

CLIENT: Ensoltis Corporation
15205 Road 28 ½
Madera, CA 93638

Test Report Number : RJ8197F-1	Date: October 25, 2021
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SAMPLE ID: The client identified the following test material as:
Ensolcomp Above Roof Deck Thermal Insulation System

SAMPLING DETAIL: Test Samples were submitted to the Laboratory directly by the client. No sampling or sample preparation were observed by QAI staff.

DATE OF RECEIPT: Samples were received at QAI facilities on: October 17, 2021

TESTING PERIOD: October 18, 2021, and October 19, 2021.

AUTHORIZATION: Testing was authorized by Lawrence Penner for proposal 21MB07151R2 signed July 29, 2021

TEST REQUESTED: Evaluate the client's roof system in accordance to ASTM E 108-20a which outlines testing to be conducted using the procedures and methods outlined in ASTM E 108-20a "Standard Test Methods for Fire Tests of Roof Coverings".

TEST RESULTS: The Ensoltis Roofing System when installed with 30 year Dimensional Shingles meeting ASTM D 3161 test method, and tested at a 5:12 test slope, has met the requirements of Class A Burning Brand, Class A Spread of Flame and Class A Intermittant Flame modes of ASTM E 108 when tested and evaluated to the requirements outlined in ASTM E 108-20A – UL 790.

Detailed test results are provided on the subsequent pages of this report.

Prepared By



Victor.A.Peinado
Senior Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**



Jason Friedrich P.E.
Engineering Manager

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DETAILS OF THE TESTING

TEST SAMPLE DESCRIPTION

1.0 Description of Test Specimens

Table 1 outlines the Ensoltis Above Roof Deck Thermal Insulation System evaluated by

COMPONENT	SUPPLIER	COMMENT
Framing Type / Species	Lowes	Moisture Content: 8-12%
Douglas Fir No.1		
Sheathing Type / Grade		AC Exterior Grade Plywood
AC Exterior 15/32"	Lowes	
Underlayment 1: Grade / Type:	Ensoltis Corporation	Roofing Underlayment was supplied by the client.
Owens Corning ProArmor Synthetic Roofing Underlayment		
Roof Covering Material 1 / Grade:	Ensoltis Corporation	shingles were supplied by the client.
Owens Corning Sure Nail Shingles		

Table No. 1: Details of the Ensoltis Corporation Roof Covering Test Specimens.

DETAILS OF THE TESTING

2.0 Test Set Up and Procedure:

Storage of Assembled Test Decks

All test deck assemblies were stored indoor at temperatures not lower than 60 °F (16 °C) nor higher than 90 °F (32 °C) for the period of time necessary to cure the assemblies and prior to testing. The test decks were stored in such a manner to assure that each deck was surrounded by free circulating air.

A photograph of the assembled test deck is provided in Appendix B of this report.

Roof System and Deck Assembly Construction Details

Lumber: Nominal 2" X 4" Douglas Fir, moisture content between 8-12%.

Deck: 15/32" AC Exterior grade plywood, moisture content not greater than 8%.

Underlayment: A single layer of Owens Corning ProArmor Synthetic Roofing Underlayment or equal was mechanically fastened to the test deck using T50 staples at 18" OC intervals. The EPS foam with a nominal 2 1/8" thickness was then fastened on top of the synthetic underlayment with 3" cap nails space about 12" apart. The EPS foam was then covered with 2 layers of ASTM D 226 Type II roofing underlayment using T50 staples at 18" OC intervals.

Roof Covering: The Owens Corning Sure Shingle were fastened to the test deck using four 3 1/4" roofing nail per shingle. Each course of shingles was layered down in a manner as to leave 6" of the previous layer exposed and was installed per the manufacturing instructions.

Test Procedure

Spread of Flame

Two test decks were constructed in accordance with Section 4 of UL790 and Section 6 of ASTM E108 with final measurements of 40-inch wide by 8-feet long and were individually mounted onto the test chamber compliant with Section 5 of ASTM E108 and UL 790. The 10-minute Spread of Flame test was performed in accordance to Section 7 of UL790 and Section 9 of ASTM E108 on the roof deck assembly's exposed roofing surface with observations of flame-spread distance and other significant observations recorded on the individual test data sheets in the Appendix A of this report.

Burning Brand

Four test decks were constructed in accordance with Section 4 of UL790 and Section 6 of ASTM E108 with final measurements of 40-inch wide by 52-inch long and were individually mounted onto the test chamber compliant with Section 5 of ASTM E108 and UL 790. The burning brand was ignited following the sequence outlined in the method and the test was performed in accordance to Section 8 of UL790 and Section 10 of ASTM E108. Observations were made and recorded during a 90 minute test period and recorded on the individual test data sheets in the Appendix A of this report.

