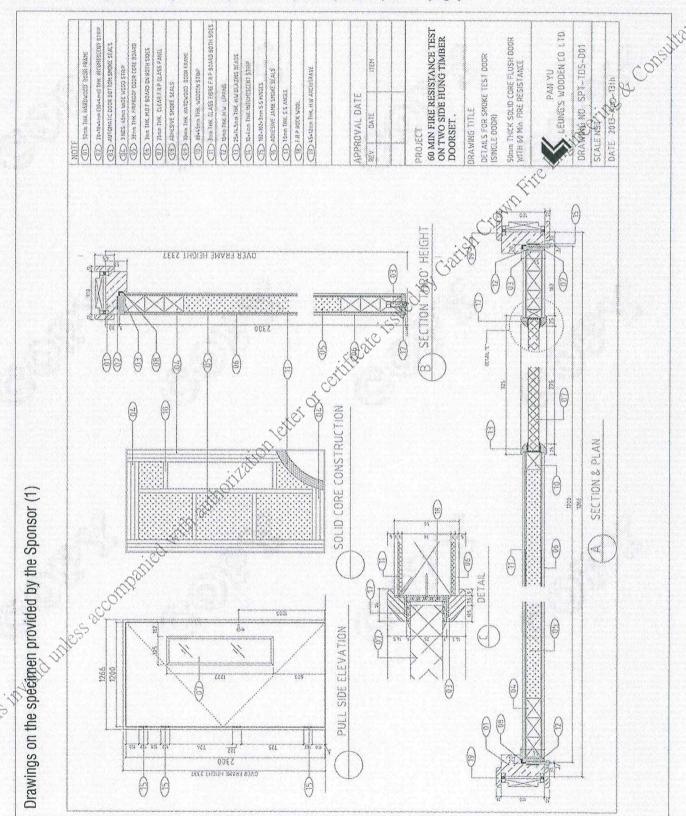
Frame Fixing – Self-tapping Scr	ews
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Brand: Howin — HMF Sizes: 10 mm by 112 mm Screws with Metal Plug  Fire Sealant  Supplier: Garish Crown Fire Engineering and Consultants  Brand: FIREMATE Model: Not Provided  Glue  Supplier: Leung's Wooden Co., Ltd. Model: Not Provided  Type: 木膠粉 *	Supplier: Brand: Howin – HMF Sizes: 10 mm by 112 mm Screws with Metal Plug  Fire Sealant  Supplier: Garish Crown Fire Engineering and Consultants Brand: FIREMATE Model: Not Provided  Glue  Supplier: Leung's Wooden Co., Ltd. Model: Not Provided Type:  ***  ***  **  **  **  **  **  **  **	Supplier:	Leung's wooden co., Ltd.	y Maria Andary Sellen (Alexandra Augusta Asena)	The report of the second section
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Supplier: Garish Crown Fire Engineering and Consultants Brand: FIREMATE Model: Not Provided  Glue Supplier: Leung's Wooden Co., Ltd. Model: Not Provided  Type: 木彫粉 *	Supplier: Garish Crown Fire Engineering and Consultants Brand: FIREMATE Model: Not Provided  Supplier: Leung's Wooden Co., Ltd. Model: Not Provided  Type: 木膠粉 *	Sizes:	10 mm by 112 mm Screws with M	letal Plug	
Supplier: Garish Crown Fire Engineering and Consultants Brand: FIREMATE Model: Not Provided  Glue  Supplier: Leung's Wooden Co., Ltd. Model: Not Provided  Type: 木膠粉 *	Supplier: Garish Crown Fire Engineering and Consultants Brand: FIREMATE Model: Not Provided  Glue  Supplier: Leung's Wooden Co., Ltd.  Model: Not Provided  Type: 木膠粉 *  ***  **  **  **  **  **  **  **  **	Fire Sealant		A CONTRACTOR OF THE CONTRACTOR	. 70
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Supplier: Leung's Wooden Co., Ltd.  Model: Not Provided Type: 木膠粉 *	Supplier: Leung's Wooden Co., Ltd.  Model: Not Provided Type: 木膠粉 *	Model:	Not Provided		ce <sup>V</sup>
Supplier: Leung's Wooden Co., Ltd.  Model: Not Provided Charitin  Type: 木膠粉 *	Supplier:    Leung's Wooden Co., Ltd.     Model:   Not Provided   Capital Type:   木膠粉 *	Glue		***************************************	
Model: Not Provided Graffs Type: 木膠粉 *  Application Research Training Research Trai	Model: Not Provided Type: 木膠粉 *  **  **  **  **  **  **  **  **  **	Supplier:	Leung's Wooden Co., Ltd.	. 20	
Type: 木膠粉 *	Type: 木膠粉 * Light to califficate single of	Model:	Not Provided	Cath	
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# 3.3 Drawings on the Specimen provided by the Sponsor (Total 1 page)





# 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 were supplied by the Sponsor.

# 4.2 Verification of the Specimen

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 structural opening sized 1270 mm (w) x 2355 mm (h) made of steel hollow sections. The space between specimen and the test frame was sealed by a drywall partition.

