



OnLevel Test Report

Balustrade Testing to BS 6180: 2011

ONLEVEL

DOCUMENT REFERENCE: DR-5262
PROJECT FILE REFERENCE: P10031

Prepared for: OnLevel

8 Alexandria Court, Ashton Commerce Park, Ashton Commerce Park,
Ashton-under-Lyne, Lancashire, OL7 0QN, United Kingdom

Revision	Date	Reason for Issue:
Rev0	15/07/2020	Draft for Internal Review
Rev1	15/07/2020	Amended, Final Issue



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1. INTRODUCTION

STS-UK Group were commissioned by Onlevel to undertake a series of balustrade tests on their own products in accordance with BS 6180:2011. Static load testing was carried out as described in the aforementioned standard to determine the load characteristics of the products. All testing was carried out by STS-UK Group at their Ellesmere Port Testing facility. The purpose of the testing was to attain results and findings that could be analysed to see if the systems were capable of withstanding the imposed loadings described in BS 6180:2011.

Installation of the barriers were carried out by STS-UK Group.

The testing took place at the following address:

Site Address: STS-UK Group, Unit 4 Poole Hall Business Park, Poole Hall Road, Ellesmere Port, Cheshire, CH66 1UA

This report summarises the test results obtained during testing by STS-UK Group and does not provide any interpretation of those results.

2. TEST SAMPLES

The test samples were all provided by Onlevel and including all balustrade equipment and fixings. Each balustrade was fixed to a concrete section using OnLevel Spartan Spigots for testing. The concrete section was cast indoors and with a C60 grade concrete.

The samples provided were as follows:

- OnLevel Spartan Spigots
- 12mm thick, 1000mm width, 1043mm height
- 2 x 6mm thick with 1.5mm PVB Interlayer, 1000mm width, 1043mm height

See Appendix A for Test Sample Drawings.

3. TEST PROGRAMME

The results tabulated below were found during testing on the 14th July 2020. For further analysis on the results found see section 4 of this report.

Test Item	System Size (mm)	Glass (mm)	Notes/Comments
Laminated	1000 x 1043	6-1.5-6	
Single Pane	1000 x 1043	12	

Table 1 – Test Programme

4. TEST METHOD

All balustrade testing was undertaken, as per BS 6180:2011, by three separate methods. Firstly, a uniformly distributed line load over the width of an individual panel, secondly an infill load over a 1m² section and finally a point load of 20mm² placed on the infill panel. The loads required for the standard varied, depending on the client's request, the loads are referenced in BS 6180:2011.

Following the installation of the balustrade using OnLevel Spartan Spigots by an STS-UK technician a bespoke load frame was positioned in front of the balustrade and fixed down to the concrete floor.

The load frame held one hydraulic cylinder that was connected to a hand pump by way of hydraulic hoses and an in-line hydraulic pressure sensor. Once the frame and hydraulics were positioned, a draw wire displacement sensor was placed along the balustrade on a free-standing tripod as close to the hydraulic jack positions as possible and wired back to a logging system. The load was then applied in a steady manner, all displacement and forces were then dynamically recorded directly to a data logger. Once the test achieved its criteria, all imposed loads were removed, and the permanent deflection noted down.

The tests were deemed a success if the system's (1) demonstrated they did not suffer non-elastic displacements and (2) displacements did not exceed 25mm respectively to their individual criteria, in accordance with BS 6180:2011. If non-elastic displacements do occur the test was aborted, and the system declared unfit for purpose.

5. RESULTS

All Testing found in this report was carried out in accordance with guidance found in BS 6180:2011. The standard states the maximum allowable deflection at full load is 25mm.

Table 2 below shows the results found during the testing, for test certificates please see Appendix B.

