

## TEST REPORT

**Lucideon Reference:** 193325 (QT-56508/1/JB)/Ref. 1

**Project Title:** Testing of Spig-Lite Pro Balustrade System whilst Submerged in Water in Accordance with BS 6180:2011 Barriers In and About Buildings

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**For the Attention of:** Mr Adam Oakes

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**Work Location:** Lucideon UK

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## 1 INTRODUCTION

Lucideon Limited were commissioned by the client, Pure Vista Ltd, to carry out load testing of their Spig-Lite Pro Balustrade system whilst installed into concrete through a waterproof roofing membrane. The Spig-Lite Pro channel was submerged in water whilst the test was undertaken in order to establish that the installation of the system did not result in a breach of the waterproof membrane.

All load testing was undertaken in accordance with BS 6180:2011 Barriers in and about buildings.

The testing was carried out at Lucideon's facilities at Queens Road, Penkhull, Stoke on Trent.

This report summarises the test results obtained during the test programme and does not provide interpretation of those results.

## 2 TEST SAMPLES

A single system was tested designated as follows:

- Spig-Lite Pro.

The system had been designed and intended to be used as the base mount for free standing balustrades. The system and glass was installed by Pure Vista personnel.

## 3 TEST PROGRAMME

A horizontal line load was applied to the systems using the following glazed sections:

- Spig-Lite Pro into Concrete whilst submerged:
  - 21.5 mm Toughened PVB 1000 mm x 1200 mm (L x H).

## 4 TEST PREPARATION

A 1.5 mm EDPM roofing membrane was installed onto a concrete block using Mapei Ultrabond Eco VS90 plus Vinyl and Rubber adhesive. A plywood frame was constructed around the membrane to form a tank.

The spigots were bolted to the top of a concrete block through the EDPM membrane. The installation incorporated the Spig-Lite Pro plastic drain block infilled with Sikaflex 11 FC sealing and bonding agent.

The spigots were bolted to the block using high performance M12 Concrete screw bolts. Two spigots were fixed per metre using a single bolt per adaptor. The glass panel was fitted into the adapters using the glass slip clamping system.

## 5 TEST METHOD

The plywood tank was filled with water to a level slightly above the Spigots. Blue dye was added to the water to aid with the visual assessment during the deconstruction on conclusion of the test. Any water ingress would be highlighted by blue staining.

A horizontal imposed line load was applied to the glass at 1100 mm above the datum level of the floor and the deflection measured at the horizontal centre points of the panel. The load was applied via a hydraulic ram and the deflection measured using a linear voltage displacement transducer (see Plate 1).

A load of 0.85 kN/m was applied giving a deflection reading of 25 mm and then held for a period of 24 hours. The load was then released, the plywood tank emptied and the system deconstructed.

## 6 RESULTS

The tests were carried out in accordance with the guidance given in BS 6180:2011 Barriers in and about buildings - Code of Practice. The loads achieved by the Spig-Lite system, tested under horizontal imposed line load whilst submerged in water, are given in Table 1.

On emptying the tank the system was deconstructed and visually assessed for signs of water ingress. Each component was individually assessed and the membrane removed to expose the underlying concrete block. No evidence of water ingress was found. Any water ingress during the test would have been highlighted by the blue dye and the system was found to be completely free of staining. Photographs showing each stage of the deconstruction can be found in the Appendix.

**TABLES**

**Table 1** - Summary of Performance of Pure Vista Spig-Lite Pro Balustrade System Mounted into Concrete Tested under Horizontal Imposed Line Load

Fix	Glass Type	Load Application (mm)	Transducer Position (mm)	Imposed Line Load at 25 mm Deflection (kN/m)	Working Line Load for System (kN/m)	Deflection at Working Line Load for System (mm)
Concrete (Submerged under Water)	21.5 mm PVB	1100	1100	0.85	0.74	18.89

**Table 2** - Summary of Suitability of Pure Vista Spig-Lite Pro Base Mounted into Concrete whilst Submerged in Water in Accordance with Table 2 of BS 6180:2011

