

**WFRC TEST REPORT NO. 140152**

**Fire Resistance Test In Accordance  
With BS EN 1364-1: 1999 On  
An Insulated Glazed Screen  
Assembly**

## Summary

**Objective** To determine the fire resistance of an asymmetrical, insulated glazed screen assembly when tested in accordance with BS EN 1364-1: 1999.

**Sponsor** Vetrotech Saint-Gobain (Int) AG, CH-3000, Bern 22, Stauffacherstrasse 128 Switzerland.

**Summary of Tested Specimen** The assembly had overall dimensions of 3000 mm high by 3000 mm wide and comprised a mild steel box section framework clad on either face with sections of 15 mm thick "Promatect H" board and mild steel flat plates. The frame incorporated a full height mullion with transom members either side such that four apertures were formed. Each aperture was glazed with a double glazed unit comprising a 29 mm thick pane of "Contraflam 60/N2" glass, a 10 mm air gap and a pane of 6 mm toughened glass. The largest unit had nominal overall dimensions of 1800 mm wide by 2600 mm high. The units were retained within the frame by the cladding sections on either face.

The assembly was fixed into an aperture within a refractory concrete lined, steel restraint frame such that that the upper, lower and one vertical edge were fixed. The remaining vertical edge was left unfixed, as required by the Standard.

### Test Results:

<b>Integrity Performance</b>	Sustained flaming	92 minutes
	Gap gauge	92 minutes
	Cotton Pad	92 minutes
<b>Insulation</b>		88 minutes

\*The test was discontinued after a period of 93 minutes.

**Date of Test** 22<sup>nd</sup> June 2004

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## Signatories

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\* For and on behalf of Warrington Fire Research Centre.

Report Issued
Date : 8 <sup>th</sup> July 2004

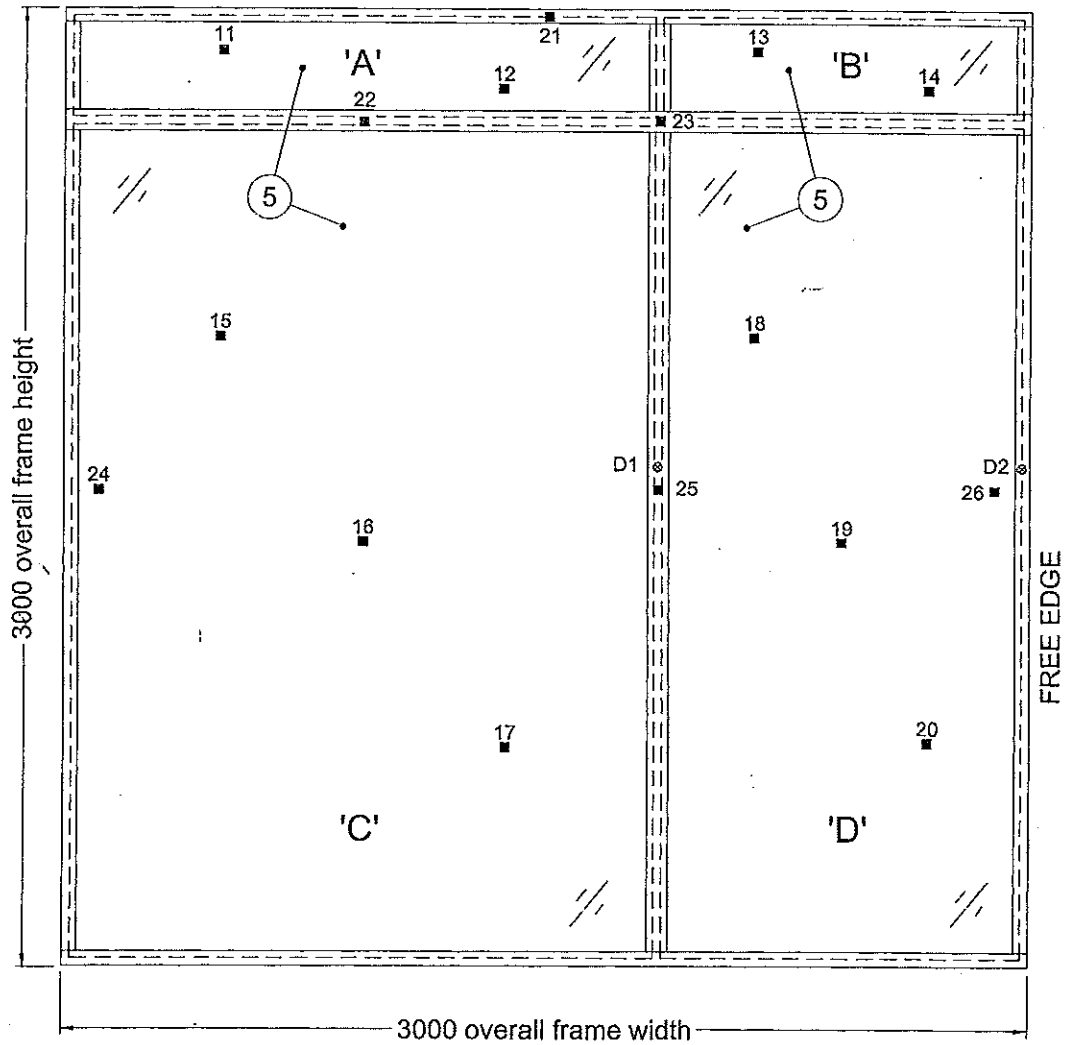
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# Test Specimen

