TEST REPORT

REPORT NUMBER: 100958340MID-002r1
ORIGINAL ISSUE DATE: JANUARY 30, 2013

EVALUATION CENTER
Intertek Testing Services NA Inc.
8431 Murphy Drive
Middleton, WI 53562

RENDERED TO

LinerLock Inc.
1509 E. McFadden Avenue
Santa Ana, CA 92705

CONTACT:
Mr. Dale Burroughs
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PRODUCT EVALUATED:
LinerLock Underlayment

EVALUATION PROPERTY:
ASTM E108, “Standard Test Methods for Fire Tests of Roof Coverings”

Report of Testing LinerLock Inc’s underlayment for compliance with the applicable requirements of ASTM E108 (2010) *“Standard Test Methods for Fire Tests of Roof Coverings”*, UL 790 (2004) and ICC-ES AC207 (2005) *"Acceptance Criteria for Polypropylene Roof Underlayments".*

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2 Introduction

Intertek Testing Services NA (Intertek) Fire Testing Laboratory in Middleton, Wisconsin conducted an investigation of the external fire resistance characteristics of LinerLock Inc's underlayment, for class "A" application. The samples were received at the laboratory November 8, 2012 in good condition.

The tests were conducted in accordance with the criteria in ICC-ES AC207 (2005)*"Acceptance Criteria for Polypropylene Roof Underlayments"* section 4.8 referencing the Intermittent Flame and Burning Brand tests in accordance with ASTM E108 (2010) *"Standard Test Methods for Fire Tests of Roof Coverings", Section 8 and Section 10* for a "Class A" rating.

3 Test Samples

The plywood decks were constructed by Intertek according to the specifications of test criteria in ASTM E108 (2010) *"Standard Test Methods for Fire Tests of Roof Coverings".* Only Burning Brand and Intermittent Flame tests were conducted per the Standard, with the exception of using 15/32" AC plywood in place of the required 3/8" (per ICC-ES AC 207) per client request.

1. The sample material was selected by an Intertek Representative.
2. The test material was submitted by Intertek Testing Services Vancouver.
3. The test materials were assembled by Intertek technicians.

The samples are described in more detail in the table below.

Deck#	Deck Type	Deck material	System
1	Burning Brand Class 'A'	3/8" A-C Exterior Plywood.	Three tab shingles (190 lb/sq Owens Corning Classic). (1) ply underlayment.
2	Burning Brand Class 'A'	3/8" A-C Exterior Plywood.	Three tab shingles (190 lb/sq Owens Corning Classic). (1) ply underlayment.
3	Burning Brand Class 'A'	3/8" A-C Exterior Plywood.	Three tab shingles (190 lb/sq Owens Corning Classic). (1) ply underlayment.
4	Burning Brand Class 'A'	3/8" A-C Exterior Plywood.	Three tab shingles (190 lb/sq Owens Corning Classic). (1) ply underlayment.
5	Burning Brand Class 'A'	15/32" A-C Exterior Plywood.	Three tab shingles (190 lb/sq Owens Corning Classic). (1) ply underlayment.
6	Burning Brand Class 'A'	15/32" A-C Exterior Plywood.	Three tab shingles (190 lb/sq Owens Corning Classic). (1) ply underlayment.
7	Intermittent Flame Class 'A'	15/32" A-C Exterior Plywood.	Three tab shingles (190 lb/sq Owens Corning Classic). (1) ply underlayment.
8	Intermittent Flame Class 'A'	15/32" A-C Exterior Plywood.	Three tab shingles (190 lb/sq Owens Corning Classic). (1) ply underlayment.

The LinerLock Inc. roofing underlayment was mechanically fastened every 8" on center on the perimeter and 12" on center in the field with ring shank roofing nails with 1" diameter plastic cap.

4 Testing and Evaluation Methods

The tests were conducted in accordance with the criteria in ICC-ES AC207 (2005)*"Acceptance Criteria for Polypropylene Roof Underlayments"* section 4.8 referencing the Intermittent Flame and Burning Brand tests in accordance with ASTM E108 (2010) *"Standard Test Methods for Fire Tests of Roof Coverings", Section 8 and Section 10* for a "Class A" rating. All tests were conducted at 5:12 slope.

