



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com

Report Number **BTC 14434F**

A FIRE RESISTANCE TEST ON A SINGLE ACTING, SINGLE
LEAF COMPOSITE DOOR, CONSTRUCTED IN A PVC /
STEEL FRAME, CONDUCTED IN ACCORDANCE WITH
BS 476: PART 22: 1987: CLAUSE 6.

Test Date: 16th February 2006

www.btconline.co.uk

Customer: **L B Plastics Limited**
Firs Works
Nether Heage
Derby
DE56 2JJ

Customer: L B Plastics Limited

BTC 14434F: Page 1 of 74



0296



A FIRE RESISTANCE TEST ON A SINGLE ACTING, SINGLE LEAF COMPOSITE DOOR, CONSTRUCTED IN A PVC / STEEL FRAME, CONDUCTED IN ACCORDANCE WITH BS 476: PART 22: 1987: CLAUSE 6.

TABLE OF CONTENTS

FOREWORD	4
REPORT AUTHORISATION	4
TEST CONSTRUCTION	5
Doorset	5
Doorset	5
Door leaf perimeter framework	6
Door leaf internal framework	7
Door leaf core	7
Door leaf outer facings	7
Door leaf lippings	8
Intumescent to door leaf	8
Intumescent to door leaf	9
Door frame (jambs & head)	9
Intumescent to frame head & jambs	10
Intumescent to frame head & jambs	11
Hinges	12
Door closer	13
Latch & Associated Furniture	14
Door viewer	15
Letter plate	15
Standard Supporting Construction	16
CONSTRUCTION DRAWINGS	17
Composite Fire Door	17
Composite Fire Door	18
General Description of Parts	19
Outer Frame General Assembly Details	20
Unexposed Face Elevation	21
Vertical Section Through Doorset – Section A-A	22
Horizontal Section Through Doorset – Section B-B	23
Horizontal Section Through Closing Edge of Doorset at Upper Latch Position - Section C-C	24
Horizontal Section Through Closing Edge of Doorset at Latch Position – Section D-D	25

Customer: L B Plastics Limited

BTC 14434F: Page 2 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 28. Unexposed face at 34 minutes.

Customer: L B Plastics Limited

BTC 14434F: Page 72 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com

Horizontal Section Through Hanging Edge of Doorset at Lower Hinge Position - Section E-E	26
TEST PROCEDURE	27
TEST RESULTS	28
LIMITATIONS	28
TEST DATA	29
Observations	29
Door Closer Moments	32
Furnace Temperature Graph	33
Furnace Pressure Graph	34
Doorset Temperature Graph	35
Unexposed Face Thermocouple Layout	36
Door Leaf Panels Standard Five Thermocouple Data	37
Door Leaf Stiles and Muntin Standard Five Thermocouple Data	39
Door Frame and Additional Thermocouple Data	41
Doorset Perimeter Gap Measurements	43
Doorset Deflection Measurements	44
PHOTOGRAPHS	45

Customer: L B Plastics Limited

BTC 14434F: Page 3 of 74





FOREWORD

This test report details a fire resistance test conducted on a single acting, single leaf composite door, hung in a PVC / steel frame. The doorset was constructed in a lightweight supporting construction comprising a timber stud partition. The test sponsor was L B Plastics Limited.

The Building Test Centre built the supporting construction and installed the test specimen between 8th and 9th February 2006. The Building Test Centre played no role in the design or selection of the materials comprising the test specimen.

The following personnel witnessed the test: -

Mr Jim Duncan of L B Plastics Ltd
Mr Derek Ward of Environmental Seals Ltd
Mr Ray James of Environmental Seals Ltd
Mr Gary Wadey of Environmental Seals Ltd

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.

REPORT AUTHORISATION

Report Author

Donna Thornton
Technologist

Authorised by

Steve Harms
BEng (Hons.), MIFireE
Fire Test Laboratory Manager

The Building Test Centre will not discuss the content of this report without written permission from the test sponsor. The Building Test Centre retains ownership of the test report content but authorises the test sponsor to reproduce the report as necessary in its entirety only.

Customer: L B Plastics Limited

BTC 14434F: Page 4 of 74



0296



TEST CONSTRUCTION

The doorset consisted of a single acting, composite door leaf, hung in a PVC / steel frame and supported in a lightweight timber stud partition.

The doorset was manufactured and supplied by L B Plastics Limited.

Information Status Key

N/C	Not checked / cannot be checked
N/A	Not Applicable
N/S	Not Supplied
BTC	Checked by BTC
C	Checked or supplied by Customer
()	Nominal dimensions

Doorset

The doorset comprised the following:

Info Status	Description. (The laboratory has checked component details marked with BTC in the 'info status' column).
-------------	---

1	Doorset	
C	Reference	Nanya FD30 Door Leaf
C	Nominal door leaf size	Height 2030mm Width 940mm Thickness 45mm
BTC	Actual door leaf size	Height 2030mm Width 940mm Thickness 45mm
C	Stated leaf mass	N/S

Customer: L B Plastics Limited

BTC 14434F: Page 5 of 74



0296



1	Doorset	
BTC	Actual leaf mass Including: Hinges Latch Handles Letterbox Spy hole/cover	42.5kg
C	Door leaf finish	See section 6

2	Door leaf perimeter framework	
C	Manufacturer (if non-timber)	N/A
C	Material (species if timber)	European Redwood
C	Reference (if non-timber)	N/A
C	Density	510kg/m ³
C N/C	Sizes – Muntins (specify quantity & position)	Head & Jambs Width 90mm Depth 40mm
C N/C	Sizes – Rails (specify quantity & position)	Stop Width 25mm Depth 12mm
C	Jointing method	Steel wood screws at 600-800mm centres

Customer: L B Plastics Limited

BTC 14434F: Page 6 of 74



0296



3	Door leaf internal framework	
C	Manufacturer	Nan Ya Company
C	Material (species if timber)	Plasterboard
C	Reference (if non-timber)	N/A
C	Density	800kg/m ³
C N/C	Sizes – Muntins (specify quantity & position)	Top Width 36mm Depth 41mm
C N/C	Sizes – Rails (specify quantity & position)	Width 36mm Depth 41mm
C	Jointing method	Adhesive with polyurethane

4	Door leaf core	
C	Manufacturer	Nan Ya Company
C	Material (species if timber)	Phenolic foam
C	Reference (if non-timber)	N/A
C	Density	150kg/m ³ (minimum)

5	Door leaf inner facings	NOT APPLICABLE
---	-------------------------	----------------

6	Door leaf outer facings	
C	Manufacturer	Nan Ya Company
C	Material (species if timber)	SMC Skin
C	Reference (if non-timber)	It is similar to FRP
C	Density	1700kg/m ³ (minimum)
C	Thickness	1.7mm (minimum)
C	Adhesive manufacturer	N/A

Customer: L B Plastics Limited

BTC 14434F: Page 7 of 74



0296



7	Door leaf lippings	
BTC	Material (species if timber)	Timber
C	Density	400kg/m ³ (minimum)
C	Thickness – measure & identify all	12mm - 22mm hanging edge 16mm (BTC) closing edge 18mm (BTC)
C	Adhesive manufacturer	Nan Ya Company
C	Adhesive Type	Polyurethane
C	Adhesive Curing Method	Pressing 30 minutes

8	Intumescent to door leaf	
C BTC	<u>Head</u>	None
	<u>Hanging Edge</u>	
C	Manufacturer	N/S
C	Reference	N/S
BTC	Size and Quantity	Length Full Width 16mm Thickness 1mm Quantity 1
BTC	Fixing method	loose
BTC	Position	Behind steel edge lipping (lipping size:- 45mm x 8mm x 3mm thick)
BTC	Colour	Grey speckled

Customer: L B Plastics Limited

BTC 14434F: Page 8 of 74



0296



8	Intumescent to door leaf	
	<u>Closing Edge</u>	
C	Manufacturer	N/S
C	Reference	N/S
BTC	Size and Quantity	Length Full Width 10mm Thickness 2mm Quantity 1
BTC	Fixing method	loose
BTC	Position	Behind steel edge lipping (lipping size:- 45mm x 8mm x 3mm thick)
BTC	Colour	Grey speckled

9	Door frame (jambs & head)	
C	Manufacturer (if non-timber)	L B Plastics Ltd
C	Material (species if timber)	PVC / steel
C	Reference (if non-timber)	SK 77950/S118 Steel reinforced
N/A	Density	N/A
N/A	Average moisture content (test lab)	N/A
C	Frame size	Width 70mm
BTC	- door stop included	Thickness 70mm
C	Overall frame dimensions	Height 2115mm Width 1050mm
C	Jambs to head jointing method	Fusion Welded
BTC	Frame fixings	100mm no.10 screws.
C	Number of frame fixings & positions	4 fixings per jamb, at 150mm from the head and base of the door frame and at 600mm centres.
BTC	- Countersunk	

Customer: L B Plastics Limited

BTC 14434F: Page 9 of 74



0296



9	Door frame (jambs & head)	
C	Door Stop	Width 20mm
BTC	Integral – part of folded steel section	Depth 20mm
N/A	Fixing for door stops (type, size and position)	N/A
N/A	Architrave	N/A
C	Threshold	Stormguard AM3 110mm x 25mm

10	Intumescent to frame head & jambs	
C	<u>OUTER head & jambs</u>	See figures 1, 3, 6 & 7
C	Manufacturer	Environmental Seals Limited
C	Reference	ES302 2mm thick No.2 ES102 2mm thick No.2
C	Size and Quantity	Length Full
BTC	<u>ES302</u> <u>2mm No.2</u>	Width 30mm
		Thickness 2mm
		Quantity 1
C	Fixing method	Self-adhesive
BTC	Position	Centrally in frame
BTC	Colour	Speckled grey
C	Size and Quantity	Length Full
BTC	<u>ES102</u> <u>2mm No.2</u>	Width 10mm
		Thickness 2mm
		Quantity 2
C	Fixing method	Self-adhesive
BTC	Position	One positioned at either side of ES302 intumescent
BTC	Colour	Speckled grey

Customer: L B Plastics Limited

BTC 14434F: Page 10 of 74



0296



10	Intumescent to frame head & jambs	
C	<u>INNER head & jambs</u>	See figures 3 & 7
C	Manufacturer	Environmental Seals Ltd
C	Reference	ES253 3mm thick No.2
C BTC	Size and Quantity	Length Full Width 25mm Thickness 3mm Quantity 1
C	Fixing method	Self-adhesive
BTC	Position	Centrally in frame
BTC	Colour	Grey inside outer black casing
C BTC	Additional Seals (NOT intumescent)	2 standard brush seals 1 Qlon weather seal (see drawings & photographs for positions)

11	Overpanel	NOT APPLICABLE
----	-----------	----------------

12	Overpanel perimeter framework	NOT APPLICABLE
----	-------------------------------	----------------

13	Overpanel core	NOT APPLICABLE
----	----------------	----------------

14	Overpanel inner facings	NOT APPLICABLE
----	-------------------------	----------------

Customer: L B Plastics Limited

BTC 14434F: Page 11 of 74



0296



15	Overpanel outer facings	NOT APPLICABLE
16	Overpanel lippings	NOT APPLICABLE
17	Overpanel Intumescent	NOT APPLICABLE
18	Glass	NOT APPLICABLE
19	Glazing aperture lining	NOT APPLICABLE
20	Glass edge seal / lining	NOT APPLICABLE
21	Glazing beads	NOT APPLICABLE
22	Hinges	
C	Manufacturer	Laird
C	Reference	DNCADG0008/DNCBDG001A
C BTC	Quantity	3
BTC	Position	230mm from base 1020mm from base 230 mm from head Measured to centre of hinge
C	Primary Material	Zinc alloy
C	Bearing Material	Acetal

Customer: L B Plastics Limited

BTC 14434F: Page 12 of 74



0296



22	Hinges	
BTC	Size of Knuckle	Approximately 16mm diameter
BTC	Size of Blades	100mm x 37mm x 4mm thick
C BTC	Fixing Size and Type	Door leaf - 50mm no.10 screws (BTC) Door frame - 25mm M4 self-drilling machine screws (C)
BTC	Number of Fixings Per Flap.	4 to door leaf 3 (visible) to door frame
C	Bedding Material Manufacturer	Environmental Seals Ltd
C	Bedding Material	1mm No.1 HP
C BTC	Bedding Material Thickness	1mm
BTC	Colour	grey speckled

23	Hinge bolts	NOT APPLICABLE
----	-------------	----------------

24	Door closer	
BTC	Manufacturer	Dorma
BTC	Reference	TS72 Silver
N/S	Material	N/S
BTC	Overall size	Length 230mm Height 65mm Depth 44mm
BTC	Fitting	Exposed face
BTC	Distance from Hanging Edge	Centred at 230mm

Customer: L B Plastics Limited

BTC 14434F: Page 13 of 74



0296



25	Latch & Associated Furniture	
C	Manufacturer	Fullex
C	Reference	Fullex Crimebeater SL16
C	Primary material	Mild Steel
C	Latch bolt material	Mazak 5
C BTC	Latch bolt throw	11mm latch (C, BTC) 13mm key (BTC) 20mm top and bottom (BTC)
C/BTC	Latch operation	Disengaged
C	Lock body bedding material manufacturer	Environmental Seals Limited
C	Lock body bedding material	1mm No.1 LPH intumescent
C	Bedding material thickness	1mm
C	Lock forend bedding material manufacturer	Environmental Seals Limited
C	Lock forend bedding material	1mm No.1 LPH intumescent
C	Bedding material thickness	1mm
C	Lever handle manufacturer	Hoppe
C	Lever handle material	Aluminium
C	Lever handle bedding material	1mm No.1 HP intumescent
C	Bedding material thickness	1mm
BTC	Lever handle size	1105mm
BTC	Handle spindle centred at (from base of door leaf)	1000mm
C BTC	Size of strike plate	Height 212mm Width 40mm
C	Strike plate bedding material manufacturer	Environmental Seals Limited
C	Strike plate bedding material	1mm No.1 LPH intumescent
C	Bedding material thickness	1mm
C	Size of keep	120mm x 30mm
C	Keep lining material	1mm No.1 LPH intumescent
C	Keep lining material thickness	1mm

Customer: L B Plastics Limited

BTC 14434F: Page 14 of 74



0296



26	Push plate	NOT APPLICABLE
----	------------	----------------

27	Flushbolts / barrel bolts	NOT APPLICABLE
----	---------------------------	----------------

28	Door viewer	
C	Manufacturer	U.A.P. Ltd
C	Reference	E1001
C	Size	Diameter 12mm Length 65mm (180° View) outer dimension - 25mm diameter with cover on fire side of door leaf (BTC)
C	Casing material	Brass
C	Bedding material manufacturer	Environmental Seals Limited
C	Bedding material	1mm No.1 HP intumescent
C	Bedding material thickness & position	1mm around viewer

29	Letter plate	
C	Manufacturer	Paddock
C	Reference	Firemaster P207 (includes own intumescent)
C	Material	Aluminium/ABS Sleeve
C	Size of cut-out	274mm x 55mm
C	Size of letter plate	303mm x 70mm
BTC	Position	Centred at 915mm from base of leaf
C	Bedding material manufacturer	Environmental Seals Limited
C	Bedding material	LBL intumescent (Letterbox Liner) 35mm wide

Customer: L B Plastics Limited

BTC 14434F: Page 15 of 74



0296



29	Letter plate	
C BTC	Bedding material thickness & position	5mm thick perimeter around head & base 7mm thick perimeter around sides
C BTC	Fixing method	Self-adhesive

See figures 1 to 10 for details of the doorset construction.

