

TEST REPORT

Report No.: B2739.02-501-47

Rendered to:

TREMCO[®], INCORPORATED
Beachwood, Ohio

PRODUCT TYPE: Air Barrier System

SERIES/MODEL: ExoAir[®] 230, ProGlaze[®] ETA System 1, Spectrem[®] 1,
TremFlex[®] 834, and Tremco[®] 2011 mesh

SPECIFICATION: ASTM E 2357-05, *Standard Test Method for
Determining Air Leakage of Air Barrier Assemblies.*

AND

ASTM E 331-00, *Test Method for Water Penetration of Exterior Windows, Curtain Walls
and Doors by Uniform Static Air Pressure Difference.*

Test Date: 08/03/11

And: 08/04/11

Report Date: 09/22/11

Test Record Retention Date: 08/04/15

1.0 Report Issued To: TREMCO®, INCORPORATED
3735 Green Road
P.O. Box 1014
Beachwood, Ohio 44122

2.0 Test Laboratory: Architectural Testing, Inc.
1140 Lincoln Avenue
Springdale, Pennsylvania 15144
724-275-7100

3.0 Project Summary:

3.1 Product Type: Air Barrier Wall

3.2 Series/Model: ExoAir® 230, ProGlaze® ETA System 1, Spectrem® 1, TremFlex® 834, and Tremco® 2011 mesh

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test method(s). The mock-up tested was representative of target installation methods. Testing was performed on one penetrated wall.

3.4 Test Dates: 08/03/2011 - 08/04/2011

3.5 Test Location: Tremco® Incorporated test facility in Cleveland, Ohio.

3.6 Test Sample Source: The test specimen was provided by the client

3.7 Test Specimen Installation: The test specimen was installed by representatives from Tremco® Incorporated.

3.8 Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Architectural Testing.

3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Tim Mattox	Tremco®
Peter Poirier	Tremco®
Pam Hernandez	Tremco®
Joe Allison	Architectural Testing, Inc.

4.0 Test Specification(s):

ASTM E 2357-05, *Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.*

ASTM E 283, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.*

ASTM E 330, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.*

ASTM E 331-00, *Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.*

A series of laboratory tests were performed to determine air leakage resistance, and durability of air barrier coating. The installation was tested for air leakage, and water penetration resistance using ASTM E 2357, ASTM E 283, and ASTM E331. The durability of the selected installations was evaluated.

5.0 Test Specimen Description:

5.1 Product Sizes:

(Penetrated Wall)

Overall Area: 5.9 m ² (64.0 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	2438	96	2438	96

5.2 Test Wall Construction: The penetrated wall was constructed of 2 x 6 wood studs, spaced 16" on center. The wall was sheathed with nominal 5/8" thick USG SecuRock® sheathing, secured with #6 x 1-1/4" long bugle head screws, spaced 8" on center. The USG sheathing was applied with one 8' long horizontal seam. The sheathing was coated with a 70 mil wet thickness of ExoAir® 230 and allowed to cure to a film thickness of 30 mil. The perimeter of the wall and the window rough opening were reinforced with Tremco® 2011 fiberglass mesh and coated with the ExoAir® 230.

5.0 Test Specimen Description: (Continued)

5.2 Test Wall Construction: (Continued)

The penetrations included a 635 mm x 1219 mm rough opening with a 600 mm x 1200 mm aluminum fixed window, a 100 mm x 100 mm HVAC duct, a 38 mm PVC pipe, and an octagonal junction box penetration per ASTM E 2357. A Proglaze® ETA System 1, with molded corners, was applied to three sides of the window and sealed in place with Tremco® Spectrum 1 sealant. A 10mm perimeter clearance space at the other penetrations was sealed with TremFlex® 834.

The clear anodized aluminum fixed window was a Kawneer Series/Model Trifab® 451 center-glazed storefront system with sill pan, single glazed with 1/4" clear tempered glass. The unit was anchored through the jambs and sill using twelve #12 x 3" long screws, five at each jamb, and two at the sill, evenly spaced. The window was sealed with Proglaze® ETA Connection and System 3 molded corners. The ETA connection was sealed to the ExoAir® coating with Tremco® Spectrum® 1 sealant.

The wall system incorporated a 1" wide horizontal 'drift joint' near the top. The drift joint was bridged with interlocking galvanized plates. The drift joint was sealed with Proglaze® ETA Connection and System 3 molded corners. The ETA connection was sealed to the ExoAir® coating with Tremco® Spectrum® 1 sealant.

