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FIRE RESISTANCE TEST TO BS 476: PART 22: 1987 ON
A GLAZING PANEL INSTALLED WITHIN A TIMBER DOOR BLANK

TEST REPORT NO. J89349/1

Prepared for:

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Member of the SGS Group (Société Générale de Surveillance)



**FIRE RESISTANCE TEST TO BS 476: PART 22: 1987
ON A GLAZING PANEL INSTALLED WITHIN A TIMBER
DOOR BLANK**

SUMMARY

A fire resistance test to BS 476: Part 22: 1987 was carried out on a GRP glazing panel installed within a 54mm thick timber door blank in a 1.1m by 1.1m fire resistance furnace. The specimen was found to satisfy the criterion of the Standard as follows:-

Integrity 39 minutes

(No value for insulation performance can be given for specimens that are essentially non-insulating in nature).

The test was terminated at 41 minutes.

1. INTRODUCTION

On the Sponsor's instructions, whose fax transmission reference DB/DT of 17th December 1991 refers, a fire resistance test to BS 476: Part 22: 1987 was performed upon a GRP glazing system installed within a 54mm thick timber door blank. The test was carried out on 19th December 1991, and was witnessed by a representative of the Sponsor.

2. TEST CONSTRUCTION

The test construction comprised a 54mm thick timber door blank, into which was installed a GRP glazed panel (sight size 570mm by 570mm). The overall dimensions of the door blank were 1150mm by 1150mm, and it was clamped in place on a concrete lined restraint frame, to form a panel for exposure to the furnace conditions.

2.1 Glazing System

The glazing system comprised a 602mm by 602mm by 6mm thick 'Fybagard' smooth faced Georgian Wired GRP sheet, installed in an aperture cut in the door blank, between timber glazing beads. The GRP panel comprised 6mm nominal thickness of 'Scott Bader Type 388 polyester resin' reinforced with 'Owens Corning' type MK22 glass fibre. The

total glass content of the panel was approximately 30%. The wire mesh used was 25 gauge galvanised mild steel wire, welded into a 12mm pitch 'net'. This was positioned within the centre of the thickness of the panel.

The glazing beads were 25mm by 27mm O/A hardwood, screwed through to the door core at 260mm centres using 65mm screws driven in at an angle. A 1mm (approx.) wide gap between each glazing bead and the GRP panel was filled with 'EVO-STIK' pre-formed intumescent sealing strips. The GRP panel was drilled and fixed to the non fire side glazing bead at 100mm centres using 20mm countersunk screws on all edges. The sight size of the panel was 570mm by 570mm.

2.2 Door Blank

The door blank was a panel with overall dimensions 1150mm by 1150mm by 54mm, thick. It comprised a 36mm thick flaxboard core (350Kg/m³ density) within a 36mm by 36mm softwood frame (620Kg/m³ density). The frame and core were covered on both sides with a 4mm thick plywood facing on top of a 5mm thick layer of chipboard (780Kg/m³ and 820Kg/m³ density respectively). The panel was hardwood lipped on all edges (9mm thick). All components were bonded together using 'E341 RF' emulsion based adhesive.

For more details of the test construction, see Figures 1 and 2.

3. TEST METHOD

The specimen described in 2 above was tested to BS 476: Part 22: 1987, Method 10; 'Determination of the fire resistance of glazed elements', on 17th December 1991.

Four thermocouples were suitably positioned within the furnace to enable the temperature to be monitored and controlled. The actual mean furnace temperature and specified mean furnace temperature are shown graphically in Figure 3. The percentage difference between the two has been calculated and is shown in Table 1.

Five disc-type thermocouples were attached to the non fire side of the construction at its centre (on the GRP) and at the centre of each of its quadrants (on the door blank). The mean and maximum temperatures recorded from these sensors are shown graphically in Figure 4. The temperature data acquired is shown in Table 2.

The pressure in the furnace was monitored and controlled to be 10 Pa \pm 2 Pa at mid height on the specimen from 5 minutes after the test commenced until test termination.

Photographs were taken of the specimen before, during and after the test; these are presented at the end of the report.

"Where areas of the test specification are ambiguous or open to interpretation the Fire Test Study Group Resolutions have been followed where appropriate. These Resolutions provide the basis of common agreements between the fire test laboratories who are members of this Group".

4. OBSERVATIONS

Time minutes	Observations
0	The test was started.
3	The GRP glazing panel was bowing and delaminating.
5	The delamination was spreading. Smoke was emanating from the specimen periphery.
8	Delamination was continuing. The areas of delamination were overlapping.
12	Small jets of vapour were coming from pinholes in the non-exposed face of the GRP.
15	Intumescent material was oozing out at the head of the GRP panel.
18	The exposed face glazing bead was charred and cracked. Extensive discolouration of the GRP was evident on the non-exposed face.
23	A crease was forming at the base of the GRP panel at mid-width.
28	Intumescent was oozing out from behind the glazing beads on both vertical edges of the panel.
33	The unexposed face of the GRP was now almost entirely blackened.
34	The glazing bead was severely cracked on the exposed face, but little of it had actually fallen away. More creases were forming on the vertical edges of the panel, and much intumescent was oozing out of the lower glazing bead.
37	The GRP panel had distorted towards the furnace at its bottom right-hand corner. Glowing was visible at this point.
39	Substantial flaming was visible spreading from the above position to the head of the panel. <u>Integrity failure</u> was deemed to have occurred.
41	The test was terminated.

5. DISCUSSION

The specimen ceased to satisfy the integrity criterion of the Standard at 39 minutes, when sustained flaming occurred on the non fire side of the panel. This was associated with a gap that had formed between the panel and the glazing bead at the base of the right-hand side, due to distortion of the panel towards the furnace at this point.

6. CONCLUSION

The GRP glazing system installed within a 54mm thick door blank, described in 2 above, was tested to BS 476: Part 22: 1987, and was found to perform as follows:-

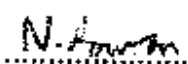
Integrity 39 minutes

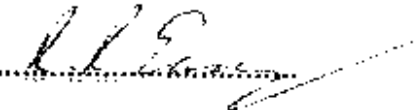
(No value for insulation can be given for elements of construction that are essentially non-insulating in nature).

7. LIMITATIONS

'The results only relate to the behaviour of the specimen of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires'.

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