Standard Supporting Construction

The doorset was mounted in a lightweight timber stud partition comprising: 50mm x 100mm timber framework fixed using 100mm nails, two per joint. Additional horizontal noggings were fixed at 2700mm height and vertical noggings at 600mm centres for the board edges.

A double layer of 12.5mm Gyproc FireLine was fixed to the timber studwork using 25mm Gyproc drywall timber screws on the inner layer and 36mm Gyproc drywall timber screws on the outer layer. The aperture of the door was lined with two layers of 12.5mm Gyproc FireLine Board. All external board joints were taped and filled using Gyproc Paper Joint Tape and Gyproc Joint Filler as appropriate. All screw heads were spotted using Gyproc Joint Filler.

1. 50mm x 100mm timber.
2. 12.5mm Gyproc FireLine board.
3. 100mm nails.
4. 25mm Gyproc drywall timber screws.
5. 36mm Gyproc drywall timber screws.
6. Gyproc Joint Tape.
7. Gyproc Joint Filler.

All materials supplied by the Building Test Centre.

The descriptions of individual components making up the test specimen were provided by the customer and were checked for accuracy wherever possible.

Customer: L B Plastics Limited

BTC 14434F: Page 16 of 74



0296



CONSTRUCTION DRAWINGS

Composite Fire Door

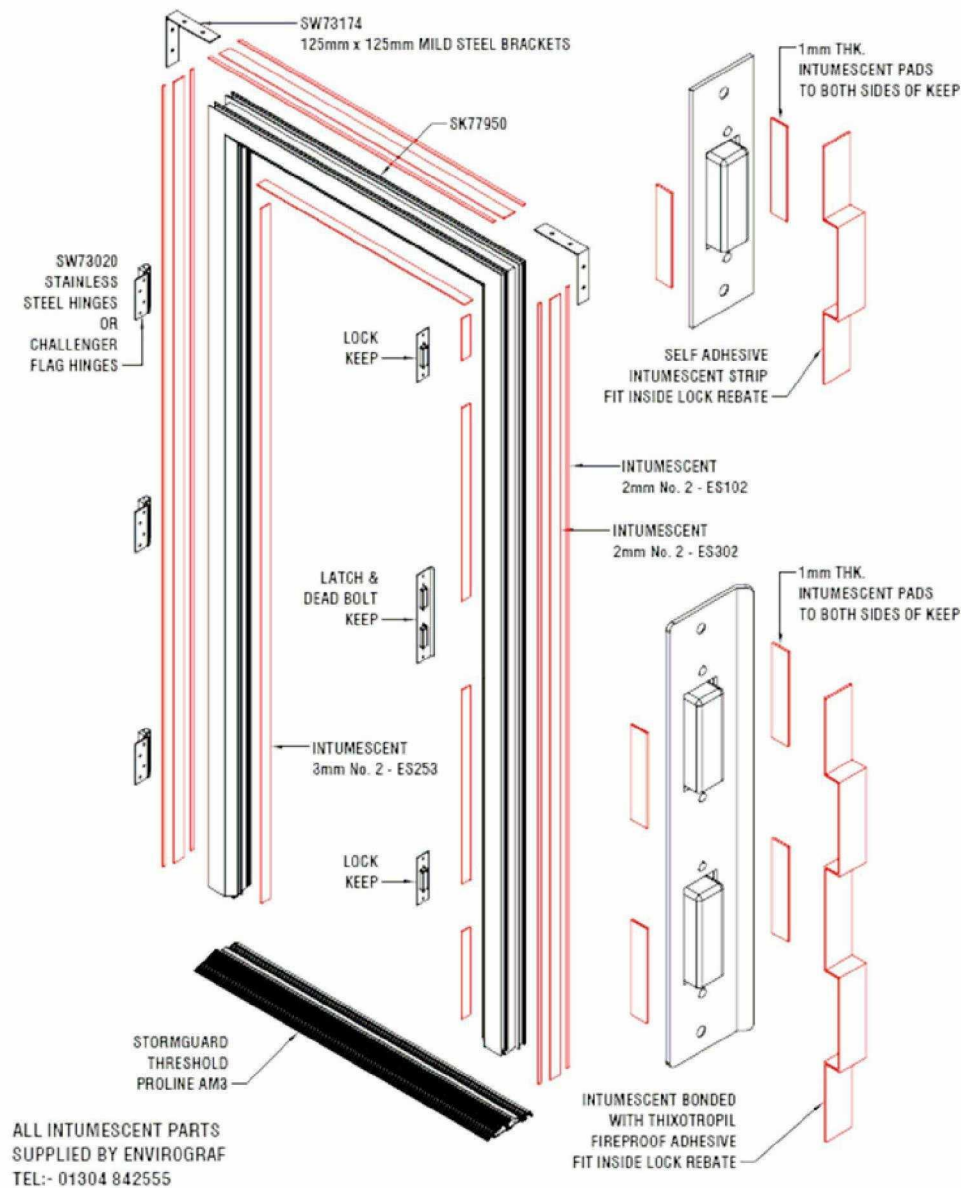


Figure 1. Pictorial view of outerframe with component descriptions.

Customer: L B Plastics Limited

BTC 14434F: Page 17 of 74



0296



Composite Fire Door

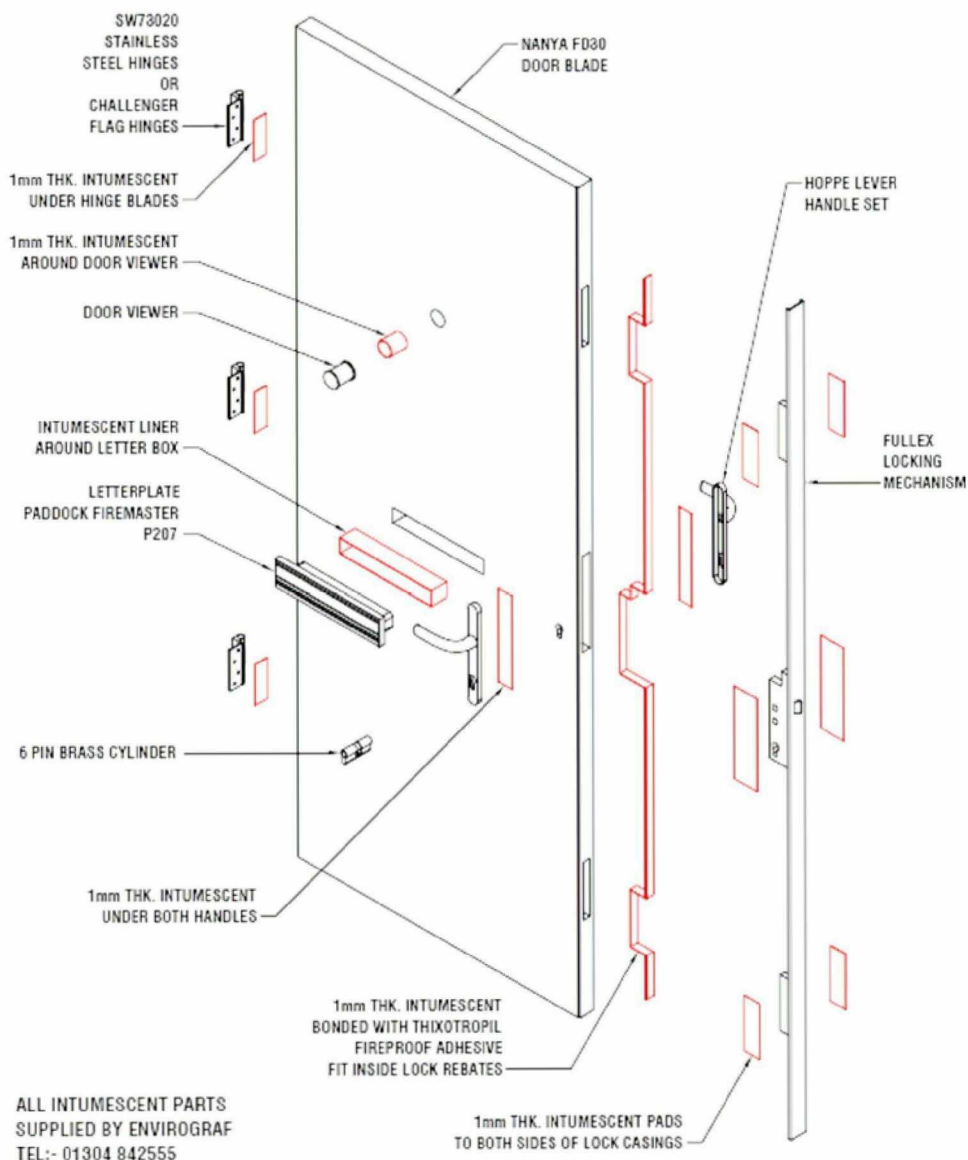


Figure 2. Pictorial view of door blade with component descriptions.

Customer: L B Plastics Limited

BTC 14434F: Page 18 of 74



0296



General Description of Parts

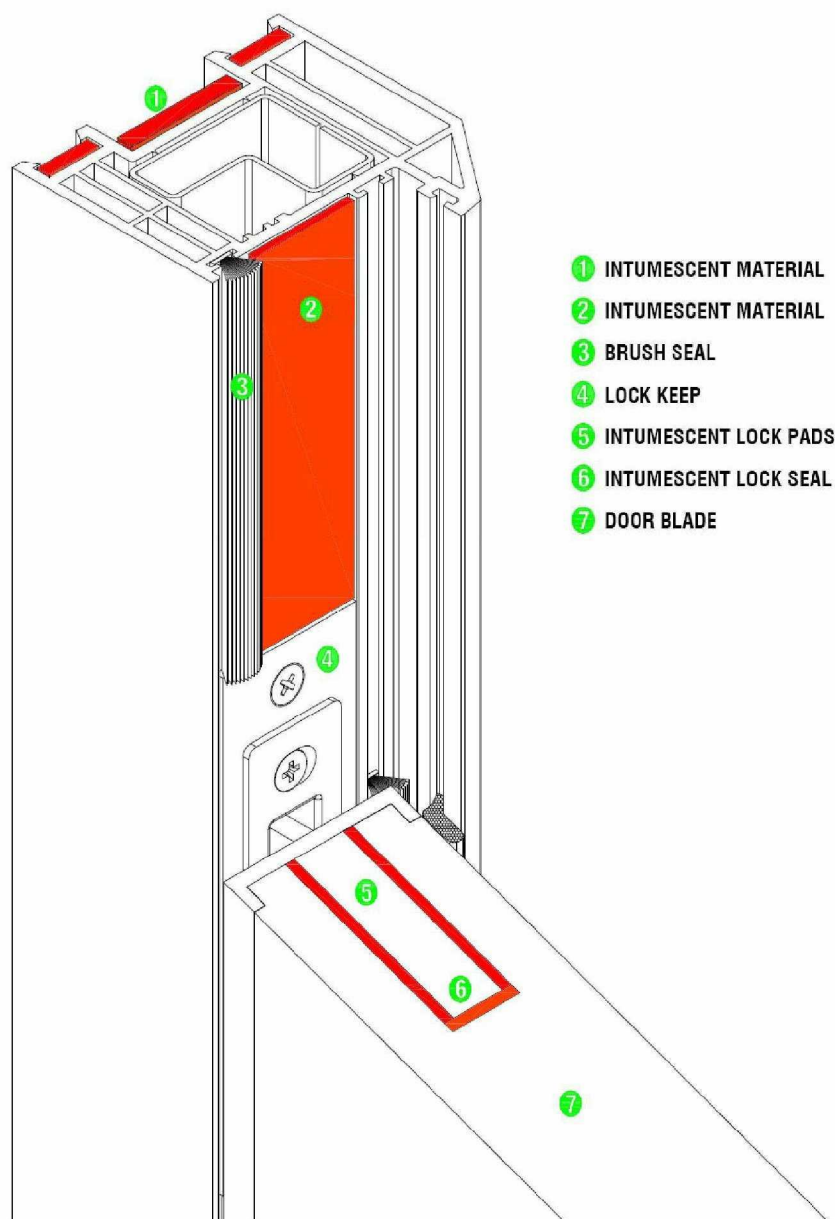


Figure 3. General description of parts.