The wall was then covered with Grade D 15 lb felt paper and secured with 10mm T50 staples spaced nominally 8" to 12" on center. A metal J channel screed edge was applied to the wall perimeter, window perimeter, three sides of the drift joint, and at the penetration perimeters (except PVC pipe). The J channel was secured at the perimeter with #8 x 1-3/4" long bugle head screws spaced 16" OC horizontal (2 each), and 8" OC vertically. The J channel at the outlet box was secured with 1-1/4" long drywall screws, and at the duct with 1-3/4" long sheet metal screws. The wall was then covered with expanded metal lath secured with #8 x 1-3/4" long bugle head self drilling screws at each stud and 8" OC vertically.

The assembly was then covered with a three-coat stucco system. The system consisted of a 3/8" thick scratch coat, a 3/8" thick brown coat, and a nominal 1/8" thick tan finish coat.

5.0 Test Specimen Description: (Continued)

5.2.1 Test Wall Installation: The test wall was installed into an Spruce/Pine/Fir wood buck and secured at the perimeter with #8 x 3" long drywall screws spaced approximately 16" on center. The perimeter of the wall was reinforced with Tremco® 2011 fiberglass mesh and coated with the ExoAir® 230.

6.0 Test Results: Tape and film were not used to seal against air leakage during structural testing. The temperature during testing was 22°C (72°F). The test results are recorded in the following tables:

Air Infiltration (before racking sequence)

Pressure	Total Leakage (cfm)	Tare (cfm)	Specimen Leakage (cfm)	Leakage Rate	
				(L/s•m ²)	(cfm/ft ²)
25 Pa (0.52 psf)	0.065	0	0.065	0.005	0.001
50 Pa (1.04 psf)	0.103	0	0.103	0.008	0.002
75 Pa (1.57 psf)	0.139	0	0.139	0.011	0.002
100 Pa (2.09 psf)	0.178	0	0.178	0.014	0.003
150 Pa (3.13 psf)	0.228	0	0.228	0.018	0.004
250 Pa (5.22 psf)	0.325	0	0.325	0.026	0.005
300 Pa (6.27 psf)	0.270	0	0.270	0.021	0.004

Air Exfiltration (before racking sequence)

Pressure	Total Leakage (cfm)	Tare (cfm)	Specimen Leakage (cfm)	Leakage Rate	
				(L/s•m ²)	(cfm/ft ²)
25 Pa (0.52 psf)	0.061	0	0.061	0.005	0.001
50 Pa (1.04 psf)	0.109	0	0.109	0.008	0.002
75 Pa (1.57 psf)	0.143	0	0.143	0.011	0.002
100 Pa (2.09 psf)	0.172	0	0.172	0.014	0.003
150 Pa (3.13 psf)	0.236	0	0.236	0.018	0.004
250 Pa (5.22 psf)	0.366	0	0.366	0.026	0.006
300 Pa (6.27 psf)	0.406	0	0.406	0.021	0.006

Note: Reference Appendix A for Air Leakage Charts and 95% confidence Interval

Note: By means of two All-thread rods incorporated at the sides of the top panel, the drift joint was then racked 3/4" to each side for three cycles and returned to the nominal position.

6.0 Test Results: (Continued)

Air Infiltration (after drift joint racking sequence)

Pressure	Total Leakage (cfm)	Tare (cfm)	Specimen Leakage (cfm)	Leakage Rate	
				(L/s•m ²)	(cfm/ft ²)
25 Pa (0.52 psf)	0.055	0	0.055	0.004	0.001
50 Pa (1.04 psf)	0.103	0	0.103	0.008	0.002
75 Pa (1.57 psf)	0.125	0	0.125	0.010	0.002
100 Pa (2.09 psf)	0.172	0	0.172	0.014	0.003
150 Pa (3.13 psf)	0.246	0	0.246	0.019	0.004
250 Pa (5.22 psf)	0.339	0	0.339	0.027	0.005
300 Pa (6.27 psf)	0.388	0	0.388	0.031	0.006

Air Exfiltration (after drift joint racking sequence)