The drywall partition was constructed by steel studs and channels with single layer gypsum board fixed on both sides.

# 4.4 Installation of the Specimen

The specimen was assembled and installed by workers delegated by the Sponsor on 2013-06-15.

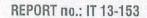
Specimen No.	Orientation 5		Test No.
OT 13 000A	Door leaf could only be swung outwards the	Ambient	QT 13-090A
QT 13-090A	test chamber	Medium	QT 13-090B

# 4.5 Specimen Conditioning

The specimen was stored in the Test Location from 2013-06-15, the date which specimen was received, to 2013-06-19, the date which smoke leakage test was performed.

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

Ambient Temperature (°C)	Relative Humidity (%)
28 ± 8	$75 \pm 10$





#### Test Method 5.

#### 5.1 **Pre-test Conditioning**

The pre-test conditionings of the specimen were carried out on 2013-06-18 prior to the smoke leakage test with reference to BS EN 1634-3: 2004 and clause E.1. DO EN 11032 Sh Clown Fire Finging eting & Con reference to BS EN 1634-3: 2004 and clause 5.1, BS EN 14600: 2005.

#### 5.2 Smoke Leakage Test

#### 5.2.1 Symbols and Designation

Symbol	Unit	Designation
Q	m³/h	Leakage rate
$Q_{app}$	m³/h	Apparatus leakage rate
Q <sub>sup/assoc</sub>	m³/h	Supporting/associated construction leakage rate
Q <sub>spec</sub>	m³/h	Test specimen leakage rate
Q <sub>t</sub>	m³/h	Total leakage rate
Q	m³/h/m	Linear leakage rate

#### 5.2.2 Sequence of Testing

For each specimen, the test was carried out in the following sequence:

- Determine the leakage rate through the test chamber and any supporting or associated construction at a) ambient temperature i.e.  $Q_{app}^{(20)} + Q_{sup/assqe}^{(20)}$
- b) Determine the total leakage rate at ambient temperature i.e. Q<sub>1</sub> (20)
- Determine the total leakage rate at medium temperature i.e. Q<sub>t</sub> (200) c)
- Determine the leakage rate through the apparatus and any supporting and associated construction at d) medium temperature 2000 i.e.  $Q_{app}^{(200)} + Q_{sup/assoc}^{(200)}$

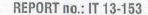
#### 5.2.3 **Ambient Temperature**

The leakage rate through the specimen was measured at pressure difference 10 Pa, 25 Pa and 50 Pa, or for at the pressure difference specified by the Sponsor. During the measurement of the leakage rate the pressure difference was maintained for 2 minutes and the value of Q<sub>spec</sub> (20) was established at the end of this period using:

$$Q_{spec}^{(20)} = Q_t^{(20)} - (Q_{app}^{(20)} + Q_{sup/assoc}^{(20)})$$
  
 $Q_t^{(20)} = Q_{spec}^{(20)}$  "length of  $gap^*$ "

\*where the "length of gap" is defined in Clause 10.2.2.1; BS EN 1634-3; 2004.

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#### 5.2.4 Medium Temperature

The average air temperature close to the face of the specimen was raised from ambient temperature to the 200 ± 20 °C in 30 ± 5 minutes. The temperature distribution over the face of the specimen was monitored by 9 numbers of type K (Figure 1) thermocouples positioned 100 ± 50 mm from the exposed face of the test specimen. During the heating up period, neutral pressure was maintained in the test chamber.