Customer: L B Plastics Limited

BTC 14434F: Page 19 of 74



0296



Outer Frame General Assembly Details

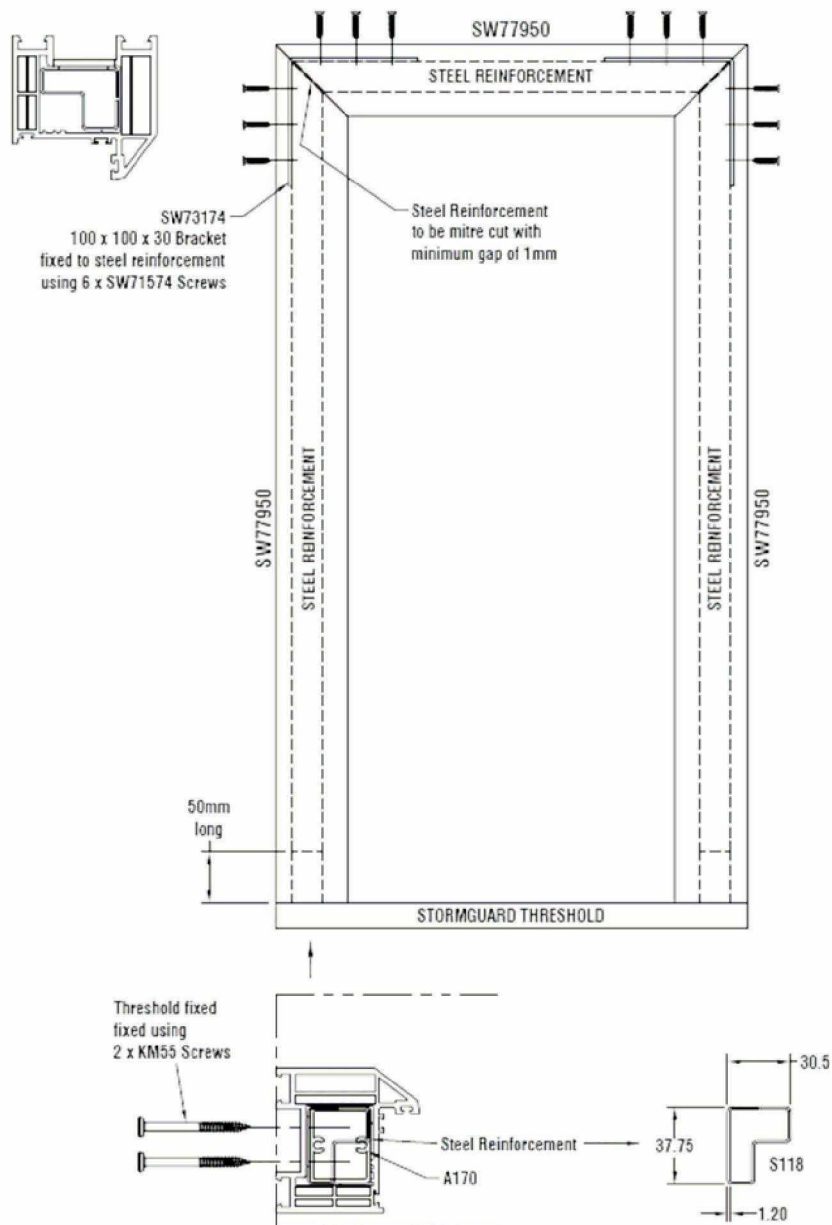


Figure 4. Outer frame general assembly details.

Customer: L B Plastics Limited

BTC 14434F: Page 20 of 74



0296



Unexposed Face Elevation

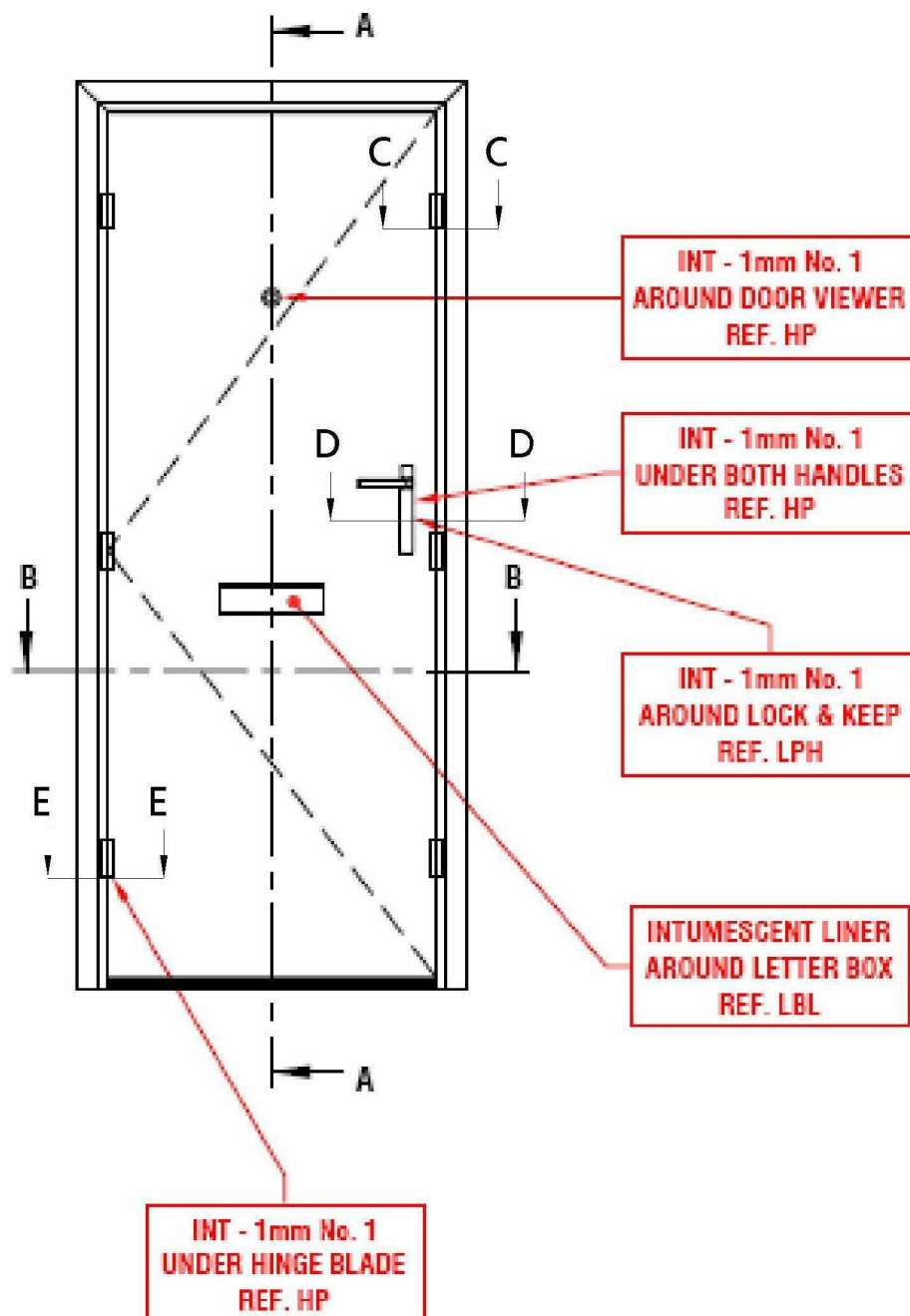


Figure 5. Vertical and horizontal cross sections.

Customer: L B Plastics Limited

BTC 14434F: Page 21 of 74



0296



Vertical Section Through Doorset – Section A-A

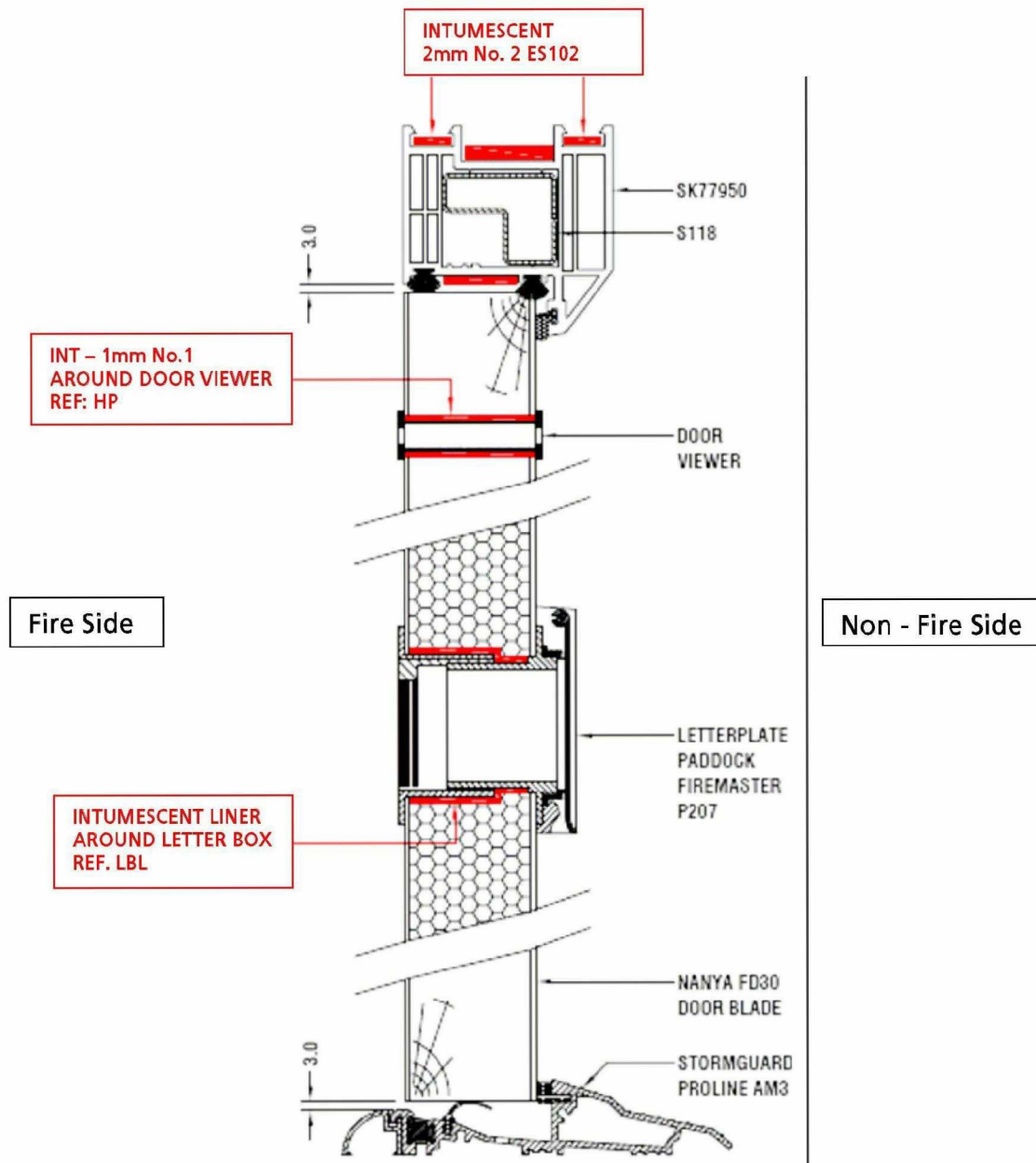


Figure 6. Horizontal Section A-A.
Note that dimensions are nominal.
Customer: L B Plastics Limited



Horizontal Section Through Doorset – Section B-B

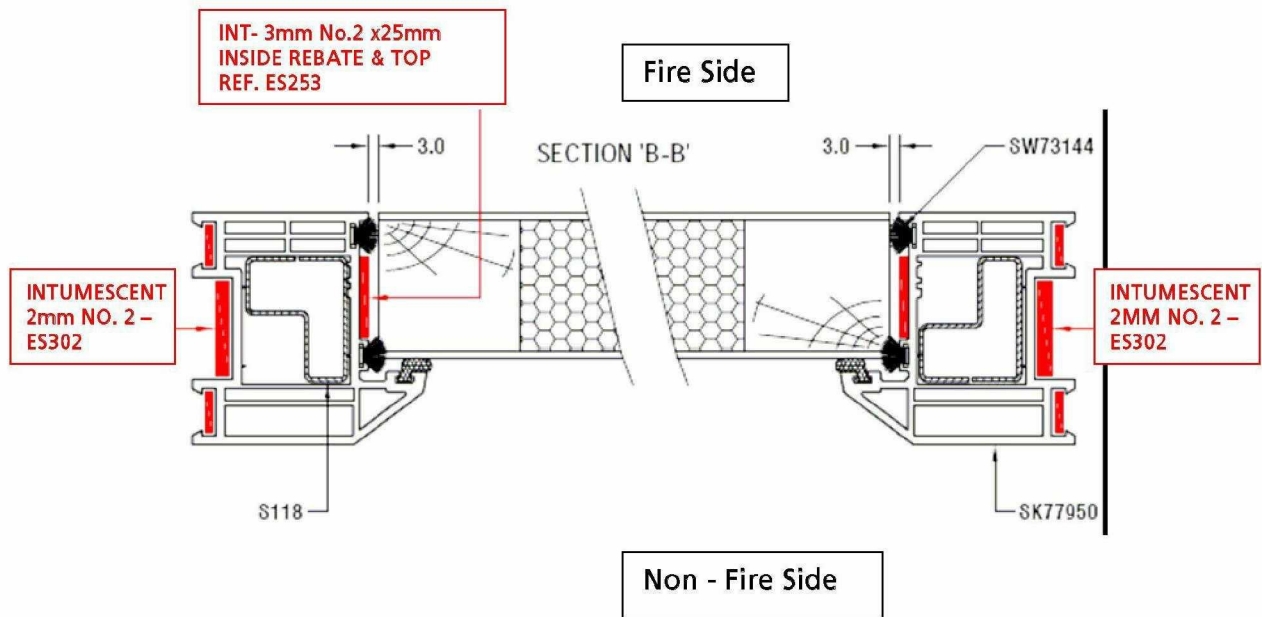


Figure 7. Horizontal Section B-B.
Note that dimensions are nominal.



Horizontal Section Through Closing Edge of Doorset at Upper Latch Position - Section C-C

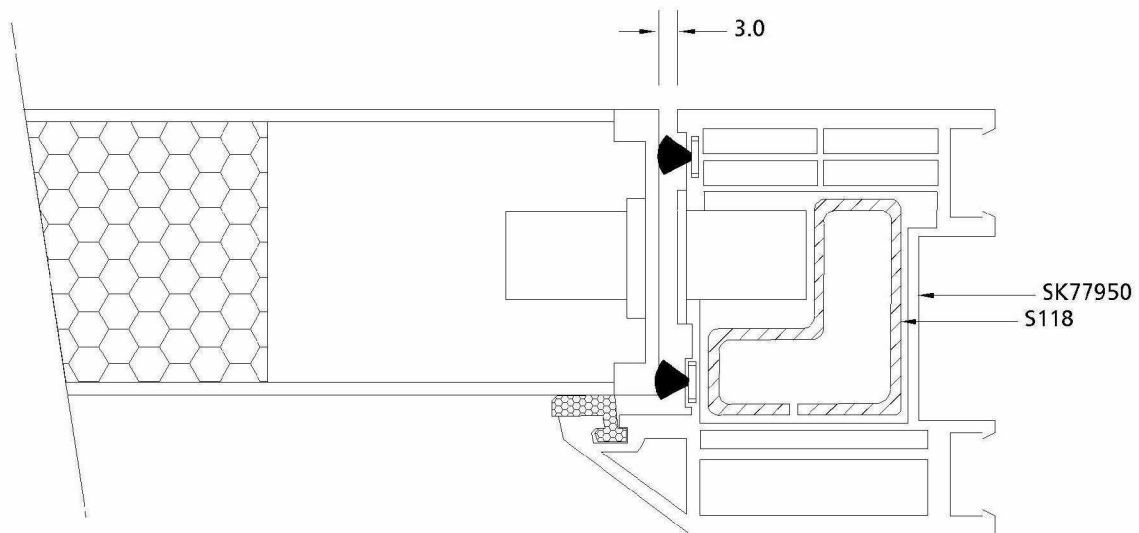


Figure 8. Horizontal Section C-C.
Note that dimensions are nominal.



