



**AIR BLAST PERFORMANCE TEST REPORT**

**Rendered to:**

**ASAP WALLS**

**PRODUCT TYPE:** Multilayer Security Wall

**SERIES/MODEL:** *s-Wall*

<b>Title</b>	<b>Summary of Results</b>
Specimen	<b>Test Specimen #1</b>
ASTM F2927 Damage Rating	Damaged
ASTM F2927 Damage Level	II
Average Peak Reflected Pressure	11.19 psi
Average Positive Phase Impulse	90 psi-msec
Average Positive Phase Duration	19.77 msec

**Report No.:** E6722.01-119-19

**Test Date:** 04/16/15

**Report Date:** 09/17/15

**Test Record Retention Date:** 04/16/19

Reference must be made to Report No. E6722.01-119-19, dated 09/17/15 for complete test specimen description and detailed test results.



## AIR BLAST PERFORMANCE TEST REPORT

Rendered to:

ASAP WALLS  
28370 St. Michaels Road  
Easton, Maryland 21601

Report No.: E6722.01-119-19  
Test Date: 04/16/15  
Report Date: 09/17/15  
Test Record Retention Date: 04/16/19

### 1.0 Project Summary:

**1.1 Product Type:** Multilayer Security Wall

**1.2 Series/Model:** *s-Wall*

**1.3 Compliance Statement:** Results obtained are tested values and were secured by using the designated test method. 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 Architectural Testing, Inc., an Intertek company ("Intertek-ATI").

**1.4 Test Date:** 04/16/15

**1.5 Test Facility:** Intertek-ATI's shock tube is housed in a 10,000 square foot state-of-the-art test facility located in York, Pennsylvania. Blast loadings are produced on the specimen to simulate the effects of a high explosive charge at a specified standoff distance. Shock waves are generated by the sudden rupturing of a thin aluminum membrane. The shock wave expands as it travels down the tube and impacts the target with a specific positive pressure and impulse. A photograph of the shock tube is provided in Figure #1 of Appendix A.

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

**1.7 Drawing Reference:** The test specimen drawings have not been provided to Intertek-ATI. Test specimen construction cannot be verified by Intertek-ATI.

## 1.0 Project Summary: (Continued)

**1.8 Data Acquisition:** Four reflective pressure transducers are utilized to record data at a 1MHz sample rate. Two reflective pressure transducers are located on the specimen holder at the top and right side (when viewed from the interior). A third pressure transducer is located on the shell to the exterior of the specimen, and a fourth is located in the witness chamber, directly to the interior of the specimen holder. A sketch of the specimen holder and corresponding reflective pressure sensor locations are provided in Figure #2 of Appendix A.

### 1.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Gilbert Meyer	ASAP Walls
Richard Grieves	ASAP Walls
Emily Riley	Intertek-ATI
Travis Hoover	Intertek-ATI
Isaiah Gebhart	Intertek-ATI

## 2.0 Test Specification:

ASTM F2927-12, *Standard Test Method for Door Systems Subject to Airblast Loadings*

**3.0 Test Specimen Description:** The following descriptions apply to all specimens.

**Test Series/Model:** *s-Wall*

**Product Type:** Multilayer Security Wall

**Overall Size:** 72" wide by 48" high

**Depth:** 4"

**Overall Area:** 24.0 ft<sup>2</sup>

**Finish:** Painted steel, 22 gauge face with 24 gauge liner

**Description:** The wall panel was consisted of 21 layers of various materials (composition and assembly details not provided). The panel was framed in steel (details not provided).

## 4.0 Installation:

The specimen was installed directly into the laboratory rigid, steel test frame holder.