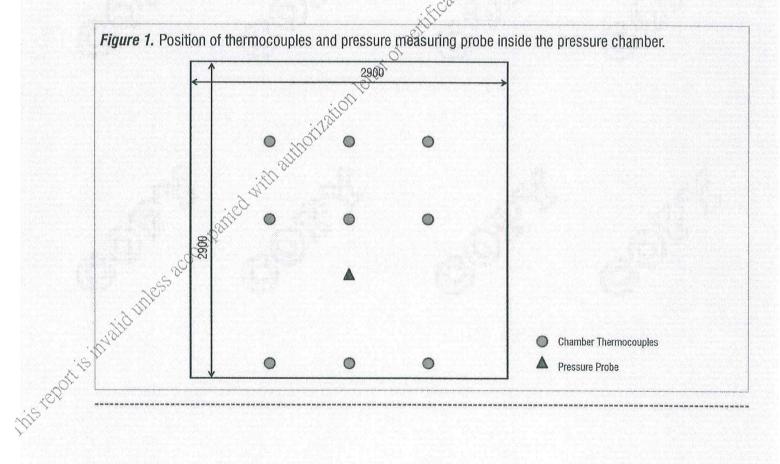
The leakage rate through the test specimen was measured at pressure differences of 10 Pa. 25 Pa and 50 Pa. or at pressure difference specified by the Sponsor. These measurements were taken within 10 minutes of achieving the test temperature. During measurement of the leakage rate the pressure difference was maintained for 2 minutes and the value of  $Q_{\text{spec}}^{(200)}$  established at the end of this period using: itely Crown

$$Q_{spec}^{(200)} = {Q_t}^{(200)} - \left( {Q_{app}}^{(200)} + {Q_{sup/assoc}}^{(200)} \right)$$

#### 5.3 **Deflection Measurements**

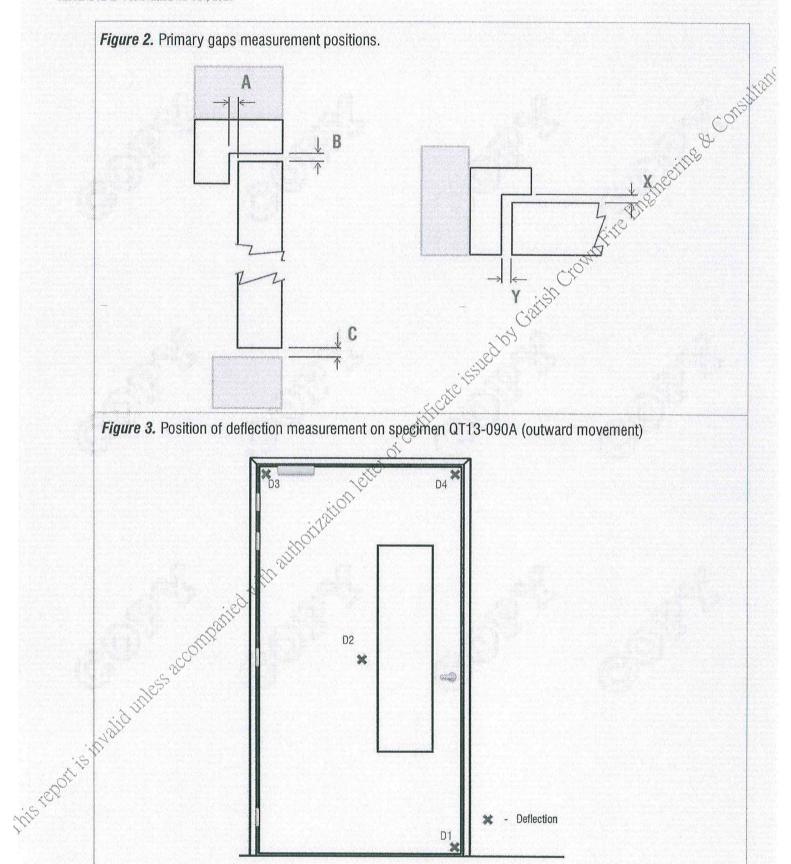
Measurements of the deflection of the test specimen were taken with a steel rule from cross line lasers across the top, mid-height and bottom of the specimen during the medium temperature smoke leakage test.

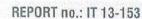
The positions of deflection measurement points are shown in Figure 3.













### 6. Test Data

#### 6.1 Specimen QT13-090A [Test QT13-090A & QT13-090B]

#### 6.1.1 **Ambient Temperature**

The ambient temperature at the commencement of test was 33.1°C.

#### 6.1.2 **Retention Forces**

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

Push	Pull
123.2 N	130.1 N

#### 6.1.3 **Gap Measurements**

#### 6.1.3.1 Primary gap width

Primary gap widths of the specimen were measured and summarized in the following table. The measurement or certificate is positions are shown in Figure 2.

Measurements were taken in mm.