Horizontal Section Through Closing Edge of Doorset at Latch Position – Section D-D

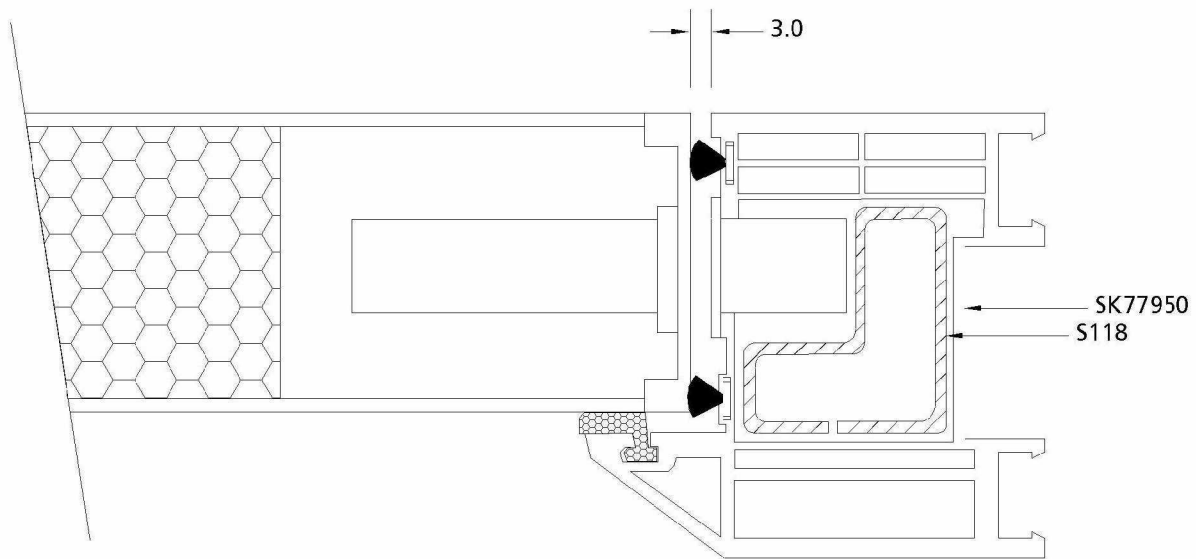


Figure 9. Horizontal Section D-D.
Note that dimensions are nominal.

Customer: L B Plastics Limited

BTC 14434F: Page 25 of 74



0296



Horizontal Section Through Hanging Edge of Doorset at Lower Hinge Position - Section E-E

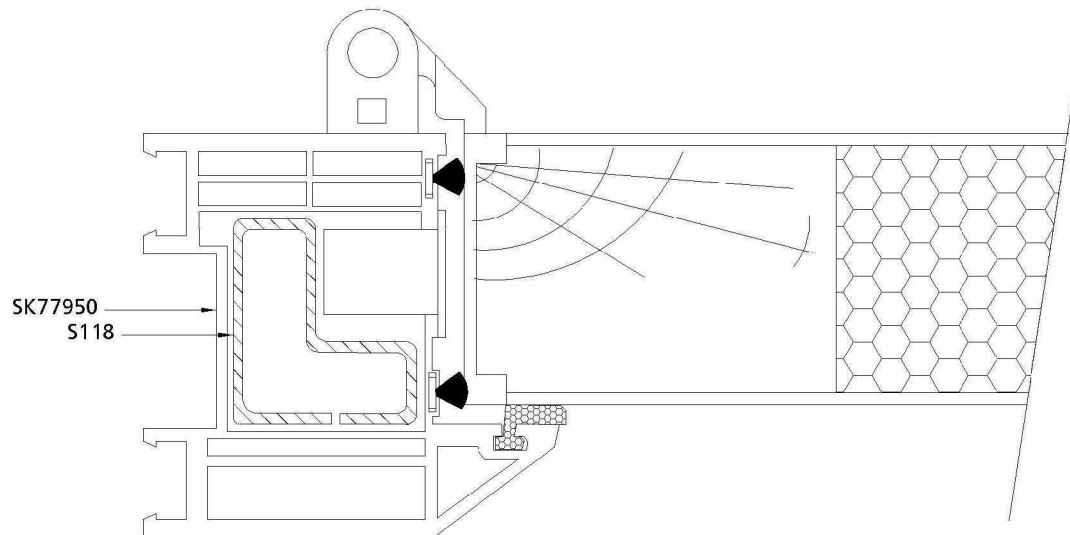


Figure 10. Horizontal Section E-E.
Note that dimensions are nominal.



TEST PROCEDURE

The test was conducted in accordance with BS 476: Part 22: 1987: Clause 6.

The doorset was installed in a lightweight timber stud partition supporting construction at the request of the customer. A second doorset was simultaneously tested adjacent to the reported specimen in the test frame. This second doorset is not included in this report (details of this second doorset are retained on file by the Building Test Centre). Two additional elements were also tested positioned above the head of each doorset, these are not included in this report.

The door leaf was hung to open into the furnace at the request of the test sponsor.
This report covers fire resistance performance in the tested direction only.

The door was fitted with latches but was tested with the latches disengaged.

Where areas of the test specification are ambiguous, or open to interpretation, the Fire Test Study Group Resolutions 43, 50, 51, 53, 63, 70, 71, 72, 77, 78, 79 and 83 and have been followed (where appropriate). These Resolutions provide the basis of common agreements between the fire test laboratories, which are members of this group.

The construction details of the test specimen were provided by the customer and were checked for accuracy wherever possible.

The test procedure used was 476/22/6, 7, 8 issue 1.

The ambient temperature at the start of the test was 16°C.

The furnace pressure was set to control at 16.3 ± 2 Pascals positive with respect to atmosphere, at 100mm below the head of the specimen, except during the first 5 minutes of the test.

Furnace pressure data is shown in figure 12.

Customer: L B Plastics Limited

BTC 14434F: Page 27 of 74



0296



TEST RESULTS

The requirements of the standard were satisfied for the following periods:

Integrity:	35 minutes
Insulation:	35 minutes (by virtue of integrity failure)

The doorset was boarded over at 37 minutes, and the test continued until 63 minutes, at the request of the customer.

LIMITATIONS

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 5 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.

Customer: L B Plastics Limited

BTC 14434F: Page 28 of 74



0296



TEST DATA

Observations

Observers: Unexposed face L H Cooper/ M Fountain
Exposed face S Belt

Time		Observations
hours	mins	<i>All observations refer to the exposed face unless otherwise stated.</i>
	0	Test started.
	1	Plastic covers on door closers started to melt.
	3	Charring in top centre of frame. <i>Unexposed face</i> Crunching and banging noises were heard from the specimen.
	4	<i>Unexposed face</i> Smoke issued from letter plate.
	5	Plastic cover of door closer dripped onto door. <i>Unexposed face</i> Smoke issued from closing edge of door leaf at approximately $\frac{3}{4}$ height.
	6	Door frame blackened on frame top and down both sides. <i>Unexposed face</i> Condensation had formed and was running down the closing edge of the door leaf, adjacent to the frame.
	7	Door closer was leaking oil, bright blue flames visible in furnace. <i>Unexposed face</i> Discolouration visible at closing edge of door leaf, adjacent to the frame at approximately $\frac{1}{4}$ height. Smoke issued from letter plate.

Customer: L B Plastics Limited

BTC 14434F: Page 29 of 74



0296



Time		Observations
hours	mins	<i>All observations refer to the exposed face unless otherwise stated.</i>
	8	<i>Unexposed face</i> Smoke increased.
	10	View into furnace obscured by smoke.
	13	<i>Unexposed face</i> Discolouration visible at the vertical edges of the letter plate and the closing edge of the door leaf.
	16	<i>Unexposed face</i> Intumescent visible at top hanging edge corner of door leaf. Door leaf bowed into the furnace.
	17	<i>Unexposed face</i> White material visible in the head of door frame.
	19	<i>Unexposed face</i> Glow visible at latch and top hanging edge of door leaf. Temperature rise around the top of the door leaf was due to hot gases.
	21	Face of door frame expanded but was leaving gaps. <i>Unexposed face</i> Letter plate started to pull away from surface of door leaf.
	22	<i>Unexposed face</i> Flash flaming at closing edge of door leaf, between $\frac{1}{4}$ and mid-height.
	23	<i>Unexposed face</i> Black intumescent visible behind letter plate.
	24	<i>Unexposed face</i> Silver foil visible behind letter plate.
	25	Door leaf bowed into furnace at top hanging edge corner by approximately 10-15mm.

Customer: L B Plastics Limited

BTC 14434F: Page 30 of 74



0296



Time		Observations
hours	mins	<i>All observations refer to the exposed face unless otherwise stated.</i>
	28	Panelling on door leaf intact.
	30	Door bowed into furnace at top hanging edge corner by approximately 20mm. <i>Unexposed face</i> Cotton pad attempted at top hanging edge corner of door leaf – no failure. Cotton pad attempted at closing edge of door leaf, at approximately 300mm from head – no failure. 25mm gap gauge attempted at top hanging edge corner of door leaf – no failure.
	31	<i>Unexposed face</i> Cotton pad attempted at latch – no failure.
	32	<i>Unexposed face</i> Cotton pad attempted at approximately 30mm from the head at the closing edge of the door leaf - no failure.
	33	<i>Unexposed face</i> Flash flaming at closing edge of door leaf, at approximately ¼ height. Thermocouple no.31 fell from the top of the door frame.
	34	Through gap visible at top closing edge corner of door frame.
	35	<i>Unexposed face</i> INTEGRITY FAILURE. The gap at the top closing edge corner of the door frame exceeded 25mm in diameter (visual observation).
	36	Letter box had fallen into the furnace (not visible earlier due to smoke in the furnace). <i>Unexposed face</i> FURTHER INTEGRITY FAILURE Sustained flaming between latch and door frame.

Customer: L B Plastics Limited

BTC 14434F: Page 31 of 74



0296



Time		Observations
hours	mins	<i>All observations refer to the exposed face unless otherwise stated.</i>
	37	Top section of outer layer of door leaf had fallen into the furnace. <i>Unexposed face</i> The doorset was boarded over and the test was continued to observe the additional elements of the test specimen. This was carried out at the request of the customer.
1	03	TEST TERMINATED at the request of the customer.

Door Closer Moments

The door opening and closing moments were measured following the methodology of FTSG Resolution No.63, and the maximum recorded as follows:

Opening moment: 63.5 Nm

Closing moment: 19.7 Nm

Customer: L B Plastics Limited

BTC 14434F: Page 32 of 74



0296



Furnace Temperature Graph

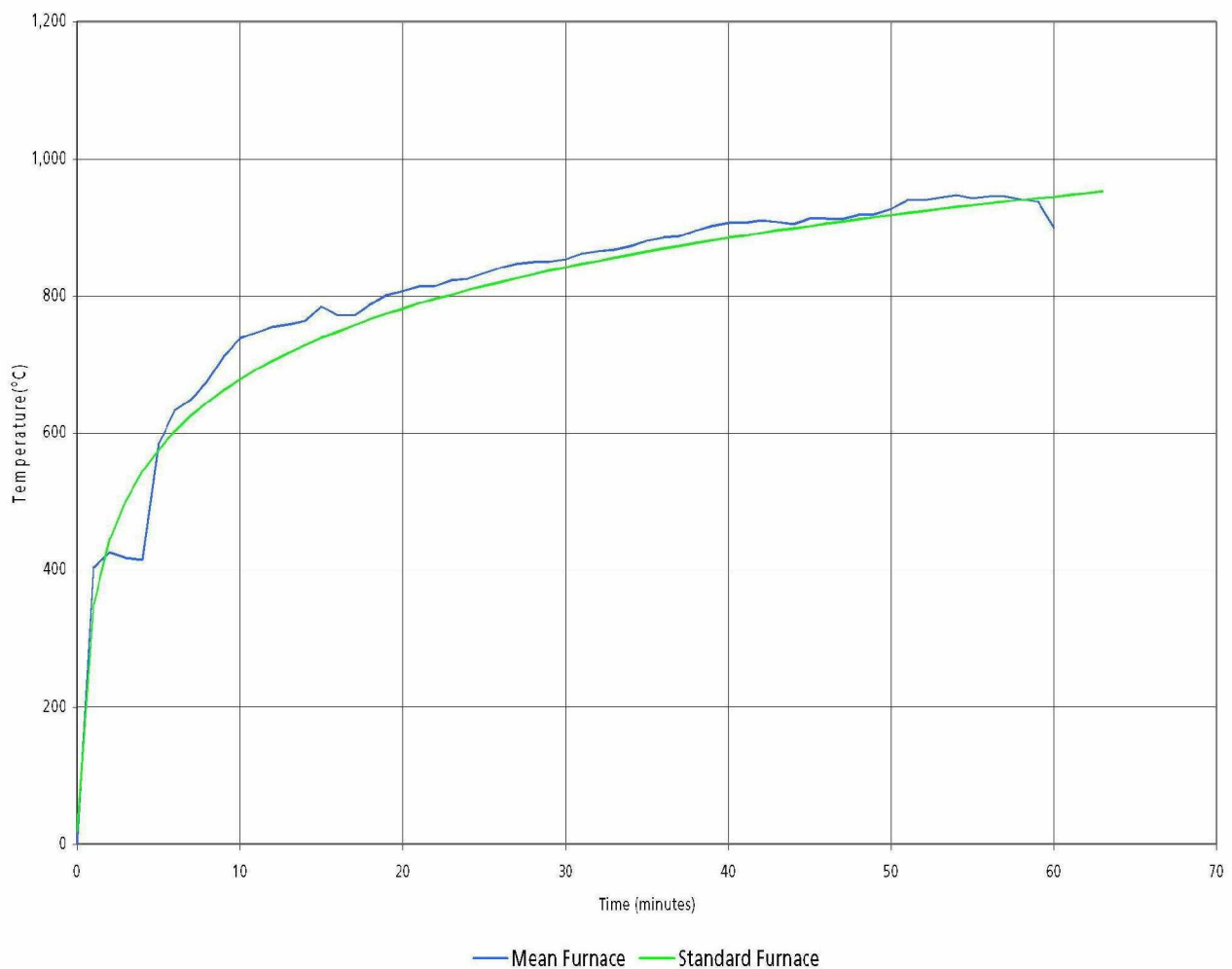


Figure 11. Furnace temperature graph.