Intermittent Flame

Two test decks were constructed in accordance with Section 4 of UL790 and Section 6 of ASTM E108 with final measurements of 40-inch wide by 52-inch long and were individually mounted onto the test chamber compliant with Section 5 of ASTM E108 and UL 790. The 90-minute Intermittent Flame test was performed in accordance to Section 6 of UL790 and Section 8 of ASTM E108 on the roof deck assembly's exposed roofing surface with observations recorded on the individual test data sheets in the Appendix A of this report.

2.1 Test Requirements

At no time during or after the intermittent flame, spread of flame or burning brand tests shall:

- 1 Any portion of the roof covering material be blown or fall off the test deck in the form of flaming or glowing brands that continue to glow after reaching the floor, or
- 2 The roof deck be exposed, or
- 3 Portions of the roof deck fall away in the form of particles that continue to glow after reaching the chamber floor.
- 4 At no time during the Class A intermittent flame or burning brand tests shall there be sustained flaming of the underside of the test assembly deck.
- 5 At the conclusion of the spread of flame tests, the flaming shall not have spread beyond 8 feet for Class A.
- 6 There shall be no significant lateral spread of flame from the path directly exposed to the test flame during spread of flame tests.

3.0 Test Results

The following summarizes testing conducted by QAI during testing of the Ensoltis Corporation Ensoltis Above Roof Deck Thermal Insulation System roof when tested to ASTM E 108-20a.

Client Name:	Ensoltis Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Owens Corning ProArmor Synthetic Roofing Underlayment
Version / Publication of Method:	20a			Underlayment 2: Grade / Type:	ASTM D226 Type II Roofing Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes				
Spread of Flame	Yes				
Roofing Class	A				

Sample ID:

Ensoltis Above Roof Deck Thermal Insulation System

Test Conditions	Class A Requirement	Average Recorded
Wind Speed (ft/min)	1012 – 1100 ft/min	1055 (ft/min)
Flame Temperature (°F)	1400 ± 50 (°F)	1382 (°F)
Burning Brand Weight (grams)	2000 ± 150 (grams)	2015.25 (grams)

Conclusion:

The Ensoltis Roofing System when installed with Owens Corning Sure Nail 3 Tab Shingles , and tested at a 5:12 test slope, has met the requirements of Class A Burning Brand, Class A Spread of Flame and Class A Intermittant Flame modes of ASTM E 108 when tested and evaluated to the requirements outlined in ASTM E 108-20A – UL 790.

Spread of Flame Test							
Test Date	Test Assembly	Ignition Time (MM:SS)	Maximum Spread of Flame (ft)	Lateral Spread of Flame (ft)	Condition @ Start of Test		Result:
					Temp. (°F)	RH (%)	
2021-10-19	1	03:00	4.0	0	58	60	Pass
2021-10-19	2	02:55	4.5	0	58	60	Pass
Burning Brand Test							
Test Date	Test Assembly	Brand Weight (g)	Sustained Under Deck Ignition Time (MM:SS)	Test Termination (MM:SS)	Condition @ Start of Test		Result:
					Temp. (°F)	RH (%)	
2021-10-18	1	2030.00	0:00:00	0:47:00	55.0	64	Pass
2021-10-19	2	2023.00	0:00:00	0:46:00	61.0	56	Pass
2021-10-19	3	2010.00	0:00:00	0:44:00	61.0	56	Pass
2021-10-19	4	1998.00	0:00:00	0:37:50	61.0	56	Pass

Intermittant Flame Test						
Test Date	Test Assembly	Sustained Under Deck Ignition Time (MM:SS)	Test Termination (MM:SS)	Condition @ Start of Test		Result:
				Temp. (°F)	RH (%)	
2021-10-19	1	0:00:00	1:00:00	59	57	Pass
2021-10-18	2	0:00:00	1:00:00	59	57	Pass

Appendix A: Burning Brand-Test Specimen #1

Client Name:	Ensoltis Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Owens Corning ProArmor Synthetic Roofing Underlayment
Publication of Method:	20a			Underlayment 2: Grade / Type:	ASTM D226 Type II Roofing Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes			Test Temperature (°F)	55
Spread of Flame	Yes			Test Humidity (%)	64
Roofing Class	A			Test Date	10-18-2021

Sample Id:

Ensoltis Above Roof Deck Thermal Insulation System Burning Brand - Specimen #1

Critical Standard Observations	
Test Duration	0:47:00
Sustained Flaming on Underside of Roof Deck	0:00:00
Production of Flaming Brands of roof covering material	0:00:00
Production of Glowing Brands of roof covering material	0:00:00
Displacement of the Test Sample	0:00:00
Exposure of Portions of the deck	0:00:00
Falling away of portions of the deck	0:00:00
Result	Pass

