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ARK SYNTHETICS INC.
TEST REPORT

SCOPE OF WORK

REPORT OF ARMOUR AD PRO UNDERLAYMENT TESTED IN ACCORDANCE WITH ASTM D1970/D1970M-21, *STANDARD SPECIFICATION FOR SELF-ADHERING POLYMER MODIFIED BITUMINOUS SHEET MATERIALS USED AS STEEP ROOFING UNDERLAYMENT FOR ICE DAM PROTECTION*

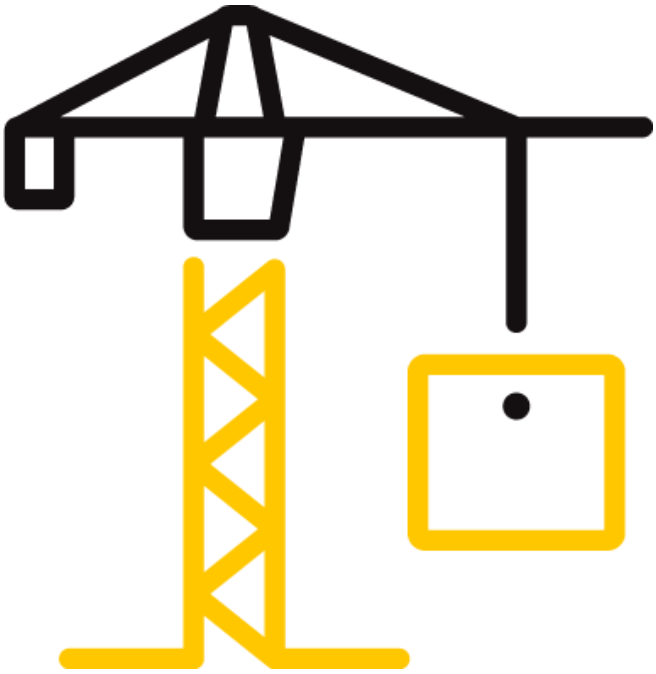
REPORT NUMBER
105714229COQ-006

TEST DATE(S)
04/10/25 – 06/23/25

ISSUE DATE
06/25/25

PAGES
25

DOCUMENT CONTROL NUMBER
GFT-OP-10c (09/29/20)



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TEST REPORT FOR ARK SYNTHETICS INC.
Report No.: 105714229COQ-006
Date: 06/25/25

REPORT ISSUED TO

ARK SYNTHEICS INC.
114-5788 Birney Ave
Vancouver, B.C
V6S 0A9
Canada

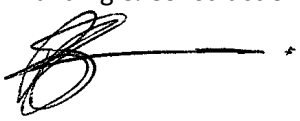
SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Ark Synthetics Inc., 114-5788 Birney Ave, Vancouver, B.C, V6S 0A9, Canada, to perform testing in accordance with ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*, on their Armour AD Pro Underlayment product. Results obtained are tested values and were secured by using the designated test method. Testing was conducted at the Intertek test facility in Coquitlam, BC, Canada.

Unless differently required, Intertek reports apply the "Simple Acceptance" rule also called “Shared Risk approach,” of ILAC-G8:09/2019, Guidelines on Decision Rules and Statements of Conformity.

For INTERTEK B&C:

COMPLETED BY:	Frank Gadea-Lopez	**REVIEWED BY:**	Baldeep Sandhu
TITLE:	Sr. Tech. – Building & Construction	**TITLE:**	Manager – Building & Construction
SIGNATURE:		**SIGNATURE:**	
DATE:	06/25/25	**DATE:**	06/25/25

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Report No.: 105714229COQ-006
Date: 06/25/25

SECTION 2

SUMMARY OF TEST RESULTS

TABLE 1. TEST RESULTS			
PROPERTY	**RESULT**	**REQUIREMENT**	**PASS/FAIL**
Unroll-ability			
▪ 40 °F (4.4°C)	No cracking or sticking	No cracking or sticking	Pass
▪ 140°F (60°C)	No cracking or sticking	No cracking or sticking	Pass
Thickness, mils			
▪ Sheet Thickness	44	≥ 40	Pass
▪ Selvage Thickness	43	≥ 40	Pass
Maximum Load, lbf/in			
▪ Machine Direction	112	≥ 25	Pass
▪ Cross Direction	67	≥ 25	Pass
Elongation at Break, %			
▪ Machine Direction	57	≥ 10	Pass
▪ Cross Direction	52	≥ 10	Pass
Adhesion to Plywood, lbf/ft width			
▪ 39.2 °F (4°C)	117.1	≥ 2.0	Pass
▪ 73.4°F (23°C)	32.4	≥ 12.0	Pass
Thermal Stability, in			
▪ 158°F (70°C)	0.0	≤ 0.1	Pass
Flexibility at -20°F (-29°C)	No cracking or delamination observed	No cracking or delamination observed	Pass
Tear Resistance, lbf			
▪ Machine Direction	139	≥ 20	Pass
▪ Cross Direction	136	≥ 20	Pass
Moisture Vapor Permeance, perms	0.01	≤ 0.1	Pass
Sealability Around Nail	No water on underside of substrate, on shank of the fasteners, or between material and substrate	No water on underside of substrate, on shank of the fasteners, or between material and substrate	Pass
Waterproof Integrity of Lap Seam	No sign of water between plywood and membrane	No sign of water between plywood and membrane	Pass

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SECTION 3
TEST METHOD

The specimen was evaluated in accordance with the following:

> **ASTM D1970/D1970M-21**, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*

SECTION 4
MATERIAL SOURCE/INSTALLATION

Intertek representative, David Xu, randomly sampled the roofing underlayment product on December 28, 2024. The sample selection process was conducted at Devrel Building Materials (Langfang) Co., Ltd., Liugezhuang Village, Dacheng County, Langfang City Hebei Province, China. The product was selected in accordance with recognized independent sampling procedures and were received at the Evaluation Center on February 7, 2025 (Coquitlam ID# VAN2502071234-001).

