

APPROVAL REPORT

EVALUATION OF MS LIQUID APPLIED ROOF COVER SYSTEM IN VARIOUS ASSEMBLIES OVER SECUROCK

Prepared for:

**Adurel International Inc.
820 Water Street
Racine, WI 53403**

Project ID: 3029843

Class: 4470

Date of Approval:

December 20, 2007

Authorized by:


George A. Smith, P.E., Director/AVP

**EVALUATION OF MS LIQUID APPLIED ROOF COVER
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from

**ADUREL INTERNATIONAL INC
820 WATER STREET
RACINE, WI 53403**

I INTRODUCTION

- 1.1 Adurel International Inc submitted their MS Liquid Applied Roof Cover System to determine if it meets the approval requirements of the **Standard** listed below for Class 1 roof covers when used in the constructions described in the **EXAMINATION AND TESTS** section of this report.
- 1.2 This report may be reproduced only in its entirety and without modification.
- 1.3 **Standard:**

Title	Class Number	Date
Class 1 Roof Covers	4470	April, 1986

- 1.4 Examination included simulated wind uplift pressure tests, simulated wind uplift pull tests, external spread of flame tests, hail damage tests, foot traffic tests and leakage tests. Additional testing was conducted under FM Approvals 3023458 and released to Adurel International Inc by United States Gypsum Company for use in this program.
- 1.5 Tests show that the Adurel International Inc liquid applied roof cover, as tested, meets the Approval requirements of the **Standard** listed above for Class 1 roof covers.
- 1.6 **Listings:** The tested constructions meet the Approval criteria of FM Approvals when installed in as specified in the **CONCLUSIONS** of this report. The products will be listed in RoofNav.

II DESCRIPTIONS

- 2.1 MS2100 is a premium SEBS modified liquid membrane with ultra low permeability. MS2100 is gray in color and is used as a base coat in the MS liquid applied roof cover system. MS2100 comes in 5 gal (22.73 L) or 55 gal (250.04 L) containers.
- 2.2 MS2200 is a premium SEBS modified liquid membrane with ultra low permeability. MS200 is used as a coating over MS2100 and is white in color. MS2200 comes in 5 gal (22.73 L) or 55 gal (250.04 L) containers.
- 2.3 Adurel Death-Grip Seam Tape is a self adhering laminate of adhesive/sealant and a high strength stitchbonded polyester fabric. The adhesive/sealant is a patented, cured butyl-based permanently pressure sensitive material. Death-Grip Seam Tape is available in standard roll form in widths of 2 in., 4 in., and 6 in. The nominal thickness of the adhesive is 0.010 in. Other widths and adhesive

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thicknesses are also available on a special order basis. All products are supplied on a high strength, specially-formulated release liner.

- 2.4 All other products are as described in RoofNav. Proprietary formulations, specifications, and drawings are on file at FM Approvals.

III EXAMINATIONS AND TESTS

- 3.1 Samples were submitted for examination and testing as follows:

- 3.1.1 Tests conducted were as required by the Standard listed in paragraph 1.3 above. All other testing was waived because of the previous satisfactory performance of the components in prior Approval programs.
- 3.1.2 All components incorporated into the test sample were selected by FM Approvals personnel. The test samples were prepared by, or under the supervision of, FM Approvals personnel.
- 3.1.3 All data is on file at FM Approvals under Project ID 3029843 and Project ID 3023458 along with other documents and correspondence applicable to this program.

3.2 ASTM E 108 Spread of Flame Tests

- 3.2.1 The fire tests from above the roof cover were conducted in accordance with ASTM E108 Spread of Flame Tests.

3.2.1.1 Sample size was 3-1/3 by 8 ft. (1.0 by 2.4 m).

3.2.1.2 The wind velocity over the top of the standard panel was adjusted to 12 ± 0.5 mph (5.3 ± 0.2 m/s).

3.2.1.3 Flame exposure: The flame was adjusted to $1400 \pm 50^\circ\text{F}$ ($760 \pm 28^\circ\text{C}$) for Class A tests. The flame temperature was measured by a thermocouple located 1 in. (25.4 mm) above the surface of the standard panel and 1/2 in. (13 mm) toward the flame source from the lower edge of the standard panel. The flame was applied to each test panel for 10 minutes.

3.2.1.4 During and after the application of the flame, each panel was observed for the distance of maximum flame spread, glowing brands and other damage.

