

TEST REPORT No. 400392

Customer

ETEM S.A.

Iroon Polytechneiou, 1 - 19018 MAGOULA (Attica) - Greece

Item#

glass railing named "EB50 Glass Balustrade 1010.4"

Activity



**resistance to outward horizontal static loading
and resistance to dynamic impact in accordance
with standard NF P01-013:1988**

Results

Activity	Use	Result
outward horizontal static loading	private (1,3 kN)	compliant
	public (1,0 kN/m)	compliant
	grandstands (1,7 kN/m)	compliant
50 kg soft body dynamic impact		compliant

(#) according to that stated by the customer.

Bellaria-Igea Marina - Italy, 21 December 2022

Chief Executive Officer

 Order:
94054

 Item origin:
sampled and supplied by the customer

 Identification of item received:
2022/2549/B dated 8 November 2022

 Activity date:
14 November 2022

 Activity site:
Istituto Giordano S.p.A. - Strada Erbosa Uno, 72 -
47043 Gatteo (FC) - Italy

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The results relate only to the item examined, as received, and are valid only in the conditions in which the activity was carried out.

The original of this document consists of an electronic document digitally signed pursuant to the applicable Italian Legislation.

This document cancels and replaces the test report No. 400392 issued on 2 December 2022 for replacement of drawing.

Chief Test Technician:

Dott. Andrea Bruschi

Head of Security and Safety Laboratory:

Dott. Andrea Bruschi

Compiler: Dott. Marina Bonito

Reviewer: Dott. Andrea Bruschi

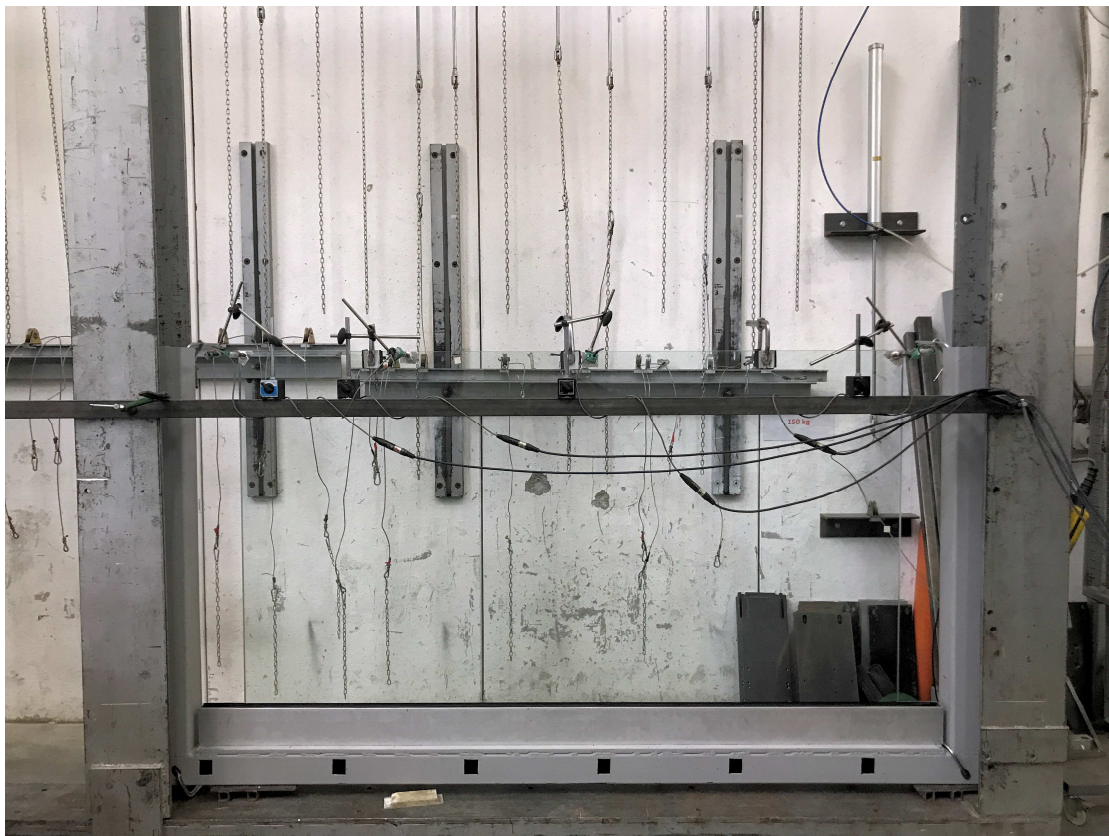
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Description of item[#]