Pressure	Total Leakage (cfm)	Tare (cfm)	Specimen Leakage (cfm)	Leakage Rate	
				(L/s•m ²)	(cfm/ft ²)
25 Pa (0.52 psf)	0.073	0	0.073	0.006	0.001
50 Pa (1.04 psf)	0.117	0	0.117	0.009	0.002
75 Pa (1.57 psf)	0.149	0	0.149	0.012	0.002
100 Pa (2.09 psf)	0.188	0	0.188	0.015	0.003
150 Pa (3.13 psf)	0.240	0	0.240	0.019	0.004
250 Pa (5.22 psf)	0.360	0	0.360	0.029	0.006
300 Pa (6.27 psf)	0.436	0	0.436	0.035	0.007

Note: Reference Appendix A for Air Leakage Charts and 95% confidence Interval

6.0 Test Results: (Continued)

Title of Test	Results	Allowed
Water Penetration, per ASTM E 331 at 300 Pa (6.24 psf)	See Notes (Two hour duration)	No Leakage
<p>Observations:</p> <ol style="list-style-type: none"> 1. After approximately 61 minutes, water penetrated internal to the duct. No leakage occurring from the perimeter of the penetration. 2. After approximately 108 minutes, some water dripping from the interior of the duct. All dripping is relative to leaks internal to the duct. No leakage occurring from the perimeter of the penetration. 3. Testing was terminated after 120 minutes of water spray with a 6.24 psf pressure difference. 		

Air Infiltration (After water resistance test sequence)

Pressure	Total Leakage (cfm)	Tare (cfm)	Specimen Leakage (cfm)	Leakage Rate	
				(L/s•m ²)	(cfm/ft ²)
25 Pa (0.52 psf)	0.083	0	0.083	0.007	0.001
50 Pa (1.04 psf)	0.101	0	0.101	0.008	0.002
75 Pa (1.57 psf)	0.142	0	0.142	0.011	0.002
100 Pa (2.09 psf)	0.158	0	0.158	0.013	0.002
150 Pa (3.13 psf)	0.162	0	0.162	0.013	0.003
250 Pa (5.22 psf)	0.299	0	0.299	0.024	0.005
300 Pa (6.27 psf)	0.329	0	0.329	0.026	0.005

The service life of this report will expire on the stated Test Record Retention End Date, at which time such materials as drawings, data sheets, samples of test specimens, copies of this report, and any other pertinent project documentation, shall be discarded without notice.

If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made. 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 specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, Inc.

Joseph E. Allison
Senior Technician

Lynn George
Director – Regional Operations

JPG:sld

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

Appendix-A: Charts (5)

Appendix-B: Photographs (5)

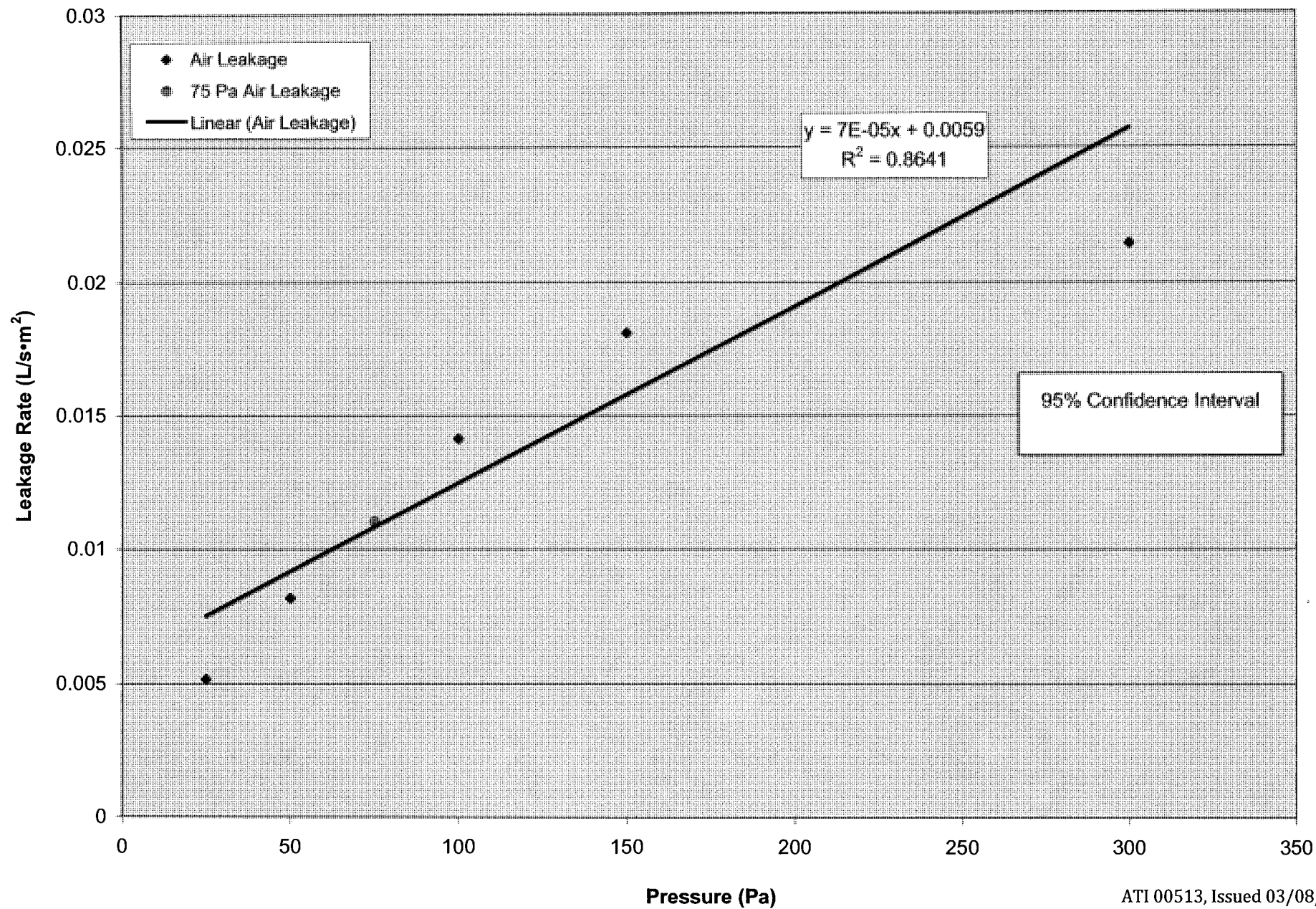
This report produced from controlled document template ATI 00523, issued 03/08/11.