Customer: L B Plastics Limited

BTC 14434F: Page 33 of 74



0296



Furnace Pressure Graph

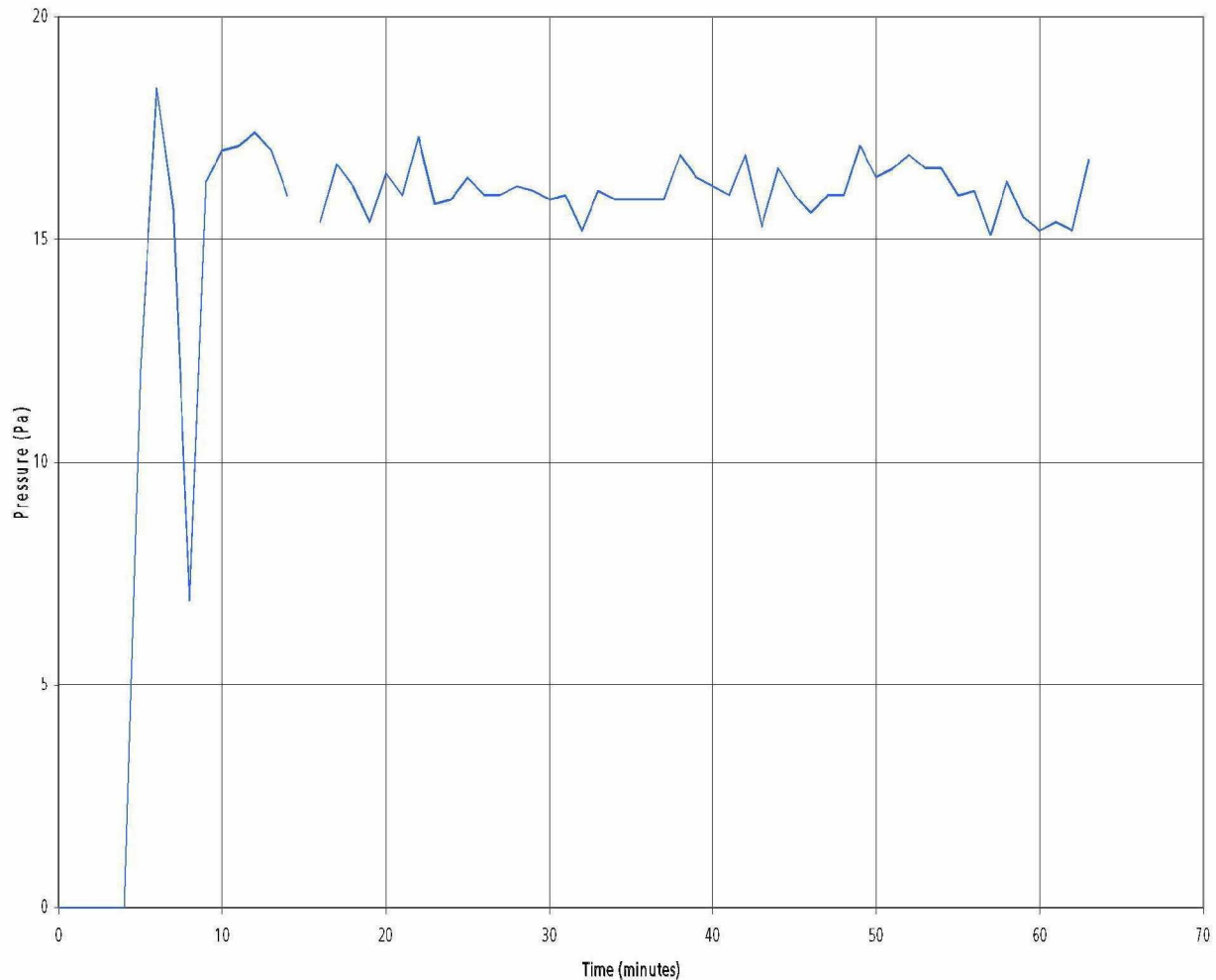


Figure 12. Furnace pressure graph.

Customer: L B Plastics Limited

BTC 14434F: Page 34 of 74



0296



Doorset Temperature Graph

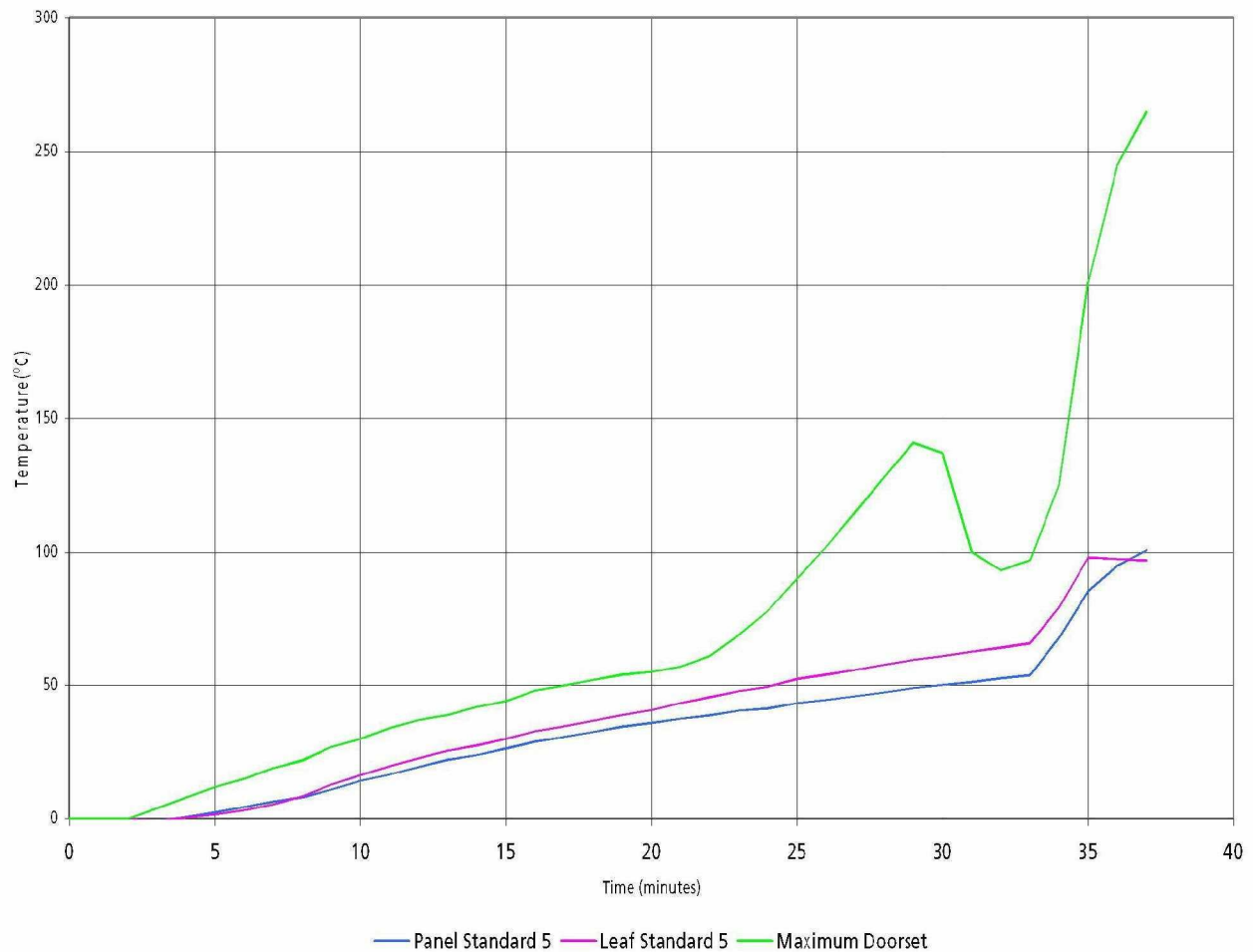


Figure 13. Doorset temperature graph.

Customer: L B Plastics Limited

BTC 14434F: Page 35 of 74



0296



Unexposed Face Thermocouple Layout

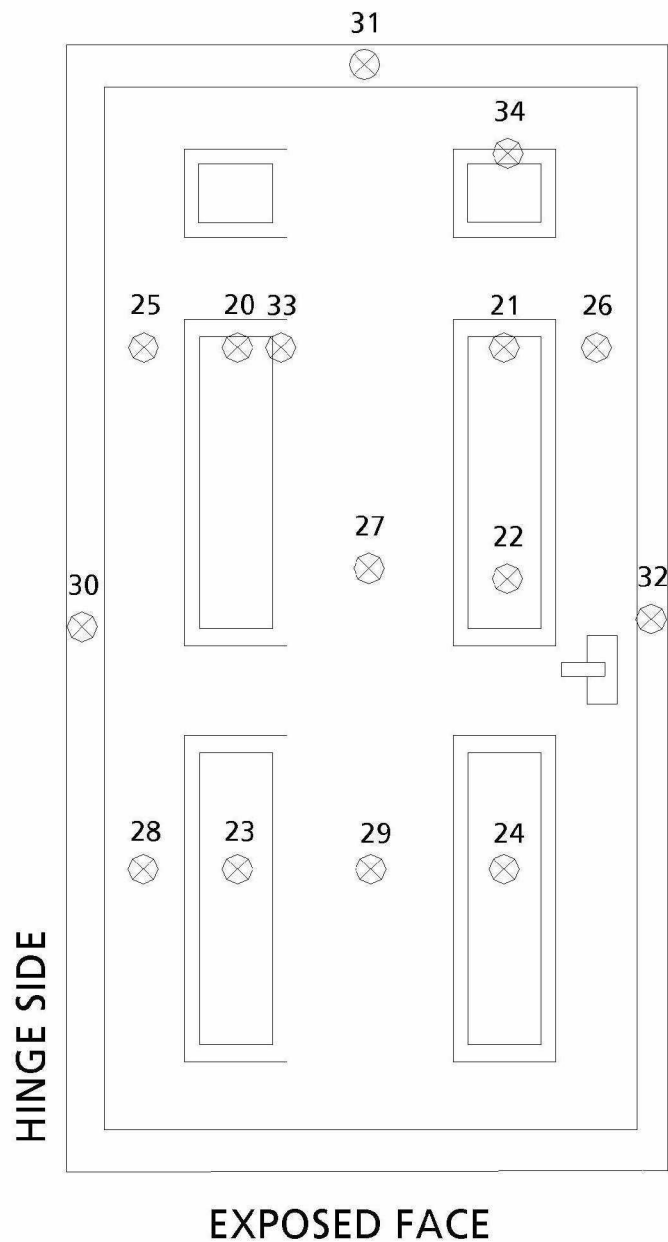


Figure 14. Thermocouple layout. (Not to scale)

Customer: L B Plastics Limited

BTC 14434F: Page 36 of 74



0296



Door Leaf Panels Standard Five Thermocouple Data

Time (mins)	Temperature Rise (°C)					
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	Mean
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	1	1	1	1
9	0	1	5	3	3	2
10	0	2	9	5	6	4
11	0	3	12	8	9	6
12	0	4	14	10	12	8
13	1	7	17	14	16	11
14	3	11	21	16	20	14
15	5	14	23	18	23	17
16	9	17	25	21	26	20
17	12	20	28	23	28	22
18	15	22	29	24	30	24
19	17	25	32	26	32	26
20	19	28	36	28	34	29
21	21	31	36	30	36	31
22	23	33	38	31	38	33
23	25	36	40	33	39	35
24	27	37	41	34	41	36
25	29	40	42	35	42	38
26	30	41	44	36	43	39
27	32	43	45	38	45	41
28	34	44	46	38	45	41
29	36	46	48	40	47	43
30	38	48	49	41	47	45
31	40	49	50	42	49	46
32	42	51	51	43	50	47
33	45	53	52	44	51	49
34	47	54	53	45	52	50
35	48	55	54	46	53	51

Customer: L B Plastics Limited

BTC 14434F: Page 37 of 74



0296



Time (mins)	Temperature Rise (°C)					
	Thermocouple No. 20	Thermocouple No. 21	Thermocouple No. 22	Thermocouple No. 23	Thermocouple No. 24	Mean
36	50	56	55	48	54	53
37	52	57	56	50	54	54

See figure 14 for the location of the thermocouples.

Customer: L B Plastics Limited

BTC 14434F: Page 38 of 74



0296



Door Leaf Stiles and Muntin Standard Five Thermocouple Data

Time (mins)	Temperature Rise (°C)					
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29	Mean
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	1	0	1	0	0
9	0	3	2	3	0	2
10	0	6	4	5	1	3
11	1	9	8	7	2	5
12	2	13	12	10	5	8
13	4	17	18	14	11	13
14	5	20	23	17	17	16
15	7	23	27	20	22	20
16	9	25	30	23	27	23
17	12	27	33	26	30	26
18	14	29	35	28	32	28
19	16	33	36	31	34	30
20	19	37	39	33	36	33
21	22	40	40	35	37	35
22	24	42	42	37	39	37
23	27	46	43	39	40	39
24	30	47	45	41	41	41
25	34	52	46	43	42	43
26	37	55	48	45	43	46
27	40	58	49	47	45	48
28	44	59	51	48	45	49
29	48	64	52	51	47	52
30	51	65	53	52	49	54
31	55	66	54	54	50	56
32	59	69	55	55	51	58
33	63	70	56	57	52	60
34	67	71	56	58	53	61
35	70	73	57	59	54	63

Customer: L B Plastics Limited

BTC 14434F: Page 39 of 74



0296



Time (mins)	Temperature Rise (°C)					
	Thermocouple No. 25	Thermocouple No. 26	Thermocouple No. 27	Thermocouple No. 28	Thermocouple No. 29	Mean
36	73	76	57	60	55	64
37	78	77	58	61	55	66

See figure 14 for the location of the thermocouples.

Customer: L B Plastics Limited

BTC 14434F: Page 40 of 74



0296



Door Frame and Additional Thermocouple Data

Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33	Thermocouple No. 34
	Left Hand Side Frame	Top Frame	Right Hand Side Frame	Reduced Area on Panel	Reduced Area on Panel
0	0	0	0	0	0
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	2	0	1	4
8	0	3	0	4	8
9	0	5	1	7	12
10	0	7	2	10	15
11	1	9	4	13	19
12	1	11	0	15	22
13	2	13	5	19	27
14	3	15	6	22	30
15	4	17	8	25	34
16	6	20	11	28	37
17	9	24	13	31	39
18	11	29	16	34	42
19	14	33	18	36	44
20	18	37	21	39	48
21	21	41	23	42	50
22	23	45	26	44	52
23	27	47	29	46	54
24	30	53	34	48	55
25	33	55	40	50	57
26	36	61	50	52	58
27	39	69	59	53	60
28	42	78	70	54	62
29	45	90	78	56	66
30	49	102	84	58	70
31	52	115	89	60	74
32	56	128	92	61	79
33	59	141	94	63	84
34	62	-	97	66	87

Customer: L B Plastics Limited

BTC 14434F: Page 41 of 74



0296



Time (mins)	Temperature Rise (°C)				
	Thermocouple No. 30	Thermocouple No. 31	Thermocouple No. 32	Thermocouple No. 33	Thermocouple No. 34
	Left Hand Side Frame	Top Frame	Right Hand Side Frame	Reduced Area on Panel	Reduced Area on Panel
35	65	-	100	68	90
36	68	-	-	71	93
37	70	-	-	75	97

See figure 14 for the location of the thermocouples.

