SAFETY, STRUCTURES AND FIRE PERFORMANCE DEPARTMENT
STUDIES AND MECHANICAL TESTS

TEST REPORT No. EEM 11 26033626/A

Concerning impact tests on a VertiQ sport panel model (dimensions 1200 x 600 x 40 mm)

This Test Report attests only to the characteristics of the item submitted for testing and does not prejudge the characteristics of similar products. So it does not constitute a product certification in the sense of Article to L 115-27 to L 115-32 and R115-1 to R115-3 of the Consumer Code modified by Law no. 2008-776 of August 4, 2008 Article 113.

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It comprises 8 pages and 7 pages of Appendix.

REQUESTED BY: **ROCKFON A/S**
(Rockwool A/S)
Kwiatowa 14
66-131 CIGACICE
POLAND

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1. SUBJECT

As requested by the ROCKFON A/S Company, mechanical impact tests on the VertiQ acoustic panel model were carried out to determine its behaviour under impacts.

2. REFERENCE TEXTS

[1] NF P 08-301: Vertical building elements. Impact resistance tests. Impact bodies. Principle and general test procedures (June 1981).

[2] «UEAtc[1] Directives for the approval of external insulation systems on façades with thin rendering over expanded polystyrene insulation. »

3. TEST SPECIMENS

Manufacturer:	ROCKFON A/S
Origin:	Factory of Roermond (NETHERLANDS)
Delivery date:	June 22, 2011 (M11052)
Observations:	None

Marne-la-Vallée, July 12, 2011

Engineer responsible for the tests	Assistant Manager of the "Studies and Mechanical Tests" Division
François BOUTIN	Pierre PIMIENTA

[1] UEAtc – Union Européenne pour l'Agrémént technique dans la construction (European Union of Agrément).

4. IDENTIFICATION OF THE LABORATORY AND TEST PROGRAMME

The tests took place on July 11, 2011 in the Materials Laboratory of the SAFETY, STRUCTURES and FIRE PERFORMANCE DEPARTMENT at the CSTB Research Centre in MARNE LA VALLÉE.

The test programme is summarised in Table 4.1.

Table 4.1: Test programme

Test body	Positioning of the test body	Type of impact	Observations
VertiQ Dimensions: 1200x600x40 mm	Test body in peripheral contact only with the support	Football of 5 kg Special ball of 1.8 kg Tennis ball, ballasted (8 kg)	Visual examination then increase in the impact energy
	Test body in contact with the support	Tests with the perfotest	Examination of the puncture ∅

5. DESCRIPTION OF THE PRODUCTS TESTED

The products tested are VertiQ Rockfon panels, overall dimension 2700x1200x40 mm, taken as test specimens in the factory under the customer's surveillance.

The geometric and descriptive characteristics are given in Table 5.1.

Table 5.1: Geometrical and descriptive characteristics of the products tested

Products	**Description**
VertiQ	Panel 1.20 m x 0.60 m x 0.04 m, density 120 kg/m^3, consisting of an acoustic panel of rock wool covered on the rear face by a glass fibre mat, bonded to the surface of the rock wool and, on the back face, a glass fibre mat, bonded to the surface of the rock wool, reinforced by a woven surfacing, bonded to the glass mesh. Marking on the back of the panel: Lengthwise: 20110620 12:57 Rockfon, Crosswise: 20110620 13:17 Rockfon.

6. MECHANICAL IMPACT TESTS

6.1 Positioning the test body

The tests were carried out in the Materials Laboratory of the SAFETY, STRUCTURES and FIRE PERFORMANCE DEPARTMENT, in a gantry, especially designed for tests of mechanical impacts on partitions.

The test bodies are described in Chapter 5.

