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European Organisation for
Technical Assessment

European Technical Assessment ETA 19/0181 of 30/04/2019

GENERAL PART

Trade name of the construction product

“La Pensilina” made of:

Base Rail

Clamping System

Structural laminated safety glass

Safety cams

Product family to which the construction product belongs

PAC 22: ROOF COVERINGS, LIGHTS, WINDOWS, RELATED KITS AND ANCILLARIES
EAD 220025-00-0401: Cantilevered Structural Horizontal Glazing (Structural Glass Canopy/Roof)

Manufacturer

Logli Massimo S.p.A.
Via Ettore Romagnoli, 6
I - 20146 Milano - Italia

Manufacturing plant

Logli Massimo S.p.A.
Via Chemnitz, 49/51
I - 59100 Prato - Italia

This European Technical Assessment contains:

17 pages, including 7 annexes which form an integral part of this assessment

This European Technical Assessment is issued in accordance with Regulation (EU) n° 305/2011, on the basis of

EAD 220025-00-0401: Cantilevered Structural Horizontal Glazing (Structural Glass Canopy/Roof)

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ETA (EUROPEAN TECHNICAL ASSESSMENT)

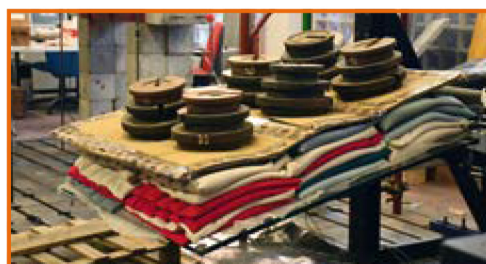
Logli Massimo S.p.A. has checked the strength and durability of the system by carrying out all the tests necessary to obtain the **ETA (European Technical Assessment)**. Voluntary document containing the performance of a construction product; issued to products for which, in the absence of a harmonized standard, a European Assessment Document (EAD) or an ETAG is available as a reference.

The release of ETA, as well as the definition of special EADs, are the responsibility of the Technical Assessment Body - TAB. The ITC is TAB designated on many product areas and can therefore define EAD, or collaborate on their definition, and release ETA.

The ETA of a product contains the performance/s to be declared, expressed in levels or classes, or in a description, of the essential characteristics agreed by the manufacturer and by the TAB that receives the ETA request for the stated intended use and the technical details necessary to apply the system of evaluation and verification of constancy of performance (VVCP).

The strict procedure is useful to justify:

- STEP 1** - Resistance to static load (Snow load)
- STEP 2** - Resistance to static equivalent lifting load (Wind action)
- STEP 3** - Resistance to the impact of a soft body and a hard body
- STEP 4** - Resistance of glass to post-breakage
- STEP 5** - Resistance to the extraction of the slab



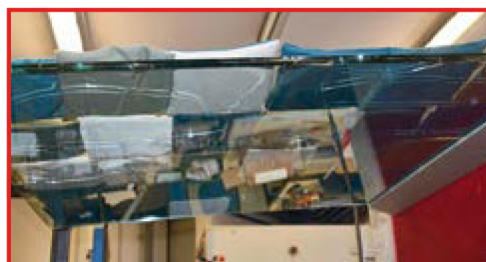
STEP 1
Snow overload



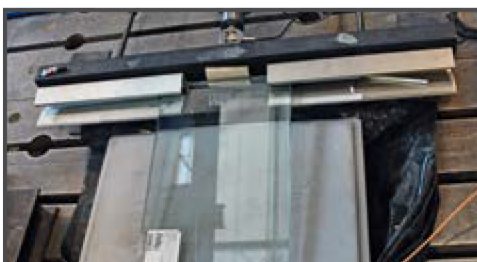
STEP 2
Wind overload (upside down profile)