Test Number	Size - Glass	Date Tested	Test Type (Line Load, Infill, Point load)	Load Applied	Result at Full Load (mm)	Pass/Fail
1	1000 x 1043 – 6-1.5-6	14 th July 2020	Line Load	0.36kN/m	23.35	Pass
2	1000 x 1043 – 6-1.5-6	14 th July 2020	Infill	0.5kN/m ²	7.02	Pass
3	1000 x 1043 – 6-1.5-6	14 th July 2020	Point Load	0.25kN	3.05	Pass
4	1000 x 1043 – 12	14 th July 2020	Line Load	0.36kN/m	13.10	Pass
5	1000 x 1043 – 12	14 th July 2020	Infill	0.5kN/m ²	5.20	Pass
6	1000 x 1043 – 12	14 th July 2020	Point Load	0.25kN	4.17	Pass

Table 3 – Product Test Results

All Information found in this report is formed from factual results found during the testing of the products.

For photographic records of sample testing please see Appendix C.

	Name	Signature	Date
Created By: Technician	Richard Clarke		15.07.2020
Checked By: Technical Director	Andrew Gore		15.07.2020

For and on behalf of Specialist Technical Services (U.K) Limited

APPENDIX A

Test Certificates

TEST CERTIFICATE

BALUSTRADE TESTING IN ACCORDANCE WITH BS 6180:2011



On behalf of OnLevel Ltd
8 Alexandria Court, Ashton Commerce Park, Ashton Commerce Park,
Ashton-under-Lyne, Lancashire, OL7 0QN, United Kingdom

HORIZONTAL UNIFORMLY DISTRIBUTED LINE LOAD 1m Laminate Glass Balustrade

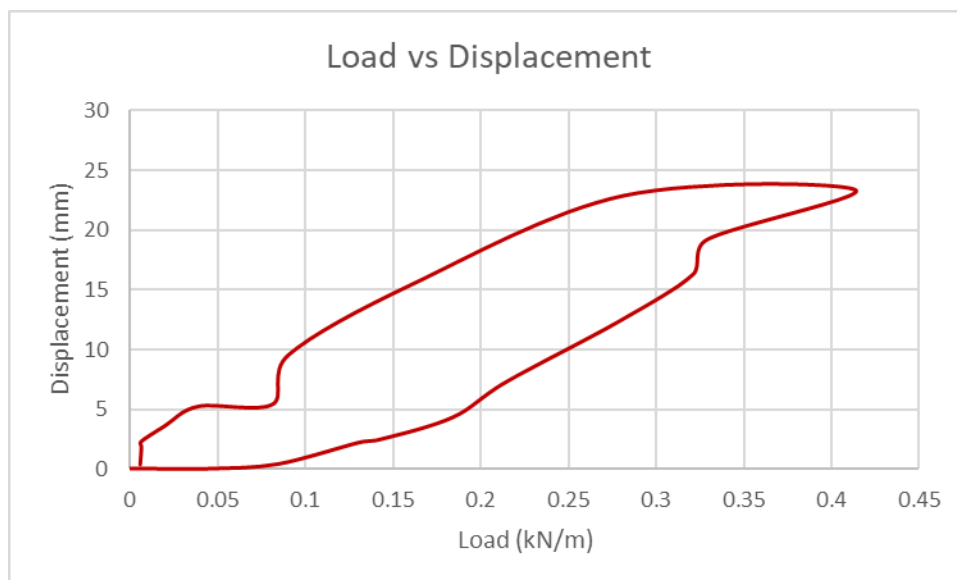
TEST DESCRIPTION: A uniformly distributed line load was applied to the balustrade system at a height of 1100mm to determine the deflection of the balustrade system when assembled. The balustrade system was installed by STS to the client's specification.

REF NO.: DR-5262
JOB NO.: P10031
CERTIFICATE NO.: IC9215

DATE TESTED: 14th July 2020
DATE REPORTED: 14th July 2020
CERTIFICATE DATE: 14th July 2020

TEST RESULTS:

Load (kN/m)	Displacement (mm)	Permanent Displacement (mm)
0.36	23.35	0.36



ANALYSIS:

The balustrade barrier when assembled and tested in the manor indicated within this certificate conforms to BS6180:2011 the balustrade barrier achieved a loading of 0.36kN/m with a maximum recorded displacement of 23.35mm.

A handwritten signature in black ink, appearing to read 'Richard Clarke'.