Thermocouple no. 31 fell off after 33 minutes.

Thermocouple no. 32 fell off after 35 minutes.

Customer: L B Plastics Limited

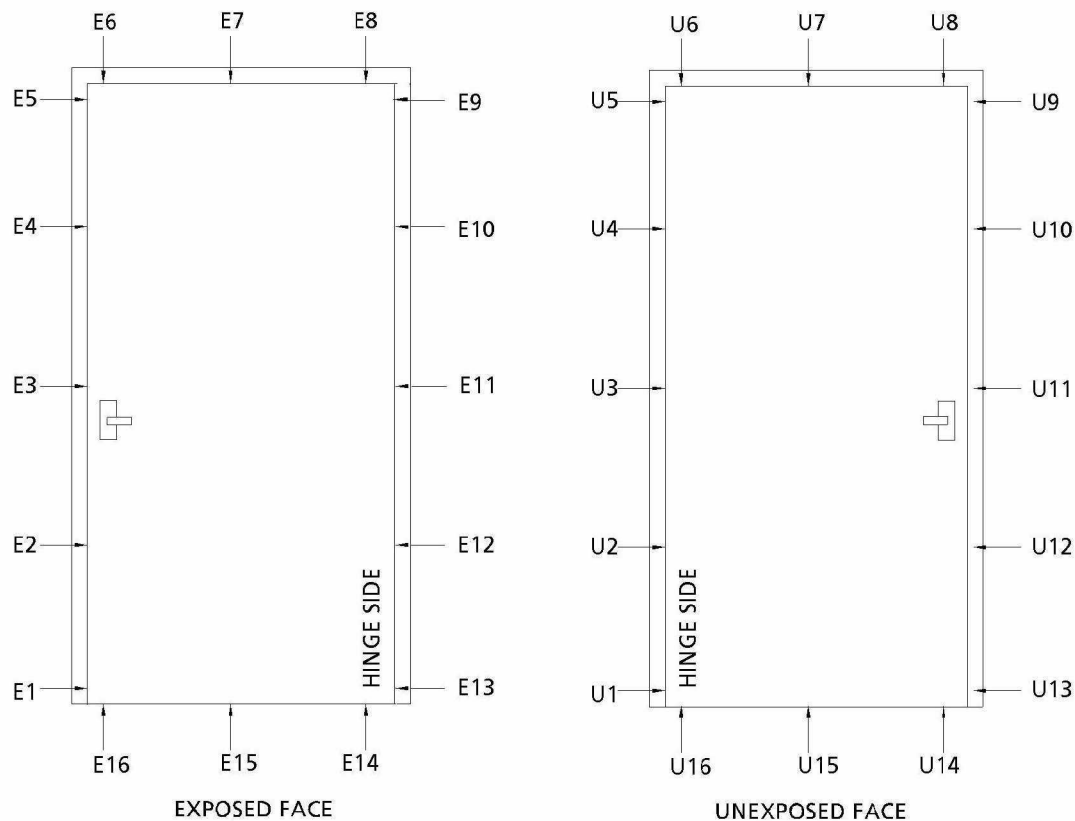
BTC 14434F: Page 42 of 74



0296



Doorset Perimeter Gap Measurements



Position	Gap (mm)	Position	Gap (mm)	Position	Gap (mm)	Position	Gap (mm)
E1	4.0	E9	4.0	U1	4.0	U9	5.5
E2	3.8	E10	4.2	U2	4.0	U10	5.0
E3	3.6	E11	4.4	U3	4.5	U11	4.5
E4	3.2	E12	3.8	U4	4.5	U12	4.5
E5	2.5	E13	2.8	U5	4.0	U13	6.0
E6	4.7	E14	3.2	U6	4.0	U14	6.5
E7	4.0	E15	2.5	U7	4.5	U15	5.5
E8	4.4	E16	2.7	U8	5.0	U16	5.0

The exposed face gaps were measured using a taper gauge, through the brush seal.
The unexposed face gaps were measured using a steel rule, with the black seal visible.

Customer: L B Plastics Limited

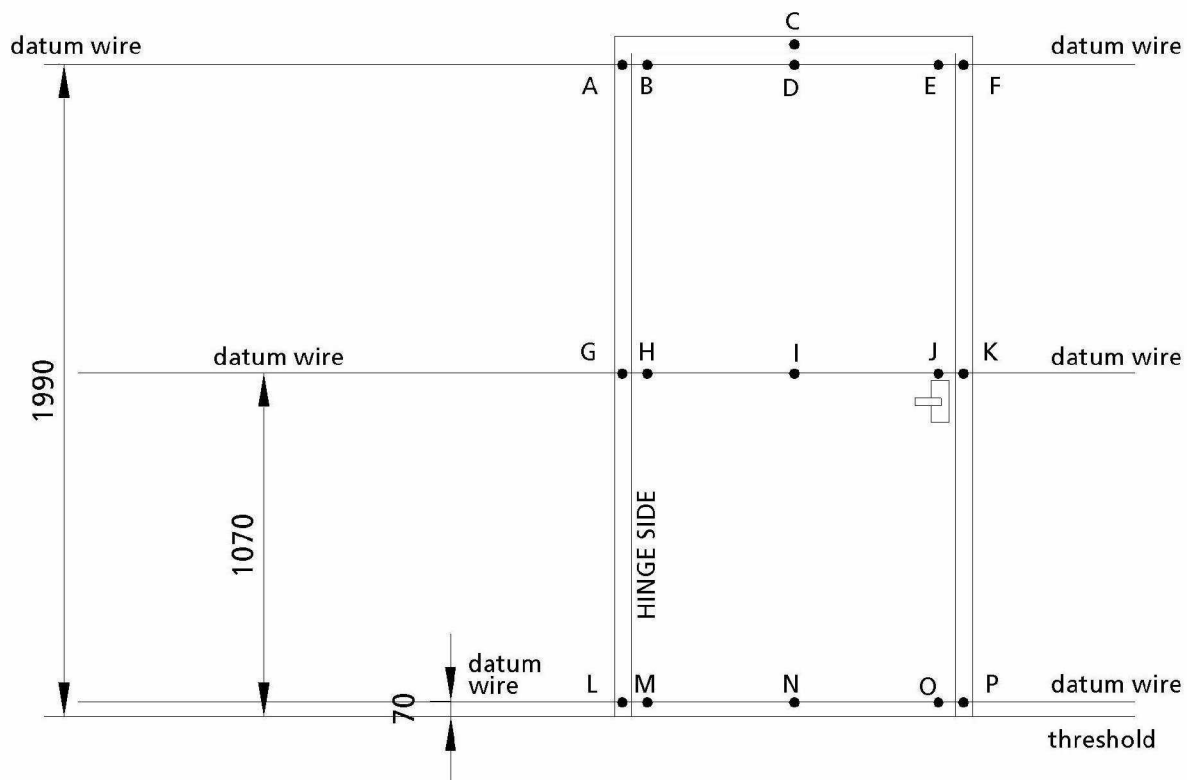
BTC 14434F: Page 43 of 74



0296



Doorset Deflection Measurements



Time	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	4	3	4	5	4	3	2	5	9	7	4	-2	0	1	-1	0
11	4	3	3	3	2	2	2	4	4	7	4	-2	-1	-1	-1	-1
17	2	37	1	19	3	0	2	25	9	15	1	-2	8	1	-1	-3
21	0	53	1	37	19	-1	2	30	11	16	-3	-3	12	2	-1	-2
27	-6	63	1	52	39	-3	2	35	9	20	-6	-4	16	2	0	-1

The measurements were in mm and the time in minutes.

Deflection readings were taken between the datum wires and the set positions on the door leaf and the frame.

Negative readings indicate deflection out of the furnace.

Customer: L B Plastics Limited

BTC 14434F: Page 44 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com

PHOTOGRAPHS



Photograph 1. Exposed face prior to test.

Customer: L B Plastics Limited

BTC 14434F: Page 45 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 2. Unexposed face prior to test.

Customer: L B Plastics Limited

BTC 14434F: Page 46 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 3. Intumescent on outer perimeter of frame and on hinge blade.

Customer: L B Plastics Limited

BTC 14434F: Page 47 of 74



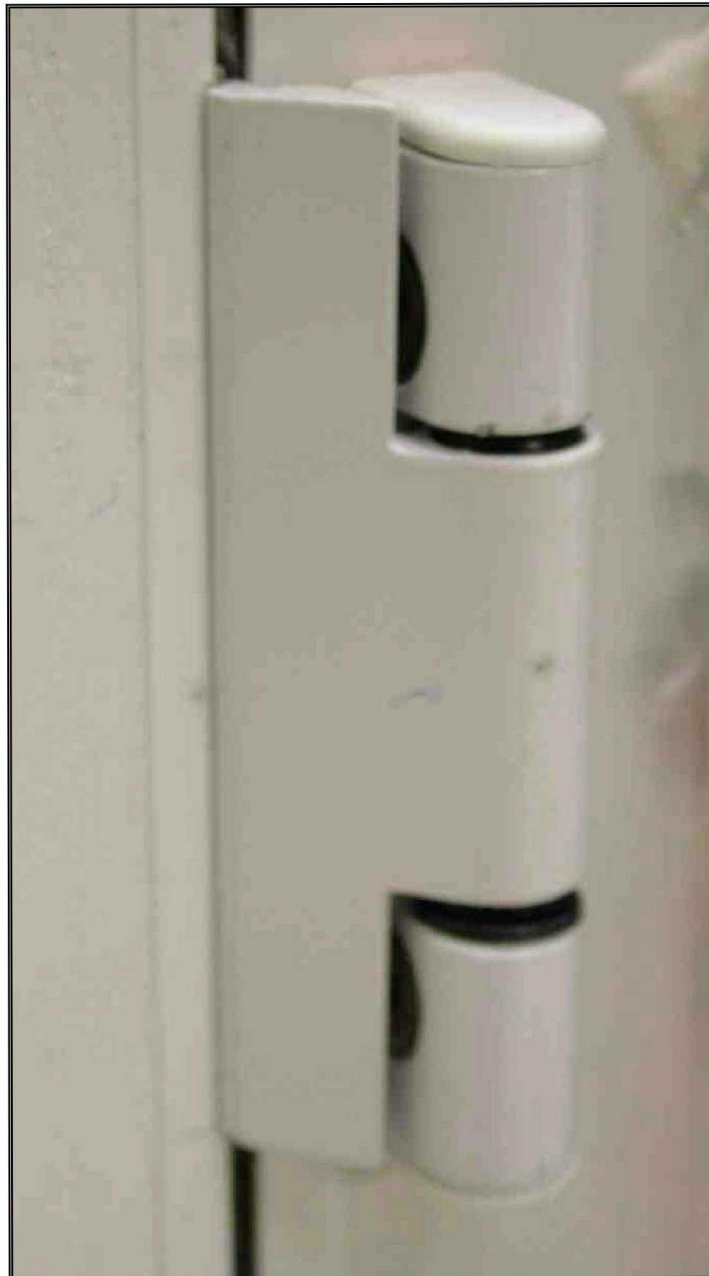
0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 4. Hinge.

Customer: L B Plastics Limited

BTC 14434F: Page 48 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 5. Handle and latch.

Customer: L B Plastics Limited

BTC 14434F: Page 49 of 74



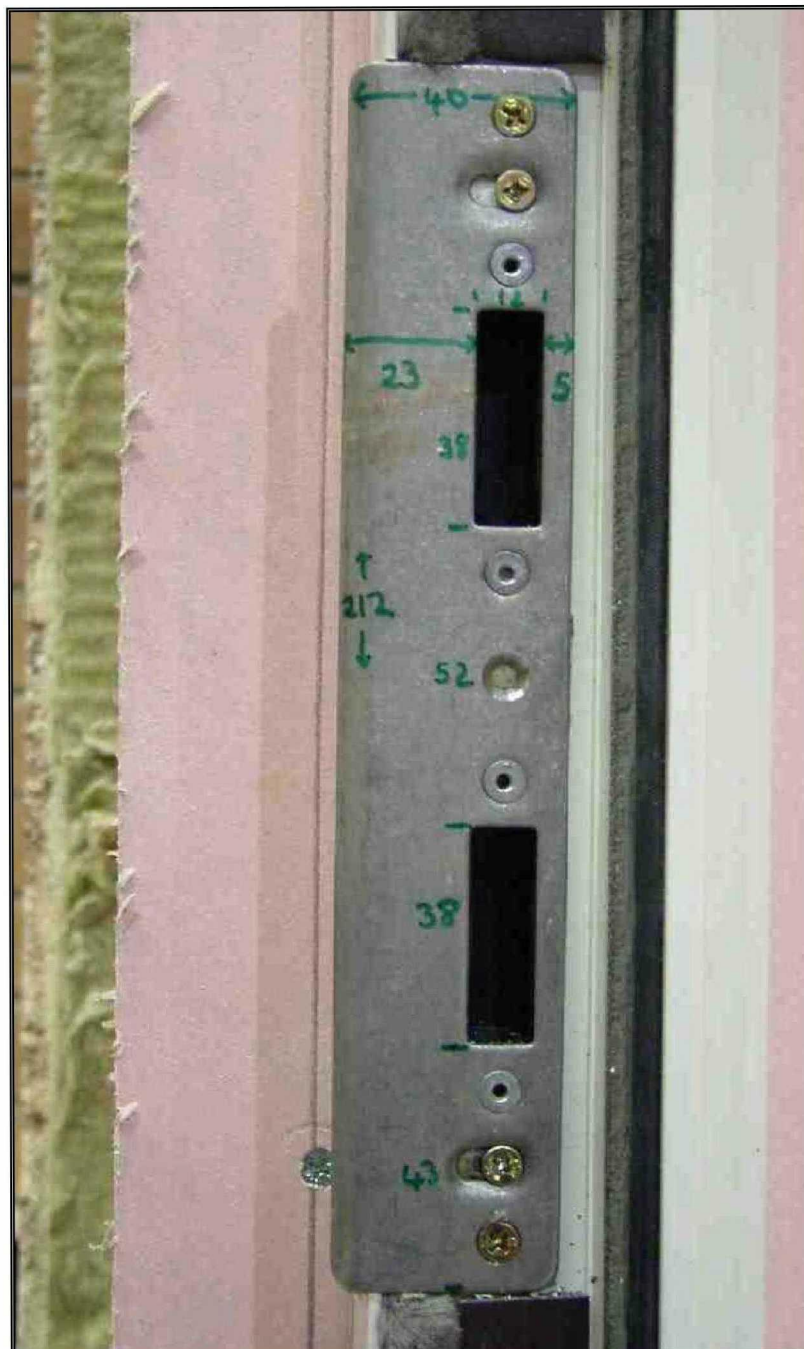
0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 6. Strike plate.

