

TEST REPORT No. 318751

Place and date of issue: Bellaria-Igea Marina - Italia, 19/09/2014

Customer: REGAL ALÜMİNYUM KÜPESTE AKS. SAN. VE TIC. LTD. STI - Emek Mah.Sivat Yolu Cad.
No.2 - 34785 SANCAKTEPE-ISTANBUL - Turkey

Date test requested: 01/09/2014

Order number and date: 64120, 01/09/2014

Date sample received: 09/09/2014

Test date: 10/09/2014

Purpose of test: Railing test according to standard NF P01-012:1988, resistance to horizontal static loading in accordance with standard NF P01-013:1988

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. 2014/1799

Sample name*

The test sample is called "REGAL ALUMINIUM RAILING SYSTEM HORIZONTAL APPLICATION WITHOUT WALL CONNECTOR".

(*) according to that stated by the Customer

Comp. MB
Revis. RP

This test report consists of 7 sheets.
This document is the English translation of the test report No. 318751 dated 19/09/2014 issued in Italian; in case of dispute the only valid version is the Italian one. Date of translation: 19/09/2014.

Sheet
1 of 7

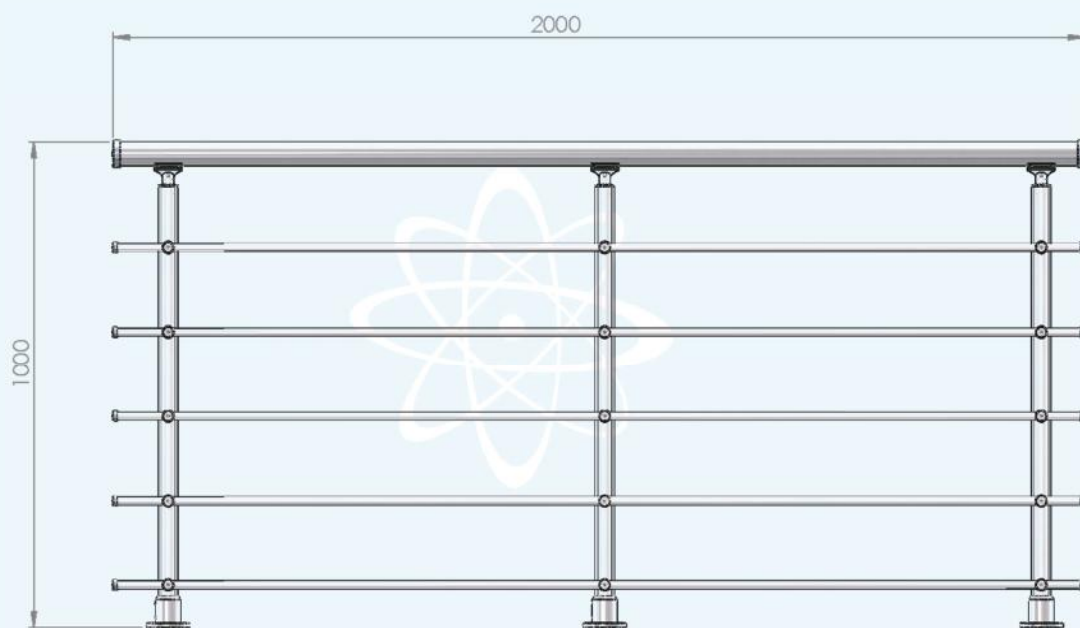
Description of sample*

The test sample consists of an aluminum railing and handrail with the following characteristic:

- measured overall width (from lateral fixing) =2000mm;
- overall height =1000mm.

Further details of sample technical specifications can be seen in Customer-supplied schematic drawings shown hereafter.

SAMPLE SCHEMATIC DRAWING



Customer-supplied list of components

Code	Description	Quantities
RGL-01	tube horizontal \varnothing 50 mm 2 meter	1
RGL-02	tube horizontal \varnothing 16 mm 2 meter	5
RGL-03	tube \varnothing 40 mm post 1 meter	3
RGL-04	\varnothing 40 mm post support	3
RGL-05	adjustable connector between \varnothing 40 mm post and \varnothing 16 mm rail	15
RGL-06	\varnothing 50 mm tube end cap	2
RGL-07	\varnothing 16 mm tube end cap	10

(*) according to that stated by the Customer



 Sample photograph.



Close-up.