General Test Observations

Surface Ignition	0:01:50
flame receding back to brand	0:10:15
smoking at the seam	0:11:04
charring at the seam	0:13:30
burning brand stopped flaming	0:14:30
burning brand stopped glowing	0:24:05
Test Terminated	0:47:00

Brand #	Brand Weight (grams)	Correct?	CC Number
1	2030.00	Yes	10
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		

Asset Number	Description	Equipment Functional Range	Calibration Date	Calibration Due Date
RP0241	Stop Watch	N/A	2021-06-30	2022-06-30
RF0005	Anemometer	30 FPM to 5000 FPM +14/-	2021-02-26	2022-02-26
TU8124	Digital Thermometer	-328°F - 2498°F	2021-06-30	2022-06-30
RP0072	Calibrated Tape Measure	0-25 Feet	2021-09-03	2022-09-03
RP0038	Temperature and Humidity Data Logger	-4°F to 158°F +/-0.8°F / 60	2021-06-30	2022-06-30
RE0039	Digital Angle Gauge	0° to 90°	2021-05-15	2022-05-15
RF0031	UL790 Test Chamber	AS PER UL790	2021-10-18	Per USE

Appendix A: Burning Brand-Test Specimen #2

Client Name:	Ensoltis Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Owens Corning ProArmor Synthetic Roofing Underlayment
Version / Publication of	20a			Underlayment 2: Grade / Type:	ASTM D226 Type II Roofing Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes			Test Temperature (°F)	61
Spread of Flame	Yes			Test Humidity (%)	56
Roofing Class	A			Test Date	10-19-2021

Sample Id: **Ensoltis Above Roof Deck Thermal Insulation System Burning Brand - Specimen #2**

Critical Standard Observations	
Test Duration	0:46:00
Sustained Flaming on Underside of Roof Deck	0:00:00
Production of Flaming Brands of roof covering material	0:00:00
Production of Glowing Brands of roof covering material	0:00:00
Displacement of the Test Sample	0:00:00
Exposure of Portions of the deck	0:00:00
Falling away of portions of the deck	0:00:00
Result	Pass

General Test Observations	
Surface Ignition	0:01:50
flame receding back to brand	0:09:33
smoking at the seam	0:10:15
charring at the seam	0:15:00
burning brand stopped flaming	0:21:30
burning brand stopped glowing	0:31:00
Test Terminated	0:46:00

Brand #	Brand Weight (grams)	Correct?	CC Number
1	2023.00	Yes	11
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		

Asset Number	Description	Equipment Functional Range	Calibration Date	Calibration Due Date
RP0241	Stop Watch	N/A	2021-06-30	2022-06-30
RF0005	Anemometer	30 FPM to 5000 FPM +14/-	2021-02-26	2022-02-26
TU8124	Digital Thermometer	-328°F - 2498°F	2021-06-30	2022-06-30
RP0072	Calibrated Tape Measure	0-25 Feet	2021-09-03	2022-09-03
RP0038	Temperature and Humidity Data Logger	-4°F to 158°F +/-0.8°F / 60	2021-06-30	2022-06-30
RE0039	Digital Angle Gauge	0° to 90°	2021-05-15	2022-05-15
RF0031	UL790 Test Chamber	AS PER UL790	2021-10-19	Per USE

Appendix A: Burning Brand-Test Specimen #3

Client Name:	Ensoltis Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Owens Corning ProArmor Synthetic Roofing Underlayment
Version / Publication of	20a			Underlayment 2: Grade / Type:	ASTM D226 Type II Roofing Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes			Test Temperature (°F)	61
Spread of Flame	Yes			Test Humidity (%)	56
Roofing Class	A			Test Date	10-19-2021

Sample Id: **Ensolcomp Above Roof Deck Thermal Insulation System Burning Brand - Specimen #3**

Critical Standard Observations	
Test Duration	0:44:00
Sustained Flaming on Underside of Roof Deck	0:00:00
Production of Flaming Brands of roof covering material	0:00:00
Production of Glowing Brands of roof covering material	0:00:00
Displacement of the Test Sample	0:00:00
Exposure of Portions of the deck	0:00:00
Falling away of portions of the deck	0:00:00
Result	Pass

General Test Observations	
Surface Ignition	0:01:50
flame receding back to brand	0:09:00
smoking at the seam	0:10:50
charring at the seam	0:12:40
burning brand stopped flaming	0:17:30
burning brand stopped glowing	0:31:15
Test Terminated	0:44:00

Brand #	Brand Weight (grams)	Correct?	CC Number
1	2010.00	Yes	12
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		