The item under examination consists of a glass railing with the dimensional characteristics shown in the following table.

Measured overall width	2000 mm
Measured overall height	1200 mm
Glass type	tempered 1010.4 (PVB)
Nominal thickness of glass	21,52 mm
Nominal section of aluminum profile	50 mm × 114 mm

Further details of item technical specifications in annex "A".



Photograph of the item

Normative references

Standard	Title
NF P01-013:1988	Essais des garde-corps - Méthodes et critères (<i>Railing tests - Methods and criteria</i>)
NF P08-301:1991	Ouvrages verticaux des constructions - Essais de résistance aux chocs - Corps de chocs - Principe et modalités générales des essais de choc (<i>Vertical building elements - Impact resistance tests - Impact bodies - Principle and general test procedures</i>)

([#]) according to that stated by the customer, apart from characteristics specifically stated to be measurements; Istituto Giordano declines all responsibility for the information and data provided by the customer that may influence the results.



LAB N° 0021 L

Apparatus

Description	In-house identification code
AEP Transducers "TS" 100 kg load cell	EDI107A
GEFRAN "PZ-34-S150" electronic displacement transducers for measuring deflection	FT451/1, FT451/2 FT451/3
LA CROSSE TECHNOLOGY "WS8009" digital thermo-hygrometer	EDI111
soft body consisting of a spheroconical 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 ± 1) kg	EDI062
steel frame simulating actual installation of the item on the floor	EDI048
WÜRTH "mEssfix" metric ruler	EDI083

Method

The test was carried out using detailed internal procedure PP083 in its current revision at testing date.

The item was secured just to the floor.

Procedure

Normative reference	Activity	Description
clause 2.2.1.2 of standard NF P01-013:1988	horizontal static loading	<p>the item was subjected to uniformly distributed load over three points, at a height from the ground equal to 1 m (see clause 2.2.1.2.1 of the standard) using this sequence:</p> <ul style="list-style-type: none"> – preload applied gradually until reaching the preset value and maintained for 3 min; – load removal setting the gauges back to zero; – horizontal static load applied gradually until reaching the preset value and maintained for 60 s following which deflection whilst loaded was measured; – removal of load and recording of permanent deflection after 3 min; – horizontal static safety load, with 1,7 aluminum coefficient, applied and maintained for 5 min, following which deflection whilst loaded was measured; – removal of safety load and recording of permanent deflection after 3 min; – verification of permissible permanent deflection "a", in mm, using the following equation: $a \leq \frac{8 \cdot X}{1000}$ <p>where: X = height of item from fixing point, in mm</p>
clause 4.5 of standard NF P08-301:1991	dynamic impact	<p>All impacts were made by releasing the impactor 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 item again after bouncing</p>

Environmental conditions

Temperature	(18 ± 2) °C
Relative humidity	(57 ± 5) %

Results

Resistance to outward horizontal static loading

Destination	Required load	Applied load [kN]	Deflection whilst loaded [mm]	Permanent deflection [mm]	Allowed permanent deflection "a" [mm]	Result
grandstands	1,7 kN/m	2,4	62,6	3,0	≤3,0	pass
	2,9 kN/m [#]	5,8	122,0	5,1	≤9,6	pass

(#) Safety load considered with aluminum coefficient 1,7.



Photograph of the item during resistance to outward horizontal static loading test

Resistance to dynamic impact

Impact area	Drop height [m]	Energy [J]	Result
centre of infill	1,2	600	no damage [#]

(#) No falling fragments that could cause personal injury were found below.

