Test Report 8802286.

Greaney Glass Products

Introduction.

This report has been prepared by Jack Nicholls & David Vinyard and relates to the activity detailed below:

Job/Registration Details		Client Details
Job number:	**8802286**	Greaney Glass Products Carnmore Oranmore County Galway Ireland
Job type:	Testing Samples Submitted	
Start Date:	21/11/2017	
Test type:	Direct	
Sample ID:	10173763	
Registration:	**NA**	
Protocol:	NA	
Quality system:	NA	
Registration:	**NA**	
Protocol:	NA	
Quality system:	NA	

The report has been approved for issue by Chris Rayment – Senior Engineer

Approved For Issue	
	Issue Date: 24 November 2017

Objectives.

Direct Test

Product Scope.

Heat-strengthened glass

Report Summary.

The samples were received on 31 October 2017 and the testing was started on 20 November 2017.

The samples submitted complied with the requirements of the test work conducted.

BS EN 1863 & BS 1288

Product Description.

BS EN 1863: Part 1: 2011

Fragmentation Test
Each sample was tested in accordance with Clause 8 and the results were recorded and assessed against the requirements of clause 8.5

4mm Clear Heat Strengthened

	Length (mm)	Width (mm)
Specimen 1	1100	360
Specimen 2	1100	360
Specimen 3	1100	360
Specimen 4	1100	360
Specimen 5	1100	360

	Specified	Actual	Assessment
Specimen 1			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 2			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 3			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 4			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 5			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass

BS EN 1863 & BS 1288

Product Description.

BS EN 1863: Part 1: 2011

Fragmentation Test
Each sample was tested in accordance with Clause 8 and the results were recorded and assessed against the requirements of clause 8.5

6mm Clear Heat Strengthened

	Length (mm)	Width (mm)
Specimen 1	1100	360
Specimen 2	1100	360
Specimen 3	1100	360
Specimen 4	1100	360
Specimen 5	1100	360

	Specified	Actual	Assessment
Specimen 1			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 2			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 3			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 4			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 5			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass

BS EN 1863 & BS 1288

Product Description.

BS EN 1863: Part 1: 2011

Fragmentation Test
Each sample was tested in accordance with Clause 8 and the results were recorded and assessed against the requirements of clause 8.5

8mm Clear Heat Strengthened

	Length (mm)	Width (mm)
Specimen 1	1100	360
Specimen 2	1100	360
Specimen 3	1100	360
Specimen 4	1100	360
Specimen 5	1100	360

	Specified	Actual	Assessment
Specimen 1			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 2			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 3			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 4			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 5			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass

BS EN 1863 & BS 1288

Product Description.

BS EN 1863: Part 1: 2011

Fragmentation Test
Each sample was tested in accordance with Clause 8 and the results were recorded and assessed against the requirements of clause 8.5

10mm Clear Heat Strengthened

	Length (mm)	Width (mm)
Specimen 1	1100	360
Specimen 2	1100	360
Specimen 3	1100	360
Specimen 4	1100	360
Specimen 5	1100	360

	Specified	Actual	Assessment
Specimen 1			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 2			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 3			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 4			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 5			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass

BS EN 1863 & BS 1288

Product Description.

BS EN 1863: Part 1: 2011

Fragmentation Test
Each sample was tested in accordance with Clause 8 and the results were recorded and assessed against the requirements of clause 8.5

6mm Climaguard Heat Strengthened

	Length (mm)	Width (mm)
Specimen 1	1100	360
Specimen 2	1100	360
Specimen 3	1100	360
Specimen 4	1100	360
Specimen 5	1100	360

	Specified	Actual	Assessment
Specimen 1			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 2			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 3			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 4			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 5			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass

BS EN 1863 & BS 1288

Product Description.

