

NBK
 Number of pages in this package:11

CLIENT INFORMATION	
Company Name	ONYX SOLAR ENERGY
Address	Calle Rio Cea 1 - 46 Avila 05004 SPAIN

AUDIT INFORMATION:			
<input checked="" type="checkbox"/> Description of Tests "Tests for Fire Resistance of Roof Covering Materials"	Per Standard No. ANSI/UL 790	Edition (Revised Date)	Eighth Edition (October 19, 2018)
<input checked="" type="checkbox"/> Tests Conducted by+	See Data Sheets		
	Printed name	Signature	
<input type="checkbox"/> UL Staff witnessing testing (WTDP only)			
	Printed name	Signature	
Reviewed and accepted by qualified Project Handler	Michael Keil	Michael Keil	
	Printed Name	Signature	

TESTS TO BE CONDUCTED:			
Test No.	Done	Test Name	<input checked="" type="checkbox"/> Comments/Parameters <input type="checkbox"/> Tests Conducted by ++
1	X	Roofing Spread Of Flame Test	Sample: M02, Test code: 09242001
2	X	Roofing Spread Of Flame Test	Sample: M01, Test code: 09242002
3	X	Roofing Burning Brand Test	Sample: M02, Test code: 09252001
4	X	Roofing Burning Brand Test	Sample: M01, Test code: 09252002

[X]Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

Ambient Temperature, °F 70 ± 20 Relative Humidity, % N/A Barometric Pressure, mBar N/A

[] No general environmental conditions are specified in the Standard(s) or have been identified that could affect the test results or measurements.

RISK ANALYSIS RELATED TO TESTING PERFORMANCE:

The following types of risks have been identified. Take necessary precautions. This list is not all inclusive.

<input type="checkbox"/> Electric shock	<input type="checkbox"/> Radiation
<input type="checkbox"/> Energy related hazards	<input type="checkbox"/> Chemical hazards
<input checked="" type="checkbox"/> Fire	<input type="checkbox"/> Noise
<input checked="" type="checkbox"/> Heat related hazards	<input type="checkbox"/> Vibration
<input checked="" type="checkbox"/> Mechanical	<input type="checkbox"/> Other (Specify) <u> </u>

TEST LOCATION: (To be completed by Staff Conducting the Testing)					
<input checked="" type="checkbox"/> UL or Affiliate	<input type="checkbox"/> WTDP	<input type="checkbox"/> CTDP	<input type="checkbox"/> TPTDP	<input type="checkbox"/> TCP	<input type="checkbox"/> PPP
	<input type="checkbox"/> WMT	<input type="checkbox"/> TMP	<input type="checkbox"/> SMT		
Company Name: UL LLC					
Address: 333 Pfingsten Road, Northbrook, Illinois, 60062					

TEST EQUIPMENT INFORMATION

[] UL test equipment information is recorded on Meter Use in UL's Laboratory Project Management (LPM) database.

[X] UL test equipment information is recorded on Dept. 3019's electronic equipment database tracking system (ShrCal) - See the attached sheet(s) "Department 3019FPD Instrument Calibration Tracking".

Department 3019FPD Instrument Calibration Tracking
 Procedure:

Test Dates: 2020-09-25 to 2020-09-24

File Number: EXXXX Assignment Number: 4789566908
 Customer: ONYX SOLAR ENERGY

Software:

FPD ID / LEM ID	Description	Version	Version Date
1F05TCP/34693	software/Roofing fire test apparatus control program	2014-05-01	1.0.13c