No gaps were formed between the bars of sufficient size to allow the passage of the gauge specified in figure 7 of standard NF P01-013:1988.

No item performance loss compared to design specifications was witnessed.



Photograph of the item after dynamic impact test

Findings

Activity	Use	Result
outward horizontal static loading	private (1,3 kN)	compliant
	public (1,0 kN/m)	compliant
	grandstands (1,7 kN/m)	compliant
50 kg soft body dynamic impact		compliant

Chief Test Technician
(Dott. Andrea Bruschi)

Andrea Bruschi

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

Andrea Bruschi

ANNEX "A"
TO TEST REPORT No. 400392

Customer

ETEM S.A.

Iroon Polytechniou, 1 - 19018 MAGOULA (Attica) - Greece

Item#

glass railing named "EB50 Glass Balustrade 1010.4"

Contents

customer-supplied drawings of the item

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94054

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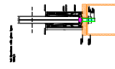
Bellaria-Igea Marina - Italia, 21 December 2022

This annex consists of. 6 pages.

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1st Specimen

SPECIMEN SECTIONS



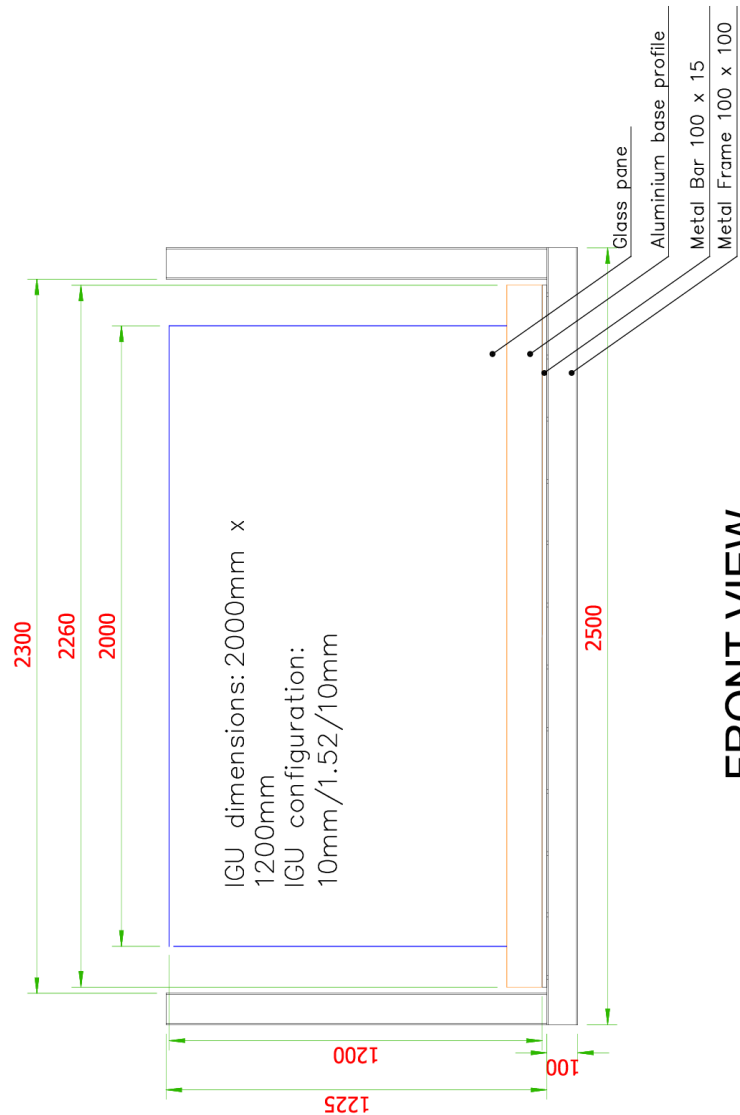
LIST OF PROFILES



MACHINING

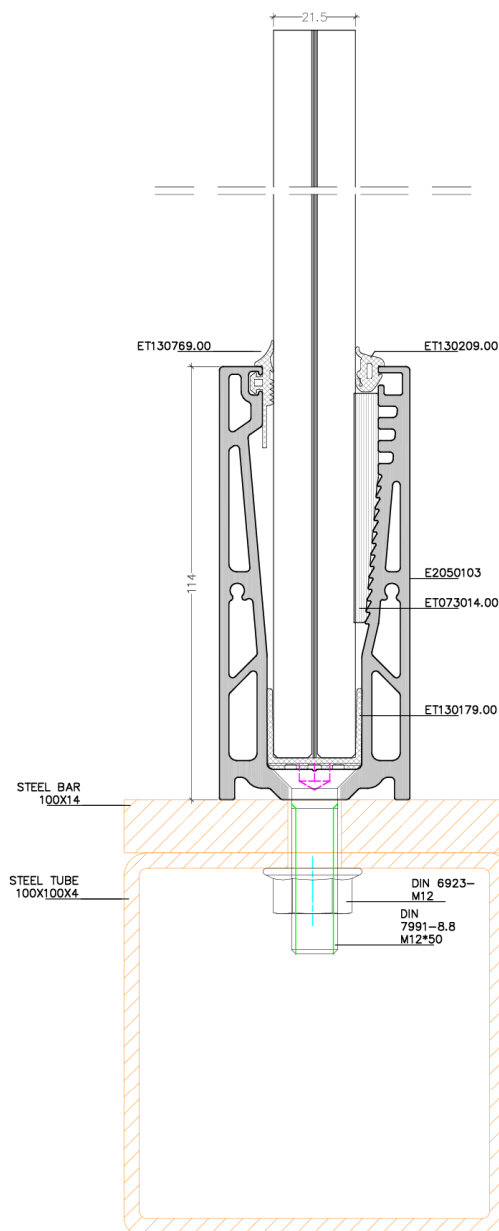


LIST OF ACCESSORIES



FRONT VIEW

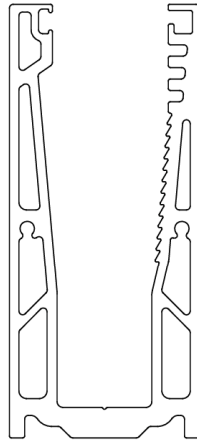
1st Specimen with glass type:
1010,4





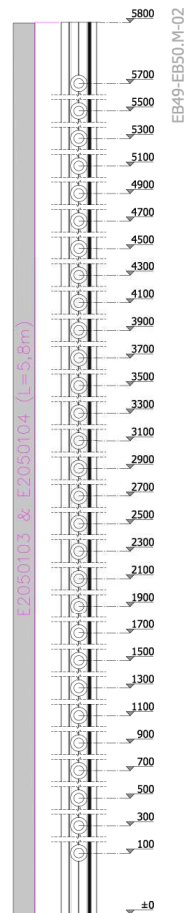
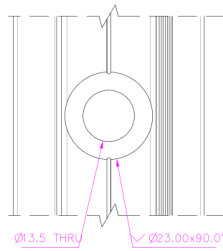
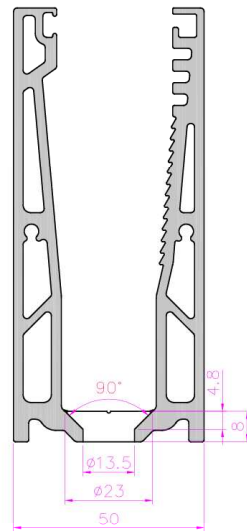
LAB N° 0021 L

E2050103
Base profile
4350 g/m






DRILLING INSTRUCTIONS for EB50:

E2050103





LAB N° 0021 L

code/description κωδικός/περιγραφή	package/pcs συσκευασία/τμχ	colour χρώμα	
Glazing EPDM gasket press-6.0 mm		●	
Elongated glazing EPDM gasket 3.0mm		●	
U-shape EPDM spacer for 1010.4 glazing		●	
Wedge for EB50 glazing 1010.4		●	