

# TEST REPORT

N. 0203/RP/13

of

2013/08/28

## Applicant

Master S.r.l.  
S.P. 37 – Km 0,700 Z.I.  
70014 Conversano (BA) - Italy

## Executed tests

Durability  
Rotation cycles  
Additional loading test  
Reveal test  
Rebate-hindrance test

## Normative References

EN 13126-1:2006  
CEN/TS 13126-8:2006  
UNI EN 1670

## Tested sample

Kit A/R 3420F.1  
trade name "Antaribalta WEEN CE"  
(cf. description)

The report is done up of 12 pages and can be reproduced only integrally.  
The results obtained refer exclusively to the samples tested.

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*Società partecipata a maggioranza dal Consiglio Nazionale delle Ricerche*

## 1. Description of the tested sample

The sample under test is a tilt and turn mechanism (cf. Fig. 1) for Camera Europea profiles, with trade name given by the applicant "Anta Ribalta WEEN".

The identification code of the tested sample, as declared by the applicant, is "3420F.1".

Both description and technical drawings below, referred to the tested sample, were declared and supplied by the applicant under his own responsibility.

- **Material:** aluminium alloy EN AW 6060-T5,  
supply condition T5 in accordance with standard UNI EN 12020-2:2002.
- **Profiles:**
  - "Z" frame code CX70.1.02,
  - "Z" increased sash code CX70.2.02,
  - 22 mm glazing bead code CX70.5.28,
all produced by Consorzio Allu Sistemi, Roma (RM) Italy.
- **Corner joint:**
  - fixed load-bearing structure:
    - 45° aluminum alignment joint plate code 0335,
produced by Master S.r.l., Conversano (BA) Italy,
    - "fuji" alignment joint plate code ACX.09.SQ,
    - pin joint plate code ACX.03.SQ,
    - pin for joint plate code ACX.08.SQ,
all produced by Consorzio Allu Sistemi, Roma (RM) Italy,
  - movable part:
    - 45° aluminum alignment joint plate code ACX.04.SQ
    - pin joint plate code ACX.06.SQ,
    - "fuji" alignment joint plate code ACX.09.SQ,
    - internal alignment joint plate in nylon code ACX.10.SQ,
    - pin for joint plate code ACX.08.SQ,
all produced by Consorzio Allu Sistemi Roma (RM), Italy
- **Thermal break:** realized by means of polyamide 6.6 bars reinforced with 25±3% glass fiber.
- **Glazing gaskets:** internal gasket in PVC code UP004,  
produced by Complastex S.p.A., Marlia (LU), Italy.
- **Gaskets:**
  - casement rabbet gasket in EPDM code ARX.10.03,
  - central seal gasket code ARX.10.01,
both produced by Consorzio Allu Sistemi, Roma (RM), Italy.
- **Hardware:** (cf. Fig. 1) locking system comprising 3 locking points:
  - n° 1 base kit tilt and turn 160kg code 3420F.1,
  - n° 1 handle with faulty operation code 6011.10,
  - n° 1 long arm for tilt and turn code 3400.22,
  - n° 1 additional arm code 3520.30,
  - operating rod in polyamide code 2010.2,
all produced by Master s.r.l., Conversano (BA), Italy.

