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Testing. Advising. Assuring.

Title:

Air Leakage Test in
Accordance with BS 476:
Part 31, Section 31.1: 1983,
on a garbage chute doorset

WF Report No:

326519

Prepared for:

RNB Engineering Limited

Unit 16,
Highams Lodge Business
Centre,
Blackhorse Lane,
London.
E17 6SH

Date: 29th April 2013

Notified Body No:

0833



0249

Summary

Objective To evaluate the performance of a specimen of a garbage chute doorset assembly, when subjected to a test utilising the test method detailed within BS 476: Part 31, Section 31.1: 1983.

Approved Document B (Fire Safety) of the Building Regulations requires doorsets shall “have a leakage not exceeding 3 m³/m/h (head and jambs only) when tested at 25 Pa under BS 476 *Fire tests on building materials and structures*, Section 31.1. *Methods for measuring smoke penetration through doorsets and shutter assemblies, Method of measurement under ambient temperature conditions*’

In the absence of other criteria, this guidance has been adopted in reporting the results of this test. The leakage rates at other pressures are also included in this report.

Test Sponsor **RNB Engineering Limited**, Unit 16, Highams Lodge Business Centre, Blackhorse Lane, London. E17 6SH

Summary of Tested Specimen The specimen had overall nominal external dimensions of 635 mm high by 635 mm wide and incorporated a chute door nominally 345 mm high by 487 mm wide. The doorset was installed such that the chute opened out, away from the test rig.

Test Results:	Leakage Rate at + 25 Pa (m³/m/h)	Leakage Rate at - 25 Pa (m³/m/h)
	2.84	2.29

Date of Tests 18th February 2013

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Signatories



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* For and on behalf of **Exova Warringtonfire**.

Report Issued

Date : 29th April 2013

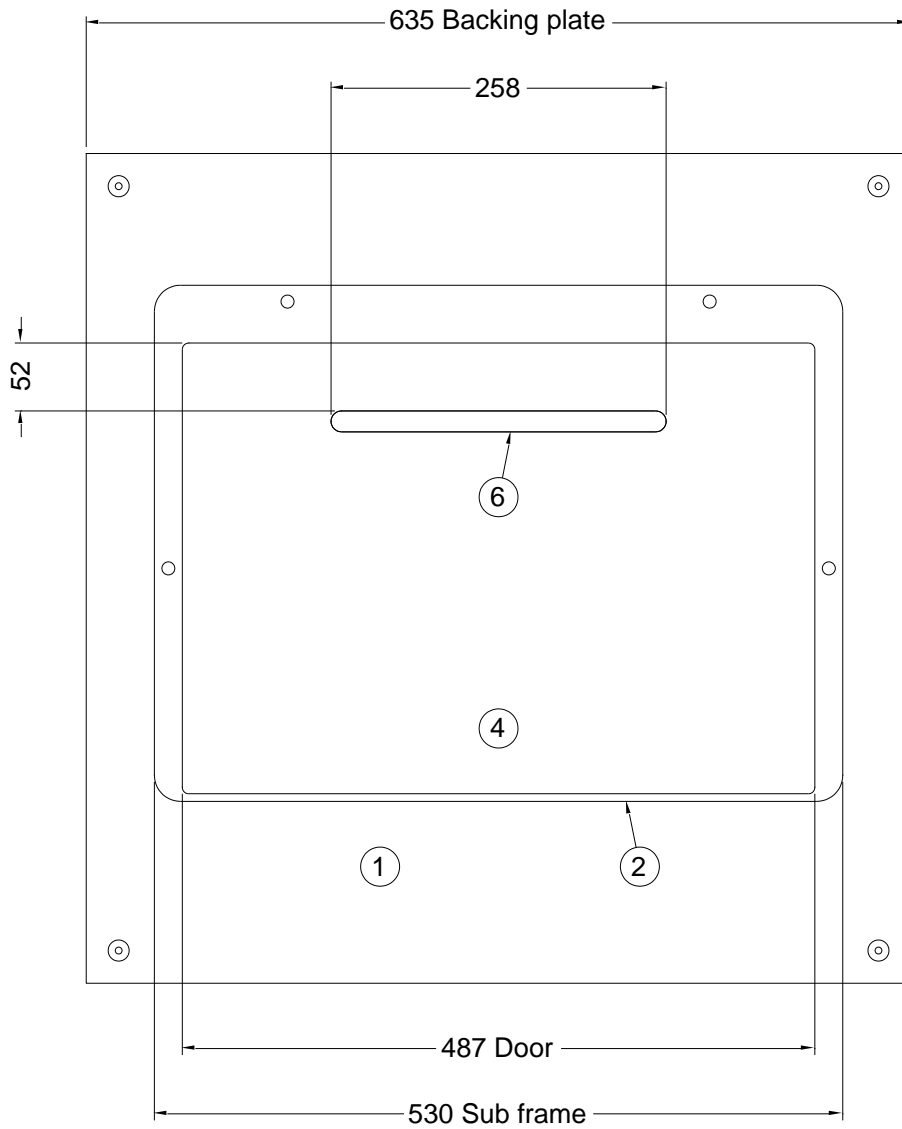
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Test Procedure