6.2 Test procedures

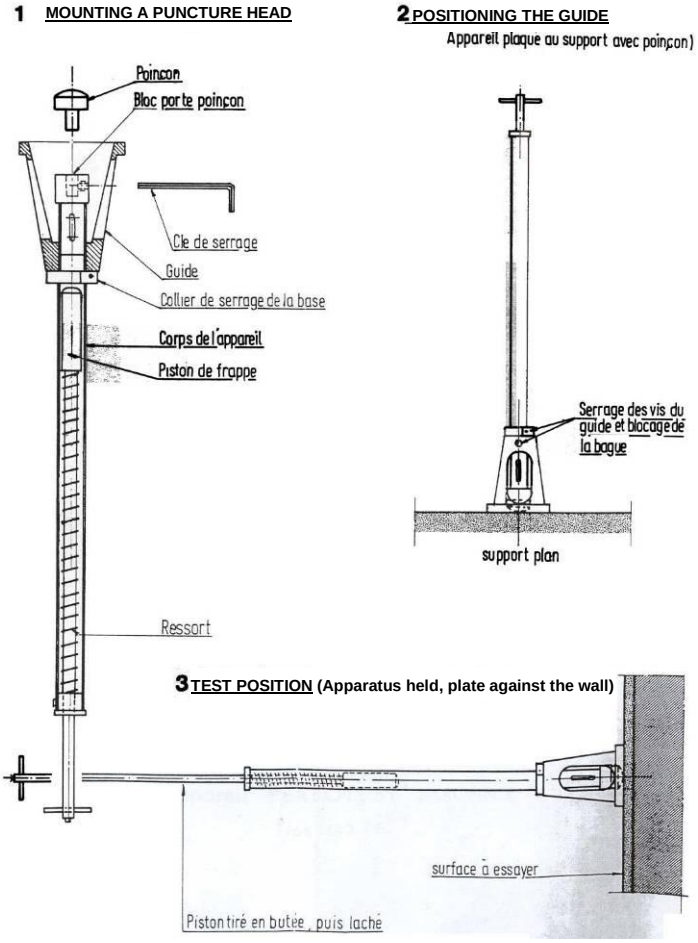
The tests were carried out, based upon the procedures set down in the UEAtc [2] Directives and in Standard NF P 08-301 [1].

The following tests were carried out:

- Impact tests with soft small dimension bodies (special ball of 1.8 kg, football of 5 kg and tennis ball of 8 kg), applied against the test body, offset from the wall so as to represent a panel in ceiling situation.

- Tests with perfotest, intended to analyse the behaviour under puncturing impacts (see Fig. 6.1.) applied against the test body, bearing against the wall so as to represent a panel in vertical position. Each test is repeated 5 times.

Figure 6.1: Description of the Perfotest



6.3 Results of the tests

The results of the tests are recorded in:

- Tables 6.1 and 6.2,
- The appended photographs, giving views of the test body during the test.

Table 6.1: VertiQ panels 1200x600x40 mm installed vertically (wall)

Product tested	**Impact body**	**Energy** (joules)	**Puncture head diameter**	**Observations**
VertiQ 1200x600x40mm	Perfotest	3.75	∅ 4 mm	Puncture of the mesh and of the rock wool core of the panel (5 times out of 5)
			∅ 6 mm	Puncture of the mesh and of the rock wool core of the panel (5 times out of 5)
			∅ 8 mm	Puncture of the mesh and of the rock wool core of the panel (5 times out of 5)
			∅ 10 mm	Puncture of the mesh and of the rock wool core of the panel (5 times out of 5)
			∅ 12 mm	Test 1: marking the mesh without tearing Test 2: partial puncture of the mesh (50%) and puncture of the wool core Test 3: marking of the mesh without tearing Test 4: marking of the mesh without tearing Test 5: partial puncture of the mesh (80%) and puncture of the wool core
			∅ 15 mm	Marking the mesh without tearing (5 times out of 5)

Table 6.2: VertiQ panels 1200x600x40 mm to be installed horizontally (ceiling) – Impacts with football 5 kg

Product	Impact body	Energy (joules)	Observations
VertiQ 1200x600x40mm	Football of 5 kg	5	No visible degradation.
		10	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.
		20	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.
		30	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.
		40	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.
		50	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.
		60	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.

Table 6.3: VertiQ panels 1200x600x40 mm to be installed horizontally (ceiling) – impacts with special ball of 1.8 kg

Product	Impact body	Energy (joules)	Observations
VertiQ 1200x600x40mm	Special ball of 1.8 kg	5	No visible damage.
		10	Test on a new panel: star pattern marking on panel on impact side (not visible after less than 1 minute). No visible damage and visual appearance not degraded.
		15	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.
		20	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.
		25	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.

