



# Test Report



Report No.	371/7772147	This report consists of 6 pages
Client	Ashton Industrial Sales South Road Harlow Essex CM20 2AR	
Authority & date	Quotation Acceptance Form reference No. BSI 0000346911, dated 3 October 2011. Equipment Record No. 10132505.	
Items tested	6 off Insulating glass units Cavity gas - Argon Desiccant - Molecular sieve - Eurosiv 3A Primary sealant - Bostik 2000 Secondary sealant - Hot melt butyl - Bostik 5000 Spacer bar - Nedex - Proflex HM 12mm System description - Ashton BSI SMO 7758373 Date of manufacture - 8 November 2011	
Specification	BS EN 1279-3:2002 Type test assessment	
Results	<b>See summary of results on page 2</b>	
Prepared by	B Bustin 	(Senior Technician Engineer)
Authorized by	S Ginger 	(Senior Engineer)
Issue Date	23 March 2012	
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of CP0322 'Conditions of contract for testing'. The results contained herein apply only to the particular sample/s tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of the Managing Director, BSI, who reserves the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.	



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## TEST AND EXAMINATION OF INSULATING GLASS UNITS TO BS EN 1279-3:2002

### INTRODUCTION

At the request of Ashton Industrial Sales the insulating glass units (IGU's) detailed below were tested and assessed to the applicable requirements of BS EN 1279-3:2002, as indicated on the following pages of this report.

This request was authorised by Quotation Acceptance Form reference no. BSI 0000346911, dated 3 October 2011.

The test items were received on 3 February 2012 and identified under Equipment Record No. 10132505. The relevant units were subjected to the climatic test commencing on 21 December 2011.

### TEST ITEMS

6 off insulating glass units each nominally 502mm x 352mm with a 12mm cavity between the two panes of 4mm glass. The components used in the construction were declared by the manufacturer as follows: -

Cavity gas -	Argon
Declared concentration -	90%
Temperature and pressure at which the IGU's were sealed -	16°C and 1016mbar
Primary sealant -	Bostik 2000
Secondary sealant -	Hot melt butyl - Bostik 5000
Desiccant -	Molecular sieve - Eurosiv 3A
Spacer bar -	Nedex - Profilex HM 12mm
Corner keys -	Profilex gas plugs
System description -	Ashton BSI SMO 7758373
Date of manufacture -	8 November 2011

### SUMMARY OF RESULTS

The insulating glass units subject to test exhibited the following characteristics:

Characteristic	IGU reference		Specified
	A	B	
Declared concentration $c_{i,o}$ (%):	90.00	90.00	-
Measured concentration $c_i$ (%):	92.30	93.60	-5%, +10% of $c_{i,o}$
Gas leakage rate $L_i$ (%a <sup>-1</sup> ):	0.84	0.80	1.00 Max

## TEST PROCEDURE

### Conditioning and dimensional measurement

The IGU's were received at BSI and stored in standard laboratory conditions of  $(23 \pm 2)^{\circ}\text{C}$  and  $(50 \pm 5)\%$  relative humidity for a period of not less than 14 days. The variation in temperature and relative humidity did not fall outside these parameters for the 14 day conditioning period. During this period the IGU's were randomly identified as A through F, and the length and width of each unit was then measured. The results are shown below: -

IGU	Length (mm)	Width (mm)
A	501	351
B	501	351
C	501	351
D	501	351
E	501	351
F	501	351
<b>Specified</b>	$(502 \pm 2)\text{mm}$	$(352 \pm 2)\text{mm}$

### Construction and appearance

Upon completion of the conditioning period two IGU's were visually examined for the following criteria and/or defects: -

Observation	IGU A	IGU B
General construction	Satisfactory	Satisfactory
Edge damage and cracks	None	None
Fractures	None	None
Specking in the cavity	None	None
Congruence of panes	Satisfactory	Satisfactory
Other visable defects	None	None

### Determination of the internal cavity volume

The two IGU's intended for test were measured to establish the internal volume. The clear distance between opposite spacers and the clear distance between the inner surfaces of the panes were measured and recorded.

Dimensions (mm)	IGU A	IGU B
Internal cavity length	474	475
Internal cavity width	325	325
Internal cavity thickness (1)	11.6	11.9
Internal cavity thickness (2)	11.7	11.7
Internal cavity thickness (3)	11.8	11.5
Internal cavity thickness (4)	11.7	11.6
Average internal cavity thickness	11.70	11.68
Calculated internal cavity volume ( $\text{cm}^3$ )	1802	1802

