

**TEST REPORT No. 368059**

Customer

**PCA - PAPADOPOULOS CONSTRUCTIVE APPLICATIONS**  
Industrial Area of Thessaloniki, Block 38 - 57022 SINDOS - Greece

Item\*

**glazed railing without handrail named "M12"**

Activity

**resistance to horizontal linear static loading and dynamic loading in accordance with standard UNI 11678:2017**

Results

Activity	Requirement	Result
Horizontal linear static load	1,0 kN/m	compliant
Hard body dynamic load	1020 mm	compliant
Double-tire body dynamic load	700 mm	compliant*

(\*) with intended uses specified in table 5 of standard UNI 11678:2017

(\*) according to that stated by the customer.

Bellaria-Igea Marina - Italy, 30 December 2019

Chief Executive Officer

Order:  
82336Item origin:  
sampled and supplied by the customerIdentification of item received:  
2019/3088 dated 16 December 2019Activity date:  
16 December 2019Activity site:  
Istituto Giordano S.p.A. - Strada Erbosa Uno, 74 -  
47043 Gatteo (FC) - Italy

This document is made up of 6 pages and 1 annex and shall not be reproduced except in full without extrapolating parts of interest at the discretion of the customer, with the risk of favoring an incorrect interpretation of the results, except as defined at contractual level.

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.

Chief Test Technician:

Dott. Andrea Bruschi

Head of Security and Safety Laboratory:

Dott. Andrea Bruschi

Compiler: Dott. Marina Bonito

Reviewer: Dott. Andrea Bruschi

Page 1 of 6

**Description of item\***

The item consists of a glass/aluminum railing without handrail with the following characteristics:

<b>Measured overall width</b>	1000 mm
<b>Measured effective height</b>	1000 mm

The glass type is laminated glass, overall nominal thickness 21,52 mm, made of:

- 10 mm tempered glass;
- 1,52 mm PVB;
- 10 mm tempered glass.

Further details of item specifications in annex "A".

**Customer-supplied component list**

Code	Description	MATERIAL
GM01-20A	railing profile fixing rubber	EPDM
GM01-20B	railing profile fixing rubber	EPDM
GM01SF-20	railing profile fixing rubber-wedges	ABS
GM01-20C	railing profile fixing rubber	EPDM
GM08	railing profile	aluminum
//	glass 10.10.4 tempered	glass
//	lifting eye bolt M10 DIN 580	steel
PCA-GM08EC	railing profile end cap	steel
//	hexagonal bolt M10x50 mm DIN 933	steel
//	washer M10 DIN 123	steel
//	hex nut M10 DIN 934	steel



**Item photograph**

(\*) 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.

### Normative references

Standard	Title
UNI 11678:2017	Vetro per edilizia - Elementi di tamponamento in vetro aventi funzione anticaduta - Resistenza al carico statico lineare ed al carico dinamico - Metodi di Prova (Glass in building - Fall-protection glass infill - Resistance to linear static loading and dynamic loading - Test methods)

### Apparatus

Description	In-house identification code
Steel frame simulating actual installation of the sample on the floor with pneumatic equipment for the simulation of the static load with 5 load actuators	EDI048
AEP 100 kg load cell	EDI063
3 GEFRAN electronic displacement transducers model "PZ-34-S150", range 0 - 150 mm	FT451/1, FT451/2 e FT451/3
Double tyre impactor 50 kg overall mass	EDI012
LA CROSSE TECHNOLOGY digital thermo-hygrometer model "WS8009"	EDI111
WÜRTH metric ruler model "mEssfix"	EDI083
BORLETTI electronic gauge model "CDEP15"	EDI066
MITUTOYO Corporation digital tape model "TD-S551D1 216-452"	FT364

### Method

The test is carried out according to the method specified in standard UNI 11678:2017 for group 1 functional configuration. Just the underside of the sample is fixed to the test rig in order to reproduce actual installation conditions.