BS EN 1863: Part 1: 2011

Fragmentation Test
Each sample was tested in accordance with Clause 8 and the results were recorded and assessed against the requirements of clause 8.5

8mm Sunguard Heat Strengthened

	Length (mm)	Width (mm)
Specimen 1	1100	360
Specimen 2	1100	360
Specimen 3	1100	360
Specimen 4	1100	360
Specimen 5	1100	360

	Specified	Actual	Assessment
Specimen 1			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 2			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 3			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 4			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass
Specimen 5			
Number of Islands	2 Max	0	Pass
Max island area/mass equivalent (mm²)	1000 Max	0	Pass
Total particle area/mass equivalent (mm²)	5000 Max	0	Pass

Test Results (Continued).

BS EN 1288: Part 3: 2000

CLAUSE

7 Procedure

7.1 Measuring width and thickness of each specimen

The glass specimens were allowed to condition for a minimum of 4 hours at ambient temperature prior to testing.

The specimens were measured in accordance with clause 7.1

CLEAR HEAT STRENGTHENED

	Specified	**Actual**
Mean width, B (mm)		
360	360 ±5	360
360	360 ±5	360
360	360 ±5	360
360	360 ±5	360
360	360 ±5	360
360	360 ±5	360
360	360 ±5	360
360	360 ±5	360
360	360 ±5	360
360	360 ±5	360
Mean thickness, h (mm)		
4	4 ±0.2	3.80
4	4 ±0.2	3.90
4	4 ±0.2	3.95
6	6 ±0.2	5.95
6	6 ±0.2	5.90
8	8 ±0.2	7.90
8	8 ±0.2	7.95
10	10 ±0.2	9.85
10	10 ±0.2	9.85
10	10 ±0.2	9.90

Test Results (Continued).

BS EN 1288: Part 3: 2000

CLAUSE

7 Procedure (continued)

7.2 Bending Test

CLEAR HEAT STRENGTHENED

The specimens were tested in accordance with clause 7.2 and the bending strengths were calculated in accordance with clause 8.

Sample Thickness Test	Side Under Failure	Origin of (s)	Time taken to failure	Bending Strength (N/mm²)	Assessment
3.80	UN MODIFIED	IN BODY	79.35	113.9	Pass
3.90	UN MODIFIED	ON EDGE	77.02	107.1	Pass
3.95	UN MODIFIED	ON BODY	87.74	124.7	Pass
5.95	UN MODIFIED	IN BODY	92.23	117.4	Pass
5.90	UN MODIFIED	IN BODY	85.70	106.0	Pass
7.90	UN MODIFIED	ON BODY	107.10	130.1	Pass
7.95	UN MODIFIED	ON BODY	102.17	119.0	Pass
9.80	UN MODIFIED	IN BODY	119.51	140.6	Pass
9.85	UN MODIFIED	IN BODY	108.18	119.5	Pass
9.90	UN MODIFIED	IN BODY	111.99	142.4	Pass

The minimum strength specified in BS EN 1863: Part 1: 2011, clause 9.4 is 70N/mm²

Test Results (Continued).