NAME: Richard Clarke
POSITION: Junior Technician

TEST CERTIFICATE

BALUSTRADE TESTING IN ACCORDANCE WITH BS 6180:2011



On behalf of OnLevel Ltd
8 Alexandria Court, Ashton Commerce Park, Ashton Commerce Park,
Ashton-under-Lyne, Lancashire, OL7 0QN, United Kingdom

UNIFORMLY DISTRIBUTED LOAD 1m Laminate Glass Balustrade

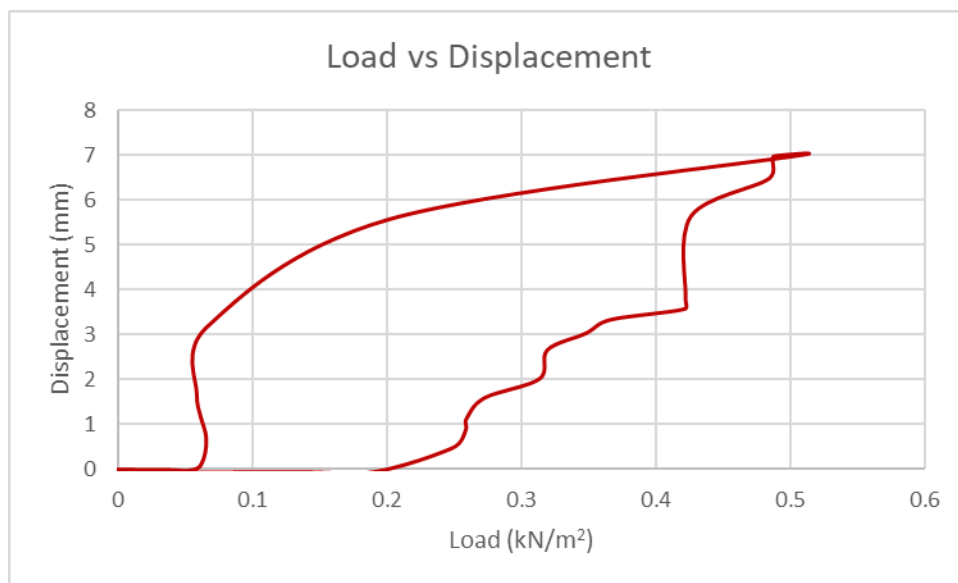
TEST DESCRIPTION: A uniformly distributed load was applied to the infill of the balustrade system, using a 1m² spreader, to determine the deflection of the balustrade system when assembled. The balustrade system was installed by STS to the client's specification.

REF NO.: DR-5262
JOB NO.: P10031
CERTIFICATE NO.: IC9216

DATE TESTED: 14th July 2020
DATE REPORTED: 14th July 2020
CERTIFICATE DATE: 14th July 2020

TEST RESULTS:

Load (kN/m ²)	Displacement (mm)	Permanent Displacement (mm)
0.5	7.02	0.00



ANALYSIS:

The balustrade barrier when assembled and tested in the manor indicated within this certificate conforms to BS6180:2011 the balustrade barrier achieved a loading of 0.5kN/m² with a maximum recorded displacement of 7.02mm.

A handwritten signature in black ink, appearing to read 'Richard Clarke'.

NAME: Richard Clarke
POSITION: Junior Technician

TEST CERTIFICATE

BALUSTRADE TESTING IN ACCORDANCE WITH BS 6180:2011



On behalf of OnLevel Ltd
8 Alexandria Court, Ashton Commerce Park, Ashton Commerce Park,
Ashton-under-Lyne, Lancashire, OL7 0QN, United Kingdom