Appendix A

Charts



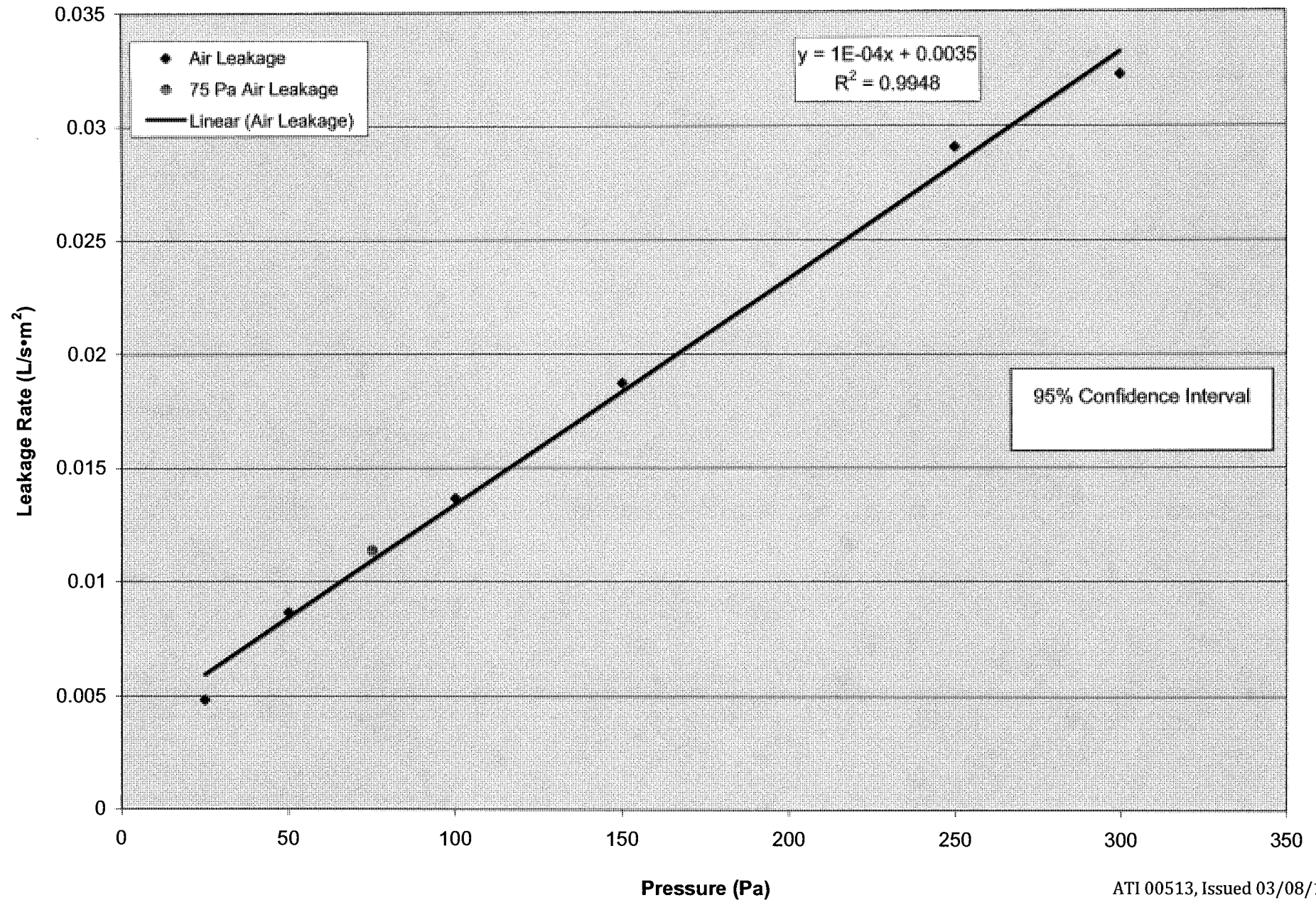
Specimen #1 - Air Infiltration
(Before racking the drift joint)