5 Test Results

5.1. Calibration

Test Conditions (Class A)

Test Date	12/11/2012
Air Velocity	1056 +/-44 fpm
Slope of Cal. Deck	5:12
Average flame temp	1407ºF
Ambient air temp.	58ºF

Test Conditions (Class A)

Test Date	1/29/2013
Air Velocity	1056 +/-44 fpm
Slope of Cal. Deck	5:12
Average flame temp	NA
Ambient air temp.	81ºF

Test Conditions (Class A)

Test Date	1/31/2013
Air Velocity	1056 +/-44 fpm
Slope of Cal. Deck	5:12
Average flame temp	1399ºF
Ambient air temp.	75ºF

5.2. Results and Observations

Burning Brand:

Test Observations Deck 1

Test Date	12/11/2012
Ambient Air Temperature	74ºF
Brand Type	(1) Class A Brand, 4.71 lb
Slope of Test Deck	5:12

Brand#	Time (min:sec)	Observations
1	00:00	Brand placed on deck.
	00:51	Surface ignition behind brand.
	05:56	Brand ¼ consumed.
	06:35	Smoke from vertical joint, underside.
	08:11	Brand ½ consumed.
	08:54	Discoloration along horizontal joint, underside.
	10:34	Smoke from horizontal joint.
	11:29	Discoloration under brand of plywood.
	12:03	Brand ¾ consumed.
	18:18	Flame out, top side.
	24:16	Smoke out, underside.
	26:51	Glow out, top side. Brand fully consumed.
	75:00	Test stop. Deck cool to touch. No smoke, glow or flame.

Acceptance Level: Class “A”. No flaming underside.

Test Observations Deck 2

Test Date	12/11/2012
Ambient Air Temperature	73ºF
Brand Type	(1) Class A Brand, 4.71 lb
Slope of Test Deck	5:12

Brand#	Time (min:sec)	Observations
1	00:00	Brand placed on deck.
	01:14	Surface ignition behind brand.
	05:42	Smoke at horizontal joint, underside.
	06:37	Brand ¼ consumed.
	09:44	Brand ½ consumed.
	10:20	Discoloration beneath brand.
	12:18	Brand ¾ consumed.
	12:51	Discoloration along horizontal joint, underside.
	19:42	Glow in plywood, underside.
	22:08	Flame out, top side.
	24:51	Glow out, top side. Brand fully consumed.
	36:57	Glow out, underside.
	75:00	Test stop.

Acceptance Level: Class “A”. No flaming underside.

Test Observations Deck 3

Test Date	12/11/2012
Ambient Air Temperature	73ºF
Brand Type	(1) Class A Brand, 4.73 lb
Slope of Test Deck	5:12

Brand#	Time (min:sec)	Observations
1	00:00	Brand placed on deck.
	01:43	Surface ignition behind brand.
	04:26	Smoke from horizontal joint, underside.
	06:32	Brand ¼ consumed.
	07:01	Discoloration along horizontal joint, underside.
	08:40	Asphalt dripping from horizontal joint.
	10:35	Brand ½ consumed.
	12:28	Brand ¾ consumed.
	17:50	Glow on underside at horizontal joint.
	18:17	Flame out, top side.
	26:04	Glow out, top side. Brand fully consumed.
	27:34	Glow out, underside.
	28:42	Glow on underside, beneath brand.
	29:08	Flame of underside.
	30:12	Test stop.

Acceptance Level: None. Flaming of the underside.

Test Observations Deck 4

Test Date	12/11/2012
Ambient Air Temperature	72ºF
Brand Type	(1) Class A Brand, 4.74 lb
Slope of Test Deck	5:12

Brand#	Time (min:sec)	Observations
1	00:00	Brand placed on deck.
	01:25	Surface ignition behind brand.
	05:07	Smoke at horizontal joint, underside.
	07:05	Brand ¼ consumed.
	07:41	Discoloration and asphalt dripping from horizontal joint, underside.
	10:04	Brand ½ consumed.
	10:34	Discoloration beneath brand.
	13:32	Brand ¾ consumed.
	14:20	Glow at horizontal joint, underside.
	16:24	Flame out, top side.
	23:54	Flame on underside.
	25:00	Test stop.