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Table 6.4: VertiQ panels 1200x600x40 mm to be horizontally installed (ceiling) – impacts with ballasted tennis ball at 8 kg

Product	Impact body	Energy (joules)	Observations
	Tennis ball in assembly of 8 kg	14.17 equivalent speed 80 km/h *	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). No visible damage and visual appearance not degraded.
		17.94 equivalent speed 90 km/h *	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). Rock wool core slightly decompressed perpendicular to the impact. No visible damage and visual appearance not degraded.
		22.15 equivalent speed 100 km/h *	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). Rock wool core decompressed perpendicular to the impact, with local adhesion failure of the mesh. No visible damage and visual appearance not degraded.
		26.80 equivalent speed 110 km/h *	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). Rock wool core decompressed perpendicular to the impact, with local adhesion failure of the mesh. No visible damage and visual appearance not degraded.
		31.89 equivalent speed 120 km/h *	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). Rock wool decompressed perpendicular to the impact through complete thickness of 40 mm, with local adhesion failure of the mesh. No visible damage and visual appearance not degraded.
		43.40 equivalent speed 140 km/h *	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). Rock wool decompressed perpendicular to the impact through complete thickness of 40 mm, with local adhesion failure of the mesh. No visible damage and visual appearance not degraded.
		56.69 equivalent speed 160 km/h *	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). Rock wool decompressed perpendicular to the impact through complete thickness of 40 mm, with local adhesion failure of the mesh. No visible damage and visual appearance not degraded.
		71.75 equivalent speed 180 km/h *	Test on a new panel: star pattern marking on panel on impact side (not visible after 1 minute). Rock wool decompressed perpendicular to the impact through complete thickness of 40 mm, with local adhesion failure of the mesh. No visible damage and visual appearance not degraded.

***** Equivalent speed**: $E = \frac{1}{2} . m . v^2$** **(joules = kg . m²/s²)**

Report end

APPENDIX

Photographs no. 1 to 3: Apparatuses of tests – Impacts from tennis ball, special ball and football

Photograph no. 4: Test apparatus – tests of impacts with ballasted tennis ball and special ball

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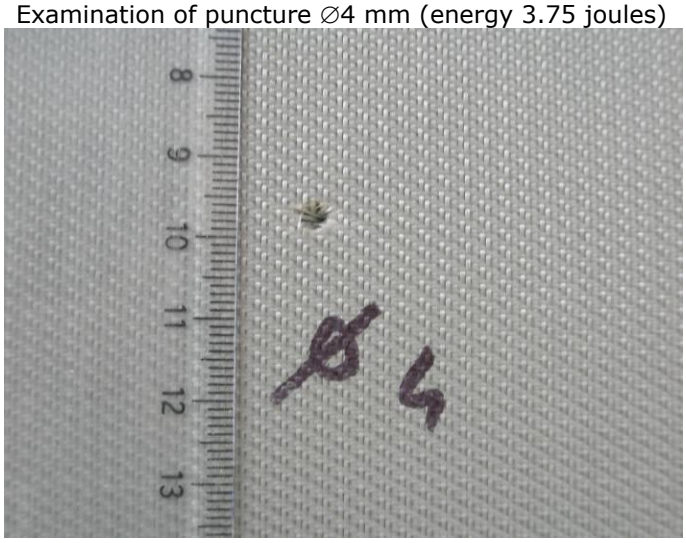
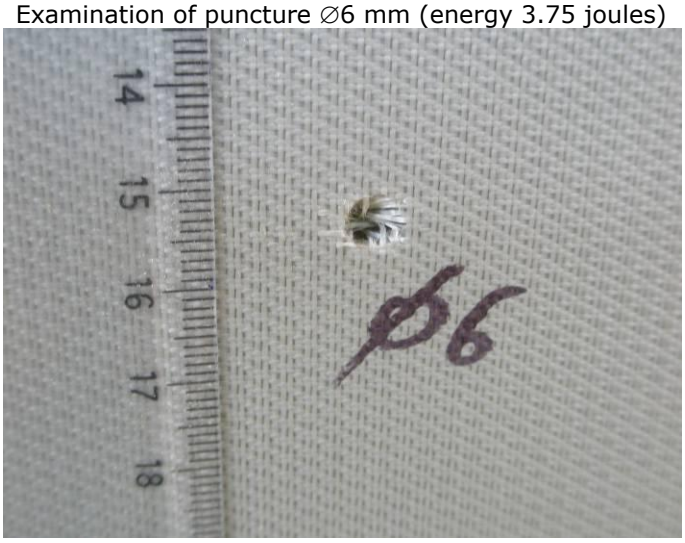
Photographs no. 5 to 10: Tests on perfotest on VertiQ 1200x600x40mm

