SGS U.S. Testing Company Inc.

5555 Telegraph Road • Los Angeles, CA 90040 • Tel: 323-838-1600 • Fax: 323-722-8251

CLIENT: NU-LOK ROOFING SYSTEMS
711 South Carson Street
Carson City, NV 89701
Michael O'Connell

Test Report No:	172589-1	**Date:**	January 22, 2003

SAMPLE ID: The Client submitted and identified the following test material as Nu-Lok Roofing System.

DATE OF RECEIPT: Entered into SGS USTC sample tracking system on November 11, 2002 as STN 35600.

TESTING PERIOD: November 18, 2002.

AUTHORIZATION: Testing authorized by Michael O'Connell.

TEST REQUESTED: Conduct a series of Class A roof fire tests, burning brand, intermittent flame and spread of flame on the submitted roofing system in accordance with the methods and procedures outlined in ASTM Test Method E108-00, "Standard Method of Fire Tests of Roof Coverings." This test method is comparable to the Standard Specification 790 of the Underwriters Laboratories, Inc., and the Uniform Building Code, Standard No. 15-2

TEST RESULTS: Pass. See detailed results on page 2 through 3.

CONCLUSION: The Nu-Lok Roofing System identified in this report, meets the Class A requirements when tested in accordance with ASTM E108-00, "Standard Test Methods for Fire Tests of Roof Coverings." This report is applicable to the installation of this system as a Class A roof at a slope not to exceed 5" per horizontal foot. Variations in the construction or installation sequence details are beyond the scope of this report.

Tested by

Brian Ortega
Test Technician

Signed for and on behalf of SGS U.S. Testing Company Inc.

Greg Banasky
Supervisor Fire Technology

TEST DECK PREPARATION: The test decks were constructed by the Laboratory. Eight test decks, two for the intermittent flame, two for the spread of flame and four for the burning brand were constructed from 2" by 4" lumber and 1/2" ACX plywood. The installation of the roofing system was witnessed by Laboratory personnel. The system consists of the following components: A) Two plies of 40 pound mineral cap sheet, B) Metal battens mechanically fastened to the test deck, C) Tile clips and D) Ceramic roofing tiles.

TEST RESULTS AND OBSERVATIONS:

Burning Brand - Class A - Four Test Decks

Wind Velocity	12 ± .5 MPH
Test Deck Slope	5" per Horizontal Foot
Class A Brands	Size: 12" x 12" x 2.25"
	One per test deck

OBSERVATIONS: All four of the burning brand decks performed in a similar manner. Following placement of the brand on the roofing system surface, popping of the tiles was noted. Ignition of the cap sheet was observed within 7 minutes of brand placement. Smoking from the underside of the deck occurred within 12 minutes of brand placement. Moderate charring of the underside surface was noted. Sustained flaming did not occur.

Intermittent Flame- Class A - Two Test Decks

Wind Velocity	12 ±.5 MPH
Flame Temperature	1400 ±50 ° F
Test Deck Slope	5" per Horizontal Foot
Cycling Periods	15 cycles - Flame ON-2 min.
	Flame OFF-2 min.

OBSERVATIONS: Both test decks performed in a similar manner. Ignition **did not** occur during any of the flame on cycles.

SGS U.S. Testing Company Inc.

Report No.: 172589-1
Date: January 22, 2003

CLIENT: NU-LOK ROOFING SYSTEMS

TEST RESULTS AND OBSERVATIONS:

Spread of Flame- Class A - Two Test Decks

Wind Velocity 12 ±.5 MPH

Flame Temperature 1400 ±50 ° F

Test Deck Slope 5" per Horizontal Foot

TEST RESULTS:	Deck No. 1	Deck No. 2
Ignition Time	Did Not Ignite	Did Not Ignite
Maximum Spread of Flame	N/A	N/A
Time to Maximum Spread	N/A	N/A
Lateral Spread of Flame	N/A	N/A

N/A = Not Applicable

OBSERVATIONS: The two spread of flame decks performed nearly identical. Ignition **did not** occur during the flame application.

CONDITIONS OF ACCEPTANCE FOR CLASSIFICATION BY ASTM E108

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 floor.
4. At no time during the Class A intermittent flame or Class A burning brand tests shall there be sustained flaming of the underside of the deck.
5. At the conclusion of the spread of flame tests, the flaming shall not have spread beyond 6 feet for Class A and there shall have been no significant lateral spread of flame from the path directly exposed to the test flame.