	<b>Primary</b>	Gap Width					
Con	Measured						
Gap	Minimum	Maximum	Average				
Α	2.1	2.1	2.1				
В	3.4	3.8	3.7				
C	1.3	3.30	2,2				
Х	2.5	34.1	3.4				
Υ	2.0	3.4	2.6				

#### Length of Gap 6.1.3.2

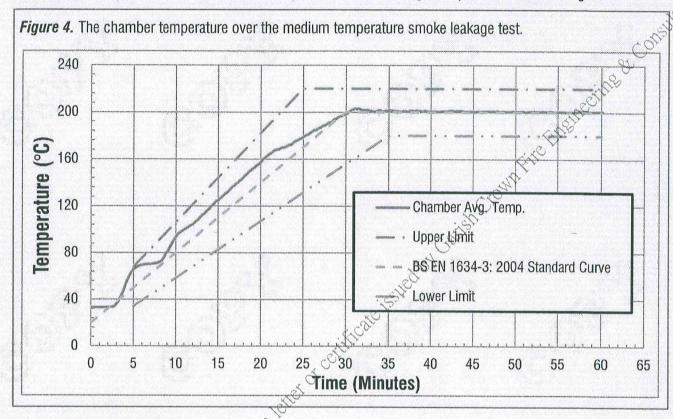
"Length of Gap" of the specimen

= 1186 mm + (2287 mm x 2) = 5.76 m



# 6.1.4 Chamber Temperature

The chamber temperature over the medium temperature smoke leakage test period is shown in Figure 4.



# 6.1.5 <u>Lateral Deflections</u>

Measured lateral deflections over the medium temperature smoke leakage test period are summarized in the following table.

A positive measurement indicates a movement towards into the pressure chamber and vice versa.

Measurements were taken in mm.

Maximum deflection measured was -5 mm at D2 at 36.5 minute of test.

Position \ Time (min)	0	5	10	15	20	25	30	31.5	34	36.5
\CD1	+0	+0	+0	+0	+0	+0	+1	+1	+1	+1
. D2	+0	+0	+1	+1	+1	+1	+1	-1	-2	-5
10) D3	+0	+0	+1	+1	+1	+2	+2	+2	+2	+2
D4	+0	+0	+1	+1	+0	+2	+2	+2	+2	1





#### 6.1.6 Observations

#### 6.1.6.1 Ambient Temperature Smoke Leakage Test

#### 6.1.6.2 Medium Temperature Smoke Leakage Test

Time (min.sec)	the test period are also attached.  Int Temperature Smoke Leakage Test  es of the specimen were observed.  Int Temperature Smoke Leakage Test  Observation (from unexposed side)				
00.00 38.13	Test started.  Smoke released from the bottom edge of the door leaf. The exposed side glass pane cracked.				
39.52	The door leaf deformed.				
60.17	Heating and Pressurization was terminated.				
heating and pressurization	The interlayer of the glass pane reacted and turned white in color. Intumescent sealar around the glass pane expanded.  The cases of the intumescent strips were softened. Some reacted intumescent was observed at the end of intumescent strips.  Some cracks appeared on the door frame and the door lippings.  Door operability after test:  The door leaf could be fully-opened manually.				
	등에서는 기계를 가장하면 하게 함께 발표하면 하는데 보고 있다. 이 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은				





#### 6.1.7 **Photos**

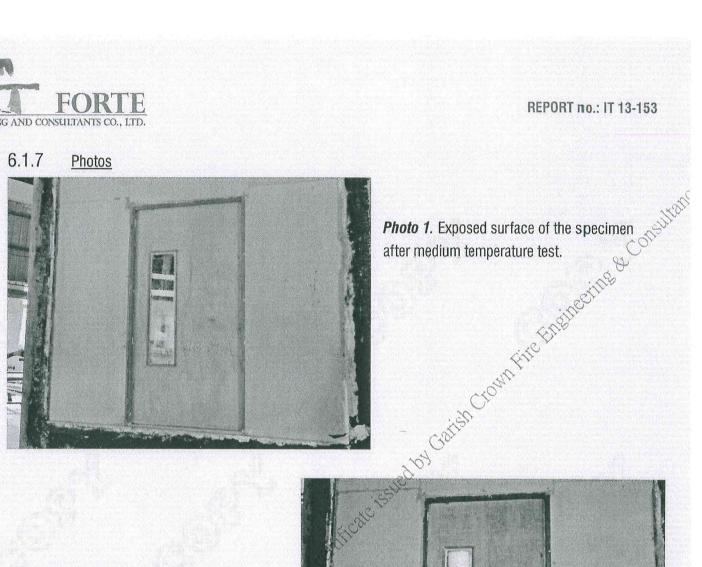


Photo 2. Exposed side of the specimen after medium temperature test.



Photo 3. Unexposed side of the specimen after medium temperature test.







Photo 4. Conceal bottom smoke seal in the specimen after medium temperature test.