Type of Occupancy for Part of the Building	Examples of Specific Use	Horizontal Uniformly Distributed Line Load (kN/m)	21.5 mm PVB Glass
Domestic and residential activities	(i) all areas within or serving exclusively one single family dwelling including stairs, landings, etc. but excluding external balconies and edges of roofs	0.36	✓
	(ii) other residential, i.e. houses of multiple occupancy and balconies, including Juliette balconies and edges of roofs in single family dwellings	0.74	✓
Offices and work areas not included elsewhere, including storage areas	(iii) light access stairs and gangways not more than 600 mm wide	0.22	✓
	(iv) light pedestrian traffic routes in industrial and storage buildings except designated escape routes	0.36	✓
	(v) areas not susceptible to overcrowding in office and institutional buildings, also industrial and storage buildings except as given above	0.74	✓
Areas where people might congregate	(vi) areas having fixed seating within 530 mm of the barrier, balustrade or parapet	1.50	X
Areas with tables or fixed seating	(vii) restaurants and bars	1.50	X
Areas without obstacles for moving people and not susceptible to overcrowding	(viii) stairs, landings corridors ramps	0.74	✓
	(ix) external balconies including Juliette balconies and edges of roofs; footways and pavements within building cartilage adjacent to basement/sunken areas	0.74	✓



Type of Occupancy for Part of the Building	Examples of Specific Use	Horizontal Uniformly Distributed Line Load (kN/m)	21.5 mm PVB Glass
Areas susceptible to overcrowding	(x) footways or pavements less than 3 m wide adjacent to sunken areas	1.50	X
	(xi) theatres, cinemas, discotheques, bars, auditoria, shopping malls, assembly areas, studios; footways or pavements greater than 3 m wide adjacent to sunken areas	3.00	X
	(xii) grandstands and stadia	(Note 1)	-
Retail areas	(xiii) all retail areas including public areas of banks/building societies or betting shops	1.50	X
Vehicular	(xiv) pedestrian areas in car parks, including stairs, landings, ramps, edges of internal floors, footways, edges of roofs	1.50 (Note 2)	X
	(xv) horizontal loads imposed by vehicles	3.0 (Note 2)	-

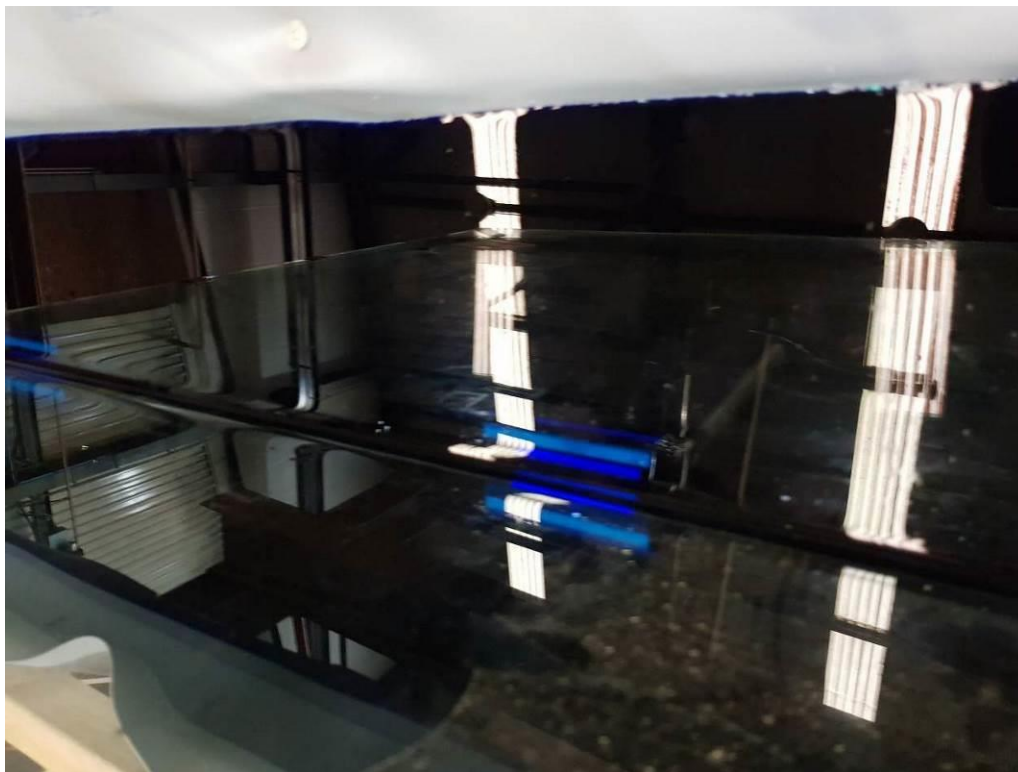
**NOTE: The results given in this report apply only to the samples that have been tested.**