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End of Report

SGS

CLIENT: **NU-LOK ROOFING SYSTEMS**
711 South Carson Street, Suite 4
Carson City, NV 89701
Attn: Michael O'Connell

Test Report No: 175543-03 **Date: July 24, 2003**

SAMPLE ID: The following test material was submitted and identified by the Client:

Five, Ceramic Roof Tiles measuring approximately 16 inches square by ¼-inch thick and weighing approximately 6½ pounds each.

DATE OF RECEIPT: Entered into SGS U.S. Testing Company sample tracking system on November 11, 2002 and were assigned Sample Tracking Number 35600.

TESTING PERIOD: April 8 through July 18, 2003.

AUTHORIZATION: Order Confirmation (Job Ticket) dated March 20, 2003.

TEST REQUESTED: Perform freeze-thaw test in accordance with Section 4.5 of ICBO ES Acceptance Criteria for Clay and Concrete Roof Tiles, AC 180, January 2002 (Effective February 1, 2002). Test Method: ASTM C 67-87, "Standard Test Methods for Sampling and Testing of Brick and Structural Clay Tile".

TEST RESULTS: See page 2

CONCLUSION: The ceramic roof tiles complied with the requirements of Section 3 1.8 of ICBO ES Acceptance Criteria for Clay and Concrete Roof Tiles, AC 180, January 2002 (Effective February 1, 2002).

Prepared By

Larry Burmer
Project Engineer

Signed for and on behalf of SGS U.S. Testing Company Inc.

Greg Wrona
Manager, Hardlines

SGS

Report No.: 175543-03
Date: July 24, 2003
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CLIENT: NU-LOK ROOFING SYSTEMS

FREEZE-THAW TEST PER SECTION 4.5 OF ICBO ES AC 180

Test Procedure: Testing was performed in accordance with Section 8 of ASTM C 67-87. Five tiles were prepared for the test by sawing off one edge of the tile. The tiles were then subjected to 50 cycles of freezing and thawing with one cycle consisting of freezing for 20 hours followed by thawing in water for 4 hours. The tiles were examined periodically during the test for breakage and disintegration.

Requirements: No breakage and no greater than 1 percent loss in dry weight of any individual tile shall occur.

Results:

Tile #	Weight Loss (%)	Observations
1	0	No breakage or disintegration of the tile occurred.
2	0	No breakage or disintegration of the tile occurred.
3	0	No breakage or disintegration of the tile occurred.
4	0	No breakage or disintegration of the tile occurred.
5	0	No breakage or disintegration of the tile occurred.
Average:	0	

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End of Report

SGS U.S. Testing Company Inc.

CLIENT: **NU-LOK ROOFING SYSTEMS**
711 South Carson Street
Carson City, NV 89701
Attn: Michael O'Connell

Test Report No: 172940 **Date: February 24, 2003**

SAMPLE ID: The Client identified as submitted ceramic roof tiles.

DATE OF RECEIPT: The samples were received on November 11, 2002 and were assigned Sample Tracking Number 35600.

TESTING PERIOD: December 16, 2002.

AUTHORIZATION: Authorization on November 27, 2002.

TEST(S) REQUESTED: ICBO "Acceptance Criteria for Clay and Concrete Roof Tiles" AC180 , January 2002. Section 3.1.4 Installed Weight.

TEST RESULTS: The installed weight of the tile was 4.8 pounds per square foot. With fastening and attachments the system was 5.6 pounds per square foot.

Testing Conducted By

Youlong Mao
Technician

Signed for and on behalf of
SGS U.S. Testing Company Inc.

Tom Clark
Manager, Mechanical
Evaluation Services

INSTALLED WEIGHT

Procedure:

Twelve tiles were weighed. The weighed tiles were placed on a flat, ridged surface with tight side laps and head laps as specified in the manufactures instructions. The total length (L) and width (W) coved by the tile was then measured. The effective length was the measured length minus the head lap. The effective width was the measured width minus the side lap. The effective area was calculated.

The tiles were put into an oven maintained at 221 ° F +/- 4 ° F for 24 hours. The tiles were removed and weighed. The unit dry weight is determined by adding the weights of each oven dry tile and dividing the total weight by the calculated effective area.

