ASTM F1233-08 PERFORMANCE TEST REPORT

Rendered to:

HAMMERGLASS AB

For:

Two Configurations of Polycarbonate Specimens

Report No.: G6655.01-119-12
Test Date: 02/13/17
Test Record Retention Date: 12/21/20

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ASTM F1233-08 PERFORMANCE TEST REPORT

Rendered to:

HAMMERGLASS AB
260 91 Forslov Akagardsvagen
Sweden

Report No.: G6655.01-119-12
Test Date: 12/21/16
Report Date: 02/13/17
Test Record Retention Date: 12/21/20

Product: Two Configurations of Polycarbonate Specimens

Project Summary: Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted by HAMMERGLASS AB to perform forced entrance resistance testing on two configurations of polycarbonate specimens.

Test Procedure: Each test specimen was evaluated in general accordance with ASTM F1233-08 (2013), *Standard Test Method for Security Glazing Materials and Systems*, ASTM International, November 2008.

Test Specimen Description:

Product Type: Two configurations of polycarbonate

Overall Size: 29-3/4" wide by 29-3/4" high

Frame Construction: No window framing materials were tested.

Polycarbonate Description:

Specimen No.	Product Type	Product No.
1	1/4" Clear Polycarbonate (0.235")	N/A
2	1/2" Clear Polycarbonate (0.460")	N/A

Qualifications: Intertek-ATI in York, PA has demonstrated compliance with ANS/ISO/IEC Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc. Intertek-ATI is accredited to perform all testing reported herein.

Test Specimen Source: The test specimens were provided by the client in good condition. Representative samples of the test specimen(s) will be retained by Intertek-ATI for a minimum of four years from the test completion date.

Conditions of Testing: Ambient laboratory temperatures were in the range of 68 ±4°F for the duration of all testing reported herein.

Installation: The test fixture was constructed in accordance with ASTM F1233. The polycarbonate panels were placed into the fixture against 1/8" thick foam glazing tape and secured with steel angle with 1/8" thick foam glazing tape against the panels. The steel angle was secured to the test frame with five (5) 1/2" diameter bolts on all four sides.

Forced Entry Resistance Test Set-up: The specimen was rigidly mounted for forced entry resistance testing. The resources (tools) for forced entry testing were provided to test personnel, in addition to a 1/8" diameter rod (Contraband) and an 8" x 8" x 5" solid rectangular object (Body Passage). A tripod-mounted video camera was used to record the entire forced entry test sequence. Concentrated assault team members are listed in the following table.

Forced Entry Resistance Test Personnel

Name	Age (yrs)	Weight (lbs)
Isaiah Gebhart	32	185
Robert Spayd	33	215

Test Results: The results are tabulated as follows:

Specimen No. 1
Sample Description: 1/4" Clear Polycarbonate;
Measured Thickness: 0.235”
Ambient Temperature: 68 °F

Sequence	Class Achieved	Description of Attack	Temperature (°F)	Actual Time (min:sec)
1	1.0	Ball Peen Hammer	66 °F	00:17
2	1.1	Ball Peen Hammer	66 °F	00:20
3	1.2	1-1/2" Pipe/Sledge	67 °F	1:00
4	1.3	Extinguisher	12 °F	00:20/00:20/00:20
5	1.4	Sledge Hammer	25 °F	01:06
6 [1, 2]	1.5	Propane Torch	400 °F	05:00

[1] *After 01:30 seconds during Sequence 6, the 1/8" diameter rod was able to pass freely through the specimen.*
[2] *After the 05:00 minutes during Sequence 6, the 8" x 8" x 5" solid rectangular object was able to pass freely through the specimen. No further testing was performed.*

Description of Attack: Forced entry personnel were directed to attack the sample of laminated glazing secured in the FER fixture. Testing began with Sequence 1 and continued until the propane torch was utilized to create an opening through the sample allowing free passage of the contraband after 01:33 min during Sequence No. 6. The testing was continued until bodily passage failure occurred during Sequence No. 6 after five minutes of the propane torch. The surface temperature of the test specimen was recorded following each attack sequence.

Test Results: (Continued)

Specimen No. 2
Sample Description: **1/2" Clear Polycarbonate;**
Measured Thickness: **0.460”**
Ambient Temperature: **68 °F**

Sequence	Class Achieved	Description of Attack	Temperature (°F)	Actual Time (min:sec)
1	1.0	Ball Peen Hammer	66 °F	00:30
2	1.1	Ball Peen Hammer	66 °F	00:13
3	1.2	1-1/2" Pipe/Sledge	66 °F	01:30
4	1.3	Extinguisher	19 °F	00:30/00:30
5	1.4	Sledge Hammer	26 °F	01:00
6 [1]	1.5	Propane Torch	415 °F	05:00
7	2.0	Ripping Bar	323 °F	00:30
8	2.1	Ram	250 °F	00:33
9	2.2	4" Pipe/Sledge	224 °F	01:20
10 [2]	2.3	Sledge Hammer	170 °F	00:13

[1] *After 05:00 min during Sequence 6, the 1/8" diameter rod was able to pass freely through the specimen.*
[2] *After five impacts during Sequence 10, the 8" x 8" x 5" solid rectangular object was able to pass freely through the specimen. No further testing was performed.*

Description of Attack: Forced entry personnel were directed to attack the sample of laminated glazing secured in the FER fixture. Testing began with Sequence 1 and continued until the propane torch was utilized to create an opening through the sample allowing free passage of the contraband after 05:00 min during Sequence No. 6. The testing was continued until bodily passage failure occurred during Sequence No. 10 after five impacts. The surface temperature of the test specimen was recorded following each attack sequence.