Instruments

FPD ID / LEM ID	Description	Range	Last Cal	Next Cal
152F12DAS/75469	instrument	Roofing fire test control	2019-11-19	2020-11-30
153F12DAS/79593	instrument	Roofing cal cart DAS	2019-11-19	2020-11-30
83F01CLK/20562	instrument	control room test time clock	2019-11-19	2020-11-30
315F15MD/92616	instrument	Roofing	2019-11-19	2020-11-30
79F03IC/20665	instrument	Roofing cal cart DAS input card	2019-11-19	2020-11-30
16FA5EPT/21312	instrument	Roofing cal cart velocity pressure trans	2019-11-19	2020-11-30
160F99EPT/21311	instrument	Roofing cal cart velocity pressure trans	2019-11-19	2020-11-30
149F65EPT/21333	instrument	Roofing cal cart velocity pressure trans	2019-11-19	2020-11-30
152F12DAS/75469	instrument	Roofing fire test control	2019-11-19	2020-11-30
16F01IC/21096	instrument	datalogger input card (tc compensation)	2019-11-19	2020-11-30
315F15MD/92616	instrument	Roofing	2019-11-19	2020-11-30
83F01CLK/20562	instrument	control room test time clock	2019-11-19	2020-11-30
119F12CLK/75468	instrument	Roofing fire test control	2019-11-19	2020-11-30
315F15MD/92616	instrument	Roofing	2019-11-19	2020-11-30
51F99SCL/21857	instrument	gram scale (brand weight)	2019-11-19	2020-11-30

THERMOCOUPLES

FPD ID / LEM ID	Description	Type	Last Cal	Next Cal
0430100002/85413	instrument	Type ROOFING TOWER	2019-11-19	2020-11-30

Daily Apparatus Calibration:

alULVersion=1
Company=ULI
File=UL790
ProjectNumber=Calibration
Sample=Thermocouple
TestLocation=RoofingFire
Technician=45547 Thomas Novotney
testdate=09-24-2020
AverageVel=1039.333
VelReading1=1039
VelReading2=1040
VelReading3=1039
VelometerCorrection(applied)= 0
AverageTemp=1362
GasUsage=0
PreGasReading=0
PostGasReading=0
GasFlowrate=0
GasValveSetting=0
VelocityUnits = Feet per Minute
GasUnits = Cubic Feet
TemperatureUnits = Degrees F

TEST EQUIPMENT INFORMATION

Inst. ID No.	Instrument Type	Test Number +, Test Title or Conditioning	Function /Range	Last Cal. Date	Next Cal. Date

+ - If Test Number is used, the Test Number must be identified on the data sheet pages or on the Data Sheet Package cover page.

The following additional information is required when using client's or rented equipment, or when a UL ID Number for an instrument number is not used. The Inst. ID No. below corresponds to the Inst. ID No. above.

Inst. ID No.	Make/Model/Serial Number/Asset No.

TEST SAMPLE IDENTIFICATION:

The table below is provided to provide correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

Sample Card No.	Date Received	<input checked="" type="checkbox"/> Test No.	Sample No.	Manufacturer, Product Identification and Ratings
3233439	2020-08-24	2, 4	M01	PV Module, M01, Glass-glass, 3mm/3mm, crystalline Si, dimensions 1300mm x 450mm, for Spread of Flame Test, 6 feet (1.82m) or less in 10 minutes (Class A) and for Burning Brand Test, A Brand (Class A)
3233440	2020-08-24	1, 3	M02	PPV Module, M02, Glass-glass, 3.2mm/3mm, amorphous silicon, dimensions 1063mm x 556mm, for Spread of Flame Test, 6 feet (1.82m) or less in 10 minutes (Class A) and for Burning Brand Test, A Brand (Class A)

Sampling Procedure -

This document contains data using color and if printed, should be printed in color to retain legibility and the information represented by the color.

Fire Test Sample Summary

Test code	Test Type	Class	Slope (in/ft)	Pass/ Fail	Sample Description
09242001	SF	A	5	P	System 2
09242002	SF	A	5	P	System 1
09252001	BB	A	5	P	System 2
09252002	BB	A	5	P	System 1

Project: 4789566908
Tested by: Thomas Novotney

File: EXXXX
Engineer: Michael Keil

TestCode: 09242001
Date: 2020-09-24

SPREAD OF FLAME TEST - ANSI/UL790 (Eighth Edition -2018/10/19)

The test deck was constructed in accordance with paragraph 4.3
The roof covering material was applied in accordance with paragraph 4.4
The test sample was conditioned in accordance with paragraph 4.5

Client Name:	ONYX SOLAR ENERGY				
System No.	2	Test No.:	1		
Class:	A	Slope (in/ft):	5	Ambient Temp (°F):	70

System Description:

A total of 2 samples of Model SMP-PV modules each measured 1.5 by 4.3 ft. were butted together to form an assembly 1.5 ft. wide by 4.3 ft. long.
PV Module, M02, Glass-glass, 3.2mm/3mm, amorphous silicon, dimensions 1062mm x 556mm, for testing.