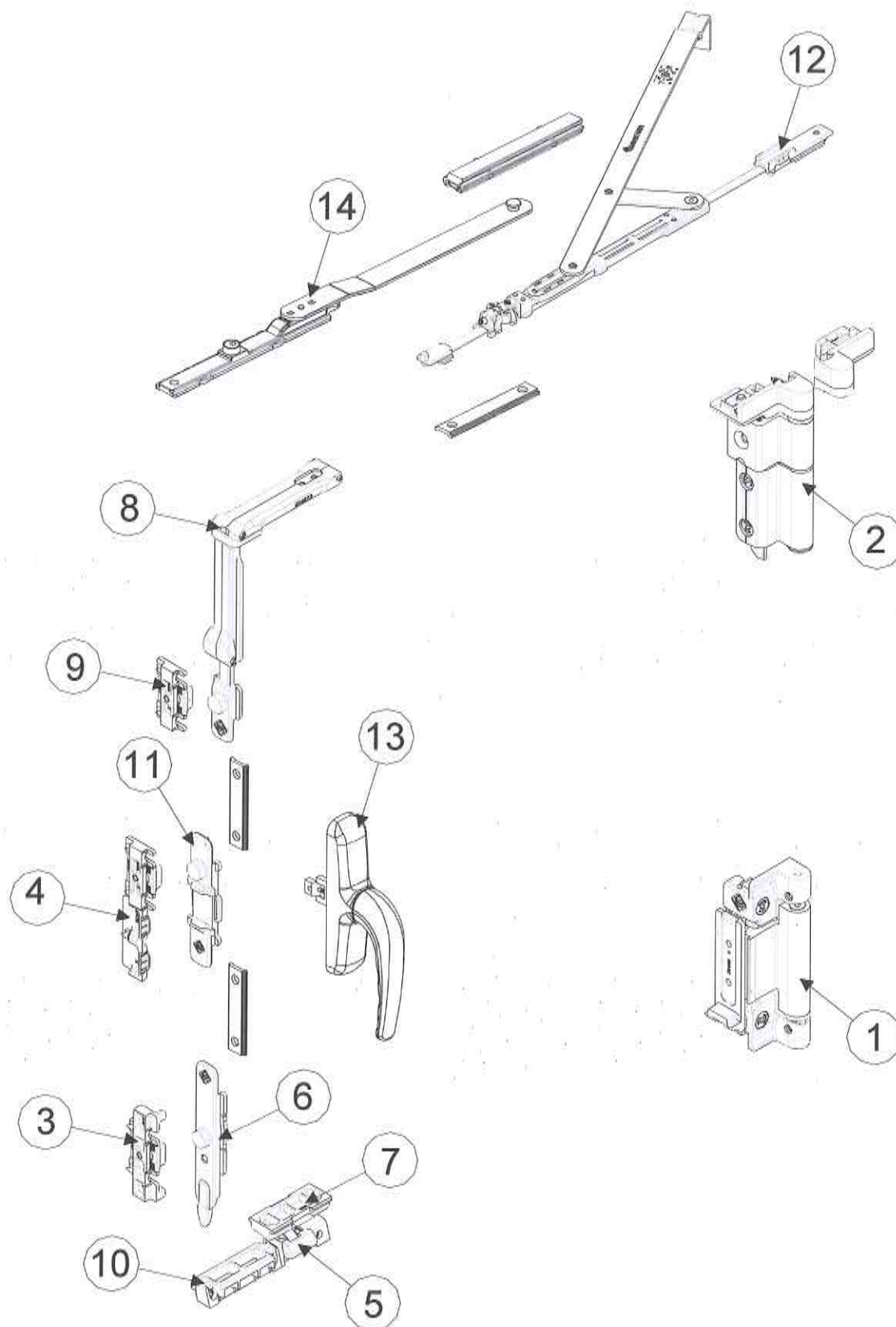


Fig. 1: Hardware of the “WEEN” Tilt&Turn kit installed on the tested sample (cf. Tab. 1).

3420F,1 base kit with adjustable joint points + hinges	N.	CODE	DESCRIPTION	Amount
	1	93400.6XXX	bottom Hinge Tilt&Turn CE WEEN	1
	2	93420.5	upper hinge T&T CE WEEN	1
	3	83400.11	Bottom adjustable joint point + faulty operation on	1
	4	83400.12	Faulty operation joint point handle	1
	5	83400.13	Support sash with roller	1
	6	83400.8F	Bottom terminal T&T fixed rod	1
	7	6N0464	CE insert support sash	1
	8	A1252.7	Corner transmission DIVISO T&T CE fixed rod	1
	9	A3620.7	Adjustable joint point	2
	10	A4206	Bottom terminal joint point	1
	11	Z0461Z70	Connection block for T&T handle AR for fixed CE	1
	12	A3400.22	long arm for Tilt and Turn CE WEEN	1
	13	A6011.10	"COMFORT" handle for Tilt and turn with faulty operation on handle	1
	14	A3520.30	additional arm CE	1

Tab. 1: Hardware of the "WEEN" Tilt&Turn kit installed on the tested sample (cfr. Fig. 1).