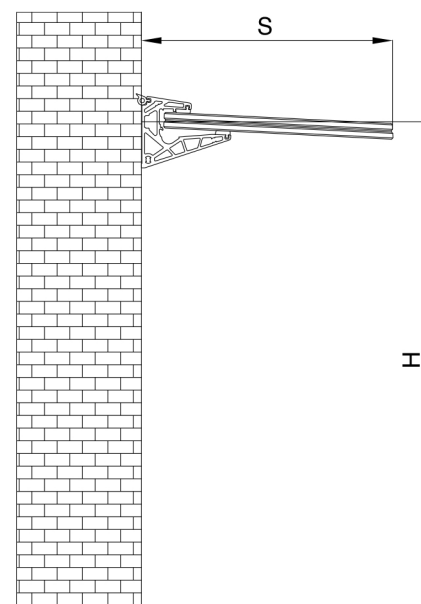
STEP 3
Impact resistance



STEP 4
Post-breakage resistance



STEP 5
Resistance to extraction



Thickness	Glass Type	Interlayer	Snow Load max [kg/m ²]	Wind Load max [kg/m ²]	Application
88.4	F - F	PVB	105	26	Cantilevered Canopy
	H - H	PVB	220	86	
	H - H	SentryGlas®	380	93	
88.4	T - T	PVB	265	86	Cantilevered Roof
106.4 (EGLAS)	T - T	DG41	380	80	H > 350 + S

Table 1 - Fields of application for the different types of glass (max values for overhang 120 cm)

Glass type: F = Float EN 572 - H = Hardened EN 1863 - T = Tempered EN 12150

Legend of the fields of use:

Cantilevered Canopy: installation without any height limitation

Cantilevered Roof H > 350 + S: installation with height limitation of: H = 350 cm + S (glass overhang)

PARAMETERS FOR THE DESIGN

IMPORTANT: SNOW LOAD and WIND LOAD must be evaluated according to Eurocode 1 or specific norm in such application, depending of: geography and building form: Geography - Morfology - Elevation - Building geometric parameters

Glass type Overhang[m]	Characteristic Values for Resistance to Snow Load [kN/m ²]				
	F-F PVB	H-H PVB	H-H SentryGlas®	T-T PVB	T-T (EGLAS) DG41
1.20	1.05	2.20	3.80	2.65	3.80
1.15	1.14	2.40	4.14	2.89	4.14
1.10	1.25	2.62	4.52	3.15	4.52
1.05	1.37	2.87	4.96	3.46	4.96
1.00	1.51	3.17	5.47	3.82	5.47
0.95	1.68	3.51	6.06	4.23	6.06
0.90	1.87	3.91	6.76	4.71	6.76
0.85	2.09	4.38	7.57	5.28	7.57
≤ 0.80	2.36	4.95	8.55	5.96	8.55

Table 2 - Snow Load Resistance of the Types Tested

Glass type Overhang[m]	Characteristic Values for Resistance to Wind Load [kN/m ²]				
	F-F PVB	H-H PVB	H-H SentryGlas®	T-T PVB	T-T (EGLAS) DG41
1.20	0.26	0.86	0.93	0.86	0.80
1.15	0.28	0.94	1.01	0.94	0.87
1.10	0.31	1.02	1.11	1.02	0.95
1.05	0.34	1.12	1.21	1.12	1.04
1.00	0.37	1.24	1.34	1.24	1.15
0.95	0.41	1.37	1.48	1.37	1.28
0.90	0.46	1.53	1.65	1.53	1.42
0.85	0.52	1.71	1.85	1.71	1.59
≤ 0.80	0.59	1.94	2.09	1.94	1.80

Table 3 - Wind Load Resistance of the Types Tested

The Snow Load and Wind Load values refer to the configurations validated by the ETA.
The tables contain the resistance values corresponding to the variable overhang.
Extrapolate the values to get the maximum possible overhang in the analyzed case.

