

TEST REPORT No. 342592

Place and date of issue: Bellaria-Igea Marina - Italia, 31/05/2017

Customer: GÜRSAN ALUMINYUM MANUFACTURING LIMITED COMPANY - Alkop Sanayi Sitesi B-7
Blok No:15-16 - 34517 ESENYURT - ISTANBUL - Turkey

Date test requested: 28/04/2017

Order number and date: 70285, 28/04/2017

Date sample received: 03/05/2017

Test date: from 05/05/2017 to 11/05/2017

Purpose of test: resistance to horizontal linear static loading according to D.M. Infrastrutture dated 14/01/2008 and standard UNI 10806:1999 and resistance to dynamic loading according to standard UNI 10807:1999

Test site: Istituto Giordano S.p.A. - Via Erbosa, 72 - 47043 Gatteo (FC) - Italia

Origin of sample: sampled and supplied by the Customer

Identification of sample received: No. 2017/0973/D

Sample name*

The test sample is called "RAILING X41".

(*) according to that stated by the Customer

Comp. MB
Revis. AB

This test report consist of 8 sheets and 1 annex.

Sheet
1 of 8

Description of sample*

The test sample consists of a tempered glass railings with aluminum structure having the characteristics shown in the following table.

Width		2015 mm
Height from floor level		1100 mm
Tempered glass type		10 10.4 (PVB)
Glass dimensions	width	1000 mm
	height	1318 mm

Further details of sample specifications can be seen in Customer-supplied schematic drawings shown in annex "A" to this test report.



Sample photograph.

(*) according to that stated by the Customer



Detail.

Normative references

Resistance to horizontal linear static loading

The test was performed according to the requirements of the following documents:

- clause 3.1.4 “Carichi variabili” (*“Variable loads”*) of D.M. Infrastrutture (Ministry of Infrastructures Decree) dated 14/01/2008 “Norme Tecniche per le costruzioni” (*“Technical standards for construction”*), published in the Ordinary Supplement of Official Journal No. 29 dated 04/01/2008 - General Series;
- UNI 10806:1999 dated 31/01/1999 “Ringhiere, balaustre o parapetti prefabbricati - Determinazione della resistenza meccanica ai carichi statici distribuiti” (*“Prefabricated railing systems - Determination of the mechanical strength under distributed static loads”*).

Resistance to dynamic load

The test was carried out according to the requirements of standard UNI 10807:1999 dated 31/01/1999 “Ringhiere, balaustre o parapetti prefabbricati - Determinazione della resistenza meccanica ai carichi dinamici” (*“Prefabricated railing systems - Determination of the mechanical strength under dynamic load”*);

Test apparatus**Resistance to horizontal linear static loading**

The following equipment was used to carry out the resistance to static loading test:

- Istituto Giordano steel frame simulating actual mounting of the sample to the floor with pneumatic load devices (in-house identification code: EDI048);
- electronic displacement transducers for measuring deflections, complete with calibration report issued by Istituto Giordano S.p.A.(in-house identification code: EDI 114-115-116);
- AEP Transducers 1kN loading unit(in-house identification code: EDI104;
- measuring tape (in-house identification code: FT364);
- digital thermo-hygrometer (in-house identification code: EDI111).

Resistance to dynamic load

The following equipment was used to carry out the test:

- sphero-conical bag, diameter 0,40 m and height 0,60 m, filled with hardened glass beads, diameter 3 mm, until reaching a total mass of 50 kg (in-house identification code EDI062);
- levelling rod.

Test method**Resistance to horizontal linear static loading**

The test was performed according to the method requested by standard UNI 10806:1999, but using the book values of the table 3.1.II of D.M. Infrastrutture dated 14/01/2008.

The sample was only fixed inferiorly on the steel frame simulating actual installation of the sample on the floor.

The sample was subjected to horizontal linear static load apportioned, as defined by the Costumer, on the upper edge of the plate.

It was applied a preload in a progressive manner, in the horizontal direction towards the outside, amounting to 50 % of the expected load for the test, keeping it for 5 min.

After removal of the preload, it was registered the position of the upper edge of the plate (at the ends and in the center line of the sample) with respect to a fixed reference of the test bench so as to detect the relative displacement during and after the application of the load. Then it has been proceeded to the application of the test load in a progressive manner (with a time of not less than 5 s).

When reaching the test load it was maintained for at least 15 min then the deformation under load was recorded, after which it was proceeded to progressively remove the load down to zero. After a waiting of at least 5 min residual deformations were detected.

Specifically it has been carried out the following sequence of tests:

- pre-load equal to 50 % of the load defined by the Customer;
- removal of the preload and detection of the initial position of the edge of the plate;
- application of the load defined by the Customer for 15 min and record of the deformations under load;
- load removal and registration of residual deformation after 5 min.

Resistance to dynamic load

With only bottom secured to the test rig, the sample underwent impact test according to standard UNI 10807:1999.

All the impacts were made by releasing the impactor so that it fell from a specified height with a pendulum movement and without initial velocity. The impactor was hung by an inextensible pendulum wire of negligible mass so that when at rest it made contact with the point of intended impact.

After each impact, the impactor was prevented from hitting the sample again after bouncing.

Environmental conditions at the time of testing

Room temperature	(20 ± 2) °C
Relative humidity	(50 ± 5) %

Test results

Resistance to horizontal linear static loading

Applied load for unit length	Deformation whilst loaded		Permanent deformation		Effect
	A	B	A	B	
[kN/m]	[mm]	[mm]	[mm]	[mm]	
1,0	67,4	67,2	4,3	4,6	no damage



Photograph of the sample subjected to horizontal linear static loading.

Dynamic loading according to standard UNI 10807:1999

Impact area	Drop height [mm]	Nominal energy [J]	Result
centre of infill	300	150	no damage

**Photograph of the sample after the impact.**

Findings

On the basis of the test performed, the results obtained and the provisions of D.M. Infrastrutture dated 14/01/2008 and standard UNI 10807, the test sample, a railing secured to the test rig only by bottom, called "RAILING X41" and submitted by the company GÜRSAN ALUMINYUM MANUFACTURING LIMITED COMPANY - Alkop Sanayi Sitesi B-7 Blok No:15-16 - 34517 ESENYURT - ISTANBUL - Turkey, obtains the results given in the following table.

Test	Normative reference	Requirement	Result
Horizontal linear static load	D.M. Infrastrutture dated 14/01/2008 (table 3.1.II)	1,0 kN/m	Compliant with all categories except C3*
Dynamic load	UNI 10807	150 J	Compliant

(*) Category C3: areas of high-density pedestrian traffic with no impediment to the free movement of persons such as museums, exhibition rooms, railway stations, ballrooms, gymnasiums, terracing, buildings used to host public events, concert halls, sports centres and respective spectator areas.

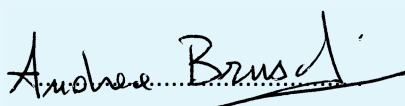
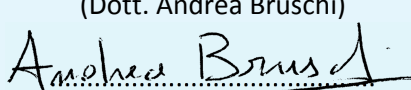
The results given refer exclusively to the test sample itself and are only valid under the same conditions in which testing was carried out.

This test report alone shall not be considered a certificate of conformity.

Test Technician
(Dott. Andrea Bruschi)

Head of
Security and Safety Laboratory
(Dott. Andrea Bruschi)

Chief Executive Officer

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Registro Imprese di Rimini n. 00 549 540 409

ANNEX "A" TO TEST REPORT No. 342592

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Object: Sample technical documentation

In the following sheet is shown Customer-supplied schematic drawing related to the sample.