**END OF REPORT**

## PLATES



**Plate 1** - Generic Test Configuration



**Plate 2** – Spig-Lite Pro Submerged in Water



**Plate 3** – Spig-Lite Pro Submerged



**Plate 4** – Draining of the Tank after Test





**Plate 5** – Spig-Lite Pro on Deconstruction



**Plate 6** – Concrete Bolt used to Anchor Balustrade System



**Plate 7** – Block after Deconstruction



**Plate 8** – Waterproof Membrane after Deconstruction

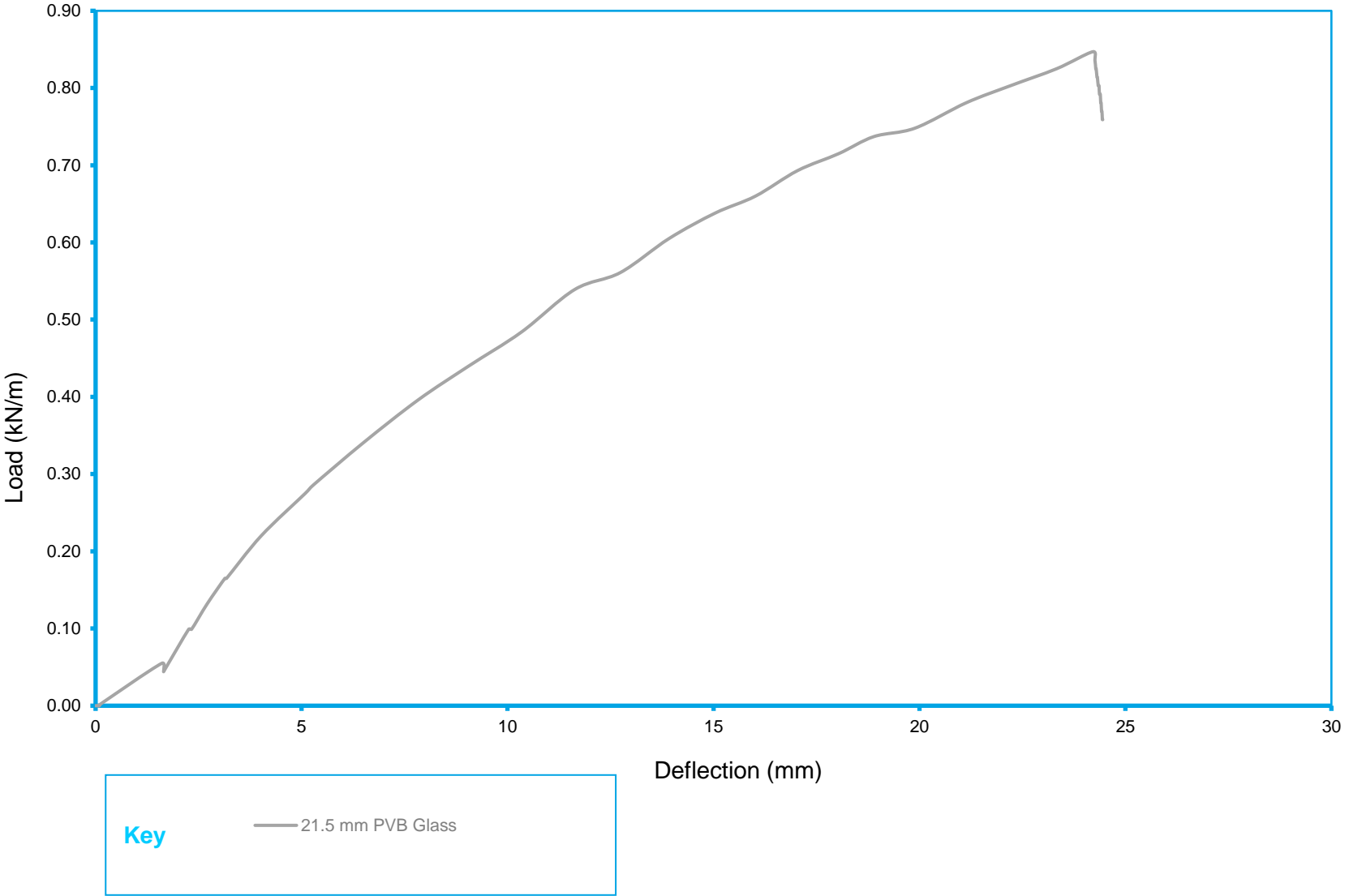


