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Date	Report	Page
28 March 2013 Rev 12 April 2013	PX21774 rev	1(2)

Hammerglass AB
Åkagårdsvägen
269 71 Förslöv
Sweden

Explosion test

(3 supplements)

1 Introduction

Hammerglass AB, Förslöv, commissioned SP Technical Research Institute of Sweden to perform an explosion protection test to a window unit. The window was manufactured from Hammerglass, a special type of polycarbonate, mounted into a steel frame.

2 Test methods

The test was performed in accordance with the following standard:

- SS-EN 13124-2-2004 “Windows, Doors And Shutters - Explosion Resistance - Test Method - Part 2: Range Test”
- SS-EN 13123-2-2004 “Windows, Doors, And Shutters - Explosion Resistance - Requirements And Classification - Part 2: Range Test”

Test date:	12 November 2012
Test site:	Sågebacken, Uddevalla, Sweden
Test personnel:	Peter Blomgren, Per-Arne Thuresson, Mikael Videby
Temperature:	+4.0°C
Air humidity:	68.4%
Explosive substance:	Poladyn dynamite
Detonation height:	The explosive charge was positioned 0.5 metres above ground level

3 Test items

Test object:	Sheets of polycarbonate mounted in a steel frame. The sheets measured 1500 x 900 mm, with a thickness of 12 mm.
Manufacturer:	Hammerglass AB
Drawings:	See supplement 1
Photograph:	A photograph of the test unit is shown in supplement 2

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4 Performance and results

4.1 Description of test object

Test no.	Test object
1	Flat sheet mounted with 24 M8 bolts in steel frame, see supplement 1, page 1.
1	Flat sheet mounted with 24 M8 bolts in steel frame, see supplement 1, page 1.
3	Curved sheet mounted with 24 M8 bolts in steel frame, see supplement 1, page 2.
4 Extra test*	Curved sheet mounted with 24 M8 bolts in steel frame, see supplement 1, page 2.

* Same test object as in Test 3 but with a bag of stones placed next to explosive charge

4.2 Test results

Test	Class	Charge (kg)	Distance (m)	Pressure P _{so} bar	Impulse I _{so} bar/ms
1	EXR1	3	5	1.22	1.17
2	EXR2	3	3	2.06	1.77
3	EXR1	3	5	1.07	0.94
4	EXR2	3	3	1.67	1.87

5 Summary

Hammerglass AB commissioned an explosion protection test on Hammerglass sheets. The tested polycarbonate sheets met the requirements in each class in accordance with SS-EN 13123-2-2004 "Windows, Doors, And Shutters - Explosion Resistance - Requirements And Classification - Part 2: Range Test".

The measurement tolerance for pressure was $\leq 2.0\%$, and $\leq 2.0\%$ for impulse. The test results apply solely for the examples tested.

This report was reviewed due the addition of definitions.

SP Technical Research Institute of Sweden
SP Construction & Mechanics – Safety and Function