Customer: L B Plastics Limited

BTC 14434F: Page 50 of 74



0296



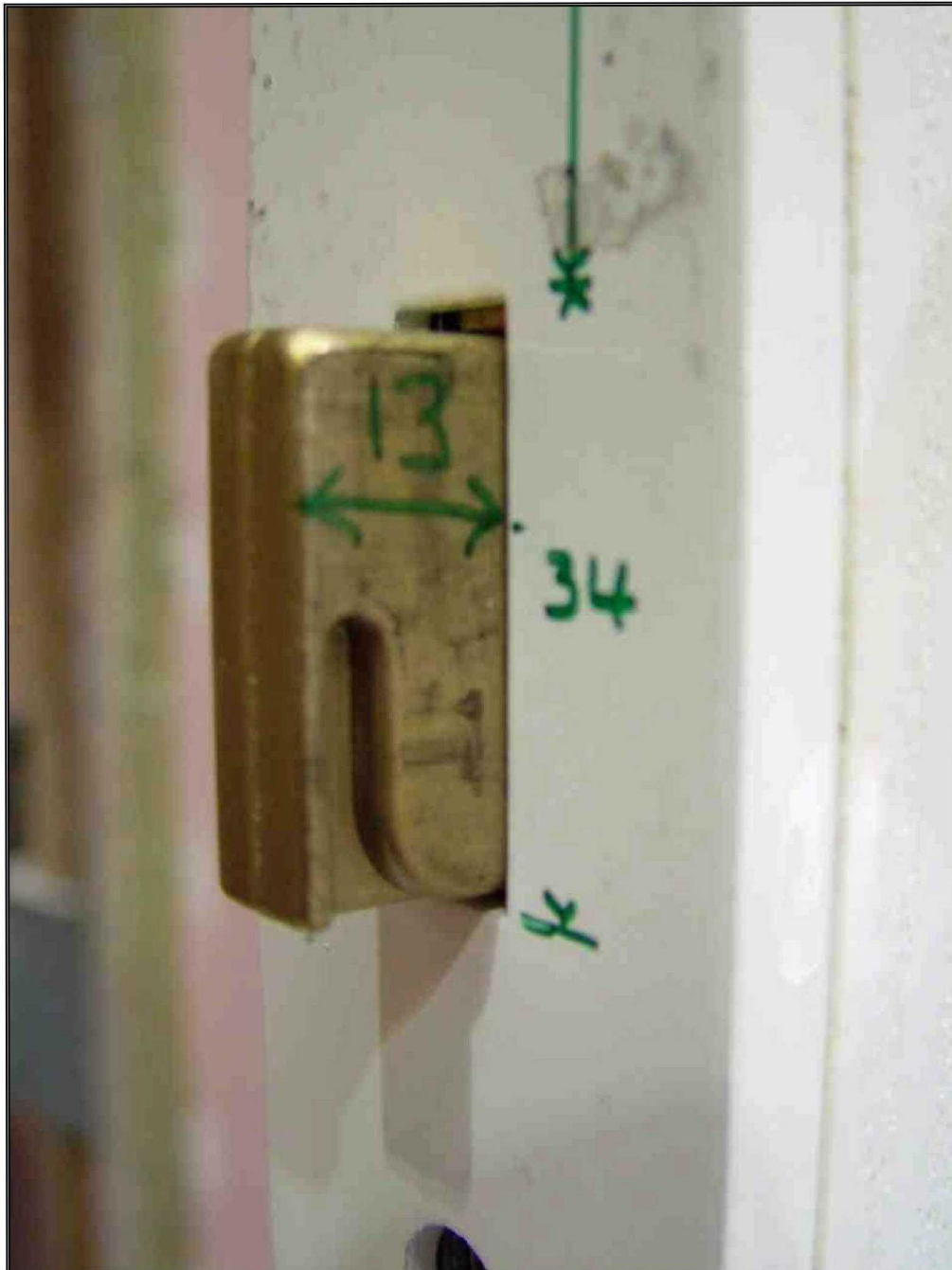
Photograph 7. Lower latch bolt.

Customer: L B Plastics Limited

BTC 14434F: Page 51 of 74



0296



Photograph 8. Lock bolt.

Customer: L B Plastics Limited

BTC 14434F: Page 52 of 74



0296



Photograph 9. Door closer on exposed face of door leaf A, identical closer fitted to door leaf B.

Customer: L B Plastics Limited

BTC 14434F: Page 53 of 74



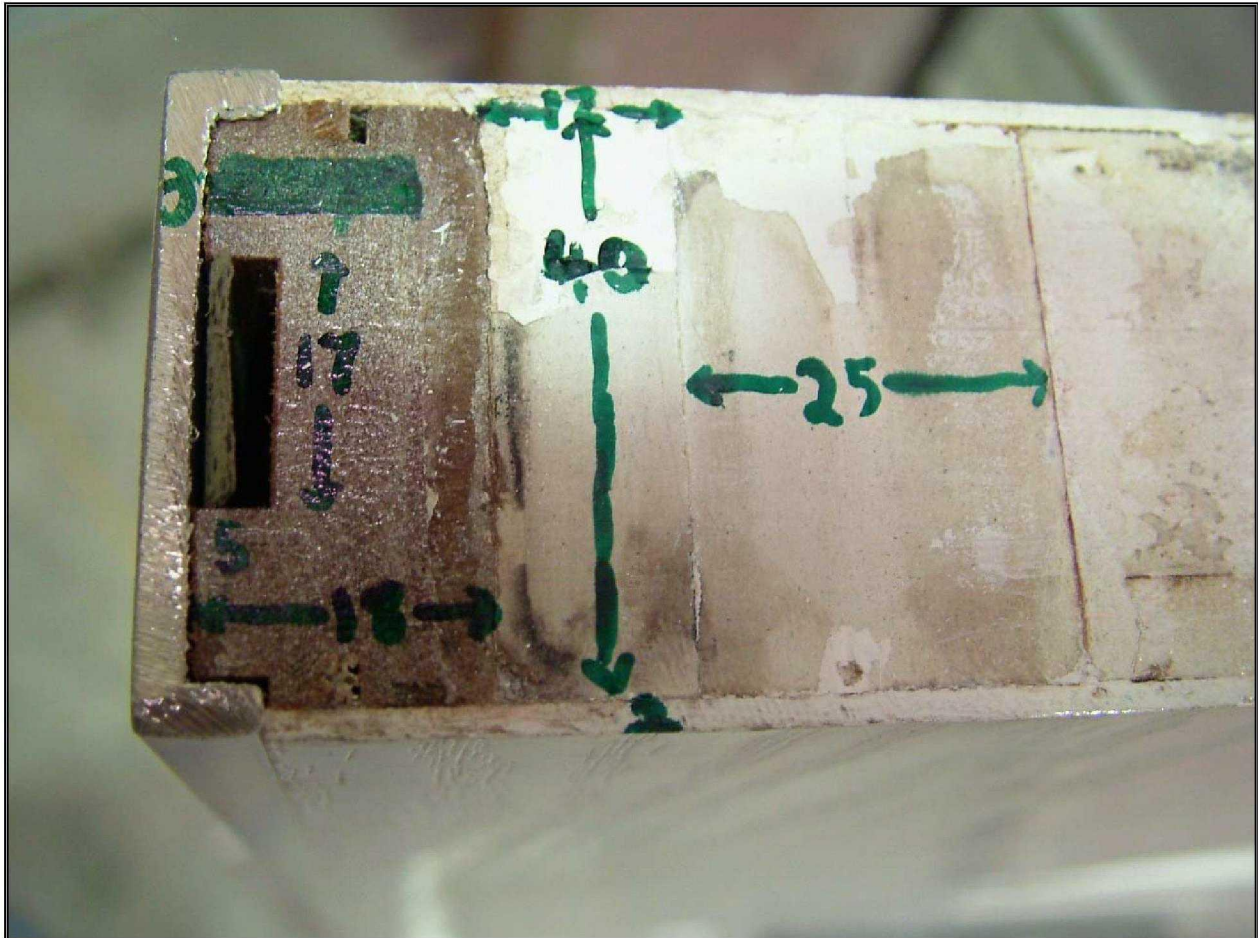
0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 10. Closing edge of door leaf.

Customer: L B Plastics Limited

BTC 14434F: Page 54 of 74



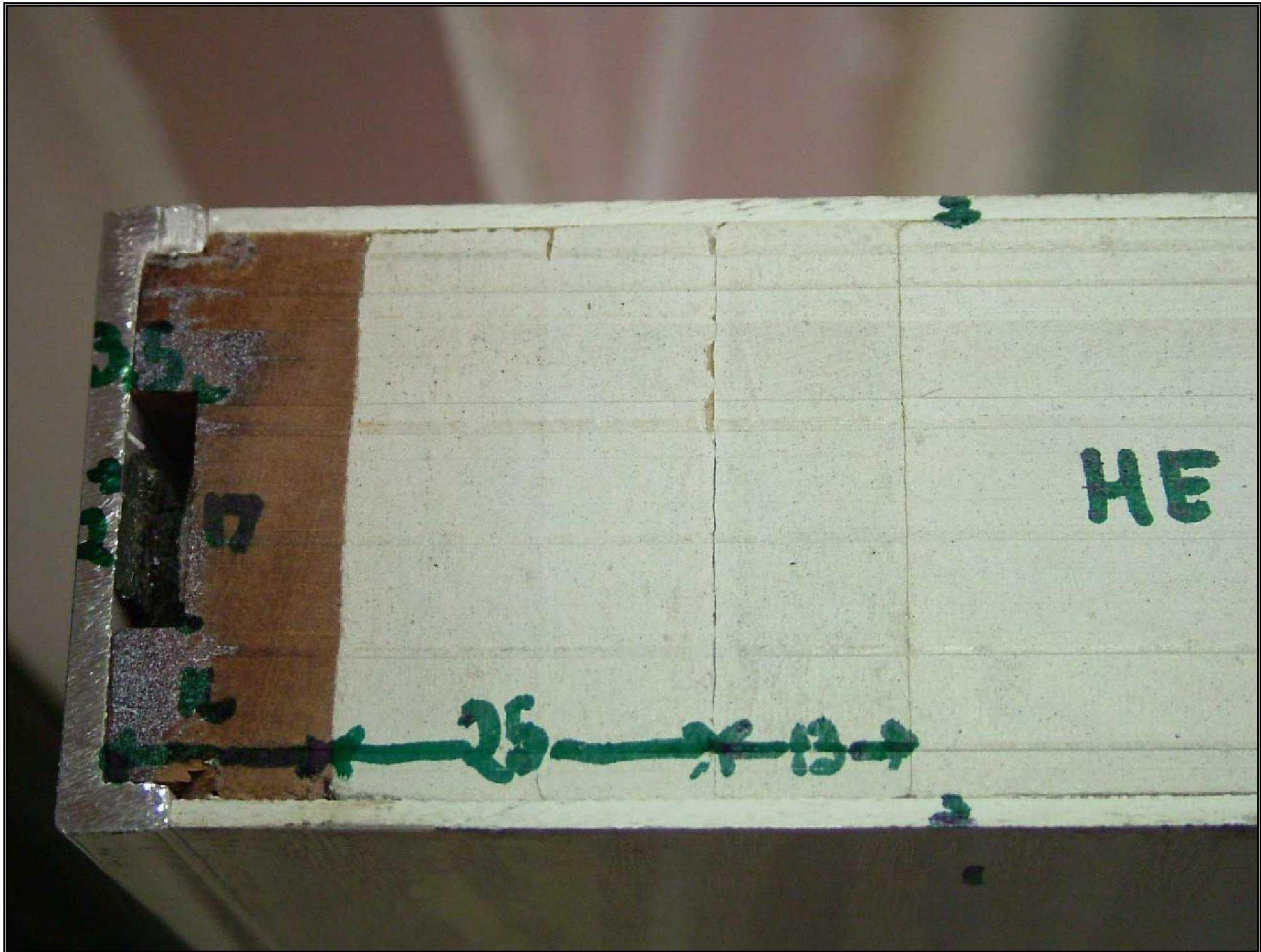
0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 11. Hanging edge of door leaf.

Customer: L B Plastics Limited

BTC 14434F: Page 55 of 74



0296



Photograph 12. Letter plate.

Customer: L B Plastics Limited

BTC 14434F: Page 56 of 74



0296



Photograph 13. Letter plate flap held open, showing inside.

Customer: L B Plastics Limited

BTC 14434F: Page 57 of 74



0296



Photograph 14. Spyhole viewed from the exposed face.

Customer: L B Plastics Limited

BTC 14434F: Page 58 of 74



0296



Photograph 15. Spyhole from the unexposed face.

Customer: L B Plastics Limited

BTC 14434F: Page 59 of 74



0296



Photograph 16. Outer perimeter of frame and threshold.