Asset Number	Description	Equipment Functional Range	Calibration Date	Calibration Due Date
RP0241	Stop Watch	N/A	2021-06-30	2022-06-30
RF0005	Anemometer	30 FPM to 5000 FPM +14/-	2021-02-26	2022-02-26
TU8124	Digital Thermometer	-328°F - 2498°F	2021-06-30	2022-06-30
RP0072	Calibrated Tape Measure	0-25 Feet	2021-09-03	2022-09-03
RP0038	Temperature and Humidity Data Logger	-4°F to 158°F +/-0.8°F / 60	2021-06-30	2022-06-30
RE0039	Digital Angle Gauge	0° to 90°	2021-05-15	2022-05-15
RF0031	UL790 Test Chamber	AS PER UL790	2021-10-19	Per USE

Appendix A: Burning Brand-Test Specimen #4

Client Name:	Ensoltis Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Owens Corning ProArmor Synthetic Roofing Underlayment
Publication of	20a			Underlayment 2: Grade / Type:	Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes			Test Temperature (°F)	61
Spread of Flame	Yes			Test Humidity (%)	56
Roofing Class	A			Test Date	10-19-2021

Sample Id:

Ensoltis Above Roof Deck Thermal Insulation System Burning Brand - Specimen #4

Critical Standard Observations	
Test Duration	0:37:50
Sustained Flaming on Underside of Roof Deck	0:00:00
Production of Flaming Brands of roof covering material	0:00:00
Production of Glowing Brands of roof covering material	0:00:00
Displacement of the Test Sample	0:00:00
Exposure of Portions of the deck	0:00:00
Falling away of portions of the deck	0:00:00
Result	Pass

General Test Observations	
Surface Ignition	0:01:35
flame receding back to brand	0:09:15
smoking at the seam	0:10:26
charring at the seam	0:10:30
burning brand stopped flaming	0:15:50
burning brand stopped glowing	0:22:20
Test Terminated	0:37:50

Brand #	Brand Weight (grams)	Correct?	CC Number
1	1998.00	Yes	13
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		
	0.00		

Asset Number	Description	Equipment Functional Range	Calibration Date	Calibration Due Date
RP0241	Stop Watch	N/A	2021-06-30	2022-06-30
RF0005	Anemometer	30 FPM to 5000 FPM +14/-	2021-02-26	2022-02-26
TU8124	Digital Thermometer	-328°F - 2498°F	2021-06-30	2022-06-30
RP0072	Calibrated Tape Measure	0-25 Feet	2021-09-03	2022-09-03
RP0038	Temperature and Humidity Data Logger	-4°F to 158°F +/-0.8°F / 60	2021-06-30	2022-06-30
RE0039	Digital Angle Gauge	0° to 90°	2021-05-15	2022-05-15
RF0031	UL790 Test Chamber	AS PER UL790	2021-10-19	Per USE

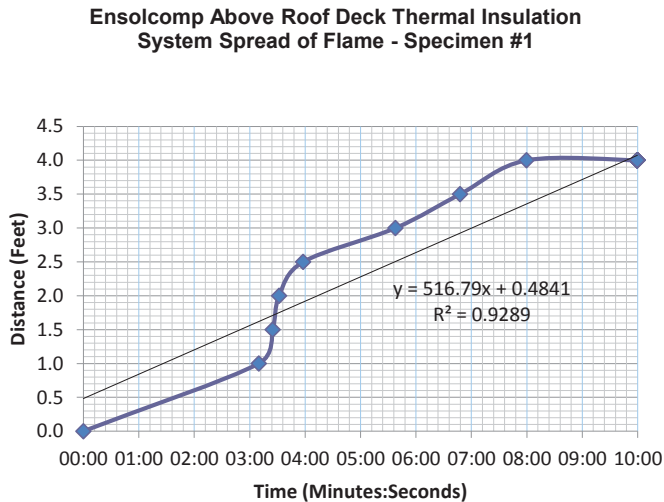
Appendix A: Spread of Flame-Test Specimen #1

Client Name:	Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Synthetic Roofing Underlayment
Publication of	20a			Underlayment 2: Grade / Type:	Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes			Test Temperature (°F)	58
Spread of Flame	Yes			Test Humidity (%)	60
Roofing Class	A			Test Date	10-19-2021

Sample Id:

Ensoltis Above Roof Deck Thermal Insulation System Spread of Flame - Specimen #1

# of Feet	Time (mm : ss)	Half Foot	Time (mm : ss)
1	03:10	1.5	03:25
2	03:32	2.5	03:58
3	05:38	3.5	06:48
4	08:00	4.5	
5		5.5	
6		6.5	
7		7.5	
8			