Verified by

Torbjörn Granberg

Peter Blomgren

Supplements

1. Drawings of frames (2 pages)
2. Photographs
3. Graphs

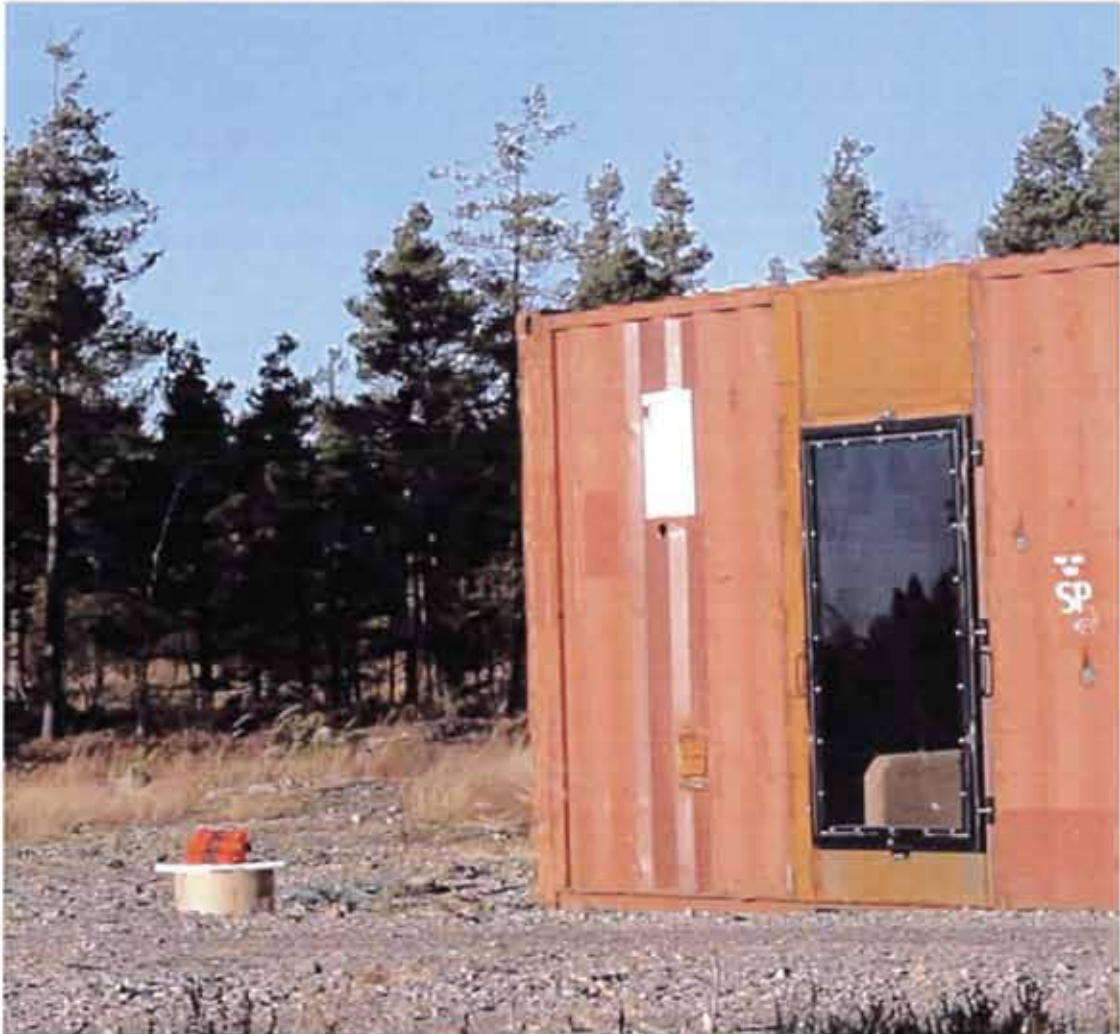
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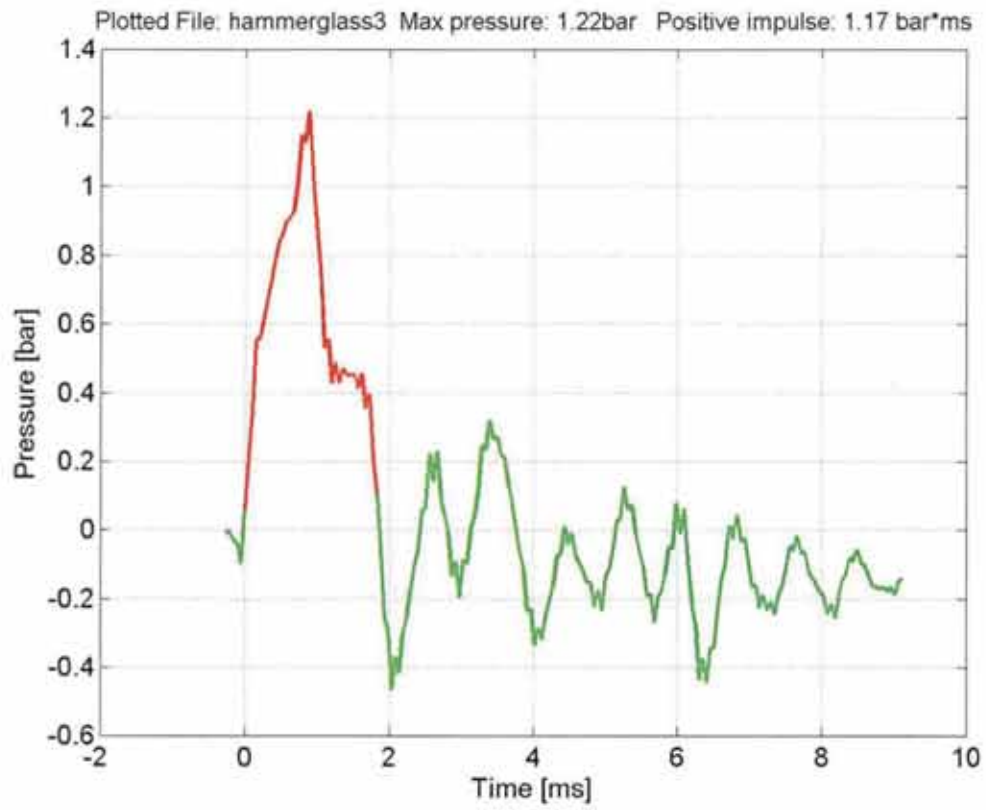
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Supplement 2