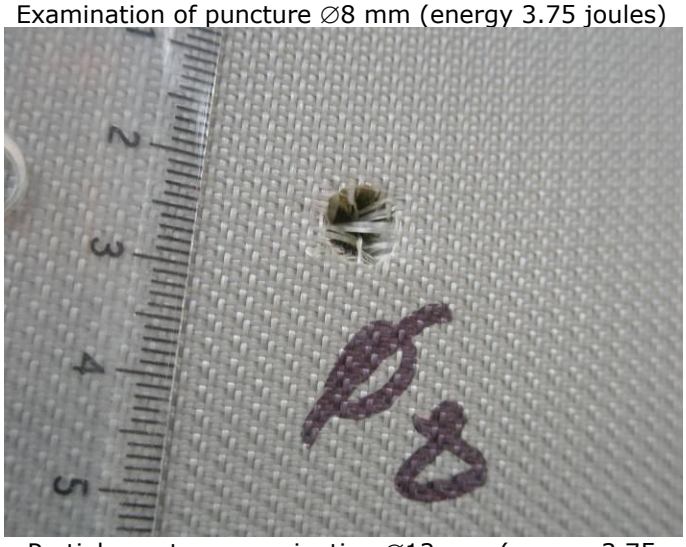
Examination of puncture ∅4 mm (energy 3.75 joules)



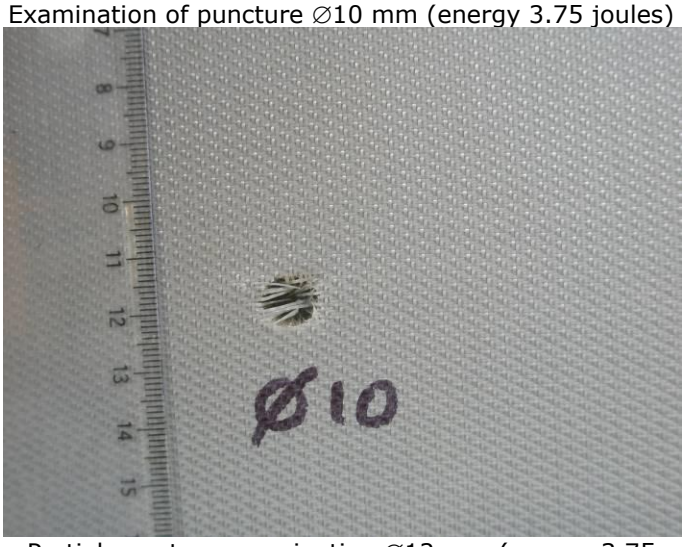
Examination of puncture ∅6 mm (energy 3.75 joules)



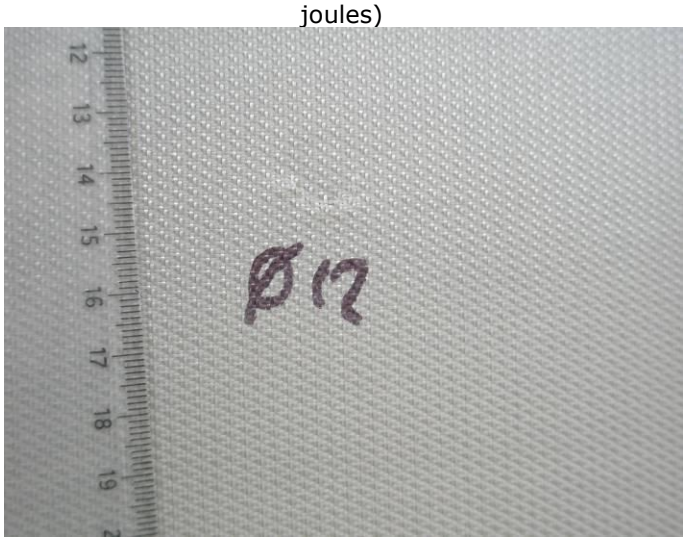
Examination of puncture ∅8 mm (energy 3.75 joules)



Examination of puncture ∅10 mm (energy 3.75 joules)