## 2. Sampling Procedure

The product was sampled directly by the applicant, who indicated its traceability on the basis of the previously described code..

## 3. Samples preparation procedure

The sample was prepared in accordance with the provisions of standards EN 13126-1:2006 and with reference to CEN/TS 13126-8:2006. The sample was assembled on test window using fixing systems as expected by applicant in use. The test window was introduced by the applicant in a supporting frame stiff enough to withstand the test pressures, fastened as under service conditions and free from bending and torsion stresses that might affect test results. Therefore, the window was fixed straight on the equipment test. A dimensional control of the sample was carried out prior to the test by means of a flexometer.

## 4. Test method

The performed and described tests were carried out under Witness Testing regime on 2013-07-23 in the laboratory of Master S.r.l. , in Conversano, S.P. 37 – Km 0,700 Z.I., directly by an operator of Master S.r.l., Mr. Gianni Antonio Aniello, under the instruction of Katia Foti of IRCCOS S.c.a r.l.. Test equipment and the competence of the personnel have been subjected to a preventive check by ITC-CNR during an Audit on 2008-07-14 with positive outcome, then kept under periodical check.



#### 4.1. Durability

The test was performed in accordance with standard EN 13126-1:2006 and with reference to CEN/TS 13126-8:2006.

- *Principle of test.* The test involves checking that the additional displacement of any of the unrestrained corners subjected to a given number of operating cycles, and following the application of a given force, does not exceed a certain value.
- *Test procedure.* In accordance with § 5.3 e 7.3 del CEN/TS 13126-8:2006, a total of at least 15 000 test cycles are performed, each of which consisting of these movements:
  - sash in the closed position, hardware locked;
  - sash movement into the tilt position (or turn position – 100 mm);
  - sash movement back to the closed position, hardware to be locked;
  - sash movement into the turn position – 100 mm (or tilt position);
  - sash movement back into the closed position, hardware to be locked.

During the durability test, the test specimen is operated by use of the window handle.

The durability tests shall be performed at a rate of  $(250_0^{+25})$  cycles/h in accordance with 8.2 of EN 13126-1:2006, except in the case of a manufacturer choosing the option of specifying a lower testing speed. In this case the test report shall specify the testing speed and the reasons for using the lower speed.

#### 4.2. Rotation cycles

The test was performed in accordance with standard EN 13126-1:2006 and with reference to CEN/TS 13126-8:2006.

- *Principle of test.* The test involves checking that the additional displacement of any of the unrestrained corners subjected to a given number of operating cycles, and following the application of a given force, does not exceed a certain value.
- *Test procedure.* With reference to § 7.3.2 of CEN/TS 13126-8:2008, before beginning the 90° turn position test, the test specimen is adjusted by the test house in accordance with the manufacturer's regulations. The sash is moved into the 90° turn position by the test rig. The striking force occurs at a suitable location on the sash. In this test the sash is stopped approximately 50 mm before its final closed position. More specifically, 5 000 cycles are performed for test sizes of class 1 and 2 and 10 000 cycles for class 3.

The durability tests shall be performed at a rate of  $(250_0^{+25})$  cycles/h in accordance with 8.2 of prCEN/TS 13126-1:2006, except in the case of a manufacturer choosing the option of specifying a lower testing speed. In this case the test report shall specify the testing speed and the reasons for using the lower speed.

#### 4.3. Additional loading test – 1000 N

The test was performed in accordance with standard EN 13126-1:2006 and with reference to CEN/TS 13126-8:2006.

- *Principle of test.* The tests consists of checking that, having applied a vertical force by means of a weight fixed to the handle, the hinge mechanisms still demonstrate a connection between the sash and the frame, although it is not necessary that the sash still operate.

*Test procedure.* With reference to 7.3.3 of CEN/TS 13126-8:2008, before beginning the 90° turn position test, the test specimen is adjusted by the test house in accordance with the manufacturer's regulations.