Introduction	<p>Approved Document B (Fire Safety) of the Building Regulations requires doorsets shall “have a leakage not exceeding 3 m³/m/h (head and jambs only) when tested at 25 Pa under BS 476 <i>Fire tests on building materials and structures</i>, Section 31.1. <i>Methods for measuring smoke penetration through doorsets and shutter assemblies, Method of measurement under ambient temperature conditions</i>’</p> <p>Certain aspects of some test specifications are open to different interpretations. The Fire Test Study Group has identified a number of such areas and has agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Group. Where such Resolutions are applicable to this test they have been followed.</p>
Instruction to test	<p>The tests were conducted on the 18th February 2013 on behalf of RNB Engineering Limited.</p>
Test Specimen Construction	<p>A comprehensive description of the test construction is given in the Schedule of Components. The description is based on a detailed survey of the specimen and information supplied by the sponsor of the test.</p>
Installation	<p>The specimen was supplied by the test sponsor on the 18th February 2013. Exova Warringtonfire was not involved in any selection or sampling procedures of the specimens or any of the components.</p> <p>A representative of Exova Warringtonfire installed the specimen within the partition on the 18th February 2013.</p>
Preparation	<p>The test was conducted in accordance with the procedures specified in BS 476: Part 31: Section 31.1: 1983.</p> <p>Prior to the evaluation the gaps between the leaf and the frame were measured and the values recorded. The perimeter gaps were then sealed and the differential pressures were applied. The leakage rates measured were recorded as the base rig leakage. The door gaps were then unsealed and the leakage measured at the same differential pressures. The above procedure was then repeated with the airflow in the opposite direction.</p>