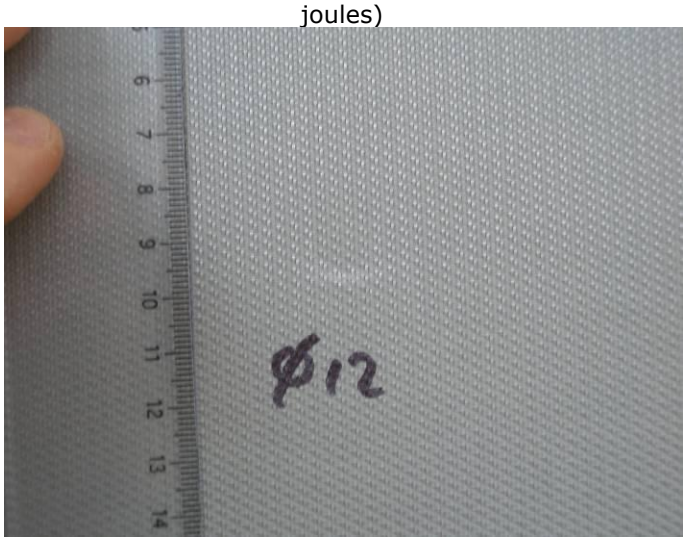
Partial puncture examination ∅12 mm (energy 3.75 joules)



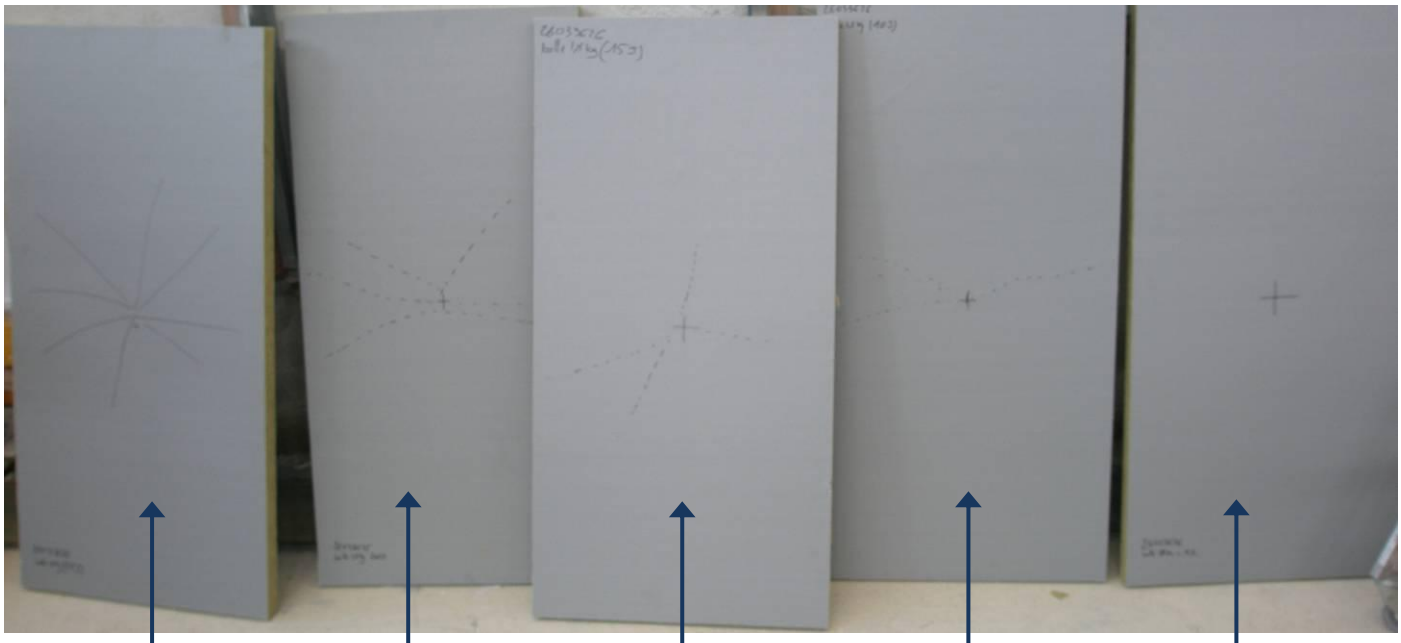
Partial puncture examination ∅12 mm (energy 3.75 joules)

Photograph no. 11: Test on perfotest on VertiQ 1200x600x40mm

Examination of non-puncture ∅12 mm (energy 3.75 joules)



Photograph no. 12: Impact test of ballasted special ball at 1.8 kg on VertiQ 1200x600x40mm