**5.0 Test Results:** The results are tabulated as follows

**Test Specimen #1:**

Description	Results
Ambient Temperature	69°F
Product Temperature	68°F
<b>ASTM Damage Rating and Level</b>	<b>Damaged, II</b>

Peak Positive Pressure	
Top Pressure	10.59 psi
Right Pressure	11.48 psi
Shell Pressure	11.50 psi
<b>Average Pressure</b>	<b>11.19 psi</b>
Witness Chamber Pressure	0.28 psi/No pressure rise

Peak Positive Phase Duration	
Top Duration	19.77 msec
Right Duration	-- <sup>1</sup>
Shell Duration	-- <sup>1</sup>
<b>Average Duration</b>	<b>19.77 msec</b>

<sup>1</sup> Readings at pressure sensors did not cross zero during the data capture.

Peak Positive Phase Impulse	
Top Impulse	91 psi*msec
Right Impulse	91 psi*msec
Shell Impulse	90 psi*msec
<b>Average Impulse</b>	<b>90 psi*msec</b>

Witness Chamber Results
The s-Wall had a maximum 15/16" permanent bow deformation at the center of the panel after the test.

**Note:** To officially qualify the product as Damage Level II, two additional specimens need to be tested.

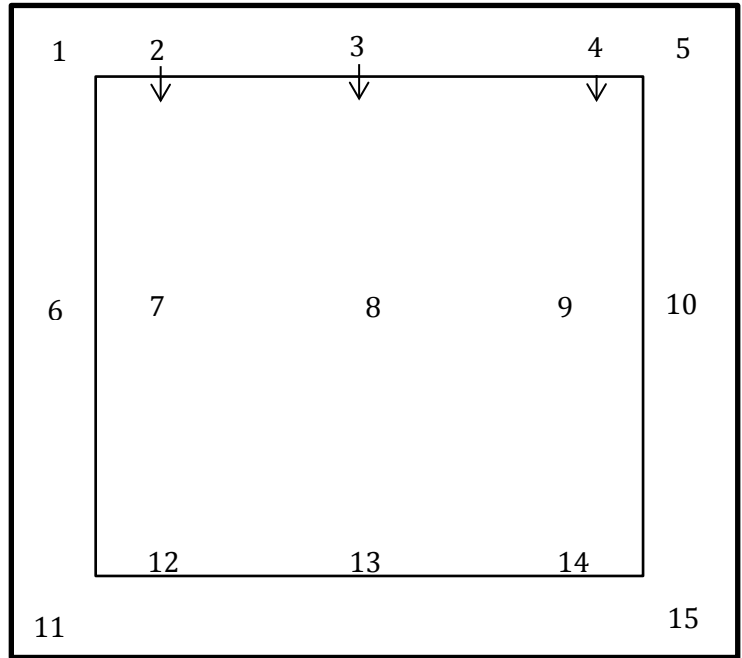
Pressure-time plots are presented in Appendix B. Pre-test and post-test photographs are provided in Appendix C.

**5.0 Test Results:** (Continued)

**Test Specimen #1:** (Continued)

**Deflection Measurements**

Location	Pre-Test	Post-Test	$\Delta$
1	2	2	0
2	2-1/8	2-1/8	0
3	2-1/8	1-1/2	5/8
4	2-1/4	2-3/16	1/16
5	2-1/8	2-1/8	0
6	2-1/8	2-1/16	1/16
7	2-5/16	2-1/8	3/16
8	2	1-1/16	15/16
9	2-1/4	2-3/16	1/16
10	2-1/8	2-1/8	0
11	2-1/8	2-3/16	1/16
12	2-1/4	2-1/4	0
13	2-3/16	2	3/16
14	2-3/16	2-3/16	0
15	2-1/8	2-1/16	1/8



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 ARCHITECTURAL TESTING, INC.:



Digitally Signed by Isaiah Gebhart

Isaiah W. Gebhart  
Technician - Structural Systems Testing



Digitally Signed by Joseph Reed

Joseph A. Reed, P.E.  
Director - Engineering

IWG:tah/jas/cmd

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A - Test Facility (1)
- Appendix B - Pressure-Time Plots (2)
- Appendix C - Photographs (2)



### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	09/17/15	N/A	Original report issue



