

# TEST REPORT

**No. IR4858**

## **LOAD TESTING OF BALUSTRADE MS123**

**Job No. I1727**

PREPARED BY TESTCONSULT LIMITED  
FOR

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## 1. INTRODUCTION

TestConsult Ltd was instructed by PANIDIS Makedoniki SA (client) to carry out load testing to two glass balustrade systems, at our test laboratory in Warrington, Cheshire. Two single systems were submitted for physical loading assessments. In this report the system MS123 is being tested according to the British Standards for “Barriers in and about buildings”.

The balustrade system is comprised of a glass panel that acted as the barrier and aluminium frameless standoff clamp brackets that acted as the supports.

## 2. METHODOLOGY

### 2.1 Setup

The MS-123 balustrade; frameless standoff bracket clamps were used as supports that were fixed and secured with through-bolts (Fisher FXA M6 x 85mm) to the vertical side of a step. Then the glass panel was positioned and secured on the bracket clamps.



Figure 1: MS-123 setup ([http://www.maksystem.gr/products\\_det.asp?prcid=102&pid=2963](http://www.maksystem.gr/products_det.asp?prcid=102&pid=2963))

### 2.2 Load Assessments

The barrier should be of adequate strength and stiffness to sustain the applied loads and have a maximum deflection as given in BS 6180:2011.

Section 6.4 of this standard specifies the maximum allowable horizontal deflection and the deflection on the load to the infill. In each instance the following loading conditions are applicable:

- Horizontal uniformly distributed line load (applied at 1.1m from the finished floor)
- Uniformly distributed load applied to the infill
- Point load applied to the infill

For all three tests the balustrade will be tested to its maximum allowable deflection and then the force will be noted. BS 6180:2011 states that for the horizontal uniformly distributed line load the maximum allowable deflection at any point of the system is 25mm. For the load tests to the infill the maximum allowable deflection at any point of the system is 25mm or  $L/65$ , whichever is smaller (where L is the distance between the supports).

Furthermore to measure the deflection a displacement gauge was used, which was positioned at the opposite side of the glass panel at a point where the maximum deflection of the system would be expected.

### 2.3 Test Procedure

The use of the balustrade system was unknown, and as instructed by the client they were tested to the extreme, to the maximum allowable deflection and then the load was noted.

#### 2.3.1 MS-123

##### 2.3.1.1 Horizontal uniformly distributed line load test

With the use of G-clamps a square section beam was secured at the top of the balustrade system, where the load was applied with a 5tn jack. The displacement gauge during this test was positioned exactly opposite the point where the load was applied.



Figure 2: Setup for MS123 during horizontal uniformly distributed load test

##### 2.3.1.2 Uniformly distributed load applied to the infill

Apart from the 5tn jack, a stiff and square ply board was used to apply the load to the infill which was secured with G-clamps. During this test the displacement gauge was positioned at the top of the glass panel.



Figure 3: Setup for MS123 during uniformly distributed load test applied to the infill

### 2.3.1.3 A Point load applied to the infill

For this test only the 5tn jack was used to apply the point load to the centre of the infill and during this test and the displacement gauge was positioned at the top of the glass panel.



Figure 4: Setup for MS123 during point load test applied to the infill

## 3 RESULTS & FINDINGS

The results of all three tests are presented on the test certificate along with a plot. According to the loads applied when maximum allowable deflection was reached MS-123 system can be used for:

- Domestic and Residential Activities – All areas within or serving exclusively one single family dwelling including stairs, landings, etc. but excluding external balconies and edges of roofs.
- Office and work areas not included elsewhere, including storage areas – Light pedestrian traffic routes in industrial and storage buildings except designated escape routes.

For the above usage the balustrade system is therefore considered to be satisfactory and meet the conditions stated in the aforementioned British Standards.



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