- The sash is rotated into the 90° turn position and an additional vertical force of 1 000 N is applied near the window handle and is maintained for 5 min. In accordance with 5.5, during and after the additional loading test, the sash shall not drop.

#### 4.4. Reveal test for hardware without turn-restrictor

The test was performed in accordance with standard EN 13126-1:2006 and with reference to CEN/TS 13126-8:2006.

- *Principle of test.* The tests consists of checking that, after making the specimen collide with an obstacle, the hinge mechanisms still demonstrate a connection between the sash and the frame, although it is not necessary that the sash still operate.
- *Test procedure.* With reference to 7.3.4 of CEN/TS 13126-8:2008, in order to test the hardware, the sash is measured from one position, 450 mm from the end position (= position of the sash in the reveal),

through which a falling test mass of 10 kg accelerates. The test mass is connected by a cable to the test specimen near the window-handle. The cable length shall be selected so that the test mass comes to a halt 20 mm before the sash reaches its final position and collides with the obstacle. After every test the sash shall be left to swing to a halt. This test is carried out 3 times.

#### 4.5. Rebate-hindrance test

The test was performed in accordance with standard EN 13126-1:2006 and with reference to CEN/TS 13126-8:2006.

- *Principle of test.* The tests consists of checking that, after swinging the sash towards the frame with an obstacle in between, the hinge mechanisms still demonstrate a connection between the sash and the frame, although it is not necessary that the sash still operate.
- *Test procedure.* With reference to § 7.3.6 del CEN/TS 13126-8:2008, to test the hardware, the sash is measured from one position, 450 mm from the end position (= position of the sash in the reveal), through which a falling test mass of 10 kg accelerates. The test mass is connected by a cable to the test specimen near the window handle. The cable length shall be selected so that the test mass comes to a halt 20 mm before the sash reaches its final position and collides with the obstacle. After every test the sash shall be left to swing to a halt. This test is carried out 3 times.

### 5. Test equipment

The equipment used to perform the tests, in accordance with EN 13126-1:2006, consists of:

- a supporting frame rigid enough to withstand the test load without deflection or torsion;
- a device to clamp the test window at  $(90 \pm 5^\circ)$  to the plane of the frame;
- a device having weights matching the requested forces  $F$ ;
- a device to apply the forces (rigid cable, deflection pulley and support);
- an instrument to measure deflection to an accuracy of 0,01 mm;
- a metal tape measure with an accuracy of 0,5 mm;
- steel cables, hooks and fasteners for use when testing;
- an instrument that allows the window under test to be opened and closed at a constant rate of  $(250^{+25})$  cycles/h.

Tests have been followed and recorded in real time with a specific dedicated appliance, producer certified and assembled by:

- No. 1 webcam PTZ professional with these characteristics
  - optical objective motorized 18x, automatic focus to allow day/night shooting in low lighting condition until 0,005 lux;
  - audio bidirectional support;
    - support for combined use of Motion JPEG e MPEG-4;
    - movements PTZ selecting in remote-control by mouse/joystick;
    - resolution of a 704x576 pixel (PAL) and 704x480 (NTSC);
    - level of access multi-user, filter for address IP, cryptographic;
    - HTTPS e authentication IEEE 802.1X for the security of the web.
  - 1 disk with USB/LAN interface capable of storing up to 500 Gb of data (RAID). Secure access through ACL and user/password.
  - 1 appliance with functionality of Firewall, IDS/IPS, Antivirus, VPN Gateway, User Access Control, User Authentication Protocol, Nflow reporter, reporting analysis.



## 6. Expression of results

The classification of tilt & turn hardware kits shall be in accordance with the requirements of Clause 4 of EN 13126-1:2006, i.e. a nine digit coding system each indicating a particular requirement:

1) *category of use:*

- no marking is required

2) *durability:*

- grade 4: 15000 cycles
- grade 5: 25000 cycles

3) *mass:*

- the maximum tested sash-mass from 60 Kg to 200 Kg (a sash mass of 60 Kg should be 060)

