

Load Test Summary Report — Aluminium Balustrade System

Structural load testing to the domestic (Category A) barrier loading requirements of BS 6180:2011, BS EN 1991-1-1 (UK National Annex) and PD 6688-1-1

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Product	The Outdoor Look Aluminium Balustrade System (picket infill)
Date of testing	September–October 2026
Testing conducted by	The system manufacturer, at its production facility
Report issued by	The Outdoor Look

Summary. The Outdoor Look Aluminium Balustrade System was load tested in its standard production configuration, on straight (level) runs and on a 35° stair (raked) run, at the full standard clear span of 1,829mm and at a supplementary reduced span of 1,500mm. The system passed every test requirement for domestic (Category A) use — the horizontal line load of 0.36 kN/m at the top of the barrier, the 0.5 kN/m² uniformly distributed load on the infill, and the 0.25 kN point load on the infill — in every configuration, within the 25mm deflection limit and with no significant permanent deformation. The system is therefore suitable for barriers in and around single-family dwellings in line with BS 6180:2011, with the design loads taken from PD 6688-1-1 as referenced by the UK National Annex to BS EN 1991-1-1.

01 PRODUCT TESTED

The system was tested exactly as supplied to customers, in its standard production specification:

- Finished guarding height 1,100mm on level runs; aluminium posts with aluminium base plates, fixed with M10 × 70mm stainless steel (SUS304) flat-head bolts to a rigid substrate
- 1,829mm top and bottom rails with aluminium picket infill (100mm sphere rule compliant spacing); all extrusions in aluminium alloy 6005-T6
- Standard fixed brackets on straight runs; standard stair bracket kit on the raked run; stainless steel (SUS304) bracket fixings
- Black powder-coated finish

02 STANDARDS AND DESIGN LOADS

Testing was carried out against the minimum horizontal imposed loads for barriers in domestic, single-family dwellings (occupancy Category A) given in PD 6688-1-1, as referenced by the UK National Annex to BS EN 1991-1-1 and applied in accordance with BS 6180:2011:

LOAD	REQUIREMENT	APPLICATION
Horizontal uniformly distributed line load	0.36 kN/m	At the top of the barrier, applied horizontally
Uniformly distributed load on the infill	0.5 kN/m ²	Across the picket infill
Concentrated (point) load on the infill	0.25 kN	On an individual picket, 100mm loading head

Acceptance criteria applied: maximum horizontal deflection under load not exceeding 25mm (BS 6180:2011 serviceability limit), return to position on unloading with no significant permanent deformation, and all connections intact.

03 TEST METHOD

- Line loads applied horizontally at the top of the barrier, distributed across four equally spaced loading points, calculated as Load (kg) = line load (kN/m) × span (m) × 102, and held for at least one minute
- Point loads applied to an individual picket through a 100mm loading head and held for 90 seconds; infill UDL applied across the full picket array via a steel plate and calibrated counterweights
- Deflection measured by instrument at every load stage, under load and after unloading; posts bolted to a rigid test substrate so recorded deflection is that of the balustrade system
- Stair configuration assembled at a 35° pitch using the standard stair bracket kit, with the line load applied horizontally; as-built clear span 1,792mm

04 RESULTS — DOMESTIC (CATEGORY A) LOADS

4.1 Horizontal line load — 0.36 kN/m at the top of the barrier

CONFIGURATION	APPLIED LOAD	MAX DEFLECTION UNDER LOAD	RESIDUAL AFTER UNLOADING	LIMIT	RESULT
Straight run, 1,829mm clear span	67 kg	14.7 mm	0.7 mm	25 mm	PASS
Stair run (35°), 1,792mm clear span	67 kg	11.0 mm	1.0 mm	25 mm	PASS
Straight run, 1,500mm clear span	67 kg	12.0 mm	1.0 mm	25 mm	PASS
Stair run (35°), 1,500mm nominal span	67 kg	6.0 mm	1.0 mm	25 mm	PASS

4.2 Infill uniformly distributed load — 0.5 kN/m²

CONFIGURATION	APPLIED LOAD	MAX DEFLECTION UNDER LOAD	LIMIT	RESULT
Straight run, 1,829mm clear span	87 kg	12.2 mm	25 mm	PASS
Stair run (35°), 1,792mm clear span	87 kg	14.2 mm	25 mm	PASS
Straight run, 1,500mm clear span	87 kg	8.7 mm	25 mm	PASS
Stair run (35°), 1,500mm nominal span	87 kg	12.2 mm	25 mm	PASS