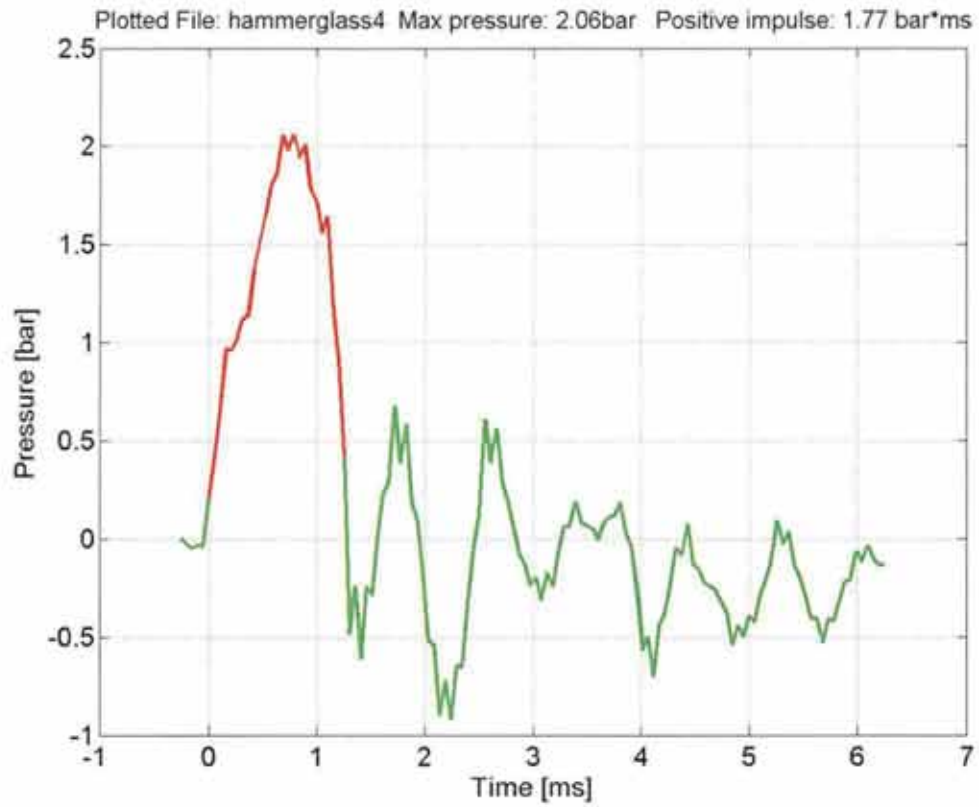


Supplement 3



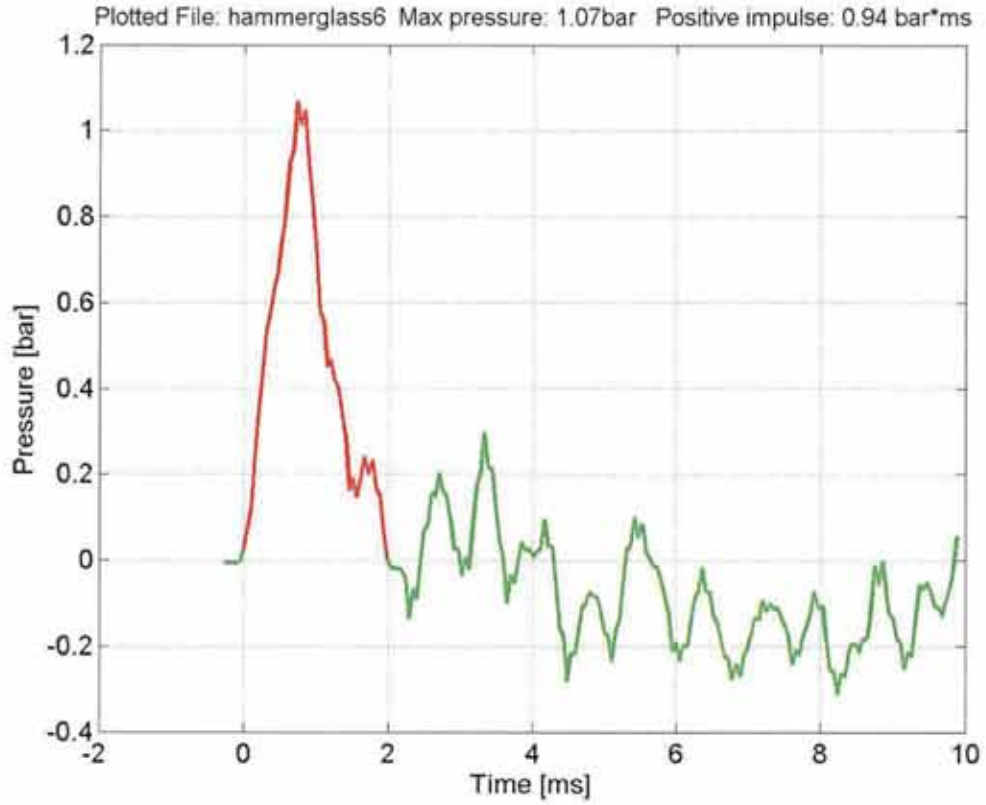
Test 1