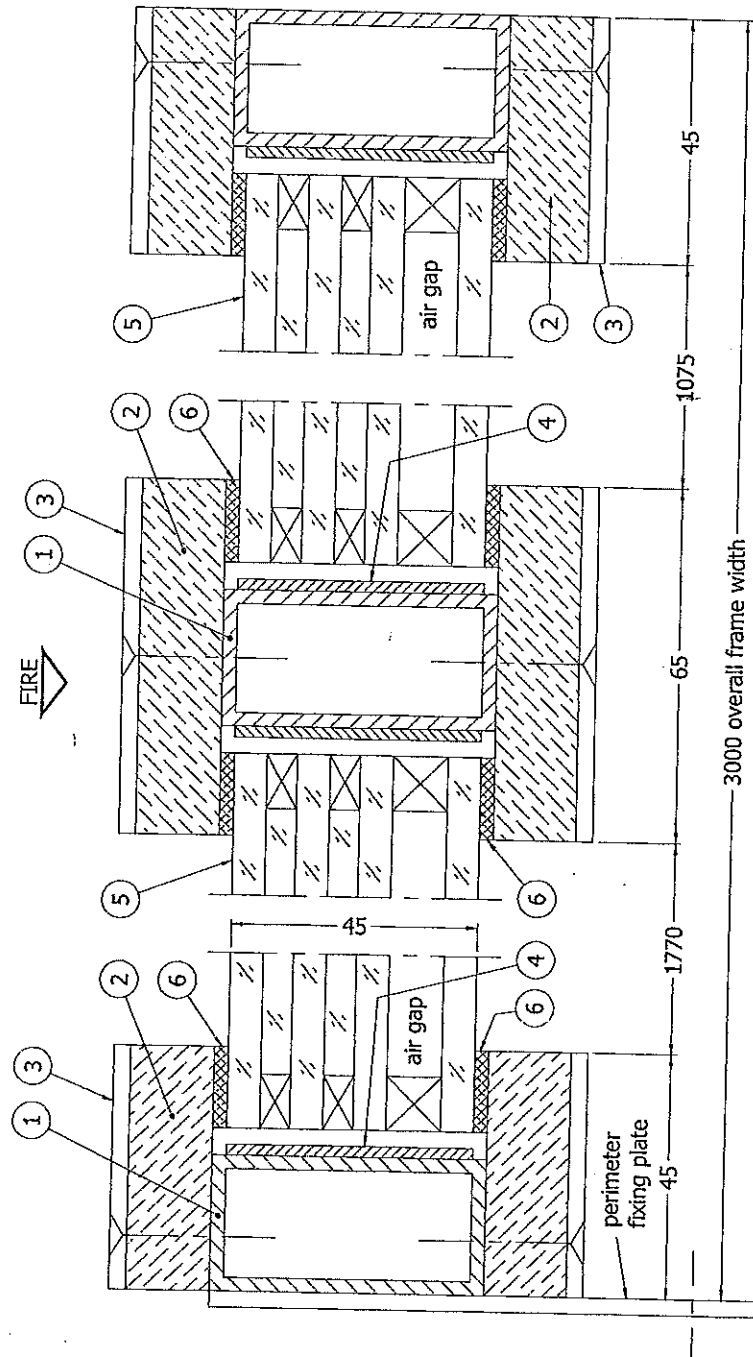
Figure 1- General Elevation of Test Specimen and Unexposed Face Thermocouples



