



#### FIELD TEST REPORT

#### Rendered to:

# REAL ESTATE AND CONSTRUCTION SERVICES DEPARTMENT OF ADMINISTRATION STATE OF MINNESOTA

**PROJECT:** New Replacement Windows – Phase I

State Capital Building St. Paul, Minnesota

Report No.: D7138.01-201-43

Test Dates: Through:

07/21/14 07/25/14

Report Date:

08/01/14

Consultant's Report





#### FIELD TEST REPORT

#### Rendered to:

#### REAL ESTATE AND CONSTRUCTION SERVICES

Department of Administration State of Minnesota 301 Administration Building 50 Sherburne Avenue St. Paul, Minnesota 55155

> Report No.: D7138.01-201-43 Test Dates: 07/21/14 Through: 07/25/14

Report Date:

08/01/14

**Project Identification**: New Replacement Windows – Phase I

State Capital Building St. Paul, Minnesota

**Project Summary**: Architectural Testing was contracted to perform on-site testing at the above referenced project. Air infiltration and water penetration tests were conducted on nine (9) specimens consisting of a wood single hung and fixed windows. The specimens tested met the performance requirements listed herein.

**Test Methods**: Tests were conducted in accordance with the following:

AAMA 502-12, Voluntary Specification for Field Testing of Newly Installed Fenestration Products.

ASTM E 783-02 (Re-Approved 2010), Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

ASTM E 1105–00 (Re-Approved 2008), Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

#### **Pre-Test Inspection:**

A visual inspection of the designated test areas were performed prior to testing. The operable test specimens were operated, closed, and locked prior to testing. No obvious deficiencies were observed.







#### **Test Procedure**:

The perimeter of the chamber was attached and sealed to exterior stone surrounding the window openings. The stone and mortar joints surrounding the test areas were shielded from the test conditions with plastic, duct tape and sealant (only the window frame and sash were tested).

The chambers were equipped with a centrifugal blower/vacuum pump, air flow meter, and a pressure sensing device to maintain the desired air pressure differential across the assembly.

Air infiltration tests were conducted at 6.24 psf pressure differential for the fixed windows and 1.57 psf pressure differential for the operating windows.

Water penetration tests were conducted at 3.06 psf air pressure differential. Four cycles were employed during the test. Each cycle consisted of 5 minutes with the air pressure applied and 1 minute with the air pressure released. Water was applied continuously at the required rate of 5gph/ft<sup>2</sup>. During testing, the interior face of the test area was inspected for water leakage.

Performance Criteria: Provided by Real Estate and Construction Services per job site specifications.

Operable at 1.57 psf: 0.45 cfm/ft<sup>2</sup> Fixed at 6.24 psf: 0.10 cfm/ft<sup>2</sup> Maximum Allowable Air Infiltration:

Water Leakage: (Field Water Definition)

#### TEST RESULTS

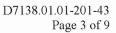
**Date**: 07/21/14

Ambient Exterior Air Temperature: 81°F Barometric Pressure: 29.86 in.

General Note #1: All locations referenced are as viewed from the interior unless otherwise noted.

General Note #2: Unless specifically noted within this report, atmospheric conditions at the time of testing did not have an adverse impact on the results of the test. These environmental conditions are recorded for informational use only to confirm that the conditions will not have a negative impact on testing.

General Note #3: The test areas were chosen by the client or client representative.







Test Results: (Continued)

## **Test Specimen #1**:

Manufacturer: Re-View Windows

Description: Wood Fixed Window – Type A Overall Size: 60" wide by 83-5/16" high

Location: North elevation, ground floor, GN07

| Title of Test                   | Test Results            | <u>Allowable</u>        |
|---------------------------------|-------------------------|-------------------------|
| Air Infiltration @ 6.24 psf     | $0.02 \text{ cfm/ft}^2$ | $0.10 \text{ cfm/ft}^2$ |
| Water Penetration<br>@ 3.06 psf | No water leakage        | No water leakage        |

## **TEST RESULTS**

**Date**: 07/22/14

**Ambient Exterior Air Temperature**: 76°F **Barometric Pressure**: 29.96 in.

#### **Test Specimen #2**:

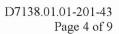
Manufacturer: Re-View Windows

Description: Wood Single Hung Arch Top Window – Type D

Overall Size: 66" wide by 131" high

Location: North elevation, first floor, 1N12

| Title of Test                   | <b>Test Results</b>       | <u>Allowable</u>        |
|---------------------------------|---------------------------|-------------------------|
| Air Infiltration<br>@ 1.57 psf  | $0.10  \mathrm{cfm/ft}^2$ | $0.45 \text{ cfm/ft}^2$ |
| Water Penetration<br>@ 3.06 psf | No water leakage          | No water leakage        |







# TEST RESULTS

**Date**: .07/23/14

**Ambient Exterior Air Temperature**: 70°F **Barometric Pressure**: 30.19 in.

## **Test Specimen #3**:

Manufacturer: Re-View Windows

Description: Wood Single Hung Arch Top Window – Type H

Overall Size: 60-1/4" wide by 117-5/8" high Location: East elevation, first floor, 1E20

| <b>Title of Test</b>            | Test Results            | <u>Allowable</u>        |
|---------------------------------|-------------------------|-------------------------|
| Air Infiltration<br>@ 1.57 psf  | $0.04 \text{ cfm/ft}^2$ | $0.45 \text{ cfm/ft}^2$ |
| Water Penetration<br>@ 3.06 psf | No water leakage        | No water leakage        |

