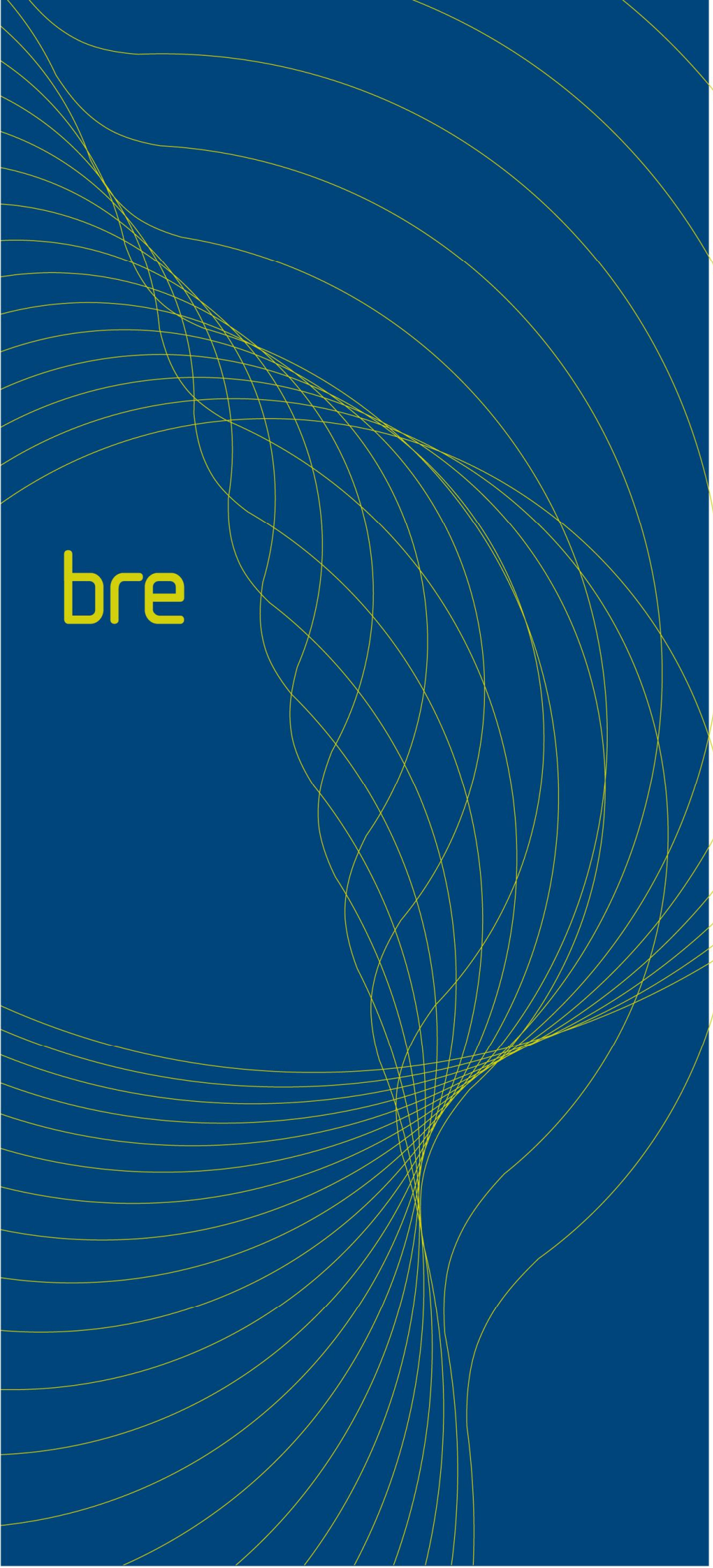


Air-tightness tests on a Manthorpe Building Products GL250 Loft Access Hatch

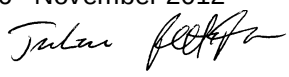
Prepared for: Mr. Ben Hales
Product Designer

Manthorpe Building Products

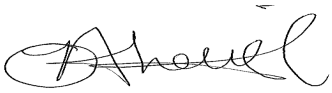
11th December 2012

Test report number 283 - 506

Tested on behalf of BRE by

Name	Julian Pettifer
Position	Senior Technician, Building Technology Group
Date	16th November 2012
Signature	

Prepared on behalf of BRE by

Name	Felix Ahatty BEng (Hons)
Position	Engineer, Building Technology Group
Date	11th December 2012
Signature	

Approved on behalf of BRE

Name	Dr. P. A. Blackmore
Position	Associate Director, Building Technology Group
Date	11th December 2012
Signature	

BRE
Garston
WD25 9XX
T + 44 (0) 1923 664000
F + 44 (0) 1923 664010
E enquiries@bre.co.uk
www.bre.co.uk

Contents

1 Introduction

At the request of Mr. Ben Hales of Manthorpe Building Products, Brittain Drive, Codnor Gate Business Park, Ripley, Derbyshire, DE5 3ND, BRE issued proposal 132-474 dated 30th October 2012. The client accepted this on 2nd November 2012 BRE tested the specimens on Friday 16th November 2012.