4) *fire resistance:*

- no requirements

5) *safety in use:*

- class 1: the hardware shall conform to the requirements of safety in use

6) *corrosion resistance:*

- grade 0: no defined corrosion resistance
- grade 1: low corrosion resistance
- grade 2: moderate corrosion resistance
- grade 3: high corrosion resistance
- grade 4: very high corrosion resistance
- grade 5: exceptionally high corrosion resistance

7) *security:*

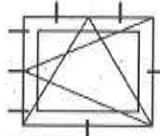
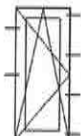
- no marking is required

8) *applicable:*

- tipo A side-hung window inward opening;
- tipo B side-hung window outward opening;
- tipo E Tilt&Turn, Tilt-First;

9) *test sizes (cf. Tab. 1):*

- grade 1: (designated number 16) width 1 300 mm x height 1 200 mm;
- grade 2: (designated number 23) width 1 550 mm x height 1 400 mm;
- grade 3: (designated number 8) width 900 mm x height 2 300 mm.

Sizes S.R.W. X S.R.H. in mm*	Minimum number of locking points	Schema showing the positions of the locking points	Mass (kg)
1 300 x 1 200 1 550 x 1 400	7		$m \leq 130 \text{ kg}$ $m > 130 \text{ kg}$
900 x 2 300	6		sizes of balcony door

\* S.R.W. = Sash Rebate Width, S.R.H. = Sash Rebate Height.

Tab. 2. Dimensions of the test equipment and minimum number of locking points.

## 7. Results

### 7.1. Preventive control on the sample A (dimensions and surfaces)

Measures	width (m)	height (m)	surface (m <sup>2</sup> )
Whole sample	1,550	1,400	2,17

Tab. 3

### 7.2. Durability

#### 7.2.1. Verification of the durability with both Tilt& Turn and shutter opening

Grade of the sample	Sash-mass (Kg)	Cycles carried (n°)	Cycles required (n°)
4	160	15.000	15.000

Tab. 4

#### 7.2.2. Verifying of the durability with shutter opening (rotation cycles)

Grade of the sample	Sash-mass (Kg)	Cycles carried (n°)	Cycles required (n°)
4	160	5.000	5.000

Tab. 5

With reference to clauses 5.4.1, 5.4.2 and 5.4.3 of CEN/TS 13126-8:2006, there is compliance with admissible operation and variable tolerance requirements, in particular:

- the horizontal force in order to close the sash from the turn position does not exceed 120 N;
- In conjunction with a counteracting force of 20+10 N per locking point, maximum torque applied to the handle did not exceed 10 Nm and maximum force applied to the handle did not exceed 100 N;
- before and after the test, the distance between the frame surface and beginning of the sash overlap was measured in conjunction with a counteracting force of 20+10 N. The results did not differ by more than 1 mm.

### 7.3. Additional loading test resistance

Opening angle	Sash-mass (Kg)	Applied load (N)	Result	Standard requirement
90°	160	1.000	positive	Sash shall not drop. The hinges shall still demonstrate a connection between the sash and the frame. It is not necessary for the sash to operate.

Tab. 6



#### 7.4. Reveal test for hardware without turn-restrictor

Impact carried (n°)	Result	Standard requirement
3	positive	Sash shall not drop. The hinges shall still demonstrate a connection between the sash and the frame. It is not necessary for the sash to operate.

Tab. 7

The result test is positive. At the end of the reveal test no visible defect and the sample maintained a satisfactory serviceability.

#### 7.5. Rebate-hindrance test

Impact carried (n°)	Result	Standard requirement
3	positive	Sash shall not drop. The hinges shall still demonstrate a connection between the sash and the frame. It is not necessary for the sash to operate.

Tab. 8

The result test is positive. At the end of the rebate-hindrance test no visible defect and the sample maintained a satisfactory serviceability.

#### 7.6. Corrosion resistance

With reference to clause 7.6 of EN 13126-8:2006, EN 13126-1:2006 and EN 1670, in order to evaluate the test specimen's corrosion resistance, a resistance to prolonged contact with atomised sodium chloride solution test was carried out on a second specimen B, identical to the first.

The specimen was given a grade 4 rating in accordance with the classification method in 5.2 of EN 1670 as shown in Table 9.