SECTION 5
EQUIPMENT

Calibration of test equipment was performed by Intertek B&C in accordance with ISO 17025 requirements.

ASSET #	DESCRIPTION	MODEL	CAL DUE DATE
P60557	Graphtec Temperature Data Logger	GL220	01/09/26
P60613	Shell Lab Oven	HF25-2	N/A
D8279	Graphtec Temperature Data Logger	GL240	07/11/25
P60359	Thermotron Environmental Chamber	SM-32C	N/A
D7849	Hobo Onset Temperature and Humidity Logger	MX1101	05/09/26
02684	Mitutoyo Digital Gauge with 9.5 mm Foot	C150 1050	06/21/25
P60553	Instron Universal Testing Machine	3382	10/11/25
P52650	Mitutoyo Digital Caliper	CD-8	06/28/25
P60494	Stanley Tape Measure	FatMax	12/03/25
D7851	Hobo Onset Thermocouple Logger	UX100-014M	05/09/26
P60609	Despatch Oven	LBB 1-69A	N/A
D7847	Ohaus Digital Scale	PX4202	01/22/26
9-0473	ASTM E96 Chamber	N/A	N/A

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TEST REPORT FOR ARK SYNTHETICS INC.
Report No.: 105714229COQ-006
Date: 06/25/25

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Frank Gadea-Lopez	Intertek B&C
Chris Chang	Intertek B&C

The above observer witnessed the test program.

SECTION 7
CONDITIONING

Unless stated otherwise, the test specimen materials were held in standard laboratory conditions for at least 48 hours at a temperature of 23 ± 2°C (73.4 ± 4°F) and relative humidity of 50 ± 5 %.

UNROLL-ABILITY

The roll of product was placed in a room operating at 4.4°C (40°F) for at least 24 hours. The product was then unrolled and evaluated for any evidence of cracking, or any stickiness during the unrolling process that may cause cracking, tearing, or other damage. The test was repeated for a temperature of 60°C (140°F).

THICKNESS

The thickness was determined in accordance with Section 7.2 of ASTM D1970/D1970M-21 with reference to ASTM D5147/D5147M-18, *Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material*, at five points across the roll width and the selvage edge. Thickness measurements were taken at two points, each 150 mm (6 in.) from edge, and at three points equally spaced between two points.

MAXIMUM LOAD AND ELONGATION AT BREAK

Maximum load and elongation at break were determined in accordance with Section 7.3 of ASTM D1970/D1970M-21 with reference to ASTM D5147/D5147M-18, *Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material*. Five (5) specimens, each measuring 25 mm (1 in.) wide by 150 mm (6 in.) long, in both machine and cross directions were cut. The clamp separation was 75 mm (3 in.) and the rate of separation of 50 mm/min (2 in./min) was used. The maximum load and percent elongation of each specimen was recorded and reported.

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TEST REPORT FOR ARK SYNTHETICS INC.
Report No.: 105714229COQ-006
Date: 06/25/25

ADHESION TO PLYWOOD

Adhesion to plywood was determined as per Section 7.4 of ASTM D1970/D1970M-21 with reference to ASTM D903-98(2017), *Standard Test Method for Peel or Stripping Strength of Adhesive Bonds*. Five (5) pieces of underlayment sheets in both the machine and cross directions, 75 mm x 200 mm (3 in. x 8 in.), were cut and bonded for 15 in^2 (3 in. x 5 in.) to a piece of 6 mm (1/4 in.) minimum thick plywood, APA Grade, Exposure 1, 75 mm x 150 mm (3 in. x 6 in.). Samples were rolled back and forth at 2 to 3 s per cycle with a roller which had a mass of 11.8 kg (26 lb), diameter of 125 mm (5 in.) and width of 125 mm (5 in.). The test was performed at 23 ± 2°C (73.4 ± 3.6°F) at the rate of 25 mm (1 in.)/min. The specimens were conditioned at the test temperature for at least 1 h prior to testing. The free end of the plywood was clamped in one grip in the tensile tester and the free end of the sheet was turned back and clamped in the other grip. Peel strength was determined on the chart as the average recorded load line from peeling the bonded area in 75 mm (3 in.) of bonded length. The test was repeated for a temperature of 4 ± 2°C (39.2 ± 3.6°F).

THERMAL STABILITY

Thermal stability was determined as per Section 7.5 of ASTM D1970/D1970M-21with reference to ASTM D1204-14, *Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature*. Five (5) 100 mm x 100 mm (4 in. x 4 in.) underlayment sheets were cut, centered and bonded to one piece of ¼ in. thick plywood, 150 mm x 200 mm (6 in. by 8 in.). The specimens were set at a 45° angle in an air-circulating oven for 14 days at 70 ± 2°C (158 ± 4°F). At the end of the exposure period, specimens were left in 23.9 ± 1.1°C (75 ± 2°F) and 50% relative humidity for at least 4 h. The furthest point of modified butyl flow from the lower edge of the sheet was measured.