Test Duration (Minutes:Seconds) 10:00
Time of Ignition (Minutes:Seconds) 03:00
Maximum Spread of Flame (ft) 4.0
Time at Maximum Spread of Flame (ft) 08:00

Flame Front Recession (ft) 0
Lateral Flame Spread (ft) 0
Flame Spread Distance at Test End (ft) 4.0
Test Result for Class A Pass

Asset Number	Description	Equipment Functional Range	Calibration Date	Calibration Due Date
RP0241	Stop Watch	N/A	2021-06-30	2022-06-30
RF0005	Anemometer	30 FPM to 5000 FPM +14/-	2021-02-26	2022-02-26
TU8124	Digital Thermometer	-328°F - 2498°F	2021-06-30	2022-06-30
RP0072	Calibrated Tape Measure	0-25 Feet	2021-09-03	2022-09-03
RP0038	Temperature and Humidity Data Logger	-4°F to 158°F +/-0.8°F / 60	2021-06-30	2022-06-30
RE0039	Digital Angle Gauge	0° to 90°	2021-05-15	2022-05-15
RF0031	UL790 Test Chamber	AS PER UL790	2021-10-19	Per USE

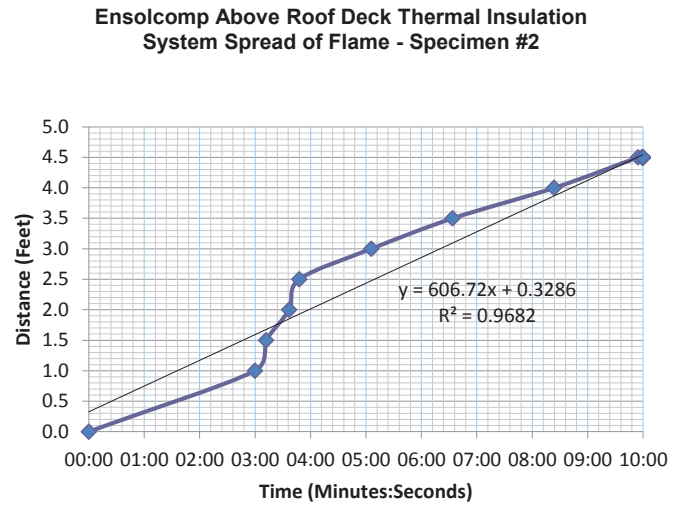
Appendix A: Spread of Flame-Test Specimen #2

Client Name:	Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Synthetic Roofing Underlayment
Publication of	20a			Underlayment 2: Grade / Type:	Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes			Test Temperature (°F)	58
Spread of Flame	Yes			Test Humidity (%)	60
Roofing Class	A			Test Date	10-19-2021

Ensoltis Above Roof Deck Thermal Insulation System Spread of Flame - Specimen #2

Sample Id:

# of Feet	Time (mm : ss)	Half Foot	Time (mm : ss)
1	03:00	1.5	03:12
2	03:37	2.5	03:48
3	05:06	3.5	06:34
4	08:24	4.5	09:55
5		5.5	
6		6.5	
7		7.5	
8			



Test Duration (Minutes:Seconds) 10:00
Time of Ignition (Minutes:Seconds) 02:55
Maximum Spread of Flame (ft) 4.5
Time at Maximum Spread of Flame (ft) 09:55

Flame Front Recession (ft) 0
Lateral Flame Spread (ft) 0
Flame Spread Distance at Test End (ft) 4.5
Test Result for Class A Pass

Asset Number	Description	Equipment Functional Range	Calibration Date	Calibration Due Date
Asset Number	Description	Equipment Functional	Calibration Date	Calibration Due Date
RP0241	Stop Watch	N/A	2021-06-30	2022-06-30
RF0005	Anemometer	30 FPM to 5000 FPM +14/-	2021-02-26	2022-02-26
TU8124	Digital Thermometer	-328°F - 2498°F	2021-06-30	2022-06-30
RP0072	Calibrated Tape Measure	0-25 Feet	2021-09-03	2022-09-03
RP0038	Temperature and Humidity Data Logger	-4°F to 158°F +/-0.8°F / 60	2021-06-30	2022-06-30
RE0039	Digital Angle Gauge	0° to 90°	2021-05-15	2022-05-15
RF0031	UL790 Test Chamber	AS PER UL790	2021-10-19	Per USE

Appendix A: Intermittent Flame-Test Specimen #1

Client Name:	Ensoltis Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Owens Corning ProArmor Synthetic Roofing Underlayment
Publication of Method:	20a			Underlayment 2: Grade / Type:	ASTM D226 Type II Roofing Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes			Test Temperature (°F)	59
Spread of Flame	Yes			Test Humidity (%)	57
Roofing Class	A			Test Date	10-19-2021