Acceptance Level: None. Flaming of the underside.

Test Observations Deck 5

Test Date	1/29/2013
Ambient Air Temperature	74ºF
Brand Type	(1) Class A Brand, 4.69 lb
Slope of Test Deck	5:12

Brand#	Time (min:sec)	Observations
1	00:00	Brand placed on deck.
	01:21	Surface ignition behind brand.
	03:49	Smoke at horizontal joint, underside.
	05:20	Brand ¼ consumed.
	08:19	Brand ½ consumed.
	09:02	Discoloration at horizontal joint, underside.
	11:03	Brand ¾ consumed.
	14:49	Flame out, top side.
	20:25	Glow at horizontal joint, underside.
	25:13	Glow out, underside.
	27:03	Glow out, top side. Brand fully consumed.
	48:52	Char and glow on underside.
	53:46	Glow out, underside.
	75:00	Test stop. No smoke, glow or flame.

Acceptance Level: Class “A”. No flaming of the underside.

Test Observations Deck 6

Test Date	1/29/2013
Ambient Air Temperature	85ºF
Brand Type	(1) Class A Brand, 4.69 lb
Slope of Test Deck	5:12

Brand#	Time (min:sec)	Observations
1	00:00	Brand placed on deck.
	01:32	Surface ignition behind brand.
	03:49	Smoke at horizontal joint, underside.
	06:04	Brand ¼ consumed.
	06:38	Discoloration and asphalt dripping from horizontal joint, underside.
	08:52	Brand ½ consumed.
	11:35	Brand ¾ consumed.
	15:23	Flame out, top side.
	23:41	Glow out, top side. Brand fully consumed.
	27:48	Smoke out, underside.
	70:00	Test stop. No smoke, glow or flame. Deck cool to touch.

Acceptance Level: Class “A”. No flaming of the underside.

Intermittent Flame Tests

Test Observations Deck: 7

Test Date	1/31/13
Ambient Air Temperature	65ºF
Slope of Test Deck	5:12

Cycle		Time To:		Observations/Comments (Include Off Cycles)
No.	Min.	Ignition (min : sec)	Flame Out (min : sec)	
1	Start	NI	NI	
2	4	NI	NI	
3	8	NI	NI	
4	12	NI	NI	
5	16	NI	NI	
6	20	NI	NI	
7	24	NI	NI	27:07 – Smoke from underside at horizontal joint.
8	28	NI	NI	29:33 – Light discoloration at horizontal joint.
9	32	NI	NI	
10	36	NI	NI	38:50 – Asphalt dripping from horizontal joint.
11	40	NI	NI	
12	44	NI	NI	
13	48	NI	NI	
14	52	NI	NI	
15	56	NI	NI	75:00 – Smoke out, underside. 105:00 – Test stop. No smoke, glow or flame.

Acceptance Level: Class “A” – No flaming of the underside of the deck.

Test Observations Deck: 8

Test Date	1/31/13
Ambient Air Temperature	77ºF
Slope of Test Deck	5:12

Cycle		Time To:		Observations/Comments (Include Off Cycles)
No.	Min.	Ignition (min : sec)	Flame Out (min : sec)	
1	Start	NI	NI	
2	4	NI	NI	
3	8	NI	NI	
4	12	NI	NI	
5	16	NI	NI	
6	20	NI	NI	22:00 – Smoke from underside at horizontal joint.
7	24	NI	NI	
8	28	NI	NI	28:20 – Asphalt dripping from horizontal joint.
9	32	NI	NI	
10	36	NI	NI	
11	40	NI	NI	42:00 – Light glow at horizontal joint.
12	44	NI	NI	
13	48	NI	NI	
14	52	NI	NI	
15	56	NI	NI	65:00 – No smoke, glow or flame. 95:00 – Test stop.

Acceptance Level: Class “A” – No flaming of the underside of the deck.