Normative references

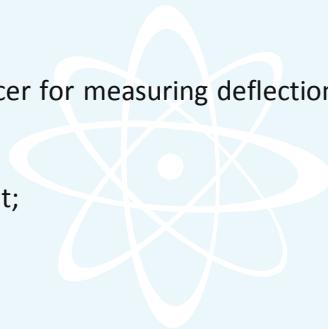
The test was carried out according to the requirements of the following standards:

- NF P01-013:1988 dated August 1988 “Essais des garde-corps. Méthodes et critères”;
- NF P01-012:1988 dated August 1988 “Règles de sécurité relatives aux dimensions des garde-corps et rampes d’escaliers”.

Test apparatus

The following equipment was used to carry out the test:

- steel frame simulating actual mounting of the sample to the floor;
- pneumatic load devices;
- electronic displacement transducer for measuring deflection complete with calibration report issued by Istituto Giordano S.p.A.;
- calibrated AEP 100 kg loading unit;
- calibrated measuring tape.



Test method

The sample, secured both to the floor and to the sides, was subjected to the following test.

Resistance to static horizontal load to the outside

- 0,65 kN horizontal static preloading of upper edge of the handrail for 3 min;
- load removal and counter reset;
- 1,3 kN horizontal static loading of the handrail for 3 min with recording of deformation;
- load removal with recording of deformation after 3 min;
- horizontal static safety loading of the handrail with coefficient of 1,7 for aluminum, totaling 2,21 kN, with recording of deformation;

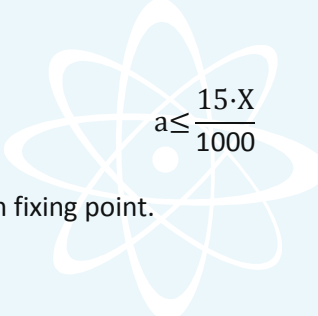
- verification of maximum permanent deformation “a” after removal of safety load using the following equation:

$$a \leq \frac{8 \cdot X}{1000}$$

where: X = height of sample from fixing point.

Resistance to static horizontal load to the inside

- 0,2 kN horizontal static preloading of the handrail for 3 min;
- load removal and counter reset;
- 0,4 kN horizontal static loading of the handrail for 1 min with recording of deformation;
- verification of maximum permanent deformation “a” after removal of safety load using the following equation:


$$a \leq \frac{15 \cdot X}{1000}$$

where: X = height of sample from fixing point.

Resistance to static vertical load

- 0,2 kN vertical static preloading of upper edge of the handrail for 3 min;
- removal of load and reset counters;
- 1,0 kN vertical static loading of upper edge of the handrail for 1 min with recording of deformation;
- verification of maximum permanent deformation “a” ≤ 3 mm after removal of safety load.

Environmental conditions at the time of testing

Room temperature	(25 ± 2) °C
Relative humidity	(65 ± 5) %

Test results

Resistance to static horizontal load to the outside

The load was applied at three points, at handrail midpoint, 400 mm (0,4·L) from the right end and 400 mm (0,4·L) from the left end.

Overall applied load (clause 2.2.1.2 of standard NF P01-013) [kN]	Measure point	Deformation whilst loaded [mm]	Permanent set [mm]	Maximum allowable permanent set "a" [mm]
1,30	right end	50,1	0,9	8,0
	500 mm from the left end	69,7	0,8	
	handrail midpoint	77,4	1,1	
	left end	50,5	1,4	
2,21	right end	73,4	3,7	8,0
	500 mm from the left end	88,2	4,0	
	handrail midpoint	98,6	3,9	
	left end	65,5	3,1	
PASS permanent set ≤ a				

Resistance to static horizontal load to the inside

The load was symmetrically applied halfway between each couple of uprights on the handrail, whilst deformation was measured halfway along the overall length of the handrail.

Overall applied load (clause 2.2.2.1 of standard NF P01-013) [kN]	Deformation whilst loaded at the handrail midpoint [mm]	Permanent set at the handrail midpoint [mm]	Maximum allowable permanent set "a" [mm]
0,4	8,2	1,2	15,0
PASS permanent set at the handrail midpoint $\leq a$			

Resistance to static vertical load

The load was applied at two points on the handrail placed at 150 mm from the middle of the length of the handrail, whilst deformation was measured halfway along the overall length of the handrail.

Overall applied load (clause 2.2.3.4 of standard NF P01-013) [kN]	Deformation whilst loaded at the handrail midpoint [mm]	Permanent set at the handrail midpoint [mm]	Maximum allowable permanent set "a" [mm]
1,0	3,2	0,4	3,0
PASS permanent set at the handrail midpoint $\leq a$			

Test Technician:
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Dott. Andrea Bruschi

Chief Executive Officer
(Dott. Arch. Sara Lorenza Giordano)