### Procedure

Normative reference	Activity	Test parameters
clause 5	Linear distributed load	<p>Three gauges were positioned in order to measure the relative displacement of the panel top edge (two at the ends and one at the midpoint between them) and the following test sequence was performed:</p> <ul style="list-style-type: none"> <li>- preload of 30 % of the maximum working load for 5 min</li> <li>- preload removal and gauge reset</li> <li>- maximum working load for 5 min, recording deflections</li> <li>- load removal and recording of permanent deformation after 15 min</li> <li>- ultimate load for 5 min and load removal</li> <li>- induced breakage of a directly-loaded panel</li> <li>- collapse load after induced breakage, corresponding to 30 % of the maximum working load, for 1 min</li> </ul>
clause 6	Impact	<ul style="list-style-type: none"> <li>- 1 kg hard body impact;</li> <li>- 50 kg semi-rigid body impact</li> </ul>

**Environmental conditions**

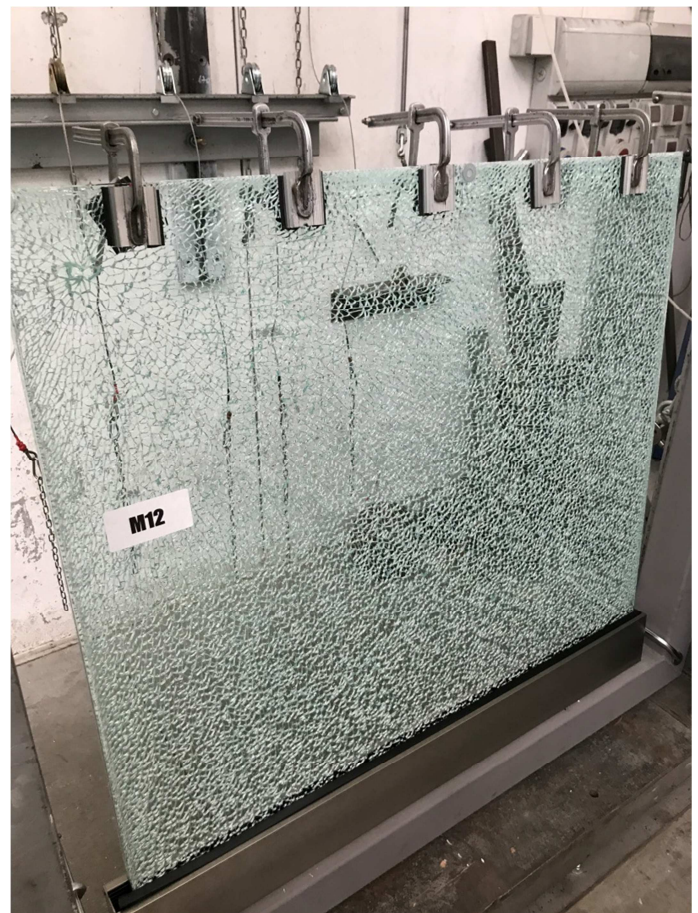
Temperature	(17 ± 1) °C
Relative humidity	(50 ± 5) %

**Results**
**Linear distributed load**

Load step	Load [kN/m]	Duration [min]	Deflection at the measuring points			Maximum allowed deformation [mm]	Effect
			A [mm]	B [mm]	C [mm]		
preload	0,5	5	//	//	//	//	no damage
working load	1,0	5	34,8	35,0	34,3	≤100	no damage
load removal	0,0	//	2,1	2,0	2,0	≤10	//
ultimate load	1,5	5	//	//	//	//	no damage
breakage of internal glass pane							
collapse load after glass pane breakage	0,3	1	//	//	//	//	no collapse