FLEXIBILITY AT -29°C (-20°F)

Low temperature flexibility was determined as per Section 7.6 of ASTM D1970/D1970M-21. Five (5) specimens measuring 25 mm x 150 mm (1 in. x 6 in.) were prepared in both the machine and cross-machine directions of the roll. The specimens and a 25 mm (1 in.) diameter steel mandrel were conditioned in a cold chamber at a temperature of -29 ± 2°C (-20 ± 3.6°F) for a minimum of 2 hours. After conditioning, each specimen was bent over a mandrel with the weathering side down through a 180 ± 5° angle within 2 ± 1 s. Testing was then repeated for samples with the weathering side up. All specimens were visually inspected for any signs of cracking.

TEAR RESISTANCE

Tear resistance was determined as per Section 7.7 of ASTM D1970/D1970M-21 with reference to ASTM D4073-06(2019)e1, *Standard Test Method for Tensile-Tear Strength of Bituminous Roofing Membranes*. Five (5) specimens were prepared as shown in Fig.1 in both the machine and cross-machine directions of the roll. Each test specimen was clamped in the jaws so that the

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jaw faces covered a 75 mm (3 in.) wide by 50 mm (2 in.) area of the specimen at each end. The specimen was tested at a rate of 50 mm/min (2.0 in/min). The average tear strength in each direction was reported.

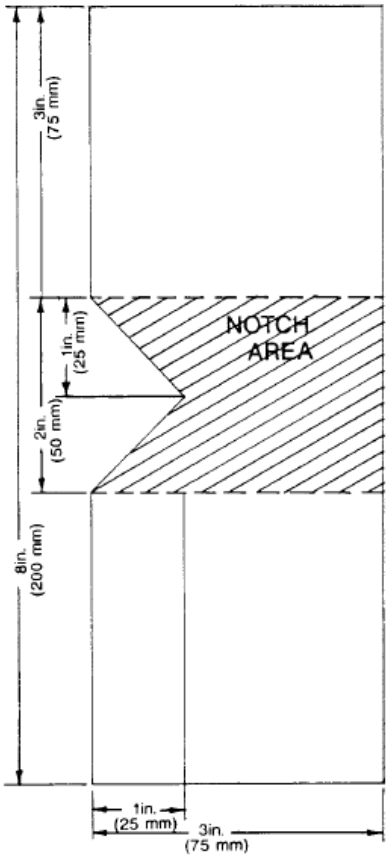

Figure 1. Tensile Tear Sample

MOISTURE VAPOR PERMEANCE

The water vapor permeability was determined as per Section 7.8 of ASTM D1970/D1970M-21 with reference to ASTM E96/E96M-24, *Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials*, desiccant method. Four circular specimens of the material were prepared for testing. Three test dishes measuring 229 mm (9 in.) in diameter were filled with calcium chloride to within 6.4 mm (¼-in.) of the top. The circular specimens were then attached to the top of each dish by sealing the perimeter of the material to the dish with a molten wax blend. The specimens were prepared with the product exterior surface placed face up. An additional control specimen was prepared in an identical manner to the other

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three test specimens with the exception that no calcium chloride was placed in the dish. The four assemblies were placed in a controlled chamber operating at a temperature and relative humidity of 23°C and 50% respectively. The assemblies were then weighed periodically until 8 (eight) data points were obtained. The water-vapor transmission was calculated as follows:

WVT = G/tA
WVP = WVT/ΔP = WVT/S (R1-R2) O

where: WVT= rate of water vapor transmission, g/m²s
G= weight change, g
t= time during which G occurred
A= test area, m²

WVP= permeance, g/Pa s m²
ΔP= vapor pressure difference, Pa
S= saturation vapor pressure at test temperature, Pa
R1= relative humidity at the source expressed as a fraction
R2= relative humidity at the vapor sink expressed as a fraction
O= overlap factor

SEALABILITY AROUND NAIL (HEAD OF WATER TEST)

Sealability around nail (head of water test) was conducted as per Section 7.9 of ASTM D1970/D1970M-21 with reference to ASTM D7349/D7349M-15 (Reapproved 2019), *Standard Test Method for Determining the Capability of Roofing and Waterproofing Materials to Seal around Fasteners*. Testing was conducted using Protocol 4. Two (2) 300 mm by 300 mm (12 in. x 12 in.) underlayment sheets were cut and centered on a piece of 12 mm (15/32 in.) minimum thick (APA Rated, Exposure 1) plywood. The film was peeled off the self-stick underlayment sheet and the membrane was rolled a total of three back and forth cycles using an 11.8 kg (26 lb) roller with a 125 mm (5 in.) diameter and 125 mm (5 in.) width. Each cycle was completed in 4 to 6 seconds. A 75 mm x 75 mm (3 in. x 3 in.) single-thickness piece of ASTM D3462-labelled asphalt shingle material was placed on top of the test specimen. Two (2) 32 mm (1.25 in.) galvanized smooth shank steel roofing nails, 25 to 51 mm (1 to 2 in.) apart, were driven near the center of the plywood so that the nail heads were flush with the surface of the sheet. A bottom of a 4L can was cut out and centered, bottom side down, on the membrane. Sealant was applied around the outside and also the inside of the rim of the can to bond to the membrane. The can, after 24 h at ambient temperature, was filled with water to a depth of 125 ± 6 mm (5 ± 0.25 in.) with distilled water. The entire assembly was placed in a refrigerator at 4 ± 2°C (39.2 ± 3.6°F) for a period of 72 ± 0.25 hours. A visual inspection of the water in the bottom can, on the nail shanks, on the underside of the plywood, under the intervening material, and between the plywood and the underlayment sheet was made.