Customer: L B Plastics Limited

BTC 14434F: Page 60 of 74



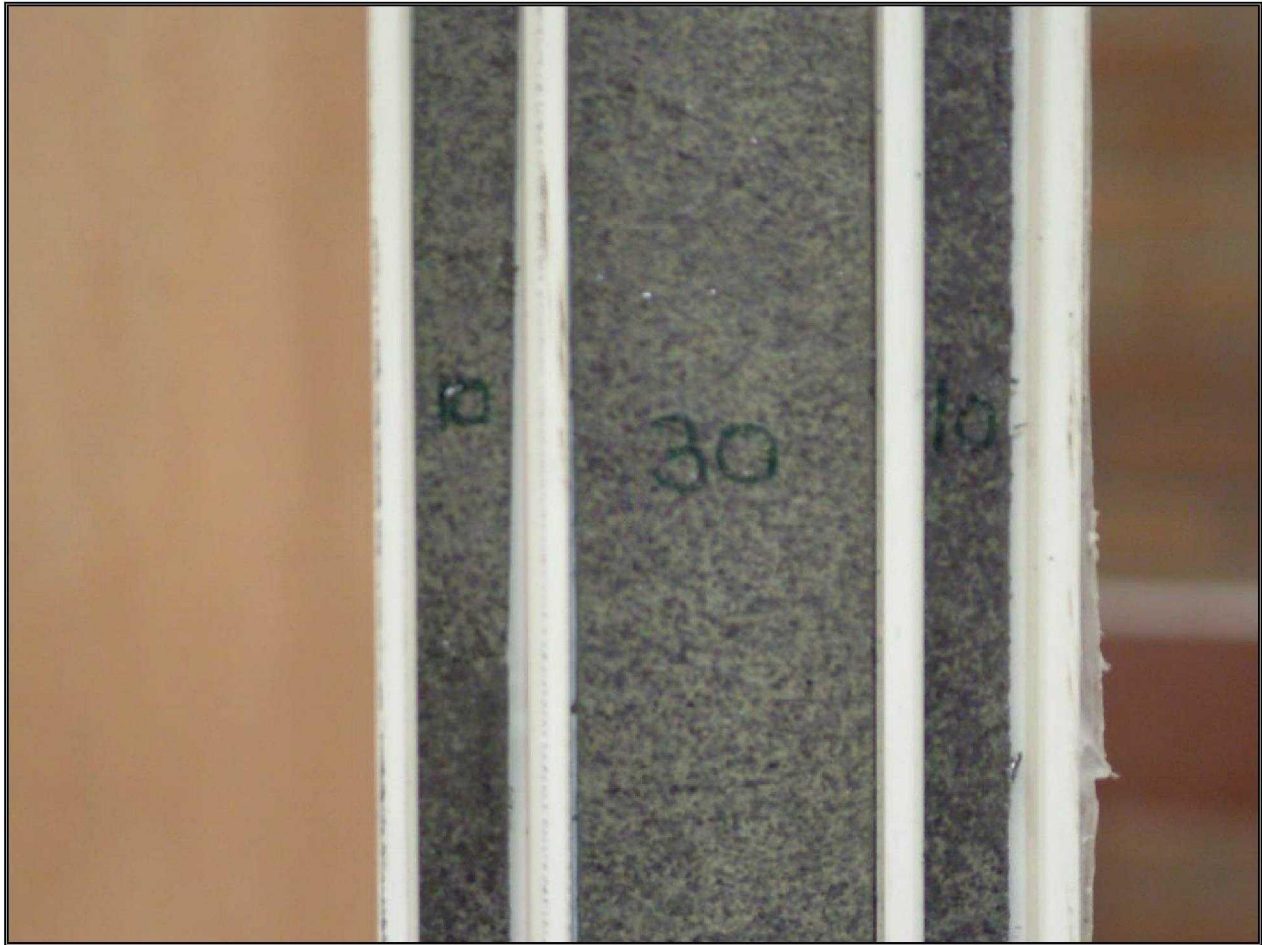
0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 17. Outer perimeter of frame, showing intumescent strips.

Customer: L B Plastics Limited

BTC 14434F: Page 61 of 74



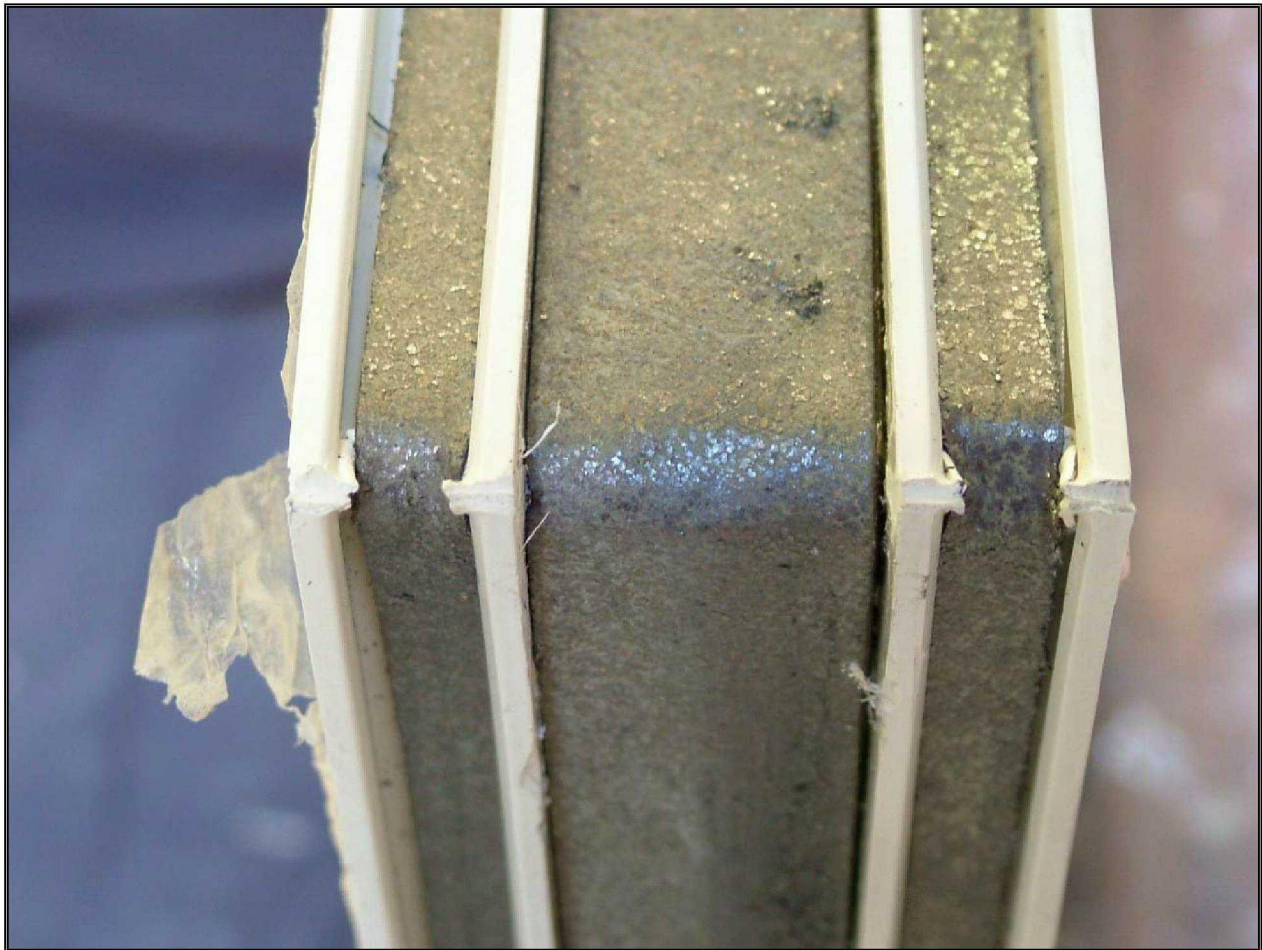
0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 18. Top corner of outer perimeter of frame.

Customer: L B Plastics Limited

BTC 14434F: Page 62 of 74



0296



Photograph 19. Intumescent in door frame, adjacent to strike plate

Customer: L B Plastics Limited

BTC 14434F: Page 63 of 74



0296



Photograph 20. Threshold at base of doorframe.

Customer: L B Plastics Limited

BTC 14434F: Page 64 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 21. Threshold at base of doorframe.

Customer: L B Plastics Limited

BTC 14434F: Page 65 of 74



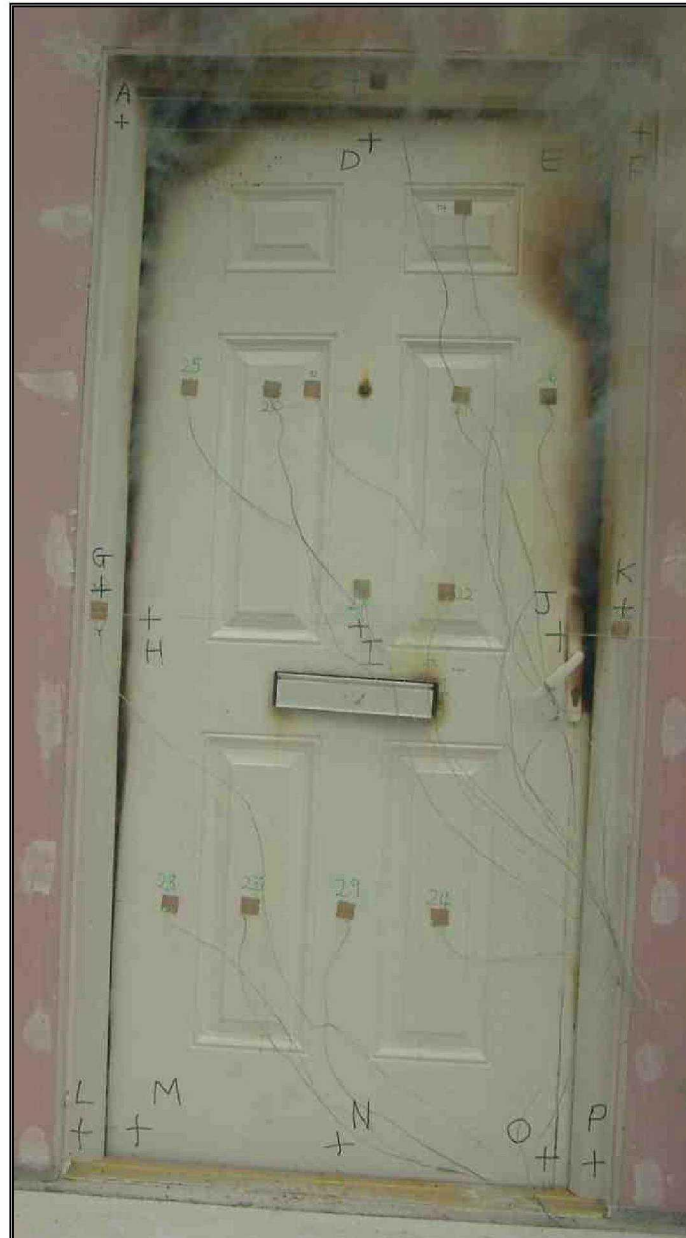
0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 22. Unexposed face of doorset at 20 minutes.

Customer: L B Plastics Limited

BTC 14434F: Page 66 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 23. Letter plate at 20 minutes.

Customer: L B Plastics Limited

BTC 14434F: Page 67 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 24. Top hanging edge corner of door leaf at 20 minutes.

Customer: L B Plastics Limited

BTC 14434F: Page 68 of 74



0296



Photograph 25. Door handle at 20 minutes.

Customer: L B Plastics Limited

BTC 14434F: Page 69 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 26. Letter plate pulled away from leaf at 25 minutes.

Customer: L B Plastics Limited

BTC 14434F: Page 70 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



Photograph 27. Top hanging edge corner of door leaf at 33 minutes, showing activated intumescent.

Customer: L B Plastics Limited

BTC 14434F: Page 71 of 74



0296



The Building Test Centre

Fire Acoustics Structures

The Building Test Centre
British Gypsum Limited
East Leake
Loughborough
Leics. LE12 6NP
Tel (0115) 945 1564
Fax (0115) 945 1562
email btc.testing@bpb.com



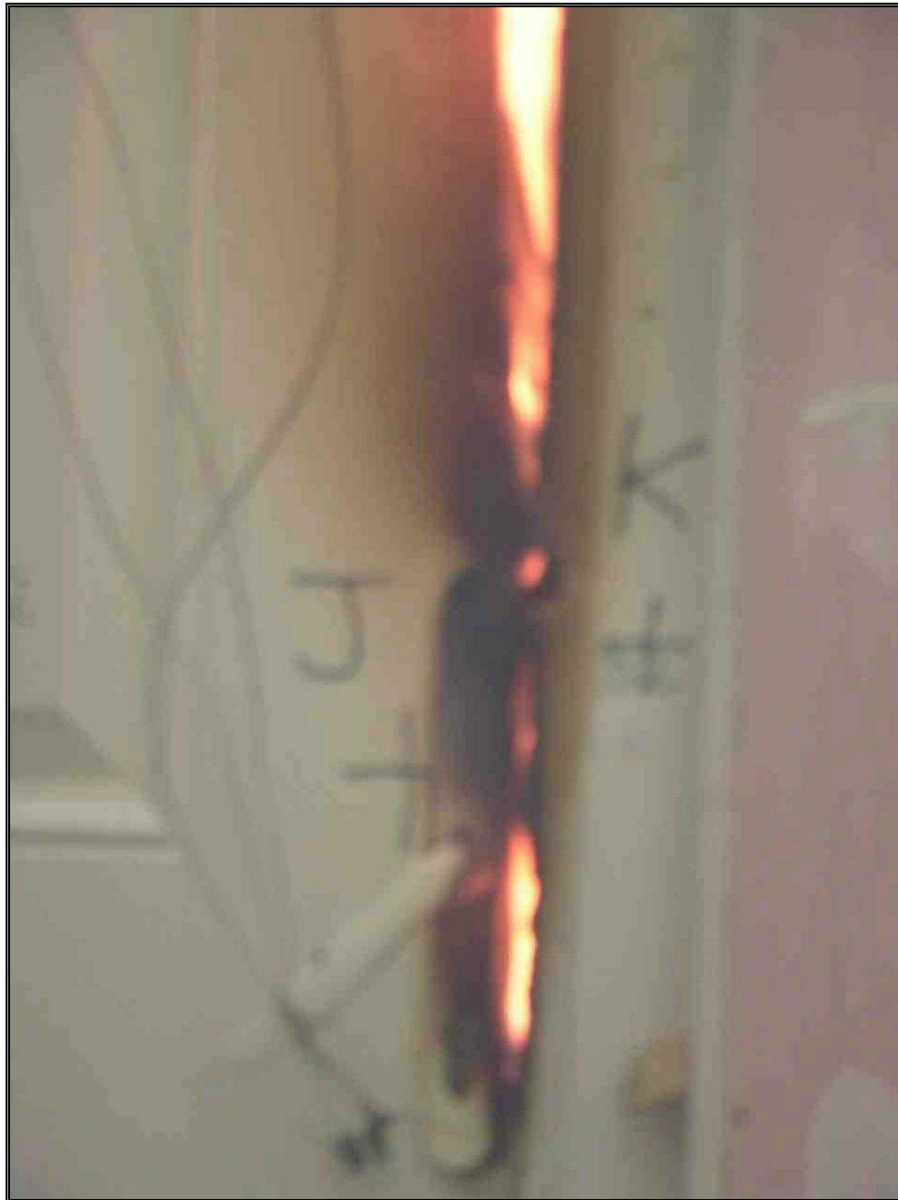
Photograph 29. Top closing edge corner at 35 minutes, showing position of integrity failure.

Customer: L B Plastics Limited

BTC 14434F: Page 73 of 74



0296



Photograph 30. Gap between door leaf and frame at 35 minutes.

Customer: L B Plastics Limited

BTC 14434F: Page 74 of 74



0296