Test report

Test report relating to a glass product according to European standard EN 12600, Pendulum test for flat glass, concerning the product marked as: Low iron solar textured glass thickness 2.8, 2.5 and 2.0mm, manufactured by: Gujarat Borosil LTD.

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Contents

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 12600 [1]. Although sample sizes are considerable deviating from the standard, we have followed the described test execution as good as possible with adaptations to the test equipment. Test results are given but a classification cannot be given, due to reasons of reproducibility.

1.2 Description of the test specimen

General

Name of the manufacturer	Gujarat Borosil LTD.
Address of the manufacturer	Govali, Ankleshwar Rajpipala Road Jhagadia Taluka, Dist. : Bharuch, Gujarat INDIA
Production plant of the samples	Govali, Ankleshwar Rajpipala Road Jhagadia Taluka, Dist. : Bharuch, Gujarat INDIA
Line ID where the samples are made	-
Production date	-
Sampling date	-
The product was marked as	Low iron solar textured glass thickness 2.8, 2.5 and 2.0mm
Dimensions of the samples	**1100 x 1700 mm !!**

Specific

Nominal thicknesses	2.8, 2.5 and 2.0 mm
Configuration	Low iron solar textured glass
Intermediate layer: type, thickness	n.a.
Applied films	n.a.

1.3 Sampling procedure

TÜV Rheinland B.V., acting as Notified Test Laboratory, has had no influence on the selection of the sample. All test specimen within the sample were test-worthy and were received on 3rd September 2017.

1.4 Application

The request for testing was submitted by the manufacturer on 12th October 2017, order or reference number or name: -. Assignment Form number: 17.A217.

1.5 Method of testing

All applicable tests have been performed according to the European standard EN 12600 [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.

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1.8 Notifications, accreditations, designations

TÜV Rheinland Nederland B.V. has been notified by the Dutch Minister for Housing and the Central Government Sector as Notified Laboratory (number 1750) and Notified (Factory Production Control) Certification Body (number 0336) for the European Construction Products Regulation 305/2011 (EU).

TÜV Rheinland Nederland B.V. has been accredited by the Dutch Accreditation Council (RvA) as ISO 17025 Test Laboratory (nr. L 484) and ISO 17065 Certification Body (nr. C078).

TÜV Rheinland Nederland B.V. has been designated as Technical Service (Laboratory) by the Approval Authorities for Germany (KBA – E1) and the Netherlands (RDW – E4) for automotive safety glass (ECE R43, 92/22/EC, 2009/144/EC).

TÜV Rheinland Nederland B.V. has been recognised by the German Institute for building technics (DIBt) under number NL005 as test, control and certification body.

Remark

The reported tests were performed under ISO 17025 accreditation.

1.9 Calibration of the test rig

Date of the last calibration of the test rig according to annex B of EN 12600 [1]: 25 May 2016.

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2 Test results

Test results after performing all applicable tests according to European standard EN 12600 [1].

Remark : *Due to limitations in production, the samples sizes made it necessary to adjust the equipment, results are based on a test that is equal to the test as described in EN 12600.*

Thickness 2,8 mm

Class	Drop height (mm)	Result test 1	Result test 2	Result test 3	Result test 4
3	190	No breakage	No breakage	No breakage	No breakage
2	450	Breakage 4b	Breakage 4b	Breakage 4b	Breakage 4b
1	1200	Breakage 4b	Breakage 4b	Breakage 4b	Breakage 4b

Average thickness of the 4 measurements	2,71 mm
Because of asymmetric composition: Impact side	Smooth side
Performance classification	1 (C) 3

Thickness 2,5 mm

Class	**Drop height (mm)**	**Result test 1**	**Result test 2**	**Result test 3**	**Result test 4**
3	190	No breakage	No breakage	No breakage	No breakage
2	450	Breakage 4b	Breakage 4b	Breakage 4b	Breakage 4b
1	1200	Breakage 4b	Breakage 4b	Breakage 4b	Breakage 4b