4.3 Infill point load — 0.25 kN on an individual picket

CONFIGURATION	APPLIED LOAD	MAX DEFLECTION UNDER LOAD	RESIDUAL AFTER UNLOADING	LIMIT	RESULT
Straight run, 1,829mm clear span	26 kg	18.6 mm	1.0 mm	25 mm	PASS
Stair run (35°), 1,792mm clear span	26 kg	24.5 mm	1.0 mm	25 mm	PASS
Straight run, 1,500mm clear span	26 kg	20.4 mm	1.0 mm	25 mm	PASS
Stair run (35°), 1,500mm nominal span	26 kg	19.0 mm	1.0 mm	25 mm	PASS

Note: an initial point load test on the 1,829mm stair configuration recorded 26.4mm, attributed on investigation to clip seating in the raked test rig. The test was repeated under identical conditions and recorded 24.5mm; both results are documented in the underlying test records.

4.4 Repeated loading

Before failure testing, each configuration was subjected to 10 load/unload cycles at 138 kg — the equivalent of a 0.74 kN/m line load, more than double the domestic design load. Across all four configurations, no bracket or screw loosening and no post, rail or base abnormality was recorded, with rail positions stable to within 1–2mm across the cycles.

4.5 Ultimate (failure) testing

After the serviceability and cyclic tests, the line load was increased progressively to failure in each configuration:

CONFIGURATION	ULTIMATE FAILURE LOAD	APPROX. EQUIVALENT LINE LOAD	MARGIN OVER 0.36 kN/M DOMESTIC REQUIREMENT
Straight run, 1,829mm	702 kg (1,547 lb)	3.8 kN/m	More than 10×
Stair run, 1,792mm	644 kg (1,419 lb)	3.5 kN/m	More than 9×
Straight run, 1,500mm	738 kg (1,627 lb)	4.8 kN/m	More than 13×
Stair run, 1,500mm nominal	624 kg (1,376 lb)	4.1 kN/m	More than 11×

In every case, first failure occurred at a bracket or rail connection (wall-mount bracket fracture, rail side-wall tearing, or bracket fixing loosening). No post or post base failed in any test, at any load.

05 STAIR CONFIGURATION — GUARDING GEOMETRY

The stair run was assembled at a 35° pitch (representative of UK domestic stairs, which do not exceed 42°) at an as-built clear span of 1,792mm. The measured overall rise of the assembly was 2,132mm, which at the measured span and pitch corresponds to a guarding height of approximately 1,100mm measured vertically from the pitch line ($2,132\text{mm} - 1,792\text{mm} \times \sin 35^\circ$) — comfortably above the 900mm minimum required for stairs by Approved Document K.

06 MATERIALS AND FINISH

Alloy	All extrusions in aluminium 6005-T6. Chemical composition verified by test to ASTM B211-12 against the alloy specification limits — all elements within limits (QA-certified, August 2026).
Powder coating	Black polyester powder coating, film thickness controlled at 60–120µm (86µm measured on the test panel). Cross-cut adhesion, hardness, impact, acid-resistance and boiling-water tests all passed on the production black coating.
Corrosion resistance	The coating system passed 1,000 hours of neutral salt spray testing to ASTM B117 with the highest ratings (10/10/10 — no creepage at scribe, no blistering, no rusting) on all samples. The manufacturer has confirmed the tested coating system is identical to that applied to this product.

07 BASIS OF THIS REPORT

Testing was conducted by the system manufacturer at its production facility using calibrated loads, instrumented deflection measurement and photographic/video records, following a test specification issued by The Outdoor Look based on BS 6180:2011, BS EN 1991-1-1 (UK National Annex) and PD 6688-1-1. This report summarises those results; the underlying test records, photographs and material certificates are held on file by The Outdoor Look and are available on reasonable request.

This report relates to the system as tested. Compliance of any specific installation also depends on correct assembly and fixing to a suitable structural substrate, which remains the responsibility of the installer. This report covers domestic (Category A) applications; for any other occupancy category, contact The Outdoor Look.

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