- 3.2.2 Three 3-1/3 by 8 ft. (1.0 by 2.4 m) test samples were prepared. The components and sequence of installation were as follows:

Samples 1, 2;

- 1/2 in. (12.7 mm) plywood
- 2 in. (50.8 mm) thick AC Foam II, loose laid
- 1/2 in. (12.7 mm) SECUROCK roof board, mechanically fastened
- MS2200 coating applied at a rate of 1 gal/sq (0.41 l/sq m). When base coating cured, MS2200 coating was applied at a rate of 1.5 gal/sq (0.6 l/sq m)

Sample 3:

- 1/2 in. (12.7 mm) plywood
- 2 in. (50.8 mm) thick AC Foam II, loose laid

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- 1/2 in. (12.7 mm) SECUROCK roof board, mechanically fastened
- MS2200 coating applied at a rate of 1 gal/sq (0.41 L/sq m). When base coating cured, MS2200 coating was applied at a rate of 1.5 gal/sq (0.61 L/sq m)
- 4 in (101.6 mm) wide Death-Grip Seam Tape adhered up the center of the sample

3.2.3 The results of the ASTM E108 Spread of Flame tests were as follows:

Sample No.	Slope	Max. Flame Spread	Rating
1	2 in 12	3 ft 1 in (0.94 m)	Class A*
2	2 in 12	3 ft 4 in (1.02 m)	Class A
3	2 in 12	3 ft 4 in (1.02 m)	Class A

*confirming test of Class A rating for a 2 in 12 slope

Deck exposure, flying brands and significant lateral flame spread were not observed during the tests.

3.3 FM Approvals 5x9 ft (1.5x2.7 m) Simulated Wind Uplift Pressure Tests

3.3.1 Tests were conducted using the FM Approvals Uplift Pressure Test Apparatus to evaluate the ability of the above deck components of the roofing system to resist a minimum simulated wind uplift pressure of 60 psf (2.9 kPa) without failure of the assemblies.

3.3.1.1 The simulated wind uplift pressure tests utilized a 9 ft. (2.7 m) long by 5 ft. (1.5 m) wide by 2 in. (51 mm) deep steel pressure vessel arranged to apply air pressure at pre-established standard rates to the underside of the test sample which formed the top of the pressure vessel. The vessel was pressurized with compressed air.

3.3.1.2 A net pressure of 30 psf (1.4 kPa) was applied to the test sample and maintained for 1 minute. The pressure was increased to 45 psf (2.2 kPa), then to 60 psf (2.9 kPa) and held for 1 minute at each increment. The pressure was increased in increments of 15 psf (0.7 kPa) every minute until failure occurred.

3.3.2 Two 5x9 ft. (1.5x2.7 m) samples were prepared. The components, sequence of installation and test results were as follows:

Sample 1:

- FM Approved 22 gauge steel deck
- 1/2 in. (12.7 mm) SECUROCK roof board, loose laid
- 2 in (50.8 mm) thick AC Foam II, loose laid
- 5/8 in (16 mm) SECUROCK roof board, 4 x 4 ft. (1.2 x 1.2 m), mechanically fastened at 1 fastener per 4 sq ft (0.37 sq m) with OMG 3 in. Galvalume Steel Plates and OMG #12 Standard fasteners
- MS2200 base coating applied at a rate of 1 gal/sq (0.41 L/sq m). After base coating cured, 2 in (50.8 mm) wide Death-Grip Seam Tape was self adhered over the joints. MS2200 coating was then applied at a rate of 1 gal/sq (0.41 L/sq m)

Test Result: The test sample met the 90 psf (4.3 kPa) minimum FM Approvals requirements

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for Class 1-90 windstorm classification. The construction failed after maintaining a load of 105 psf (5.0 kPa) for 20 seconds. The SECUROCK roof board cracked around a stress plate.

