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Testing of Polycarbonate Panes using a Sharp Impact

1 Introduction

On behalf of Hammerglass AB, SP has conducted testing of individual polycarbonate panes with nominal thickness of 6.0 mm, 8.0 mm and 10.0 mm.

Purpose:	To test the strength of the panes in the event of a sharp impact.
Test location:	Bygg och Mekanik's laboratory.

2 Specimens

Designation:	Hammerglass Single 6, 8, and 10 mm.
Dimensions:	1100x900 mm.
Sampling:	The specimens were delivered by Hammerglass AB.
Day of arrival at SP:	March 2011

3 Test method and implementation

Test method: The test was carried out according to EN 356 "Glass in building - Security glazing - Testing and classification of resistance against manual attack", item 9, edition 1. One exception to EN 356 was that the striking point of the axe was moved before the axe edge passed through the window. This was done to reduce the number of strikes needed to achieve a square opening. The glazing was clamped between a rubberised steel box and a rubberised steel frame. First, 12 strikes were made with the back of the axe. After that, the test continued with the edge of the axe until a square opening of 400x400 mm was made or until the desired class was reached.

Test date: 14/04/2011—20/04/2011.

Number of samples: 3 samples/thickness.

4 Results

The number of strikes needed to make a square opening of 400x400 mm can be found in Tables 1-3. During the 8.0 and 10.0 tests, the test was interrupted after 72 strikes without a square opening of 400x400 mm.

Table 1 Results for Hammerglass Single 6.0 mm

Sample	Number of strikes	Pane thickness, measured during testing (mm)
1	52	5.8
2	63	5.8
3	64	5.8

Table 2 Results for Hammerglass Single 8.0 mm

Sample	Number of strikes	Pane thickness, measured during testing (mm)
1	72	7.8
2	72	7.8
3	72	7.8

Table 3 Results for Hammerglass Single 6.0 mm

Sample	Number of strikes	Pane thickness, measured during testing (mm)
1	72	9.6
2	72	9.7
3	72	9.6

Table 4 Requirements according to EN 356

Class	Number of strikes
P6B	30-50
P7B	51-70
P8B	more than 70

5 Miscellaneous

The tested polycarbonate panes of type Hammerglass Single 6.0 mm met the requirements for P7B according to EN 356, edition 1. The tested polycarbonate panes of type Hammerglass Single 8.0 and 10.0 mm met the requirements for P8B according to SS-EN 356, edition 1.

The measurement uncertainty of the impact energy is estimated at < 1.0%.

The specified measurement uncertainty corresponds to an approximate confidence interval of 95% around the measurement value. This range has been calculated in accordance with GUM (the ISO guide to the expression of uncertainty in measurements). This normally means quadratic addition of included standard uncertainties and multiplication of the so obtained weighted standard uncertainty with coverage factor of k=2. 1

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Bygg och Mekanik - Strength and structure

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