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TEST REPORT FOR ARK SYNTHETICS INC.
Report No.: 105714229COQ-006
Date: 06/25/25

WATERPROOF INTEGRITY OF SIDE LAP SEAM (HEAD OF WATER TEST)

Waterproof integrity of side lap seam (head of water test) was conducted as per Section 7.10 of ASTM D1970/D1970M-21. Two (2) 300 mm by 300 mm (12 in. x 12 in.) underlayment sheets were cut and centered on a piece of 10 mm (3/8 in.) minimum thick (APA Rated, Exposure 1) plywood. Each test specimen consisted of two pieces of underlayment sheet assembled to form a lap seam per the manufacturer's instructions. The film was peeled off the self-stick underlayment sheet for the lower portion of the lap seam and the membrane was rolled a total of three back and forth cycles using a 11.8 kg (26 lb) roller with a 125 mm (5 in.) diameter and 125 mm (5 in.) width. Each cycle was completed in 4 to 6 seconds. From the upper portion of the lap seam, a portion of the release liner was removed to expose the bottom coating that covered the lap. This piece was placed over the previously applied piece to form a lap 3 inches in width. The edges of the sheet were manually pressed down to prevent lifting. Refer to Figure 2 below for detailed drawing of the assembly. A bottom of a 4L can was cut out and centered, bottom side down, on the membrane. Sealant was applied around the outside, as well as the inside of the rim of the can to bond to the membrane. The can, after 24 h at ambient temperature, was filled with water to a depth of 125 ± 6 mm (5 ± 0.25 in.) with distilled water. The entire assembly was placed in a refrigerator at 4 ± 2°C (39.2 ± 3.6°F) for a period of 72 ± 0.25 hours. A visual inspection of the water in the bottom can, on the nail shanks, on the underside of the plywood, under the intervening material, and between the plywood and the underlayment sheet was made.

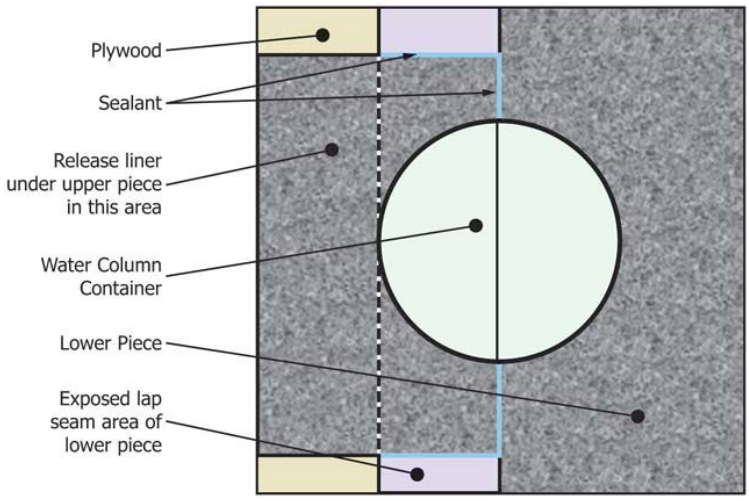

Figure 2. Waterproof Integrity of Side Lap Test Specimen Assembly

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SECTION 8
TEST SPECIMEN DESCRIPTION

Armour AD Pro is a self-adhered synthetic roofing underlayment consisting of a polypropylene mesh on the exposed side, a lamination layer, a polypropylene scrim, and a butyl layer on the sheathing side which is protected by a removable release liner made of silicon-coated paper. It has a nominal weight of 801 gsm (16.41 lbs/100sq.ft).

SECTION 9
TEST RESULTS

A summary of the test results is presented in Section 2 of this test report. See Appendices for a full set of test data.

SECTION 10
CONCLUSION

The Ark Synthetics Inc. Armour AD Pro Underlayment product identified and evaluated in this report has met the requirements contained in ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*.

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TEST REPORT FOR ARK SYNTHETICS INC.
Report No.: 105714229COQ-006
Date: 06/25/25

SECTION 11
APPENDIX A – TEST DATA (13 PAGES)

Company	Ark Synthetics Inc	Technician(s)	Chris Chang / Frank Gadea-Lopez
Project No.	G105714229	Reviewer	Baldeep Sandhu
Models	Armour AD Pro	Start/End Date	April 10, - June 23,2025
Product Name	Same as above	Sample ID	VAN2502071234-001
Standard	**ASTM D1970/D1970M-21, *Standard Specification For Self-Adhering Polymer Modified Bituminous Sheet Materials Used As Steep Roofing Underlayment For Ice Dam Protection***		

Test Data Package

Table of Contents

Test:	**Unroll-ability**	Project #:	G105714229
Date:	19-Jun-25	Eng./Tech:	Frank Gadea-Lopez
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product Tested:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada

Test Method: ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*

Samp size: Roll of membrane

Test Temps: 4.4 °C (40 °F)
60 °C (140 °F)

Equipment: Graphtec Midi Logger (Intertek ID# P60557, cal due January 9, 2026)
Shell Lab Oven (Intertek ID# P60613)
Graphtec Midi Logger (Intertek ID# D8279, cal due July 11, 2025)
Thermotron Environmental Chamber (Intertek ID# P60359)

Time/Temp/RH: 9:00AM / 22.1°C / 50.0%

Unroll-ability @ 4.4 °C Start: 9:00AM
Finish: 9:00AM

Rolled membrane put in cold chamber at 4.4°C for 24 hours before being unrolled

Observations/Comments: **No cracking, sticking, tearing or other damage when unrolled**

Unroll-ability @ 60 °C Start: 9:00AM
Finish: 9:00AM

Rolled membrane put in heat chamber at 60°C for 24 hours before being unrolled

Observations/Comments: **No cracking, sticking, tearing or other damage when unrolled**