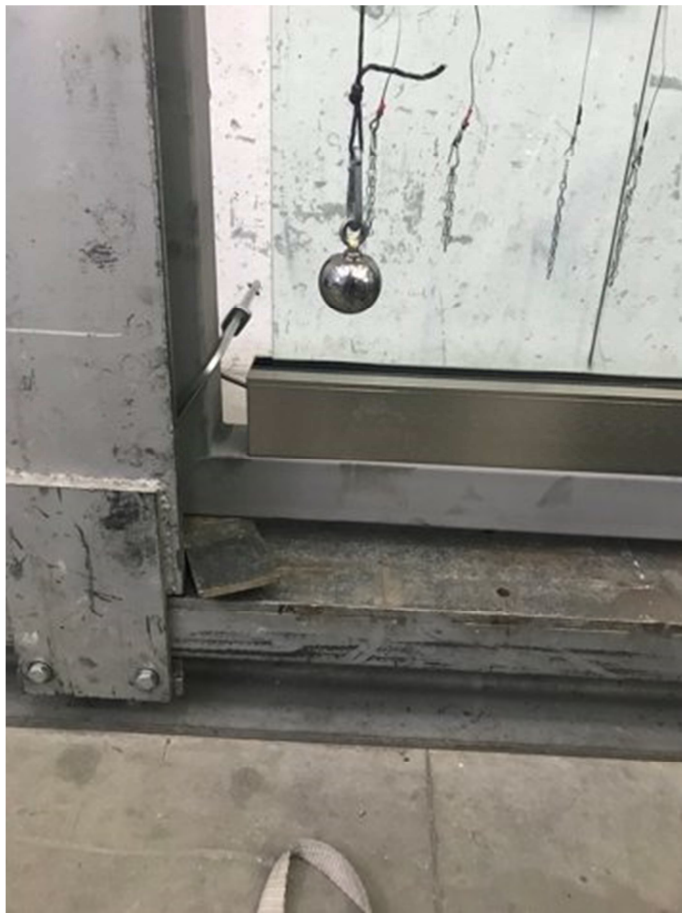
Photograph of the railing subjected to working load



Photograph of the railing after breakage

**Dynamic loading**

Impact type	Impact area	Drop height [mm]	Impact energy [J]	Effect
hard body	along the median 100 mm from the upper edge	1020	10	no damage
	at infill centre	1020	10	no damage
	near to a fixing point	1020	10	no damage
double-tire body	100 mm from top edge	700	350	no damage
	at infill centre	700	350	no damage
	250 mm from the corner along the bisectors	700	350	no damage



**Photograph of the railing after hard body impact**



**Photograph of the railing after double-tire body impact**

## Findings

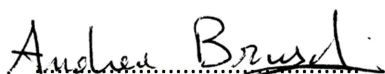
Activity	Requirement	Result
Horizontal linear static load	1,0 kN/m	compliant
Hard body dynamic load	1020 mm	compliant
Double-tire body dynamic load	700 mm	compliant*

(\*) with intended uses specified in table 5 of standard UNI 11678:

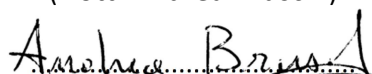
- areas for domestic and residential activities, including residential buildings and related services, as well as hotels
- offices
- areas with tables, such as schools, cafes, restaurants, banquet halls, reading rooms and reception
- areas with fixed seating, such as churches, theaters, cinemas, conference and waiting rooms, university classrooms and lecture halls shops, malls, markets, department stores

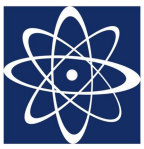
As requested by issue k) of clause 7 "Rapporto di prova" ("Test Report") of standard UNI 11678:2017 hereby it is stated that: this test report does not represent an assessment of suitability for use or a certificate of conformity of the product. The results obtained refer only to the tested sample and describe product performances under the specified test conditions.

Chief Test Technician  
(Dott. Andrea Bruschi)



