OFFICIAL SPANISH TEST REPORT

(According to Spanish mandatory standard CTE and UNE 85-238-91)

EASY GLASS® VIEW

MOD. 6923

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Bellaterra, January 26th, 2017

Test Report nº: **17/13713-106**

Client: **Q-RAILING EUROPE GMBH & CO. KG**
Marie Curie Straβe, 8-14
D–46446 EMMERICH AM RHEIN (GERMANY)

TEST REPORT

1.- TESTED SAMPLES:

A railing system for fall protection for permanent use in building works and consists of, two vertical profiles located at the end of the glass made in extruded aluminum that must be well attached to the building structure, a unit of laminated double glass inserted in the metal section, a clamps for both profiles and the rubber joint to fit the glass. The system can receive different thicknesses and compositions of laminated glass. The samples are tested with units of laminated and tempered glass.

The model to test is:

EASY GLASS VIEW

That must be attached at its vertical ends with the option of the internal or external positioning according the building hole, as below be defined.

2.- TEST REQUESTED:

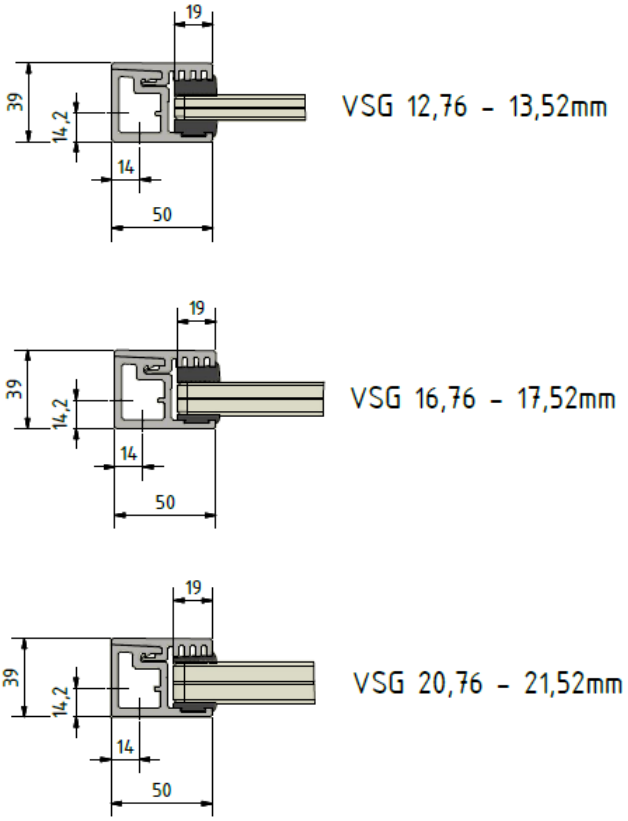
Are the following:

2.1.-) First, is requested the verification of the Spain mandatory standard for railings according the class of resistance named "Código Técnico de la Edificación (CTE) Documento Básico de Seguridad de Utilización y Accesibilidad, Sección SUA 1 Seguridad frente al riesgo de caídas, Apartado 3.2 Desniveles, características de las barreras de protección, Sub-apartado 3.2.2. Resistencia".

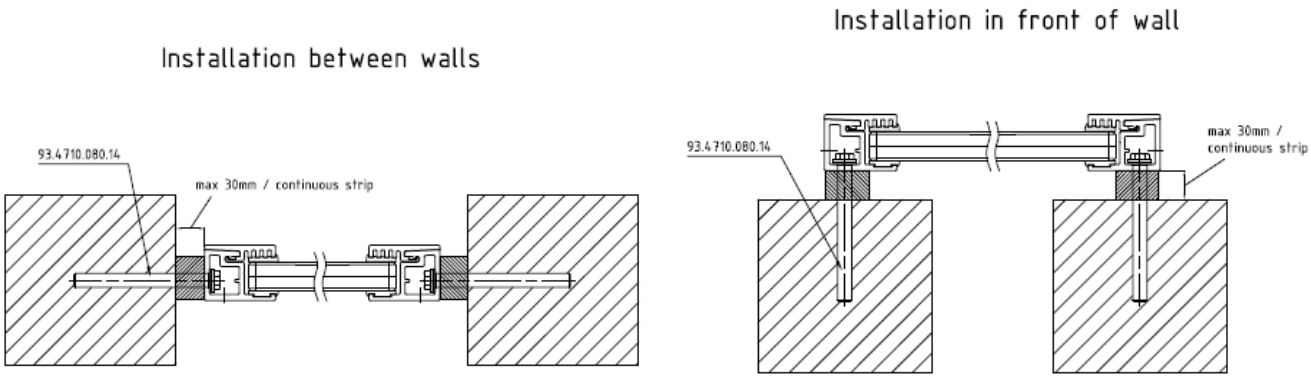
2.2.-) Second, also is requested the dynamic impact test for railings according the standard UNE 85-238-91: Barandillas. Métodos de ensayo

