

Bellaterra : April 10, 2019  
Report number : **19/19331-0857**  
Petitioner's Reference : **PURE VISTA LTD**  
VAT: GB924774988  
Pendewey, Stony Lane, Bodmin PL31 2QX  
UNITED KINGDOM

## TEST REPORT

### **1.- PRODUCT TESTED:**

A guard railing to prevent falls, for permanent use in building work, comprising a lower extruded aluminium section that must be anchored on the top of the slab, a double glazed laminated glass pane inserted in the metal section and the appropriate wedges to ensure the rigidity of the system. Glass panes of different thicknesses and compositions may be inserted in the system. For the test have been used units of tempered laminated glass 12.12.4 as well as screws to concrete slab.

The tested sample was delivered to the premises of APPLUS-Bellaterra and installed by the Petitioner.

The commercial name of the model in question is:

**MEGA-Grip Base Mount  
( double tempered laminated glass 12.12.4 )**

### **2.- TESTS REQUESTED:**

2.1.-) Firstly, a request was made to check the mandatory specification for rails with a resistance grade of **3,0 kN/m** in accordance with the Spanish Technical Building Code (CTE) Basic Safety Document regarding Use and Accessibility, Section SUA 1 Safety against the risk of falls, Section 3.2 Differences in level, characteristics of protective barriers, subsection 3.2.2. Resistance.

2.2.-) On the other hand, the following tests were also requested, based on standard UNE 85-238-91: Railings. Test methods:

- Soft body dynamic test, on the filling element of the railing.
- Hard body dynamic test, on the filling element of the railing.

The results set out in this report refer only to the sample received by LGAI, tested under the conditions indicated in the test guidelines or methods described in this document. LGAI Technological Center, S.A. is not responsible for the documentation provided by the applicant.

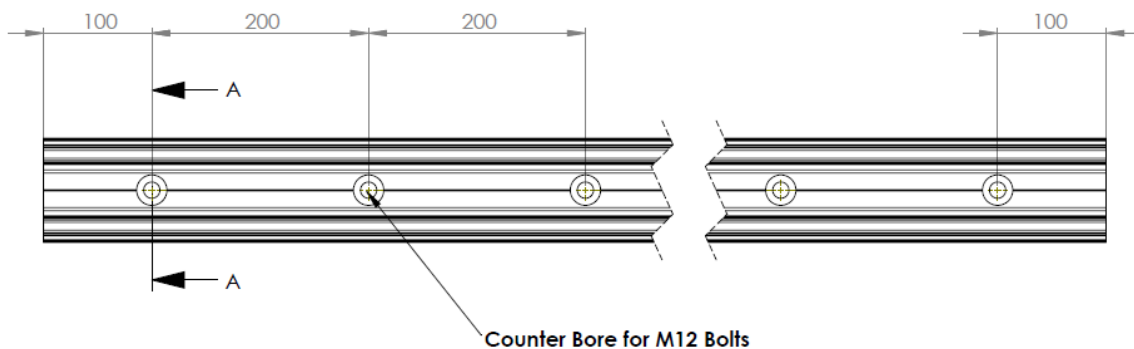
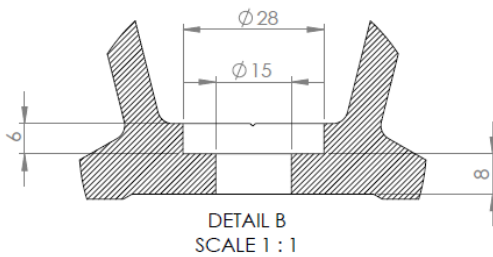
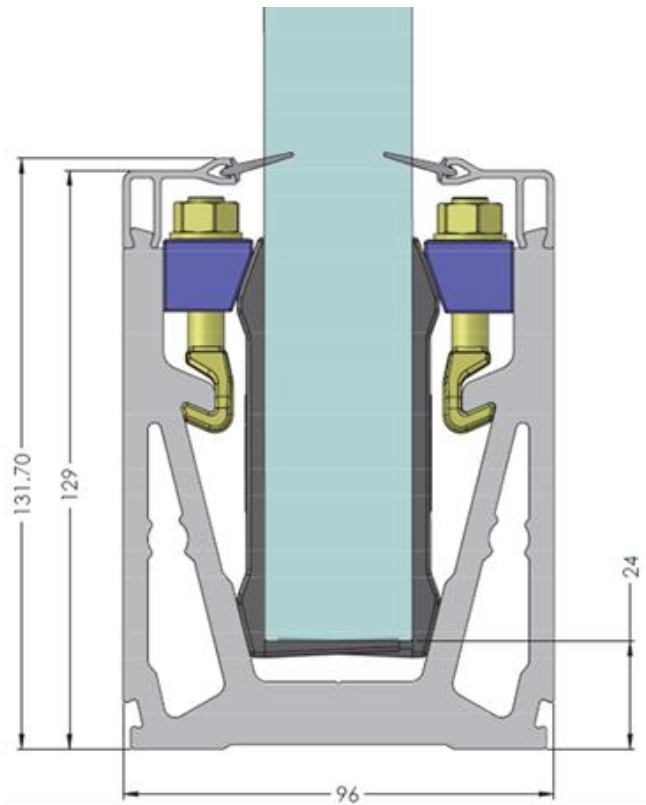
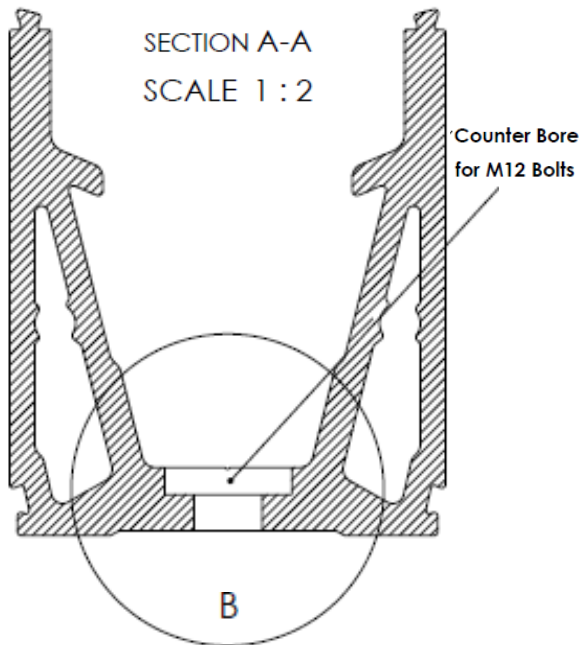
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**PURE VISTA LTD**