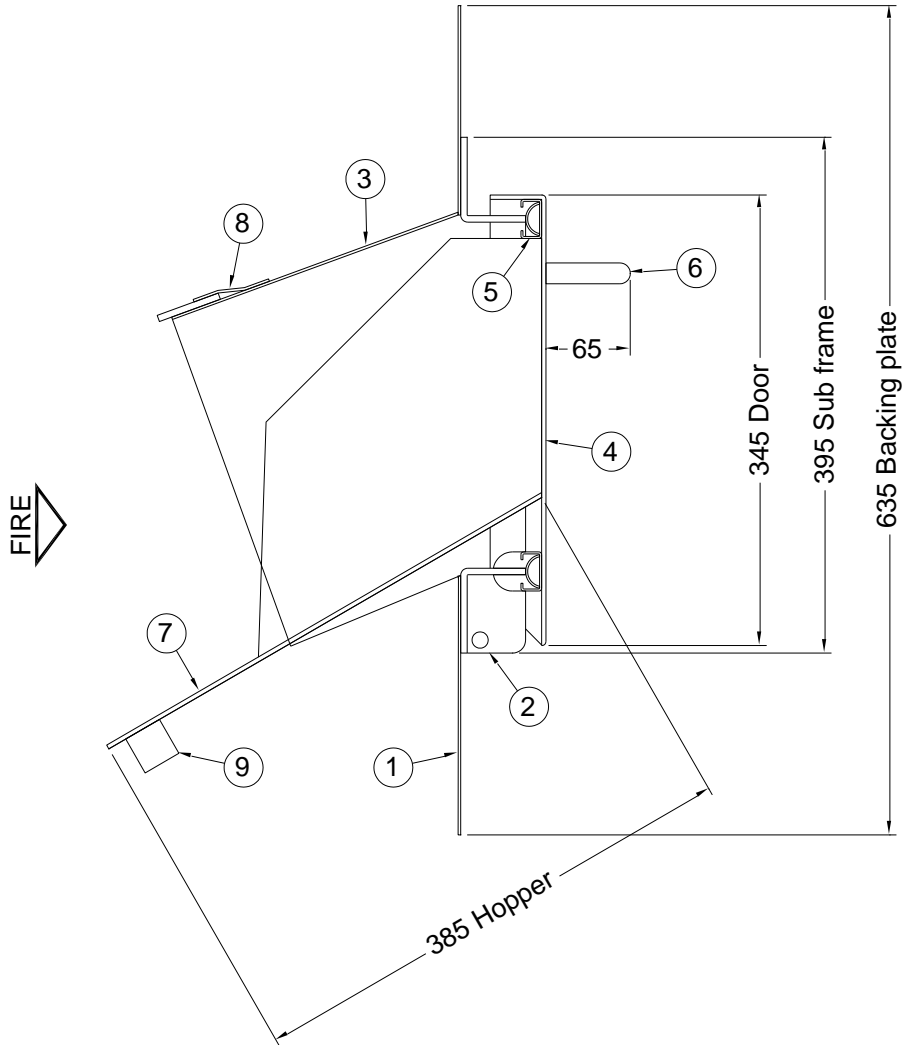
Test Specimen

Figure 1- General Elevation of Test Specimen



Do not scale. All dimensions are in mm

Figure 2 – Side View of Door & Chute Hopper



Do not scale. All dimensions are in mm

Schedule of Components

(Refer to Figures 1 & 2)

(All values are nominal unless stated otherwise)

(All other details are as stated by the sponsor)

<u>Item</u>	<u>Description</u>
1. Backing Plate	
Material	: Mild steel
Thickness	: 2 mm
Overall size	: 635 mm x 635 mm
Fixing method	: Through fixed to blockwork wall using 100 mm long x 8 mm concrete fixings
2. Sub Frame	
Material	: Mild steel angles
Thickness	: 5 mm
Overall size	: 65 mm x 50 mm
Jointing method	
i. top and sides	: Mitred and seam welded
ii. base and sides	: Butted and seam welded
Fixing method	: Through bolted to backing plate using 6 off M10 bolts with suitable nuts
3. Chute Canopy	
Material	: Mild steel
Thickness	: 2 mm
Overall size	: 390 mm wide x 220 mm deep
Fixing method	: Weld fixed to the back face of the sub frame, item 2
4. Chute Door	
Material	: Mild steel
Thickness	: 3.3 mm
Overall size	: 487 mm wide x 345 mm high x 43 mm deep
Jointing method	
i. top and sides	: Mitred and seam welded
ii. base and sides	: Butted and seam welded
Fixing method	: Through bolted to backing plate using 6 off M10 bolts with suitable nuts
5. Chute Door Back Seal	
Material	
i. housing	: Mild steel channel
ii. seal	: Rubber
Overall size of housing	: 30 mm wide x 16 mm deep with 6 mm returned edges
Jointing method	: Mitred
Fixing method	: Welded to the back face of the chute door, item 3
6. Chute Door Handle	
Material	: Mild steel
Overall size	: 258 mm long x 16 mm diameter with 65 mm projection
Fixing method	: Welded to the front face of the chute door, item 3

<u>Item</u>	<u>Description</u>
7. Chute Hopper	
Material	: Mild steel
Thickness	: 3.3 mm
Overall size	: 348 mm wide x 195 mm deep x 385 mm long
Fixing method	: Welded to the back face of the Chute door, item 4
8. Chute Hopper Stop	
Material	
i. housing	: Mild steel
ii. seal	: Rubber
Overall sizes	
i. housing	: 60 mm wide x 2 mm thick x 370 mm long
ii. seal	: 50 mm wide x 5 mm thick x 370 mm long
Fixing methods	
i. housing	: Seam welded to top of
ii. seal	: Butted and seam welded
	: Through bolted to backing plate using 6 off M10 bolts with suitable nuts
9. Counter Balance	
Material	: Mild steel
Overall size	: 30 mm x 30 mm
Fixing method	: Welded to the under side of the Chute hopper, item 7

Test Data and Information

General

The following data, which was recorded during the tests, is included in the report:

- Table of the net leakage through the specimen at specified pressure differentials.
- Graph of the net leakages through the specimen at specified pressure differentials.

The ambient air temperature in the vicinity of the test construction at the start of the test was 10°C with no variation during the test.