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





**ANNEX "A"**  
**TO TEST REPORT No. 368059**

Customer

**PCA - PAPADOPOULOS CONSTRUCTIVE APPLICATIONS**  
Industrial Area of Thessaloniki, Block 38 - 57022 SINDOS - Greece

Item\*

**glazed railing without handrail named "M12"**

Contents

**technical documentation**

Order:  
82336

Item origin:  
sampled and supplied by the customer

Identification of item received:  
2019/3088 dated 16 December 2019

Activity date:  
16 December 2019

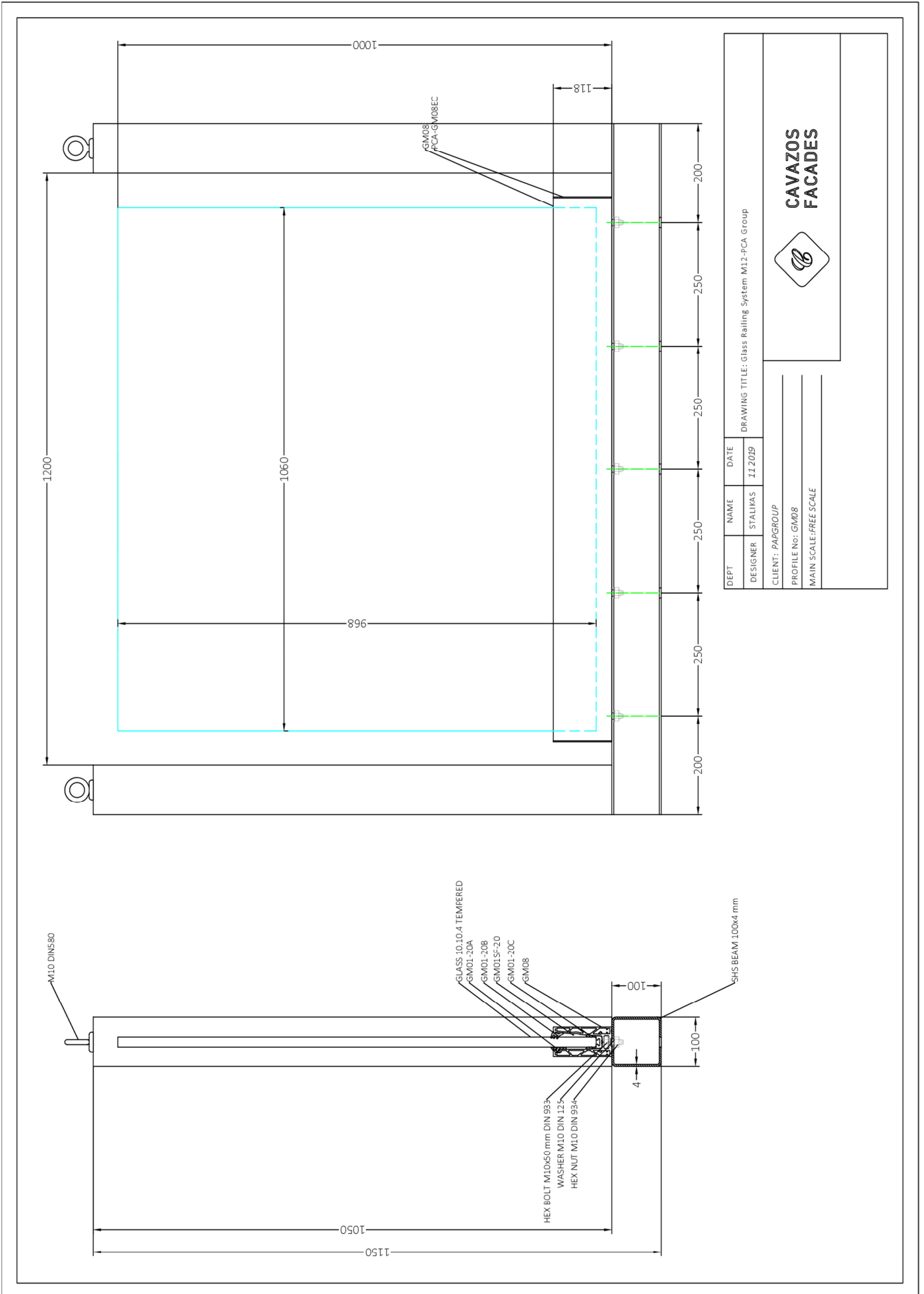
Activity site:  
Istituto Giordano S.p.A. - Strada Erbosa Uno, 74 -  
47043 Gatteo (FC) - Italy


(\* ) according to that stated by the customer.

Bellaria-Igea Marina - Italy, 30 December 2019

This annex consists of. 2 pages.

Page 1 of 2



DEPT	NAME	DATE	DRAWING TITLE: Glass Railing System M12-PCA Group
DESIGNER	STALIMAS	11.2019	
CLIENT: PAPGROUP			 <b>CAVAZOS FACADES</b>
PROFILE No: GM08			
MAIN SCALE: FREE SCALE			