TEST DURATION		
Grade	Duration	
0 (not defined)	-	
1 (low)	24 h +1/-0h	
2 (moderate)	48 h +1/-0h	
3 (high)	96 h +1/-0h	
4 (very high)	240 h +1/-0h	X
5 (exceptionally)	480 h +1/-0h	

## 8. Overall grade of the arm with variable geometry

Category of Use	Durability	Mass	Fire resistance	Safety in use	Corrosion resistance	Burglary grade	Applicable	Test sizes
1	2	3	4	5	6	7	8	9
-	4	160	0	1	4	-	8	1550/1400

Tab. 9. classification of the tested sample

## 9. Photographs of the sample under test and of the experimental setup

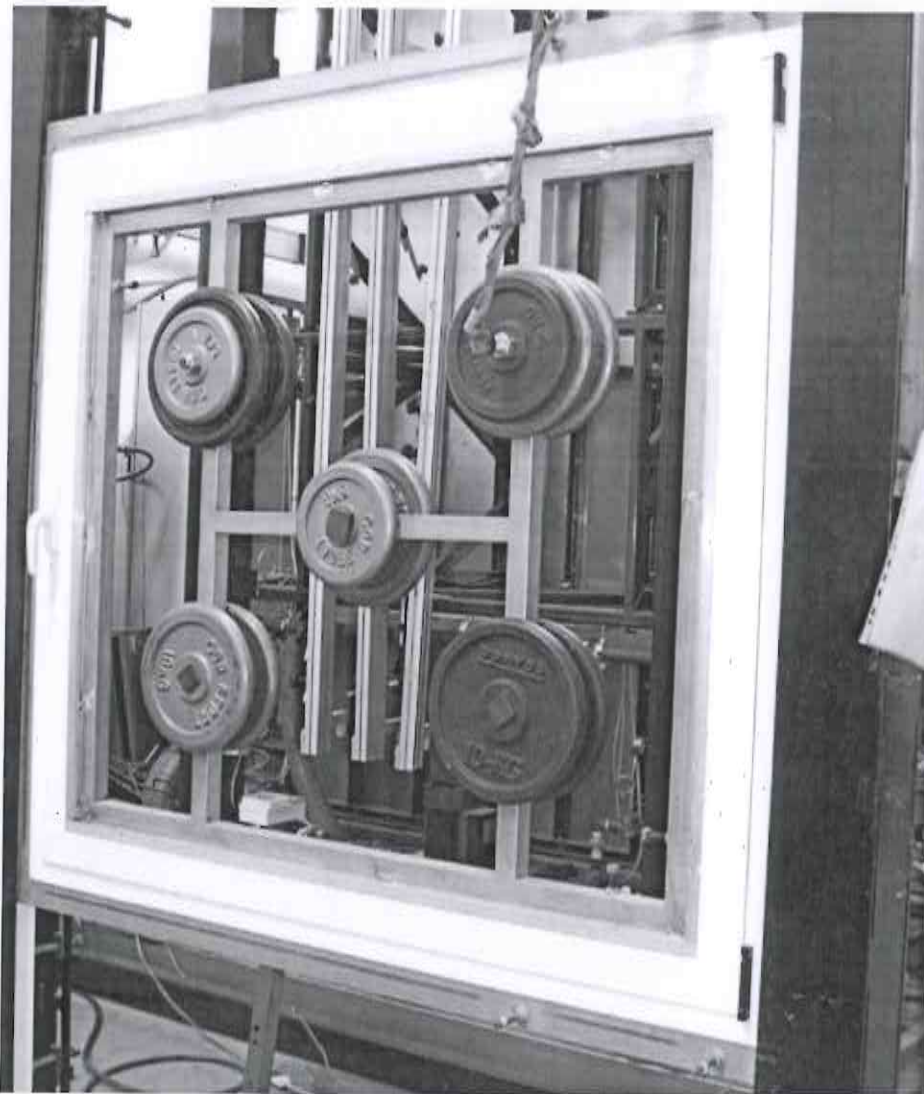


Photo 1. Tested sample in the experimental setup.