The tests were carried out under the BRE Standard Terms and Conditions of Business for testing as part of BRE project number CV5774/Job Number 283 – 506.

2 Objectives of the testing

The testing was performed in order to measure the rate of air leakage through the Manthorpe GL250 loft access hatch.
Building Regulations are constantly changing with the aim to further improve the energy efficiency of buildings, a key factor in these guidelines relates to the need for air tightness within the fabric of a building. For example Part L2A states that a reasonable limit for the designed air permeability of buildings is $10m^3/h/m^2$ at 50 Pa.
The latest update to BS 5250:2011 the Code of Practice for the Control of Condensation in Buildings continues to provide guidance on the methods for maintaining the air tightness of internal ceilings. Annex H.3.2 outlines the rules for producing a well sealed ceiling which includes the requirements for loft access hatches as follows:

'H.3.2 Internal Finishes and Ceilings
The air leakage rate through an access hatch, including its frame, when tested to BS EN 13141-1:2004, ***4.3*** *should be less than 1 m^3/h at a pressure difference of 2 Pa. It may be assumed that "push-up" wooden hatch covers in a frame, constructed in-situ, with continuous compressible seals, will meet this criterion provided the weight of the door is at least 5.5 kg. Hatch covers should either be heavy enough to compress a seal or be clamped, with a closed cell compressible seal, or "O-ring" between it and the frame. Drop-down hatch covers are more difficult to seal; it is recommended that proprietary units with a supplied hatch cover in a frame are used. Manufacturers can provide third party evidence that the leakage criterion is met.'*

With the industry reliant on the Building Regulations for guidance, it is important for the specifiers of a loft access hatch to know the air leakage rate through the product at pressure of 2Pa and 50 Pa.

.

3 Details of the testing and the test rig

BS 5250: 2011 specifies that loft access hatches should be tested to BS EN 13141-1: 2004. This standard is intended for testing the ventilation performance of externally and internally mounted air transfer devices of the following types:

- Devices with fixed opening(s)
- Devices with manually adjustable opening(s)
- Devices with pressure difference controlled opening(s)
- Window openings specifically designed to act as an air transfer device

It can be seen from the above list that this standard is intended for testing devices with openings. It was not intended for testing nominally sealed devices such as loft access hatches. This has some consequences when it comes to analysis of the results because the airflow through loft hatches, as might be expected, does not fit the equation for flow through an opening. However, the basic principles of the BS EN 13141-1: 2004 test will apply to loft access hatches.

The basic principle of the test is that a specimen is fixed into one face of an airtight box and the air pressure differential is then gradually increased (or decreased) in prescribed increments from 1 Pa to 100 Pa and the flow rate measured at each increment. The airflow was applied using a variable speed centrifugal fan and the mass flow rate was measured using a calibrated flow meter. The mass flow rate (kg/h) was converted to volume flow rate m^3/h taking account of the barometric pressure and temperature measured during the testing. A calibrated manometer was used to measure the air pressure differential across the specimen.

The rig has an opening of about 860 mm x 800 mm into which the test specimen is clamped. The opening has strips of closed cell foam around the perimeter to give an airtight seal. Figure 1 shows a loft hatch clamped into the rig.

BS EN 13141-1 requires that the test rig has a background leakage rate lower than 1 litre/s at 100 Pa (= 3.6 m^2/h). The background leakage of the test rig was measured under both positive and negative pressures by using a 1 m^2 sheet of mdf clamped on to the test rig. This background leakage was subtracted from all measured test results. Table 1 shows the background leakage rate of the test rig, which is well within the specified requirements of BS EN 13141-1.