Supplement 3



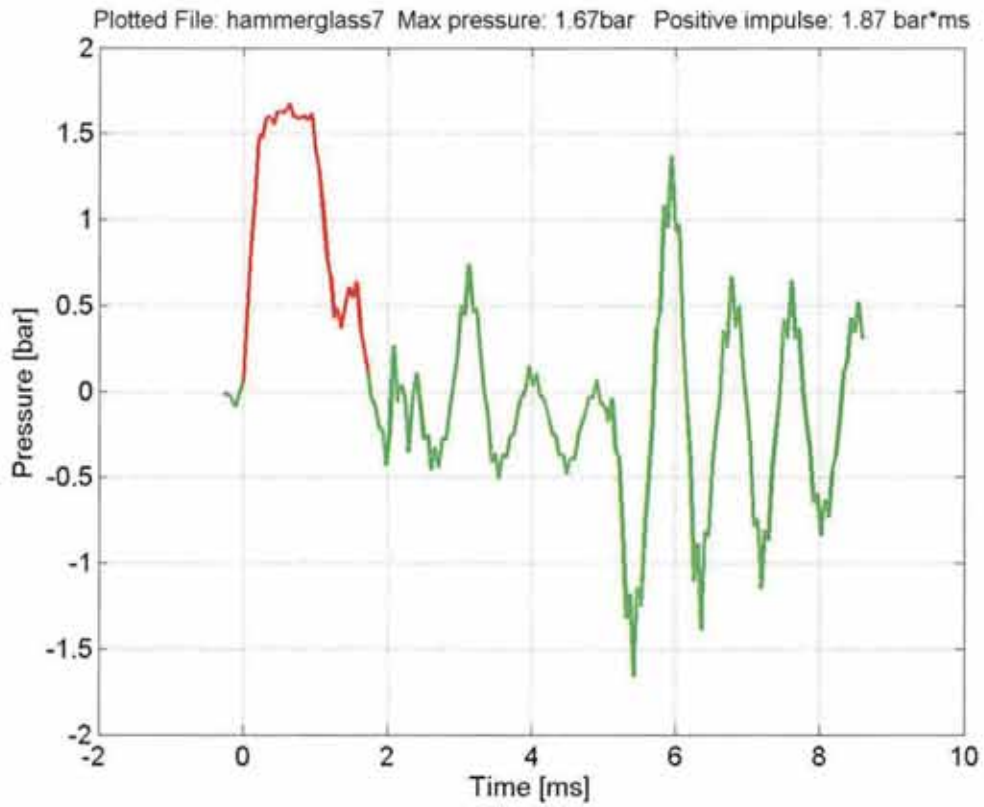
Test 2

Supplement 3



Test 3

Supplement 3



Test 4