

Contents

1	Introduction	3
1.1	Purpose	3
1.2	Description of the samples	3
1.3	Sampling procedure.....	3
1.4	Application	3
1.5	Method of testing	3
1.6	Put out to contract	3
1.7	Privacy statement	4
2	Test results	5
3	Conclusion.....	7
4	References	8
5	Signature	9

1 Introduction

1.1 Purpose

The tests have been performed in order to establish whether or not the product meets the requirements of the European standard EN 356 [1].

1.2 Description of the samples

General

Trade mark of the foils	3M
Type of the foils	Ultra S600 and Safety S140
Dimensions of the samples	900 x 1100 ± 5 mm

Specific

Material	Float glass
Thickness	6 mm
Foils	<ul style="list-style-type: none">• Ultra S600 at attack side;• Ultra S600 at both sides;• Safety S140 at attack side;• Safety S140 at both sides.
Attack face	as marked by the manufacturer

Remark: old type name for Ultra S600 was Ultra 600; old type name for Safety S140 was SH14CLARL.

1.3 Sampling procedure

The samples have been submitted by the manufacturer. The test house has had no influence on the selection of the samples.

1.4 Application

The request for testing was submitted by the manufacturer on July 3, 2009, order or reference number or name: 5605762/09/DJI. Assignment Form number: 09.A071.

1.5 Method of testing

All applicable tests have been performed according to the European standard EN 356 [1].

1.6 Put out to contract

No tests were performed at third parties.

1.7 Privacy statement

Due to privacy reasons, the names of involved personnel that executed the tests, are not disclosed in the report. However, this information is available on internal work sheets, test forms etc. in the project file.

2 Test results

Test results after performing all applicable tests according to European standard EN 356 [1].

Classification table for the resistance of security glazing products

Test method	Category of resistance	Drop height mm	Total number of strikes	Code designation for category of resistance
Hard body	P1A	1500	3 in a triangle	EN 356 P1A
Hard body	P2A	3000	3 in a triangle	EN 356 P2A
Hard body	P3A	6000	3 in a triangle	EN 356 P3A
Hard body	P4A	9000	3 in a triangle	EN 356 P4A
Hard body	P5A	9000	3x3 in a triangle	EN 356 P5A
Axe	P6B	-	30 to 50	EN 356 P6B
Axe	P7B	-	51 to 70	EN 356 P7B
Axe	P8B	-	over 70	EN 356 P8B

Test results

6mm float glass with foil Ultra S600 at the attack side

Type of test	Position 1	Position 2	Position 3
P1A	no breakage	no breakage	no breakage
P1A	breakage/no penetration	breakage/no penetration	breakage/no penetration
P1A	no breakage	no breakage	breakage/no penetration

Type of test	Clamping > 140 N/mm ²	Visual Inspection	Thickness (mm)
P1A	ok	ok	6.00 mm
P1A	ok	ok	6.11 mm
P1A	ok	ok	6.07 mm

6 mm float glass with foils Ultra S600 at both sides

Type of test	Position 1	Position 2	Position 3
P2A	no breakage	breakage/no penetration	breakage/no penetration
P2A	no breakage	breakage/no penetration	breakage/no penetration
P2A	no breakage	breakage/no penetration	breakage/no penetration

Type of test	Clamping > 140 N/mm ²	Visual Inspection	Thickness (mm)
P2A	ok	ok	6.11 mm
P2A	ok	ok	6.17 mm
P2A	ok	ok	6.14 mm

6 mm float glass with foil Safety S140 at the attack side

Type of test	Position 1	Position 2	Position 3
P3A	breakage/no penetration	breakage/no penetration	breakage/no penetration
P3A	breakage/no penetration	breakage/no penetration	breakage/no penetration
P3A	breakage/no penetration	breakage/no penetration	breakage/no penetration

Type of test	Clamping > 140 N/mm ²	Visual Inspection	Thickness (mm)
P3A	ok	ok	6.47 mm
P3A	ok	ok	6.37 mm
P3A	ok	ok	6.33 mm

6 mm float glass with foils Safety S140 at both sides

Type of test	Position 1	Position 2	Position 3
P4A	breakage/no penetration	breakage/no penetration	breakage/no penetration
P4A	breakage/no penetration	breakage/no penetration	breakage/no penetration
P4A	breakage/no penetration	breakage/no penetration	breakage/no penetration

Type of test	Clamping > 140 N/mm ²	Visual Inspection	Thickness (mm)
P4A	ok	ok	6.51 mm
P4A	ok	ok	6.48 mm
P4A	ok	ok	6.41 mm

Test data

Date of test	July 30, July 31 and August 4, 2009
Drop test apparatus	Nr. A91302
Clamping pressure, if higher than (≥ 160) kN/m ²	Not applicable
Code designation of the category of resistance	EN 356 P1A for Ultra S600 at attack side EN 356 P2A for Ultra S600 at both sides EN 356 P2A for Safety S140 at attack side EN 356 P4A for Safety S140 at both sides

3 Conclusion

The 6 mm float glass with foils, trade mark: 3M, types: Ultra S600 and Safety S140, meets the applicable requirements as stated in the European standard EN 356 [1] for a class:

- EN 356 P1A for Ultra S600 at attack side;
- EN 356 P2A for Ultra S600 at both sides;
- EN 356 P2A for Safety S140 at attack side;
- EN 356 P4A for Safety S140 at both sides.

The test results exclusively relate to the tested objects.

Remark 1

When and if changes are made in production method and/or equipment, assessment according to this standard shall be reconsidered and re-tests shall be performed when the changes can lead to different specifications of the glass. The decision and responsibility lies at the manufacturer.

4 References

- 1 European standard EN 356:1999 (E),
Glass in building – Security glazing – Testing and classification of resistance
against manual attack,
European Committee of Standardization, November 1999.

5 Signature

Author Mr. T.R. Cruijff	Signature 
Specialist	
Peer review Mr. M.J.R. Luppens	Signature 
Specialist	
Approved by Mr. A.J. Piers, B.Sc.	Signature 
Business unit manager	

(This is the end of this TNO report).