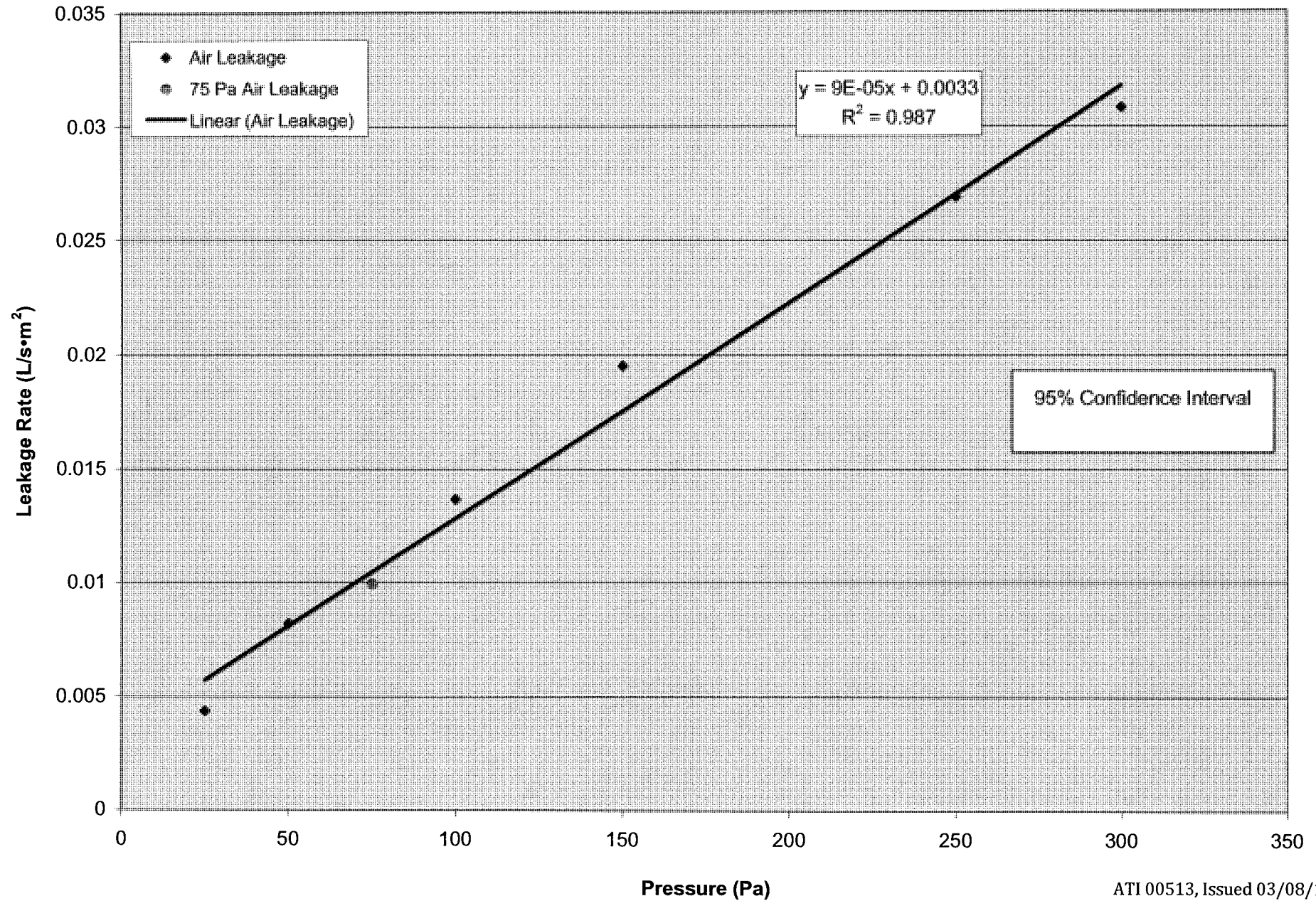
Architectural Testing, Inc.