Flame Spread Data

Distance (Feet)		Time (Min:Sec)		Distance (Feet)		Time (Min:Sec)
Ignition		05:10		2		06:23
0.5		05:10		2.5		06:32
1		06:18		2.5		07:19
1.5		06:19				

Notes:

For this test, the module assembly was applied to a Spread of Flame Plywood Deck (UL790, Fig. 4.0) which was covered with a 40 in. wide by 8 ft. long (1/4 in thick) piece of DensDeck (Georgia-Pacific).

00:02:39 Solar panel glass cracked/shattered

Summary of Results:

Maximum spread of flame (feet): 2.5 Test Duration (minutes): 10

There was no significant lateral spread of flame from the path directly exposed to the test flame.
No portion of the roof covering material was blown or fell off the test deck in the form of flaming/glowing brands.
The roof deck was not exposed by breaking, sliding, cracking, or warping of the roof covering.
No portions of the roof deck fell away in the form of glowing particles.

Pass/Failed: Pass

Only those products bearing the UL Mark should be considered as being covered by UL.

Project: 4789566908
Tested by: Thomas Novotney

File: EXXXX
Engineer: Michael Keil

TestCode: 09242002
Date: 2020-09-24

SPREAD OF FLAME TEST - ANSI/UL790 (Eighth Edition -2018/10/19)

The test deck was constructed in accordance with paragraph 4.3
The roof covering material was applied in accordance with paragraph 4.4
The test sample was conditioned in accordance with paragraph 4.5

Client Name: ONYX SOLAR ENERGY			
System No. 1	Test No.: 2		
Class: A	Slope (in/ft): 5	Ambient Temp (°F): 70	

System Description:

A total of 3 samples of Model SMP-PV modules each measured 1.83 by 3.50 ft. were butted together to form an assembly 1.83 ft. by 10.5 ft. The 3.50 ft. dimension of the module assembly was placed parallel with the length of the carriage.

PV Module, M01, Glass-glass, 3mm/3mm, crystalline Si, dimensions 1300mm X 450mm, for fire testing.

Flame Spread Data

Distance (Feet)		Time (Min:Sec)		Distance (Feet)		Time (Min:Sec)
Ignition		04:22		2.5		08:24
0.5		04:22		3		09:29
2		08:03				

Notes:

For this test, the module assembly was applied to a Spread of Flame Plywood Deck (UL790, Fig. 4.0) which was covered with a 40 in. wide by 8 ft. long (1/4 in thick) piece of DensDeck (Georgia-Pacific).

Summary of Results:

Maximum spread of flame (feet): 3 Test Duration (minutes): 10

There was no significant lateral spread of flame from the path directly exposed to the test flame.
No portion of the roof covering material was blown or fell off the test deck in the form of flaming/glowing brands.
The roof deck was not exposed by breaking, sliding, cracking, or warping of the roof covering.
No portions of the roof deck fell away in the form of glowing particles.

Pass/Failed: Pass

Only those products bearing the UL Mark should be considered as being covered by UL.

Project: 4789566908
Tested by: Thomas Novotney

File: EXXXX
Engineer: Michael Keil

TestCode: 09252001
Date: 2020-09-25

BURNING BRAND TEST - ANSI/UL790 (Eighth Edition -2018/10/19)

The test deck was constructed in accordance with paragraph 4.2
The roof covering material was applied in accordance with paragraph 4.4
The test sample was conditioned in accordance with paragraph 4.5

Client Name: ONYX SOLAR ENERGY	Brand Weight (g): 1898
System No. 2	Test No.: 1
Class: A	Slope (in/ft): 5
	Deck Thickness (in): 15/32
	Ambient Temp (°F): 70

System Description:

A total of 2 samples of Model SMP-PV modules each measured 1.5 by 4.3 ft. were butted together to form an assembly 1.5 ft. wide by 4.3 ft. long.
PV Module, M02, Glass-glass, 3.2mm/3mm, amorphous silicon, dimensions 1062mm x 556mm, for testing.