- Positions of thermocouples
- ⊙ Positions of deflection measurements (D1 & D2)

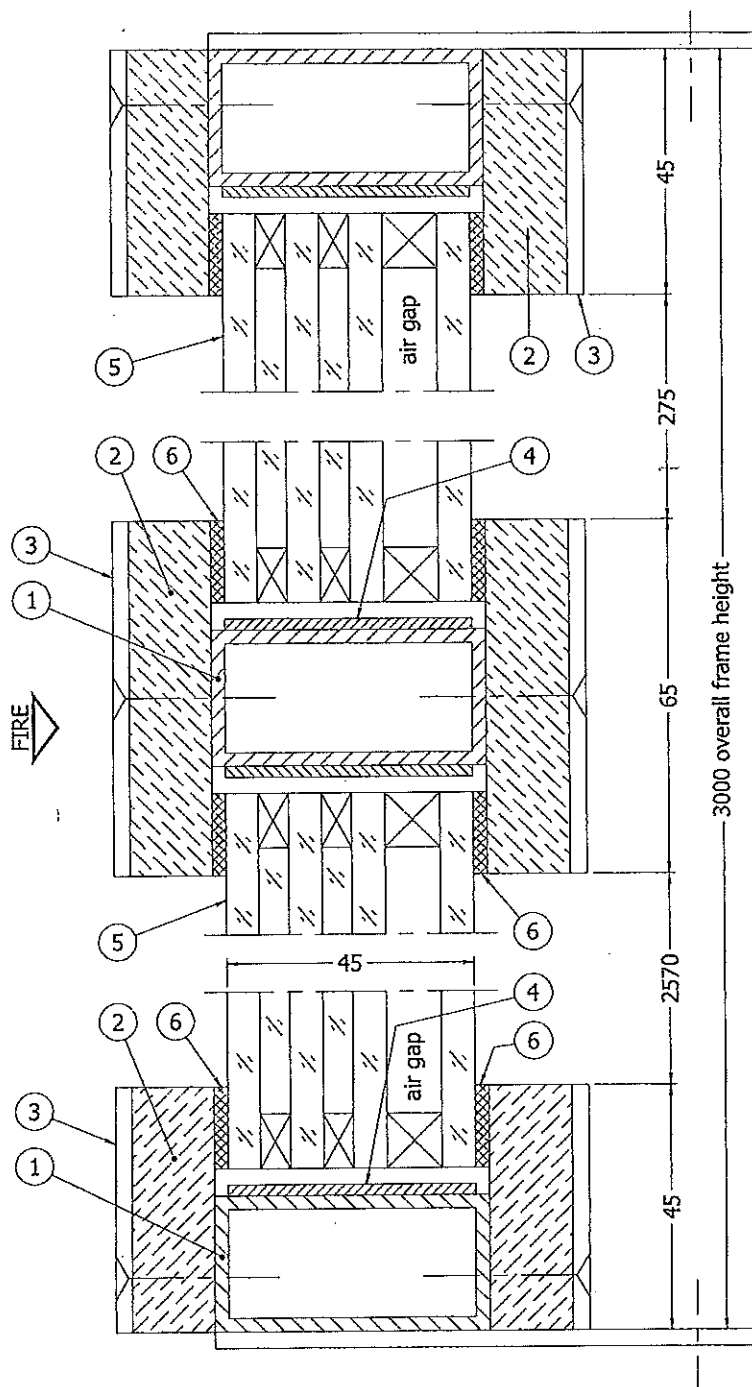
Do not scale. All dimensions are in mm

Figure 2 – Typical Horizontal Section



Do not scale. All dimensions are in mm

Figure 3 – Typical Vertical Section



Do not scale. All dimensions are in mm

## Schedule of Components

(Refer to Figures 1 to 3)  
(All values are nominal unless stated otherwise)  
(All other details are as stated by the sponsor)

<u>Item</u>	<u>Description</u>
<b>1. Perimeter Frame, Mullion and Transom</b>	
Material	: Rectangular hollow section mild steel tubes
Thickness	: 2.5 mm
Overall section size	: 50 mm x 25 mm
Corner joints	: Welded and dressed flush
Fixing method to concrete lining of furnace aperture.	: Anchor bolts via fixing plates. The free edge and the other perimeter gaps between the concrete and the perimeter frame were packed with mineral fibre insulation.
Details of anchors	
i. manufacturer	: Hilti
ii. type	: HT10/92 with M10 steel washer
iii. quantity	: 1 no. anchor per fixing plate
Details of fixing plate	
i. material	: Mild steel plate
ii. thickness	: 3 mm
iii. size	: 30 mm wide x 100 mm long with a 12 mm wide x 20 mm long slotted hole.
iv. quantity	: 5 no. at 675 mm centres along head, base and one vertical edge of perimeter frame.
