



Bucknalls Lane, Garston
Watford, Herts WD25 9BA
Telephone: 01923 665300
Facsimile: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

BRITISH BOARD OF AGRÉMENT ASSESSMENT REPORT
Ref: S2/49532

Product title:

Duraflex Diamond Suite PVC-U Window System

Manufacturer and factory location:

Duraflex Ltd, a Division of MASCO UK Windows Group Ltd
Severn Drive,
Tewkesbury Business Park,
Tewkesbury,
Gloucestershire,
GL20 8SF

The British Board of Agrément has as Notified Body (NB) No 0836 performed Initial Type Testing of the product mentioned above. This report may be used in support of an EC Declaration of Conformity according to the requirements in the harmonized European Standard EN 14351-1 : 2006 + A1 : 2010.

Contract No: S2/49532

Report by: Luke Adams

Work period: June to December 2012

Approved by:
(Project Manager)

Date:

13-DEC-12

Authorised by:
(Head of Approvals – Physics)

Date:

10/12/12

On behalf of the British Board of Agrément

1 INTRODUCTION

This Report describes tests and assessments undertaken by the BBA which can contribute to the Evaluation of Conformity requirements for CE marking within the context of 89/106/EEC Construction Products Directive, as the BBA has been notified as an approved body against EN 14351-1 : 2006 + A1 : 2010 (Notified Body number 0836).

In EN 14351-1 : 2006 + A1 : 2010 *Windows and doors - Product standard, performance characteristics - Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics* the level of Attestation of Conformity has been set as system 3 for windows (with or without related hardware).

The tasks under the responsibility of the manufacturer, including sampling, are as follows:

- Factory production control
- Initial Type Testing of the product by a Notified Body.

This report covers Initial Type Tests for Air leakage, Watertightness, Resistance to Wind Loading, Load-bearing Capacity of Safety Devices, Operating Forces, Mechanical Strength, Acoustic Properties and Thermal Transmittance and an assessment of the manufacturer's Declaration of Content.

2 PRODUCT RANGE

2.1 Description of test specimens

Sample 1

Duraflex Diamond Suite, fixed PVC-U window 1980 mm high by 2000 mm wide.

Sample 2

Duraflex Diamond Suite, side-hung PVC-U window fitted with espagnolette only, 1500 mm high by 800 mm wide.

Sample 3

Duraflex Diamond Suite, side-hung PVC-U window fitted with espagnolette and shootbolt 1500 mm high by 800 mm wide.

Sample 4

Duraflex Diamond Suite, top-hung PVC-U window fitted with espagnolette only, 1350 mm high by 1350 mm wide.

Sample 5

Duraflex Diamond Suite, top-hung PVC-U window fitted with espagnolette and shootbolt, 1350 mm high by 1350 mm wide.

Sample 6

Duraflex Diamond Suite, side-hung next to side hung PVC-U window fitted with espagnolette only, 1500 mm high by 1350 mm wide.

Sample 7

Duraflex Diamond Suite, side-hung next to side hung PVC-U window fitted with espagnolette and shootbolt, 1500 mm high by 1350 mm wide.

Sample 8

Duraflex Diamond Suite, side-hung over fixed PVC-U window fitted with espagnolette and shootbolt, 2100 mm high by 900 mm wide.

Sample 9

Duraflex Diamond Suite, side-hung next to side hung PVC-U window fitted with recycled PVC-U reinforcing and espagnolette only, 1500 mm high by 1200 mm wide.

Sample 10

Duraflex Diamond Suite, side-hung next to side hung PVC-U window fitted with recycled PVC-U reinforcing and espagnolette with shootbolt, 1500 mm high by 1200 mm wide.

Sample 11

Duraflex Diamond Suite, side-hung next to side hung PVC-U window fitted with espagnolette only, 1200 mm high by 1500 mm wide.

Sample 12

Duraflex Diamond Suite, side-hung next to side hung PVC-U window fitted with espagnolette and shootbolt, 1200 mm high by 1500 mm wide.

Sample 13

Duraflex Diamond Suite, top-hung PVC-U window, 1200 mm high by 1200 mm wide.

Sample 14

Duraflex Diamond Suite, side-hung next to side hung PVC-U window, 1350 mm high by 1410 mm wide.

Sample 15

Duraflex Diamond Suite, tilt and turn next to fixed PVC-U window, 1500 mm high by 2000 mm wide.