Impact 1.8kg - 25 J:
Marking, temporary, star pattern on the mesh

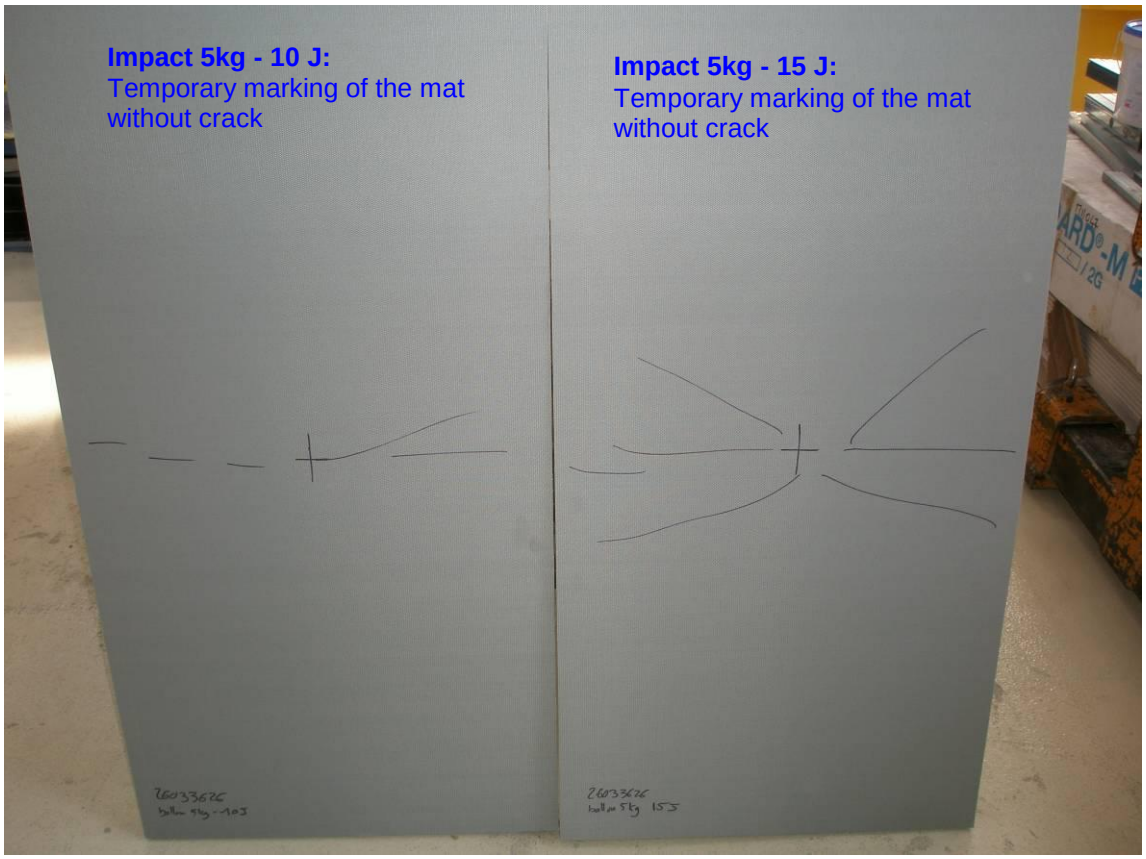
Impact 1.8kg - 20 J:
Marking, temporary, star pattern on the mesh

