



Underwriters Laboratories Inc.®

333 Pfingsten Road
Northbrook, Illinois 60062-2096
United States Country Code (1)
(847) 272-8800
Fax No. (847) 509-6395
<http://www.ul.com>

January 7, 2003

Mr. Spence Bardeen
Ecostar Inc.
230 Center Drive, #201
Vernon Hills, IL 60061

Our Reference: R18920

Dear Mr. Bardeen

This is in response to our phone conversation today.

As discussed, Ecostar currently has the following Class A Listings with Underwriters Laboratories:

Molded plastic shingles, for installation as Class A prepared roof covering. Limited to 15/32 in. plywood decks and one layer of G-P Gypsum, 1/4 in. (min) Dens Deck® overlayment board mechanically fastened with all joints staggered a min of 6 in. from the plywood joints and one ply of Type 30 asphalt felt.

Molded plastic shingles, for installation as Class A prepared roof covering. Limited to 15/32 in. plywood decks and one ply of ELK VERSASHIELD™ Underlayment.

The following Ecostar products are eligible for use in these systems:

Seneca Cedar Shake Tiles, Titus Tiles, Celestial Slate Colonial, Celestial Beveled Edge Slate, Celestial Beavertail Slate, Celestial Traditional Slate and Celestial Chisel Point Slate.

If any questions arise on the above, please contact the writer.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Douglas C. Miller'.

Douglas C. Miller
Engineering Group Leader
Fire Protection Division

A not-for-profit organization
dedicated to public safety and
committed to quality service

333 Pfingsten Road
Northbrook, Illinois 60062-2096
United States Country Code (1)
(847) 272-8800
FAX No. (847) 272-8129
<http://www.ul.com>



File R18920
Project 98NK28255

January 29, 2001

REPORT

on

ROOFING SYSTEMS

Under The

CLASSIFICATION PROGRAM

EcoStar, Inc.
Vernon Hills, IL

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GENERAL

INVESTIGATION:

System No. 1 - "Celestial Slate" shingles submitted for Class A over 15/32 in. plywood decks with Type 30 felt and 1/4 in. min. G-P Gypsum Dens-Deck®.

System No. 2 - "Celestial Slate" shingles submitted for Class A over 15/32 in. plywood decks with ELK VERSASHIELD™ underlayment.

Our engineering evaluation plan consisted of conducting Class A Spread of Flame testing on System No. 1 and Class A Intermittent Flame and Class A Burning Brand testing with System No. 2

DESCRIPTION

PRODUCT COVERED:

The product covered by this Report is "Celestial Slate" shingle.

The product in this Report is Listed as to external fire exposure only.

USE:

The product is intended for use as a building material as permitted by authorities having jurisdiction.

TEST RECORD NO. 1

EXAMINATION OF MATERIALS:

The materials used in this investigation were produced under the observation of a Representative of Underwriters Laboratories Inc. The composition of the finished materials is of a proprietary nature. Data on the composition is on file at the Laboratories for use in the Follow-Up Service Program.

Various physical and chemical tests were conducted on the components and finished products. The results developed from these tests were employed in establishing specifications for use in the factory Follow-Up Service Program.

FIRE TESTS:

SAMPLES

System No. 1 - Plywood deck, Type 30 underlayment and "Celestial Slate" shingles nailed in place.

System No. 2 - 15/32 in. plywood deck, one layer ELK VERSASHIELD™ underlayment and "Celestial Slate" shingles nailed in place.

Class A fire tests were conducted on the above samples. These tests were conducted in accordance with the Test Standard ANSI/UL 790, "Tests for Fire Resistance of Roof Covering Materials," (ASTM E-108, "Fire Tests of Roof Coverings").

In the spread of flame and intermittent flame tests described in this Report, the temperature of the test flame, as measured by a No. 14 gauge chromel-alumel wire thermocouple located as described in ANSI/UL Standard 790, was found to be $1400 \pm 50^\circ\text{F}$. The physical appearance of the test flame when the test apparatus was calibrated for flame temperature, was generally triangular in shape, being about 3 ft wide at the deck's leading edge and gradually narrowing to a width of approximately 6 in. at the top of the 52 in. long calibration deck, with licks of flame extending approximately another 1 ft.

The wind velocity required by ANSI/UL 790 was determined by taking readings on a smooth deck (40 in. wide and 52 in. long) midway up the deck at the center and 3 in. from each vertical edge with a vane type anemometer and timer. The velocity measured at an incline of 5 in./ft was found to be 1050 ± 50 ft/min ($12 \pm 1/2$ mi/h) with the carriage in position.

The results of these tests are summarized on the following pages:

SPREAD OF FLAME TEST

<u>Test No.</u>	<u>System No.</u>	<u>Slope of Deck, in./ft</u>	<u>Maximum Flame Spread, ft</u>	<u>Exposure of Roof Deck</u>
1	1	5	5	None
2	1	5	5	None

At no time during these tests were any flying flaming brands of roof covering material produced. Also, there was no significant lateral spread of flame from the path directly exposed to the test flame.

INTERMITTENT FLAME TEST - CLASS A

<u>Test No.</u>	<u>System No.</u>	<u>Slope Of Deck, in./ft</u>	<u>Time of Smoke Underside, min:s</u>	<u>Asphalt Dripping Underside, min:s</u>	<u>Time of Glow Underside, min:s</u>	<u>Depth Of Char, in.</u>	<u>Duration Of Test, Min</u>
3	2	5	9:20	-	70:00	Full	120
4	2	5	14:30	-	70:00	Full	120

At no time during these tests were any flying flaming brands of the roof covering material produced or did exposure of the roof deck occur. Also, at no time during these tests were any sparks or flames noted on the underside of the deck.