**Specimen #1 - Air Exfiltration
(Before racking the drift joint)**





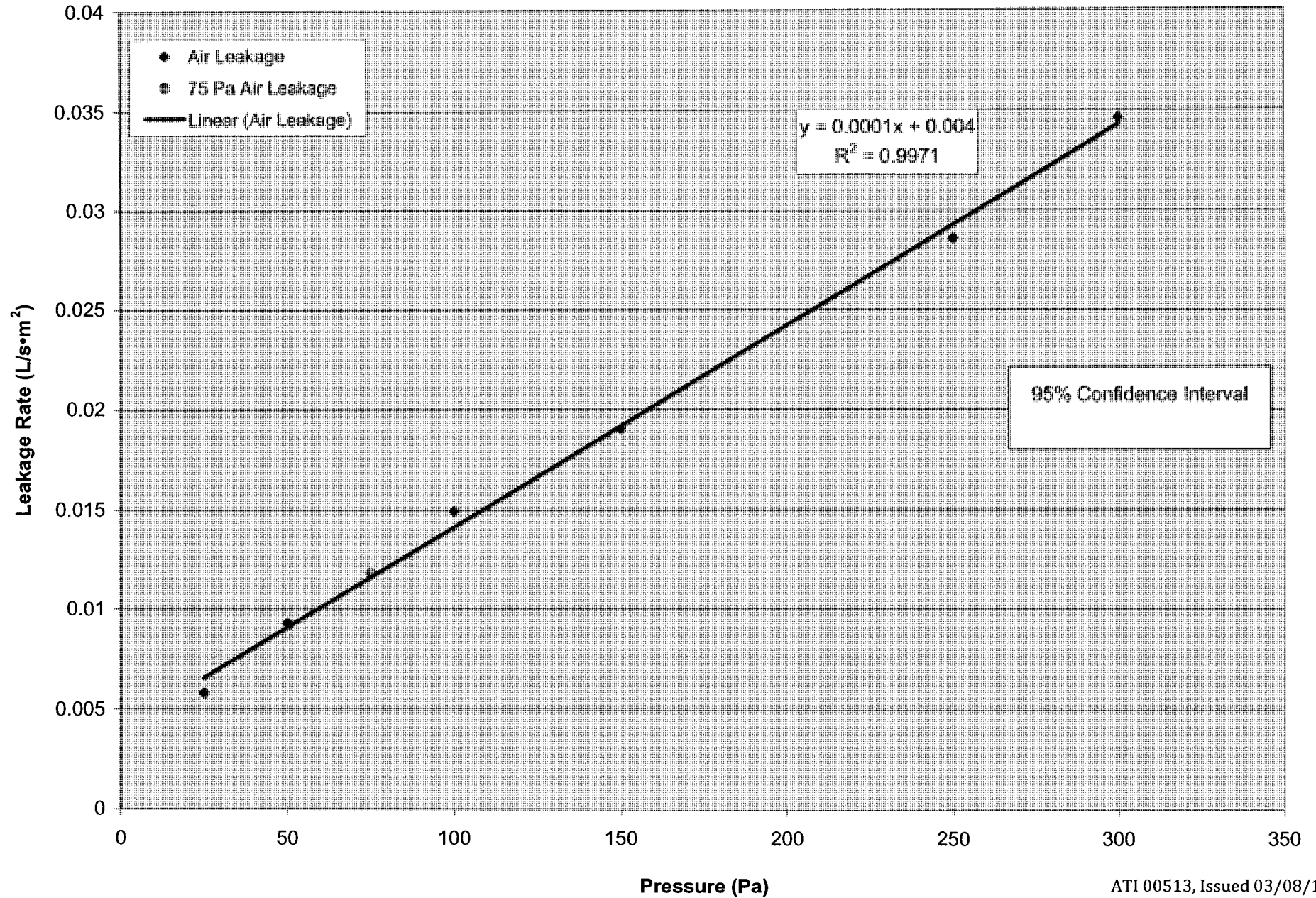
Architectural Testing, Inc.