**GLASS RAILING**  
Ref.: MEGA-Grip Base Mount  
( DOUBLE TEMPERED LAMINATED GLASS 12.12.4 )

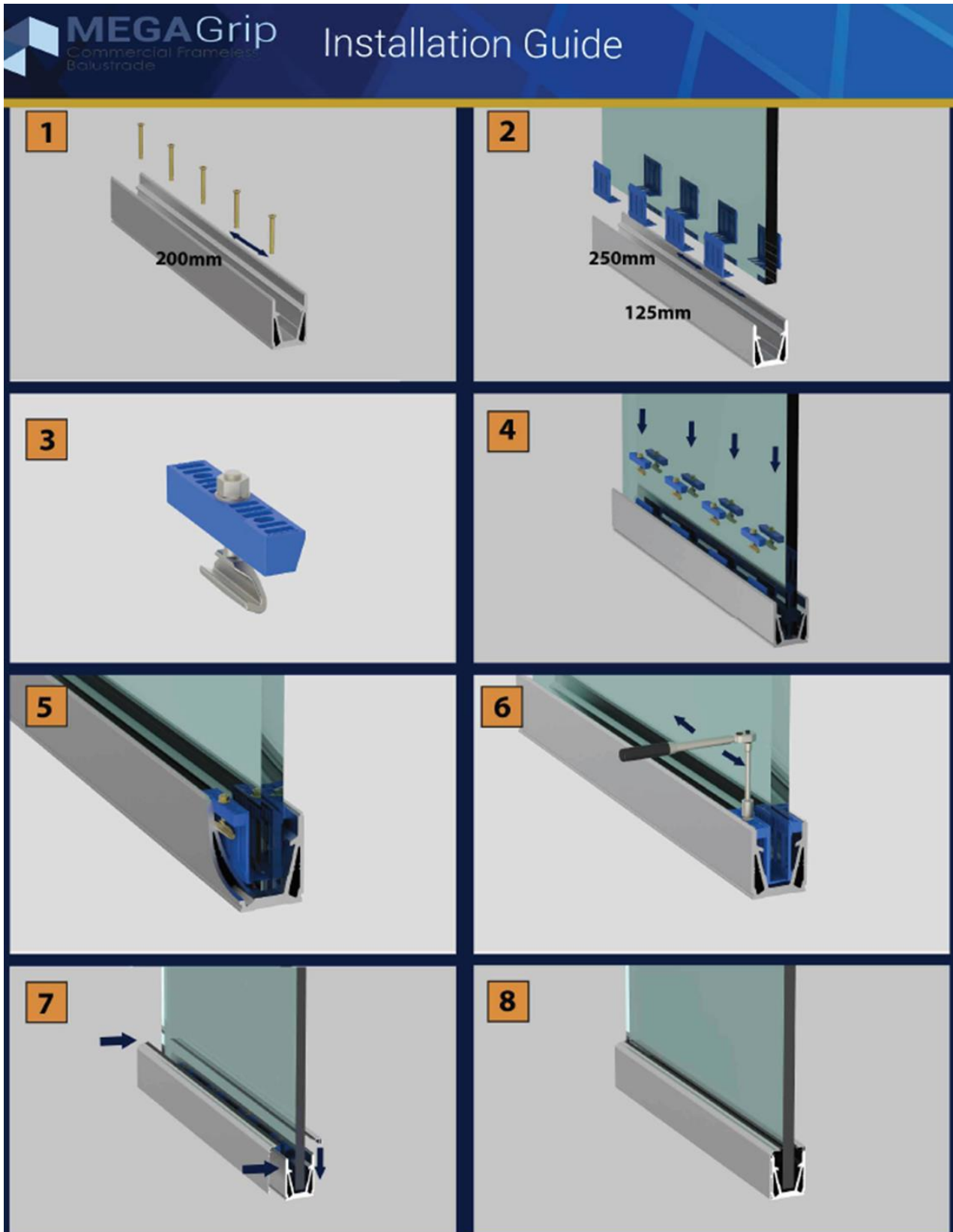
**3.- RAILING IDENTIFICATION:**

DO NOT SCALE DRAWING		REVISION
<b>Purevista</b>		
TITLE: Megagrip with Top Seal		
DWG NO.	16-08-17	A4
SCALE:1:1	SHEET 2 OF 3	



**PURE VISTA LTD**

GLASS RAILING  
Ref.: MEGA-Grip Base Mount  
( DOUBLE TEMPERED LAMINATED GLASS 12.12.4 )



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A specification of the components and geometric definition of the tested railing are shown in the following table:

<b>RAILING COMPONENTS</b>	
Distance between fasteners	100 mm from the ends and 200 mm between them
Fastener type	Internal – threaded anchor FISCHER RG 18 x 125 M12 I with the Everbuild Anchorset Red Resin. Along with M12 bolts 10.9 strength 12x (5 units)
Substrate type	Concrete
Aluminium section length	1000 mm
Aluminium section height	111,5 mm
Aluminium section width	96 mm
Glass dimensions (length x height)	1000 mm x 1200 mm
Type of glass and thickness	Double tempered laminated 12.12.4 mm
Glass height from ground level	1225 mm
Distance between wedges	125 mm from the ends and 250 mm between them

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<b>PURE VISTA LTD</b>	<p>GLASS RAILING          Ref.: MEGA-Grip Base Mount          ( DOUBLE TEMPERED LAMINATED GLASS 12.12.4 )</p>

**4.- TESTS:**

The tests were performed on day March 26, 2019.