Sample 2:

- FM Approved 22 gauge steel deck
- 1/2 in. (12.7 mm) SECUROCK roof board, loose laid
- 2 in (50.8 mm) thick AC Foam II, loose laid
- 1/2 in (12.7 mm) SECUROCK roof board, 4 x 4 ft. (1.2 x 1.2 m), mechanically fastened at 1 fastener per 2.67 sq ft (0.25 sq m) with OMG 3 in. Galvalume Steel Plates and OMG #12 Standard fasteners
- MS2200 coating applied at a rate of 1 gal/sq (0.41 L/sq m). After base coating cured, 2 in (50.8 mm) wide Death-Grip Seam Tape was self adhered over the joints. MS2200 coating was then applied at a rate of 1 gal/sq (0.41 L/sq m)

Test Result: The test sample met the 90 psf (4.3 kPa) minimum FM Approvals requirements for Class 1-90 windstorm classification. The construction failed after maintaining a load of 120 psf (5.7 kPa) for 6 seconds. The SECUROCK roof board cracked between fasteners. Roof constructions tested using this test method are limited by FM Approvals to a maximum windstorm classification of Class 1-90.

3.4 FM Approvals 2x2 ft (0.61x0.61 m) Simulated Wind Uplift Pull Test

3.4.1 Testing was conducted using the FM Approvals Uplift Pull Test Apparatus to evaluate the ability of the above deck components of the roofing system to resist a minimum simulated wind uplift pressure of 60 psf (2.9 kPa) without failure of the assembly.

3.4.1.1 The simulated wind uplift pull test utilized a loading device supported by a steel frame to apply an uplift force to each test sample via a 2x2 ft (0.6x0.6 m) plywood form secured to the top of the test panel with an adhesive. The uplift force was applied perpendicular to the test panels and was monitored with a calibrated load cell.

3.4.1.2 A net uplift force equivalent to an uplift pressure of 30 psf (2.9 kPa) was applied to the test sample and maintained for 1 minute. The force was increased to the equivalent of 45 psf (4.3 kPa), then to the equivalent of 60 psf (5.7 kPa) and held for 1 minute at each increment. The force was increased in increments equivalent to 15 psf (0.7 kPa) every minute until failure occurred.

3.4.2 One test sample was prepared. The components, sequence of installation and test results were as follows:

Sample 1:

- Structural concrete deck
- 1/2 in. (12.7 mm) SECUROCK roof board, adhered with Weather-Tite One Step Foamable Adhesive in 3/4 in. (19mm) ribbons in rows of 12 in. (305 mm) o.c.
- MS2200 coating applied at a rate of 1 gal/sq (0.41 L/sq m). When base coating cured, MS2200 coating was applied at a rate of 1.5 gal/sq (0.61 L/sq m)

Test Result: The test sample met the 990 psf (47.4 kPa) minimum FM Approvals requirement

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for Class 1-990 windstorm classification. The construction components did not fail for the duration of the test.

3.5 FM Approvals Simulated Hail Damage Tests

3.5.1 Tests were conducted using the FM Approvals Simulated Hail Damage Test Apparatus to evaluate the ability of the roof covers to withstand a hailstorm without damage to the membrane.

3.5.1.1 For the severe hail damage tests, a 1¼ in. (49 mm) diameter steel ball weighing 0.79 lbs. (0.359 kg) was dropped on the test sample from a 17 ft 9½ in. (5.42 m) height through a 3¾ in. (0.86 m) length of PVC pipe with a 2 in. (51 mm) inside diameter. This procedure was repeated several times on various sections of the sample. After each drop the sample was inspected for damage to the weatherproof membrane. Following initial testing, the sample was conditioned (weathered) for 1000 hours in the FM Approvals Ultraviolet Weatherometer. The initial procedure was then repeated on the conditioned sample.

3.5.1.2 After each drop, the sample is inspected and there must be no evidence of splitting, delamination or rupture of the roof cover.

3.5.2 One 2x4 ft. (0.6x1.2 m) sample was prepared. The components and sequence of installation were as follows:

Sample No.1:

- 1/2 in. (12.7 mm) SECURROCK
- MS2200 coating applied at a rate of 1 gal/sq (0.41 L/sq m). When base coating cured, MS2200 coating was applied at a rate of 1.5 gal/sq (0.61 L/sq m)

3.5.3 No damage to the roof cover test sample described in 3.5.2 above was observed after each drop of the simulated hail impactor before or after conditioning (weathering).

3.6 FM Approvals Resistance to Foot Traffic Tests

3.6.1 Tests were conducted using the FM Approvals Resistance to Foot Traffic Test Apparatus to evaluate the ability of the roof cover/insulation combinations to resist simulated foot traffic without damage.