Test Summary: The test summary is reported in the following table.

Specimen No.	Forced Entry Class Achieved	
	Passage of Contraband	Body Passage
1	1.4	1.4
2	1.4	2.2

List of Official Observers:

Name	Company
Travis A. Hoover	Intertek-ATI
Isaiah W. Gebhart	Intertek-ATI
Robert G. Spayd	Intertek-ATI

Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period.

Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

Digitally Signed by: Robert Spayd

Robert G. Spayd
Technician II

Digitally Signed by: Travis Hoover

Travis A. Hoover
Program Manager

RGS:tah/jas

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A - Photographs (3)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	02/13/17	N/A	Original report issue

APPENDIX A

Photographs

Photo No. 1
Specimen No. 1 - Test Setup

Photo No. 2
Specimen No. 1 - Contraband Failure

Photo No. 3
Specimen No. 1 - Body Passage Failure

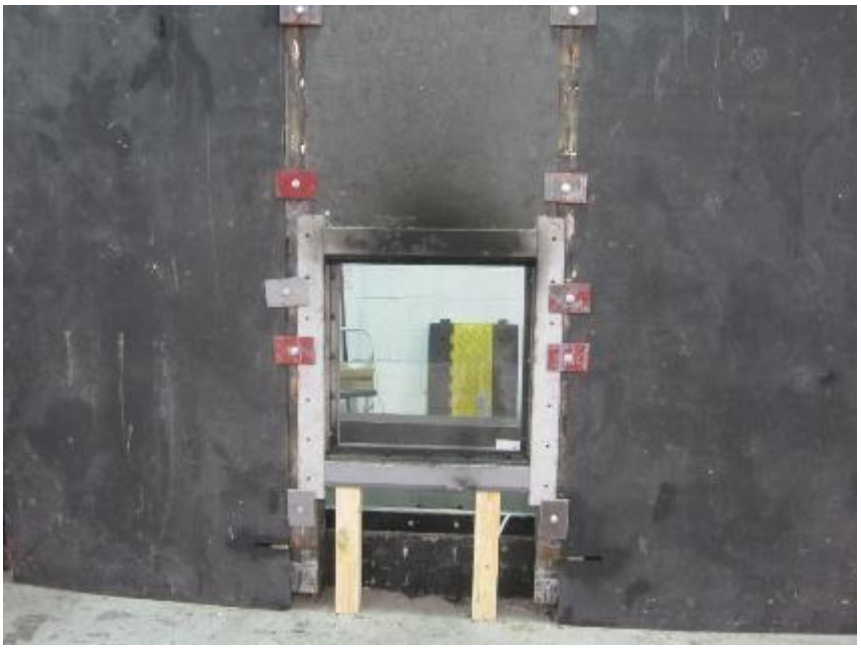

Photo No. 4
Specimen No. 2 - Test Setup

Photo No. 5
Specimen No. 2 - Contraband Failure

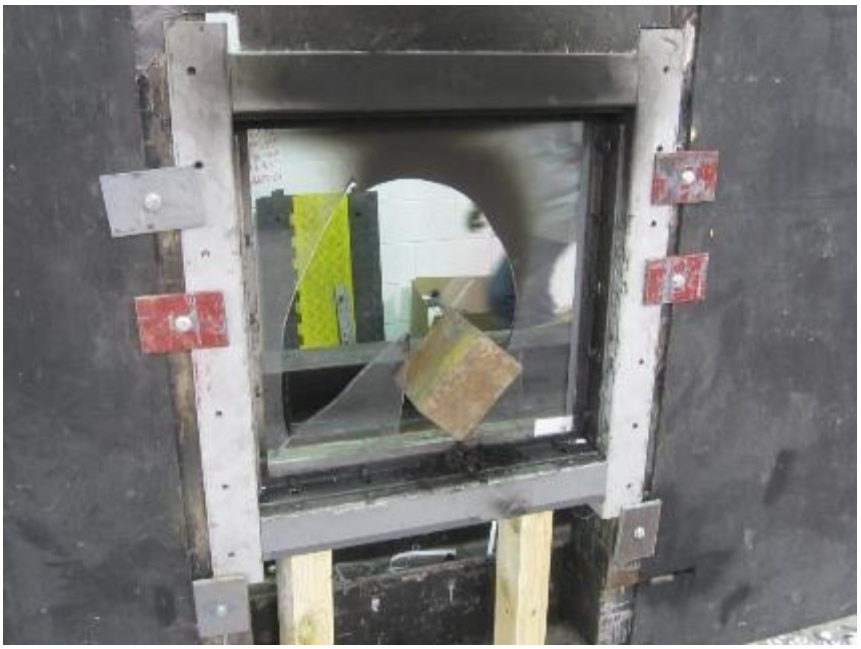

Photo No. 6
Specimen No. 2 - Body Passage Failure