Results:

Effective Area of the tile, 17.5 square feet
Dry weight of the tile, 84 pounds

Installed Weight, 4.8 pounds per square foot (tile only)

Installed Weight, 5.6 pounds per square foot (w/system)

Weight of the Attachment System, 0.81 pounds per square foot (system only)

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End of Report

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CLIENT: **NU-LOK ROOFING SYSTEMS**
711 South Carson Street, Suite 4
Carson City, NV 89701
Attn: Michael O'Connell

Test Report No:	**175543-02**	**Date: April 23, 2003**

SAMPLE ID: The following test material was submitted and identified by the Client:

Five, Ceramic Roof Tiles measuring approximately 16 inches square by ¼-inch thick and weighing approximately 6½ pounds each.

DATE OF RECEIPT: Entered into SGS U.S. Testing Company sample tracking system on November 11, 2002 and were assigned Sample Tracking Number 35600.

TESTING PERIOD: April 16 through 23, 2003.

AUTHORIZATION: Order Confirmation (Job Ticket) dated March 20, 2003.

TEST REQUESTED: Perform water absorption test in accordance with Section 3.1.3 of ICBO ES Acceptance Criteria for Clay and Concrete Roof Tiles, AC 180, January 2002 (Effective February 1, 2002) for compliance with Section 15.506.2 of the 1997 UBC Standard 15-5.

TEST RESULTS: See page 2

CONCLUSION: The ceramic roof tiles complied with the requirements of Section 15.506.2 of the 1997 UBC Standard 15-5 for water absorption.

Prepared By

Larry Burmer
Project Engineer

Signed for and on behalf of
SGS U.S. Testing Company Inc.

Tom Clark
Manager, Mechanical Evaluation

CLIENT: NU-LOK ROOFING SYSTEMS

WATER ABSORPTION TEST PER SECTION 15.506.2 OF THE 1997 UBC STANDARD 15-5

Test Procedure: Five sample pieces weighing not less than 12 pounds (5.4 kg) were taken from the tiles fractured in the strength test (Report Number 175543-01). The sample pieces were dried in an oven for 24 hours at 221°F (105°C) removed and allowed to cool in a desiccator for 15 minutes. The samples were then weighed to the nearest 0.01 grams. The samples were then immersed in distilled water maintained at 68°F (20°C) for 48 hours. The samples were individually removed from the water; the surfaces wiped dry and weighed immediately.

Requirement: No sample shall absorb more than 15 percent water of its dry weight.

Results:

Tile #	Water Absorption (%)
1	0.2
2	0.2
3	0.2
4	0.2
5	0.2

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End of Report

SGS

CLIENT: NU-LOK ROOFING SYSTEMS
711 South Carson Street, Suite 4
Carson City, NV 89701
Attn: Michael O'Connell

Test Report No: 175543-01	Date: April 23, 2003

SAMPLE ID: The following test material was submitted and identified by the Client:

Five, Ceramic Roof Tiles measuring approximately 16 inches square by ¼-inch thick and weighing approximately 6½ pounds each.

DATE OF RECEIPT: Entered into SGS U.S. Testing Company sample tracking system on November 11, 2002 and were assigned Sample Tracking Number 35600.

TESTING PERIOD: April 16 through 23, 2003.

AUTHORIZATION: Order Confirmation (Job Ticket) dated March 20, 2003.

TEST REQUESTED: Perform strength test in accordance with Section 3.1.2 of ICBO ES Acceptance Criteria for Clay and Concrete Roof Tiles, AC 180, January 2002 (Effective February 1, 2002) for compliance with Section 15.506.1 of the 1997 UBC Standard 15-5.

TEST RESULTS: See page 2

CONCLUSION: The ceramic roof tiles complied with the requirements of Section 15.506.1 of the 1997 UBC Standard 15-5 for strength.

Prepared By

Larry Burmer
Project Engineer

Signed for and on behalf of SGS U.S. Testing Company Inc.

Tom Clark
Manager, Mechanical Evaluation

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CLIENT: NU-LOK ROOFING SYSTEMS

STRENGTH TEST PER SECTION 15.506.1 OF THE 1997 UBC STANDARD 15-5

Test Procedure: To simulate actual in field installation, the tiles were individually supported on the Client's metal batten support system. A load was applied through a 2 x 4 wood piece placed midway between and parallel to the supporting battens. The load was applied at a uniform rate not exceeding 10 pounds per second until failure.

Requirement: The average breaking load shall not be less than 300 pounds (1335 N) for five consecutively tested samples or 250 pounds (1110 N) for any individual sample.

Results:

Tile #	Breaking Load (lbs)
1	677
2	783
3	556
4	642
5	711
Average:	674

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End of Report