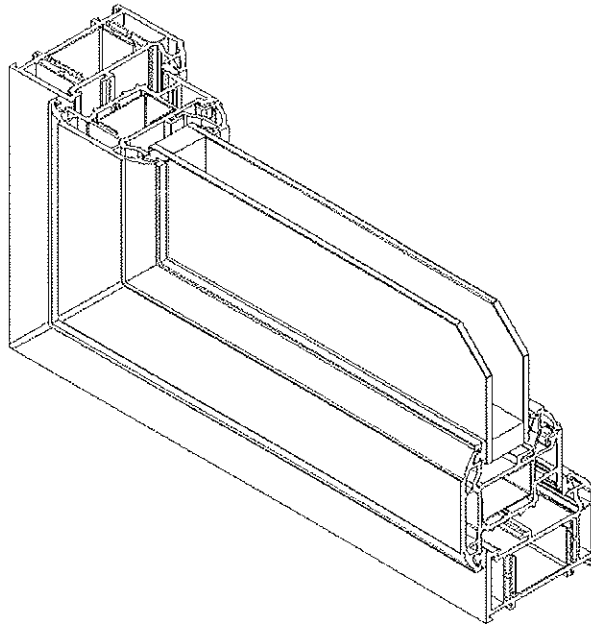
Sample 16

Duraflex Diamond Suite, tilt and turn PVC-U window, 2100 mm high by 1300 mm wide.

2.2 Product Description:

- the Duraflex Diamond Suite 65 mm and 70 mm casement and tilt/turn PVC-U window systems are fabricated from unplasticized polyvinyl chloride (PVC-U) profiles, produced by conventional extrusion techniques. The profiles incorporate rolled-in gaskets made from Thermoplastic Elastomer (QLON) material.
- multilight windows incorporate mullions and transoms connected to the outer frame and, where relevant, to each other by means of welded joints.
- the PVC-U extrusions are cut to length, and where required, galvanized steel, aluminium or recycled PVC-U reinforcement sections are inserted in the PVC-U sections before they are welded together.
- white opening light frame members are reinforced with galvanized mild steel, aluminium or recycled PVC-U reinforcement where their length exceeds 1250 mm. Mullions, transoms and sash members are reinforced with galvanized mild steel, aluminium or recycled PVC-U reinforcing where their length exceeds 1000 mm.
- the head of white Tilt and Turn frame members are reinforced with galvanized mild steel, aluminium or recycled PVC-U reinforcement where their length exceeds 1250 mm. Jambs are fully reinforced when coupled next to another unit. Mullions and transoms are reinforced with galvanized mild steel, aluminium or recycled PVC-U reinforcing where their length exceeds 800 mm. Sash members are reinforced with galvanized mild steel, aluminium or recycled PVC-U reinforcement for all widths and jambs exceeding 700 mm. Foiled products are fully reinforced on all occasions.
- top-hung and side-hung windows covered by this Initial Type Test Report are fitted with friction hinges constructed from stainless steel. The hinges incorporate a plastic slider which can be adjusted by means of a brass screw or a die-cast, slot-headed cam to provide the necessary braking action. Restrictor hinges are also available from the range of fittings to restrict the opening of the window to a maximum distance of 100 mm. This safety device has been tested as part of Essential Characteristic No 1 (see Table 2). The hinges are fixed to the frames with screws.
- top-hung and side-hung windows are fastened by means of concealed espagnolette or shootbolt locking systems constructed from chromated zinc-plated mild steel, operated by a handle. The keeps are made from zinc-based alloy and are fixed by means of self-tapping screws. The espagnolette handle is formed from zinc-based alloy with various finishes.
- Tilt and Turn windows covered by this Initial Type Test Report are fitted with a Tilt and Turn mechanism comprising an espagnolette type locking system, hinges and a tilt stay, all formed from stainless steel. The mechanism incorporates locking rollers and, as an option, shootbolt locks which engage with keeps fixed to the outer frame, and is operated with a handle. The tilt option has been tested as part of Essential Characteristic No 1 (see Table 2). The Tilt and Turn mechanisms are fixed to the frames with screws.

Figure 1 – Corner detail of an outward opening Duraflex Diamond Suite PVC-U Window System



Glazing

- windows are supplied glazed using double-glazed units either 24 mm (4/16/4) or 28 mm (4/20/4) or triple glazed units either 36 mm (4/12/4/12/4) or (6/10/4/10/6) using a 36 mm bead, including where required, laminated glass coupled with reduced size of spacer; the units are as detailed below. All glass is positioned by plastic setting blocks and packing pieces and the units are held in place with PVC-U glazing beads.