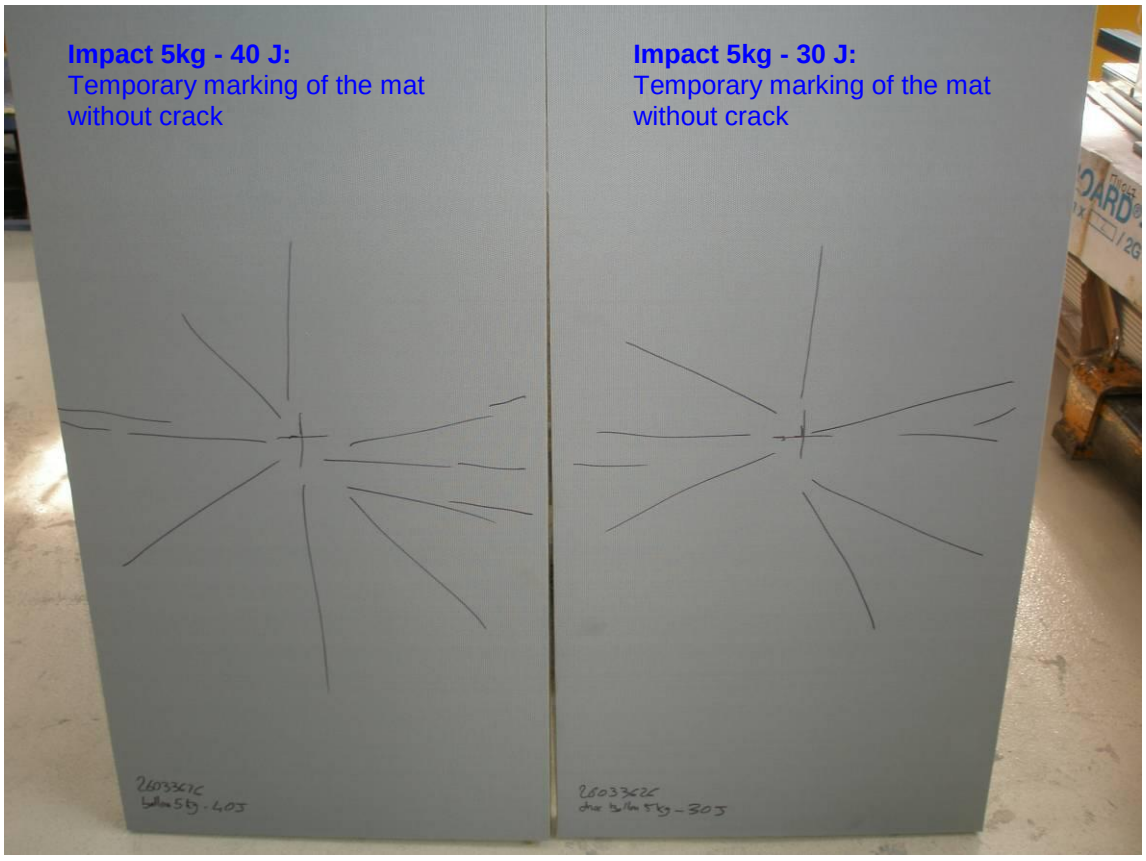
Impact 1.8kg - 15 J:
Marking, temporary, star pattern on the mesh

Impact 1.8kg - 10 J:
Marking, temporary, star pattern on the mesh

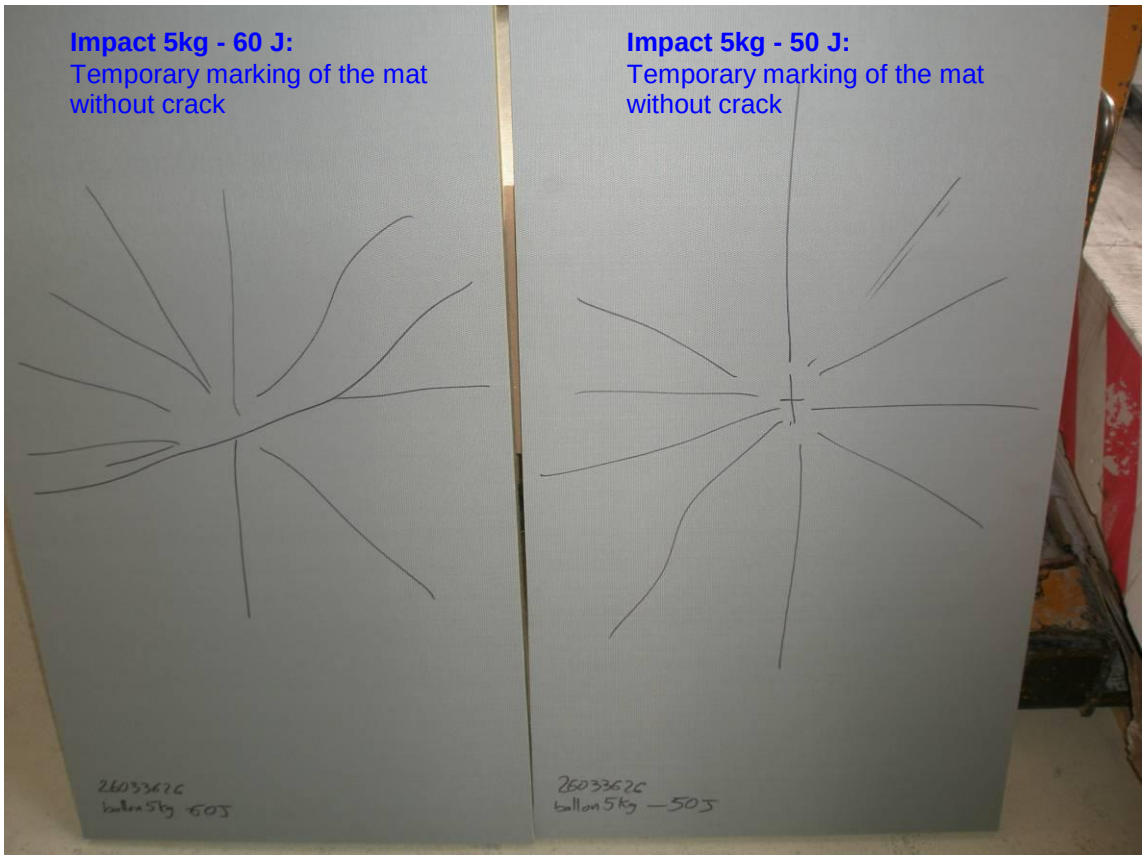
Impact 1.8kg - 5 J:
No visible deterioration