Average thickness of the 4 measurements	2,57 mm
Because of asymmetric composition: Impact side	Smooth side
Performance classification	1 (C) 3

Thickness 2,0 mm

Class	**Drop height (mm)**	**Result test 1**	**Result test 2**	**Result test 3**	**Result test 4**
3	190	No breakage	No breakage	No breakage	No breakage
2	450	Breakage 4b	Breakage 4b	Breakage 4b	Breakage 4b
1	1200	Breakage 4b	Breakage 4b	Breakage 4b	Breakage 4b

Average thickness of the 4 measurements	2,14 mm
Because of asymmetric composition: Impact side	Smooth side
Performance classification	1 (C) 3,

Period of testing

The tests took place on 21-11-2017.

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Explanation

EN 12600 § 6 Classification

6.1 General

Glazing conforming to this European Standard is classified as follows:

- its performance under the impact test;
- the drop height at which breakage occurred;
- the drop height at which the product passed in accordance with a) of clause 4;
- the drop height at which the product passed in accordance with b) of clause 4;
- the mode of breakage of the material if it remains unbroken after the impact test.

6.2 Drop height class

Glazing shall be classified as follows:

- Class 3: material that conforms to the requirements of clause 4 when tested by the method given in clause 5 at a drop height of 190 mm;
- Class 2: material that conforms to the requirements of clause 4 when tested by the method given in clause 5 at drop heights of 190 mm and 450 mm;
- Class 1: material that conforms to the requirements of clause 4 when tested by the method given in clause 5 at drop heights of 190 mm, 450 mm and 1 200 mm.

6.3 Mode of breakage

If all test pieces remain unbroken at the drop height appropriate to its intended drop height class, the mode of breakage shall be determined as per Annex C. The mode of breakage shall be described as follows:

- Type A: numerous cracks appear forming separate fragments with sharp edges, some of which are large (typical of annealed glass);
- Type B: numerous cracks appear, but the fragments hold together and do not separate (typical of laminated glass);
- Type C: disintegration occurs, leading to a large number of small particles that are relatively harmless (typical of toughened glass).

Performance classification

The performance classification of a glass product shall be given as follows:

α (β) φ

where

- **α** is the highest drop height class at which the product either did not break or broke in accordance with a) or b) of clause 4;
- **β** is the mode of breakage;
- **φ** is the highest drop height class at which the product either did not break or when broke, broke in accordance with a) of clause 4.

When a glass product breaks at a drop height of 190 mm and the breakage is not in accordance with a) of clause 4 then the value of φ quoted shall be zero.

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3 Conclusion

The tested glass product, marked by the client or manufacturer as trade Low iron solar textured glass thickness 2.8, 2.5 and 2.0mm, manufactured by: Gujarat Borosil LTD., meets the applicable requirements as stated in the European standard EN 12600 [1] for a class: 1 (C) 3.

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.

Remark 2

If no reference of the product description was supplied by the manufacturer, than that document shall be added to this test report by the manufacturer. It was to the manufacturer's responsibility that the samples delivered for initial type test are representative to the production and deviations from perfection were included in the delivered test samples.

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4 References

1 European standard EN 12600:2002 (E),
Glass in building – Pendulum test – Impact test method and classification for float glass,
European Committee for Standardization, November 2002.

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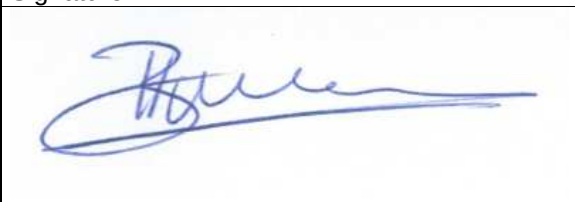
5 Signatures

Author	Signature
Mr. R. Brandhorst Specialist	
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Mr. M.A.A.M. Schets, B.Sc. Specialist	
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(This is the end of this report).