

TEST REPORT No. 255094

Place and date of issue: Bellaria-Igea Marina - Italy, 18/05/2009

Customer: POLYPIÙ S.r.l. - Via A. da Giussano, snc - 20011 CORBETTA (MI) - Italy

Date test requested: 03/04/2009

Order number and date: 44677, 06/04/2009

Date sample received: 05/05/2009

Test date: 14/05/2009

Purpose of test: determination of the hail resistance of roofing in accordance with standard UNI 10890:2000

Test site: Istituto Giordano S.p.A. - Blocco 4 - Via San Mauro, 8 - 47814 Bellaria-Igea Marina (RN) - Italy

Sample origin: sampled and supplied by the Customer

Identification of sample received: No. 2009/0971

Sample name*

The test sample is called "SMARTPIÙ ALVEOLARE".

(*) according to that stated by the Customer.

Comp. AV
Revis. AB

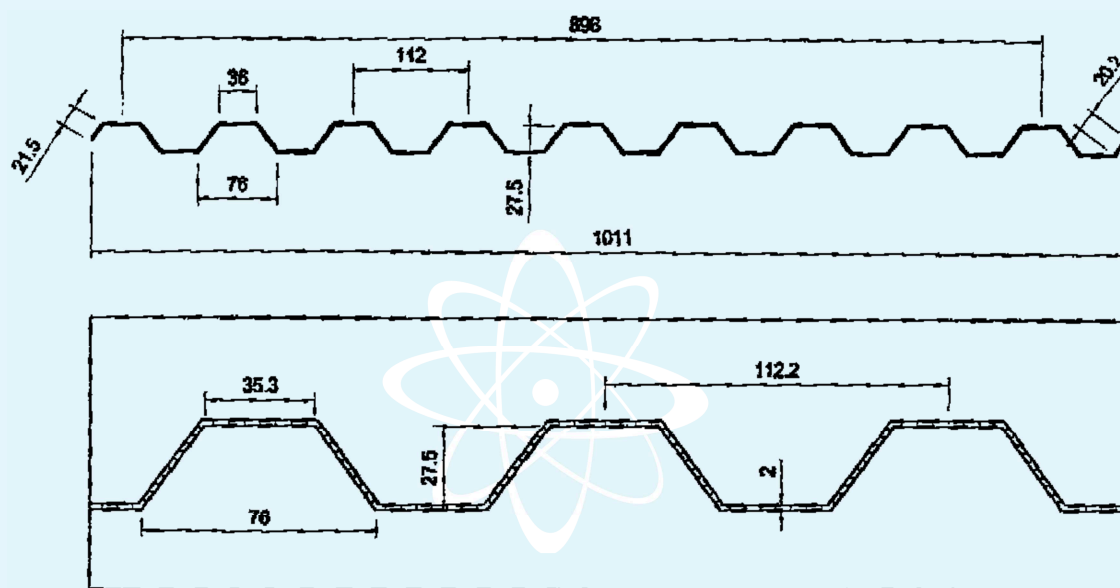
This test report consists of 6 sheets.
This document is the English translation of the test report No. 255094 dated 18/05/2009 issued in Italian;
in case of dispute the only valid version is the Italian one. Date of translation: 27/03/2018.

Sheet
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Description of sample*

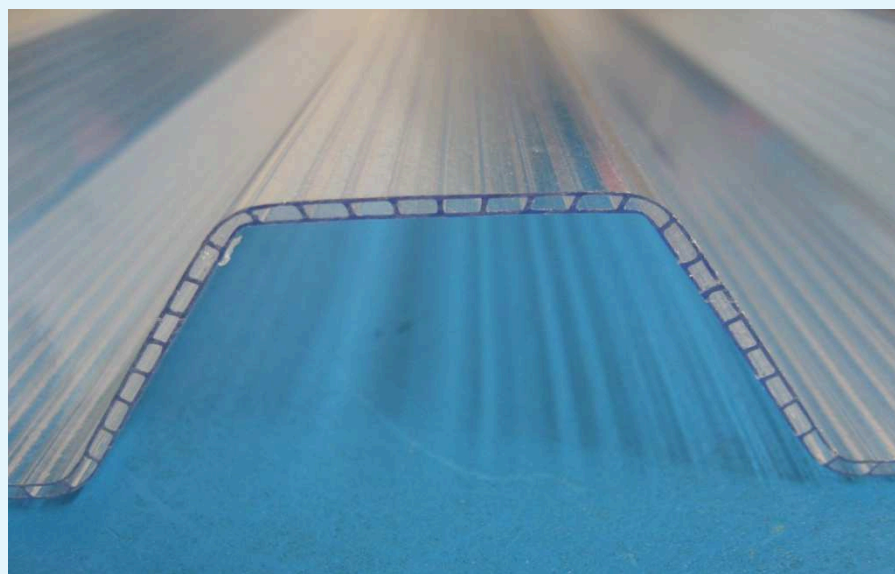
The test sample is a ribbed cellular polycarbonate panel with the following characteristics:

- thickness 2 mm;
- overall width (1011 ± 5) mm (width of sheet);
- effective cover (8796 ± 5) mm (equal to 8 ribs);
- sheet lengths equal to or in submultiples of 11600 mm;
- colour: clear neutral.