Photographs no. 13 and 14: Impact test on ballasted football at 5 kg on VertiQ 1200x600x40mm

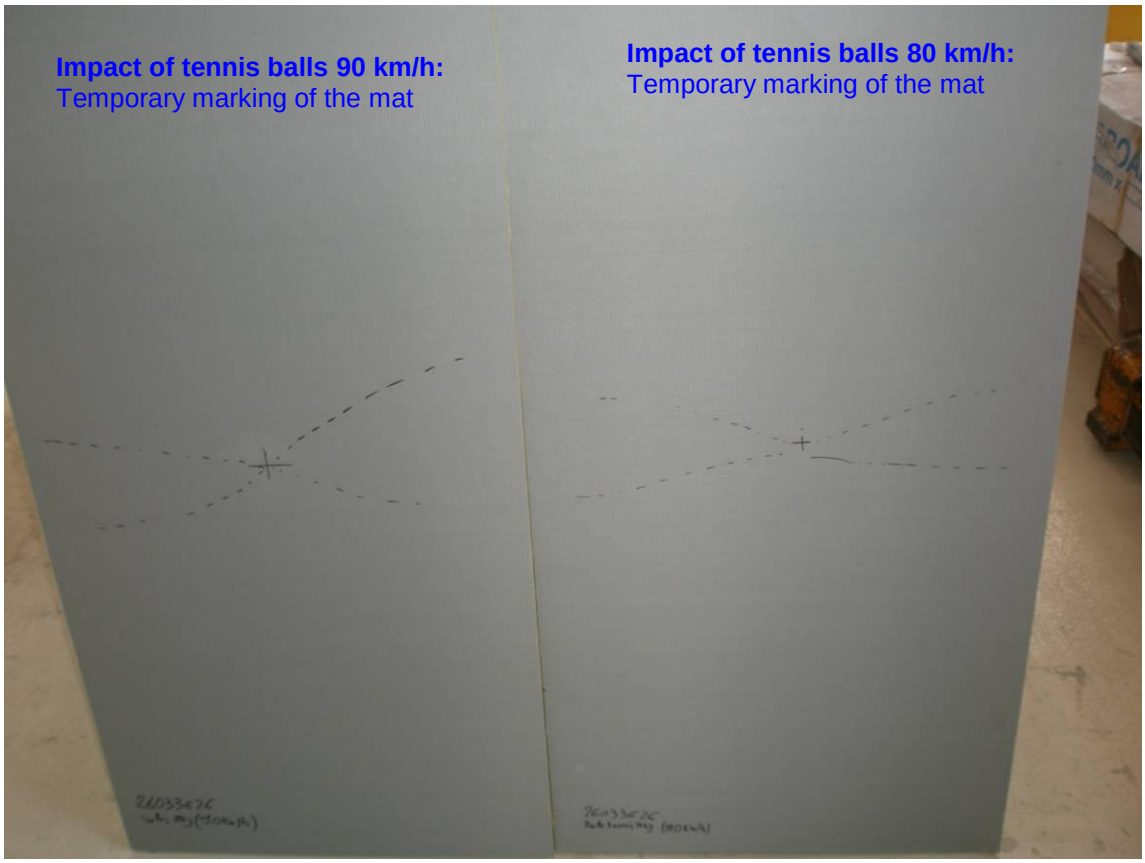




Photograph no. 15: Impact test on ballasted football at 5 kg on VertiQ 1200x600x40mm



Photograph no. 16: Impact test of ballasted tennis balls on VertiQ 1200x600x40mm



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Photographs no. 17 and 18: Impact test of ballasted tennis balls on VertiQ 1200x600x40mm