Leakage Calculation

The readings were corrected for each leakage measurement to a reference temperature of 22°C and standard atmospheric pressure (1 atmosphere equals 101325 Pa) utilising the following formula:

$$Q = Q_a \times \frac{(P_a + p)}{101325} \times \frac{293.15}{(T_a + 273.15)} \times (1 - 0.3795) \times \frac{M_w}{100} \times \frac{E_s}{P_a + p}$$

Where Q = Adjusted rate of air flow (m³/h)

Q_a = Measured rate of airflow (m³/h)

p = Pressure increase (Pa)

P_a = Barometric Pressure (Pa)

T_a = Air temperature (°C)

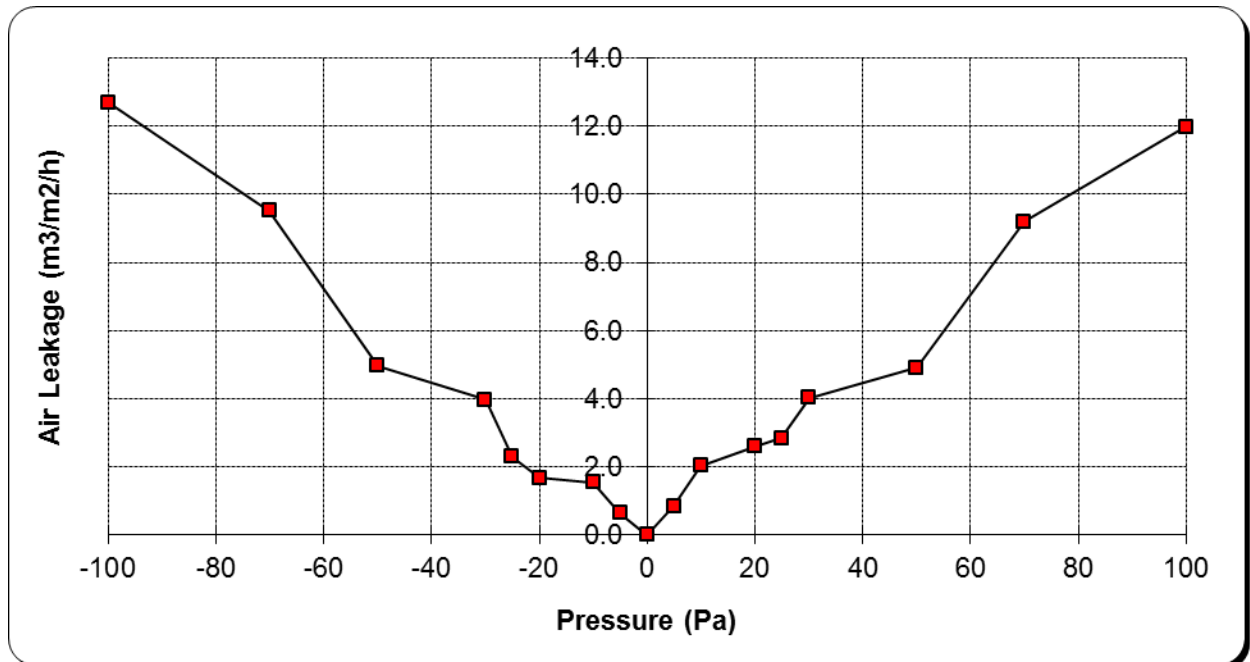
M_w = Relative Humidity (%)

E_s = Saturated water vapour pressure (Pa)

Leakage Data

Net Leakages at Specified Pressure Differentials

Pa	m ³ /m/h
-100	12.70
-70	9.52
-50	4.96
-30	3.96
-25	2.29
-20	1.66
-10	1.54
-5	0.62
0	0
5	0.83
10	2.03
20	2.58
25	2.84
30	4.01
50	4.91
70	9.20
100	11.99



Performance Criterion

Approved Document B (Fire Safety) of the Building Regulations requires doorsets shall “have a leakage not exceeding 3 m³/m/h (head and jambs only) when tested at 25 Pa under BS 476 *Fire tests on building materials and structures*, Section 31.1. *Methods for measuring smoke penetration through doorsets and shutter assemblies, Method of measurement under ambient temperature conditions*’

In the absence of other criteria, this guidance has been adopted in reporting the results of this test, which are detailed below. The leakage rates at other pressures are also included in this report.

Ongoing Implications

Limitations The results relate only to the behaviour of the specimen under the particular conditions of test.

The test results relate only to the specimen tested. Application of the results to specimens of different dimensions or incorporating different components should be the subject of a design appraisal.

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 specimen of a garbage chute doorset has been subjected to a test in accordance with BS 476: Part 31, Section 31.1: 1983.

The performance of the specimen was assessed against the criteria detailed within the Standard and the following results obtained:

Test Results:	Leakage Rate at + 25 Pa (m ³ /m/h)	Leakage Rate at - 25 Pa (m ³ /m/h)
	2.84	2.29
Date of Test	18 th February 2013	