**Specimen #1 - Air Infiltration
(After racking the drift joint)**



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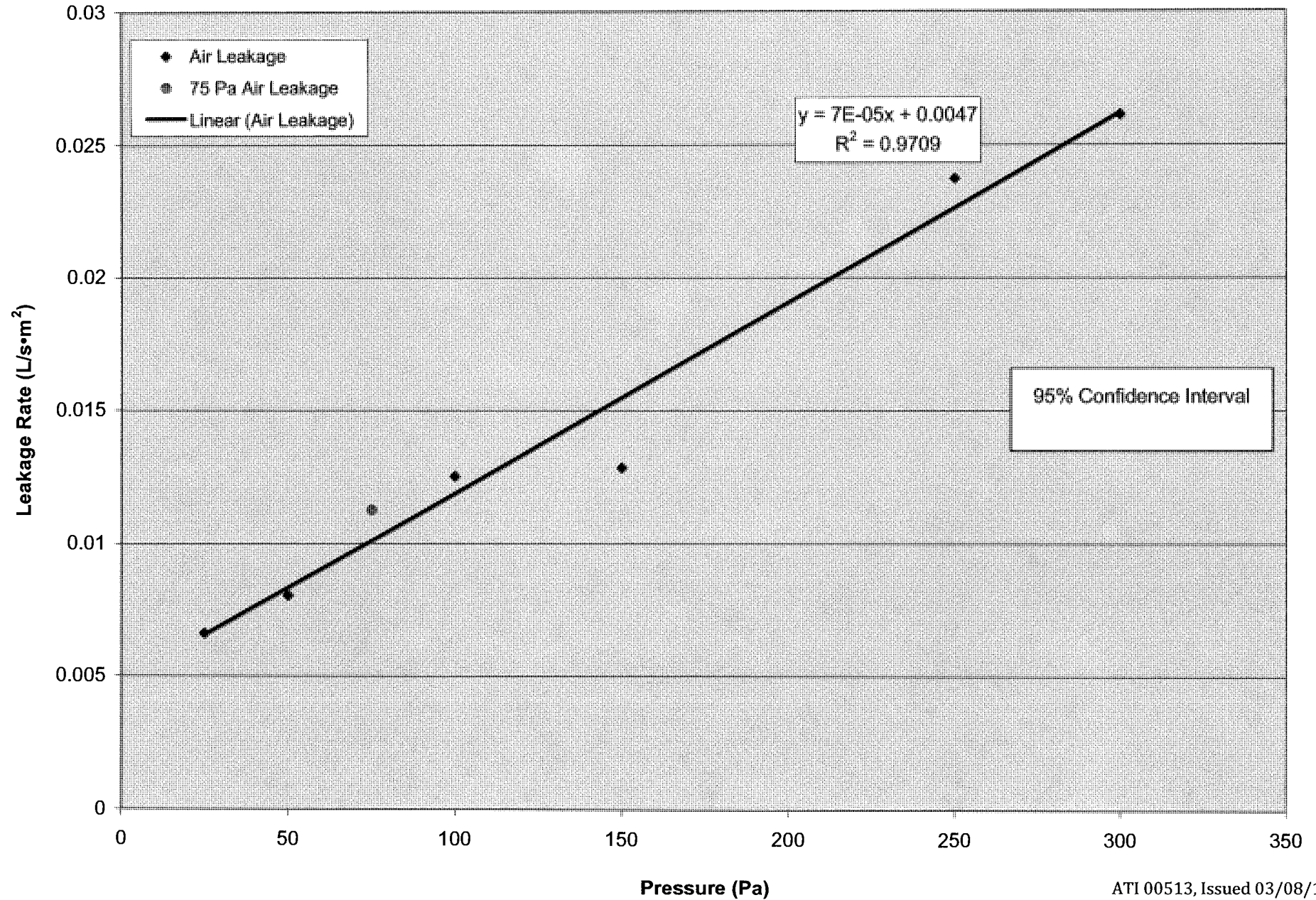
**Specimen #1 - Air Exfiltration
(After racking the drift joint)**





Architectural Testing, Inc.