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Test: **Thickness**
Date: 6-Jun-25
Client: Ark Synthetics Inc
Product: **Armour AD Pro**
Specimen ID: **As Received**
Test Standard(s): ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*
ASTM D5147/D5147M-18, *Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material*
Conditioning: Minimum 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 5%
Equipment: Hobo Onset MX1101 Temperature and Humidity Logger (Intertek ID# D7849, cal due May 9, 2026)
Mitutoyo Digital Deflection Gauge with 9.5 mm Presser Foot (Intertek ID# 02684, cal due June 21, 2025)
Time/Temp/RH: 12:20PM / 23.5°C / 51.5%

Project #: G105714229
Eng./Tech: Chris Chang
Reviewer: Baldeep Sandhu
Location: Coquitlam, BC, Canada

Specimen	Sheet Thickness		Selvage Thickness	
	Thickness (mm)	Thickness (mil)	Thickness (mm)	Thickness (mil)
1	1.1	44	1.1	44
2	1.2	47	1.1	43
3	1.1	42	1.1	42
4	1.1	43	1.1	41
5	1.2	46	1.1	43
Mean:	**1.1**	**44**	**1.1**	**43**
StdDev:	0.1	2.1	0.0	1.2
COV:	4.7%	4.7%	2.7%	2.7%

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Test:	**Maximum Load & % Elongation**	Project #:	G105714229
Date:	6-Jun-25	Eng./Tech:	Chris Chang
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada

Specimen ID: **As Received**

Test Standard(s): ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*
ASTM D5147/D5147M-18, *Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material*

Conditioning: Minimum 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 5%

Sample size: 1 x 6 in. (25.4 x 152.4 mm)

Init. Jaw sep: 3 ins

Crosshead speed: 2 in/min. 50.8 mm/min.

Equipment: Instron 3382 Universal Test Apparatus with 100 kN Load Cell (Intertek ID# P60553, cal due October 11, 2025), BlueHill Version: 4.34.30245
Mitutoyo Digital Caliper (Intertek ID# 52650, cal due June 28, 2025)
Hobo Onset MX1101 Temperature and Humidity Logger (Intertek ID# D7849, cal due May 9, 2026)
Stanley Tape Measure (Intertek ID# P60494, cal due December 3, 2025)

Time/Temp/RH: 2:00PM / 23.5°C / 53.1%

Machine or roll direction

Sample #	Width (ins)	Load @ brk (lbs)	length @ brk(ins)	brk load (lbs/ins)	% E @ brk
1	1.00	116.42	3.9	116.29	29.1%
2	1.00	104.78	5.0	104.82	68.2%
3	1.00	110.53	4.3	110.49	44.1%
4	1.00	116.84	5.2	117.07	72.0%
5	1.00	112.76	5.2	113.12	73.8%
			Mean:	**112.36**	**57.4%**
			StdDev:	4.96	19.9%
			COV:	4.4%	34.6%

Cross Machine direction

Sample #	Width (ins)	Load @ brk (lbs)	length @ brk(ins)	brk load (lbs/ins)	% E @ brk
1	1.00	70.91	4.6	70.88	52.4%
2	1.00	62.14	5.0	62.34	65.3%
3	1.00	66.79	4.3	66.66	42.6%
4	1.00	68.77	4.1	68.47	36.4%
5	1.00	65.26	4.9	65.21	61.7%
			Mean:	**66.71**	**51.7%**
			StdDev:	3.24	12.3%
			COV:	4.9%	23.8%

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Test:	**Adhesion to Plywood - Tested at 4°C (39°F)**	Project #:	G105714229
Date:	19-Jun-25	Eng./Tech:	Frank Gadea-Lopez
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada

Test Methods: ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*
ASTM D903-98(2017), *Standard Test Method for Peel or Stripping Strength of Adhesive Bonds*

Conditioning: Minimum 4 hours at a temperature of 4 ± 2°C

Sample size: 3 x 8 ins. (75 x 203 mm)

Equipment: Instron 3382 Universal Test Apparatus with 100 kN Load Cell (Intertek ID# P60553, cal due October 11, 2025), BlueHill Version: 4.34.30245
Hobo Onset MX1101 Temperature and Humidity Logger (Intertek ID# D7849, cal due May 9, 2026)
Graphtec Midi Logger (Intertek ID# D8279, cal due July 11, 2025)
Thermotron Environmental Chamber (Intertek ID# P60359)

Test Speed: Peel back at 180° at a rate of 50.8mm (2in)/min

Time/Temp/RH: 8:00AM / 22.1°C / 50.0%

Specimen	Width (mm)	Peel Load (lbf)	Peel Load (kgf)	Peel Strength (lbf/ft width)	Peel Strength (kgf/30.5cm)
1	75	38.82	17.61	157.76	71.61
2	75	30.36	13.77	123.37	56.00
3	75	22.68	10.29	92.17	41.83
4	75	23.19	10.52	94.26	42.78
5	75	29.07	13.19	118.14	53.62
	Mean:	**28.82**	**13.1**	**117.1**	**53.17**
	StdDev:	6.55	3.0	26.6	12.09
	COV:	22.7%	22.7%	22.7%	22.7%

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Total Quality. Assured.