**Plate 9** – Concrete Slab after Deconstruction



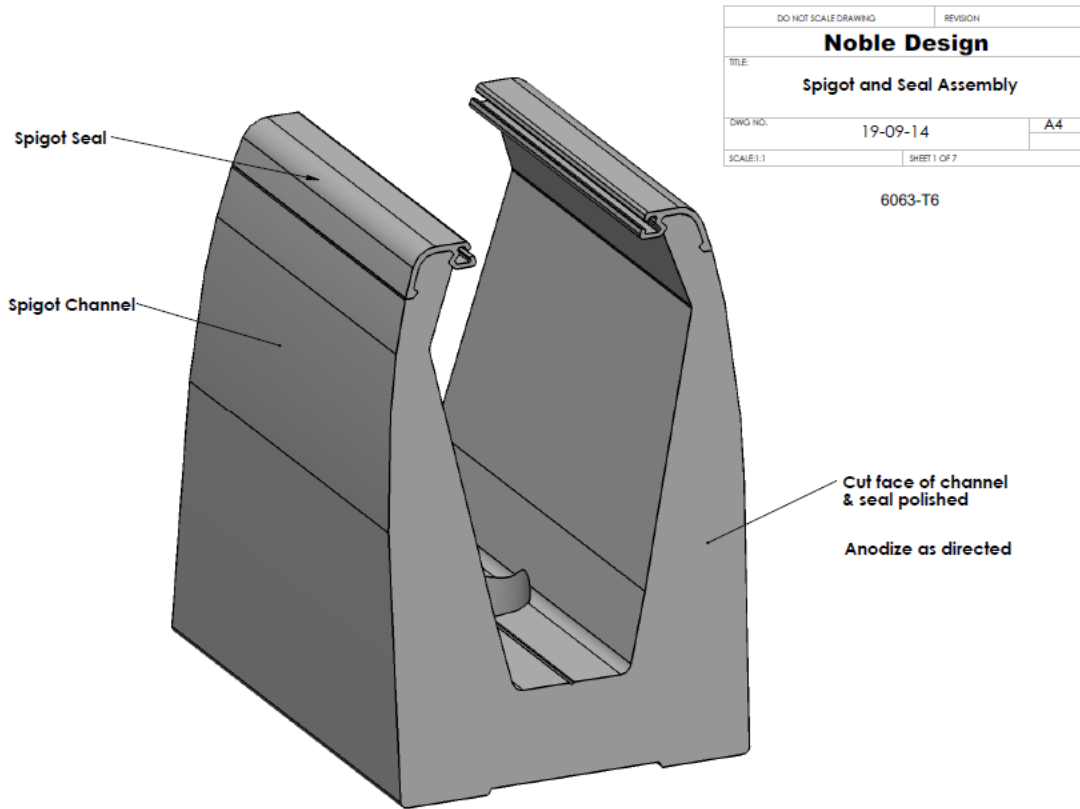
**Chart 1 - Load Deflection Curve for Pure Vista Spig-Lite Pro System Incorporating 21.5 mm PVB Glass Whilst Submerged in Water**

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### APPENDIX 1 - Spig-Lite Pro



### Concrete Fixing - High Performance W-HAZ-S/S anchor