BS EN 1288: Part 3: 2000

CLAUSE

7 Procedure (continued)

7.2 Bending Test

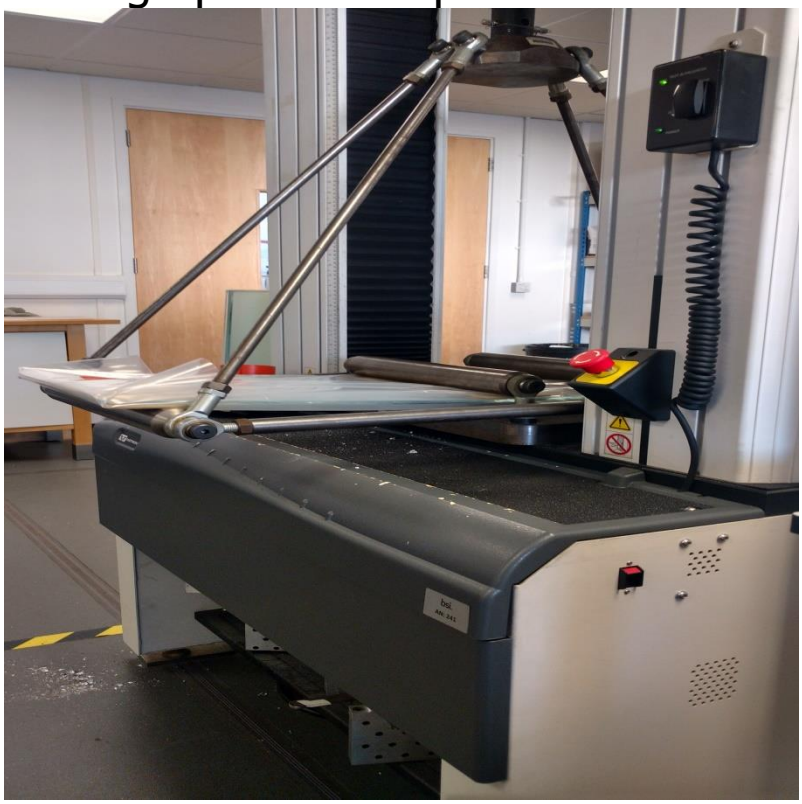
CLIMAGUARD 6MM AND SUNGUARD 8MM HEAT STRENGTHENED

The specimens were tested in accordance with clause 7.2 and the bending strengths were calculated in accordance with clause 8.

Sample Thickness Test	Side Under Failure	Origin of (s)	Time taken to failure	Bending Strength (N/mm²)	Assessment
5.95	UN MODIFIED	ON EDGE	111.8	157.1	Pass
5.90	UN MODIFIED	IN BODY	93.7	120.9	Pass
5.90	UN MODIFIED	IN BODY	119.5	180.9	Pass
5.90	UN MODIFIED	ON EDGE	121.3	177.7	Pass
5.95	UN MODIFIED	ON EDGE	110.4	156.7	Pass
7.95	UN MODIFIED	IN BODY	99.1	111.0	Pass
7.90	UN MODIFIED	IN BODY	112.1	142.6	Pass
7.90	UN MODIFIED	IN BODY	105.8	129.1	Pass
7.90	UN MODIFIED	ON EDGE	110.7	146.7	Pass
7.90	UN MODIFIED	IN BODY	92.2	100.9	Pass

The minimum strength specified in BS EN 1863: Part 1: 2011, clause 9.4 is 70N/mm²

Photographs of Sample.



Test Samples.

Sample Id	ER Number	Description
1	10173763	Clear Heat Strengthened
2	10173763	Climaguard Heat Strengthened
3	10173763	Sunguard Heat Strengthened

Description of Test Samples.

Sample Description
8 off 4mm Clear Heat Strengthened
7 off 6mm Clear Heat Strengthened
7 off 8mm Clear Heat Strengthened
8 off 10mm Clear Heat Strengthened
10 off 6mm Sunguard Heat Strengthened
10 off 8mm Climaguard Heat Strengthened

Test Requirements.

BS EN 1863 / BS 1288 Direct Test

Clause	Requirements
Results table	*BS EN 1863 / BS 1288 Direct Test*

Glossary of Terms.

PASS: Complies. Tested by BSI engineers at BSI laboratories.

PASS1: Complies. Witnessed by BSI engineers in manufacturers laboratory.

PASS2: Complies. Tests carried out by third party lab; results accepted by BSI.

PASS*: Report resulted in uncertainty and states that Compliance is more probable than non-compliance.

FAIL: Non compliance – Product does not meet the requirements of this clause.

FAIL*: Report resulted in uncertainty and states that Non-compliance is more probable than compliance.

N/A: Not applicable to design under consideration.

N/T: Not tested due to similarity to previously tested item; reference earlier test report.

Conditions of Issue.

This Test Report is issued subject to the conditions stated in current issue of 'BSI Terms of Service'. The results contained herein apply only to the particular sample(s) tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of BSI, who reserve the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.

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*** End of Report ***