Sample schematic drawing

(*) according to that stated by the Customer.



Close-up of sheet section

Normative references

The test was carried out in accordance with standard UNI 10890:2000 dated 30/06/2000 "Elementi complementari di copertura - Cupole e lucernari continui di materiale plastico - Determinazione della resistenza alla grandine e limiti di accettazione" (*"Roof fittings - Plastic domes and skylights - Determination of hail resistance and acceptance criteria"*).

Test apparatus

The following equipment was used to carry out the test:

- vertical compressed-air firing tube equipped with pressurisation tank, loading and firing valves, loading pressure manometer, photocell capable of measuring the velocity of the projectile as it leaves the mouth of the firing tube to an accuracy of 0,5 %;
- projectiles comprising polyamide balls of diameter $(40 \pm 0,5)$ mm and mass $(38,5 \pm 0,5)$ g;
- steel and timber support simulating actual service conditions;
- Angelantoni 600 temperature and humidity chamber capable of controlling the internal temperature within the range (-40 ± 1) °C and $(+160 \pm 1)$ °C;
- ice maker.

Test method

The sample was stored for 24 hours at a room temperature of 18-25 °C.

The sample underwent type B conditioning: prior to testing, the impact area is covered for 4 min with a layer of crushed ice and the test is then conducted within 10 seconds of it being removed in accordance with clause 4 of standard UNI 10890:2000.

The test is carried out in accordance with clause 6 of standard UNI 10890:2000.

The sample was simply laid on a flat non-deformable surface.

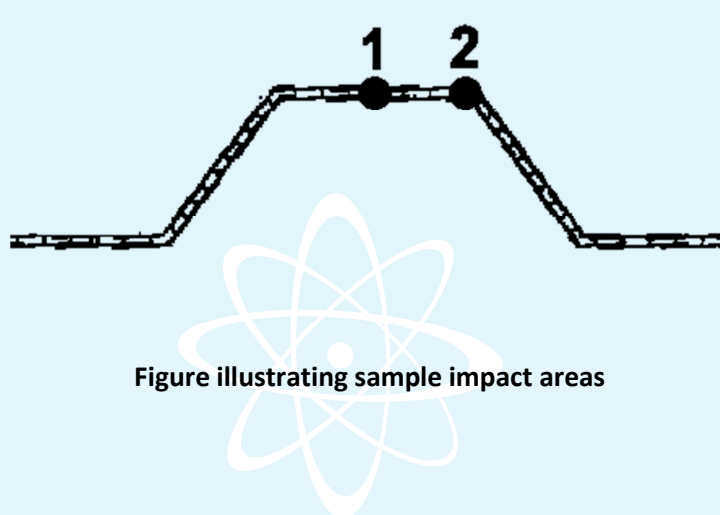


Figure illustrating sample impact areas

Environmental conditions during test

Ambient temperature	(23 ± 2) °C
Relative humidity	(50 ± 5) %

Test results

Type B conditioning: with ice		
Impact area [No.]	Firing velocity [m/s]	Result
1	15,9	no damage
1	16,2	no damage
2	15,8	no damage
2	16,0	no damage
1	19,2	no damage
1	19,7	no damage
2	19,0	no damage
2	20,1	no damage
1	20,2	no damage
1	22,8	no damage
1	23,3	no damage
2	22,0	no damage
2	23,6	no damage
1	24,9	no damage
1	25,1	no damage
2	24,8	no damage
2	24,9	no damage

Type B conditioning: with ice		
Impact area [No.]	Firing velocity [m/s]	Result
1	26,8	Slight deformation only perceptible by touch and visible against the light
1	27,9	Slight deformation only perceptible by touch and visible against the light
2	26,5	Slight deformation only perceptible by touch and visible against the light
2	27,2	Slight deformation only perceptible by touch and visible against the light
1	31,2	Slight visibly-perceptible deformation
1	32,6	Slight visibly-perceptible deformation
2	31,8	Slight visibly-perceptible deformation
2	32,6	Slight visibly-perceptible deformation
CLASS VB, where $V = 25^{+0,8}_{-0}$ m/s		



Sample after-test photo

Test Technician:
Geom. Roberto Porta

Head of Applied Physics Laboratory:
Dott. Ing. Vincenzo Iommi

Chief Executive Officer

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