**4.1.- Checking of the mandatory specification for railings depending on their resistance grade, based on the Spanish Technical Building Code (CTE).**

Technical Building Code (CTE) Basic Document on Safety in Use and Accessibility, Section SUA 1 Safety against the risk of falls, Section 3.2 Differences in level, characteristics of protective barriers, subsection 3.2.2. Resistance, specifies that barriers must have a certain resistance grade, depending on the area where they are installed.

DB-SE-AE (Structural Safety, Actions in Building) of the CTE specifies the use categories which are summarised in the following table, with the horizontal loads that they must be able to withstand.

Use category		Use subcategory		Resistance kN/m
A	Residential areas	A1	Homes and rooms in hospitals and hotels	0.8
		A2	Lumber rooms	0.8
B	Administrative areas			0.8
C	Public access areas (except for surfaces belonging to categories A, B and D)	C1	Areas with tables and chairs	0.8
		C2	Areas with fixed seats	0.8
		C3	Areas with no obstacles that prevent the free movement of people, such as halls in public buildings, government buildings, hotels, museum exhibition halls, etc.	1.6
		C4	Areas used in gymnasiums or for physical activities	1.6
		C5	Crowded areas (concert halls, stadiums, etc.)	3.0
D	Commercial areas	D1	Commercial establishments	0.8
		D2	Supermarkets, hypermarkets or large department stores	0.8
E	Traffic areas and light vehicle parking lots (<30kN)			1.6
F	Passable roofs with private access			1.6
G	Roofs accessible only for maintenance purposes	G1	Roofs with a slope less than 20°	0.8
			Light-weight purlin roofs (with no frame)	
		G2	Roofs with a slope greater than 40°	0.8

The upper edge of the railing was subject to a linear outward load in kN/m for 3 minutes, and a check was performed to check for the existence of any irregularity that could affect its functionality or stability.