3.- RAILING IDENTIFICATION:

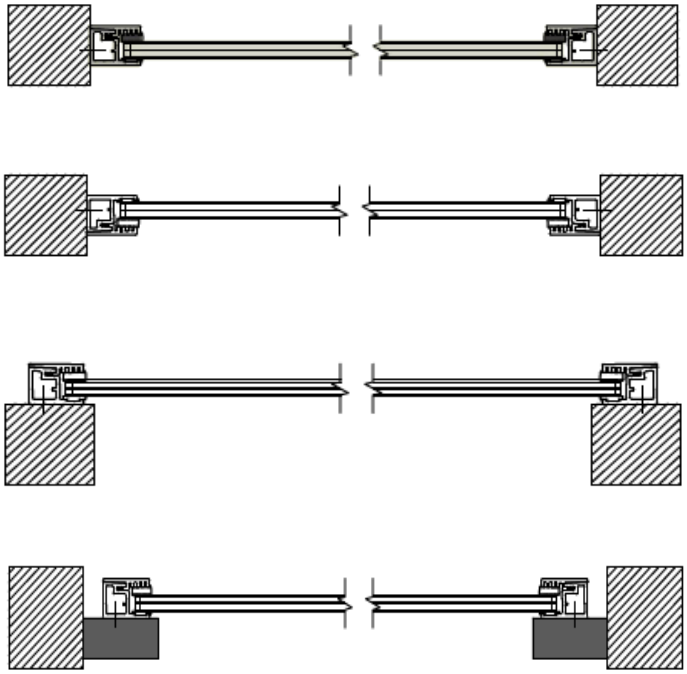
The sections of the profile with different glasses are:



The scheme of the positioning in the building works, are:



Positioning according internal (inside or outside), external or on the door or window:



The identification of the product is:

ALUMINIUM	AW-6063-T6
ANCHORS	According the catalogue
SPACING ANCHORS	1 ut. @ 250 mm.
GLASS HEIGHT	1100 mm.

4.- TESTS:

The tests were carried out on January 10th, 2017.

4.1.- Resistance test with horizontal outward load:

The standard "Código Técnico de la Edificación (CTE) Documento Básico de Seguridad de Utilización y Accesibilidad, Sección SUA 1 Seguridad frente al riesgo de caídas, Apartado 3.2 Desniveles, características de las barreras de protección, Sub-apartado 3.2.2. Resistencia", specifies that the railings need to have a category of resistance according where are located.

The CTE, in the document DB-SE-AE (Seguridad Estructural, Acciones en la Edificación) specifies the use categories that appear in the following table with the resistance that need to have.

The railing is tested with a lineal and horizontal load at the top of the banister in kN/m, and outwards during 3 minutes. At the end of the test, disorders in performance or stability are not allowed.

Use Categories		Use Sub-categories		Resistance kN/ml
A	Residential areas	A1	Houses and room areas in hospitals and hotels	0.8
		A2	Storage rooms	0.8
B	Administrative areas			0.8
C	Public access areas (except the A,B and D areas categories)	C1	Tables and chairs areas	0.8
		C2	Fixed seats areas	0.8
		C3	Areas without obstacles and free movement of people as public halls, administrative building, hotels, showrooms, museums, etc.	1.6
		C4	Fitness areas	1.6
		C5	Agglomeration areas, concert halls, stadiums, etc.	3.0
D	Mall areas, shopping centers	D1	Shops, commercial rooms	0.8
		D2	Supermarkets, hypermarket, department stores…	0.8
E	Traffic and parking areas for light vehicles (<30kN)			1.6
F	Terraces with private access only			1.6
G	Passable roof only for maintenance	G1	Roof with tilt, up to 20º Light roofs	0.8
		G2	Roof with inclination of more than 40º	0.8

The tests results are the following:

System	Assembly	Glasso	Glass dimensions (l x h) mm.	Load kN/m	Maximum deflection mm.	Residual deflection mm.
Easy Glass View	External	6.6.2	2000 x 1100	0,8	30,8	1,4
				1,6	52,7	2,2
			2410 x 1000	0,8	48,9	2,4
				1,6	90,1	2,5
	Internal	8.8.2	2500 x 1100	1,6	54,6	2,6
			3000 x 1100	1,6	90,7	5,5

4.2.- Resistance to dynamic impact:

4.2.1.- Standard soft body dynamic test:

The test consist in to drop a heavy and big body on the filling of the railing, at the end on the central part of the glass, as defined in the chapter 9.2.3 of the standard UNE 85-238-91. The special body has a mass of 50 Kg.
The impact energy will be of 600J (0,5kN x 1,20m).
The test will be done at the internal and central part of the railing.