Test pressure Pa	Air leakage in box Positive Pressure m^3/h	Air leakage in box Negative Pressure m^3/h
1	0.11	0.15
2	0.15	0.18
4	0.17	0.21
8	0.29	0.30
10	0.35	0.35
15	0.45	0.41
20	0.76	0.69
30	1.09	1.02
40	1.27	1.29
50	1.46	1.57
60	1.71	1.86
80	2.13	2.39
100	2.65	2.79

Table 1 Background air leakage rate from test rig

4 Test Specimen

4.1 Manthorpe GL250 Loft Access Hatch

The sample sent was a drop down access hatch which was 562mm wide and 726mm long. The specimen was installed into the test box as can be seen in Figure 1 below.

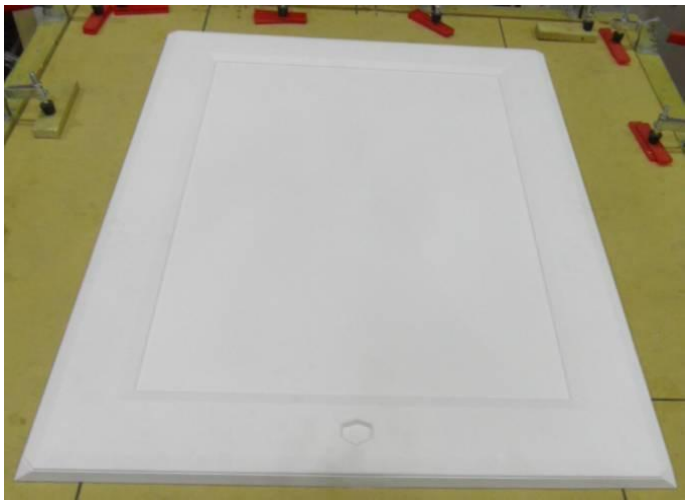


Figure 1 View of Manthorpe GL250 Loft Access Hatch before test.

5 Test results

The BS EN 13141-1: 2004 test procedure only requires testing under positive differential pressure, i.e. for loft hatches this would be a positive pressure on the indoor face of the hatch (not on the roof space side). However, because the performance of the specimen were expected to be different under positive and negative pressure, the test was repeated for negative applied pressure.

The air leakage rates in m^3/h for the positive and negative pressure tests are shown in table 2 below.

Positive differential air pressure Pa	Air permeability of GL250 Loft Access Hatch Under Positive pressure m^3/h	Air permeability of GL250 Loft Access Hatch Under Negative pressure m^3/h
1	0.04	0.01
2	**0.05**	**0.02**
4	0.04	0.02
8	0.01	0.01
10	0.00	0.00
15	0.02	0.00
20	0.00	0.01
30	0.00	0.02
40	0.03	0.03
50	**0.11**	**0.04**
60	0.15	0.06
80	0.16	0.04
100	0.14	0.12

Table 2 Air leakage of GL250 Loft Access Hatch

From Table 2 it can be seen that the GL250 loft access hatch gives a lower air leakage rate under negative pressure than under positive pressures.

The BS 5250 maximum recommended air leakage rate for loft hatches in sealed ceilings is 1 m^3/h at a positive pressure differential of 2 Pa. The air leakage rates at 2 Pa are highlighted in table 2 where it can be seen that the GL250 loft access hatch product meets this requirement with a leakage rate of 0.05 m^3/h.

At a positive test pressure of 50 Pa the air leakage rate was 0.11 m^3/h. The units given for leakage rate in Part L2A of the Building Regulations are $m^3/h.m^2$.

The calculated air leakage per unit area of GL-250 loft access hatch assembly was 0.19$m^3/h.m^2$ and this is within the Part L2A 'reasonable limit' for the design air permeability of buildings.

6 Summary

	Air flow per unit m^3/h at 2 Pa	Air flow per unit area $m^3/h/m^2$ at 50 Pa
Manthorpe GL-250	0.05	0.19

Table 3 Conclusion Results Table

The Manthorpe Building Products loft access hatch Model GL-250 met the BS 5250: 2011 recommendation for a leakage rate of $<1m^3/h$ at a pressure differential of 2 Pa.

It also met the Building Regulations Part L2A 'reasonable limit' for the design air permeability of buildings of $10m^3/h.m^2$ at 50Pa.

It should be noted that the above requirements are only best practice recommendations or guidance and are not pass/fail criterion. Products that don't meet these requirements can still be sold but it is likely that the new trend towards well sealed ceilings will mean that specifiers will increasingly want products that comply with the requirements of BS 5250: 2011.

==========REPORT ENDS==========