Sample Id: **Ensoltcomp Above Roof Deck Thermal Insulation System Intermittant Flame - Specimen #1**

Critical Standard Observations		Test Flame Application for Class A		
Test Duration	1:00:00	Flame On	Flame Off	Number of Cycles
Sustained Flaming on Underside of Roof Deck	0:00:00	(Min)	(Min)	(#)
Production of Flaming Brands of roof covering material	0:00:00	2	2	15
Production of Glowing Brands of roof covering material	0:00:00			
Displacement of the Test Sample	0:00:00	Result Pass		
Exposure of Portions of the deck	0:00:00			
Falling away of portions of the deck	0:00:00			

Cycle	Time	Observations	Cycle	Time	Observations
1	0-2 min. On	*	9	32-34 min. On	*
	2-4 min. Off	*		34-36 min. Off	*
2	4-6 min. On	*	10	36-38 min. On	*
	6-8 min. Off	*		38-40 min. Off	*
3	8-10 min. On	*	11	40-42 min. On	*
	10-12 min. Off	*		42-44 min. Off	*
4	12-14 min. On	*	12	44-46 min. On	*
	14-16 min. Off	*		46-48 min. Off	*
5	16-18 min. On	*	13	48-50 min. On	*
	18-20 min. Off	*		50-52 min. Off	*
6	20-22 min. On	*	14	52-54 min. On	*
	22-24 min. Off	*		54-56 min. Off	*
7	24-26 min. On	*	15	56-58 min. On	*
	26-28 min. Off	*		58-60 min. Off	*
8	28-30 min. On	*			
	30-32 min. Off	*			

Abbreviations: IG = Ignition, SE = Self Extinguished, SF = Sustained Flaming on Roof Deck

Note:

Asset Number	Description	Equipment Functional Range	Calibration Date	Calibration Due Date
RP0241	Stop Watch	N/A	2021-06-30	2022-06-30
RF0005	Anemometer	30 FPM to 5000 FPM +14/-	2021-02-26	2022-02-26
TU8124	Digital Thermometer	-328°F - 2498°F	2021-06-30	2022-06-30
RP0072	Calibrated Tape Measure	0-25 Feet	2021-09-03	2022-09-03
RP0038	Temperature and Humidity Data Logger	-4°F to 158°F +/-0.8°F / 60	2021-06-30	2022-06-30
RE0039	Digital Angle Gauge	0° to 90°	2021-05-15	2022-05-15
RF0031	UL790 Test Chamber	AS PER UL790	2021-10-18	Per USE

Appendix A: Intermittent Flame-Test Specimen #2

Client Name:	Ensoltis Corporation	Criteria:	ASTM E 108	Framing Type / Species	Douglas Fir No.1
Job No.:	RJ8197F-1	Criteria Version:	20a	Sheathing Type / Grade	AC Exterior 15/32"
Test Method:	ASTM E 108			Underlayment 1: Grade / Type:	Owens Corning ProArmor Synthetic Roofing Underlayment
Version / Publication of Method:	20a			Underlayment 2: Grade / Type:	ASTM D226 Type II Roofing Underlayment
System Type	roof			Joint Compound?	N/A
Test Slope	5:12			Insulation Type / Grade	N/A
Test Degree	22.62°			Roof Covering Material 1 / Grade:	Owens Corning Sure Nail Shingles
Burning Brand	Yes			Roof Covering Material 2 / Grade:	
Intermittant Flame	Yes			Test Temperature (°F)	59
Spread of Flame	Yes			Test Humidity (%)	57
Roofing Class	A			Test Date	10-18-2021

Sample Id:

Ensoltis Above Roof Deck Thermal Insulation System Intermittant Flame - Specimen #2

Critical Standard Observations		Test Flame Application for Class A		
Test Duration	1:00:00	Flame On	Flame Off	Number of Cycles
Sustained Flaming on Underside of Roof Deck	0:00:00	(Min)	(Min)	(#)
Production of Flaming Brands of roof covering material	0:00:00	2	2	15
Production of Glowing Brands of roof covering material	0:00:00			
Displacement of the Test Sample	0:00:00	Result		Pass
Exposure of Portions of the deck	0:00:00			
Falling away of portions of the deck	0:00:00			