POINT LOAD 1m Laminate Glass Balustrade

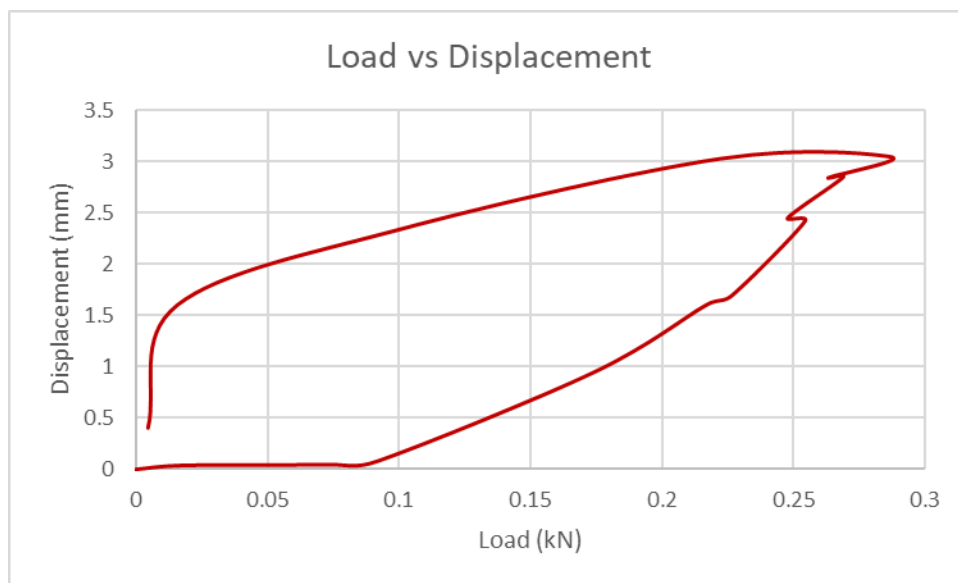
TEST DESCRIPTION: A point load was applied to the infill of the balustrade system to determine the deflection of the balustrade system when assembled. The balustrade system was installed by STS to the client's specification.

REF NO.: DR-5262
JOB NO.: P10031
CERTIFICATE NO.: IC9217

DATE TESTED: 14th July 2020
DATE REPORTED: 14th July 2020
CERTIFICATE DATE: 14th July 2020

TEST RESULTS:

Load (kN)	Displacement (mm)	Permanent Displacement (mm)
0.25	3.05	0.40



ANALYSIS:

The balustrade barrier when assembled and tested in the manner indicated within this certificate conforms to BS6180:2011 the balustrade barrier achieved a loading of 0.25kN with a maximum recorded displacement of 3.05mm.

A handwritten signature in black ink, appearing to read 'Richard Clarke'.

NAME: Richard Clarke
POSITION: Junior Technician

TEST CERTIFICATE

BALUSTRADE TESTING IN ACCORDANCE WITH BS 6180:2011



On behalf of OnLevel Ltd
8 Alexandria Court, Ashton Commerce Park, Ashton Commerce Park,
Ashton-under-Lyne, Lancashire, OL7 0QN, United Kingdom

HORIZONTAL UNIFORMLY DISTRIBUTED LINE LOAD **1m Glass Balustrade**

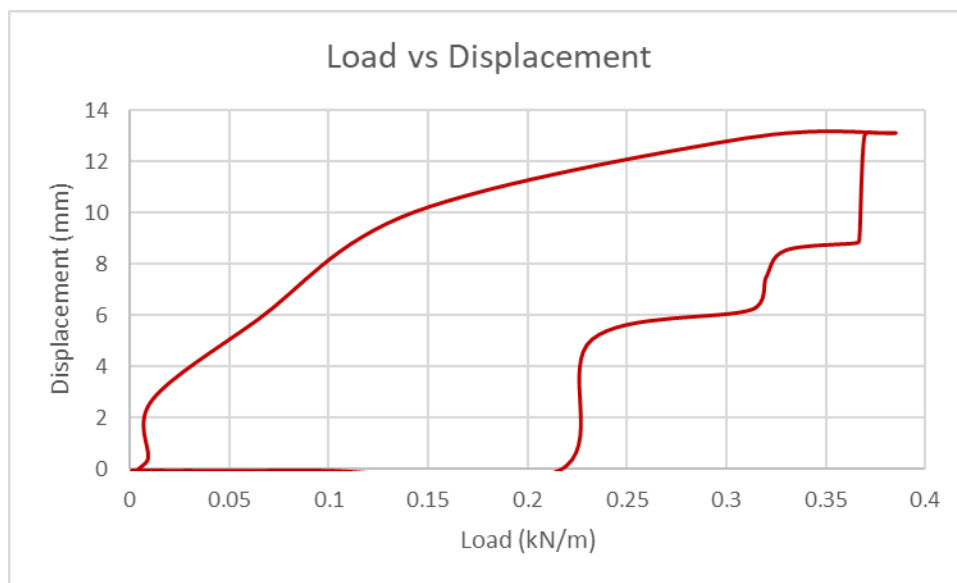
TEST DESCRIPTION: A uniformly distributed line load was applied to the balustrade system at a height of 1100mm to determine the deflection of the balustrade system when assembled. The balustrade system was installed by STS to the client's specification.