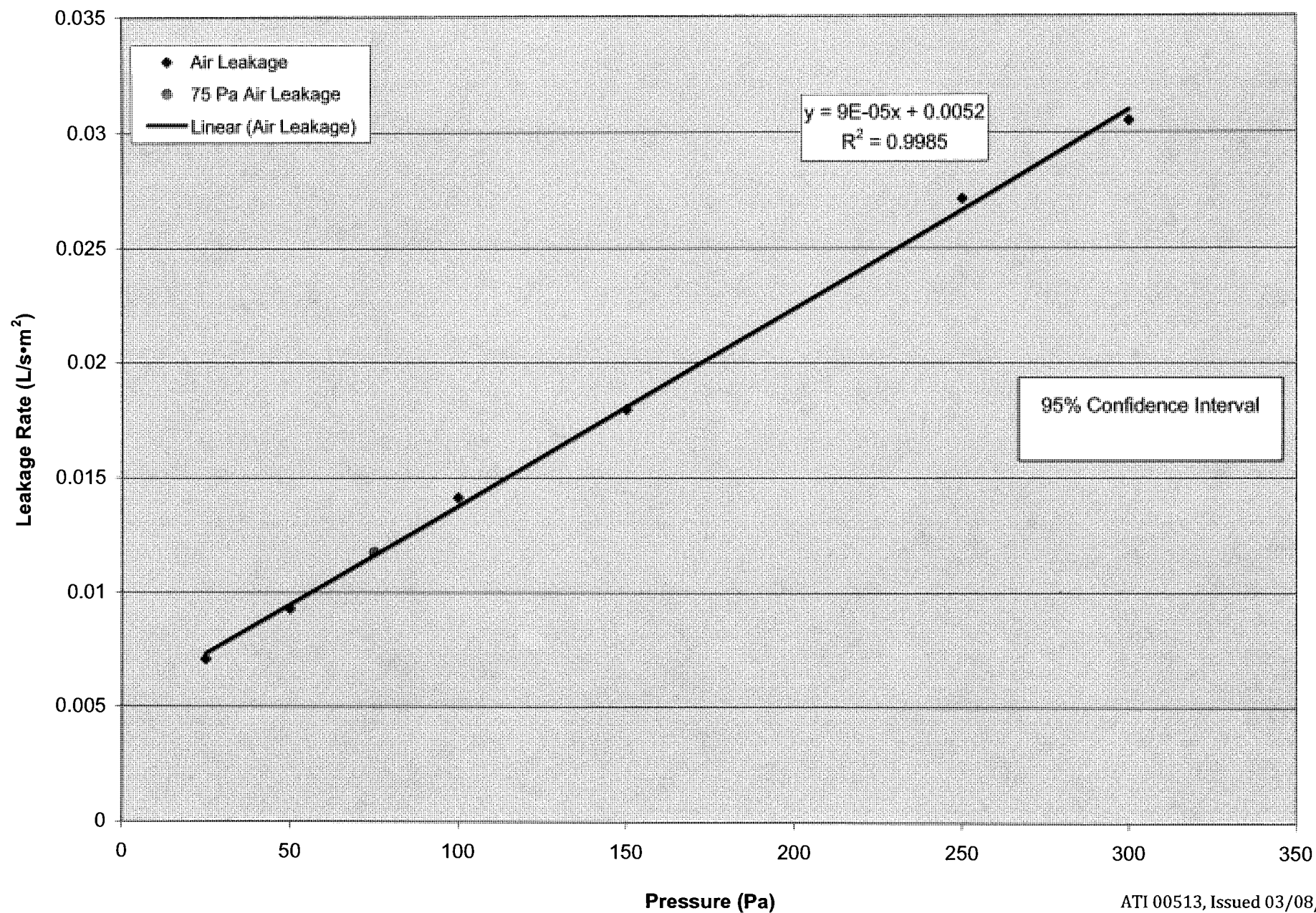
Specimen #1 - Air Infiltration (After water test)





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Specimen #1 - Air Exfiltration (After water test)



Appendix B

Photographs



Photo No. 1
Exterior view of wall system



Photo No. 2
Interior view of wall system



Photo No. 3
Interior view of drift joint



Photo No. 4
Exterior view of drift joint



Photo No. 5
Interior view of water penetration internal of duct dripping out