4.2.2.- Hard body dynamic test:

The test consist in to drop a small and hard ball, this is a steel ball with a mass of 0,5 Kg and 50mm of diameter. The energy of the impact will be 3,75 J (0,005kN x 0,75m).
The test will impact at the center of the railing and any damage will be checked.

Impact results:

System	Assembly	Glass	Glass dimensions (l x h) mm.	Impact 600J	Impact 3,75 J
Easy Glass View	External	6.6.2	2000 x 1100	No damage	No damage
			2410 x 1000	No damage	No damage
	Internal	6.6.2	2000 x 1100	No damage	No damage
		8.8.2	2500 x 1100	No damage	No damage
		8.8.2	3000 x 1100	No damage	No damage

5.- CONCLUSIONS:

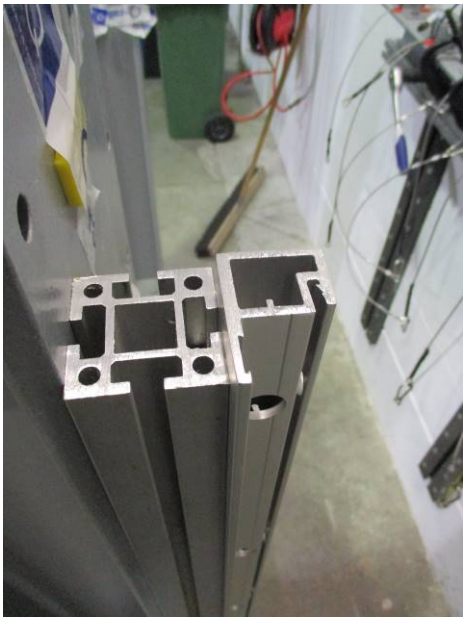
Considering that have tested the worst cases of the family and considering that thicker laminated and tempered glass provides more resistance, it can be concluding according the CTE the suitable models are:

System	Assembly	Glass	Maximum Lenght Minimum Height (l x h) mm.	Resistance kN/m		
				0,8	1,6	3,0
Easy Glass View	External	6.6.2	2410 / 1000	✓	✓	X
	Internal	6.6.2	2410 / 1000	✓	✓	X
	External	8.8.2	3000 / 1100	✓	✓	X
	Internal	8.8.2	3000 / 1100	✓	✓	X

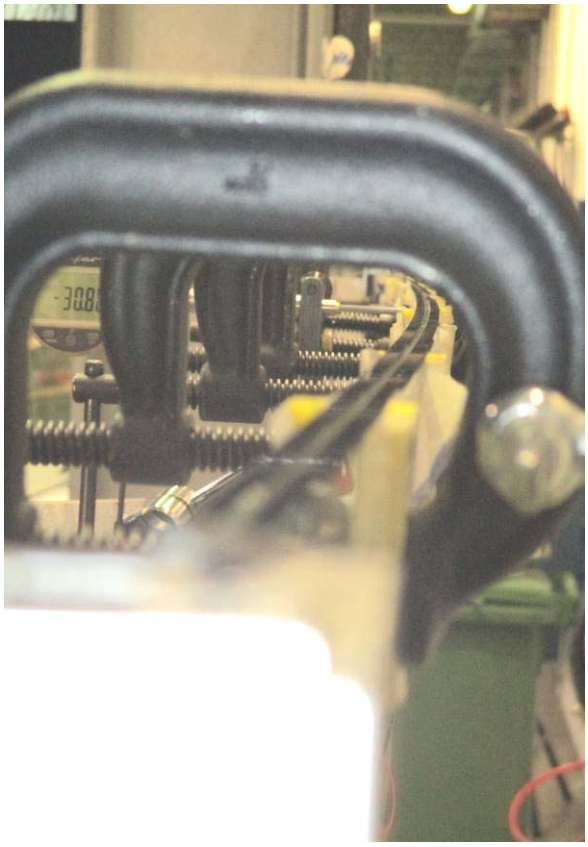
(X) = Profile not designed for this class.

These loads must to be compared with according the use categories of the CTE, related in this document.