Test:	**Adhesion to Plywood - Tested at 23°C (73°F)**	Project #:	G105714229
Date:	6-Jun-25	Eng./Tech:	Chris Chang
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada

Test Methods: ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*
ASTM D903-98(2017), *Standard Test Method for Peel or Stripping Strength of Adhesive Bonds*

Conditioning: Minimum 4 hours at a temperature of 23 ± 2°C

Sample size: 3 x 8 ins. (75 x 203 mm)

Equipment: Instron 3382 Universal Test Apparatus with 100 kN Load Cell (Intertek ID# P60553, cal due October 11, 2025), BlueHill Version: 4.34.30245
Hobo Onset MX1101 Temperature and Humidity Logger (Intertek ID# D7849, cal due May 9, 2026)

Test Speed: Peel back at 180° at a rate of 50.8mm (2in)/min

Time/Temp/RH: 2:45PM / 23.5°C / 52.9%

Specimen	Width (mm)	Peel Load		Peel Strength	
		(lbf)	(kgf)	(lbf/ft width)	(kgf/30.5cm)
1	75	7.90	3.58	32.08	14.56
2	75	7.38	3.35	29.94	13.59
3	75	7.87	3.57	31.91	14.48
4	75	8.57	3.89	34.70	15.75
5	75	8.18	3.71	33.16	15.05
	Mean:	**7.98**	**3.6**	**32.4**	**14.69**
	StdDev:	0.44	0.2	1.8	0.79
	COV:	5.5%	5.5%	5.4%	5.4%

Total Quality. Assured.

Test:	**Thermal Stability**	Project #:	G105714229
Date:	5-Jun-25	Eng./Tech:	Frank Gadea-Lopez
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada
Specimen ID:	**As Received**		

Test Standard(s): ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*
ASTM D1204-14(2020), *Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature*

Conditioning: Minimum 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 5%

Samp size: 4 in. x 4 ins. (100 mm x 100 mm)

Test Temp: 70 ± 2°C (158 ± 4°F)

Equipment: Hobo Onset MX1101 Temperature and Humidity Logger (Intertek ID# D7849, cal due May 9, 2026)
Digital Calipers (Intertek ID# 52650, cal due June 28, 2025)
Onset UX100-014M Thermocouple Logger (Intertek ID# D7851, cal due May 9, 2026)
Despatch Oven (Intertek ID# P60609)

Time/Temp/RH: 8:30AM / 23.1°C / 50.0%

Sample #	Flow acrosss the lower edge of the samples	
	(mm)	(in)
1	0.0	0.00
2	0.0	0.00
3	0.0	0.00
4	0.0	0.00
5	0.0	0.00
Mean:	0.0	0.0
StdDev:	0.0	0.0
COV:	0.0%	0.0%

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Total Quality. Assured.

Test:	**Flexibility at -29°C (-20°F)**	Project #:	G105714229
Date:	17-Jun-25	Eng./Tech:	Chris Chang
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada
Specimen ID:	**As Received**		

Test Standard(s): ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*

Conditioning: Minimum 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 5%

Samp size: 1 in. x 6 ins. (25 mm x 200 mm)

Test Temp: -20°F (-29°C)

Equipment: Graphtec Midi Logger (Intertek ID# D8279, cal due July 11, 2025)
Thermotron Environmental Chamber (Intertek ID# P60359)

Test Method: Samples conditioned at -29°C (-20°F) for 2 hours before testing
Samples bent 180° around 1inch mandrel in 2 s at -20°F (-29°C)

Time/Temp/RH: 10:20AM / 23.1°C / 50.0%

Sample Roll - Machine Direction		
Specimen	**Specimen Orientation**	**Observations**
1	Weathering side up	No cracking
2	Weathering side down	No cracking
3	Weathering side up	No cracking
4	Weathering side down	No cracking
5	Weathering side up	No cracking

Sample Roll - Cross-machine Direction		
Specimen	**Specimen Orientation**	**Observations**
1	Weathering side up	No cracking
2	Weathering side down	No cracking
3	Weathering side up	No cracking
4	Weathering side down	No cracking
5	Weathering side up	No cracking

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Total Quality. Assured.

Test:	**Tear Resistance**	Project #:	G105714229
Date:	17-Jun-25	Eng./Tech:	Frank Gadea-Lopez
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada

Specimen ID: **As Received**

Test Standard(s): ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*
ASTM D4073-06(2019)e1, *Standard Test Method for Tensile -Tear strength of Bituminous Roofing Membrane*

Conditioning: Minimum 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 5%

Samp size: 3 in. x 8 in.

Equipment: Instron 3382 Universal Test Apparatus with 100 kN Load Cell (Intertek ID# P60553, cal due October 11, 2025), BlueHill Version: 4.34.30245
Hobo Onset MX1101 Temperature and Humidity Logger (Intertek ID# D7849, cal due May 9, 2026)
Stanley Tape Measure (Intertek ID# P60494, cal due December 3, 2025)

Crosshead speed: 50 mm/minute (2 ins./minute)

Init. Grip separation: 4 ins.