Overhang [cm]

Snow Load [kg/m ²]	Overhang [cm]														
	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
50	0.69	0.78	0.88	0.99	1.10	1.21	1.33	1.46	1.59	1.72	1.86	2.01	2.16	2.31	2.47
60	0.73	0.84	0.95	1.07	1.19	1.32	1.46	1.60	1.75	1.90	2.06	2.22	2.39	2.57	2.75
70	0.78	0.90	1.02	1.15	1.29	1.43	1.58	1.74	1.90	2.08	2.25	2.44	2.63	2.83	3.03
80	0.83	0.96	1.09	1.24	1.39	1.54	1.71	1.88	2.06	2.25	2.45	2.65	2.87	3.09	3.32
90	0.88	1.02	1.16	1.32	1.48	1.65	1.83	2.02	2.22	2.43	2.65	2.87	3.10	3.35	3.60
100	0.93	1.08	1.23	1.40	1.58	1.76	1.96	2.17	2.38	2.61	2.84	3.09	3.34	3.61	3.88
110	0.98	1.14	1.30	1.48	1.67	1.87	2.09	2.31	2.54	2.78	3.04	3.30	3.58	3.87	4.16
120	1.03	1.20	1.38	1.57	1.77	1.98	2.21	2.45	2.70	2.96	3.23	3.52	3.82	4.13	4.45
130	1.08	1.26	1.45	1.65	1.87	2.09	2.34	2.59	2.86	3.14	3.43	3.74	4.05	4.39	4.73
140	1.13	1.31	1.52	1.73	1.96	2.21	2.46	2.73	3.02	3.31	3.63	3.95	4.29	4.64	5.01
150	1.18	1.37	1.59	1.82	2.06	2.32	2.59	2.87	3.18	3.49	3.82	4.17	4.53	4.90	5.29
160	1.22	1.43	1.66	1.90	2.15	2.43	2.71	3.02	3.33	3.67	4.02	4.38	4.77	5.16	5.58
170	1.27	1.49	1.73	1.98	2.25	2.54	2.84	3.16	3.49	3.85	4.22	4.60	5.00	5.42	5.86
180	1.32	1.55	1.80	2.06	2.35	2.65	2.96	3.30	3.65	4.02	4.41	4.82	5.24	5.68	6.14
190	1.37	1.61	1.87	2.15	2.44	2.76	3.09	3.44	3.81	4.20	4.61	5.03	5.48	5.94	6.42
200	1.42	1.67	1.94	2.23	2.54	2.87	3.22	3.58	3.97	4.38	4.80	5.25	5.72	6.20	6.71
225	1.54	1.82	2.12	2.44	2.78	3.14	3.53	3.94	4.37	4.82	5.29	5.79	6.31	6.85	7.41
250	1.67	1.97	2.29	2.64	3.02	3.42	3.84	4.29	4.77	5.26	5.79	6.33	6.90	7.50	8.12
275	1.79	2.12	2.47	2.85	3.26	3.69	4.16	4.65	5.16	5.71	6.28	6.87	7.50	8.15	8.83
300	1.91	2.26	2.65	3.06	3.50	3.97	4.47	5.00	5.56	6.15	6.77	7.41	8.09	8.80	9.53

Table 4 - Axial load in kN resulting on the single anchorage in function of Overhang and Snow Load

- Axial load on anchors in kN: the abacus reports the values of the resulting force on the single anchor in relation to the overhang and SNOW load, assuming 5 fixings per meter (distance between holes $i = 200$ mm).
- SNOW load in kg/m²: the snow load is defined by the National Regulations according to the geographical area, of the altitude and exposure.

Overhang [cm]