3.6.1.1 A 3 in. (76 mm) square steel plate with rounded corners was centered on the centerline of a 12 in. (305 mm) square horizontal test panel. A 200 lb. (91 kg) load was imposed on the plate and then removed. This cycle was repeated four additional times. Penetration and residual readings were taken after each cycle without removing the plate. The roof covers were inspected for damage after the last cycle at the steel plate interface.

3.6.1.2 There must be no tearing or cracking of the roof cover causing exposure of plastic, glass fiber, foam or other compressible core materials.

3.6.2 One sample was prepared. The components and sequence of installation were as follows:

Sample No.1:

- 1/2 in. (12.7 mm) SECURROCK
- MS2200 coating applied at a rate of 1 gal/sq (0.41 L/sq m). When base

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coating cured, MS2200 coating was applied at a rate of 1.5 gal/sq (0.61 l/sq m)

3.6.3 No damage to the roof cover test sample described in 3.6.2 above was observed after the tests.

3.7 FM Approvals Susceptibility to Leakage Test

3.7.1 A test was conducted in accordance with the FM Approvals Susceptibility to Leakage Test Procedure to evaluate the ability of the roof cover to resist leakage of water under the conditions of the test.

3.7.1.1 The test apparatus consists of top and bottom sections which are bolted or clamped together with the specimen being evaluated placed as a diaphragm between the sections. The top and bottom sections consist of 9-1/4 in. (235 mm) diameter cap cemented to 7-3/4 in. (197 mm) clear acrylic pipe. An 11-5/8 in. (295 mm) diameter pipe flange is cemented to the other end of each pipe section. Both top and bottom sections are bolted or clamped together at the flanges with the cover being evaluated placed between them. The apparatus is fabricated to allow both a standing head of water above and additional air pressure below the test sample. Each section is fabricated with two 1/2 in. (13 mm) diameter pipe outlets to allow connection of an air pressure source and a pressure gauge.

3.7.1.2 After conditioning (weathering) for 1000 hours in the FM Approvals Ultraviolet Weatherometer, a 10 in. (254 mm) diameter specimen was cut from the sample and bolted or clamped in place between the flanges of the test apparatus. Water was placed over the sample to a depth of 6 in. (152 mm) and maintained for a period of 7 days. At the end of the 7 day period, air was introduced below the sample at a pressure of 1 psi (6.3 kpa) and cycled 25 times from 1 psi (6.3 kpa) to ambient.

3.7.1.3 There must be no signs of water leakage during the 7 day period or during or after the pressure cycles following the exposure.

3.7.2 One 18 in. (460 mm) diameter panel of MS2200 liquid applied roof cover was prepared. The components and sequence of installation are as follows.

Sample No. 1:

- Plastic sheeting
- MS2200 coating applied at a rate of 1 gal/sq (0.41 L/sq m). When base coating cured, MS2200 coating was applied at a rate of 1.5 gal/sq (0.61 l/sq m)
- When dry, the MS2200 roof cover system was peeled off the plastic sheeting and tested singly as a membrane layer

3.7.3 No signs of water leakage through the roof cover test sample described in 3.7.2 above was observed during the 7 day exposure to a head of water during or after the pressure cycles following the exposure.

IV MARKING

4.1 The manufacturer shall mark each bucket, drum or packing container with the manufacturer's name and product trade name. In addition, the bucket, drum or container must be marked with the

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Approval Mark of FM Approvals.

- 4.2 Markings denoting Approval by FM Approvals shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under the FM Approvals Facilities and Procedures Audit program.
- 4.3 The manufacturer agrees that use of the FM Approvals name or Approval Mark is subject to the conditions and limitations of the Approval by FM Approvals. Such conditions and limitations must be included in all references to Approval by FM Approvals.

V REMARKS

- 5.1 The securement of the roof system must be enhanced at the building corners and perimeter as outlined in FM Global Property Loss Prevention Data Sheet 1-29.
- 5.2 The roof covers must be installed using an FM Approved roof perimeter flashing system. See RoofNav for details.

VI FACILITIES AND PROCEDURES AUDITS

Adurel International Inc manufacturing locations in Chicago, IL and Ashland, OH are subject to periodic audit inspections to determine that the quality and uniformity of the materials have been maintained and will provide the same level of performance as originally FM Approved. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.