Description of glazing units

- outer panes of Float glass, Low Iron glass (annealed or toughened) or Laminated glass
- cavity fill of air or Argon gas
- inner panes of hard or soft coated glass (annealed or toughened) or laminated glass
- spacer bars of :- Duralite, Edgetech, Swisspacer V, Thermobar, Chromatech, Aluminium or Intercept

2.3 The intended use:

The product is a range of PVC-U windows for use as replacement or new construction. The window systems are intended for daily lighting in domestic and commercial locations where there are no restrictions to fire and fire resisting requirements.

3 SAMPLING

The samples and the sampling information were provided by the manufacturer.

Table 1 Sampling information

	Test Report number							
	46200(1)	46200(2)	47862	47974	48291	49523A	49523C	2744
Sampling carried out by:	Mr D Riley	Mr D Riley	Mr B Messenger	Mr D Riley	Mr D Riley	Mr L Adams	Mr L Adams	Mr D Riley
Specimens supplied by:	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd
Specimen supplying date to testing laboratory:	20-Oct-10	20-Oct-10		19-May-11	17-Jun-11	28-Feb-12	28-Feb-12	14-Aug-06
Specimen numbers:	T1/46200/1 T1/46200/2 T1/46200/3 T1/46200/4 T1/46200/5 T1/46200/6 T1/46200/7	T1/46200/1 T1/46200/2 T1/46200/4 T1/46200/5 T1/46200/6 T1/46200/7		T1/47974/1 T1/47974/2 T1/47974/3	T1/48291/1 T1/48291/2	S2/48594/3 S2/48594/5	S2/48594/4 S2/48594/6	T1/40958/3
Place of sampling	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd	Duraflex Ltd	BBA	BBA	Duraflex Ltd

Additional details of sample history in accordance with EN 14351-1 + A10 : 2010, clause 7.2.3.3 can be found in the Sample Declaration/Characterisation forms detailed in Appendix I of each Test Report.

The manufacturer selected and provided details of the windows for the computer simulations in relation to Thermal Transmittance.

4 RESULTS

4.1 Load Capacity of Safety devices

Initial Type Testing has been carried out by the BBA, Notified Body No 0836 and Exova Warringtonapt, Notified Body No 1104. The test results are given in Test Reports detailed below and cover Essential Characteristic No 1. Copies of these Reports are attached as Appendix I

- BBA Test Report 49523C, dated 23 October 2012
 - Report summary Siegenia tilt/turn gear tested on a Duraflex Diamond Suite PVC-U window
- Exova Warringtonapt Report number 310901, dated 24 October 2012
 - Report summary 16" Mila Ideal restrictor hinges on a Eurocell PVC-U window.

A further test report was supplied by the manufacturer from BSI, Report number 2370/7492989 however no Notified Body number was stated on the Test Report even though BSI are a registered Notified Test Laboratory (No 0086). It has been found that BSI were not a registered Notified Body at the time the Report was issued and as such the result should not be used in the Declaration of Performance..

4.2 Thermal transmittance

The following Thermal Reports issued by Duraflex Ltd (Essential Characteristic No 2) were validated by the BBA, Notified Body No 0836 and are attached as Appendix II.

- Duraflex Therm Calculation Report 0985 BBA dated 17 September 2012
- Duraflex Therm Calculation Report 857 dated 20 September 2012
- Duraflex Therm Calculation Report 061 dated 20 September 2012
- Duraflex Therm Calculation Report 060 TILT TURN dated 20 September 2012

4.3 Air Permeability

Initial Type Testing has been carried out by the BBA, Notified Body No 0836. The test results are given in the following test reports (Essential Characteristic No 3) attached as Appendix III

- Test Report 46200(1) dated 13 September 2011
- Test Report 2744 dated 21 March 2007
- Test Report 49523A dated 23 October 2012
- Test Report 47862 dated 6 January 2012

4.4 Watertightness

Initial Type Testing has been carried out by the BBA, Notified Body No 0836. The test results are given in the following test reports (Essential Characteristic No 4) attached as Appendix III

- Test Report 46200(1) dated 13 September 2011
- Test Report 2744 dated 21 March 2007
- Test Report 49523A dated 23 October 2012
- Test Report 47862 dated 6 January 2012

4.5 Resistance to wind load

Initial Type Testing has been carried out by the BBA, Notified Body No 0836. The test results are given in the following test reports (Essential Characteristic No 5) attached as Appendix III

- Test Report 46200(1) dated 13 September 2011
- Test Report 2744 dated 21 March 2007
- Test Report 49523A dated 23 October 2012
- Test Report 47862 dated 6 January 2012

4.6 Acoustic Performance

A test report was supplied by the manufacturer, from The University of Salford, Report number AT/08/05 however no Notified Body number was stated on the Test Report even though The University of Salford are a registered Notified Test Laboratory (No 1145). It has been found that The University of Salford were not a registered Notified Body at the time the Report was issued and as such the result should not be used in the Declaration of Performance..