REF NO.: DR-5262
JOB NO.: P10031
CERTIFICATE NO.: IC9218

DATE TESTED: 14th July 2020
DATE REPORTED: 14th July 2020
CERTIFICATE DATE: 14th July 2020

TEST RESULTS:

Load (kN/m)	Displacement (mm)	Permanent Displacement (mm)
0.36	13.10	0.00



ANALYSIS:

The balustrade barrier when assembled and tested in the manner indicated within this certificate conforms to BS6180:2011 the balustrade barrier achieved a loading of 0.36kN/m with a maximum recorded displacement of 13.10mm.

A handwritten signature in black ink, appearing to read 'Richard Clarke'.

NAME: Richard Clarke
POSITION: Junior Technician

TEST CERTIFICATE

BALUSTRADE TESTING IN ACCORDANCE WITH BS 6180:2011



On behalf of OnLevel Ltd
8 Alexandria Court, Ashton Commerce Park, Ashton Commerce Park,
Ashton-under-Lyne, Lancashire, OL7 0QN, United Kingdom

UNIFORMLY DISTRIBUTED LOAD 1m Glass Balustrade

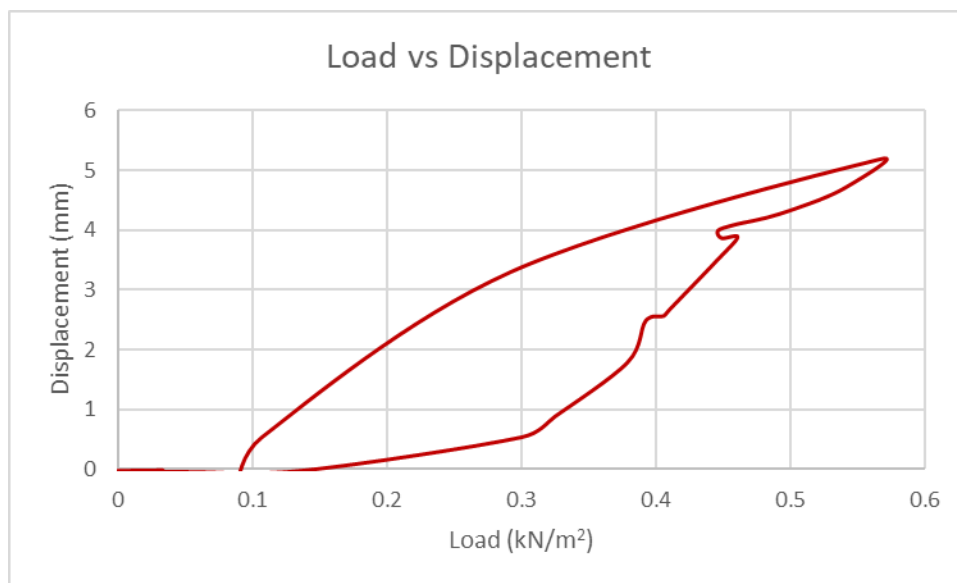
TEST DESCRIPTION: A uniformly distributed load was applied to the infill of the balustrade system, using a 1m² spreader, to determine the deflection of the balustrade system when assembled. The balustrade system was installed by STS to the client's specification.