> Photo 5. Lever handle position of the specimen after medium temperature test.

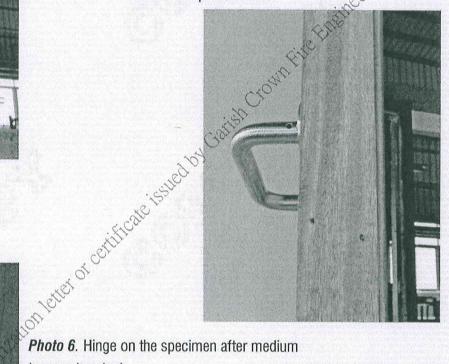
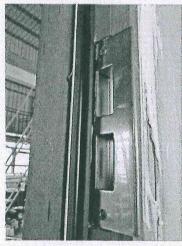
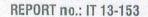




Photo 6. Hinge on the specimen after medium temperature test.

Photo 7. Strike plate position on the specimen before test.







### 7. Test Results

From the test data obtained from the smoke leakage tests, leakage rates for each test specimen were calculated and are summarized in the following table.

No. of Test	Test no. (Face exposed to pressure)	Temperature & Conditions	Leakage rate Q <sub>spec</sub> (m³/h) at pressure difference of			Linear Leakage Rate Q (m³/h/m) at pressure difference of	
			10 Pa	25 Pa	50 Pa	25 Pas	50 Pa
1 QT13-090A (Swing Outwards)	Ambient (threshold sealed)	1.24	5.81	10.96	÷1.01+	1.90	
	Ambient	1.35	6.90	13.15	1.20	2.28	
2	QT13-090B (Swing Outwards)	_ Medium (200°C)	2.32	0.51	30 <b>&lt; 0.1</b> *	All Tables of Carlos	A production of the second state of the second seco

[\* & \*] Description on smoke leakage performance criteria for classification of smoke control door and shutter assemblies are quoted in *Appendix A*.

### 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 of test results is restricted to the allowable changes which a sponsor may make to the tested specimen following a successful smoke leakage test. These variations may 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 1634-3: 2004 and relevant clauses and annexes. Permitted variations away from the test specimen include 1) construction of assembly, 2) size and aspect ratio, 3) glazing, 4) supporting constructions and 5) Seals.



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# Appendix A

# Definitions on Smoke leakage S<sub>a</sub> and S<sub>m</sub> in BS EN 1634-3: 2004

Statements concerning definitions on smoke leakage S<sub>a</sub> and S<sub>m</sub> stated in BS EN 1634-3 are quoted:

British Standards Institution, London, 2007 - BS EN 1634-3: 2004 Incorporating corrigendum no. 1 "Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware Part 3: Smoke control test for door and shutter assemblies", 3.1.4 & 3.1.5

3.1.4 Smoke leakage S.

Ambient temperature smoke leakage classification as defined in 7.5.6.3.1 of EN 13501-2: 2003.

3.1.5 Smoke leakage Sm

Ambient plus medium temperature (200°C) smoke leakage classification as defined in 7.5.63.1 of EN 13501-2: 2003.

### Performance Criteria of Smoke Leakage in BS EN 13501-2: 2003

Statements concerning performance criteria of smoke leakage in BS EN 13501-2: 2003 are quoted:

British Standards Institution, London, 2003 - BS EN 13501-2: 2003 "Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services", 5.2.7 & 7.5.6.3.1

5.2 Resistance to fire performance characteristics

5.2.7 S - Smoke leakage

Smoke leakage S is the ability of the element to reduce or eliminate the passage of gases or smoke from one side of the element to the other.

- \* Sa considers smoke leakage at ambient temperature only.
- \*S<sub>m</sub> considers smoke leakage at both ambient temperature and at 200°C.
- Performance criteria 7.5.6.3
- 7.5.6.3.1 Smoke leakage

This is the ability of the element to reduce or eliminate the passage of smoke from one side of the door to the other. The following performance levels are defined:

- \*smoke leakage  $S_m$  when the maximum leakage rate measured at both ambient temperature and 200°C and up to a pressure of 50 Pa does not exceed 20 m³/h for a single leaf doorset, or 30 m³/h for a double leaf doorset;
- maximum leakage rate measured at ambient temperature only, does not exceed 3 m³/h per meter length of gap between the fixed and doorset (e.g. between the door leaf and door frame), excluding leakage at the threshold. + smoke leakage Sa - when the maximum leakage rate measured at ambient temperature, and at a pressure of up to 25 Pa only, does not exceed 3 m3/h per meter length of gap between the fixed and movable components of the

**END OF REPORT**