Underside Activity

First Smoke (Hr:Min:Sec)	First Asphalt Drip (Hr:Min:Sec)	First Glow (Hr:Min:Sec)	Flames On Underside (Hr:Min:Sec)
NA	NA	NA	None

Test Observations:

00:00:47 Solar panel glass cracked/shattered	00:10:22 Surface flames 1/2 foot above top of brand
00:04:20 Brand 25% consumed	00:16:40 Brand 75% consumed
00:07:07 Surface flames 1 foot above top of brand	00:21:28 Surface flames 1/2 foot above top of brand
00:09:12 Brand 50% consumed	00:21:45 Brand 100% consumed
00:10:11 Brand falls through solar panel	00:32:50 All action ceased, test terminated.

Summary of Results:

Char Depth (inches): 0 Test Duration (minutes): 32.8

No portion of the roof covering material was blown or fell off the test deck in the form of flaming/glowing brands.
The roof deck was not exposed by breaking, sliding, cracking, or warping of the roof covering.
No portions of the roof deck fell away in the form of glowing particles.
There was no sustained flaming of the underside of the deck.

Pass/Failed: Pass

Only those products bearing the UL Mark should be considered as being covered by UL.

Project: 4789566908
Tested by: Thomas Novotney

File: EXXXX
Engineer: Michael Keil

TestCode: 09252002
Date: 2020-09-25

BURNING BRAND TEST - ANSI/UL790 (Eighth Edition -2018/10/19)

The test deck was constructed in accordance with paragraph 4.2
The roof covering material was applied in accordance with paragraph 4.4
The test sample was conditioned in accordance with paragraph 4.5

Client Name: ONYX SOLAR ENERGY	Brand Weight (g): 1928
System No. 1	Deck Thickness (in): 15/32
Test No.: 2	Ambient Temp (°F): 70
Class: A	Slope (in/ft): 5

System Description:

A total of 3 samples of Model SMP-PV modules each measured 1.83 by 3.50 ft. were butted together to form an assembly 1.83 ft. by 10.5 ft. The 3.50 ft. dimension of the module assembly was placed parallel with the length of the carriage.

PV Module, M01, Glass-glass, 3mm/3mm, crystalline Si, dimensions 1300mm X 450mm, for fire testing.

Underside Activity

First Smoke (Hr:Min:Sec)	First Asphalt Drip (Hr:Min:Sec)	First Glow (Hr:Min:Sec)	Flames On Underside (Hr:Min:Sec)
00:10:59	NA	NA	None

Test Observations:

00:02:46 Solar panel glass cracked/shattered
00:03:13 Ignition of solar panel backsheet
00:03:25 Surface flames 1/2 foot above top of brand
00:04:10 Brand 25% consumed
00:07:24 Brand falls through solar panel
00:09:06 Surface flames 1 foot above top of brand
00:10:51 Brand 50% consumed
00:10:59 Smoke on underside at Horizontal Joint

00:13:28 Surface flames 1-1/2 feet above top of brand
00:13:29 Surface flames 2 feet above top of brand
00:13:29 Surface flames 2-1/2 feet above top of brand
00:15:20 Discoloration on underside at plywood joint
00:19:19 Brand 75% consumed
00:24:24 Surface flames 2-1/2 feet above top of brand
00:28:50 Brand 100% consumed
00:54:30 All action ceased, test terminated.

Summary of Results:

Char Depth (inches): 1/8

Test Duration (minutes): 54.5

No portion of the roof covering material was blown or fell off the test deck in the form of flaming/glowing brands.
The roof deck was not exposed by breaking, sliding, cracking, or warping of the roof covering.
No portions of the roof deck fell away in the form of glowing particles.
There was no sustained flaming of the underside of the deck.

Pass/Failed: Pass

Only those products bearing the UL Mark should be considered as being covered by UL.

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