REF NO.: DR-5262
JOB NO.: P10031
CERTIFICATE NO.: IC9219

DATE TESTED: 14th July 2020
DATE REPORTED: 14th July 2020
CERTIFICATE DATE: 14th July 2020

TEST RESULTS:

Load (kN/m ²)	Displacement (mm)	Permanent Displacement (mm)
0.5	5.20	0.00



ANALYSIS:

The balustrade barrier when assembled and tested in the manor indicated within this certificate conforms to BS6180:2011 the balustrade barrier achieved a loading of 0.5kN/m² with a maximum recorded displacement of 5.20mm.

A handwritten signature in black ink, appearing to read 'Richard Clarke'.

NAME: Richard Clarke
POSITION: Junior Technician

TEST CERTIFICATE

BALUSTRADE TESTING IN ACCORDANCE WITH BS 6180:2011



On behalf of OnLevel Ltd
8 Alexandria Court, Ashton Commerce Park, Ashton Commerce Park,
Ashton-under-Lyne, Lancashire, OL7 0QN, United Kingdom

POINT LOAD 1m Laminate Glass Balustrade

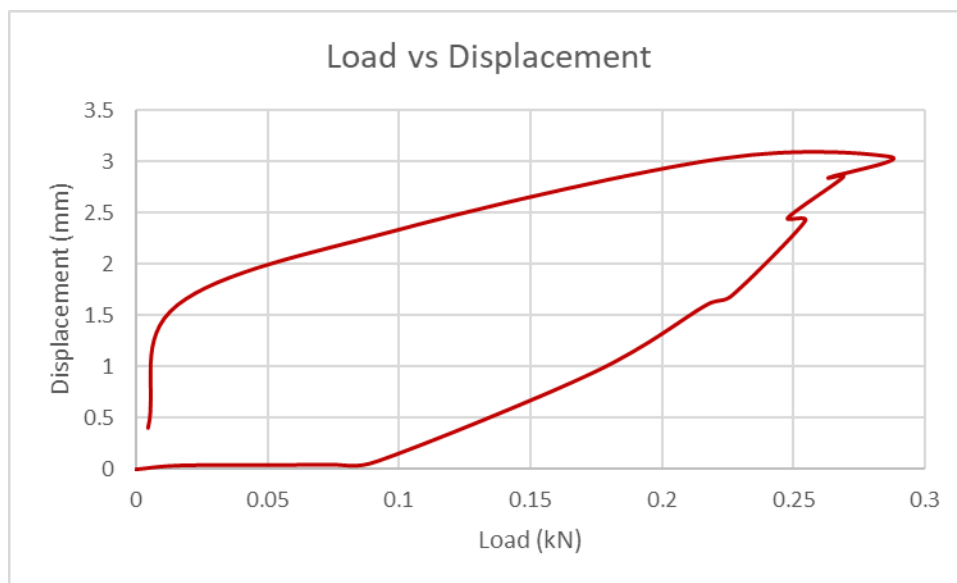
TEST DESCRIPTION: A point load was applied to the infill of the balustrade system to determine the deflection of the balustrade system when assembled. The balustrade system was installed by STS to the client's specification.

REF NO.: DR-5262
JOB NO.: P10031
CERTIFICATE NO.: IC9220

DATE TESTED: 14th July 2020
DATE REPORTED: 14th July 2020
CERTIFICATE DATE: 14th July 2020

TEST RESULTS:

Load (kN)	Displacement (mm)	Permanent Displacement (mm)
0.25	4.17	0.63



ANALYSIS:

The balustrade barrier when assembled and tested in the manner indicated within this certificate conforms to BS6180:2011 the balustrade barrier achieved a loading of 0.25kN with a maximum recorded displacement of 4.17mm.

A handwritten signature in black ink, appearing to read 'Richard Clarke'.

NAME: Richard Clarke
POSITION: Junior Technician

APPENDIX B

Photographic Evidence



Photographs 1&2 – Photograph 1 shows the equipment and method of the uniformly distributed line load testing. Photograph 2 shows the equipment and method of the 1m² Infill load testing.



Photographs 3&4 – Photographs 3&4 shows the equipment and method of the point load testing.