Fixing method	: Welded to back face of perimeter frame
<b>2. Frame Cover</b>	
Material	: Promatect H
Thickness	: 15 mm
Width	
i. to perimeter frame	: 45 mm
ii. to mullion and transom	: 65 mm



<u>Item</u>	<u>Description</u>
<b>3. Frame Cover Plates</b>	
Material	: Mild steel
Thickness	: 3 mm
Width	
i. to perimeter frame	: 45 mm
ii. to mullion and transom	: 65 mm
Fixing method	: Screw fixed at 300 mm centres
Details of screw fixings	
i. type	: Countersunk head machine screws
ii. material	: Finish BZP
iii. size	: M6 x 30 mm long
<b>4. Frame Lining</b>	
Manufacturer	: Gluske
Reference	: Flexpan 200
Material	: Intumescent seal
Thickness	: 2 mm
Width	: 45 mm
Fixing method	: Self adhesive fixed to the inside faces of each glazing aperture.
<b>5. Glass</b>	
Manufacturer	: Vetrotech Saint Gobain
Reference	: Contraflam 60/N2 ISO
Overall thickness	: 45 mm
Details of each Layer	: 6 mm Tempered glass 5.5 mm Interlayer 6 mm Tempered glass 5.5 mm Interlayer 6 mm Tempered glass 10 mm air gap 6 mm Tempered glass
Glass pane sizes (width & height)	:
i. Pane A	: 1105 mm x 305 mm
ii. Pane B	: 1800 mm x 305 mm
iii. Pane C	: 1105 mm x 2600 mm
iv. Pane D	: 1800 mm x 2600 mm
Nominal edge clearance	: 5 mm
Setting blocks	
i. material	: Promatect H
ii. thickness	: 5 mm
iii. length	: 80 mm
iv. quantity	: 2 no. per pane