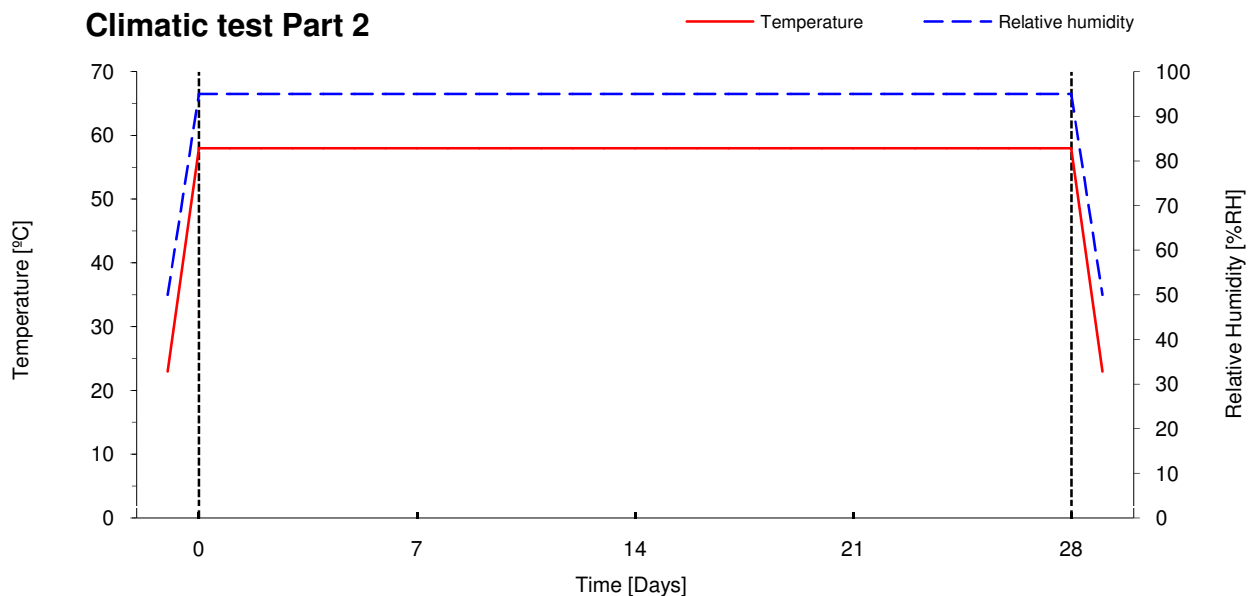
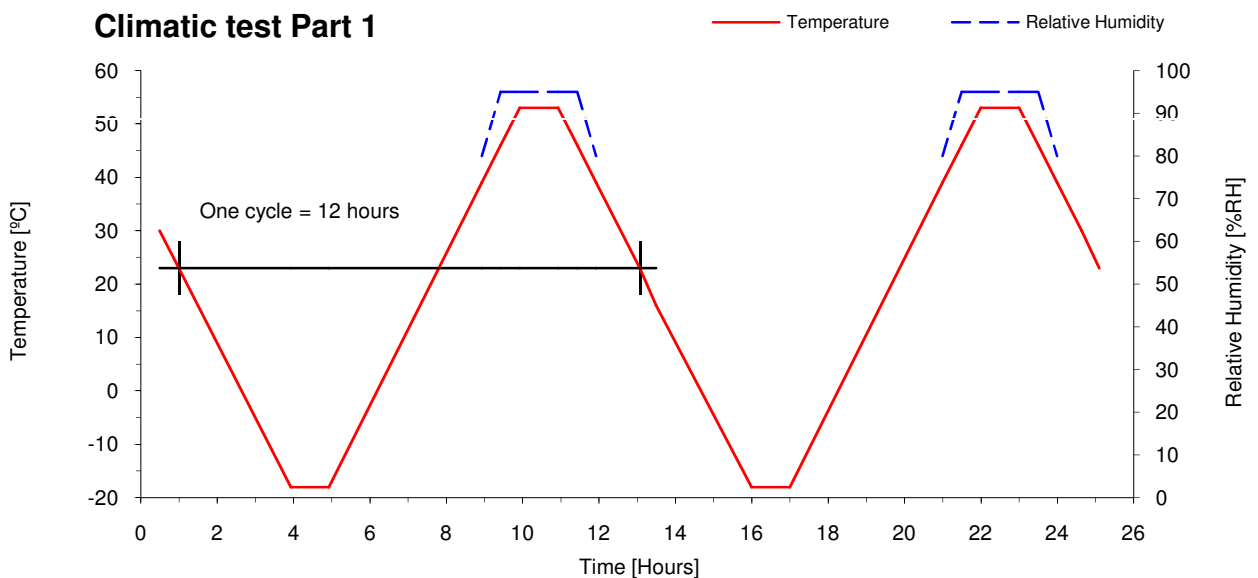
**TEST PROCEDURE (continued)**

**Climatic test**

The two IGU's intended for leakage testing and two others were placed in a climatic test chamber. The remaining IGU's were stored in standard laboratory conditions as spare samples. The climatic test consisted of two parts. The first part was 28 cycles each of 12 hours. The temperature dwells were for 1 hour at -18°C and +53°C with ramps of 14°C/hour between the dwells, the humidity was maintained at 95%RH or greater for the upper temperatures. The second part was a period of four weeks (28 days) at a constant +58°C/≥95%RH.