Time/Temp/RH: 1:00PM / 22.1°C / 49.0%

Tested in roll direction

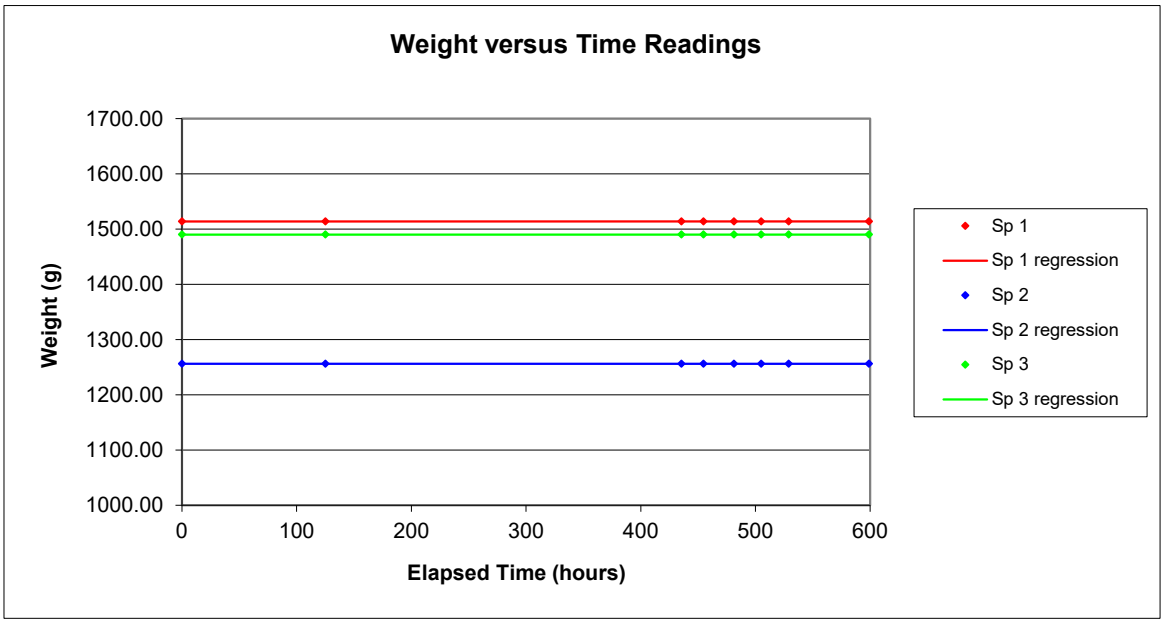
Sample	Max load (lbs)	Tear prop (N)
1	153.1	681.03
2	136.9	608.78
3	124.0	551.53
4	121.0	538.16
5	159.5	709.46
Mean:	**138.9**	**617.79**
StdDev:	17.13	76.18
COV:	12%	12%

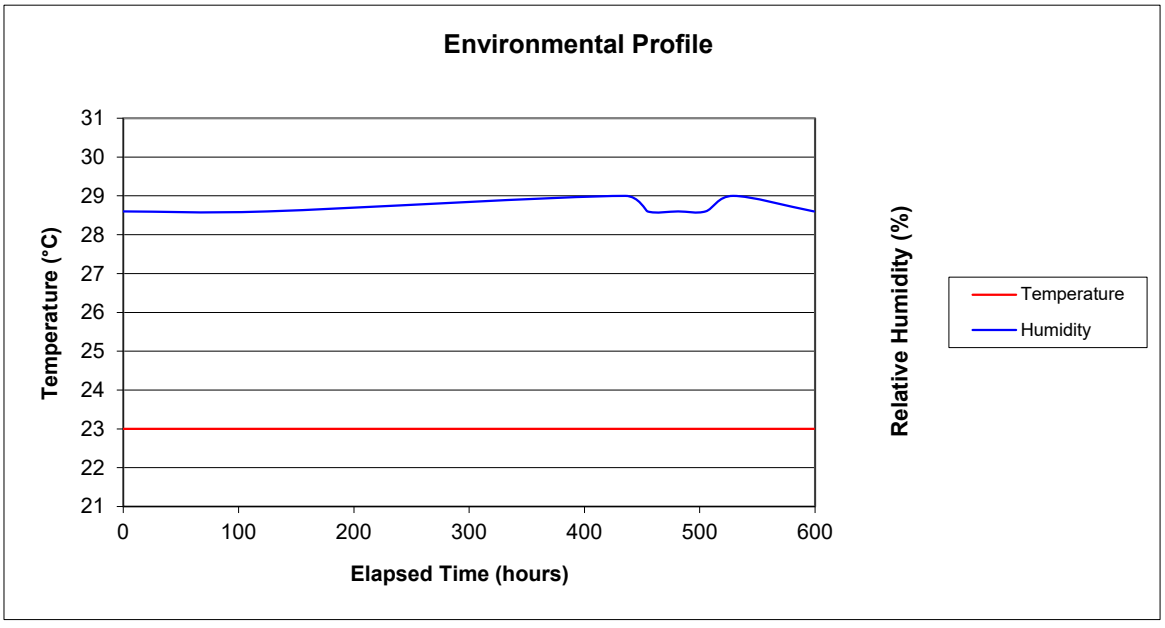
Tested in cross direction

Sample	Max load (lbs)	Tear prop (N)
1	146.1	649.87
2	132.8	590.67
3	143.5	638.17
4	116.1	516.56
5	143.2	636.81
Mean:	**136.3**	**606.42**
StdDev:	12.39	55.09
COV:	9%	9%

Note: Moisture content was not conducted per ASTM D95 as not required by ASTM D1970.