6 Conclusion

The tests were conducted in accordance with ASTM E108 (2010) *"Standard Test Methods for Fire Tests of Roof Coverings"*, UL 790 (2004) and ICC-ES AC207 (2005)*"Acceptance Criteria for Polypropylene Roof Underlayments"*. Only Burning Brand and Intermittent Flame tests were conducted per the Standard, with the exception of using 15/32" AC plywood in place of the required 3/8" (per ICC-ES AC 207) per client request. The results of testing for LinerLock Inc. are summarized in the table below.

Sample #	Test	Slope	Rating
1	Burning Brand	5:12	Class 'A'
2	Burning Brand	5:12	Class 'A'
3	Burning Brand	5:12	None
4	Burning Brand	5:12	None
5	Burning Brand	5:12	Class 'A'
6	Burning Brand	5:12	Class 'A'

The underlayment applied as specified in this report, complied with the acceptance criteria of ICC-ES AC207 (2005)*"Acceptance Criteria for Polypropylene Roof Underlayments"* for a Class A application at a 5:12 slope with a substitution of 15/32" AC plywood sheathing.

This report does not automatically imply product certification. Products must be under 3rd party certification program registered and bear an accredited agencies' certification mark to demonstrate compliance.

INTERTEK TESTING SERVICES NA

Reported by: Gregory Allen

Gregory Allen
Associate Engineer, Fire Resistance
Intertek Building Products

Reviewed by: Kent Kelsey

Kent Kelsey
Project Manager, Fire Resistance
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APPENDIX A

Photos

Photographs
After tests

Sample 1 (After)

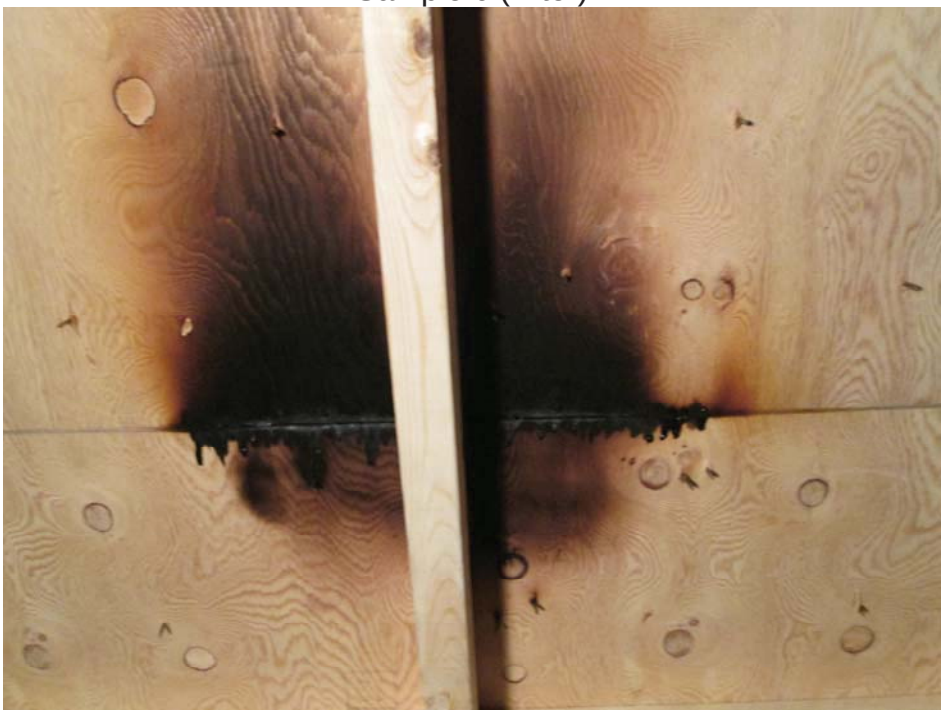
Sample 2 (After)

Sample 3 (After)

Sample 4 (After)

Sample 5 (After)

Sample 6 (After)



Sample 7 (After)

Sample 8 (After)

REVISION SUMMARY

DATE	SUMMARY
12/26/12	Initial report.
1/30/13	Added addition tests.
1/31/13	Added addition tests.