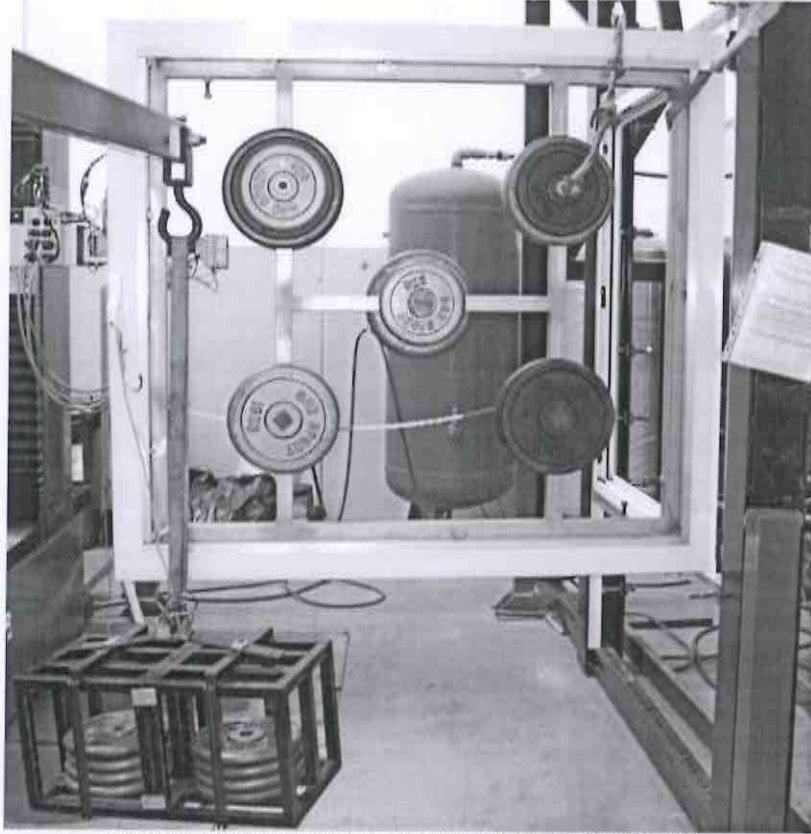


Photo 2. Tested sample during the additional loading test.

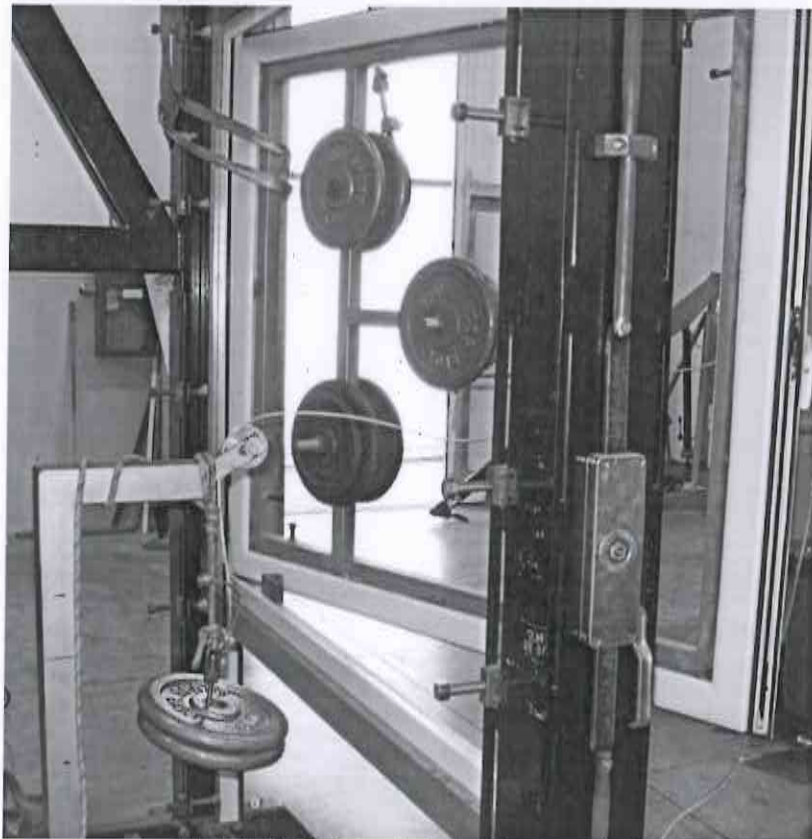


Photo 3. Tested sample during the reveal test.