VII MANUFACTURER'S RESPONSIBILITIES

- 7.1 To assure compliance with his procedures in the field, the manufacturer shall supply to the roofer such necessary instruction or assistance required to produce the desired performance achieved in the tests.
- 7.2 The manufacturer shall notify FM Approvals of any planned change in the FM Approved products, prior to general sale or distribution, using Form 797, FM Approved Product Revision Report.

VIII DOCUMENTATION

The following documents describe the products and are filed under Project ID 3029843.

Document	Issue or Revision	Description
Facilities and Procedures Audit Manual (Chicago, IL)	November, 2007	FPA Manual
Facilities and Procedures Audit Manual (Ashland, OH)	November, 2007	FPA Manual

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IX CONCLUSIONS

9.1 Test results from this, and previous programs indicate that the Adurel International Inc liquid applied roof cover meets the Standard 4470 Approval requirements for Class 1 Roof Covers when installed in the following constructions.

Roof Cover:	MS Liquid Applied Roof Cover System
Application:	MS2100 coating applied at a rate of 1 gal/sq (0.41 L/sq m). After base coating cured, minimum 2 in. (50.8 mm) Adurel Death-Grip Seam Tape is self adhered over the joints. MS2200 coating is then applied at a rate of 1.5 gal/sq (0.61 L/sq m)
Decks:	Steel, Concrete
Hail:	SH
ASTM E108:	Class A at 2 in 12

Construction #1: Deck: Structural Concrete (New). Insulation: Minimum 2 in. (51 mm) thick AC Foam-II, H-Shield, or ENRGY 3 insulation, adhered with hot asphalt in full coverage at 25 lb/sq (1.2 kg/m²) or Insta-Stik Roofing Adhesive, OlyBond 500 Adhesive Fastener, TITSEET Roofing Adhesive, Adurel AF15 Adhesive Foam Adhesive, or Weather-Tite One-Step Foamable Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, adhered with hot asphalt in full coverage at 25 lb/sq (1.2 kg/m²) or Insta-Stik Roofing Adhesive, OlyBond 500 Adhesive Fastener, TITSEET Roofing Adhesive, Adurel AF15 Adhesive Foam Adhesive, or Weather-Tite One-Step Foamable Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-495.

Construction #2: Deck: Structural Concrete (New). Insulation: Minimum 2 in. (51 mm) thick ISO 95+ GL insulation, adhered with hot asphalt in full coverage at 25 lb/sq (1.2 kg/m²) or Insta-Stik Roofing Adhesive, Adurel AF15 Adhesive Foam Adhesive, Weather-Tite One-Step Foamable Adhesive, or Pliodeck Insulation Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, adhered with hot asphalt in full coverage at 25 lb/sq (1.2 kg/m²) or Insta-Stik Roofing Adhesive, Adurel AF15 Adhesive Foam Adhesive, Weather-Tite One-Step Foamable Adhesive, or Pliodeck Insulation Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-435 when using Pliodeck Insulation Adhesive or Class 1-495 when using other adhesives.

Construction #3: Deck: Steel (new). Thermal Barrier: Minimum ½ in. (13 mm) thick SECUROCK, loose laid. Insulation: Minimum 1 in. (25 mm) BASF or Huntsman 1 pc f EPS board, loose laid. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, minimum 4 x 4 ft. (1.2 x 1.2 m) board, mechanically fastened at 1 fastener per 2.67 ft² (0.25 m²) with any of the fasteners listed below. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-75.

Fasteners: OMG 3 in. Galvalume Steel Plate and OMG #12 Standard or OMG #14 Heavy Duty Fasteners, Dekfast Galvalume Steel Hex or Dukfast Galvalume 3 in. Round with Dekfast #12 or #14, or Tru-Fast MP-3 Round with Tru-Fast DP.

Construction #4: Deck: Steel (new). Thermal Barrier: Minimum ½ in. (13 mm) thick SECUROCK, loose laid. Insulation: Minimum 1 in. (25 mm) BASF or Huntsman 1 pc f EPS board, loose laid. Cover Board: Minimum ¾ in. (16 mm) thick SECUROCK, minimum 4 x 4 ft.

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(1.2 x 1.2 m) board, mechanically fastened at 1 fastener per 4 ft² (0.37 m²) with any of the fasteners listed in Construction #3. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-90.