**NOTE:** BSI's environmental chambers are calibrated and programmed to produce the conditions required by the specification. However, due to the uncertainty of measurement associated with environmental chamber calibration, it cannot be guaranteed that the tolerances specified in the standard for the conditions within the chamber were maintained throughout the whole of the conditioning period.

The graphs shown below detail the two parts of this climatic test.



**TEST PROCEDURE (continued)**

Upon completion of the climatic test the 4 IGU's were again conditioned at standard laboratory conditions of  $(23 \pm 2)^{\circ}\text{C}$  and  $(50 \pm 5)\%$  relative humidity for a minimum of 28 days and a maximum of 49 days before commencing the gas leakage test. Occasionally it may be necessary to use a non standard test method (NSTM) and change the minimum conditioning period after climate exposure from 28 days to 21 days or to change the maximum conditioning period from 49 days to 182 days. This NSTM was agreed and accepted at the CEN TC 129 WG4 committee meeting on 20 February 2007.

**Gas Leakage test**

IGU A and B were subjected to the gas leakage test in accordance with the requirements of the standard using a full container.

The principal of the test is that the container creates a chamber around the edge of the IGU in which the air can be replaced with Helium. A steady flow of Helium is passed through the container, for several days, until all the air has been purged. The container is then isolated from the Helium supply. Throughout this test the container (and thus the IGU) are maintained at a temperature of  $(20 \pm 1)^{\circ}\text{C}$ .

After an isolation period of at least 20 hours, Helium is again purged through the container and any gasses that have escaped from within the IGU cavity are collected and measured using a gas chromatograph. The isolation and measurement processes are repeated until the standard deviation of at least four successive measurements is less than 0.25 micrograms/hour and at least one result is higher than the result immediately preceding it.

**Gas concentration test**

Following the gas leakage test a sample of gas was taken directly from the cavity of each IGU and the level of Argon was established as a percentage of the total gas sampled.

To collect the cavity gas the IGU was held in a special test rig that allowed a drill bit and pipe assembly to be sealed to the IGU's outer edge. A hole was made in the edge of the IGU with a drill bit and a sample of the cavity gas extracted from the IGU via the flutes of the drill. The gas sample was then analysed using the gas chromatograph.

**TEST RESULTS****Gas leakage Unit A**

Measurement	Isolation period (hours:minutes)	Measured argon ( $\mu$ l)	Calculated argon ( $\mu$ g/h)	Standard deviation
1	22:00	39.00	2.90	-
2	22:55	38.70	2.75	-
3	24:47	36.30	2.38	-
4	21:33	36.20	2.73	0.19
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-

	Actual	Specified
<b>Declared concentration (%):</b>	<b>90</b>	<b>-</b>
<b>Measured gas concentration (%):</b>	<b>92.3</b>	<b>- 5%, +10% of Declared</b>
<b>Calculated gas leakage rate (% per annum):</b>	<b>0.84</b>	<b>1.00 % per annum</b>

**Gas leakage Unit B**

Measurement	Isolation period (hours:minutes)	Measured argon ( $\mu$ l)	Calculated argon ( $\mu$ g/h)	Standard deviation
1	22:50	38.70	2.77	-
2	21:00	29.10	2.25	-
3	21:40	37.10	2.79	-
4	48:05	78.10	2.64	0.22
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-

	Actual	Specified
<b>Declared concentration (%):</b>	<b>90</b>	<b>-</b>
<b>Measured gas concentration (%):</b>	<b>93.6</b>	<b>- 5%, +10% of Declared</b>
<b>Calculated gas leakage rate (% per annum):</b>	<b>0.80</b>	<b>1.00 % per annum</b>

Note: For each sample, the calculated gas leakage is based on the mean of the last four results.

End of Report

## Appendix A

**BSI**

Kitemark House  
 Maylands Avenue  
 Hemel Hempstead  
 Herts  
 HP2 4SQ

**Summary of Report No. 371/7772147****Date: 23 March 2012**

Insulating glass units  
 Measurement of gas leakage and gas concentration  
 according to BS EN 1279-3:2002  
 For details, see the test report

Company name: **Ashton Industrial Sales**  
 Address: **South Road**  
**Harlow**  
**Essex**  
**CM20 2AR**

Plant name: **Ashton Industrial Sales**  
 Address: **South Road**  
**Harlow**  
**Essex**  
**CM20 2AR**

System description reference: Ashton BSI SMO 7758373  
 Product Name: Argon filled units  
 Test report for moisture penetration index : AIS 2011/1

Applied gas :	<b>Argon</b>	
Unit number :	<b>A</b>	<b>B</b>
Measured concentration $c_i$ (%) :	<b>92.3</b>	<b>93.6</b>
Declared concentration $c_{i,0}$ (%) :	<b>90</b>	<b>90</b>
Gas leakage rate $L_i$ (%a <sup>-1</sup> ) :	<b>0.84</b>	<b>0.80</b>

A handwritten signature in black ink, appearing to read 'S Ginger', is located in the bottom right corner of the page.

S Ginger  
 Senior Engineer