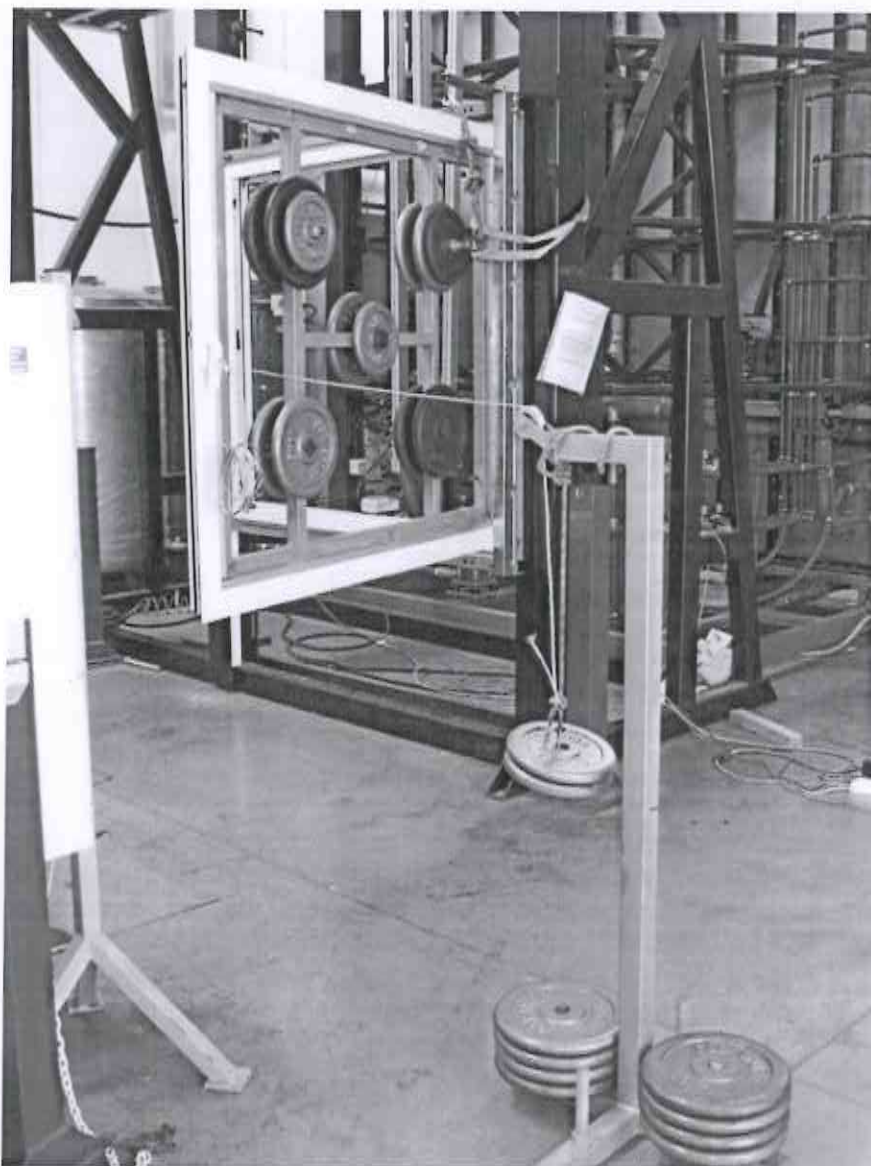


Photo 4. Tested sample during the rebate-hindrance test.

#### 10. Limitations

This Test Report does not represent either an evaluation the suitability of use or a certificate of product conformity. The results obtained refer exclusively to the samples tested.

*Technical Operator*

*Katia Foti*

*Katia Foti*

*The chairman*

*for Mr Italo Meroni*

*Katia Foti*

----- End of the Test Report No.0203/RP/13-----