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<u>Item</u>	<u>Description</u>
<b>6. Glass Edge Seal</b>	
Manufacturer	: Gluske
Material	: Ceramic fibre tape
Thickness	: 4 mm
Width	: 15 mm
Fixing method	: Self adhesive fixed to Item 2 at both sides of the glass. The seal at the fire side face was capped with a bead of intumescent sealant.
Details of intumescent sealant	
i. manufacturer	: Dow Corning
ii. reference	: Firestop 700
iii. material	: Silicone (colour : black)
iv. application method	: Cartridge gunned

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## Instrumentation

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<b>General</b>	The instrumentation was provided in accordance with the requirements of the Standard.
<b>Furnace</b>	<p>The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 1999 Clause 5.1 using nine plate thermometers, distributed over a plane 100 mm from the surface of the test construction.</p> <p>Nine additional thermocouples of the type specified in the British Standard, BS 476: Part 20: 1987 were included within the furnace chamber for information purposes.</p>
<b>General</b>	Thermocouples were provided to monitor the unexposed surface of the specimen. The output of all instrumentation was recorded at no less than one minute intervals as follows:
<b>Thermocouples 11 to 20</b>	At ten positions on the surface of the glazing, two positions each for Panes A and B and three positions each for Panes C and D.
<b>Thermocouples 24 and 26</b>	At two positions on the surface of the glazing, one positioned 100 mm in from the free vertical edge and one positioned adjacent to the fixed vertical edge.
<b>Thermocouples 21 to 23 and 25</b>	<p>At four positions on the unexposed surface of the frame cover plates.</p> <p>The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1.</p>
<b>Roving Thermocouple</b>	A roving thermocouple was available to measure temperatures on the unexposed surface of the specimens at any position which might appear to be hotter than the temperatures indicated by the fixed thermocouples.
<b>Deflection</b>	The horizontal deflection of the screen was measured at mid-height of the free perimeter edge and the mullion.
<b>Integrity Criteria</b>	Cotton pads and gap gauges were available to evaluate the integrity of the specimen.
<b>Furnace Pressure</b>	The furnace atmospheric pressure was controlled so that it complied with the requirements of BS EN 1363-1: 1999, Clause 5.2. The calculated pressure differential relative to the laboratory atmosphere at the top of the specimen was 20 (+0/-3) Pa.

**Review**

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over five years old should be considered by the user. The laboratory that issued the report will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

**Conclusions**

**Evaluation  
Against  
Objective**

A single specimen of a symmetrical, insulated glazed screen assembly has been subjected to a fire resistance test in accordance with BS EN 1364-1: 1999, 'Fire resistance tests for non-loadbearing elements - Part 1: Walls', BS EN 1363-1: 1999, 'General requirements' and BS EN 1363-2: 1999, 'Alternative and additional procedures'.

The specimen was judged on its ability to comply with the performance criteria for integrity and insulation, as required by with BS EN 1364-1: 1999, and achieved the results detailed below:

<b>Integrity Performance</b>	Sustained flaming	92 minutes
	Gap gauge	92 minutes
	Cotton Pad	92 minutes
<b>Insulation Performance</b>		88 minutes

## Field of Direct Application

### General

The results of this fire test are directly applicable to similar constructions where one or more of the changes listed below are made and the construction continues to comply with that appropriate design code for its stiffness and stability. Other changes are not permitted.

- Decrease in the linear dimensions of panes.
- Change in the aspect ratio of panes provided that the largest dimension of the pane and its area are not increased.
- Decrease in the distance between mullions and/or transoms.
- Decrease in the distance between fixing centres.
- Increase in the dimensions of framing members.
- Changed in the angle of installation by up to 10° from the vertical.
- No extension of height is allowed above that tested.
- The result of a test of fire resistant glazing tested in one of the standard supporting constructions given in EN 1363-1, or the test frame, is applicable to any other supporting construction within the same type (high density rigid, low density rigid or flexible) that has a greater fire resistance.