Construction #5: Deck: Steel (new). Insulation: Minimum 2 in. (51 mm) thick AC Foam-II, H-Shield, or ENRGY 3 insulation, minimum 4 x 4 ft. (1.2 x 1.2 m) board, mechanically fastened at 1 fastener per 4 ft² (0.37 m²) with any of the fasteners listed in Construction #3. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, adhered with Insta-Stik Roofing Adhesive, OlyBond 500 Adhesive Fastener, TITSEET Roofing Adhesive, Adurel AF15 Adhesive Foam Adhesive, or Weather-Tite One-Step Foamable Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-75.

Construction #5a: Deck: Steel (new). Insulation: Minimum 2 in. (51 mm) thick ISO 95+ GL insulation, minimum 4 x 4 ft. (1.2 x 1.2 m) board, mechanically fastened at 1 fastener per 4 ft² (0.37 m²) with any of the fasteners listed in Construction #3. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, adhered with Insta-Stik Roofing Adhesive Adurel AF15 Adhesive Foam Adhesive, or Weather-Tite One-Step Foamable Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-75.

Construction #6: Deck: Steel (new). Insulation: Minimum 1.5 in. (38 mm) thick AC Foam-II or ENRGY 3 insulation, minimum 4 x 4 ft. (1.2 x 1.2 m) board, mechanically fastened at 1 fastener per 2 ft² (0.19 m²) with any of the fasteners listed in Construction #3. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, adhered with Insta-Stik Roofing Adhesive, OlyBond 500 Adhesive Fastener, TITSEET Roofing Adhesive, Adurel AF15 Adhesive Foam Adhesive, or Weather-Tite One-Step Foamable Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-90.

Construction #6a: Deck: Steel (new). Insulation: Minimum 1.5 in. (38 mm) thick H-Shield insulation, minimum 4 x 4 ft. (1.2 x 1.2 m) board, mechanically fastened at 1 fastener per 2 ft² (0.19 m²) with any of the fasteners listed in Construction #3. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, adhered with Insta-Stik Roofing Adhesive or TITSEET Roofing Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-90.

Construction #7: Deck: Steel (new). Insulation: Minimum 2 in. (51 mm) AC Foam-II, H-Shield, or ENRGY 3 roof insulation, minimum 4 x 4 ft. (1.2 x 1.2 m) board, mechanically fastened at 1 fastener per 2.67 ft² (0.37 m²) with any of the fasteners listed in Construction #3. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, adhered with Insta-Stik Roofing Adhesive, OlyBond 500 Adhesive Fastener, TITSEET Roofing Adhesive, Adurel AF15 Adhesive Foam Adhesive, or Weather-Tite One-Step Foamable Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-90.

Construction #7a: Deck: Steel (new). Insulation: Minimum 2 in. (51 mm) ISO 95+ GL, minimum 4 x 4 ft. (1.2 x 1.2 m) board, mechanically fastened at 1 fastener per 2.67 ft² (0.37 m²) with any of the fasteners listed in Construction #3. Cover Board: Minimum ½ in. (13 mm) thick SECUROCK, adhered with Insta-Stik Roofing Adhesive Adurel AF15 Adhesive Foam Adhesive, or Weather-Tite One-Step Foamable Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof

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Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-90.

Construction #8: Deck: Structural Concrete (new), Insulation: Minimum ½ in. (13 mm) thick SECUROCK, adhered with hot asphalt in full coverage at 25 lb/sq (1.2 kg/m²), Insta-Stik Roofing Adhesive Adurel AF15 Adhesive Foam Adhesive, or Weather-Tite One-Step Foamable Adhesive in ¼ in. (19 mm) ribbons spaced 12 in. (305 mm) o.c. Roof Cover: MS Liquid Applied Roof Cover system is applied as outlined above. Meets Class 1-990 with Weather-Tite One-Step Foamable Adhesive or Adurel AF15 Adhesive. Meets Class 1-495 with hot asphalt or Insta-Stik.

- 9.2 Tests show that the tested roof constructions in and of themselves would not create a need for automatic sprinklers.
- 9.3 Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.
- 9.4 Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.

TESTING SUPERVISED BY: Michael Burke

PROJECT DATA RECORD: 3029843

ORIGINAL TEST DATA: 3023458, 3029843

ATTACHMENTS: none

REPORT BY:



Michael Burke.
Engineer - Materials Group

REPORT REVIEWED BY:



Phillip J. Smith P.E.
Technical Team Manager - Materials Group