	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
50	0.20	0.24	0.29	0.34	0.40	0.45	0.52	0.58	0.65	0.73	0.81	0.89	0.98	1.07	1.16
60	0.35	0.42	0.50	0.59	0.68	0.78	0.89	1.00	1.12	1.25	1.38	1.53	1.68	1.83	1.99
70	0.49	0.59	0.71	0.83	0.96	1.10	1.26	1.42	1.59	1.77	1.96	2.16	2.37	2.59	2.83
80	0.63	0.77	0.91	1.07	1.24	1.43	1.62	1.83	2.06	2.29	2.54	2.80	3.07	3.36	3.66
90	0.78	0.94	1.12	1.32	1.53	1.75	1.99	2.25	2.52	2.81	3.12	3.44	3.77	4.12	4.49
100	0.92	1.12	1.33	1.56	1.81	2.08	2.36	2.67	2.99	3.33	3.69	4.07	4.47	4.88	5.32
110	1.07	1.29	1.54	1.80	2.09	2.40	2.73	3.09	3.46	3.85	4.27	4.71	5.17	5.65	
120	1.21	1.47	1.75	2.05	2.38	2.73	3.10	3.50	3.93	4.37	4.85	5.34	5.87		
130	1.36	1.64	1.95	2.29	2.66	3.05	3.47	3.92	4.39	4.90	5.42	5.98			
140	1.50	1.82	2.16	2.54	2.94	3.38	3.84	4.34	4.86	5.42	6.00				
150	1.64	1.99	2.37	2.78	3.22	3.70	4.21	4.75	5.33	5.94					
160	1.79	2.16	2.58	3.02	3.51	4.02	4.58	5.17	5.80						
170	1.93	2.34	2.78	3.27	3.79	4.35	4.95	5.59	6.26						
180	2.08	2.51	2.99	3.51	4.07	4.67	5.32	6.00							
190	2.22	2.69	3.20	3.75	4.35	5.00	5.69	6.42							
200	2.37	2.86	3.41	4.00	4.64	5.32	6.06								
210	2.51	3.04	3.61	4.24	4.92	5.65	6.43								

Higher values of the axial load are related to the Wind Loads for which in ETA 19/0181 there are no validated configurations

Table 5 - Axial load in kN resulting on each anchorage as a function of the overhang and the wind load

- Axial load on the anchors in kN: the abacus indicates the values of the resultant force on each anchorage with respect to the overhang and WIND load, assuming 5 fixings per meter (distance between holes $i = 200$ mm).
- WIND load in kg/m^2 : the wind load is defined in the Norms according to factors such as: geographical area, altitudine, typical construction exposure and geometry, aerodynamic coefficients.

Key:

The colours identify the fields of application with different types of anchor depending on the type of support:

"Green": chemical anchor on **Alveolater** wall, anchoring depth between 80 and 130 mm (Extraction load max 1.8 kN)

"Yellow": chemical anchor on **Doppio UNI** wall, anchoring depth ≥ 130 mm (Extraction load max 2.6 kN)

"Orange": chemical anchor on **solid brick** wall, anchoring depth ≥ 100 mm (Extraction load max 3.6 kN)

"Red": chemical anchor on **cracked concrete** wall, anchoring depth ≥ 120 mm (Extraction load max 10.4 kN)

Note: these examples are provided considering the use of an M10 threaded bar in class A4

Example:

Installation area: n.d. - Snow load $100 \text{ kg}/\text{m}^2$ - Wind load $87 \text{ kg}/\text{m}^2$ - Project overhang: 100 cm

Procedure:

1. See Table 1 for the type of glass that can be used for snow and wind loads, using the most conservative value.

In this case, the only possible configuration is the one with H-H-SG glass, for a maximum overhang of 120 cm.

2. In Tables 2 and 3, check if there are other possible configurations for the project overhang. In this case the snow load is almost always verified, the wind load excludes for each value of the overhang only the configuration F-F PVB. We can see that for an overhang of 100 cm, you can choose 4 of the 5 possible configurations.

3. Use Tables 4 and 5 for the values of the resulting axial force on the anchors. By matching the values of the snow/wind load and the project overhang find the axial load on each anchor. In this case the most conservative value between the two is corresponding to the wind load $F_e = 3.12 \text{ kN}$.

The installer will install La Pensilina using anchors with a resistance to extraction higher than the resulting Project axial load value F_e .

WARNING! The resistance of the anchorage is influenced by:

- The type of support (eg masonry, block wall, concrete beam, etc.)
- The type and dimensions of the anchorage (eg mechanical, chemical, etc.)
- The depth of anchorage
- A correct installation

In case the required resistance conditions for the system can not be satisfied on the available support with the anchor types available, it will be necessary to reduce the overhang of the project to find the appropriate resistance value in the abacus.