TEST REPORT

REPORT NUMBER: 102724484COQ-001A
ORIGINAL ISSUE DATE: October 25, 2016
REVISION DATE: December 8, 2016
2nd REVISION DATE: June 5, 2017

EVALUATION CENTER
Intertek Testing Services NA Ltd.
1500 Brigantine Drive
Coquitlam, BC V3K 7C1
Canada

RENDERED TO
TRICO ALUMINUM PRODUCTS LTD.
UNIT #306, 20285 STEWARD CRESCENT
MAPLE REIDGE, BC
V2X 8G1

Manufacturer:	**Trico Aluminum Products Ltd.**
Product Type:	**Aluminum Multi-Lite Fixed Window Combination**
Product Series:	**CW Series**
Specification/Standard:	**AAMA/WDMA/CSA 101/I.S.2/A440-08** **AAMA/WDMA/CSA 101/I.S.2/A440-11** **A440S1-09** **ASTM E331-00(2016)**
Evaluation Properties:	**Air Leakage Resistance** **Water Penetration Resistance – Static & Cyclic**
Evaluated Results:	**Air Leakage Resistance @ 75 Pa (Infiltration/Exfiltration) = Fixed** **Air Leakage Resistance @ 300 Pa (Infiltration/Exfiltration) = Fixed** **Water Penetration Resistance = (Can) PG100 @ 730 Pa (15.3 psf)**
Test Completion Date:	**November 25, 2016**

1 Table of Contents

2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted testing for Trico Aluminum Products Ltd. (Trico) on 2400 mm x 2400 mm (94.5" x 94.5") CW Series Aluminum Multi-Lite Fixed Combination Window system. Testing was conducted in accordance with following standard / specification for Air Leakage Resistance and Water Penetration Resistance testing only:

- AAMA/WDMA/CSA 101/I.S.2/ A440-08 *"Standard/Specification for windows, doors, and unit skylights"* (NAFS-08)
- AAMA/WDMA/CSA 101/I.S.2/ A440-11 *"Standard/Specification for windows, doors, and unit skylights"* (NAFS-11)
- A440S1-09 *"Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for windows, doors, and skylights"* (A440S1)

This evaluation was started on September 21, 2016 and completed on November 25, 2016.

3 Test Samples

3.1. SAMPLE SELECTION

The sample was not selected by an Intertek representative and was received at the Coquitlam Evaluation Center on September 20, 2016.

The test specimen identification is as provided by the client and Intertek accepts no responsibility for any inaccuracies therein. Intertek has not verified the composition, manufacturing techniques or quality assurance procedures.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The thermally broken Aluminum Multi-lite Fixed Combination Window system had an overall size of 2440 mm x 2440 mm (96" x 96"). The unit was configured as a 2 by 2 fixed lite system separated by a full length vertical mullion and split horizontal mullions.

A description of the assembly along with a set of profile drawings provided by DBH Glass & Aluminum Ltd. can be found in Appendix A of this report. A photo of the assembly during testing can be found in Appendix B of this report.

4 Testing and Evaluation Methods

4.1. WATER PENETRATION RESISTANCE – CYCLIC

A four-cycle Water Penetration Resistance test was performed in accordance with ASTM E547-00(2016) *"Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Air Pressure Difference"* (ASTM E547). The test was performed using the specified pressure differential and a water spray rate of at least 204 L/m^2 per hour (5.0 U.S. gal/ft^2 per hour). Each cycle consisted of five minutes with the pressure applied and one minute with the pressure released, during which the water spray was continuously applied.

4.2. WATER PENETRATION RESISTANCE - STATIC

A static Water Penetration Resistance test was performed in accordance with ASTM E331-00(2016) *"Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Static Air Pressure Difference"* (ASTM E331). The test was performed using the specified pressure differential and a water spray rate of at least 204 L/m^2 per hour (5.0 U.S. gal/ft^2 per hour). The pressure was applied for 15 minutes during which the water spray was continuously applied.

4.3. AIR LEAKAGE RESISTANCE

The Air Leakage Resistance test was performed in accordance with ASTM E283-04(2012), *"Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen"*. Air infiltration and exfiltration tests were performed using test pressures of 75 Pa (1.57 psf) and 300 Pa (6.27 psf). The maximum air leakage rate was calculated and compared to the allowable air leakage.

4.4. DEVIATION FROM STANDARD METHOD

There were no noted deviations from the test standards used in the evaluation reported herein.

5 Test Apparatus

Equipment used during testing is listed as follows:

Test	Equipment	Intertek ID#
Air Leakage and Water Penetration Resistance	Fenestration Testing Control Unit	60650
	Water spray assembly	60651
		60652
		60653

6 Testing and Evaluation Methods

6.1. WATER PENETRATION RESISTANCE – CYCLIC

During the 24-minute test period, using a pressure differential of 730 Pa (15.3 psf), there was no water leakage observed. The system **met** the **(CAN) PG100** Water Penetration Resistance performance requirements under NAFS-08, NAFS-11 and A440S1.

6.2. WATER PENETRATION RESISTANCE – STATIC

During the 15-minute test period, using a pressure differential of 730 Pa (15.3 psf), there was no water leakage observed. The system **met** the **730 Pa (15.3 psf)** Water Penetration Resistance – Static performance requirements when tested to ASTM E331 using the evaluation criteria of A440S1.