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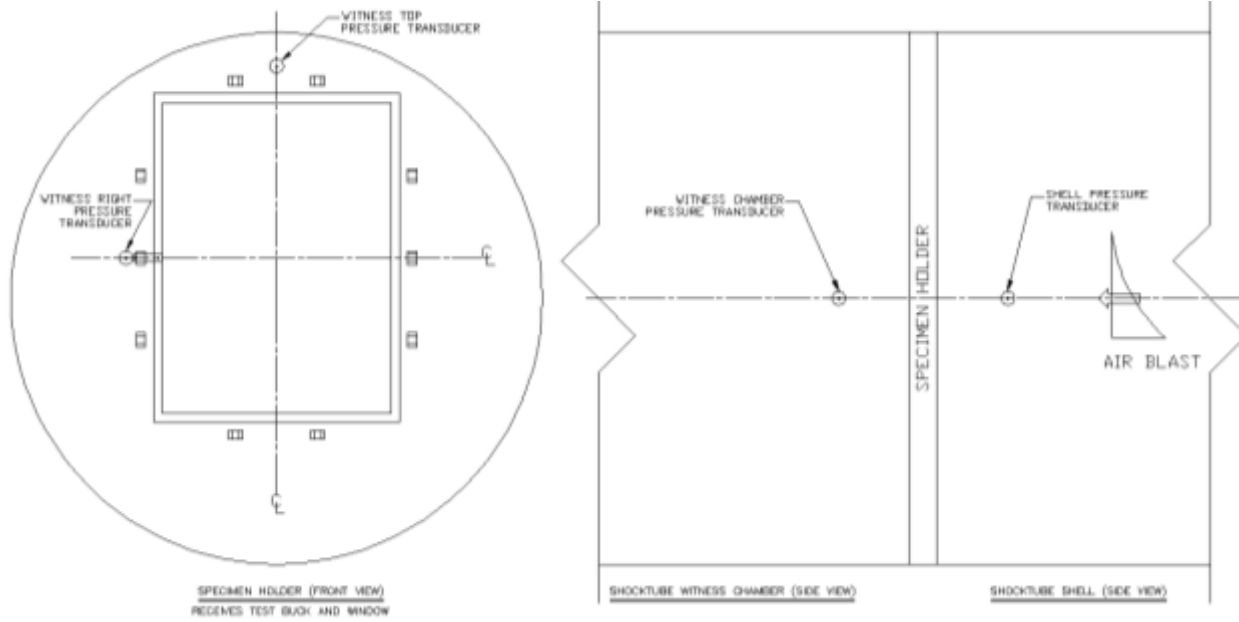
## **APPENDIX A**

