

Nd mTEST REPORT

Intertek

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EVALUATION CENTER

INTERTEK TESTING SERVICES NA LTD.
1500 BRIGANTINE DRIVE
COQUITLAM, BC V3K 7C1

RENDERED TO

KOROLITE ENGINEERED PANEL STRUCTURES LTD.
19402 – 56TH AVENUE
SURREY, BC
V3S 6K4

PRODUCT EVALUATED:
K-Lock Structural Insulated Panels (SIP) – Surface Seal

EVALUATION PROPERTY:
Air Leakage and Water Penetration

Report of K-Lock Structural Insulated Panels (SIP) tested in accordance with the following:

- **ASTM E283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen**
- **ASTM E331-00 (2009), Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference**

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2 Introduction

Intertek Testing Services NA Ltd. (Intertek) has conducted air leakage and water penetration testing for Korolite Engineered Panel Structures Ltd. on a structural insulated panel product. The testing was carried out in accordance with the following:

- ASTM 283-04, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*
- ASTM E331-00 (2009), *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*

This evaluation was completed during the month of January 2012.

3 Test Samples

3.1. SAMPLE SELECTION

Intertek representative, Adam Mantei, sampled and witnessed the manufacture of the structural insulated panel product on October 26, 2011. The sample selection process and witnessing was conducted at 19402 – 56TH Avenue, Surrey, BC. Products were selected in accordance with recognized independent sampling procedures, and were received at the Evaluation Center on November 1, 2011.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The product was identified as the K-Lock Structural Insulated Panel (SIP), an insulated sandwich panel consisting of metal outer skins bonded to a Type I expanded polystyrene (EPS) foam core. The metal skin is G90 galvanized prepainted steel in 26ga standard thickness. The panels are manufactured in thicknesses ranging from 2 in. to 12 in. For testing purposes, panels measuring 4 ft. wide x 10 ft. high x 4 in. thick were used. Three (3) test panels were used to construct a 12 ft. wide x 10 ft. high wall assembly. The panels were joined along the vertical with the K-Lock tongue and groove connection. Korolite Engineered Panel Structures Ltd. representatives were present to construct the test assembly. The test sample was sealed along the surface of the panel joints on both the interior and exterior sides of the test assembly using Tremco Proglaze silicone sealant. Refer to Figure 1 below for assembled test sample.



Photo 1. Test Assembly

4 Testing and Evaluation Methods

4.1. CONDITIONING

Before testing, the sample materials were maintained in standard laboratory conditions for a minimum of 48 hours at a temperature of $73 \pm 4^{\circ}\text{F}$ ($23 \pm 2^{\circ}\text{C}$) and relative humidity of $50 \pm 20\%$.

4.2. AIR LEAKAGE TEST

Air leakage was tested in accordance with ASTM E283-04. A nominal 2 in. x 12 in. lumber test frame was sealed around the perimeter of the test assembly. The test specimen was sealed to a vertical pressure chamber and tested for air leakage resistance at a pressure differential of 300 Pa. For testing purposes, a sheet of polyethylene film was sealed to the face area of the test specimen to provide a completely sealed test specimen. The pressure differential was applied to the test specimen, and the extraneous air flow was then measured. The polyethylene sheet was then removed and while still maintaining the correct pressure differential, the total air flow was measured. The air leakage through the test specimen was calculated as follows:

$$Q_s = Q_t - Q_e \quad \text{Where}$$

Q_s	=	Air leakage through the test specimen, L/s (ft^3/min)
Q_t	=	Measured total air flow, L/s (ft^3/min)
Q_e	=	Measured extraneous air flow, L/s (ft^3/min)

The air leakage through the test specimen per unit area was calculated as follows:

$$q_A = Q_s/A$$

Where

- q_A = Air leakage per unit area, L/(s·m²) (ft³/min·ft²)
- Q_s = Air leakage through the test specimen, L/s (ft³/min)
- A = Area, m² (ft²)

4.3. WATER PENETRATION TEST

Water penetration testing was conducted in accordance with ASTM E331-00 (2009). A nominal 2 in. x 12 in. lumber test frame was sealed around the perimeter of the test assembly. The test assembly was placed against a water spray and pressure chamber, and then subjected to 137 Pa (2.86 psf) of pressure with a continuing water spray at 5.0 US gal/ft²h (3.4 L/m²min). The pressure and specified rate of water spray was maintained for 15 minutes. Throughout the duration of the test, the panel was inspected for any sign of water penetration through the test panel.

5 Testing and Evaluation Methods

The test results for the Korolite panels are shown in Table 1 below:

Description	Test	Result	
K-Lock Structural Insulated Panel (SIP) – 4 in. thick (panel joint was sealed along the surface on interior and exterior faces)	Air Leakage	Infiltration	0.002 (L/s)/m ²
		Exfiltration	0.002 (L/s)/m ²
	Water Penetration	The assembly showed no sign of any water penetration. The assembly passed the water penetration test.	

6 Conclusion

The Korolite Engineered Panel Structures Ltd. SIP product identified and evaluated in this report has been tested in accordance with the following:

- ASTM 283-04, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*
- ASTM E331-00 (2009), *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.*


The product test results are presented in Section 5 of this report.

INTERTEK TESTING SERVICES NA LTD.

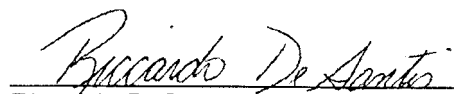
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APPENDIX A: Test Data (2 pages)



AIR TEST DATA

Date: 6-Jan-12
Project No.: G100498116
Client: Korolite Engineered Panel Structures Ltd.
Product: K-Lock SIP - 3 Panel Wall System w/ Surface Sealant
Size: 12 ft x 10 ft
Standard: ASTM E283-04, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, C. Walls, and Doors under Specified Pressure Differences Across the Specimen*

Air Leakage Resistance Test

Equipment:	Make:	Model No.:	Serial No.:	ITS ID#
Laminar Flow Element:	Meriam	Z50MW20-2F	705960-W1	
Differential Pressure:	Meriam	40HE35-WM	705960-W2	
Chamber Pressure (75 Pa):	Dwyer	0-0.5 "H ₂ O		2101
Inlet Pressure:	Dwyer	0-4 "H ₂ O		2100

Area: $\frac{3658}{11.150}$ mm Wide x $\frac{3048}{120.013}$ mm High = $\frac{11149584}{}$ mm²
 $\frac{11.150}{}$ m² $\frac{120.013}{}$ ft²

Test Pressure: 300 Pa
Corrected Air Leakage Rate (Infiltration): (L/s)/m²: 0.002
cfm/ft²: 0.000
Corrected Air Leakage Rate (Exfiltration): (L/s)/m²: 0.002



WATER LEAKAGE TEST

Date: 6-Jan-12
Project No.: G100498116
Client: Korolite Engineered Panel Structures Ltd.
Product: K-Lock SIP - 3 Panel Wall System w/ Surface Sealant
Size: 12 ft x 10 ft
Standard: ASTM E331-00 (2009), *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Differenece*

Size: Width: 3658 mm 144.02 inches
Height: 3048 mm 120.00 inches


Equipment: Manometer: Dwyer U-4" H₂O, Intertek ID#: 2100
Stop Watch: Fisher Scientific, Intertek ID #: 60332

Test Pressure: 137 Pa

Observations: Start Time: 10:50 End Time: 11:05

No Leakage Found - Pass 137 Pa
Results: Pass

Tested By: 
David Park

Reviewed By: 
Riccardo DeSantis