Test:	**Moisture Vapor Permeance**	Project #:	G105714229
Date:	1-Apr-25	Eng./Tech:	Frank Gadea-Lopez
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
	Armour AD Pro	Location:	Coquitlam, BC, Canada





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Test:	**Moisture Vapor Permeance**	Project #:	G105714229
Date:	1-Apr-25	Eng./Tech:	Frank Gadea-Lopez
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada

Test Methods: ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*
ASTM E96/E96M-24, *Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials*

Test Procedure: **Desiccant Method**

Conditioning: 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 2%

Equipment: Ohaus Digital Scale (Intertek ID# D7847, cal due January 22, 2026)
Test Chamber (Intertek ID# 9-0473)
Mitutoyo Digital Caliper (Intertek ID# 52650, cal due June 28, 2025)
Hobo Onset MX1101 Temperature and Humidity Logger (Intertek ID# D7849, cal due May 9, 2026)

Measurement	Specimen		
	1	2	3
Mean Barometric Pressure (kPa)	102.27	102.27	102.27
Mean Air Temperature (°C)	23.00	23.00	23.00
Mean Saturation Vapour Pressure[1] (Pa)	2855	2855	2855
Mean Relative Humidity in chamber (%)	48.5	48.5	48.5
Relative Humidity in test dish (%)	0	0	0
Specimen Weight Change (g)	0.110	0.160	0.080
Moisture Gain of Dessicant (%)	0	0	0
Moisture Gain Control Limit (%)	10	10	10
Effective Test Dish Diameter (mm)	230.0	230.0	230.0
Effective Test Area (m²)	4.15E-02	4.15E-02	4.15E-02
Gradient of weight/time graph (g/hour)	1.73E-04	-6.53E-05	1.12E-04
Specimen Mean Thickness (mm)	0.90	1.01	1.02
Uncorrected Water Transmission (g/hour.m²)	4.16E-03	-1.57E-03	2.69E-03
Uncorrected Water Permeance (ng/Pa.s.m²)	8.34E-01	-3.15E-01	5.40E-01
Permeability of Still Air (ng/Pa.s.m)	1.93E+02	1.93E+02	1.93E+02
Permeance of Still Air (ng/Pa.s.m²)	3.02E+04	3.02E+04	3.02E+04
Vapor Resistance of Still Air (m².s.Pa/kg)	3.31E+07	3.31E+07	3.31E+07
Surface Resistances (m².s.Pa./kg)	4.00E+07	4.00E+07	4.00E+07
Total Still Air and Specimen Surface (m².s.Pa/kg)	7.31E+07	7.31E+07	7.31E+07
Four Times Test Area Divided By Perimeter (m)	2.30E-01	2.30E-01	2.30E-01
Excess Water Transmission Due to Mask (%)	0.34	0.39	0.39
Excess Water Permeance Due to Mask (ng/Pa.s.m²)	2.87E-03	-1.22E-03	2.11E-03
Mask-corrected Water Permeance (ng/Pa.s.m²)	8.31E-01	-3.14E-01	5.38E-01
Water Vapour Transmission (g/hour.m²)	4.15E-03	-1.57E-03	2.68E-03
Water Vapour Permeance (ng/Pa.s.m²)	8.31E-01	-3.14E-01	5.38E-01
Water Vapour Permeability (ng/Pa.s.m)	7.44E-04	-3.16E-04	5.48E-04

[1]Estimated by the Clausius-Clapeyron equation

Test Result Summary	Metric units	Imperial Units
Water Vapor Transmission	1.75E-03 g/hr.m²	2.51E-03 grns/hr.ft²
	4.21E-02 g/day.m²	6.02E-02 grns/day.ft²
Water Vapor Permeance	3.52E-01 ng/Pa.s.m²	6.15E-03 perms
Water Vapor Permeability	3.25E-04 ng/Pa.s.m	2.24E-04 Perm inch

Test:	**Sealability Around Nail**	Project #:	G105714229
Date:	17-Jun-25	Eng./Tech:	Frank Gadea-Lopez
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada
Specimen ID:	**As Received**		

Test Standard(s): ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*
ASTM D7349/D7349M-15(2019), *Standard Test Method for Determining the Capability of Roofing and Waterproofing Materials to Seal around Fasteners*

Conditioning: Minimum 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 5%

Test Duration: Maintained at 4°C for 3 days

Equipment: Graphtec Midi Logger (Intertek ID# D8279, cal due July 11, 2025)
Thermotron Environmental Chamber (Intertek ID# P60359)

Time/Temp/RH: 8:15AM / 22.1°C / 50.0%

Seability Around Nail

Specimen	Test Condition	Pass/Fail
1	As Received	Pass
2	As Received	Pass

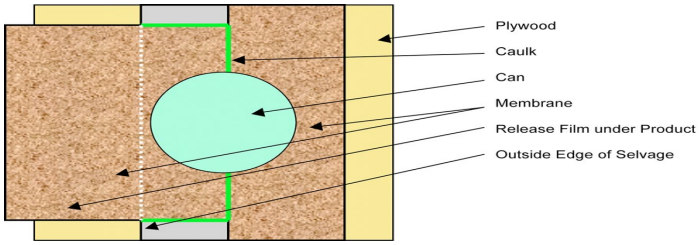
Test:	**Lap Integrity - Lap Seam**	Project #:	G105714229
Date:	17-Jun-25	Eng./Tech:	Frank Gadea-Lopez
Client:	Ark Synthetics Inc	Reviewer:	Baldeep Sandhu
Product:	**Armour AD Pro**	Location:	Coquitlam, BC, Canada
Specimen ID:	**As Received**		

Test Standard(s): ASTM D1970/D1970M-21, *Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection*

Conditioning: Minimum 24 hours at a temperature of 23 ± 2°C and relative humidity of 50 ± 5%

Equipment: Graphtec Midi Logger (Intertek ID# D8279, cal due July 11, 2025)
Thermotron Environmental Chamber (Intertek ID# P60359)

Test Configuration:



Test Duration: Maintained at 4°C for 3 days

Time/Temp/RH: 8:15AM / 22.0°C / 50.0%

Specimen	Test Method	Pass/Fail
1	**See Test Configuration above**	**Pass**
2	**See Test Configuration above**	**Pass**

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SECTION 12
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	06/25/25	N/A	Original Report Issue