### **Test Facility**





**Figure #1**  
**Shock Tube and Test Facility**



**Figure #2**  
**Pressure Sensor Locations**

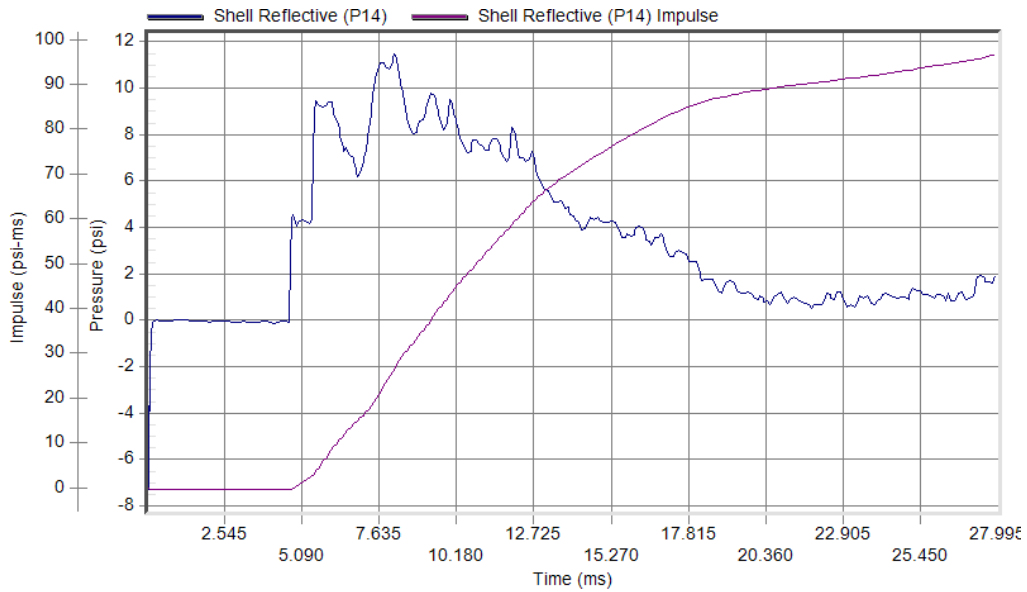


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## **APPENDIX B**

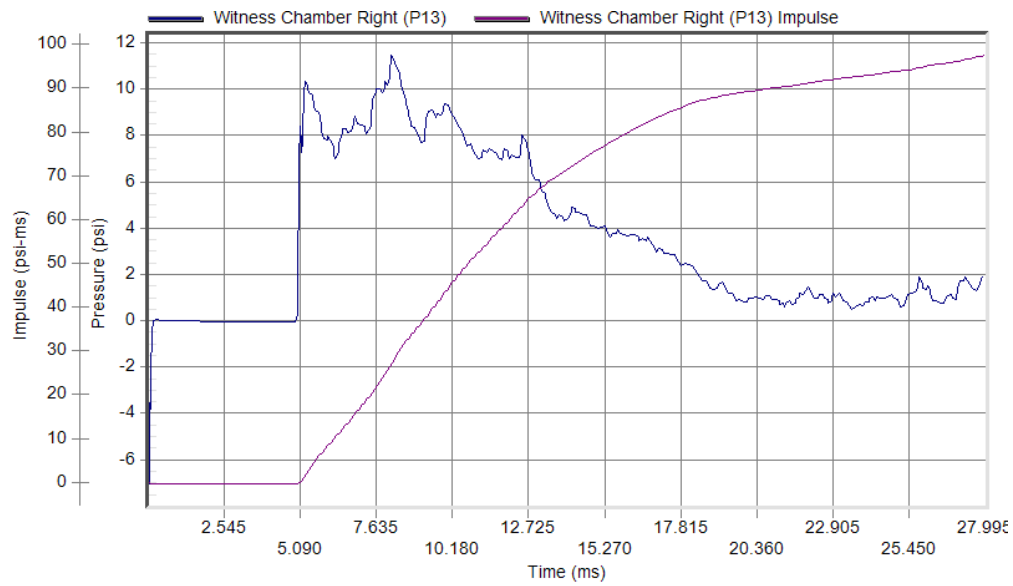
### **Pressure-Time Plots**

## Specimen #1



Peak Pressure: 11.50 psi at 8.17 ms  
Duration: 0.00 ms

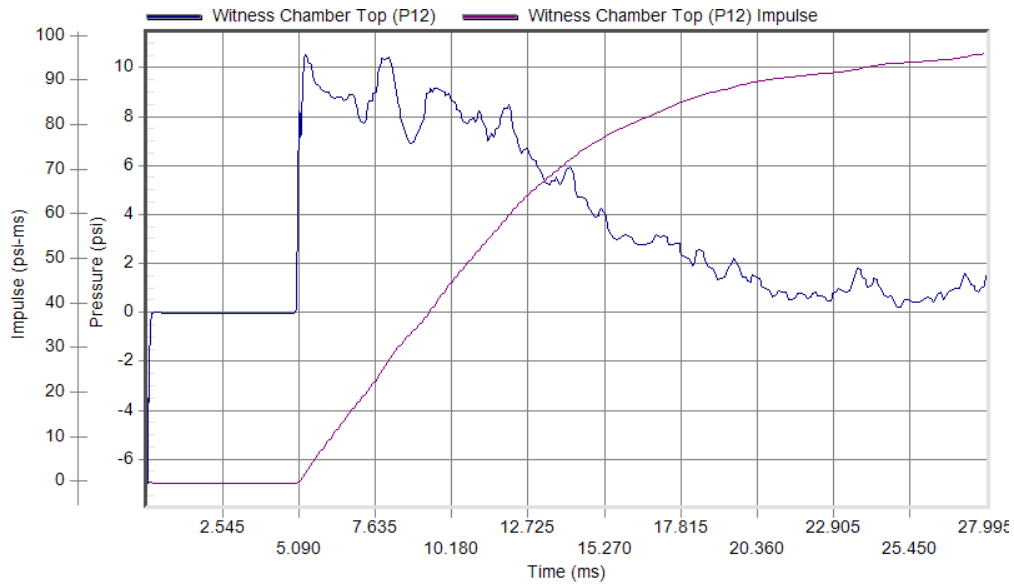
Test Date: 4/16/2015  
Test Time: 11:04 am



Peak Pressure: 11.48 psi at 8.17 ms  
Duration: 0.00 ms

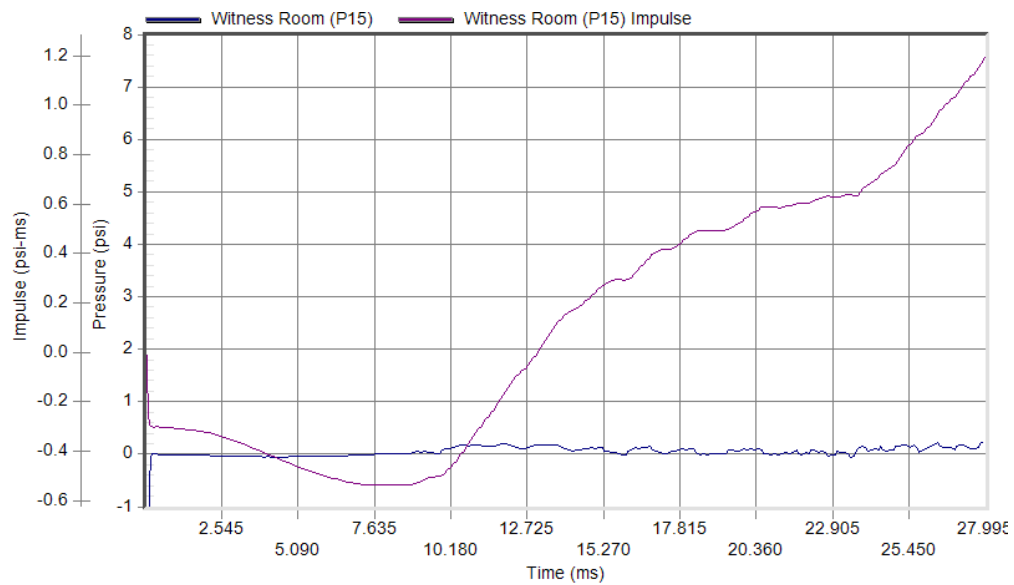
Test Date: 4/16/2015  
Test Time: 11:04 am

### Specimen #1 (Continued)



Peak Pressure: 10.59 psi at 5.33 ms  
Duration: 19.77 ms

Test Date: 4/16/2015  
Test Time: 11:04 am



Peak Pressure: 0.28 psi at 27.97 ms  
Duration: 0.00 ms

Test Date: 4/16/2015  
Test Time: 11:04 am



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## **APPENDIX C**

### **Photographs**



**Photo No. 1**  
**Pre-Test Condition of Wall Specimen, Interior**



**Photo No. 2**  
**Post-Test Condition of Wall Specimen, Interior**



**Photo No. 3**  
**Post-Test Condition - Slight Permanent Deformation of *s-Wall* Panel**