Cycle	Time	Observations	Cycle	Time	Observations
1	0-2 min. On	*	9	32-34 min. On	*
	2-4 min. Off	*		34-36 min. Off	*
2	4-6 min. On	*	10	36-38 min. On	*
	6-8 min. Off	*		38-40 min. Off	*
3	8-10 min. On	*	11	40-42 min. On	*
	10-12 min. Off	*		42-44 min. Off	*
4	12-14 min. On	*	12	44-46 min. On	*
	14-16 min. Off	*		46-48 min. Off	*
5	16-18 min. On	*	13	48-50 min. On	*
	18-20 min. Off	*		50-52 min. Off	*
6	20-22 min. On	*	14	52-54 min. On	*
	22-24 min. Off	*		54-56 min. Off	*
7	24-26 min. On	*	15	56-58 min. On	*
	26-28 min. Off	*		58-60 min. Off	*
8	28-30 min. On	*			
	30-32 min. Off	*			

Abbreviations: IG = Ignition, SE = Self Extinguished, SF = Sustained Flaming on Roof Deck

Note:

Asset Number	Description	Equipment Functional Range	Calibration Date	Calibration Due Date
RP0241	Stop Watch	N/A	2021-06-30	2022-06-30
RF0005	Anemometer	30 FPM to 5000 FPM +14/-	2021-02-26	2022-02-26
TU8124	Digital Thermometer	-328°F - 2498°F	2021-06-30	2022-06-30
RP0072	Calibrated Tape Measure	0-25 Feet	2021-09-03	2022-09-03
RP0038	Temperature and Humidity Data Logger	-4°F to 158°F +/-0.8°F / 60	2021-06-30	2022-06-30
RE0039	Digital Angle Gauge	0° to 90°	2021-05-15	2022-05-15
RF0031	UL790 Test Chamber	AS PER UL790	2021-10-11	Per USE

Appendix B: Photographs

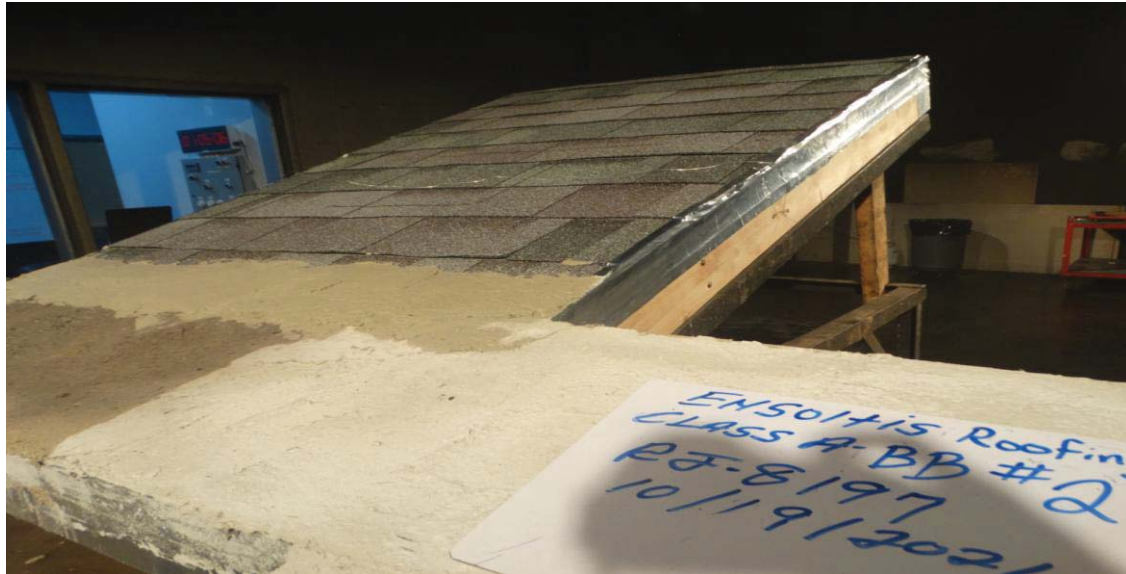


Photograph 1: Ensoltis Above Roof Deck Thermal Insulation System.
Owens Corning Sure Nail Shingles test deck assembly from the top.



Photograph 2:
Class A Burning Brand test deck assembly #1 from the top.

Appendix B: Photographs (Continued)