6.3. AIR LEAKAGE RESISTANCE – November 25, 2016

Air test data is indicated in the following table:

Overall Assembly	
Area:	5.76 m^2, 62.00 ft^2
Infiltration rate @ 75 Pa:	0.01 L/s*m^2, 0.00 cfm/ft^2
Exfiltration rate @ 75 Pa:	0.01 L/s*m^2, 0.00 cfm/ft^2
Infiltration rate @ 300 Pa:	0.01 L/s*m^2, 0.00 cfm/ft^2
Exfiltration rate @ 300 Pa:	0.01 L/s*m^2, 0.00 cfm/ft^2
Allowable Leakage Rates	
Maximum allowable air leakage rate (US):	1.5 L/s*m^2, 0.3 cfm/ft^2
Maximum allowable air leakage rate (CAN – Fixed):	0.2 L/s*m^2, 0.04 cfm/ft^2

The overall system **met** the US performance requirements as well as the **Fixed** Canadian performance requirements at 75 Pa and 300 Pa when evaluated under NAFS-11 and A440S1.

7 Conclusion

The CW Series Aluminum Multi-Lite Fixed Combination system tested and described herein achieved the **Fixed** Air Leakage Resistance and **(Can) PG100** Water Penetration Resistance performance requirements when tested in accordance with NAFS-08, NAFS-11 and A440S1 as well as the 730 Pa (15.3 psf) performance requirements when tested to ASTM E331 with the A440S1 evaluation criteria.

INTERTEK TESTING SERVICES NA LTD.

Reported by: _____
David Park
Technician – Building Products

Reviewed by: _____
Riccardo DeSantis
Manager – Building Products Canada

APPENDIX A

Drawings – 6 Pages

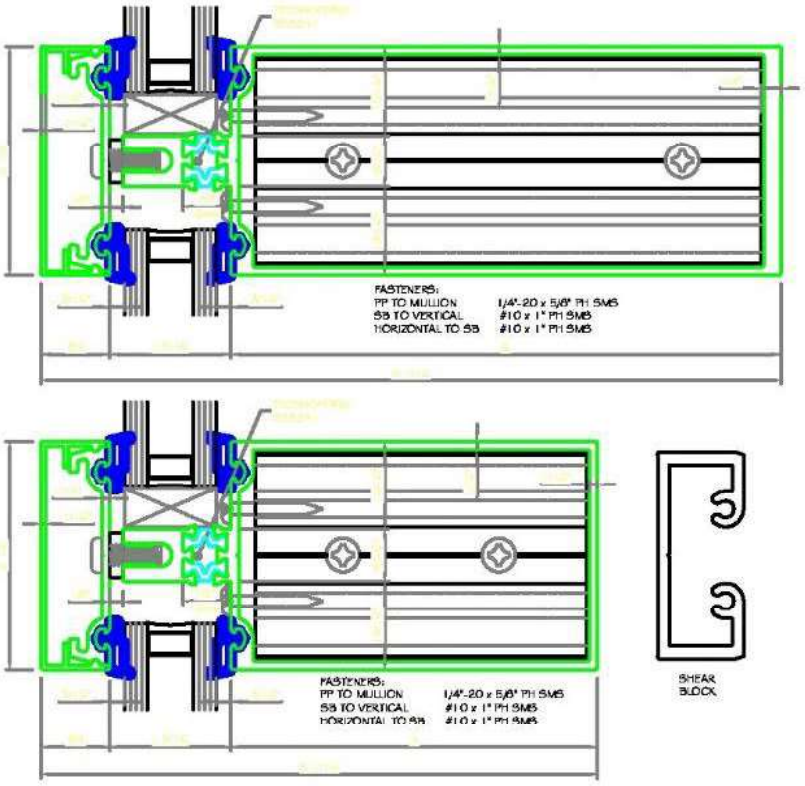
DBH GLASS & ALUMINUM Ltd.

CW SERIES

CW series is a spigot assembled curtain wall system.

- The mullions are attached via spigot with 4 #10 X 3/4" tek screws.
- The horizontal mullion is attached to the spigot by 2 #10 X 1 1/4" FHSM screws.
- All connections are sealed with Tremco 440- 1/16" shim tape.
- All corners a dammed with corner blocks (poly-chlor 1734) and sealed with Dow Corning CWS.
- Gaskets are installed on curtain wall: Nose (poly-chlor 2182) thermal gasket and to glass line pocket custom step gasket (poly-chlor 1841 stile)
- Pressure plate is installed via screw spline (nose) using ¾" ¼-20 stainless steel screws at 6" intervals. Full length gasket (poly-chlor 1841 stile) to pressure plate.
- Capped with Beauty Cover Cap. Weep holes on Horizontals at 6" from either end.

- For testing purposes the Installation box is lined with 1"X3" angles to fasten curtain wall with #10 X3/4" and foil skinned to allow for a proper ASTM E331 Static water test.
- Glass is 1" over all. 6mm on 6mm argon filled. Sitting on ¼" rubber setting blocks.



APPENDIX B

Photos – 1 Page

CW Series Multi-lite Fixed Combination Window – Water Penetration Test Set-up

APPENDIX C

Revision Table – 1 Page

Revision Table				
Date	**Section**	**Description**	**Technician**	**Reviewer**
Oct 25/16	----	Original Issue Date	----	----
Dec 8/16	General Report	Air Leakage Resistance testing had been added to this report with the testing performed on Nov 25/16.		
Jun 5/17	General Report	Updated company name to Trico Aluminum Products Ltd.