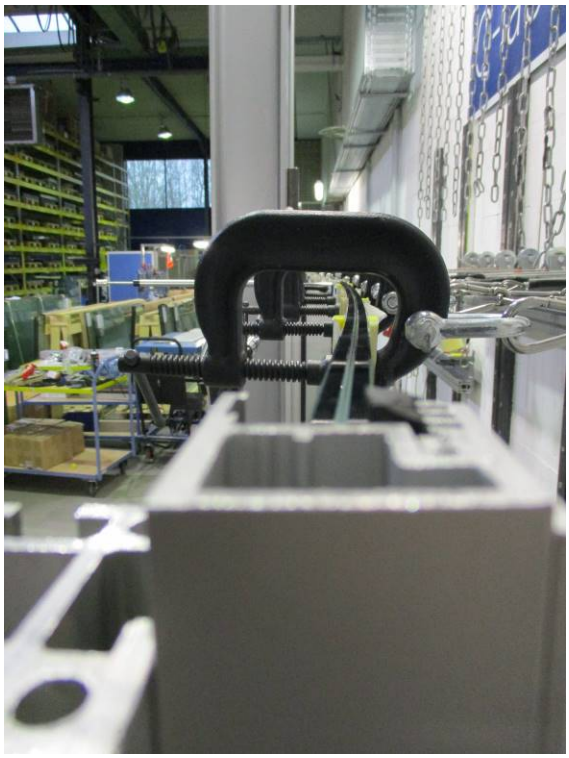
Some test's pictures are shown below:



EG View profile with external positioning



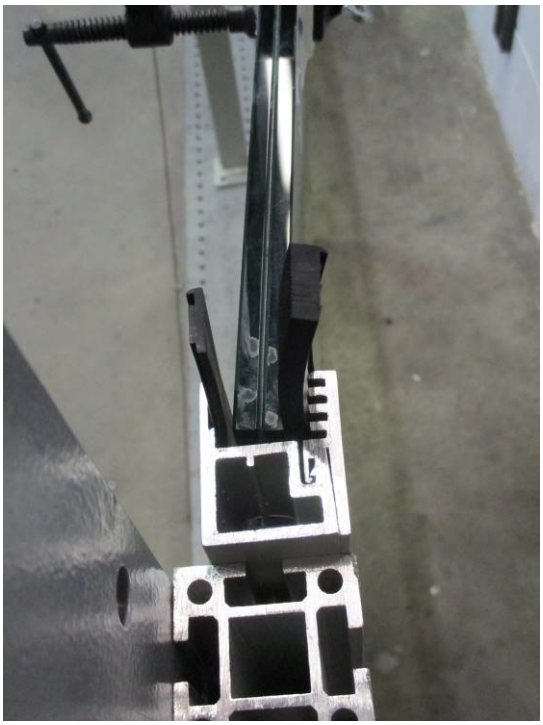
Resistance test on 2000 x 1100 mm., glass with external positioning.

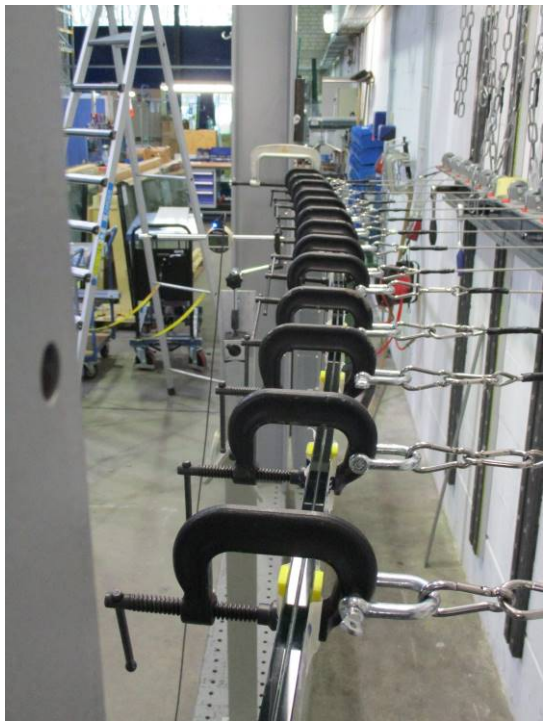


Resistance test on 2000 x 1100 mm. glass

Resistance test on 2410 x 1000 mm. glass

Resistance test on 2500 x 1100 mm., with internal positioning glass 8.8.82





Resistance test on 3000 x 1100 mm., with internal positioning glass 8.8.2

Laboratory Manager
LGAI Technological Center S.A.

Test Manager
LGAI Technological Center S.A.

GOOD LUCK WITH
YOUR INSTALLATION!

VIEL ERFOLG MIT
IHRER MONTAGE!

SUCCES MET
DE INSTALLATIE!

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