A summary of the results for sections 4.1 to 4.6 is given in Table 2.

Table 2 Summary of results for essential characteristics

Essential characteristic	Testing or calculation standard	Classification standard	Measurement results
1 Load-bearing capacity of safety devices	EN 14609	EN 14351-1	Pass
2 Thermal transmittance	EN ISO 10077-1 and EN ISO 10077-2	EN 14351-1	U value $\leq 1.8 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$
3 Air permeability	EN 1026	EN 12207	> Class 2, 300Pa
4 Watertightness	EN 1027	EN 12208	> Class 7A, 300Pa
5 Resistance to wind load	EN 12211	EN 12210	> A3, 1200Pa

4.2 Dangerous substances

The declaration of content has been made by the manufacturer and has been examined to ensure that it contains the information required by EN 14351-1 + A1 : 2010 relating to Dangerous Substances. It states that the products contain no materials liable to emission or migration during normal intended use and for which emission or migration into the environment is potentially dangerous to hygiene, health or the environment.

A copy of the manufacturer's declaration is shown in Appendix IV.

5 VOLUNTARY CHARACTERISTICS

5.1 Cyclic Operation

Initial Type Testing has been carried out by the BBA, Notified Body No 0836. The test results are given in the following test reports (Voluntary Characteristic No 1) attached as Appendix V

- Test Report 48291 dated 24 June 2011
- Test Report 47974 dated 3 August 2011
- Test Report 49523C dated 23 October 2012
- Test Report 46200(2) dated 13 September 2011

5.2 Mechanical Strength

Initial Type Testing has been carried out by the BBA, Notified Body No 0836. The test results are given in the following test reports (Voluntary Characteristic No 2) attached as Appendix V

- Test Report 48291 dated 24 June 2011
- Test Report 47974 dated 3 August 2011
- Test Report 49523C dated 23 October 2012
- Test Report 46200(2) dated 13 September 2011

5.3 Operating Forces

Initial Type Testing has been carried out by the BBA, Notified Body No 0836. The test results are given in the following test reports (Voluntary Characteristic No 3) attached as Appendix V

- Test Report 48291 dated 24 June 2011
- Test Report 47974 dated 3 August 2011
- Test Report 49523C dated 23 October 2012
- Test Report 46200(2) dated 13 September 2011

A summary of the results for sections 5.1 to 5.3 is given in Table 3.

Table 3 Summary of results for voluntary characteristics

Voluntary characteristic	Testing or calculation standard	Classification standard	Measurement results
1 Cyclic Operation	EN 1191	EN 12400	Class 2, Moderate duty
2 Mechanical Strength	EN14608 EN14609	EN13115	Class 3, 300N Class 3, 600N
3 Operating forces	EN 13115	EN 12046-1	Class 1, 100N

6 REPORT CONDITIONS

6.1 This Report:

- relates only to the product/system that is named and described in the Report, or samples thereof if appropriate;
- is granted only to the company, firm or person named in the Report – no other company, firm or person may claim any entitlement to this Report;
- cannot be transferred or assigned;
- has to be read, considered and used in its entirety and as a whole document – it may be misleading and will be incomplete to be selective;
- does not provide or confer product/system approval status;
- is copyright of the BBA, which asserts and retains copyright and other intellectual property rights in and over the Report and its contents; and
- is subject to English Law.

6.2 Publications and documents referred to in this Report are those that were current at the date this Report was issued, except where stated otherwise.

6.3 The BBA has used due skill, care and diligence in the preparation of this Report, but no warranty is provided.

6.4 No independent verification of any of the materials, samples, information, or documents supplied to the BBA has been made, except where otherwise stated.

6.5 This Report and the data and information therein results relate only to product/system named in the Report, or samples thereof is appropriate, and the BBA has no responsibility for the design, materials, workmanship or performance of the product/system.

6.6 This Report does not constitute an approval, certification or endorsement of the product/system named on the front page.