## **Test Specimen #4**:

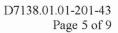
Manufacturer: Re-View Windows

Description: Wood Single Hung Window - Type J

Overall Size: 63" wide by 120" high

Location: North elevation, second floor, 2N13

| Title of Test                  | <u>Test Results</u>      | <u>Allowable</u>        |
|--------------------------------|--------------------------|-------------------------|
| Air Infiltration<br>@ 1.57 psf | 0.03 cfm/ft <sup>2</sup> | $0.45 \text{ cfm/ft}^2$ |
| Water Penetration @ 3.06 psf   | No water leakage         | No water leakage        |







## **TEST RESULTS**

**Date**: 07/24/14

**Ambient Exterior Air Temperature**: 70°F Barometric Pressure: 30.04 in.

# **Test Specimen #5**:

Manufacturer: Re-View Windows

Description: Wood Single Hung Window - Type J

Overall Size: 63" wide by 120" high

East elevation, second floor, 2E17 Location:

| <b>Title of Test</b>            | <b>Test Results</b>     | <u>Allowable</u>        |
|---------------------------------|-------------------------|-------------------------|
| Air Infiltration<br>@ 1.57 psf  | $0.03 \text{ cfm/ft}^2$ | $0.45 \text{ cfm/ft}^2$ |
| Water Penetration<br>@ 3.06 psf | No water leakage        | No water leakage        |

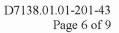
## **Test Specimen #6**:

Manufacturer: Re-View Windows

Description: Wood Fixed Window - Type O Overall Size: 50-1/8" wide by 97-3/4" high

East elevation, second floor landing, 2E15 Location:

| Title of Test                  | <u>Test Results</u>     | <u>Allowable</u>          |
|--------------------------------|-------------------------|---------------------------|
| Air Infiltration<br>@ 6.24 psf | $0.01 \text{ cfm/ft}^2$ | $0.10  \mathrm{cfm/ft}^2$ |
| Water Penetration  @ 3.06 psf  | No water leakage        | No water leakage          |







# TEST RESULTS

**Date**: 07/25/14

**Ambient Exterior Air Temperature**: 72°F **Barometric Pressure**: 29.82 in.

# **Test Specimen #7**:

Manufacturer: Re-View Windows

Description: Wood Single Hung Window - Type S

Overall Size: 52" wide by 63-5/8" high

Location: East elevation, third floor, 3E21

| Title of Test                   | Test Results            | Allowable               |
|---------------------------------|-------------------------|-------------------------|
| Air Infiltration<br>@ 1.57 psf  | $0.07  \text{cfm/ft}^2$ | $0.45 \text{ cfm/ft}^2$ |
| Water Penetration<br>@ 3.06 psf | No water leakage        | No water leakage        |

## **Test Specimen #8**:

Manufacturer: Re-View Windows

Description: Wood Single Hung Window - Type J

Overall Size: 56" wide by 74-7/8" high

Location: East elevation, third floor, 3E04

| <u>Title of Test</u>            | Test Results             | <u>Allowable</u>        |
|---------------------------------|--------------------------|-------------------------|
| Air Infiltration<br>@ 1.57 psf  | 0.02 cfm/ft <sup>2</sup> | $0.45 \text{ cfm/ft}^2$ |
| Water Penetration<br>@ 3.06 psf | No water leakage         | No water leakage        |





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Test Results: (Continued)

**Test Specimen #9**:

Manufacturer: Re-View Windows

Description: Wood Single Hung Arch Top Window – Type A

Overall Size: 60" wide by 83" high

Location: East elevation, Ground, GE15

| <b>Title of Test</b>           | <b>Test Results</b>     | Allowable               |
|--------------------------------|-------------------------|-------------------------|
| Air Infiltration<br>@ 1.57 psf | $0.04 \text{ cfm/ft}^2$ | $0.45 \text{ cfm/ft}^2$ |
| Water Penetration  @ 3.06 psf  | No water leakage        | No water leakage        |

Witnesses: The following representatives witnessed all or part of the testing.

| Name          | Company                     |
|---------------|-----------------------------|
| Deb Young     | HGA                         |
| Todd Maxwell  | Re-view Windows             |
| Mark Pelz     | Architectural Testing, Inc. |
| Dax R. Stoehr | Architectural Testing, Inc. |





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This report is prepared for the convenience of our customer and endeavors to provide accurate and timely project information. It contains a summary of observations made by a qualified representative of Architectural Testing. This report is intended to help in your Quality Assurance Program, but it does not represent a continuous nor exhaustive evaluation. The statements made herein do not constitute approval, disapproval, certification, acceptance of performance or materials, or an endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested.

A copy of this report will be retained by Architectural Testing for a period of four years from the report date. Architectural Testing will service this report for the entire test record retention period. Test records such as detailed drawings, data sheets, representative sample of test specimens or other pertinent project documentation will be retained by Architectural Testing for the entire test retention period.

For ARCHITECTURAL TESTING, INC:

Digitally Signed by: Dax Stoehr

Dax R. Stoehr Technician Daniel A. Johnson

Director – Regional Operations

DRS/jb

Attachments (pages): This report is complete only when all attachments listed are included. Appendix A: Photographs (2 pages)





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# **Revision Log**

| <u>Rev. #</u> | <b>Date</b> | Page(s) | Revision(s)            |
|---------------|-------------|---------|------------------------|
| 0             | 08/01/14    | N/A     | Original report issue. |





# APPENDIX A

# **Photographs**





Photo No. 1: exterior isolation.



Photo No. 2: Exterior view with chamber installed.





Photo No. 3: Interior view.