According to section 3.2. DB SE-AE of the Spanish Technical Building Code, the structure of the railings, parapets, low walls or protective railings on terraces, viewpoints, balconies or stairs must be able to withstand an evenly-distributed horizontal force that corresponds to their use category and subcategory.

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<b>HORIZONTAL STATIC TEST, OUTWARDS</b> <b>( Load 3,0 kN/m = 3,0 KN )</b>	<p>Maximum deflection: 56,8 mm</p> <p>Under the use load, the railing presented no irregularities that could affect its functionality or stability.</p>
<p><b>IT IS COMPLIANT with the requirements of section 3.2 DB SE-AE</b>  <b>For use categories/subcategories that require a resistance of up to 3,0 kN/m</b></p>	

**4.2.- Soft body dynamic test**

The test consisted of subjecting the filling component (in this case, glass) to the shock effect defined in section 9.2.3 of standard UNE 85238:91 on a large soft body. A spherical bag with a mass of 50 kg was used for the impact.

The impact energy had to be 600J (0,5kN x 1,20m).

The shock was applied to the interior part of the element and the impact had to hit the geometric centre of the filling element.

<b>SOFT BODY DYNAMIC TEST</b> <b>ON THE FILLING ELEMENT, AT THE GEOMETRIC CENTRE</b>	
Performance requirement	COMPLIANT/ NON-COMPLIANT
No pieces or elements will be detached that could cause injury to persons outside	<b>COMPLIANT</b>
In railings with a filling element comprised of one or more panels, the surface of the broken part must not let the tester pass through. In addition the filling element must not become detached from the railing frame.	<b>COMPLIANT</b>
<p><b>IT COMPLIES with the requirements of standard UNE 85-238:91</b></p>	

***Note: after an impact of these characteristics it is advisable that the handrail is checked and readjusted.***

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#### **4.3.- Hard body dynamic test**

The test consists of subjecting the filling element (in this case, glass), to the shock effect of a hard solid steel body with a mass of 0,5 kg and diameter of 50mm. The impact energy must be 3,75 J (0,005kN x 0,75m).

The impact must hit the geometric centre of the filling element. An annotation is made of the diameters of the dents created and whether or not a fracture had taken place.

<b>HARD BODY DYNAMIC TEST ON THE FILLING ELEMENT, AT THE GEOMETRIC CENTRE</b>	
<b>Performance requirement</b>	<b>COMPLIANT/ NON-COMPLIANT</b>
No pieces or elements will be detached that could cause injury to persons outside.	<b>COMPLIANT</b>
In railings with a filling element comprised of one or more panels, the surface of the broken part must not let the tester pass through. In addition the filling element must not become detached from the railing frame.	<b>COMPLIANT</b>
<b>IT COMPLIES with the requirements of standard UNE 85238:91</b>	



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**PHOTOS:**



**Horizontal static test, outwards ( 3,0 kN/m )**



**Soft body dynamic test**



**Hard body dynamic test**



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## **CONCLUSIONS**

***The tested railing MEETS THE CLIENT'S SPECIFICATIONS CTE (DB SU-1 y DB SE-AE) for the following categories (As stated in paragraph 3.2 and table 3.3 of the DB-SE-AE of the CTE, for the categories/subcategories of use where a resistance of up to 3,0 kN/m is required***

- *A: Residential areas*
- *B: Administrative areas*
- *C: public access areas*
- *D: Commercial areas*
- *E: Traffic and parking areas for light vehicles (<30kN)*
- *F: Accessible covers accessible only privately*
- *G: Decks accessible only for preservation*

***The tested handrail MEETS THE SPECIFICATIONS contained in Standard UNE 85-238-91 for the following tests:***

- *Dynamic testing conducted with soft body*
- *Dynamic testing conducted with hard body*

Manager for Construction Materials  
LGAI Technological Center S.A.

Managing Technician  
LGAI Technological Center S.A.

### **Quality Assurance Service**

Applus+ guarantees that this task has been carried out in compliance with the requirements of our Quality and Sustainability System, and furthermore, that the contractual terms and legal regulations have been complied with. In the framework of our improvement programme, we would appreciate any comments you may deem appropriate. These should be addressed to the manager who signs this document, or to the Quality Director of Applus+ at the following address: [satisfaccion.cliente@applus.com](mailto:satisfaccion.cliente@applus.com)