



System Development

Laboratory Glass Impact Test Report (BS EN 12600)

Sample type: 6mm thick, tempered glass

Test sponsor: Safe Lite Glass Industries LLC



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Quality management

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1. Introduction

This report describes the impact resistance test performed at the Al Futtaim Element Materials Technology Dubai L.L.C (AFE) laboratory at Plot 597-451, Dubai Investments Park, Dubai, at the request of the test sponsor listed in Table 1.

Table 1 Test sponsor details

Test sponsor	Address
Safe Lite Glass Industries LLC	Warehouse – factory no.: 327 Jurf Industrial Zone 1, Ajman United Arab Emirates Tel: 06 565 1388

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1.1 Purpose of testing

The tests were conducted on 21 October 2022 to determine the performance of the glass samples with respect to impact resistance.

The test methods were in accordance with the following standard and the AFE method statement DMC4334 Rev.0.

- BS EN 12600:2002

This test report relates only to the actual samples as tested and described herein.

The test was conducted by Shibu Varghese of AFE.

2. Test apparatus

The test apparatus comprised of a main frame and a clamping frame which was fitted to the main frame which was used to hold the test piece in position for the duration of the test and a dual tyre impactor with suspension device and release mechanism. The total mass of the impactor was 50 kg.

3. Test sample

The test samples comprised of 876 mm x 1938 mm x 6 mm thick, tempered glasses. The glass samples were supplied by Safe Lite Glass Industries LLC.

The tests were conducted on 4 samples.

Sample conditioning			
Date	20 October 2022	Condition period	12 hours
Ambient temperature 20 - 23 °C			

4. Test procedure & criteria

4.1 Test procedure

The test piece was securely clamped in the sub-frame, the impactor was positioned such that it was hanging at rest, at the centre of the test piece, between 5 to 15 mm from the surface.

The impactor was raised to a drop height of 190 mm and released.

The sample was inspected to determine whether it has:

- Remained unbroken.
- Broken safely in accordance with the performance criteria stated in section 4.2.1 below.
- Broken and failed to comply with the performance criteria stated in section 4.2.1 below.

The above procedure was repeated at drop heights of 450 mm and 1,200 mm.

4.2 Performance classification

4.2.1 Mode of breakage

When tested, the test piece shall not break or shall break as defined below:

If the test piece disintegrates, the 10 largest crack-free particles collected within 3 minutes after impact shall together weigh no more than the mass equivalent to 6,500 mm² of the original test piece. The particles shall be selected only from the portion of the original test piece exposed in the test frame. Only the exposed area of any particle retained in the test frame shall be considered in determining the mass equivalent.

If the test pieces remain unbroken at the drop height appropriate to its intended drop height class, the mode of breakage shall be determined as follows:

Type A - Numerous cracks appear forming separate fragments with sharp edges some of which are large - mode of breakage for typical annealed glass

Type B - Numerous cracks appear but the fragments hold together and does not separate - mode of breakage for typical laminated glass

Type C - Disintegration occurs, leading to large number of small particles that are relatively harmless - mode of breakage for typical toughened glass.

4.2.2 Drop height class

The glazing conforming to the 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 section 4.2.1 above.
- The mode of breakage of the material if it remains unbroken after the impact test.

Class 3 - material that conforms to the requirements of section 4.2.1 when tested at a drop height of 190 mm.

Class 2 - material that conforms to the requirements of section 4.2.1 when tested at drop heights of 190 mm and 450 mm.

Class 1 - material that conforms to the requirements of section 4.2.1 when tested at drop heights of 190 mm, 450 mm, and 1,200 mm.

4.2.3 Classification

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

α (β) Φ

Where:

α - Highest drop height class at which the product either did not break or broke in accordance with section 4.2.1

β - Mode of breakage

Φ - Highest drop height class at which the product did not break or when broke, broke in accordance with clause a) of section 4.2.1

If the glass breaks at a drop height of 190 mm and the breakage is not in accordance with clause a) of section 4.2.1, then the value of Φ shall be zero.

The maximum allowable weight of particles as per section 4.2.1.2 is 97 grammes.

5. Test results / observations

Ambient temperature range: 22 - 23 °C

Drop height = 190 mm		
Sample no.	Mode of breakage	Weight of glass particles (g)
1	No breakage.	N/A
2	No breakage.	N/A
3	No breakage.	N/A
4	No breakage.	N/A

Drop height = 450 mm		
Sample no.	Mode of breakage	Weight of glass particles (g)
1	No breakage.	N/A
2	No breakage.	N/A
3	No breakage.	N/A
4	No breakage.	N/A

Drop height = 1200 mm		
Sample no.	Mode of breakage	Weight of glass particles (g)
1	No breakage.	N/A
2	No breakage.	N/A
3	No breakage.	N/A
4	No breakage.	N/A




As any of the glasses did not break at any drop heights, one glass panel was intentionally broken to determine the mode of breakage.

The mode of breakage was found to be typical of toughened glass. See Photo 3 in Appendix A.

6. Classification

The tested glass type is classified as **1(C)1**.

Appendix A Photographs

Photo no.	Description	Photograph
1	Impact test set-up.	
2	Glass logo on test samples.	
3	Glass breakage pattern when intentionally broken.	



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