BURNING BRAND TEST - CLASS A

<u>Test No.</u>	<u>System No.</u>	<u>Slope Of Deck, in./ft</u>	<u>Time of Smoke Underside, min:s</u>	<u>Asphalt Dripping Underside, Min:s</u>	<u>Time of Glow Underside, min:s</u>	<u>Depth Of Char, in.</u>	<u>Duration Of Test, Min</u>
1	2	5	5:50	None	None	Full	90:00
2	2	5	16:35	None	None	Full	90:00
5	2	5	29:00	None	None	Full	90:00
6	2	5	35:14	None	None	Full	90:00

At no time during these tests were any flying flaming brands of the roof covering material produced or did exposure of the roof deck occur. Also, at no time during these tests were any sparks or flames noted on the underside of the deck.

PRACTICABILITY:

The construction materials used in the roofing systems were readily installed by qualified workers with tools and methods commonly used for construction work of similar nature. Materials and installation procedures in accordance with those previously described in this Report are significant factors in the exterior fire performance of the construction.

CONCLUSION

The following conclusion represents the judgement of Underwriters Laboratories Inc. based upon the results of the examination, tests and data analysis presented in this Report, as they relate to established principles and previously recorded data.

The product covered by this Report is judged to be eligible for Listing and Follow-Up Service. The manufacturer is authorized to use the UL Listing Marking as shown below on such products which comply with the Follow-Up Procedure and any other applicable requirements of Underwriters Laboratories Inc. Only those products which properly bear the UL Listing Marking are considered as Listed by Underwriters Laboratories Inc.

LISTING MARKS

The Listing Marks to be used with the "Celestial Slate" shingles is illustrated below:

LISTING MARK:

LISTED
PREPARED ROOFING MATERIAL
SHINGLES - CLASS A
DEGREE OF RESISTANCE TO EXTERNAL
FIRE AND FLAMMABILITY LIMITS
IN ACCORDANCE WITH UL STANDARD 790
WHEN APPLIED IN ACCORDANCE WITH
INSTRUCTIONS INCLUDED WITH THIS ROOFING

CANADIAN UL MARK:

LISTED ISSUE NO.
PREPARED ROOFING MATERIALS
SHINGLES - CLASS A
DEGREE OF RESISTANCE TO EXTERNAL FIRE
AND FLAMMABILITY LIMITS IN
ACCORDANCE WITH CAN/ULC-S107-M87

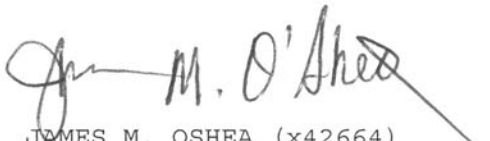
LISTING:

Prepared Roof Covering Materials Listings will be promulgated as described below:

Molded Plastic Shingles for installation as Class A prepared roof covering. Limited to 15/32 in. plywood decks and one layer of 1/4 in. (min) G-P Gypsum Dens-Deck® mechanically fastened with all joints staggered a min of 6 in. from the plywood joints and one ply of Type 30 asphalt felt.


Molded Plastic Shingles for installation as Class A prepared roof covering. Limited to 15/32 in. plywood decks and one ply of ELK VERSASHIELD™ Underlayment.

Report by:



JAMES M. OSHEA (x42664)
Senior Engineering Associate

Reviewed by:



DOUGLAS C. MILLER (X43262)
Engineering Group Leader

Sample Description	Heat Flux kW/m ²	Mounting	Sample Area m ²	Test #	Ignition Time, s	Initial Wt grams	Total Wt Loss grams	Heat of Comb. kJ/g	Avg HRR at 180s kW/m ²	Peak HRR kW/m ²	Total Heat MJ/m ²	Peak SRR m ² Sec.	Total Smoke m ²	Ext. Cross-Sectional Area m ² /g	Test Code
Celestial Slate	35	HEG	0.01	1	53	64.24	43.8	27.4	225.4	245.5	120.0	0.105	37.72	0.861	12080002
Celestial Slate	35	HEG	0.01	2	58	61.77	39.8	27.2	174.8	206.1	108.2	0.079	38.83	0.976	12080003
Celestial Slate	35	HEG	0.01	3	53	68.92	43.2	27.3	190.4	223.7	117.8	0.092	42.59	0.986	12080004
Celestial Slate	35	HEG	0.01	4	56	66.13	44.2	28.0	208.8	231.8	123.9	0.108	45.11	1.021	12080005
Celestial Slate	35	HEG	0.01	5	58	59.88	36.5	28.6	185.7	232.9	104.3	0.097	31.23	0.856	12080006

Range

5

1.4

39.4

0.165

Standard Deviation

2.5

0.6

14.5

0.076

Average

55.6

27.7

228.0

0.940

3 Sigma

7.5

1.8

43.5

0.228

Acceptable FUS Range (Avg ± 3 sigma)

Time to Ignition (sec)	Peak HRR (kW/m ²)	Avg Heat of Combustion (kJ/g)	Extinction Cross-section (m ² g)
63++	272	29	1.17++
48	184++	26++	0.86++

Based on original tests #'s 12080002 to 12080006

Orientation - HEG

Heat Flux (kW/m²) - 35

Test Duration (min) - 15:30

++ - Results which exceed indicated limited do not necessarily constitute failure, - advise Conformity Assessment Services, 3011, Sec. E.