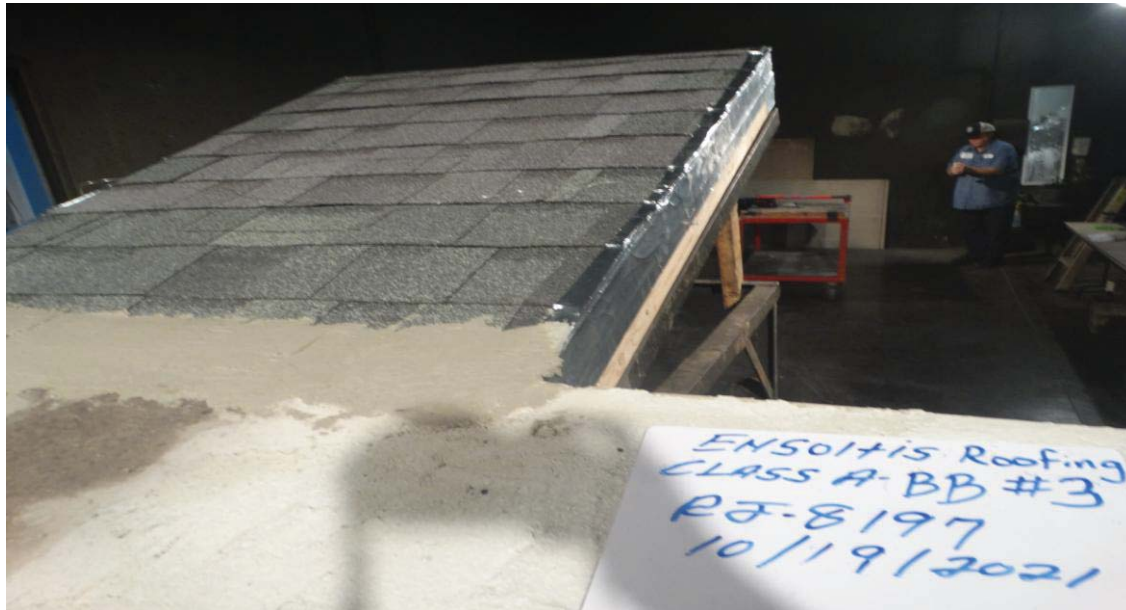


Photograph 3: Ensoltis Above Roof Deck Thermal Insulation System.
Owens Corning Sure Nail Shingles test deck assembly from the top.



Photograph 4:
Class A Burning Brand test deck assembly #2 from the top.

Appendix B: Photographs (Continued)



Photograph 5: Ensoltis Above Roof Deck Thermal Insulation System.
Owens Corning Sure Nail Shingles test deck assembly from the top.



Photograph 6:
Class A Burning Brand test deck assembly #3 from the top.

Appendix B: Photographs (Continued)



Photograph 7: Ensoltis Above Roof Deck Thermal Insulation System.
Owens Corning Sure Nail Shingles test deck assembly from the top.

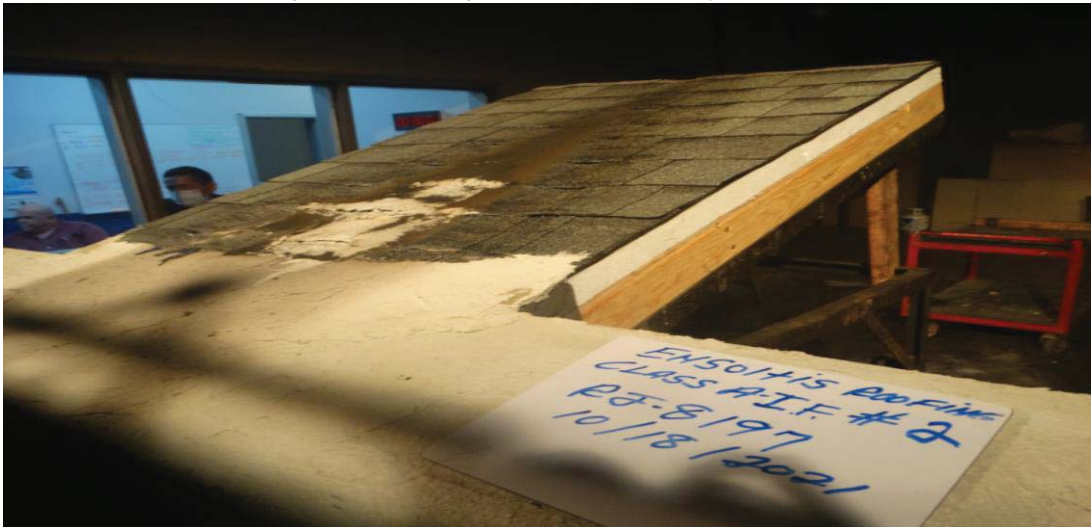


Photograph 8:
Class A Burning Brand test deck assembly #4 from the top.

Appendix B: Photographs (Continued)



Photograph 9: Intermittant Flame test deck #1
Owens Corning Sure Nail Shingles test deck assembly from the top.



Photograph 10:
Class A Intermittant Flame test deck assembly from the top.

Appendix B: Photographs (Continued)



Photograph 11: Spread of Flame test deck #1
Owens Corning Sure Nail Shingles test deck assembly from the top.



Photograph 12:
Class A Spread of Flame test deck assembly from the top.

<<<END OF REPORT>>>